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FINAL REPORT

Environmental and Social Impact Assessment (ESIA)

For

INITIAL PHASE POWER PLANT

DAWEI SEZ INITIAL PHASE DEVELOPMENT

Volume I

Prepared by

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ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ

သယံဇာတနှင့်သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန

ပြည်ထောင်စုဝန်ကြီးရုံး

စာအမှတ် (သစ်တော) ၃(၂)/၁၆(ဃ)(၃၄၃၇/၂၀၁၇)

ရက်စွဲ ၂၀၁၇ ခုနှစ်၊ အောက်တိုဘာလ ၃၀ ရက်

သို့

ထားဝယ်အထူးစီးပွားရေးဇုန်စီမံခန့်ခွဲမှုကော်မတီ

အကြောင်းအရာ။ **တနင်္သာရီတိုင်းဒေသကြီး၊ ထားဝယ်အထူးစီးပွားရေးဇုန်တွင် အကောင်အထည်ဖော်ဆောင်ရွက်မည့် (၄၂၀)မဂ္ဂါဝပ် လျှပ်စစ်ဓာတ်အားပေး စက်ရုံ တည်ဆောက်ခြင်းလုပ်ငန်း၏ ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း အစီရင်ခံစာအပေါ် အတည်ပြုနိုင်ပါကြောင်း စိစစ်တင်ပြခြင်းကိစ္စ**

ရည်ညွှန်းချက် ။ ထားဝယ်အထူးစီးပွားရေးဇုန်စီမံခန့်ခွဲမှုကော်မတီ၏ ၇-၁-၂၀၁၆ ရက်စွဲပါ စာအမှတ်၊ ဥညမ-ထဝ-၁/DSEZ-၄/၂၀၁၆(၀၀၇)

ထားဝယ်လျှပ်စစ်ဓာတ်အားဖြန့်ဝေရေးကုမ္ပဏီ (Dawei Power Company)မှ တနင်္သာရီတိုင်းဒေသကြီး၊ ထားဝယ်အထူးစီးပွားရေးဇုန်တွင် အကောင်အထည်ဖော်ဆောင်ရွက်မည့်(၄၂၀)မဂ္ဂါဝပ် လျှပ်စစ်ဓာတ်အားပေးစက်ရုံ တည်ဆောက်ခြင်းလုပ်ငန်းအတွက် ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA) အစီရင်ခံစာတင်ပြလာသည့် ကိစ္စနှင့်ပတ်သက်၍ အဆိုပါအစီရင်ခံစာသည် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း ဆိုင်ရာ လုပ်ထုံးလုပ်နည်း အပိုဒ်(၆၃)ပါအချက်များနှင့် ကိုက်ညီမှုရှိကြောင်း စိစစ်တွေ့ရှိရသဖြင့် တင်ပြလာသည့် အစီရင်ခံစာကို အတည်ပြုပါကြောင်းနှင့် လုပ်ငန်းများဆောင်ရွက်ရာတွင် အောက်ဖော်ပြပါအချက်များအား အလေးထားလိုက်နာ အကောင်အထည်ဖော်ဆောင်ရွက်ရန် လိုအပ်ပါကြောင်း အကြောင်းပြန်ကြားအပ်ပါသည်-

(က) စီမံကိန်းအဆိုပြုသည့် ပတ်ဝန်းကျင်၊ လူမှုရေးနှင့် ကျန်းမာရေးဆိုင်ရာ ထိခိုက်နိုင်မှုများကို လျော့ချမည့် နည်းလမ်းများ၊ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်များ၊ ၎င်းနှင့်ဆက်စပ်သည့် အစီအစဉ်ခွဲများ၊ စောင့်ကြပ်ကြည့်ရှုမည့် နည်းလမ်းများ အပါအဝင် ဆောင်ရွက်ရမည့် ကိစ္စရပ်များအားလုံးကို အတည်ပြုထားသည့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာတွင် ဖော်ပြထားသည့်အတိုင်း လိုက်နာအကောင်အထည်ဖော်ဆောင်ရွက်ရန်၊

(ခ) စီမံကိန်းအဆိုပြုသူသည် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်နှင့် အစီအစဉ်ခွဲများ၊ စောင့်ကြပ်ကြည့်ရှုမည့် အစီအစဉ်များအတွက် လုံလောက်သည့် ရန်ပုံငွေထားရှိ သုံးစွဲရန်နှင့် ၎င်းအစီအစဉ်များကို အကောင်အထည်ဖော်ဆောင်ရွက်မည့် အဖွဲ့အစည်းများ ဖွဲ့စည်းဆောင်ရွက်ရန်၊

30.10.2017

(ဂ) ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ (၂၀၁၂)၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး နည်းဥပဒေ (၂၀၁၄)၊ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း (၂၀၁၅)၊ အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး(ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ (၂၀၁၅) အရ လိုက်နာဆောင်ရွက်ရမည့် အချက်များအားလုံးကို လိုက်နာဆောင်ရွက်ရန်၊

(ဃ) စီမံကိန်းအဆိုပြုသူသည် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်၊ စီမံကိန်းကတိကဝတ်အားလုံးနှင့် စည်းကမ်းချက်များကို အပြည့်အဝအကောင်အထည်ဖော်ရမည့်အပြင် ယင်း၏ကိုယ်စား စီမံကိန်းကို ဆောင်ရွက်ပေးသူကန်ထရိုက်တာနှင့် လက်ခွဲဆောင်ရွက်ပေးသူ ဆပ်ကန်ထရိုက်တာများအားလုံးက စီမံကိန်းအတွက် လုပ်ငန်းများဆောင်ရွက်ရာတွင် သက်ဆိုင်ရာဥပဒေ၊ နည်းဥပဒေများ၊ ဤလုပ်ထုံးလုပ်နည်း၊ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်နှင့် စည်းကမ်းချက်များအားလုံးကို အပြည့်အဝ လိုက်နာဆောင်ရွက်စေရန်၊

(င) ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအစီရင်ခံစာ၏ စီမံကိန်းအဆိုပြုသူမှ လိုက်နာဆောင်ရွက်မည့် ကတိကဝတ်များဇယား၊ ဥပဒေများ၊ ကတိကဝတ်များကို လိုက်နာဆောင်ရွက်ရန်၊

(စ) IFC ၏ Environmental, Health and Safety General Guideline (2007) ၊ Environmental, Health and Safety Guidelines for Thermal Power Plants (2008) နှင့် Performance Standard on Environmental and Social Sustainability (2012) ပါ ပြဋ္ဌာန်းချက်များအတိုင်း လိုက်နာဆောင်ရွက်ရန်၊

(ဆ) အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များပါ ပြဋ္ဌာန်းချက်အတိုင်း Discharge Point မှ မီတာ ၁၀၀ တွင် ရေ၏ tempera -ture ၃ ° C ထက် နည်းစေရေး ထိန်းချုပ်ဆောင်ရွက်သွားရန်၊

(ဇ) ASME Boiler and Pressure Vessel Code ပါ ပြဋ္ဌာန်းချက်များနှင့်အညီ Heat Recovery Steam Generator Stack ကို တပ်ဆင်အသုံးပြုသွားရန်၊

(ဈ) Gas Emission နှင့်ပတ်သက်၍ IFC 2008 EHS Guideline for thermanl power plant ပါပြဋ္ဌာန်းချက်များအတိုင်း လိုက်နာဆောင်ရွက်ရန်၊

(ည) Noise Emission နှင့်ပတ်သက်၍ 3 m အမြင့်ရှိသည့် Metal Steel Fence များထားရှိရန်နှင့် IFC 2007 General EHS Guideline ပါ ပြဋ္ဌာန်းချက်များအတိုင်း လိုက်နာဆောင်ရွက်ရန်၊

(ဋ) Sediment Quality ထိခိုက်နိုင်မှုများနှင့်ပတ်သက်၍ Sediment Quality of International Association for Impact Assessment NOAA Screen Quick Reference Table (2014) ကို လိုက်နာဆောင်ရွက်ရန်၊

(ဌ) Waste Water Treatment Facilities ကို တပ်ဆင်ဆောင်ရွက်သွားရန်၊

(ဍ) စီမံကိန်းမှ ပတ်ဝန်းကျင်လိုက်နာဆောင်ရွက်မှုဆိုင်ရာ ISO 14001 ၊ ISO 18001 အသိအမှတ်ပြု လက်မှတ်ရရှိရေး ဆောင်ရွက်ရန်၊

(ဎ) မြေနေရာပြုပြင်ခြင်းနှင့် စီမံကိန်းတည်ဆောက်ခြင်းလုပ်ငန်းမှ လေအရည်အသွေး ထိခိုက်နိုင်မှုများနှင့် ဖုန်မှုန့်ထွက်ရှိမှုကို လျှော့ချနိုင်ရေးအတွက် ရေဖြန်းခြင်းနှင့် မော်တော်ယဉ်များ၏ ကန့်သတ်၍ တစ်နာရီလျှင် ၄၀ ကီလိုမီတာထက် မပိုစေရေး စီစဉ်ဆောင်ရွက်ရန်၊

(ဏ) Disaster Preparedness Plan & Emergency Response Plan များကို ရေးဆွဲပြီးနောက် သက်ဆိုင်ရာတိုင်းဒေသကြီး/ပြည်နယ် သဘာဝဘေးဆိုင်ရာ စီမံခန့်ခွဲမှု ကော်မတီသို့ တင်ပြအတည်ပြုချက်ရယူရန်၊

(တ) စီမံကိန်းပိုင်ရှင်သည် မိမိ၏ စီမံကိန်းဧရိယာအတွင်း ရှေးဟောင်းဝတ္ထုပစ္စည်း တွေ့ရှိက အနီးဆုံးရပ်ကွက် သို့မဟုတ် ကျေးရွာအုပ်ချုပ်ရေးမှူးထံ အကြောင်းကြားရန်၊

(ထ) လူမှုရေးဆိုင်ရာ ပူးပေါင်းတာဝန်ယူမှုအစီအစဉ် (Corporate Social Responsib -ility - CSR) ကို အကောင်အထည်ဖော်ဆောင်ရွက်ရန်၊

(ဒ) ဒေသခံပြည်သူများ (stakeholders) နှင့်စဉ်ဆက်မပြတ်တွေ့ဆုံဆွေးနွေးပြီး ၎င်းတို့၏ အကြံပြုချက်နှင့်လိုလားချက်များအား အလေးထားပေါင်းစပ်ဆောင်ရွက်ရန်၊

(ဓ) စီမံကိန်းအဆိုပြုသူသည် အတည်ပြုထားသည့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာကို ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်းပါ ပြဋ္ဌာန်းချက်များနှင့်အညီ အများပြည်သူသိရှိနိုင်စေရေး ထုတ်ဖော်ကြေငြာရန်၊

(န) ဘာသာပြန်ထားသော EIA အစီရင်ခံစာ အကျဉ်းချုပ်အား စီမံကိန်းတည်ရှိရာ နေရာနှင့်နီးစပ်သည့် မြို့နှင့်ကျေးရွာများရှိ အုပ်ချုပ်ရေးမှူးရုံးများ၊ မြို့နယ်အထွေထွေအုပ်ချုပ်ရေးရုံးများသို့ ဖြန့်ဝေဆောင်ရွက်သွားရန်၊

(ပ) အငြင်းပွားမှုများ၊ မကျေနပ်မှုများဖြေရှင်းရေးအတွက် Grievance Mechanism ကို တည်ထောင်၍ အဆိုပါ Grievance Mechanism ဆိုင်ရာ အချက်အလက်များ၊ တာဝန်ယူဖြေရှင်းမည့် ပုဂ္ဂိုလ်၏ အမည်နှင့်ဖုန်းနံပတ်၊ ဆက်သွယ်ပေးပို့ရမည့် လိပ်စာသည်တို့ကို စီမံကိန်းတည်ရှိရာ နေရာနှင့်နီးစပ်သည့် မြို့နှင့်ကျေးရွာများရှိ အုပ်ချုပ်ရေးမှူးရုံးများ၊ မြို့နယ်အထွေထွေအုပ်ချုပ်ရေးရုံးများသို့ ဖြန့်ဝေဆောင်ရွက်သွားရန်၊

(ဖ) အတည်ပြုထားသည့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာတွင် စီမံကိန်းပိုင်ရှင်နှင့် ရေးသားပြုစုသည့် ကျွမ်းကျင်ပညာရှင် တတိယအဖွဲ့အစည်းမှ ကတိပြုဝန်ခံချက် လက်မှတ်ရေးထိုးထားမှုများရေးထိုး၍ တနင်္သာရီတိုင်းဒေသကြီး၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနနှင့် နေပြည်တော်၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး

ဦးစီးရုံးချုပ်သို့ ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းအစီရင်ခံစာ အပြည့်အစုံကို ပေးပို့ရန်၊

(ဗ) စီမံကိန်းအဆိုပြုသူသည် Monitoring Report ကို ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဦးစီးဌာနသို့ (၆) လ လျှင်တစ်ကြိမ်တင်ပြရန်၊

၂၅/၁၀/၂၀၁၇

ပြည်ထောင်စုဝန်ကြီး(ကိုယ်စား)
(ဝင်းဇော်၊ဒုတိယအမြဲတမ်းအတွင်းဝန်)

မိတ္တူကို

ညွှန်ကြားရေးမှူးချုပ်
ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန

The Republic of the Union of Myanmar

Ministry of Natural Resource and Environmental Conservation

The Minister's Office

Letter No. (Thittaw) 3 (2)/16 (d) (3437)/2017)

Date: 25 October 2017

To Dawei Special Economic Zone Management Committee

Subject: Vetting and Reporting on Approval on Environmental Impact Assessment of Constructing Electrical Power Station of 420 MW capacity in Dawei Special Economic Zone, Tannitharryi Region

Reference: Letter of Dawei Committee, dated 7 January 2016, letter No. OoNyaMa-HtaWa-1/DSEZ-42016 (007)

In the matter of the submission of report on environmental impact assessment (EIA) on constructing electricity power station of 420 MW by Dawei Power Company in Dawei Special Economic Zone in Tannitharryi Region, we found that the assessment report is in compliance with paragraph 63 of the Environmental Assessment Procedure and thus we approve the report and in response that we recommend following to be complied with:

(a) To carry out the programmes exactly as what is proposed in the approved environmental impact assessment report, including methods to minimize impact on environment, social and health which may be caused by the proposed project, arrangement for environmental programmes, related sub-programmes, methods of supervision

(b) The proponent to make provision for fund for programmes and sub-programmes; programmes for supervision and to form implementation body for such programmes

(c) To comply with the provisions of the Environmental Conservation law (2012), the Environmental Conservation Rules (2015), Procedure relating to the Environmental Impact Assessment Procedure (2015), National Environmental Quality Guideline (Emission) (2015)

(d) The proponent to ensure environmental management programmes, all project-related undertakings and regulations in addition to causing its contractor and sub-contractor implementing the project on behalf of the proponent to fully comply with applicable law, rules, this procedure, environmental management programmes and rules

(e) Table of undertaking, laws, and warranties to be complied by the proponent of the environmental assessment report

(f) To comply with IFC's Environmental, Health and Safety General Guideline (2007), Environmental, Health and Safety Guidelines for Thermal Power Plants (2008) and Performance Standard on Environmental and Social Sustainability (2012)

(g) To ensure maintaining water temperature 3 degree Celsius within 100 meters from discharge point as prescribed in the National Environmental Quality (Emission) Guideline

(h) To install heat recovery steam generator stack as provided in ASME Boiler and Pressure Vessel Code

(i) To comply with IFC 2008 EHS Guideline for thermal power plant as provided in Gas Emission

(j) To have metal steel fence with 3 m high for noise emission and to comply with IFC 2007 General EHS Guideline

(k) With regard to sediment quality, to comply with sediment quality of International Association for Impact Assessment NOAA Screen Quick Reference Table (2014)

(l) To have waste water treatment facilities in place

(m) To carry out ISO 14001, ISO 18001 to obtain certificate relating to project environmental compliance

(n) To arrangement for water spraying to minimize impact on air quality caused by construction and modification of typography of land and emission of dust by implementation of the project and to prescribe vehicle speed limit to 40 km per hour

(o) To devise disaster preparedness plan and emergency response plan and seek approval thereof from relevant region and state environmental management committee

(p) The proponent to inform the ward/village general administrator in antiques are found in the project area

(q) To implement corporate social responsibility-CSR

(r) To incorporate in the implementation the requests and recommendation of the continuous engagement of the stakeholders

(s) The proponent to publicize the approved environmental assessment report in accordance with the provision of the Environmental Assessment Procedure

(t) To circulate the summary of the translated EIA report to nearby village/ward and township general administrator office

(u) To establish grievance mechanism to resolve disputes and grievances and circulate particulars such as responsible person to resolve the dispute, name and phone number, address to general administrator offices of nearby town and village

(v) To submit complete approved environmental assessment signed and undertaken by the owner of the project, expert third party organization to the Environmental Conservation Department of Tannitharryi Region and Director General Office of Environmental Conservation Department, Nay Pyi Taw

(w) The proponent to submit monitoring report to the Environmental Conservation Department every six months.

Sd/

On behalf of the Union Minister

Win Zaw, deputy permanent secretary

cc.

Director General

Environmental Conservation Department

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စာအမှတ် - DPC ၀၁/၂၀၁၈

၂၀၁၈ခုနှစ် ဧပြီလ ၃၀ရက်

သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန
ရုံးအမှတ် (၁၉)
နေပြည်တော်၊ မြန်မာ

ရည်ညွှန်းချက်။ ဦးလှမောင်သိန်း
ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန

အကြောင်းအရာ။ ထားဝယ်အထူးစီးပွားရေးဇုန်တွင် အကောင်အထည်ဖော်တည်ဆောက်မည့် ကနဦးကာလ ဓါတ်အားပေးစက်ရုံ၏ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာ (ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ် ပါဝင်သော) တင်ပြခြင်း

သို့
ဦးအုန်းဝင်း

Dawei Power Company Limited (DPC) ၏ ညွှန်ပြချက်များနှင့် TEAM Consulting Engineering and Management Co., Ltd. မှ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း (၂၀၁၅ခုနှစ်၊ ဒီဇင်ဘာလ ၂၉ ရက်နေ့)နှင့်အညီ ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း (EIA) ကိုပြင်ဆင်ပြီး Dawei Power Company Limited မှ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဦးစီးဌာန (ECD) သို့ ၂၀၁၇ခုနှစ် ဇွန်လ ၃၀ ရက်နေ့ (စာအမှတ် - DPC ၀၇/၂၀၁၇) တွင် တရားဝင် တင်သွင်းခဲ့ပါသည်။.

ဤနေရာတွင် သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေဝန်ကြီးဌာန၏ တရားဥပဒေအရ ဘောင်ဝင်စေရန်နှင့် ဘဏ္ဍာရေးအရ ယုံကြည်စိတ်ချရန်အလို့ငှာ အောက်ပါအတိုင်း ဖော်ပြထား ပါသည်။

က။ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနမှ ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း (EIA) အားပြီးမြောက် မှန်ကန်ကြောင်း ထောက်ခံ အတည်ပြုပါသည်။

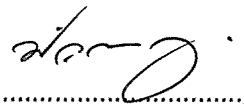
ခ။ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဝန်ကြီးဌာန (MONREC) မှ ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း (EIA) သည် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်းနံပါတ် အပါအဝင် မြန်မာနိုင်ငံ၏ ဥပဒေများနှင့်အညီ အတိအကျလိုက်နာ ပြင်ဆင်ထားကြောင်း တာဝန်ယူ အတည်ပြုခြင်းနှင့် နယ်ပယ်အတိုင်းအတာသတ်မှတ်ခြင်း အစီရင်ခံစာကို သယံဇာတနှင့် သဘာဝ ပတ်ဝန်းကျင် ထိန်းသိမ်းရေး ဝန်ကြီးဌာနမှ ၂၀၁၆ခုနှစ် ဇန်နဝါရီလ ၂၇ရက်တွင်အသိအမှတ်ပြုခဲ့ပြီး ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန(ECD) မှ အသိအမှတ်ပြုသက်သေလက်မှတ် စာအမှတ် EIA - ၂/၂ (၁၂၈/၂၀၁၇) ကို ၂၀၁၇ခုနှစ် ဇန်နဝါရီလ ၃၀ရက်တွင် ရရှိခဲ့ပါသည်။

ဂ။ ယခုစီမံကိန်းသည် Dawei Power Company Limited မှ အကောင်အထည်ဖော်သော ထားဝယ်အထူးစီးပွားရေးဇုန် ကနဦးကာလ ဓါတ်အားပေးစက်ရုံ စီမံကိန်းဖြစ်ပြီး (က) EIA တွင် ပါဝင်ရမည့် ကတိကဝတ်များနှင့် တာဝန်ဝတ္တရားများ (ခ) အစီအစဉ်အားလုံးနှင့် အမျိုးမျိုးသော အစိတ်အပိုင်းများအတွက် အကန့်အသတ်မဲ့ခြင်း၊ ထိခိုက်မှုရှောင်ရှားခြင်း၊ လျော့ချခြင်းနှင့် ပြန်လည်ကုစားမှုနည်းလမ်းများပါဝင်ကြောင်းကို သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင် ထိန်းသိမ်းရေး ဝန်ကြီးဌာနမှ တာဝန်ယူ အတည်ပြုပြီး စီမံကိန်းဖွံ့ဖြိုးတိုးတက်ရေး၊ တည်ဆောက်ရေး၊ လုပ်ငန်းအပ်နှံရေး၊ လုပ်ငန်းလည်ပတ်ရေးနှင့် စီမံကိန်း ထိန်းသိမ်းမှုများအတွက် ကတိကဝတ်များ၊ တာဝန်ယူမှုများ၊ အစီအစဉ်များနှင့် နည်းလမ်းများအား ဆောင်ရွက်ရန် ကန်ထရိုက်တာ၊ ဆပ်ကန်ထရိုက်တာ သို့မဟုတ် အခြားသော အဖွဲ့အစည်းအား ဆောင်ရွက်စေပါမည်။

ဃ။ ကျရှုံးမှားယွင်းမှုများ ဖြစ်ပေါ်ခဲ့ပါက သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဝန်ကြီးဌာန (MONREC) သို့ ငွေကြေးပေးလျော်ခြင်းနှင့် ဥပဒေ သို့မဟုတ် စီမံကိန်း၏ လိုက်လျော သဘောတူညီမှု နှင့် ၎င်း၏ နောက်ဆက်တွဲများအတွက် ပြစ်ဒဏ်ပေးလျော်ခြင်း တို့ကို သဘောတူလက်ခံပြီး သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဝန်ကြီးဌာန (MONREC)မှ သတ်မှတ်သော ကုန်ကျစရိတ်များနှင့် သင့်တော်သော ပြုပြင်မှုများအတွက် Dawei Power Company Limited မှ တာဝန်ယူ ဆောင်ရွက်သွားပါမည်။

င။ ကျရှုံးမှားယွင်းမှုများကို သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဝန်ကြီးဌာန (MONREC)မှ ပြန်လည်ပြုပြင်ရန် ခွင့်ပြုချက်အား ကုမ္ပဏီမှ ဆောင်ရွက်ရမည်။ ခွင့်ပြုချက် သဘောတူညီချက် စည်းကမ်း သတ်မှတ်ချက်များနှင့် မကိုက်ညီပါက မြန်မာနိုင်ငံအစိုးရ၏ အခြားသော သတ်မှတ်ချက်အတိုင်း ကုစားရမည် ဖြစ်ပါသည်။

ခွင့်ပြုချက်ပေးအပ်သော ရှေ့နေ၏ အာဏာနှင့် အောက်ဖော်ပြရာနေရာတွင် တာဝန်ရှိသူတစ်ဦးမှ အတိအလင်း လက်မှတ်ရေးထိုးလိုက်ပါသည်။



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မှ Dawei Power Company Limited

အမည် Mr. Panya Visetnut

ရာထူး Assistant Manager

DPC DAWEI POWER COMPANY LIMITED

DAWEI POWER COMPANY LIMITED

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Reference No. DPC 01/2018

30th April 2018

Ministry of Natural Resource and Environmental Conservation
Office No. (19)
Nay Pyi Taw, Myanmar

Attn: U Hla Maung Thein
Environmental Conservation Department

Re: Environmental Impact Assessment Report in respect of the Initial Phase Power Plant of Dawei SEZ (the "EIA including EMP")

Dear U Ohn Win,

We refer to the captioned EIA, which was prepared and finalized by TEAM Consulting Engineering and Management Co., Ltd. in accordance with the Environmental Impact Assessment Procedure (29th December, 2015) under the instructions of Dawei Power Company Limited (DPC) and formally submitted by Dawei Power Company Limited to Environmental Conservation Department (ECD) under DPC letter dated 30th June 2017 (letter no. DPC 07/2017).

Intending to be legally bound hereby and financially liable to Ministry of Natural Resource and Environmental Conservation/MONREC hereunder, we:

a. Endorse and confirm to Ministry of Natural Resource and Environmental Conservation/MONREC the accuracy and completeness of the EIA,

b. Confirm and undertake to Ministry of Natural Resource and Environmental Conservation/ MONREC that the EIA has been prepared in strict compliance with applicable Myanmar law, including EIA Procedures No. and with the Scoping Report / Terms of Reference dated 27th January 2016 as approved by Ministry of Natural Resource and Environmental Conservation/MONREC on 30th January 2017 as evidenced by the ECD letter No. EIA-2/2 (128/2017), and

c. Confirm and undertake to Ministry of Natural Resource and Environmental Conservation/MONREC that the project company established by Dawei

Power Company Limited in respect of the Initial Phase Power Plant of Dawei SEZ project shall at all times comply fully with: (i) any and all commitments and obligations as set forth in the EIA, and (ii) any and all plans and the various components thereof, including without limitation, impact avoidance, mitigation, and remediation measures, and with respect to both (i) and (ii), including but not limited to such commitments, obligations, plans and measures as relate to the development, construction, commissioning, operation and maintenance of the project, and any circumstance in which work done or to be done, or services performed or to be performed, in connection with the project's development, construction, commissioning, operation and maintenance is carried out or intended or required to be carried out by any contractor, subcontractor or other party.

d. We acknowledge and agree that any failure to so comply shall subject us to liability for breach of this undertaking and that, in addition to making financial compensation to Ministry of Natural Resource and Environmental Conservation/MONREC and payment of any applicable penalties under the law or under the project's concession agreement and its appendixes, Dawei Power Company Limited shall be responsible to Ministry of Natural Resource and Environmental Conservation/MONREC to carry out and bear all costs of the immediate and proper rectification of the event of non-compliance and any effects thereof.

e. We acknowledge and agree, further, that any failure to so comply may be treated by Ministry of Natural Resource and Environmental Conservation/MONREC as a breach by the project company under the concession agreement which, if not rectified in accordance with the terms and conditions of the concession agreement, may lead to termination or other due exercise by the GOVERNMENT OF MYANMAR of remedies available to it thereunder.

The issuance of this confirmation and undertaking has been duly authorized by all necessary corporate actions and a copy of the resolution of the Dawei Power Company Limited authorizing it and the power of attorney explicitly granting signing authorization to the individual who has signed below are attached as schedules hereto.

....

By: Dawei Power Company Limited
Name: Mr. Panya Visetnut
Title: Assistant Manager

ကနဦးကာလ ဓါတ်အားပေးစက်ရုံစီမံကိန်း

စီမံကိန်း၏ အဓိက ကတိကဝတ်များ

Dawei Power Company Limited မှ စီမံကိန်းဖွံ့ဖြိုးမှုအတွက် သက်ဆိုင်နေသော ဖြစ်ပေါ်လာနိုင်သည့် ထိခိုက်မှုများအတွက် လျော့ချရေး စီမံခန့်ခွဲမှုအဖြစ် ပတ်ဝန်းကျင်နှင့် လူမှုရေးဆိုင်ရာ ထိခိုက်မှုများနှင့် လျော့ချမှုနည်းလမ်းများအတွက် ကတိကဝတ်များ၏ အကျဉ်းချုပ်စာရင်းကို အောက်တွင်ဖော်ပြထား ပါသည်။

ကတိကဝတ်ဖော်ပြချက်နေရာ	ကတိကဝတ်
<u>**ပတ်ဝန်းကျင်နှင့် လူမှုရေးဆိုင်ရာ ထိခိုက်မှု ဆန်းစစ်ခြင်း (ESIA) အစီရင်ခံစာ**</u>	
အခန်း (၃) မူဝါဒ၊ ဥပဒေဆိုင်ရာနှင့် ဖွဲ့စည်းဆောင်ရွက်ပုံဆိုင်ရာ လေ့လာသုံးသပ်ချက်	
အပိုင်း ၃.၁ - ပတ်ဝန်းကျင်နှင့် လူမှုရေးဆိုင်ရာ မူဝါဒများပေါင်းစပ်ခြင်း	• DPC သည် တည်ဆောက်ဆဲကာလနှင့် လုပ်ငန်းလည်ပတ်ဆောင်ရွက်သည့် ကာလများ တွင်ဖြစ်ပေါ်လာသော ပတ်ဝန်းကျင်နှင့်လူမှုရေးဆိုင်ရာ စီမံခန့်ခွဲမှုများ အတွက် ပတ်ဝန်းကျင်နှင့် လူမှုရေးဆိုင်ရာ မူဝါဒများကို လမ်းညွှန်သွားရမည် ဖြစ်ပါသည်။ • DPC သည် မြန်မာအင်ဂျင်နီယာကောင်စီမှ အသိအမှတ်ပြုထားသော ကန်ထရိုက်တာ၏ "Registered Engineer Certificate" ကို ဆောက်လုပ်ရေး လုပ်ငန်းများမစတင်ခင် တင်ပြသွားမည် ဖြစ်ပါသည်။
အပိုင်း ၃.၂.၁ - ပတ်ဝန်းကျင်ဆိုင်ရာ စီမံခန့်ခွဲမှု၊ လူမှုရေးဆိုင်ရာ ထိခိုက်မှုစီမံခန့်ခွဲ မှုများနှင့် သက်ဆိုင်သော ဥပဒေများနှင့် စည်းမျဉ်းများ	DPC သည် အောက်ဖော်ပြပါ ဥပဒေတို့ကို လိုက်နာမည် ဖြစ်ပါသည်။ • ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ (၂၀၁၂) - အပိုဒ် ၇(ဏ)၊ ၁၄၊ ၁၅၊ ၂၄၊ ၂၅၊ ၂၉ • ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနည်းဥပဒေ (၂၀၁၄) - အပိုဒ် ၆၈ (က) (ခ) • ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း (၂၀၁၅) - အပိုဒ် ၁၀၂ (က) (ခ)၊ ၁၀၃၊ ၁၀၄၊ ၁၀၅၊ ၁၀၆၊ ၁၀၇၊ ၁၀၈၊ ၁၀၉၊ ၁၁၀၊ ၁၁၃၊ ၁၁၅ နှင့် ၁၁၇ • အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ (၂၀၁၅) • မြန်မာနိုင်ငံရင်းနှီးမြှုပ်နှံမှု ဥပဒေ (၂၀၁၆) - အပိုဒ် ၅၀ (က) (ဃ)၊ ၅၁ (ခ) (ဂ) (ဃ)၊ ၆၅ (ဆ) (ဈ) (ည) (ဋ) (ဌ) (ဍ) (ဏ) (တ) (ထ) နှင့် ၇၃ • တိုင်းရင်းသားလူမျိုးများ အကျိုးစီးပွား ကာကွယ်စောင့်ရှောက်ရေး ဥပဒေ (၂၀၁၅) - အပိုဒ် ၅ • လျှပ်စစ်ဥပဒေ (၂၀၁၄) - အပိုဒ် ၁၀ (ခ)၊ ၁၈၊ ၂၀ (က)၊ ၂၂ (က)၊ ၂၆ (က) (ခ)၊ ၂၇၊ ၄၀ နှင့် ၆၈ • အလုပ်ရုံအက်ဥပဒေ (၁၉၅၁) - အပိုဒ် ၅ နှင့် ၇ • ပြည်သူ့ကျန်းမာရေး ဥပဒေ (၁၉၇၂) - အပိုဒ် ၃နှင့် ၅ • ကူးစက်ရောဂါများ ကာကွယ်နှိမ်နင်းရေးဥပဒေ (၁၉၉၅) - အပိုဒ် ၃ (က)၊ ၄၊ ၉ (က) (ခ) (ဂ) (ဃ) နှင့် ၁၁ • ဆေးလိပ်နှင့် ဆေးရွက်ကြီးထွက်ပစ္စည်းသောက်သုံးမှု ထိန်းချုပ်ရေးဥပဒေ (၂၀၀၆) - အပိုဒ် ၉ (က) (ခ) (ဂ) (ဃ) • မြန်မာနိုင်ငံ မီးသတ်တပ်ဖွဲ့ဥပဒေ (၂၀၁၅) - အပိုဒ် ၂၅ (က) (ခ) • မော်တော်ယာဉ် ဥပဒေ (၂၀၁၅)နှင့် မော်တော်ယာဉ် နည်းဥပဒေများ (၁၉၈၇) • မြန်မာ့အာမခံလုပ်ငန်း ဥပဒေ (၁၉၉၃) - အပိုဒ် ၁၅ နှင့် ၁၆ • အလုပ်သမားအဖွဲ့အစည်းဥပဒေ (၂၀၁၁) - အပိုဒ် ၁၇၊ ၁၈၊ ၁၉၊ ၂၀၊ ၂၁၊ နှင့် ၂၂ • အလုပ်သမားရေးရာ အငြင်းပွားမှု ဖြေရှင်းရေး ဥပဒေ (၂၀၁၂) - အပိုဒ် ၃၈၊ ၃၉၊

ကတိကဝတ်ဖော်ပြချက်နေရာ	ကတိကဝတ်
	၄၀ နှင့် ၅၁ • အလုပ်အကိုင်နှင့် ကျွမ်းကျင်မှု ဖွံ့ဖြိုးတိုးတက်ရေး ဥပဒေ (၂၀၁၃) - အပိုဒ် ၅၊ ၁၄ နှင့် ၃၀ (က) (ခ) • အနည်းဆုံးအခကြေးငွေ ဥပဒေ (၂၀၁၃) - အပိုဒ် ၁၂၊ ၁၃ (က) (ခ) (ဂ) (ဃ) (င) (စ) (ဆ) နှင့် ၁၈ (ဃ) (င) • အခကြေးငွေ ပေးချေရေး ဥပဒေ (၂၀၁၆) - အပိုဒ် ၃၊ ၄၊ ၅၊ ၇၊ ၈၊ ၉၊ ၁၀၊ ၁၁၊ ၁၂၊ ၁၃ နှင့် ၁၄ • အလုပ်သမားလျော်ကြေးအက်ဥပဒေ (၁၉၂၃) - အပိုဒ် ၁၃ • ခွင့်နှင့်အလုပ်ပိတ်ရက်များ အက်ဥပဒေ (၁၉၅၁) • လူမှုဖူလုံရေး ဥပဒေ (၂၀၁၂) - အပိုဒ် ၁၁ (က)၊ ၁၅ (က)၊ ၁၈ (ခ)၊ ၄၈ (ခ) နှင့် ၇၅ • ရေနံအက်ဥပဒေ (၁၉၃၄) - အပိုဒ် ၃ • ရေနံနည်းဥပဒေ (၁၉၃၇) - အခန်း ၃ နှင့် ၄ • ရေအရင်းအမြစ်နှင့် မြစ်၊ ချောင်းများ ထိန်းသိမ်းရေး ဥပဒေ (၂၀၀၆) - အပိုဒ် ၈ (က) နှင့် ၂၄ (ခ) • ရေချိုငါးလုပ်ငန်း ဥပဒေ (၁၉၉၁) - အပိုဒ် ၄၀ • မြန်မာ့ပင်လယ်ငါးလုပ်ငန်း ဥပဒေ (၁၉၉၀) - အပိုဒ် ၃၉ • ယဉ်ကျေးမှုအမွေအနှစ်ဒေသများ ကာကွယ်ထိန်းသိမ်းရေး ဥပဒေ (၁၉၉၈) - အပိုဒ် ၁၃ နှင့် ၂၂ • ရှေးဟောင်းဝတ္ထုပစ္စည်းများ ကာကွယ်ထိန်းသိမ်းရေး ဥပဒေ (၂၀၁၅) - အပိုဒ် ၁၂ • ရှေးဟောင်းအဆောက်အအုံများ ကာကွယ်ထိန်းသိမ်းရေး ဥပဒေ (၂၀၁၅) - အပိုဒ် ၁၂၊ ၁၅ နှင့် ၂၀ (စ) • သစ်တောဥပဒေ (၁၉၉၂) - အပိုဒ် ၁၂ (က) • အထူးစီးပွားရေးဇုန် ဥပဒေ (၂၀၁၄) - အပိုဒ် ၁၁ (စ) (တ)၊ ၂၇၊ ၃၅၊ ၇၅၊ ၇၇၊ ၇၈ နှင့် ၈၀ (က) (ခ) (ဂ) (ဃ) (င) • မြန်မာနိုင်ငံအင်ဂျင်နီယာကောင်စီဥပဒေ (၂၀၁၃) - အပိုဒ် ၃၄ နှင့် ၃၇ • မြန်မာ့ဆိပ်ကမ်းအာဏာပိုင် ဥပဒေ (၂၀၁၅) - အပိုဒ် ၂၃ (က) • ပို့ကုန်သွင်းကုန် ဥပဒေ (၂၀၁၂) - အပိုဒ် ၇
အပိုင်း ၃.၅ - အပြည်ပြည်ဆိုင်ရာ ပေါ်လစီများ၊ လမ်းညွှန်ချက်များနှင့် စံနှုန်းများ	DPC သည် အောက်ဖော်ပြပါတို့ကို လိုက်နာမည် ဖြစ်ပါသည်။ • ပတ်ဝန်းကျင်နှင့် လူမှုရေးဆိုင်ရာ ရေရှည်လုပ်ဆောင်မှု စံနှုန်းများ၊ ၂၀၁၂ခုနှစ် ဇန်နဝါရီလ ၁ ရက် • ပတ်ဝန်းကျင်၊ ကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေးဆိုင်ရာ ယေဘုယျ လမ်းညွှန်ချက်များ၊ ၂၀၀၇ခုနှစ် ဧပြီလ ၃၀ရက် • အပူစွမ်းအင်သုံး ဓါတ်အားပေးစက်ရုံများအတွက် ပတ်ဝန်းကျင်၊ ကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေးဆိုင်ရာ လမ်းညွှန်ချက်များ၊ ၂၀၀၈ ခုနှစ် ဒီဇင်ဘာလ ၁၉ ရက် • ကမ္ဘာ့ဘဏ်၏ ညစ်ညမ်းမှုကာကွယ်ခြင်းနှင့် လျော့ချခြင်း လက်စွဲစာအုပ်၊ ၁၉၉၈ ခုနှစ်
ဇယား ၃.၆-၁ - အပြည်ပြည်ဆိုင်ရာ ပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး စံနှုန်းများ	DPC သည် အောက်ဖော်ပြပါတို့ကို လိုက်နာမည် ဖြစ်ပါသည်။ • ပတ်ဝန်းကျင်လေထု အရည်အသွေး • ပတ်ဝန်းကျင် ဆူညံသံ အဆင့်များ • တုန်ခါမှု • ကမ်းရိုးတန်းရေ အရည်အသွေး • အနယ်အနှစ် အရည်အသွေး • မြေအောက်ရေ အရည်အသွေး • အပူစီးဆင်းမှု

ကတိကဝတ်ဖော်ပြချက်နေရာ	ကတိကဝတ်
ဇယား ၃.၆-၂ - အမျိုးသား ထုတ်လွှတ်မှု စံနှုန်းများ	DPC သည် တာဘိုင်လောင်ကြွမ်းခြင်းနှင့် အင်ဂျင်လည်ခြင်းတို့မှ ထွက်ပေါ်လာသော လေထုထုတ်လွှတ်မှုအဆင့်များအတွက် ၂၀၁၅ခုနှစ် ဒီဇင်ဘာလ ၂၉ ရက်နေ့တွင် ထုတ်ပြန်သော မြန်မာနိုင်ငံ၏ အမျိုးသား ပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များကို လိုက်နာပါမည်။
ဇယား ၃.၆-၃ - အမျိုးသား စွန့်ထုတ်မှု စံနှုန်းများ	DPC သည် အပူစွမ်းအင်သုံးဓါတ်အားပေးစက်ရုံမှ စွန့်ထုတ်မှုအဆင့်နှင့် ဆောက်လုပ်ရေး ကာလတွင် စီမံကိန်း သုံးရေနှင့် ရေဆိုး စွန့်ထုတ်မှု အတွက် ၂၀၁၅ခုနှစ် ဒီဇင်ဘာလ ၂၉ ရက်နေ့တွင် ထုတ်ပြန်သော မြန်မာနိုင်ငံ၏ အမျိုးသား ပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များကို လိုက်နာပါမည်။
ဇယား ၃.၆-၄ - သဘာဝဓါတ်ငွေ့သုံး ဓါတ်အားပေး စက်ရုံအတွက် ထုတ်လွှတ်မှု စံနှုန်းများ	DPC သည် တာဘိုင်လောင်ကြွမ်းခြင်းနှင့် အင်ဂျင် လည်ပတ်ခြင်းကြောင့် ထွက်ပေါ်လာသော လေထုထုတ်လွှတ်မှု အဆင့်များအတွက် IFCမှ အပူစွမ်းအင်သုံး ဓါတ်အားပေးစက်ရုံများအတွက် ထုတ်ပြန်ထားသော ပတ်ဝန်းကျင်၊ ကျန်းမာရေးနှင့် ဘေးကင်းလုံးခြုံရေး လမ်းညွှန်ချက်များကို လိုက်နာပါမည်။
အခန်း (၄) - စီမံကိန်းဖော်ပြချက်နှင့် အခြားသော ရွေးချယ်နည်းလမ်းများ	
အပိုင်း ၄.၁-၁ - စီမံကိန်း ဖော်ပြချက်	• DPC သည် စီမံကိန်းချဉ်းကပ်လမ်းဘူမိစံနှုန်းများအတွက် သက်ဆိုင်ရာ မြန်မာနိုင်ငံ ဥပဒေနှင့် စံနှုန်းများ အပြင် အပြည်ပြည်ဆိုင်ရာ စံနှုန်းများကို လိုက်နာပါမည်။ • စီမံကိန်းတွင် လောင်ကျွမ်းခြင်းကာလတွင် DRY LOW NO_X (DLN) နည်းပညာကို အသုံးပြုပြီး အပူစွမ်းအင်ထွက်ရှိမှုတိုးတက်ပြီး NO_X ထွက်ရှိမှု လျော့နည်းအောင် လုပ်ဆောင်သွားမည် ဖြစ်ပါသည်။ • စီမံကိန်းတွင် ASME ဘွိုင်လာနှင့် ဖိအားထိန်းချုပ်မှုကုဒ် (Pressure Vessel Code)နှင့်အတူ အစိုးအဌေ့မှ အပူပြန်ရယူနိုင်သော အင်ဂျင်မီးခိုးတိုင်ကို တတ်ဆင်မည် ဖြစ်ပါသည်။ • စီမံကိန်းအတွက် အအေးခံရေယူဆောင်ရာ အဝင်ပေါက်နေရာတွင် ၁၀ စင်တီမီတာ (bar screen) နှင့် ၁၀ မီလီမီတာ(travelling screen) ဇကာ ၂ခုကို တပ်ဆင်မည်ဖြစ်ပါသည်။ • စီမံကိန်းတွင် သဘာဝဓါတ်ငွေ့သီးသန့်အသုံးပြုနိုင်သော ဓါတ်ငွေ့အင်ဂျင်နှင့်ပေါင်း စပ်ထားသော ဓါတ်ငွေ့တာဘိုင် တို့ကို တပ်ဆင်မည်ဖြစ်ပါသည်။ • စီမံကိန်းလုပ်ငန်းလည်ပတ်ချိန်တွင် အရေးပေါ်ပြတ်တောက်မှုအတွက် ဒီဇယ်မီးစက် အသုံးပြုရန်အတွက် ဒီဇယ်ဆီသိုလှောင်ကန်များကို ဆောက်လုပ်သွားမည် ဖြစ်ပါသည်။ • စီမံကိန်းတွင် အအေးစနစ်အတွက် ပင်လယ်ရေရယူရန် လိုအပ်ပါသည်။ • စီမံကိန်းတွင် ရေဆိုးသန့်စင်မှုကိရိယာများကို တပ်ဆင်ပြီး ၎င်းမှထွက်ရှိလာသော ရေသည် ၂၀၁၅ခုနှစ် ဒီဇင်ဘာလ ၂၉ရက်နေ့တွင် မြန်မာနိုင်ငံမှ ထုတ်ပြန်လိုက်သော အမျိုးသား ပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ တွင်ပါဝင်သော စွန့်ထုတ်မှု အရည်အသွေး စံနှုန်းနှင့် ကိုက်ညီအောင် ဆောင်ရွက် ရပါမည်။ • စီမံကိန်းဓါတ်အားပေးစက်ရုံလုပ်ငန်းခွင် ဧရိယာများဖြစ်သော ထိန်းချုပ်ခန်းများ၊ ရုံးခန်း နှင့် သာမာန်လုပ်ငန်းလုပ်ဆောင်မှုနေရာများတွင် ဆူညံသံထိန်းချုပ်မှုများ ပြုလုပ်မည် ဖြစ်ပါသည်။ • စီမံကိန်းတွင် ဓါတ်အားပေးစက်ရုံဒီဇိုင်းနှင့် အခြားသော သက်ဆိုင်ရာ ကိရိယာများ၏ ဆူညံသံ၊ တုန်ခါမှုနှင့် အန္တရာယ်ရှိသော အလုပ်များ စသည်တို့ကို အပူစွမ်းအင်သုံး ဓါတ်အားပေးစက်ရုံ၏ လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေး (OSH) လိုအပ်ချက်များနှင့်အညီ လိုက်နာဆောင်ရွက်မည် ဖြစ်ပါသည်။ • စီမံကိန်းသည် လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး

ကတိကဝတ်ဖော်ပြချက်နေရာ	ကတိကဝတ်
	အသေးစိတ် အစီအစဉ် ပြင်ဆင်မှုအတွက် တာဝန်ယူရန်လိုအပ်ပြီး ၎င်းသည် စီမံကိန်းလုပ်ငန်း လည်ပတ်မှုတွင် အမြင့်ဆုံးအဆင့် လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေး ဖြစ်ရန် လိုအပ်ပါသည်။ • စီမံကိန်းတွင် အဆောက်အဦးအားလုံး၏ ဒီဇိုင်းနှင့် ဖွဲ့စည်းတည်ဆောက်ပုံတို့သည် ပတ်ဝန်းကျင်နှင့် လိုက်လျောညီထွေမှုရှိအောင် ဆောက်လုပ်မည် ဖြစ်ပါသည်။ • စီမံကိန်းတွင် မိုးရေအတွက်စီမံခန့်ခွဲမှု စနစ်အဖြစ် ရရှိလာသော မိုးရေများကို စီဆင်းနိုင်သော ရေမြောင်းများပြုလုပ်ပေးမည် ဖြစ်ပါသည်။
အခန်း (၆) - ထိခိုက်သက်ရောက်မှု ဆန်းစစ်ခြင်းနှင့် လျော့ချရေးနည်းလမ်းများ	
အပိုင်း ၆.၃ - အကြိုတည်ဆောက်ရေး ကာလ	DPC သည် စီမံကိန်းအကြိုတည်ဆောက်ရေးကာလတွင် ဖြစ်ပေါ်လာသော အောက်ဖော်ပြပါ သက်ဆိုင်ရာ ပတ်ဝန်းကျင်ပြဿနာများအတွက် လျော့ချရေး နည်းလမ်းများကို လုပ်ဆောင်မည် ဖြစ်ပါသည်။ • ဖုန်မှုန့် • ဓါတ်ငွေ့ထုတ်လွှတ်မှု • ဆူညံသံ • စီမံကိန်းရှင်းလင်းခြင်းစွန့်ပစ်ပစ္စည်း • ယာဉ်လမ်းသွားလာခြင်း • ရှေးဟောင်းသုတေသနနေရာတွင် ထိခိုက်မှု • ဗျစ်နီမြစ်တိမ်ကောခြင်း • အလုပ်သမားများအတွက် လုပ်ငန်းခွင် ဘေးအန္တရာယ်ကင်းရှင်းခြင်းနှင့် ကျန်းမာရေး တို့ဖြစ်ပါသည်။
အပိုင်း ၆.၃.၃.၁ - ဖုန်မှုန့်	စီမံကိန်း၏ ဖုန်မှုန့်ထွက်ပေါ်မှုများကို ကမ္ဘာ့ဘဏ်၏ ပတ်ဝန်းကျင်လေထုအရည်အသွေး စံနှုန်းများ နှင့် ကိုက်ညီအောင် ထိန်းချုပ်သွားမည် ဖြစ်ပါသည်။
အပိုင်း ၆.၃.၃.၃ - ဆူညံသံ	US.EPA၏ တည်ဆောက်မှုဆိုင်ရာ ဆူညံသံစံနှုန်းများနှင့် IFC၏ ပတ်ဝန်းကျင် ဆူညံသံ အဆင့်များနှင့် ကိုက်ညီအောင် စီမံကိန်းမှ ဆောင်ရွက်သွားမည် ဖြစ်ပါသည်။
အပိုင်း ၆.၃.၃.၆ - ရှေးဟောင်းသုတေသန နေရာတွင် ထိခိုက်မှု	စီမံကိန်းသည် သက်ဆိုင်ရာ အာဏာပိုင် (အနုပညာ ဦးစီးဌာန)နှင့် ကျေးရွာအုပ်ချုပ်ရေးမှူး နှင့် မြို့နယ် အုပ်ချုပ်ရေးမှူးတို့ကို အကြောင်းကြားကာ ရှေးဟောင်းသုတေသနနှင့် ယဉ်ကျေးမှု အမွေအနှစ် ပစ္စည်းများကို ရှာဖွေရမည် ဖြစ်ပါသည်။
အပိုင်း ၆.၃.၄.၁ - ဗျစ်နီမြစ် တိမ်ကောခြင်း	• MIE သည် အစားထိုးလှေဆိပ်/သင်္ဘောဆိပ်ကို ချည်ဦးချောင်းနေရာတွင် အကောင်အထည်ဖော် ဆောင်ရွက်ပေးသွားမည် ဖြစ်ပါသည်။ ၎င်းအစားထိုး လှေဆိပ်/ သင်္ဘောဆိပ်သည် ဗျစ်နီမြစ်တွင် လက်ရှိတည်ရှိနေသော လှေဆိပ်နှင့် အမျိုးအစားတူ သို့မဟုတ် အရည်အသွေးတူ ဖြစ်အောင်ဆောင်ရွက်ပေးပါမည်။ • MIE သည် ချည်ဦးချောင်းကို သောင်တူးဖော်မှုများပြုလုပ်ပေးပြီး လှေဆိပ်/ သင်္ဘောဆိပ်ကို အဆင့်မြှင့်တင်ပေးသွားမည် ဖြစ်ပါသည်။ • ထိခိုက်ခံစားရသော ကျေးရွာသူ/သားများနှင့် သင်္ဘောပိုင်ရှင်များအား MIE မှ လူထုကြားနာမှုများ ပြုလုပ်ပြီး ရှင်းလင်းမှုများ ပြုလုပ်သွားမည် ဖြစ်ပါသည်။
အပိုင်း ၆.၃.၄.၂ - လုပ်ငန်းခွင်ကျန်းမာရေး နှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး	DPC သည် အလုပ်သမားများ ဖုန်မှုန့်နှင့်ထိတွေ့မှု၊ ဆူညံသံနှင့် ဓါတ်ငွေ့ ထုတ်လွှတ်မှုများမှ လျော့နည်းသက်သာစေရန် သင့်တော်သော နည်းလမ်းများ ကို ထောက်ပံ့ပေးသွားမည် ဖြစ်ပြီး ဆောက်လုပ်ရေးလုပ်ငန်းခွင်တွင် ဖုန်မှုန့်၊ ဆူညံသံနှင့် ဓါတ်ငွေ့ ထုတ်လွှတ်မှုများ လျော့နည်းအောင် ဆောင်ရွက်သွားမည် ဖြစ်ပါသည်။
အပိုင်း ၆.၄ - တည်ဆောက်ဆဲကာလ	DPC သည် စီမံကိန်းတည်ဆောက်ဆဲကာလတွင် အောက်ဖော်ပြပါ သက်ဆိုင်ရာ ပတ်ဝန်းကျင် ပြဿနာများအတွက် လျော့ချရေးနည်းလမ်းများကို လိုက်နာဆောင်ရွက်သွားမည် ဖြစ်ပါသည်။ • ဖုန်မှုန့်

ကတိကဝတ်ဖော်ပြချက်နေရာ	ကတိကဝတ်
	• ဖါတ်ငွေ့ထုတ်လွှတ်မှု • ဆူညံသံ • ရေဆိုး • ဆောက်လုပ်ရေးလုပ်ငန်း စွန့်ပစ်ပစ္စည်းများ • လမ်းပန်းဆက်သွယ်ရေး • ရှေးဟောင်းသုတေသနနေရာတွင် ထိခိုက်မှု • ဒေသခံ စီပွားရေး • အသက်မွေးဝမ်းကြောင်း • အခြေခံအဆောက်အဦးနှင့် ဝန်ဆောင်မှုများ • ရိုးရာနှင့်ယဉ်ကျေးမှု • ဒေသခံကျန်းမာရေး၊ ဘေးအန္တရာယ်ကင်းရှင်းရေးနှင့် လုံခြုံရေး • ဒေသခံများမှ စီမံကိန်းအပေါ် အနတ်လက္ခဏာ သဘောထားတို့ဖြစ်ပါသည်။
အပိုင်း ၆.၄.၃.၁ - ဖုန်မှုန့်	စီမံကိန်း၏ ဖုန်မှုန့်ထွက်ပေါ်မှုများကို ကမ္ဘာ့ဘဏ်၏ ပတ်ဝန်းကျင်လေထုအရည်အသွေး စံနှုန်းများ နှင့် ကိုက်ညီအောင် ထိန်းချုပ်သွားမည် ဖြစ်ပါသည်။
အပိုင်း ၆.၄.၃.၂ - ဓါတ်ငွေ့ထုတ်လွှတ်မှု	စီမံကိန်း၏ ပတ်ဝန်းကျင်လေထု အရည်အသွေးကို ၂၀၁၅ ခုနှစ်တွင် ထုတ်ပြန်ထားသော မြန်မာနိုင်ငံ၏ အမျိုးသား ပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များနှင့် ကိုက်ညီအောင် ဆောင်ရွက်သွားပါမည်။
အပိုင်း ၆.၄.၃.၃ - ဆူညံသံ	US.EPA၏ တည်ဆောက်မှုဆိုင်ရာ ဆူညံသံစံနှုန်းများနှင့် IFC၏ ပတ်ဝန်းကျင် ဆူညံသံ အဆင့်များနှင့် ကိုက်ညီအောင် စီမံကိန်းမှ ဆောင်ရွက်သွားမည် ဖြစ်ပါသည်။
အပိုင်း ၆.၄.၃.၄ - ရေဆိုး	စီမံကိန်း၏ စွန့်ထုတ်မှုအရည်အသွေးစံနှုန်းကို ၂၀၁၅ ခုနှစ်တွင် ထုတ်ပြန်ထားသော အမျိုးသား မြန်မာနိုင်ငံ၏ ပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များနှင့် ကိုက်ညီအောင် ဆောင်ရွက်သွားပါမည်။
အပိုင်း ၆.၄.၃.၅ - ဆောက်လုပ်ရေးလုပ်ငန်း စွန့်ပစ်ပစ္စည်းများ	• စီမံကိန်း၏ အနယ်အနှစ်အရည်အသွေးကို ၂၀၀၄ ခုနှစ်တွင် ထုတ်ပြန်ထားသော INTERNATIONAL ASSOCIATION FOR IMPACT ASSESSMENT (IAIA) NOAA SCREEN QUICK REFERENCE TABLE နှင့် ကိုက်ညီအောင် ဆောင်ရွက်သွားပါမည်။ • WHO ၏ ၂၀၁၁ ခုနှစ်တွင် ထုတ်ပြန်သော သောက်သုံးရေအရည်အသွေး လမ်းညွှန်ချက် နှင့် ကိုက်ညီအောင် ဆောင်ရွက်သွားပါမည်။ • စွန့်ပြစ်အမှိုက်ကို စီမံကိန်းအတွင်း သို့မဟုတ် အပြင်တွင် ဖြစ်ကတတ်ဆန်း စုပုံစွန့်ပြစ်ခြင်း မပြုလုပ်ရပါ။ • ဆောက်လုပ်ရေးလုပ်ငန်း စွန့်ပစ်ပစ္စည်း စီမံခန့်ခွဲမှုနှင့် ပတ်သက်၍ ဒေသခံများမှ တိုင်ကြားမှုများ ဖြစ်ပေါ်လာလျှင် စီမံကိန်းမှ တာဝန်ယူ ဆောင်ရွက်ပေးသွားရမည် ဖြစ်ပါသည်။
အပိုင်း ၆.၄.၄.၁ - ဒေသခံစီပွားရေး	• စီမံကိန်းပိုင်ရှင်နှင့် ကန်ထရိုက်တာတို့သည် အလုပ်သမား ဦးစီးဌာနကို ဆက်သွယ်ပြီး စီမံကိန်းဆောက်လုပ်ရေးလုပ်ငန်းများ မစတင်ခင် အလုပ်သမားဦးစီးဌာနမှ ထုတ်ပြန် ထားသော ဥပဒေနှင့် စည်းမျဉ်းများနှင့်အညီ အလုပ်သမားများအား လေ့ကျင့် သင်ကြားခြင်း အစီအစဉ်များ ပြုလုပ်ရန် လိုအပ်ပါသည်။ • စီမံကိန်းအတွက် ဝန်ထမ်းများ ရှာဖွေရာတွင် ဆောက်လုပ်ရေးလုပ်ငန်းခွင်နှင့် နီးသော ရွာမှ အရည်အချင်းရှိသော ဒေသခံကျေးရွာသားများအား ဌားရမ်းမည် ဖြစ်ပါသည်။ • စီမံကိန်းသည် သက်ဆိုင်ရာ အလုပ်သမားဥပဒေ၊ လူမှုဖူလုံရေး ဥပဒေ၊ အခြေခံ အခကြေးငွေပေးချေရေး ဥပဒေနှင့် အခြားသော သက်ဆိုင်ရာ ဥပဒေနှင့်

ကတိကဝတ်ဖော်ပြချက်နေရာ	ကတိကဝတ်
	စည်းမျဉ်းများအား လိုက်နာမည် ဖြစ်ပါသည်။ • စီမံကိန်းဆောက်လုပ်ရေးအတွက် ဝန်ထမ်းခန့်အပ်ရန် ဒေသခံများအား အတတ်ပညာ သင်တန်းများ ထောက်ပံ့ပေးသွားမည် ဖြစ်ပါသည်။
အပိုင်း ၆.၅ - လုပ်ငန်းလည်ပတ်ဆောင် ရွက် သည့်ကာလ	DPC သည် လုပ်ငန်းလည်ပတ်ဆောင်ရွက်သည့်ကာလတွင် အောက်ဖော်ပြပါ သက်ဆိုင် ရာ ပတ်ဝန်းကျင် ပြဿနာများအတွက် လျော့ချရေးနည်းလမ်းများကို လိုက်နာဆောင် ရွက် သွားမည် ဖြစ်ပါသည်။ • ဓါတ်ငွေ့ထုတ်လွှတ်မှု (NO_x) • ဆူညံသံ • ရေဆိုး • အအေးခံရေ ရယူခြင်း • အပူစွန့်ထုတ်ခြင်း • လုပ်ငန်းခွင် ဘေးအန္တရာယ်ကင်းရှင်းရေးနှင့် ကျန်းမာရေး • ဒေသခံကျန်းမာရေး၊ ဘေးကင်းရေးနှင့် လုံခြုံရေး • ဒေသခံဖွံ့ဖြိုးတိုးတက်ရေး အထောက်အပံ့များနှင့် လူမှုပူပေါင်း တာဝန်ယူမှု (CSR) • ဒီရေတော စီမံခန့်ခွဲမှု အစီအစဉ်တို့ဖြစ်ပါသည်။
အပိုင်း ၆.၅.၃.၁ - ဓါတ်ငွေ့ထုတ်လွှတ်မှု (NO_x)	စီမံကိန်း၏ ပတ်ဝန်းကျင် လေထုအရည်အသွေး စံနှုန်းနှင့် ဓါတ်ငွေ့ထုတ်လွှတ်မှု စံနှုန်းများအတွက် အောက်ဖော်ပြပါ စံနှုန်းများကို လိုက်နာပါမည်။ • ၁၉၉၈ ခုနှစ်တွင် ကမ္ဘာ့ဘဏ်မှ ထုတ်ပြန်ထားသော အပူစွမ်းအင်သုံး ဓါတ်အားပေး စက်ရုံ - ဓါတ်အားပေးစက်ရုံအသစ်တို့အတွက် ညစ်ညမ်းမှုကာကွယ်ရေးနှင့် လျော့ချရေး လမ်းညွှန်ချက် လက်စွဲ စာအုပ် • ၂၀၀၇ ခုနှစ်တွင် IFC မှ ထုတ်ပြန်ထားသော ပတ်ဝန်းကျင်၊ ကျန်းမာရေးနှင့် ဘေးကင်း လုံခြုံရေး လမ်းညွှန်ချက် - ပတ်ဝန်းကျင်လေထုထုတ်လွှတ်ခြင်းနှင့် ပတ်ဝန်းကျင်လေထု အရည်အသွေး • ၂၀၁၅ ခုနှစ်တွင် ထုတ်ပြန်ထားသော မြန်မာနိုင်ငံ၏ အမျိုးသား ပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ • ၂၀၀၈ ခုနှစ်တွင် IFC မှ ထုတ်ပြန်ထားသော အပူစွမ်းအင်သုံး ဓါတ်အားပေးစက်ရုံများ အတွက် ပတ်ဝန်းကျင်၊ ကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေး လမ်းညွှန်ချက် တို့ဖြစ် ပါသည်။
အပိုင်း ၆.၅.၃.၂ - ဆူညံသံ	စီမံကိန်း၏ ပတ်ဝန်းကျင် အသံဆူညံမှုအတွက် အောက်ဖော်ပြပါ စံနှုန်းများကို လိုက်နာပါမည်။ • ၂၀၀၇ ခုနှစ်တွင် IFC မှ ထုတ်ပြန်ထားသော ပတ်ဝန်းကျင်၊ ကျန်းမာရေးနှင့် ဘေးကင်း လုံခြုံရေး လမ်းညွှန်ချက် - ပတ်ဝန်းကျင်လေထုထုတ်လွှတ်ခြင်းနှင့် ပတ်ဝန်းကျင်လေထု အရည်အသွေး • ၂၀၁၅ ခုနှစ်တွင် ထုတ်ပြန်ထားသော အမျိုးသား မြန်မာနိုင်ငံ၏ ပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ ဓါတ်အားပေးစက်ရုံ တည်ဆောက်ရေးပြင်ပ ပတ်ဝန်းကျင်ဆူညံသံအဆင့် သည် ၈၅ dB(A) ထက် မကျော်လွန်စေပဲ မည်သည့်လူပုဂ္ဂိုလ်မှ နားအကာအကွယ်မပါပဲ (၈)နာရီ ကျော် အလုပ်လုပ်ကိုင်ခြင်း မပြုလုပ်ရပါ။
အပိုင်း ၆.၅.၃.၃ - ရေဆိုး	စီမံကိန်းသည် စွန့်ထုတ်မှုအရည်အသွေး စံနှုန်းများအတွက် ၂၀၁၅ ခုနှစ်တွင် ထုတ်ပြန်ထားသော မြန်မာနိုင်ငံ၏ အမျိုးသား ပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များကို လိုက်နာသွားမည် ဖြစ်ပါသည်။
အပိုင်း ၆.၅.၃.၄ - အအေးခံရေ ရယူခြင်း	စီမံကိန်းအတွက် အအေးခံရေယူဆောင်ရာ အဝင်ပေါက်နေရာတွင် ၁၀ စင်တီမီတာ (bar screen) နှင့် ၁၀ မီလီမီတာ(travelling screen) ဇကာ ၂ခုကို တပ်ဆင်မည်ဖြစ်ပါသည်။

ကတိကဝတ်ဖော်ပြချက်နေရာ	ကတိကဝတ်
အပိုင်း ၆.၅.၃.၅ - အပူစွန့်ထုတ်ခြင်း	စွန့်ထုတ်ရာနေရာမှ မီတာ (၁၀၀) အကွာတွင် အပူချိန်သည် (၃) ဒီဂရီစင်တီဂရိတ် ထက်မပိုစေရန် ထိန်းချုပ်ထားရပါမည်။
အပိုင်း ၆.၅.၄.၁ - လုပ်ငန်းခွင် ကျန်းမာရေး နှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး	စီမံကိန်းသည် အောက်ဖော်ပြပါ သက်ဆိုင်ရာ လမ်းညွှန်ချက်များကို လိုက်နာဆောင်ရွက် သွားပါမည်။ • ၂၀၀၇ ခုနှစ်တွင် ထုတ်ပြန်ထားသော IFC ၏ ယေဘူယျ EHS လမ်းညွှန်ချက် - လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး • ၂၀၀၈ ခုနှစ်တွင် ထုတ်ပြန်ထားသော IFC ၏ ယေဘူယျ EHS လမ်းညွှန်ချက် - အပူစွမ်းအင်သုံး ဓါတ်အားပေးစက်ရုံများအတွက် အပိုင်း ၁.၂ - လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး တို့ဖြစ်ပါသည်။
အပိုင်း ၆.၅.၄.၃ - ဒေသခံဖွံ့ဖြိုး တိုးတက်ရေး အထောက်အပံ့များနှင့် လူမှုရေးပူးပေါင်းတာဝန်ယူမှု (CSR)	စီမံကိန်းလုပ်ငန်းလည်ပတ်ဆောင်ရွက်သည့်ကာလတွင် လူမှုရေးပူးပေါင်းတာဝန်ယူမှု တို့ကို ထောက်ပံ့ပေးရပါမည်။ ကုမ္ပဏီမှ စီမံကိန်းအနီးအနားရှိ ကျေးရွာများမှ ဒေသခံလုပ်ဆောင်မှုများဖြစ်သော ပညာရေး၊ ကျန်းမာရေး၊ ကိုးကွယ်ယုံကြည်မှု၊ ယဉ်ကျေးမှု၊ အလုပ်အကိုင်တိုးတက်မှုနှင့် ကျား/မ ဖွံ့ဖြိုးတိုးတက်ရေးတို့ကို ထောက်ပံ့ပေးသွားမည် ဖြစ်ပါသည်။
အပိုင်း ၆.၆ - လုပ်ငန်းရပ်စဲခြင်းကာလ	DPC သည် လုပ်ငန်းရပ်စဲခြင်းကာလတွင် အောက်ဖော်ပြပါ သက်ဆိုင် ရာ ပတ်ဝန်းကျင် ပြဿနာများအတွက် လျော့ချရေးနည်းလမ်းများကို လိုက်နာဆောင်ရွက် သွားမည် ဖြစ်ပါသည်။ • ဖုန်မှုန့် • ဓါတ်ငွေ့ထုတ်လွှတ်မှု • ဆူညံသံ • ပိတ်သိမ်းခြင်းစွန့်ပစ်ပစ္စည်းများ • လမ်းပန်းဆက်သွယ်ရေး • လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး တို့ဖြစ်ပါသည်။
အပိုင်း ၆.၇.၃ - လုပ်ငန်းလည်ပတ် ဆောင်ရွက် သည့်ကာလအတွက် ပတ်ဝန်း ကျင်ဆိုင်ရာ ဆိုးကျိုးသက်ရောက်မှု စီမံခန့်ခွဲခြင်း	• စီမံကိန်းသည် ဒီဇိုင်း၊ ကိရိယာများရွေးချယ်ခြင်း၊ တပ်ဆင်ခြင်းနှင့် တည်ဆောက်ခြင်းများ ပြုလုပ်ရာတွင် အခြားသော အသိအမှတ်ပြုနည်းပညာ အဖွဲ့အစည်းများဖြစ်သော American Society Of Mechanical Engineers (ASME)၊ American Gas Association (AGA)၊ US National Fire Protection Association (NFPA) နှင့် American Society of Testing Materials (ASTM) တို့၏ သက်ဆိုင်ရာ လမ်းညွှန်ချက် သို့မဟုတ် စံနှုန်းများကို အခြေခံ၍ လုပ်ဆောင်သွားမည် ဖြစ်ပါသည်။ • စီမံကိန်းအတွက် ဓါတ်ငွေ့ယိုစိမ့်မှုကာကွယ်ခြင်းစနစ်ကို HSE လမ်းညွှန်ချက် အမှတ် PM (၈၄) ၏ အကြံပေးချက်များအတိုင်း တပ်ဆင်သွားမည် ဖြစ်ပါသည်။ • စီမံကိန်းတွင် အသေးစိတ်ဒီဇိုင်းနှင့် သတ်မှတ်ချက်များပြီးနောက် အန္တရာယ်နှင့် လုပ်ငန်းလုပ်ဆောင်မှု အသေးစိတ်လေ့လာမှု (HAZOP) ကိုလုပ်ကိုင်သွားမည် ဖြစ်ပါသည်။ • ဂတ်(စ်) ပိုက်လိုင်းစနစ်အတွင်းသို့ သန့်ရှင်းရေးပြုလုပ်ချိန်တွင် မီးနှင့် ပေါက်ကွဲစေနိုင်သော ပစ္စည်းများ ယူဆောင်ခြင်းနှင့် ဂတ်(စ်) ပိုက်လိုင်းစနစ်သို့ လောင်ကျွမ်းစေနိုင်သော ပစ္စည်းယူဆောင်ခြင်းကို NFPA ၅၆ (PS) အရ ပြင်းထန်စွာ ကန့်သတ်ထိန်းချုပ်ထားရမည်ဖြစ်ပါသည်။
အခန်း (၇) - စုပေါင်းထိခိုက်မှု ဆန်းစစ်ခြင်း	
အပိုင်း ၇.၂.၂ - လေထုအရည်အသွေး ထိခိုက်မှု ဆန်းစစ်ခြင်း	စီမံကိန်းသည် အောက်ဖော်ပြပါ ပတ်ဝန်းကျင်လေထု အရည်အသွေးစံနှုန်းနှင့် ဓါတ်ငွေ့ထုတ်လွှတ်မှု စံနှုန်း တို့ကို လိုက်နာဆောင်ရွက်သွားပါမည်။ • ၁၉၉၈ ခုနှစ်တွင် ကမ္ဘာ့ဘဏ်မှ ထုတ်ပြန်ထားသော အပူစွမ်းအင်သုံး ဓါတ်အားပေး စက်ရုံ - ဓါတ်အားပေးစက်ရုံအသစ်တို့အတွက်

ကတိကဝတ်ဖော်ပြချက်နေရာ	ကတိကဝတ်
	ညစ်ညမ်းမှုကာကွယ်ရေးနှင့် လျော့ချရေး လမ်းညွှန်ချက် လက်စွဲ စာအုပ် • ၂၀၀၇ ခုနှစ်တွင် IFC မှ ထုတ်ပြန်ထားသော ပတ်ဝန်းကျင်၊ ကျန်းမာရေးနှင့် ဘေးကင်း လုံခြုံရေး လမ်းညွှန်ချက် - ပတ်ဝန်းကျင်လေထုထုတ်လွှတ်ခြင်းနှင့် ပတ်ဝန်းကျင်လေထု အရည်အသွေး
အခန်း (၈) - ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်	
အပိုင်း ၈.၁ - အယူအဆမူဘောင်	DPC သည် စီမံကိန်းတည်ဆောက်ရေးနှင့် လုပ်ငန်းလည်ပတ်ဆောင်ရွက်သည့်ကာလများအတွက် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်များအတွက် ဥပဒေမူဘောင်အနေဖြင့် ၂၀၁၅ ခုနှစ်တွင် ထုတ်ပြန်ထားသော ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်းအတိုင်း လိုက်နာဆောင်ရွက်သွားမည် ဖြစ်ပါသည်။
အပိုင်း ၈.၂ - စီမံကိန်း၏ EHS ပေါ်လစီ၊ ကတိကဝတ်နှင့် ဥပဒေ လိုအပ်ချက်များ	စီမံကိန်း၏ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ် (EMP) အတွက် ဥပဒေလိုအပ်ချက်များအဖြစ် လျှပ်စစ်ဥပဒေ (၂၀၁၄)၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး နည်းဥပဒေ (၂၀၁၄) နှင့် မြန်မာနိုင်ငံတွင် ၂၀၁၅ခုနှစ် ဒီဇင်ဘာလ ၂၉ရက်နေ့တွင် ထုတ်ပြန်သော အမျိုးသား ပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များကို လိုက်နာသွားမည် ဖြစ်ပါသည်။
အပိုင်း ၈.၃ - တည်ဆောက်ဆဲ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ် (CEMP) အကျဉ်း ချုပ်	ပိုင်ရှင် CEMP သည် စီမံကိန်း၏ အသေးစိတ်ဒီဇိုင်းနှင့် သက်ဆိုင်ရာ အဆောက်အဦး၊ ဆောက်လုပ်ရေးနည်းလမ်းနှင့် သတ်မှတ်ချက်များကို ပြင်ဆင်ထားပြီး ကန်ထရိုက်တာ CEMP မှ ၎င်းတို့အားလုံးအတွက် လျော့ချရေးနည်းလမ်းများကို ဆောင်ရွက်ရန် DPC မှ တာဝန်ယူရမည် ဖြစ်ပါသည်။ တည်ဆောက်ရေးကာလတွင် အောက်ဖော်ပြပါတို့ကို အကောင်အထည်ဖော် ဆောင်ရွက်သွားမည် ဖြစ်ပါသည်။ • ယေဘူယျ ဆောက်လုပ်ရေး • ဇီဝအမျိုက် စီမံခန့်ခွဲမှု • ဒီရေတော စီမံခန့်ခွဲမှု • လေထုအရည်အသွေး စီမံခန့်ခွဲမှု • ဆူညံသံ စီမံခန့်ခွဲမှု • ရေဆိုး စီမံခန့်ခွဲမှု • စွန့်ပစ်ပစ္စည်း စီမံခန့်ခွဲမှု • လမ်းပန်းဆက်သွယ်ရေး စီမံခန့်ခွဲမှု • လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး (OHS) စီမံခန့်ခွဲမှု • အရင်းအမြစ် စီမံခန့်ခွဲမှု • လူမှုပူးပေါင်းတာဝန်ယူမှု (CSR) • အရေးပေါ်အခြေအနေ စီမံခန့်ခွဲမှု တို့ဖြစ်ပါသည်။
အပိုင်း ၈.၄ - လုပ်ငန်းလည်ပတ်ဆောင်ရွက်ခြင်း ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ် (OEMP) အကျဉ်းချုပ်	DPC သည် အောက်ဖော်ပြပါ တို့ကို အကောင်အထည်ဖော် ဆောင်ရွက်သွားမည် ဖြစ်ပါသည်။ • လေထုအရည်အသွေး စီမံခန့်ခွဲမှု • ဆူညံသံ စီမံခန့်ခွဲမှု • ရေဆိုး စီမံခန့်ခွဲမှု • လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး (OHS) စီမံခန့်ခွဲမှု • လူမှုပူးပေါင်းတာဝန်ယူမှု (CSR) • ဒီရေတော ပြန်လည်ထူထောင်ရေး စီမံခန့်ခွဲမှု • အရေးပေါ်အခြေအနေ စီမံခန့်ခွဲမှု တို့ဖြစ်ပါသည်။
အပိုင်း ၈.၅ - လုပ်ငန်းရပ်စဲခြင်း ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ် (DEMP) အကျဉ်းချုပ်	DPC သည် အောက်ဖော်ပြပါ တို့ကို အကောင်အထည်ဖော် ဆောင်ရွက်သွားမည် ဖြစ်ပါသည်။ • လေထုအရည်အသွေး စီမံခန့်ခွဲမှု

ကတိကဝတ်ဖော်ပြချက်နေရာ	ကတိကဝတ်
	• ဆူညံသံ စီမံခန့်ခွဲမှု • ရေဆိုး စီမံခန့်ခွဲမှု • လမ်းပန်းဆက်သွယ်ရေး စီမံခန့်ခွဲမှု • လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး (OHS) စီမံခန့်ခွဲမှု • လူမှုပတ်ဝန်းကျင်ဆိုင်ရာ စီမံခန့်ခွဲမှု တို့ဖြစ်ပါသည်။
အပိုင်း ၈.၆ - အရေးပေါ်အခြေအနေ တုန့်ပြန်မှု အစီအစဉ်	DPC နှင့် ကန်ထရိုက်တာသည် စီမံကိန်း အကြိုတည်ဆောက်ရေးလုပ်ငန်းဆောင်ရွက်ခြင်းကာလ၊ တည်ဆောက်ဆဲကာလ၊ လုပ်ငန်းလည်ပတ်ဆောင်ရွက်ခြင်းကာလနှင့် လုပ်ငန်းရပ်စဲခြင်းကာလများ အတွက် ဘေးအန္တရာယ်အတွက် ကြိုတင်ပြင်ဆင်မှု အစီအစဉ်နှင့် အရေးပေါ်အခြေအနေ တုန့်ပြန်မှု အစီအစဉ်ကို ပြင်ဆင်ထားရမည် ဖြစ်ပါသည်။ ၎င်း အစီအစဉ်များကို တိုင်းဒေသကြီးအစိုးရ သဘာဝဘေးအန္တရာယ် စီမံခန့်ခွဲမှု ကော်မတီသို့ တင်ပြပြီး ခွင့်ပြုချက်ရယူရန် လိုအပ်ပါသည်။
အခန်း (၉) - အများပြည်သူတိုင်ပင်ဆွေးနွေးခြင်းနှင့် ထုတ်ဖော်ကြေညာခြင်း	
အပိုင်း ၉.၇ - နောင်ကာလ ဆွေးနွေးခြင်းများအတွက် အကြံပေးချက်များ	• စီမံကိန်းလုပ်ဆောင်မှုများနှင့် သက်ဆိုင်သော သတင်းအချက်အလက်များကို ဒေသခံပါဝင်သူများကော်မတီ (CPC) သို့ပေးပို့ပေးရပါမည်။
အခန်း (၁၀) - နိဂုံးချုပ်နှင့် အကြံပေးချက်များ	
အပိုင်း ၁၀.၂ - အကြံပေးချက်များ	• DPC သည် ရေရှည်တည်တံ့သော ပတ်ဝန်းကျင်နှင့် လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး စီမံခန့်ခွဲမှုအတွက် ပိုမိုကောင်းမွန်သော ပတ်ဝန်းကျင်ကာကွယ်ခြင်းနှင့် ထိန်းသိမ်းစောင့်ရှောက်ခြင်း ဖြစ်စေရန် ISO 14001 နှင့် OHSAS 18001 ကို အကောင်အထည်ဖော်ရပါမည်။ • စီမံကိန်းတည်ဆောက်ဆဲကာလနှင့် လုပ်ငန်းလည်ပတ်ဆောင်ရွက်ခြင်းကာလ၏ ပတ်ဝန်းကျင်စောင့်ကြည့်လေ့လာခြင်း အစီအစဉ်တွင် ကောက်ယူသော နမူနာများကို မြန်မာနိုင်ငံအစိုးရအသိအမှတ်ပြု သို့မဟုတ် အဆင့်မီပုဂ္ဂလိက ဓါတ်ခွဲခန်းသို့ DPC မှ ပို့ဆောင်ကာ ဓါတ်ခွဲစမ်းသပ်ရပါမည်။

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မှ Dawei Power Company Limited

အမည် Mr. Panya Visetnut

ရာထူး Assistant Manager

INITIAL PHASE POWER PLANT PROJECT

PROJECT KEY COMMITMENTS

A consolidated summary list of environmental and social impacts and mitigation measures commitments that Dawei Power Company Limited will be expected to adopt in order to manage and mitigation potential impacts associated with the project development is provided below:

Commitment Source	Commitment
ESIA Report	
Chapter 3-Overview of the Policy, Legal and Institutional Framework	
Section 3.1 : Corporate Environmental and Social Policies	• DPC will formulate environmental and social policies to guide its environmental and social management during the construction and operation phases. • DPC will submit the "Registered Engineer Certificate" of the contractor which is certified by Myanmar Engineering Council before construction commencement.
Section 3.2.1: Laws and Regulations related to Environmental Management, Social Impact Management	DPC will follow: • The Environmental Conservation Law (2012); Section 7 (o), 14, 15, 24, 25, 29 • The Environmental Conservation Rules (2014); Rule 68 (a) (b) • Environmental Impact Assessment Procedure (2015); Paragraph 102 (a) (b), 103, Rule 104, Paragraph 105, 106, 107, 108, Rule 109, Paragraph 110, 113, 115 and 117 • Emission Quality Standards Guidelines (2015) • The Myanmar Investment Law (2016); Section 50 (a) (d), 51 (b) (c) (d), 65 (g) (i) (j) (k) (l) (m) (o) (p) (q) and 73 • Protection the Rights of National Races Law (2015); Section 5 • The Electricity Law (2014), Section 10 (b), 18, 21 (a), 22 (a), 26 (a) (b), 27, 40 and 68 • Factories Act (1951), Section 5 and 7 • The Public Health Law (1972), Section 3 and 5 • Prevention and Control of Communicable Diseases Law (1995), Section 3 (a), 4, 9 (a) (b) (c) (d) and 11 • The Control of Smoking and Consumption of Tobacco Product Law (2006), Section 9 (a) (b) (c) (d) • The Myanmar Fire Force Law (2015), Section 25 (a) (b) • The Motor Vehicle Law (2015) and Rules (1987) • The Myanmar Insurance Law (1993), Section 15 and 16 • Labour Organization Law (2011), Section 17, 18,

Commitment Source	Commitment
	19, 20, 21 and 22 • The Settlement of Labour Disputes Law (2012), Section 38, 39, 40 and 51 • Employment and Skill Development Law (2013), Section 5, 14 and 30 (a) (b) • The Minimum Wages Law (2013), Section 12, 13 (a) (b) (c) (d) (e) (f) (g) and 18 (d) (e) • Payment of Wages Law (2016), Section 3, 4, 5, 7, 8, 9, 10, 11, 12, 13 and 14 • Workmen's Compensation Act (1923), Section 13 • The Leave and Holiday Act (1951) • Social Security Law (2012), Section 11 (a), 15 (a), 18 (b), 48 (b) and 75 • Petroleum Act (1934), Section 3 • The Petroleum Rule (1937), Chapter 3 and 4 • Conservation of Water Resources and Rivers Law (2006), Section 8 (a) and 24 (b) • Freshwater Fisheries Law (1991), Section 40 • Myanmar Marine Fishery Law (1990), Section 39 • The Protection and Preservation of Cultural Heritage Regions Law (1998), Section 13 and 22 • The Protection and Preservation of Antique Objects Law (2015), Section 12 • The Protection and Preservation of Ancient Monument Law (2015), Section 12, 15, and 20 (f) • The Forest Law (1992), Section 12 (a) • The Special Economic Zone Law (2014), Section 11 (f) (p), 27, 35, 75, 76, 77, 78 and 80 (a) (b) (c) (d) (e) • The Engineering Council Law (2013), Section 34 and 37 • Myanmar Port Authority Law (2015), Section 23 (a) • The Export and Import Law (2012), Section 7
Section 3.5: International Policies, Guidelines and Standards	DPC will follow: • Performance Standards on Environmental and Social Sustainability, January 1, 2012 • Environmental, Health, and Safety-General Guidelines, April 30, 2007 • Environmental, Health, and Safety Guidelines for Thermal Power Plants, December 19, 2008 • World Bank's Pollution Prevention and Abatement Handbook, 1998
Table 3.6-1: International Ambient Environmental Quality Standards	DPC will comply: • Ambient Air Quality • Ambient Noise Levels • Vibration

Commitment Source	Commitment
	• Coastal Water Quality • Sediment Quality • Groundwater Quality • Thermal Heat Flux
Table 3.6-2: National Emission Standards	DPC will comply National Environmental Quality (Emission) Guidelines, Myanmar, 29th December 2015 for air emission levels from combustion turbine and reciprocating engine.
Table 3.6-3: National Effluent Standards	DPC will comply National Environmental Quality (Emission) Guidelines, Myanmar, 29th December 2015 for effluent levels of thermal power and site runoff and wastewater discharges during construction phase.
Table 3.6-4: Emission Standards for Natural Gas Fueled Power Plant	DPC will comply IFC Environmental, Health, and Safety Guidelines Thermal Power Plant (2008) for air emission levels from combustion turbine and reciprocating engine.
Chapter 4-Project Description and Alternatives	
Section 4.1.1: Project Description	• DPC will comply access road geometry standard following with the requirements of Myanmar laws and regulation and international standards. • The Project will incorporate Dry Low NO_x (DLN) combustion technology for combustion period to increase thermal efficiency and reduce NO_x emissions. • The Project will install Heat Recovery Steam Generator stack in accordance with ASME Boiler and Pressure Vessel Code. • The Project will install two screens with mesh size of 10 cm (bar screen) and 10 mm (travelling screen) at entrance of cooling water intake point. • The Project will install gas engines and combined cycle gas turbines to run on natural gas only. • The Project will install the diesel oil storage tanks in adequate for emergency diesel generator operation for safe shutdown. • The Project will require sea water for the once-trough cooling system. • The Project will install facilities for the treatment of wastewater to ensure that the treated effluent will meet the applicable effluent quality standards of National Environment Quality (Emission) Guidelines, Myanmar, 29th December 2015. • The Project will control noise emission in any frequently occupied area of the power plant i.e. control rooms, office and off-site in normal operation mode. • The Project will design the power plant and its associated facilities in compliance with applicable

Commitment Source	Commitment
	OHS requirement for thermal power plant, such as noise, vibration, and hazardous works. • The Project will responsible for preparing occupational health and safety plan with detail covering every steps of operation in order to ensure the project operation reaching high-level of occupational health and safety. • The Project will design and construct all buildings and structures to blend in with the surrounding environment. • The Project will construct the storm water management system to enable effective control of storm water runoff.
Chapter 6-Impact and Risk Assessment and Mitigation Measures	
Section 6.3: Pre-construction Phase	DPC will comply the mitigation measures of the relevant environmental issues to be managed in pre-construction phase as follows: • Fugitive dust • Gaseous emissions • Noise • Site clearing wastes • Road traffic • Impacts on archaeological site • Loss of Britney Creek • Occupational safety and health of workers
Section 6.3.3.1: Fugitive Dust	The Project will comply the fugitive dust control target based on the World Bank's ambient air quality standard.
Section 6.3.3.3: Noise	The Project will comply construction noise standards of US.EPA Standards and ambient noise level of IFC Standards.
Section 6.3.3.6: Impact on Archaeological Site	The Project will inform concerned authority (Fine Arts Department), including head of village and township in case discover artifacts which potentially could have archaeological and cultural value.
Section 6.3.4.1: Loss of Britney Creek	• MIE will develop alternative dockyard/boatyard at Chi Oo Creek area. The alternative dockyard/ boatyard will be of similar kind or quality to the existing dockyard/boatyard at Britney Creek. • MIE will dredge Chi Oo Creek and upgrade the route to the dockyard/boatyard. • MIE will organize public hearing and clarification for villagers and ship owners who are potentially affected.
Section 6.3.4.2: Occupational Health and Safety	DPC will provide appropriate protective measures to minimize worker's exposure to fugitive dust, excessive noise, and gaseous emissions and to reduce the levels of dust, noise and gaseous emissions at the

Commitment Source	Commitment
	construction site.
Section 6.4: Construction Phase	DPC will comply the mitigation measures of the relevant environmental issues to be managed in construction phase as follows: • Fugitive dust • Gaseous emissions • Noise • Wastewaters • Construction wastes • Road traffic • Impact on Archaeological site • Local economy • Livelihood • Infrastructure and services • Culture and tradition • Community health, safety and security • Stakeholders' negative attitude toward the Project
Section 6.4.3.1: Fugitive Dust	The Project will comply the fugitive dust control target based on the World Bank's ambient air quality standard.
Section 6.4.3.2: Gaseous Emissions	The Project will comply ambient air quality standards of National Environmental Quality (Emission) Guidelines, Myanmar, 2015.
Section 6.4.3.3: Noise	The Project will comply construction noise standards of US.EPA Standards and ambient noise level of IFC Standards.
Section 6.4.3.4: Wastewaters	The Project will comply with applicable effluent quality standards of National Environmental Quality (Emission) Guidelines, Myanmar, 2015.
Section 6.4.3.5: Construction Wastes	• The Project will comply with applicable sediment quality of International Association for Impact Assessment (IAIA) NOAA Screen Quick Reference Table, 2004. • The Project will comply with applicable groundwater quality standards of WHO's Guidelines for Drinking Water Quality, 2011. • No wastes are haphazardly dumped inside or outside the construction site. • In case of any public complaints related to the management of construction wastes, the Project will response effectively.
Section 6.4.4.1: Local Economy	• The Project Proponent and the Contractor will contact the Labour Directorate and prepare training program for employees with reference to the laws and regulation of Labour Directorate before commencement of the Project construction. • The Project will hire qualify local people, especially residents of the villages close to the

Commitment Source	Commitment
	construction site. • The Project will comply with the requirements in national labor law, the social security law and standard wage rate, and other applicable laws and regulations. • The Project will provide skill training to local people to be employed in the project construction.
Section 6.5: Operation Phase	DPC will comply the mitigation measures of the relevant environmental issues to be managed in operation phase as follows: • Gaseous emissions (NO_x) • Noise • Wastewaters • Cooling water intake • Thermal discharge • Occupational safety and health • Community health, safety and security • Community development supports and Corporate Social Responsibility (CSR) • Mangrove management program
Section 6.5.3.1: Gaseous Emissions (NO_x)	The Project will comply ambient air quality standards and emission standards as follows: • Thermal Power: Guidelines for New Plant, Pollution Prevention and Abatement Handbook World Bank Group, 1998 • Environmental, Health, and Safety Guidelines: Environment Air Emissions and Ambient Air Quality of International Finance Corporation, 2007 • National Environmental Quality (Emission) Guidelines, Myanmar, 2015 • IFC Environmental, Health, and Safety Guideline Thermal Power Plants, 2008
Section 6.5.3.2: Noise	• The Project will comply with ambient noise levels as follows: - Environmental, Health, and Safety Guidelines: General EHS Guidelines: Environmental Noise Management of International Finance Corporation, 2007 - National Environmental Quality (Emission) Guidelines, Myanmar, 2015 • Ambient noise level outside the power plant building not exceeding 85 dB(A) on a condition that no plant personnel will be exposed to this maximum noise level more than 8 hours per day without hearing protection.
Section 6.5.3.3: Wastewaters	The Project will comply with applicable effluent quality standards of National Environmental Quality (Emission) Guidelines, Myanmar, 2015.

Commitment Source	Commitment
Section 6.5.3.4: Cooling Water Intake	The Project will install two screens with mesh size of 10 cm (bar screen) and 10 mm (travelling screen) at entrance of cooling water intake point.
Section 6.5.3.5: Thermal Discharge	The Project will control the temperature increase not exceed 3°C at about 100 m from the discharge point.
Section 6.5.4.1: Occupational Health and Safety	The Project will comply with applicable guidelines as follows: • IFC's General EHS Guidelines: Occupational Health and Safety, 2007 • IFC's EHS Guidelines: Thermal Power Plant, Section 1.2-Occupational Health and Safety, 2008
Section 6.5.4.3: Community Development Supports and Corporate Social Responsibility (CSR)	The Project will support corporate social responsibility during operation period. The company will support community activities i.e. education, health, religious, culture, occupation promotion and gender development for villages that located nearby the proposed project.
Section 6.6: Decommissioning Phase	DPC will comply the mitigation measures of the relevant environmental issues to be managed in decommission phase as follows: • Fugitive dust • Gaseous emissions • Noise • Decommissioning wastes • Road traffic • Occupational health and safety
Section 6.7.3: Environmental Risk Management-Operational Phase	• The Project will ensure that the design, selection of equipment, installation and construction will follow the health and safety guidelines, as well as applicable supplementary guidelines or standards of other recognized technical organizations such as the American Society of Mechanical Engineers (ASME), the American Gas Association (AGA), the US National Fire Protection Association (NFPA), and the American Society of Testing Materials (ASTM). • The Project will include installation of gas leakage detection system as advised in HSE's Guidance Note PM 84. • The Project will conduct a detailed hazard and operability study (HAZOP) after the detailed design and specification. • Purging of the gas piping system must strictly observe guidelines in NFPA 56 (PS) Fire and Explosion Prevention during cleaning and purging of flammable gas piping system.
Chapter 7-Cumulative Impact Assessment	
Section 7.2.2: Air Quality	The Project will comply ambient air quality standards

Commitment Source	Commitment
Impact Assessment	and emission standards as follows: • Thermal Power: Guidelines for New Plant, Pollution Prevention and Abatement Handbook World Bank Group, 1998 • Environmental, Health, and Safety Guidelines: Environment Air Emissions and Ambient Air Quality of International Finance Corporation, 2007
Chapter 8-Environmental Management Plans	
Section 8.1: The Conceptual Framework	DPC will follow the Environmental Impact Assessment Procedure (2015) to comply with legal framework of the environmental management plans of construction and operation phases.
Section 8.2: Project's EHS Policy and Commitments, and legal requirements	The Project will comply with legal requirements pertinent to the EMP prescribed in the Electricity Law 2014, the Environmental Conservation Rule 2014, EIA Procedure 2015, and National Environmental Quality (Emission) Guidelines, Myanmar, 29th December 2015.
Section 8.3: Summary of CEMP	DPC will ensure that the Contractor-CEMP will incorporate all mitigation measures as prescribed in the Owner-CEMP in preparing detailed design of the power plant and its associated facilities, construction methods, and specifications. The following issues will be implemented during the construction phase: • General construction • Biomass waste management • Mangrove management • Air quality management • Noise management • Wastewater management • Waste management • Traffic management • OHS management • Resource management • Corporate Social Responsibility (CSR) • Emergency management
Section 8.4: Summary of OEMP	DPC will implement the following issues: • Air quality management • Noise management • Wastewater management • OHS management • Corporate Social Responsibility (CSR) • Mangrove rehabilitation management • Emergency management
Section 8.5: Summary of DEMP	DPC will implement the following issues: • Air quality management

Commitment Source	Commitment
	• Noise management • Waste management • Traffic management • OHS management • Social environmental management
Section 8.6: Emergency Response Plan	DPC and the contractor will prepare Disaster Preparedness Plan and Emergency Response Plan for pre-construction, construction, operation, and decommissioning phases of the Project. The plan will be submitted to Natural Disaster Management Committee of Division/State Government and for approval.
Chapter 9 Public Consultation and Disclosure	
Section 9.7: Recommendations for Future Consultations	The Project will support the Community Participatory Committee (CPC) to disclose the information related to the Project activities.
Chapter 10-Conclusions and Recommendations	
Section 10.2: Recommendations	• DPC will develop ISO 14001 and OHSAS 18001 for better compliance with environmental protection and conservation for sustainable environment and occupational health and safety management. • DPC will send the collected samples related to environmental monitoring program during construction and operation phases to analyze at the assigned qualified laboratory under Myanmar government or qualified private laboratory.

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By: Dawei Power Company Limited

Name: Mr. Panya Visetnut

Title: Assistant Manager

ကနဦးကာလ ဓာတ်အားပေးစက်ရုံ စီမံကိန်းက လိုက်နာဆောင်ရွက်ရမည့် ဥပဒေဆိုင်ရာကတိကဝတ်များ

၁။ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ(၂၀၁၂)

၂။ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနည်းဥပဒေ(၂၀၁၄)

၃။ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးနည်းလုပ်နည်း(၂၀၁၅)

၄။ အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာအရည်အသွေးထုတ်လွှတ်မှုလမ်းညွှန်ချက်(၂၀၁၅)

၅။ မြန်မာနိုင်ငံ ရင်းနှီးမြှုပ်နှံမှု ဥပဒေ (၂၀၁၆)

၆။ လျှပ်စစ်ဥပဒေ(၂၀၁၄)

၇။ တိုင်းရင်းသားလူမျိုးများ အကျိုးစီးပွားကာကွယ်စောင့်ရှောက်ရေး ဥပဒေ(၂၀၁၅)

၈။ ပြည်သူ့ကျန်းမာရေးဥပဒေ(၁၉၇၂)

၉။ ကူးစက်ရောဂါများကာကွယ်နှိမ်နင်းရေးဥပဒေ(၁၉၉၅)

၁၀။ ဆေးလိပ်နှင့်ဆေးရွက်ကြီးထွက်ပစ္စည်းသောက်သုံးမှုထိန်းချုပ်ရေးဥပဒေ(၂၀၁၆)

၁၁။ မြန်မာနိုင်ငံမီးသတ်တပ်ဖွဲ့ဥပဒေ(၂၀၁၅)

၁၂။ မော်တော်ယာဉ်ဥပဒေ(၂၀၁၅)နှင့်မော်တော်ယဉ်နည်းဥပဒေများ(၁၉၈၇)

၁၃။ မြန်မာ့အာမခံလုပ်ငန်းဥပဒေ(၁၉၉၃)

၁၄။ အလုပ်သမားအဖွဲ့အစည်းဥပဒေ(၂၀၁၁)

၁၅။ အလုပ်သမားရေးရာအငြင်းပွားမှုဖြေရှင်းရေးဥပဒေ(၂၀၁၂)

၁၆။ အလုပ်အကိုင်နှင့်ကျွမ်းကျင်မှုဖွံ့ဖြိုးတိုးတတ်ရေးဥပဒေ(၂၀၁၃)

၁၇။ ၂၀၁၃ခုနှစ်၊အနည်းဆုံးအခကြေးငွေ ဥပဒေ

၁၈။ ၂၀၁၆ခုနှစ်၊အခကြေးငွေပေးချေရေးဥပဒေ

၁၉။ အလုပ်သမားလျော်ကြေးအက်ဥပဒေ(၁၉၅၁)

၂၀။ ခွင့်နှင့်အလုပ်ပိတ်ရက်များအက်ဥပဒေ(၁၉၅၁)

၂၁။ လူမှုဖူလုံရေးဥပဒေ(၂၀၁၂)

၂၂။ ရေနံအက်ဥပဒေ(၁၉၃၄)

၂၃။ ရေနံနည်းဥပဒေများ(၁၉၃၇)

၂၄။ ရေအရင်းအမြစ်နှင့် မြစ်၊ ချောင်းများထိန်းသိမ်းရေး ဥပဒေ(၂၀၀၆)

၂၅။ ရေချိုငါးလုပ်ငန်း ဥပဒေ (၁၉၉၁)

၂၆။ မြန်မာ့ပင်လယ်ငါးလုပ်ငန်းဥပဒေ (၁၉၉၀)

၂၇။ ယဉ်ကျေးမှုအမွေအနှစ်ဒေသများ ကာကွယ်ထိန်းသိမ်းရေး ဥပဒေ (၁၉၉၈)

၂၈။ ရှေးဟောင်းဝတ္ထုပစ္စည်းများ ကာကွယ်ထိန်းသိမ်းရေး ဥပဒေ (၂၀၁၅)

၂၉။ ရှေးဟောင်းအဆောက်အအုံများ ကာကွယ်ထိန်းသိမ်းရေး ဥပဒေ (၂၀၁၅)

၃၀။ သစ်တောဥပဒေ (၁၉၉၂)

၃၁။ မြန်မာ့အထူးစီးပွားရေးဇုန်ဥပဒေ (၂၀၁၄)

၃၂။ မြန်မာနိုင်ငံအင်ဂျင်နီယာကောင်စီဥပဒေ (၂၀၁၃)

၃၃။ အလုပ်ရုံများအက်ဥပဒေ (၁၉၅၁)

၃၄။ မြန်မာ့ဆိပ်ကမ်းအာဏာပိုင်ဥပဒေ (၂၀၁၅)

၃၅။ ပို့ကုန်သွင်းကုန်ဥပဒေ(၂၀၁၂)

၁။ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ(၂၀၁၂)

စီမံကိန်းပိုင်ရှင်သည်-

(က) ပတ်ဝန်းကျင်ကိုညစ်ညမ်းစေခဲ့လျှင်ဝန်ကြီးဌာနက သတ်မှတ်သည့် လျော်ကြေးငွေကို ပေးလျော်ပါမည်။ (ပုဒ်မ၇၊ ပုဒ်မခွဲ(ဏ) အရ)

(ခ) ပတ်ဝန်းကျင်ကိုညစ်ညမ်းမှုဖြစ်ပေါ်စေသည့်ထုတ်လွှတ်ခြင်းကို သတ်မှတ်ထားသည့် ပတ်ဝန်းကျင်အရည်အသွေး စံချိန်စံညွှန်းများနှင့်အညီ ထုတ်လွှတ်ပါမည်။(ပုဒ်မ၁၄အရ)

(ဂ) ပတ်ဝန်းကျင်ညစ်ညမ်းမှုများကို စောင့်ကြပ်ကြည့်ရှုရန်၊ ထိန်းချုပ်ရန်၊ စီမံခန့်ခွဲရန်၊ လျော့ချရန် သို့မဟုတ် ပပျောက်စေရန်လုပ်ငန်းခွင် အထောက်အကူပြုပစ္စည်း သို့မဟုတ် ထိန်းချုပ်ရေးပစ္စည်းကိရိယာကို တပ်ဆင်ခြင်း သို့မဟုတ်

သုံးစွဲခြင်းပြုပါမည်။ ထိုသို့မဆောင်ရွက်နိုင်ပါက စွန့်ပစ်ပစ္စည်းများကို ပတ်ဝန်းကျင်ကိုမထိခိုက်စေသော နည်းလမ်းများနှင့်အညီ စွန့်ပစ်ပါမည်။(ပုဒ်မ၁၅အရ)

(ဃ) ဝန်ကြီးဌာနကထုတ်ပေးသည့် ကြိုတင်ခွင့်ပြုချက်ပါစည်းကမ်းချက်များနှင့်အညီ ဆောင်ရွက်ခြင်း ရှိ မရှိ လာရောက်စစ်ဆေးသည့် တာဝန်ရှိပုဂ္ဂိုလ် သို့မဟုတ် အဖွဲ့အစည်းအား စစ်ဆေးခွင့်ပြုပါမည်။ (ပုဒ်မ၂၄အရ)

(င) ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေအရထုတ်ပြန်သော နည်းဥပဒေများ၊ အမိန့်ကြော်ငြာစာ၊ အမိန့်၊ ညွှန်ကြားချက်နှင့် လုပ်ထုံးလုပ်နည်းပါ တားမြစ်ချက်များကိုလိုက်နာပါမည်။(ပုဒ်မ၂၉အရ)

၂။ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနည်းဥပဒေ(၂၀၁၄)

စီမံကိန်းပိုင်ရှင်သည်-

(က) နည်းဥပဒေ၆၉၊ နည်းဥပဒေခွဲ(က)အရ ပတ်ဝန်းကျင်ကိုညစ်ညမ်းစေသည့် ပစ္စည်းများကို အများပြည်သူအား တိုက်ရိုက်ဖြစ်စေ သွယ်ဝိုက်၍ဖြစ်စေ ထိခိုက်စေနိုင်မည့် နေရာတစ်ခုခုတွင် တစ်နည်းနည်းဖြင့် ထုတ်လွှတ်ခြင်း၊ ထုတ်လွှတ်စေခြင်း၊ စွန့်ပစ်ခြင်း၊ စွန့်ပစ်စေခြင်း၊ စုပုံခြင်း၊ စုပုံစေခြင်း မပြုပါ။

(ခ) နည်းဥပဒေ၆၉၊ နည်းဥပဒေခွဲ(က)အရ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ၊ နည်းဥပဒေများ တစ်ခုခုအရ အမိန့်ကြော်ငြာစာဖြင့် သတ်မှတ်ထားသော ဘေးအန္တရာယ်ရှိပစ္စည်းများကို အများပြည်သူအား တိုက်ရိုတ်ဖြစ်စေ သွယ်ဝိုက်၍ဖြစ်စေ ထိခိုက်စေနိုင်မည့်နေရာတစ်ခုခုတွင် တစ်နည်းနည်းဖြင့်ထုတ်လွှတ်ခြင်း၊ ထုတ်လွှတ်စေခြင်း၊ စွန့်ပစ်ခြင်း၊ စွန့်ပစ်စေခြင်း၊ စုပုံခြင်း၊ စုပုံစေခြင်း မပြုပါ။

(ဂ) နည်းဥပဒေ၆၉၊နည်းဥပဒေခွဲ(ခ)အရ ဂေဟာစနစ်နှင့်ယင်းစနစ်ကြောင့် ဖြစ်ပေါ်ပြောင်းလဲနေသော သဘာဝပတ်ဝန်းကျင်ကို ထိခိုက်ပျက်စီးစေနိုင်သည့် ပြုလုပ်မှုကို ဆောင်ရွက်ခြင်းမပြုပါ။

စီမံကိန်းပိုင်ရှင်သည်-

(က) မိမိကိုယ်တိုင်ကြောင့်ဖြစ်စေ၊ မိမိကိုယ်စား ဆောင်ရွက်သည့်ကန်ထရိုက်တာ၊ လက်ခွဲ ဆောင်ရွက်ပေးသူ ဆပ်ကန်ထရိုက်တာ၊ အရာရှိ၊ အလုပ်သမား၊ ကိုယ်စားလှယ် သို့မဟုတ် အတိုင်ပင်ခံ၏ပြုလုပ်မှု သို့မဟုတ် ပျက်ကွက်မှုကြောင့်ပေါ်ပေါက်သည့် ဆိုးကျိုးသက်ရောက်မှုကို တာဝန်ယူပါမည်။ (အပိုဒ်၁၀၂(က)အရ)

(ခ) စီမံကိန်းကြောင့်ထိခိုက်ခံစားရသူကို လက်ရှိ သို့မဟုတ် စီမံကိန်းမဆောင်ရွက်မီကာလထက် မနိမ့်ကျသော လူမှုစီးပွားရေး တည်ငြိမ်ခိုင်မာမှုရရှိသည်အထိ ဆောင်ရွက်ပေးရန်နှင့် သက်မွေးဝမ်းကျောင်းလုပ်ငန်းများ ပြန်လည်တည်ထောင်ရေးနှင့် ပြန်လည်နေရာချထားရေး အစီစဉ်များကို စီမံကိန်းကြောင့်ထိခိုက်ခံစားရသူများ၊ သက်ဆိုင်ရာအစိုးရဌာန၊ အဖွဲ့အစည်းများ၊ အခြားသက်ဆိုင်သူများနှင့် တိုင်ပင်ဆွေးနွေး၍ လိုအပ်သလိုပံ့ပိုးပေးပါမည်။ (အပိုဒ်၁၀၂(ခ)အရ)

(ဂ) ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်၊ စီမံကိန်းကတိကဝတ်အားလုံးနှင့် စည်းကမ်းချက်များကို အပြည့်အဝ အကောင်အထည်ဖော်ပါမည်။ မိမိကိုယ်စားဆောင်ရွက်သည့် ကန်ထရိုက်တာ၊ လက်ခွဲဆောင်ရွက်ပေးသူ ဆပ်ကန်ထရိုက်တာများက စီမံကိန်းအတွက်လုပ်ငန်းများ ဆောင်ရွက်ရာတွင် သက်ဆိုင်ရာဥပဒေ၊ နည်းဥပဒေများ၊ ဤလုပ်ထုံးလုပ်နည်း၊ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်နှင့် စည်းကမ်းချက်များအားလုံးကို အပြည့်အဝ လိုက်နာဆောင်ရွက်စေပါမည်။ (အပိုဒ်၁၀၄အရ)

(ဃ) ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဆိုင်ရာ လိုက်နာဆောင်ရွက်မှု သက်သေခံလက်မှတ်၊ သက်ဆိုင်ရာဥပဒေများ၊ နည်းဥပဒေများ၊ ဤလုပ်ထုံးလုပ်နည်းနှင့် စံချိန်စံညွှန်းတို့တွင်ပါရှိသော လိုအပ်ချက်အားလုံးကို တာဝန်ယူသည့်အပြင် ထိရောက်စွာအကောင်အထည်ဖော် ဆောင်ရွက်ပါမည်။ (အပိုဒ်၁၀၅အရ)

(င) အကြိုတည်ဆောက်ခြင်း၊ တည်ဆောက်ခြင်း၊ လုပ်ငန်းလည်ပတ်ဆောင်ရွက်ခြင်း၊ လုပ်ငန်းရပ်စဲခြင်း၊ လုပ်ငန်းပိတ်သိမ်းခြင်းနှင့် လုပ်ငန်းပိတ်သိမ်းပြီးကာလတို့တွင် ဆိုးကျိုးသက်ရောက်မှု အားလုံးအတွက်

စီမံကိန်းနှင့်ဆက်စပ်ဆောင်ရွက်မှုများကို စဉ်ဆက်မပြတ် ဘက်စုံစောင့်ကြပ်စစ်ဆေးပါမည်။(အပိုဒ်၁၀၆အရ)

(စ) မိမိ၏တာဝန် သို့မဟုတ် ဆောင်ရွက်ချက်ပျက်ကွက်မှုကို အမြန်ဆုံးစာဖြင့်တင်ပြပါမည်။ ပျက်ကွက်မှုကြောင့် ပတ်ဝန်းကျင်အပေါ်သက်ရောက်မှုဖြစ်နိုင်သည့်ကိစ္စ သို့မဟုတ် ဝန်ကြီး ဌာနကအမြန်သိရန်လိုအပ်သည့်ကိစ္စကို ၂၄နာရီအတွင်းလည်းကောင်း အခြားကိစ္စဖြစ်ပါက စတင်သိရှိချိန်မှ ၇ ရက် အတွင်းလည်းကောင်း ဝန်ကြီးဌာနသို့ တင်ပြပါမည်။ (အပိုဒ်၁၀၇အရ)

(ဆ) ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီစဉ်၏ဇယားပါအတိုင်းစောင့်ကြပ်ကြည့်ရှုမှုအစီရင်ခံစာကို ၆လ တစ်ကြိမ် သို့မဟုတ် ဝန်ကြီးဌာနကသတ်မှတ်သည့်အတိုင်း ဝန်ကြီးဌာနသို့ အစီရင်ခံ တင်ပြပါမည်။ (အပိုဒ်၁၀၈အရ)

(ဇ) စောင့်ကြပ်ကြည့်ရှုမှု အစီရင်ခံစာတွင် အပိုဒ်၁၀၉ပါ သတ်မှတ်ချက်များ အနည်းဆုံး ထည့်သွင်းဖော်ပြပါမည်။ (အပိုဒ်၁၀၉အရ)

(ဈ) အပိုဒ် ၁၀၈ အရ တင်ပြသည့်နေ့ရက်မှ ၁၀ရက်အတွင်း အများပြည်သူသိရှိနိုင်ရန် စီမံကိန်း၏ဝက်ဘ်ဆိုဒ်၊ စာကြည့်တိုက်၊ ပြည်သူခန်းမ၊ အများပြည်သူစုဝေးရာနေရာနှင့် စီမံကိန်းရုံးဌာနတို့တွင် အများပြည်သူသိရှိစေရန် ယင်းအစီရင်ခံစာကိုတင်ပြပါမည်။ ယင်းအစီရင်ခံစာ၏ ဒီဂျီတယ်မိတ္တူ တောင်းခံချက်ကို လက်ခံရရှိသည့်နေ့မှစ ၁၀ရက်အတွင်း အီးမေလ်ဖြင့် ဖြစ်စေ၊ တောင်းခံသူနှင့် သဘောတူညီထားသည့် အခြားနည်းလမ်းဖြင့် ဖြစ်စေ တောင်းခံသူအား ပေးပါမည်။ (အပိုဒ်၁၁၀အရ)

(ည) စောင့်ကြပ်ကြည့်ရှုရန်နှင့် စစ်ဆေးရန်တာဝန်ရှိသူကို သာမန်အလုပ်ချိန်အတွင်း ဝင်ရောက်ခွင့် ပြုပါမည်။ (အပိုဒ်၁၁၃(က)အရ) စီမံကိန်း၏ရုံးများ၊ လုပ်ငန်းခွင်၊ စီမံကိန်းနှင့် သက်ဆိုင်သော လုပ်ငန်းများ ဆောင်ရွက်နေသည့်အခြားနေရာများသို့ လိုအပ်ပါက အချိန်မရွေး ဝင်ရောက်ခွင့်ပြုပါမည်။ (အပိုဒ်၁၁၃(ခ)အရ)

(ဋ) အရေးပေါ်အခြေအနေတွင်ဖြစ်စေ၊ ပတ်ဝန်းကျင်ဆိုင်ရာနှင့် လူမှုရေးဆိုင်ရာ လိုအပ်ချက်ကို ဆောင်ရွက်ပေးရန် ပျက်ကွက်လျှင်ဖြစ်စေ၊ ထိုသို့ပျက်ကွက်နိုင်သည်ဟု ယူဆလျှင်ဖြစ်စေ စစ်ဆေးရန်တာဝန်ရှိသူက ဝင်ရောက်စစ်ဆေးလိုသည့်အချိန်တွင် ချက်ချင်းခွင့်ပြုပါမည်။ (အပိုဒ်၁၁၅အရ)

(၅) ကိုယ်စားဆောင်ရွက်ပေးသူ ကန်ထရိုက်တာနှင့် လက်ခွဲဆောင်ရွက်သူ ဆပ်ကန်ထရိုက်တာတို့ကို တာဝန်ရှိသူက စစ်ဆေးခြင်းကိုခွင့်ပြုပါမည်။ (အပိုဒ်၁၁၇အရ)

၄။ မျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာအရည်အသွေးထုတ်လွှတ်မှု လမ်းညွှန်ချက်(၂၀၁၅)

စီမံကိန်းပိုင်ရှင်သည် လမ်းညွှန်ချက်ပါ စံချိန်စံညွှန်းများနှင့်အညီ ထုတ်လွှတ်ခြင်း၊ စွန့်ပစ်ခြင်းပြုပါမည်။

၅။ မြန်မာနိုင်ငံ ရင်းနှီးမြှုပ်နှံမှု ဥပဒေ (၂၀၁၆)

စီမံကိန်းပိုင်ရှင်သည်-

(က) ငှားရမ်းခွင့် ရရှိထားသည့် အစိုးရစီမံခန့်ခွဲခွင့်ရှိသော မြေကို စာချုပ်စာတမ်းများ မှတ်ပုံတင်ခြင်း အက်ဥပဒေနှင့်အညီ စာချုပ်စာတမ်း မှတ်ပုံတင်ရုံးတွင် မှတ်ပုံတင်ပါမည်။ (ပုဒ်မ ၅၀အရ)

(ခ) အဆင့်ဆင့်သော စီမံခန့်ခွဲမှု၊ နည်းပညာ၊ လုပ်ငန်းကျွမ်းကျင်သူ နေရာတို့တွင် နိုင်ငံသားများကို စွမ်းဆောင်ရည်မြှင့်တင်ပေးပြီး အစားထိုးခန့်ထားပါမည်။ (ပုဒ်မ ၅၁ (ခ)အရ)

(ဂ) ကျွမ်းကျင်မှုမလိုအပ်သည့် လုပ်ငန်းများတွင် မြန်မာနိုင်ငံသားများကိုသာ ခန့်ထားပါမည်။ (ပုဒ်မ ၅၁ (ဂ)အရ)

(ဃ) မြန်မာနိုင်ငံသားနှင့် နိုင်ငံခြားသားများကို အလုပ်ခန့်ထားမှုဆိုင်ရာ သဘောတူညီချက် စာချုပ်ဖြင့် တည်ဆဲဥပဒေနှင့်အညီ ခန့်ထားပါမည်။ (ပုဒ်မ ၅၁ (ဃ)အရ)

(င) တည်ဆဲဥပဒေများ နည်းဥပဒေများ၊ လုပ်ထုံးလုပ်နည်းများနှင့် နိုင်ငံတကာတွင် ကျင့်သုံးသည့် အကောင်းဆုံး စံချိန်စံညွှန်းများနှင့်အညီ သဘာဝပတ်ဝန်းကျင်နှင့် လူမှုပတ်ဝန်းကျင် ထိခိုက်ပျက်စီးမှု၊ ညစ်ညမ်းမှု မဖြစ်စေရန်နှင့် ယဉ်ကျေးမှု အမွေအနှစ်များကို ထိခိုက်ပျက်စီးမှု မဖြစ်ပေါ်စေရန် လိုက်နာဆောင်ရွက်ပါမည်။ (ပုဒ်မ ၆၅ (ဆ)အရ)

(စ) အလုပ်ခန့်ထားမှုဆိုင်ရာ သဘောတူစာချုပ် ဖောက်ဖျက်ခြင်း၊ ရင်းနှီးမြှုပ်နှံမှု အပြီး ပိတ်သိမ်းခြင်း၊ လွှဲပြောင်းရောင်းချခြင်း၊ ရင်းနှီးမြှုပ်နှံမှု ရပ်ဆိုင်းခြင်း၊ လုပ်သားအင်အား လျှော့ချခြင်းတို့အတွက် အလုပ်သမားများကို တည်ဆဲဥပဒေ များနှင့်အညီ နစ်နာကြေးပေးပြီးမှသာ ရင်းနှီးမြှုပ်နှံမှုကို ရပ်ဆိုင်းပိတ်သိမ်း ပါမည်။ (ပုဒ်မ ၆၅ (ဈ)အရ)

(ဆ) ခိုင်လုံသောအကြောင်းပြချက်ဖြင့် ရင်းနှီးမြှုပ်နှံမှု ယာယီပိတ်သိမ်းပါက ပိတ်သိမ်းထားရသည့် ကာလအတွင်း အလုပ်သမားများကို တည်ဆဲဥပဒေ၊ နည်းဥပဒေများ၊ ညွှန်ကြားချက်များ၊ လုပ်ထုံးလုပ်နည်းများနှင့်အညီ လုပ်ခ၊ လစာ ပေးပါမည်။ (ပုဒ်မ ၆၅ (ည)အရ)

(ဇ) အလုပ်ကြောင့် ထိခိုက်ဒဏ်ရာ ထိခိုက်မှု၊ ကိုယ်အင်္ဂါအစိတ်အပိုင်း ချို့ယွင်းဆုံးရှုံးမှု၊ ရောဂါရရှိမှု၊ သေဆုံးမှုတို့ ဖြစ်ပွားသော အလုပ်သမားများအတွက် သက်ဆိုင်ရာအလုပ်သမား သို့မဟုတ် အမွေဆက်ခံခွင့်ရှိသူကို တည်ဆဲဥပဒေနှင့် အညီ ရထိုက်သည့် နစ်နာကြေးနှင့် လျော်ကြေးပေးပါမည်။ (ပုဒ်မ ၆၅ (ဋ)အရ)

(ဈ) လာရောက်အလုပ်လုပ်ကိုင်နေသည့် နိုင်ငံခြားသား ကျွမ်းကျင်ပညာရှင်များနှင့် ကြီးကြပ်သူများ၊ မိသားစုဝင်များသည် တည်ဆဲဥပဒေများ၊ နည်းဥပဒေများ၊ အမိန့်နှင့် ညွှန်ကြားချက်များ၊ ယဉ်ကျေးမှုနှင့် ဓလေ့ထုံးစံများကို လေးစားလိုက်နာ ရန် ကြပ်မတ်ပါမည်။ (ပုဒ်မ ၆၅ (ဌ)အရ)

(ည) စီမံကိန်းလိုအပ်ချက်အရ ခွင့်ပြုထားခြင်း မဟုတ်သော ဆောင်ရွက်ခြင်းကြောင့် သဘာဝပတ်ဝန်းကျင် ထိခိုက်ပျက်စီးစေခြင်းနှင့် လူမှုစီးပွားအပေါ် ဆုံးရှုံးမှုများ ဖြစ်ပေါ်စေပါက အဆိုပါ ဆုံးရှုံးနစ်နာမှုအတွက် ထိရောက်သည့် လျော်ကြေးကို နစ်နာသူထံသို့ ပေးလျော်ပါမည်။ (ပုဒ်မ ၆၅ (ဏ)အရ)

(ဋ) ကော်မရှင်က စစ်ဆေးကြည့်ရှုရန် ကြိုတင်အကြောင်းကြားလာပါက မည်သည့် နေရာကိုမဆို ဝင်ရောက်စစ်ဆေးခွင့်ပြုပါမည်။ (ပုဒ်မ ၆၅ (တ)အရ)

(၄) ကော်မရှင်၏ ခွင့်ပြုမိန့် သို့မဟုတ် အတည်ပြုမိန့်ကို ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ငန်းစဉ်များ မဆောင်ရွက်မီ ဦးစွာရယူရပါမည်။ ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ငန်းစဉ်များ ဆောင်ရွက်မှု အခြေအနေကို ကော်မရှင်သို့ တင်ပြပါမည်။ (ပုဒ်မ ၆၅ (ထ)အရ)

(၃) နည်းဥပဒေ၌ ဖော်ပြသတ်မှတ်ထားသော အာမခံအမျိုးအစားများကို အာမခံ ထားရှိပါမည်။ (ပုဒ်မ ၇၃ အရ)

၆။ လျှပ်စစ်ဥပဒေ(၂၀၁၄)

စီမံကိန်းပိုင်ရှင်သည်-

(က) စစ်ဆေးရေးမှူးချုပ်ထံမှ လျှပ်စစ်အန္တရာယ်ကင်းရှင်းကြောင်း လက်မှတ်ရရှိမှသာ လျှပ်စစ်ထုတ်လုပ်ခြင်း လုပ်ငန်းများ ခွင့်ပြုပါမည်။ (ပုဒ်မ၁၈အရ)

(ခ) ဤဥပဒေ၊ နည်းဥပဒေများ၊ အမိန့်ကြော်ငြာစာ၊ အမိန့်နှင့်ညွှန်ကြားချက်များကို လိုက်နာဆောင်ရွက်ရန် ပျက်ကွက်ခြင်းကြောင့်ဖြစ်စေ သတ်မှတ်ထားသည့် အရည်အသွေး နှင့် စံချိန်စံညွှန်းများကို လိုက်နာဆောင်ရွက်ရန် ပျက်ကွက်ခြင်းကြောင့်ဖြစ်စေ၊ လူပုဂ္ဂိုလ်တစ်ဦးဦး သို့မဟုတ် လုပ်ငန်းအဖွဲ့အစည်းတစ်ခုခုကို ထိခိုက်နစ်နာဆုံးရှုံးမှု ဖြစ်ပွားပါက တာဝန်ယူပါမည်။ (ပုဒ်မ၂၁(က)အရ)

(ဂ) မိမိ၏ပေါ့ဆစွာဆောင်ရွက်မှုကြောင့် လူပုဂ္ဂိုလ်တစ်ဦးဦး သို့မဟုတ် လုပ်ငန်း အဖွဲ့အစည်းတစ်ခုခုကို ထိခိုက်နစ်နာဆုံးရှုံးမှုဖြစ်ပွားပါက တာဝန်ယူပါမည်။ (ပုဒ်မ၂၂(က)အရ)

(ဃ) လျှပ်စစ်ဓာတ်အားထုတ်လွှတ်ခြင်းကြောင့် လျှပ်စစ်အန္တရာယ် မတော်တဆဖြစ်ပွားပါက စစ်ဆေးရေးမှူးချုပ်နှင့် သက်ဆိုင်ရာဌာနတာဝန်ခံထံ အမြန်ဆုံး အကြောင်းကြားပါမည်။ (ပုဒ်မ၂၇အရ)

(င) ဝန်ကြီးဌာနကထုတ်ပြန်ထားသည့် နည်းဥပဒေများ၊ စံချိန်စံညွှန်းများနှင့် လုပ်ကိုင်ဆောင်ရွက်ပါမည်။ သက်ဆိုင်ရာအစိုးရဌာန၊

အစိုးရအဖွဲ့စည်းများ၏ လိုအပ်သော စစ်ဆေးမှုများကိုခံယူပါမည်။ (ပုဒ်မ၄၀အရ)

(စ) မိမိ ပေါ့လျော့မှုကြောင့်ဖြစ်စေ၊ မိမိကတာဝန်ပေးအပ်ထားသူ၏ ပေါ့လျော့မှုကြောင့်ဖြစ်စေ၊ တာဝန်ပျက်ကွက်မှုကြောင့်ဖြစ်စေ ဓာတ်လိုက်မှု သို့မဟုတ် မီးလောင်မှုဖြစ်ပွားပြီး ထိခိုက်ဒဏ်ရာရခြင်း၊ မသန်မစွမ်းဖြစ်ခြင်း သို့မဟုတ် သေဆုံးခြင်းဖြစ်လျှင် ထိခိုက်နစ်နာသူက တောင်းခံခွင့်ရှိသည့် လျော်ကြေးကိုပေးလျော်ပါမည်။ (ပုဒ်မ၆၈အရ)

၇။ တိုင်းရင်းသားလူမျိုးများအကျိုးစီးပွားကာကွယ်စောင့်ရှောက်ရေး ဥပဒေ(၂၀၁၅)

စီမံကိန်းပိုင်ရှင်သည်-

(က) စီမံကိန်းကို အကောင်အထည်ဖော်မည့် ဒေသရှိ ဌာနေတိုင်းရင်းသား လူမျိုးများအား စီမံကိန်း၏ အကြောင်းအရာများကို ပြည့်စုံတိကျစွာ ကြိုတင်ချပြ အသိပေးပါမည်။ (ပုဒ်မ ၅ အရ)

(ခ) စီမံကိန်းကို အကောင်အထည်ဖော် ဆောင်ရွက်ရာတွင် စီမံကိန်းကို အကောင်အထည်ဖော်မည့် ဒေသရှိ ဌာနေတိုင်းရင်းသား လူမျိုးများနှင့် ညှိနှိုင်းဆောင်ရွက်ပါမည်။ (ပုဒ်မ ၅ အရ)

၈။ ပြည်သူ့ကျန်းမာရေးဥပဒေ(၁၉၇၂)

စီမံကိန်းပိုင်ရှင်သည်-

(က) ပြည်သူ့ကျန်းမာရေးအတွက် ပုဒ်မ ၃ ပါ ကိစ္စများနှင့် စပ်လျဉ်း၍ မည်သည့် စည်းကမ်းသတ်မှတ်ချက်များ၊ ညွှန်ကြားချက်များကိုမဆို လိုက်နာဆောင်ရွက်ပါမည်။ (ပုဒ်မ ၃ အရ)

(ခ) လိုအပ်ချက်အရ ဤဥပဒေအရ တာဝန်ရှိသူများက လာရောက်စစ်ဆေးခြင်းနှင့် စပ်လျဉ်း၍ မည်သည့်နေရာ၊ မည်သည့်အချိန်တွင် မည်သည့် စစ်ဆေးမှုကိုမဆို ခွင့်ပြုပါမည်။ (ပုဒ်မ ၅ အရ)

၉။ ကူးစက်ရောဂါများကာကွယ်နှိမ်နှင်းရေးဥပဒေ(၁၉၉၅)

စီမံကိန်းပိုင်ရှင်သည်-

(က) အလုပ်သမားများကို ကူးစက်ရောဂါ မဖြစ်ပွားစေရေးအတွက် လုပ်ငန်းခွင်တွင် ကျန်းမာရေးနှင့် ညီညွတ်သော နေအိမ်ဆောက်လုပ်ပေးပါမည်။ ကျန်းမာရေးနှင့် ညီညွတ်သော သောက်ရေနှင့် သုံးရေရရှိအောင် ဆောင်ရွက်ပေးပါမည်။ အညစ်အကြေးများကို စနစ်တကျ စွန့်ပစ် စေရန် ဆောင်ရွက်ပေးပါမည်။ (ပုဒ်မ ၃ (က) (၉) အရ)

(ခ) ကျန်းမာရေးဝန်ကြီးဌာနနှင့် ကျန်းမာရေးဦးစီးဌာနတို့က ညွှန်ကြားသည်နှင့် အညီ လိုက်နာဆောင်ရွက်ပါမည်။ (ပုဒ်မ ၄ အရ)

(ဂ) အောက်ပါကိစ္စရပ်များ ဖြစ်ပွားကြောင်း သိရှိလျှင် သိရှိခြင်း အနီးဆုံး ကျန်းမာရေး ဌာန သို့မဟုတ် ဆေးရုံသို့ ချက်ချင်း သတင်းပို့ပါမည် –

(၁) ကြွက်နှင့် အပါအဝင် တရိစ္ဆာန်များ အစုအလိုက်၊ အပြုံလိုက် သေဆုံးခြင်း၊

(၂) ကြွက်ကျခြင်း၊

(၃) ကူးစက်မြန်ရောဂါဖြစ်သည်ဟု သံသယရှိခြင်း သို့မဟုတ် ယင်းရောဂါ ဖြစ်ပွားခြင်း

(၄) တိုင်ကြားရမည့် ကူးစက်ရောဂါဖြစ်ပွားခြင်း၊

(ဃ) ကျန်းမာရေးအရာရှိက လိုအပ်၍ လာရောက်စစ်ဆေးလျှင် မည်သည့်နေရာ၊ မည်သည့်အချိန်တွင်မဆို ခွင့်ပြုပါမည်။ (ပုဒ်မ ၁၁ အရ)

၁၀။ ဆေးလိပ်နှင့်ဆေးရွက်ကြီးထွက်ပစ္စည်း သောက်သုံးမှုထိန်းချုပ်ရေး ဥပဒေ(၂၀၁၆)

စီမံကိန်းပိုင်ရှင်သည်-

(က) ဆေးလိပ်သောက်သုံးခွင့်မရှိသော နေရာများတွင် ထိုသို့ခွင့်မပြုကြောင်း ဖော်ညွှန်း သည့် စာတမ်းနှင့် အမှတ်အသားများကို သတ်မှတ်ချက်နှင့်အညီ ထားရှိပါမည်။ (ပုဒ်မ ၉ (က) အရ)

(ခ) ဓာတ်အားပေး စက်ရုံ ဧရိယာအတွင်း ဆေးလိပ်သောက်သုံးရန် နေရာကို စီစဉ်ပေးပြီး သတ်မှတ်ချက်နှင့်အညီ ယင်းသို့ခွင့်ပြုသည့် နေရာဖြစ်ကြောင်း ဖော်ညွှန်းသည့် စာတမ်းနှင့် အမှတ်အသား ထားရှိပါမည်။ (ပုဒ်မ ၉ (ခ) အရ)

(ဂ) ဆေးလိပ်သောက်ခွင့်မရှိသော နေရာ၌ မည်သူမျှ ဆေးလိပ်သောက်ခြင်းမပြုရန် ကြပ်မတ်ပါမည်။ (ပုဒ်မ ၉ (ဂ) အရ)

(ဃ) ကြီးကြပ်ရေးအဖွဲ့ လာရောက်စစ်ဆေးသည့်အခါ စစ်ဆေးခြင်းကို ခံယူပါမည်။ (ပုဒ်မ ၉ (ဃ) အရ)

၁၁။ မြန်မာနိုင်ငံမီးသတ်တပ်ဖွဲ့ဥပဒေ(၂၀၁၅)

စီမံကိန်းပိုင်ရှင်သည်-

(က) သီးသန့်မီးသတ်တပ်ဖွဲ့ ဖွဲ့စည်းပါမည်။ (ပုဒ်မ ၂၅ (က) အရ)

(ခ) မီးဘေးလုံခြုံရေးဆိုင်ရာ ပစ္စည်းများကို ထားရှိပါမည်။ (ပုဒ်မ ၂၅ (ခ) အရ)

၁၂။ မော်တော်ယာဉ် ဥပဒေ(၂၀၁၅) နှင့် မော်တော်ယဉ်နည်းဥပဒေများ(၁၉၈၇)

စီမံကိန်းပိုင်ရှင်သည်-

လေထုညစ်ညမ်းစေခြင်း၊ အသံဆူညံစေခြင်းနှင့် အသက်အန္တရာယ် လုံခြုံစိတ်ချမှုတို့နှင့် သက်ဆိုင်သည့် ဤဥပဒေနှင့် နည်းဥပဒေများပါ ပြဋ္ဌာန်းချက်များကို လိုက်နာဆောင်ရွက် ပါမည်။

၁၃။ မြန်မာ့အာမခံလုပ်ငန်းဥပဒေ(၁၉၉၃)

စီမံကိန်းပိုင်ရှင်သည်-

(က) ကိုယ်ပိုင်ယာဉ်များ သုံးစွဲမည်ဆိုပါက လူထိခိုက်မှုဆိုင်ရာ အာမခံ ထားရှိပါမည်။ (ပုဒ်မ ၁၅ အရ)

(ခ) ပတ်ဝန်းကျင်ကို ထိခိုက်စေခြင်းနှင့် ပြည်သူလူထုကို နစ်နာစေခြင်းဖြစ်ပေါ်လျှင် ယင်းအထွေထွေ ဆုံးရှုံးနစ်နာမှုကို ပေးလျော်နိုင်ရန် ထားရှိရမည့် အာမခံကို ထားရှိပါမည်။ (ပုဒ်မ ၁၆ အရ)

၁၄။ အလုပ်သမားအဖွဲ့အစည်းဥပဒေ(၂၀၁၁)

စီမံကိန်းပိုင်ရှင်သည်-

(က) အလုပ်သမား ဥပဒေနှင့် မညီဘဲ အလုပ်ထုတ်ခံရသည့် အလုပ်သမားကို ပြန်လည် အလုပ်ခန့်ထားရန် တောင်းဆိုသည်ကို ခွင့်ပြုပါမည်။ (ပုဒ်မ ၁၈အရ)

(ခ) အလုပ်ရှင်နှင့် အလုပ်သမားအကြား အငြင်းပွားမှုကို ညှိနှိုင်းဖျန်ဖြေရေးအဖွဲ့က ဖြေရှင်းရာတွင် ယင်းအဖွဲ့သို့ အလုပ်သမားကိုယ်စားလှယ် စေလွှတ်ခြင်းကို ခွင့်ပြုပါမည်။ (ပုဒ်မ ၁၉ အရ)

(ဂ) အလုပ်သမားဥပဒေများပါ အလုပ်သမားအခွင့်အရေး သို့မဟုတ် အကျိုးစီးပွားနှင့် စပ်လျဉ်း၍ အစိုးရ၊ အလုပ်ရှင်နှင့် တောင်းဆိုသူ အလုပ်သမားတို့ ဆွေးနွေးရာတွင် အလုပ်သမား အဖွဲ့အစည်း၏ ကိုယ်စားလှယ်ကို ပါဝင်ဆွေးနွေးခွင့်ပြုပါမည်။ (ပုဒ်မ ၂၀ အရ)

(ဃ) အလုပ်သမား ဥပဒေများနှင့်အညီ အလုပ်သမားများ၏ စုပေါင်းအရေးဆိုမှုများကို ဖြေရှင်းရာတွင် အလုပ်သမားအဖွဲ့အစည်းကို ပါဝင်ဆောင်ရွက်ခွင့်ပြုပါမည်။ (ပုဒ်မ ၂၁ အရ)

(င) အလုပ်သမား အဖွဲ့အစည်းက သက်ဆိုင်ရာ အလုပ်သမား အဖွဲ့ချုပ်က ချမှတ်ထားသော လုပ်ထုံးလုပ်နည်းများ၊ စည်းမျဉ်းစည်းကမ်း၊

ညွှန်ကြားချက်များနှင့်အညီ အစည်းအဝေးများပြုလုပ်ခြင်း၊ သပိတ်မှောက်ခြင်းတို့ကို ခွင့်ပြုပါမည်။ (ပုဒ်မ ၂၂ အရ)

၁၅။ အလုပ်သမားရေးရာအငြင်းပွားမှုဖြေရှင်းရေးဥပဒေ(၂၀၁၂)

စီမံကိန်းပိုင်ရှင်သည်-

(က) တောင်းဆို တိုင်ကြားချက်နှင့် စပ်လျဉ်း၍ သတ်မှတ်ကာလအတွင်း ဆွေးနွေး ညှိနှိုင်းဖြေရှင်းရာတွင် ပျက်ကွက်မည် မဟုတ်ပါ။ (ပုဒ်မ ၃၈ အရ)

(ခ) ခုံသမာဓိအဖွဲ့ သို့မဟုတ် ခုံအဖွဲ့က အငြင်းပွားမှု စစ်ဆေးနေစဉ် ကာလအတွင်း ထိုအငြင်းပွားမှု မစမီက ချမှတ်ထားသော အလုပ်သမားများနှင့် သက်ဆိုင်သည့် စည်းကမ်းများကို အလုပ်သမားများ၏ အကျိုးစီးပွားထိခိုက်စေရန် ရုတ်တရက် ပြောင်းလဲခြင်း မပြုပါ။ (ပုဒ်မ ၃၉ အရ)

(ဂ) အငြင်းပွားမှု တစ်ခုနှင့် စပ်လျဉ်း၍ ဤဥပဒေနှင့်အညီ ဆွေးနွေးညှိနှိုင်းခြင်း၊ ဖျန်ဖြေခြင်းနှင့် ခုံသမာဓိအဖွဲ့ဖြင့် ဆုံးဖြတ်ခြင်းတို့ကို မပြုဘဲ အလုပ်မထုတ်ပါ။ (ပုဒ်မ ၄၀ အရ)

(ဃ) ခုံသမာဓိ သို့မဟုတ် ခုံအဖွဲ့က ပုဒ်မ ၅၁ အရ ဆုံးဖြတ်သည့် လျော်ကြေးငွေကို ပေးဆောင်ပါမည်။ (ပုဒ်မ ၅၁ အရ)

၁၆။ အလုပ်အကိုင်နှင့် ကျွမ်းကျင်မှုဖွံ့ဖြိုးတိုးတက်ရေး ဥပဒေ(၂၀၁၃)

စီမံကိန်းပိုင်ရှင်သည်-

(က) အလုပ်သမားခန့်ထားရာတွင် ဤဥပဒေ ပုဒ်မ ၅ ပါ ပြဋ္ဌာန်းချက်များနှင့်အညီ စာချုပ်ချုပ်ဆို၍ ခန့်ထားပါမည်။ (ပုဒ်မ၅အရ)

(ခ) ခန့်ထားရန် လျာထားသော အလုပ်သမားနှင့် လုပ်ငန်း၌ လုပ်ကိုင်လျက်ရှိသော အလုပ်သမားများ၏ အလုပ်အကိုင်ဆိုင်ရာ ကျွမ်းကျင်မှုအဆင့် မြင့်မားစေရန် လေ့ကျင့်ရေး အစီအစဉ်များကို

လုပ်ငန်းလိုအပ်ချက်အရ ကျွမ်းကျင်မှု ဖွံ့ဖြိုးတိုးတက်ရေးအဖွဲ့၏ မူဝါဒနှင့်အညီ ဆောင်ရွက်ပါမည်။ (ပုဒ်မ ၁၄ အရ)

(ဂ) မိမိ၏ လုပ်ငန်း၌ အလုပ်သမားကြီးကြပ်သူအဆင့်နှင့် ယင်းအဆင့်အောက်ရှိ အလုပ်သမားများကို ပေးချေရသည့် စုစုပေါင်းလုပ်ခ၊ လစာ၏ ၀.၅ ရာခိုင်နှုန်း အောက် မနည်းသောငွေကို ရန်ပုံငွေသို့ ထည့်ဝင်ခြင်းအဖြစ် လစဉ်ပေးသွင်းပါမည်။ ယင်းထည့်ဝင်ကြေးအတွက် အလုပ်သမားများ၏ လုပ်ခ၊ လစာမှ ဖြတ်တောက်ခြင်းမပြုပါ။ (ပုဒ်မ၃၀အရ)

၁၇။ ၂၀၁၃ခုနှစ်၊ အနည်းဆုံးအခကြေးငွေဥပဒေ

စီမံကိန်းပိုင်ရှင်သည်-

(က) ပုဒ်မ ၁၂ ပါ သတ်မှတ်ချက်များနှင့်အညီ အခကြေးငွေ ပေးချေပါမည်။ (ပုဒ်မ၁၂အရ)

(ခ) သတ်မှတ်ထားသော အနည်းဆုံးအခကြေးငွေ နှုန်းထားများကို အလုပ်သမား များကို အသိပေးမည့်အပြင် လုပ်ငန်းခွင်တွင် မြင်နိုင်စေရန် ကြော်ငြာထားပါမည်။ (ပုဒ်မ၁၃ (က)အရ)

(ဂ) ပုဒ်မ ၁၃ ပါ ပြုစုရမည့် စာရင်းဇယားနှင့် စာတမ်းအမှတ်အသားများကို ပြုစုခြင်း၊ သက်ဆိုင်ရာ ဦးစီးဌာနသို့ သတ်မှတ်ချက်များနှင့်အညီ အစီရင်ခံခြင်း၊ ယင်းတို့ကို တောင်းခံသည့်အခါ တင်ပြခြင်းတို့ ပြုပါမည်။ (ပုဒ်မ ၁၃ (ခ)၊ (ဂ)၊ (ဃ) တို့အရ)

(ဃ) ပုဒ်မ ၁၃ (င)နှင့် ပုဒ်မ ၁၈ အရ စစ်ဆေးရေးအရာရှိများက လာရောက် စစ်ဆေးခြင်းကို ခွင့်ပြုပါမည်။ (ပုဒ်မ ၁၃ (င)နှင့် ၁၈ အရ)

(င) အလုပ်သမား ဖျားနာ၍ အလုပ်မလုပ်နိုင်သည့်အခါ ဆေးကုသရန် သတ်မှတ်ချက်များနှင့်အညီ နားခွင့်ပေးပါမည်။ (ပုဒ်မ ၁၃ (စ) အရ)

(စ) အလုပ်သမားများ၏ မိသားစုဝင် သို့မဟုတ် မိဘနာရေးဖြစ်သည့်အခါ အနည်းဆုံး အခကြေးငွေမှာ ဖြတ်တောက်ခြင်းမပြုဘဲ သတ်မှတ်ချက်များနှင့် အလုပ်နားခွင့် ပြုပါမည်။ (ပုဒ်မ ၁၃ (ဆ) အရ)

၁၈။ ၂၀၁၆ခုနှစ်၊ အခကြေးငွေပေးချေရေးဥပဒေ

စီမံကိန်းပိုင်ရှင်သည်-

(က) အခကြေးငွေ ပေးချေခြင်းနှင့် စပ်လျဉ်း၍ ပုဒ်မ ၃ နှင့် ပုဒ်မ ၄ ပါပြဋ္ဌာန်းချက်များနှင့်အညီ ပေးချေပါမည်။ (ပုဒ်မ၃ နှင့် ၄အရ)

(ခ) သဘာဝဘေးအန္တရာယ်အပါအဝင် မမျှော်လင့်သော ထူးခြားသည့်အခြေအနေ ပေါ်ပေါက်ပါက အခကြေးငွေ ပြောင်းလဲပေးချေလိုကြောင်းကို သက်ဆိုင်ရာ အလုပ်သမားများ၏ သဘောတူညီချက်ဖြင့် တင်ပြပါမည်။ (ပုဒ်မ၅အရ)

(ဂ) အလုပ်သမားထံမှ နုတ်ယူရန် လိုအပ်သည့်ငွေကြေးနှင့် စပ်လျဉ်း၍ အခန်း (၃)ပါ ပြဋ္ဌာန်းချက်နှင့်အညီ လိုက်နာဆောင်ရွက်ပါမည်။ (အခန်း ၃ အရ)

(ဃ) အချိန်ပို လုပ်ကိုင်ရသည့် အလုပ်သမားကို ဥပဒေက သတ်မှတ်သည့် နှုန်းထားအတိုင်း အချိန်ပိုလုပ်ခပေးပါမည်။ (ပုဒ်မ၁၄ အရ)

၁၉။ အလုပ်သမားလျော်ကြေး အက်ဥပဒေ(၁၉၅၁)

စီမံကိန်းပိုင်ရှင်သည် ရရှိသည့် ထိခိုက်နစ်နာမှု အမျိုးအစားအလိုက် ကိစ္စရပ်တစ်ခုချင်း အပေါ်တွင် ဤဥပဒေပါ ပြဋ္ဌာန်းချက်များနှင့်အညီ လျော်ကြေးငွေကို ပေးလျော်ပါမည်။

၂၀။ ခွင့်နှင့် အလုပ်ပိတ်ရက်များ အက်ဥပဒေ(၁၉၅၁)

စီမံကိန်းပိုင်ရှင်သည် ဤဥပဒေပါ ပြဋ္ဌာန်းချက်များနှင့်အညီ ခွင့်နှင့် အလုပ်ပိတ်ရက် များကို ခွင့်ပြုပါမည်။

၂၁။ လူမှုဖူလုံရေးဥပဒေ(၂၀၁၂)

စီမံကိန်းပိုင်ရှင်သည်-

(က) သက်ဆိုင်ရာ လူမှုဖူလုံရေးရုံးတွင် မှတ်ပုံတင်ထားရှိပါမည်။ (ပုဒ်မ၁၁ (က)အရ)

(ခ) ပုဒ်မ ၁၅၊ ပုဒ်မခွဲ (က)ပါကျန်းမာရေးနှင့် လူမှုရေး စောင့်ရှောက်မှု ရန်ပုံငွေ၊ အလုပ်လုပ်ကိုင်နိုင်စွမ်းမရှိမှု အကျိုးခံစားခွင့်၊ သက်ပြည့်အငြိမ်းစား အကျိုးခံစားခွင့်နှင့် ကျန်ရစ်သူ အကျိုးခံစားခွင့် ရန်ပုံငွေ၊ အလုပ်လက်မဲ့ အကျိုးခံစားခွင့် ရန်ပုံငွေနှင့် သတ်မှတ်ထားသော မထည့်မနေရ ထည့်ဝင်ရမည့် ရန်ပုံငွေများကို မှတ်ပုံတင်ထည့်ဝင်ပါမည်။ (ပုဒ်မ၁၅ (ခ) အရ)

(ဂ) အလုပ်သမားက ပေးသွင်းရမည့် ထည့်ဝင်ကြေးကို ယင်း၏ လုပ်ခထဲမှ နုတ်ယူပြီး မိမိက ပေးသွင်းရမည့် ထည့်ဝင်ကြေး ငွေနှင့်အတူ သက်ဆိုင်ရာ လူမှုဖူလုံရေး ရန်ပုံငွေသို့ ပေးသွင်းပါမည်။ ထိုသို့ပေးသွင်းရသည့် ကုန်ကျစားရိတ်ကို မိမိက ကျခံပါမည်။ (ပုဒ်မ၁၈ (ခ) အရ)

(ဃ) အလုပ်တွင် ထိခိုက်မှု အကျိုးခံစားခွင့် ရန်ပုံငွေသို့ သတ်မှတ်ထားသော ထည့်ဝင်ကြေးပေးပြီး အာမခံထားရှိပါမည်။ (ယင်းရန်ပုံငွေသည် အလုပ်သမား လျော်ကြေး အက်ဥပဒေပါ ပြဋ္ဌာန်းချက်များနှင့် သက်ဆိုင်ခြင်းမရှိကြောင်း သိရှိပါသည်။) (ပုဒ်မ၄၈ (ခ)နှင့် ၄၉ (က) တို့အရ)

(င) ပုဒ်မ ၁၇ တွင် ဖော်ပြထားသည့် မှတ်တမ်းနှင့် စာရင်းများကို မှန်ကန်စွာပြုစုပြီး သက်ဆိုင်ရာ လူမှုဖူလုံရေးရုံးသို့ သတ်မှတ်ချက်များနှင့်အညီ တင်ပြပါမည်။ (ပုဒ်မ၇၅အရ)

၂၂။ ရေနံအက်ဥပဒေ(၁၉၃၄)

စီမံကိန်းပိုင်ရှင်သည် စီမံကိန်းအတွက် လိုအပ်သည့် လောင်စာဆီများကို တင်သွင်းခြင်း၊ သယ်ယူပို့ဆောင်ခြင်းနှင့်သိုလှောင်ခြင်းတို့အတွက် ပုဒ်မ ၃ အရ

လိုအပ်သည့် လိုင်စင်ကို ရယူပါမည်။ ထို့ပြင် ယင်းလိုင်စင်ပါ စည်းကမ်းချက်များကိုလည်း လိုက်နာပါမည်။

၂၃။ ရေနံနည်းဥပဒေများ(၁၉၃၇)

စီမံကိန်းပိုင်ရှင်သည် စီမံကိန်းအတွက် လိုအပ်သည့် လောင်စာဆီများကို တင်သွင်းခြင်း၊ သယ်ယူပို့ဆောင်ခြင်းနှင့်သိုလှောင်ခြင်းတို့အတွက် နည်းဥပဒေများ အခန်း (၃) နှင့် (၄) ပါ သတ်မှတ်ပြဋ္ဌာန်းချက်များနှင့်အညီ လိုက်နာဆောင်ရွက်ပါမည်။ (အခန်း (၃)နှင့် (၄)အရ)

၂၄။ ရေအရင်းအမြစ်နှင့် မြစ်၊ ချောင်းများထိန်းသိမ်းရေး ဥပဒေ(၂၀၀၆)

စီမံကိန်းပိုင်ရှင်သည်-

(က) ရေအရင်းအမြစ်နှင့်မြစ်၊ ချောင်းများထိခိုက်ပျက်စီးစေရန် ရည်ရွယ်၍ တစ်စုံတစ်ရာပြုလုပ်ခြင်း မပြုပ။ (ပုဒ်မ၈ (က) အရ)

(ခ) ဦးစီးဌာနက မြစ်၊ ချောင်းအတွင်း ရေထုညစ်ညမ်းမှု မဖြစ်ပေါ်စေရေးနှင့် ရေလမ်းကြောင်းမပြောင်းလဲစေရေးအတွက် သတ်မှတ်ထားသော စည်းကမ်းချက် များကို ဖောက်ဖျက်ခြင်းမပြုပါ။ (ပုဒ်မ ၂၄ (က)အရ)

၂၅။ ရေချိုငါးလုပ်ငန်း ဥပဒေ (၁၉၉၁)

စီမံကိန်းပိုင်ရှင်သည်ရေချိုငါးလုပ်ငန်း ရေပြင်အတွင်း ရေထုညစ်ညမ်းစေခြင်းနှင့် ငါးနှင့် အခြားရေနေသတ္တဝါများကို နှောက်ယှက်ခြင်း မပြုပါ။ (ပုဒ်မ ၄၀ အရ)

၂၆။ မြန်မာ့ပင်လယ်ငါး လုပ်ငန်းဥပဒေ (၁၉၉၀)

စီမံကိန်းပိုင်ရှင်သည် ငါး၊ အခြားရေနေသတ္တဝါတို့ကို အနှောင့်အယှက်ဖြစ်စေရန် သို့မဟုတ် ရေထုကို ညစ်ငြမ်းစေရန် သက်ရှိရေသတ္တဝါကို ဖြစ်စေ၊

အရာဝတ္ထုပစ္စည်းတစ်ခုခုကို ဖြစ်စေ၊ မြန်မာ့ ပင်လယ်ငါးလုပ်ငန်း ရေပြင်တွင် စွန့်ပစ်ခြင်းမပြုပါ။ (ပုဒ်မ ၃၉ အရ)

၂၇။ ယဉ်ကျေးမှုအမွေအနှစ်ဒေသများ ကာကွယ်ထိန်းသိမ်းရေး ဥပဒေ (၁၉၉၈)

စီမံကိန်းဧရိယာသည် ရှေးဟောင်းအမွေအနှစ် ဒေသအတွင်း ကျရောက်ပါက စီမံကိန်းပိုင်ရှင်သည် ပုဒ်မ ၁၃ နှင့် ၁၅ တို့ပါ ပြဋ္ဌာန်းချက်များနှင့်အညီ လိုက်နာဆောင်ရွက် ပါမည်။

၂၈။ ရှေးဟောင်း ဝတ္ထုပစ္စည်းများ ကာကွယ်ထိန်းသိမ်းရေး ဥပဒေ (၂၀၁၅)

စီမံကိန်းပိုင်ရှင်သည် မိမိ၏ စီမံကိန်း ဧရိယာအတွင်း ရှေးဟောင်းဝတ္ထုပစ္စည်းကို တွေ့ရှိပါက အနီးဆုံးရပ်ကွက် သို့မဟုတ် ကျေးရွာအုပ်စု အုပ်ချုပ်ရေးမှူးထံ အကြောင်းကြားပါမည်။ (ပုဒ်မ၁၂ အရ)

၂၉။ ရှေးဟောင်းအဆောက်အအုံများ ကာကွယ်ထိန်းသိမ်းရေး ဥပဒေ (၂၀၁၅)

စီမံကိန်းပိုင်ရှင်သည်-

(က) စီမံကိန်း နယ်နမိတ်အတွင်း မြေအောက် သို့မဟုတ် မြေပေါ်တွင် ရှေးဟောင်း အဆောက်အအုံကို တွေ့ရှိပါက အနီးဆုံးရပ်ကွက် သို့မဟုတ် ကျေးရွာအုပ်စု အုပ်ချုပ်ရေးမှူးထံ အကြောင်းကြားပါမည်။ (ပုဒ်မ၁၂အရ)

(ခ) စီမံကိန်း ဧရိယာသည် ရှေးဟောင်းအဆောက်အအုံ ဧရိယာအဖြစ် သတ်မှတ်သည့် ဧရိယာအတွင်း ကျရောက်ပါက ရှေးဟောင်းသုတေသန ဦးစီးဌာန၏ ကြိုတင်ခွင့် ပြုချက်ကို ရယူပါမည်။ (ပုဒ်မ ၁၅ အရ)

(ဂ) ရှေးဟောင်းအဆောက်အအုံ နယ်နမိတ်အတွင်း အစိုင်အခဲများ စွန့်ပစ်ခြင်းနှင့် ဓာတုပစ္စည်းများ စွန့်ပစ်မည်ဆိုပါက ရှေးဟောင်းသုတေသန ဦးစီးဌာန၏ ကြိုတင်ခွင့် ပြုချက်ကို ရယူပါမည်။ (ပုဒ်မ ၂၀ (စ) အရ)

၃၀။ သစ်တောဥပဒေ (၁၉၉၂)

စီမံကိန်းပိုင်ရှင်သည် သစ်တောနယ်မြေ သို့မဟုတ် သစ်တောဖုံးလွှမ်းသော နယ်မြေတွင် စီမံကိန်းကို ဆောင်ရွက်ရမည်ဖြစ်ပါက သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဝန်ကြီးဌာန၏ ခွင့်ပြုချက်ရယူပြီးမှ ဆောင်ရွက်ပါမည်။ (ပုဒ်မ ၁၂ (က) အရ)

၃၁။ မြန်မာ့အထူးစီးပွားရေးဇုန်ဥပဒေ (၂၀၁၄)

စီမံကိန်းပိုင်ရှင်သည် -

(က) စီမံခန့်ခွဲမှုကော်မတီက အမိန့်ကြော်ငြာစာ၊ အမိန့်၊ ညွှန်ကြားချက်နှင့် လုပ်ထုံးလုပ်နည်း များဖြင့် သတ်မှတ်ပေးသည့် လိုက်နာရမည့် သတ်မှတ်ချက်များကို လိုက်နာဆောင်ရွက်ပါမည်။ (ပုဒ်မ ၁၁(စ) အရ)

(ခ) သဘာဝပတ်ဝန်းကျင် ထိန်းသိမ်းကာကွယ်ရေးအတွက် စီမံခန့်ခွဲမှုကော်မတီ၏ တည်ဆဲ ဥပဒေများနှင့်အညီ ကြီးကြပ်ကွပ်ကဲခြင်းကို လိုက်နာဆောင်ရွက်ပါမည်။ (ပုဒ်မ ၁၁(တ) အရ)

(ဂ) မြန်မာနိုင်ငံ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဥပဒေပါစံချိန်စံညွှန်းများနှင့် နိုင်ငံတကာ စံချိန် စံညွှန်းများကို လိုက်နာပါမည်။ ထို့ပြင် လူမှုရေးနှင့် ကျန်းမာရေးဆိုင်ရာ ထိခိုက်မှုများ မရှိစေရန် တည်ဆဲဥပဒေများနှင့်အညီ လိုက်နာဆောင်ရွက်ပါမည်။ (ပုဒ်မ ၃၅ အရ)

(ဃ) အဆင့်မြင့်နည်းပညာနှင့် ကျွမ်းကျင်မှုဆိုင်ရာ မလိုအပ်သော လုပ်ငန်းများတွင် နိုင်ငံသား များကိုသာ ခန့်ထားပါမည်။ (ပုဒ်မ ၇၄ အရ)

(င) အဆင့်မြင့်နည်းပညာနှင့် ကျွမ်းကျင်မှုဆိုင်ရာ လိုအပ်သော လုပ်ငန်းများတွင် နိုင်ငံသား ကျွမ်းကျင်သူ အလုပ်သမားများ၊ အတတ်ပညာရှင်များနှင့် ဝန်ထမ်းများကို -

(၁) လုပ်ငန်းစတင်သည့်နှစ်မှ ပထမ ၂ နှစ်အတွင်း၌ အနည်းဆုံး ၂၅ ရာခိုင်နှုန်း၊

(၂) လုပ်ငန်းစတင်သည့်နှစ်မှ ဒုတိယ ၂ နှစ်အတွင်း၌ အနည်းဆုံး ၅၀ ရာခိုင်နှုန်း၊

(၃) လုပ်ငန်းစတင်သည့်နှစ်မှ တတိယ ၂ နှစ်အတွင်း၌ အနည်းဆုံး ၇၅ ရာခိုင်နှုန်း၊

ခန့်ထားပါမည်။ (ပုဒ်မ ၇၅ အရ)

(စ) မိမိနှင့် အလုပ်သမား၊ အတတ်ပညာရှင် သို့မဟုတ် ဝန်ထမ်းတို့အကြား အငြင်းပွားမှု ပေါ်ပေါက်ပါက စီမံခန့်ခွဲမှုကော်မတီ၏ စေ့စပ်ညှိနှိုင်းခြင်းနှင့် ဖြန်ဖြေခြင်းကို ခံယူပါမည်။ (ပုဒ်မ ၇၆(က) အရ)

(ဆ) မိမိခန့်ထားမည့် နိုင်ငံခြားသားဝန်ထမ်းများအတွက် ထားဝယ်အထူးစီးပွားရေးဇုန်အတွင်း ဖွင့်လှစ်ထားသည့် အလုပ်သမားကိုယ်စားလှယ်ရုံးက ထုတ်ပေးသည့် အလုပ်လုပ်ခွင့် ပါမစ်ကို ရယူပါမည်။ (ပုဒ်မ ၇၇ အရ)

(ဇ) နိုင်ငံခြားသားဝန်ထမ်းကို သတ်မှတ်ထားသည့် အရေအတွက်ထက် ပိုမို ခန့်ထားလိုပါက စီမံခန့်ခွဲမှုကော်မတီ၏ ခွင့်ပြုချက်ရရှိမှသာ ခန့်ထားပါမည်။ (ပုဒ်မ ၇၈ အရ)

(ဈ) အသုံးပြုခွင့်ရရှိထားသည့် စီမံကိန်းမြေပေါ်တွင် လူနေအိမ်ခြေများ၊ အဆောက်အအုံများ၊ လယ်ယာဥယျာဉ်ခြံမြေများ၊ သီးပင်စားပင်များ၊ စိုက်ခင်းများ၊ ပြောင်းရွှေ့ရှင်းလင်းပေးရန် လိုအပ်ပါက ထိုသို့ပြောင်းရွှေ့နေရာချထားခြင်းနှင့် လျော်ကြေးပေးခြင်းတို့အတွက် ကုန်ကျစရိတ်များကို ချုပ်ဆိုထားသည့် သဘောတူညီချက်နှင့်အညီ ကျခံပါမည်။ (ပုဒ်မ ၈၀(က) အရ)

(ည) ပြောင်းရွှေ့ရသူများအတွက် မူလအဆင့်အတန်းထက် မနိမ့်ကျစေရန်၊ ယင်းတို့၏အခြေခံ လိုအပ်ချက်များ ပြည့်စုံစေရန်နှင့် အဆိုပါလုပ်ငန်းများ အဆင်ပြေချောမွေ့စေရန် စီမံခန့်ခွဲမှု ကော်မတီနှင့် ညှိနှိုင်းဆောင်ရွက်ပါမည်။ (ပုဒ်မ ၈၀(ခ) အရ)

(ဋ) အသုံးပြုခွင့်ရရှိသော စီမံကိန်းမြေကို သတ်မှတ်ထား စည်းကမ်းချက်များနှင့်အညီ အသုံးပြု ပါမည်။ (ပုဒ်မ ၈၀(ဂ) အရ)

(ဌ) အသုံးပြုခွင့်ရရှိသော စီမံကိန်းမြေ၏ သဘာဝမြေမျက်နှာသွင်ပြင် သို့မဟုတ် မြေ အနိမ့် အမြင့် အနေအထားကို စီမံခန့်ခွဲမှုကော်မတီ၏ ခွင့်ပြုချက်မရှိဘဲ သိသာထင်ရှားစွာ ပြုပြင် ပြောင်းလဲခြင်းမပြုပါ။ (ပုဒ်မ ၈၀(ဃ) အရ)

(ဍ) အသုံးပြုခွင့်ရရှိသော စီမံကိန်းမြေ၏ မြေပေါ်သို့မဟုတ် မြေအောက်၌ မိမိအားခွင့်ပြုသည့် လုပ်ငန်းနှင့် မသက်ဆိုင်သည့် သဘာဝသယံဇာတ တွင်းထွက်ပစ္စည်းကိုဖြစ်စေ၊ ရှေးဟောင်းဝတ္ထုပစ္စည်းကို ဖြစ်စေ၊ ရတနာသိုက်ကိုဖြစ်စေ တွေ့ရှိလျှင် စီမံခန့်ခွဲမှုကော်မတီ သို့ ချက်ချင်းအကြောင်းကြားပါမည်။ ထို့ပြင် စီမံခန့်ခွဲမှုကော်မတီက

အစားထိုးစီစဉ်ပေးသည့် နေရာသို့ ပြောင်းရွှေ့ဆောင်ရွက်ပါမည်။ (ပုဒ်မ ၈၅ အရ)

၃၂။ မြန်မာနိုင်ငံအင်ဂျင်နီယာကောင်စီဥပဒေ (၂၀၁၃)

စီမံကိန်းပိုင်ရှင်သည် -

(က) အင်ဂျင်နီယာဆိုင်ရာလုပ်ငန်းနှင့် နည်းပညာဆိုင်ရာ လုပ်ငန်းများကို ကောင်စီကထုတ်ပေး သော မှတ်ပုံတင်လက်မှတ် ရရှိထားသည့် အင်ဂျင်နီယာများကိုသာ ခန့်အပ်ဆောင်ရွက်စေ ပါမည်။ (ပုဒ်မ ၃၇ အရ)

(ခ) အင်ဂျင်နီယာဝန်ထမ်းများက မှတ်ပုံတင်လက်မှတ်ပါ စည်းကမ်းချက်များကို လည်းကောင်း၊ မြန်မာနိုင်ငံအင်ဂျင်နီယာ ကောင်စီဥပဒေပါ ပြဋ္ဌာန်းချက်များကို လည်းကောင်း၊ ယင်းဥပဒေအရ ထုတ်ပြန်သည့် နည်းဥပဒေများ၊ အမိန့်နှင့် ညွှန်ကြားချက်တို့ပါ တားမြစ်ချက်များကို လည်းကောင်း လိုက်နာစေရပါမည်။ (ပုဒ်မ ၃၄ အရ)

၃၃။ အလုပ်ရုံများအက်ဥပဒေ (၁၉၅၁)

စီမံကိန်းပိုင်ရှင်သည် ဥပဒေပြဋ္ဌာန်းချက်အားလုံးကို လိုက်နာဆောင်ရွက်ပါမည်။

၃၄။ မြန်မာ့ဆိပ်ကမ်းအာဏာပိုင်ဥပဒေ (၂၀၁၅)

စီမံကိန်းပိုင်ရှင်သည် ဆိပ်ကမ်းနယ်နိမိတ်အတွင်း ကမ်းပါးနယ်နှင့် ကုန်းမြေမှ ဘေးအန္တရာယ် ဖြစ်စေတတ် သော ပစ္စည်းများ၊ အဆိပ်သင့်ပစ္စည်းများ၊ အမှိုက်သရိုက်များ၊ အညစ်အကြေးများနှင့် စွန့်ပစ်ပစ္စည်းများကို ရေထုအတွင်း ပြစ်ချခြင်းမပြုရန် ဆိပ်ကမ်းအာဏာပိုင်၏ စီမံချက်နှင့်အညီ လိုက်နာဆောင်ရွက်ပါမည်။ (ပုဒ်မ ၂၃(က) အရ)

၃၅။ ပို့ကုန်သွင်းကုန်ဥပဒေ (၂၀၁၂)

စီမံကိန်းပိုင်ရှင်သည် ပြည်ပမှပစ္စည်းများ တင်သွင်းပါက ခွင့်ပြုချက်ပါ စည်းကမ်းချက်များအတိုင်း လိုက်နာပါမည်။ (ပုဒ်မ ၇ အရ)

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မှ Dawei Power Company Limited

အမည် Mr. Panya Visetnut

ရာထူး Assistant Manager

The Applicable Laws and Legal Commitments for Initial Phase Power Plant Project in Dawei Special Economic Zone

Applicable Legislations, Guidelines and the Legal Framework of Environmental Issues

Past and Present Environmental Legislation and Regulations of Myanmar

The National Commissions for Environmental Affairs (NCEA) formed in February 1990 outlined **Myanmar Agenda 21**, which contains social, economic, institutional and infrastructural strengthening programmes as well as environmental conservation programmes.

To achieve sound environmental management in Myanmar, the respective Ministries fundamentally devise 56 environmental policies and regulations that are directly related with environmental conservation and protection. The State Law and Order Restoration Council ratified the **Forest Law in November 1992,** in order to conserve the environmental factors and to maintain a sustained yield of the forest produce and **Protection of Wild Life and Wild Plants and Conservation of Natural Areas Law in 1994**.

In order to uphold further environmental protection promote sustainable development and bring into line for environmental affairs, in April 2011, National Environmental Conservation Committee (NECC) was reformed for the national environmental management in Myanmar. The Ministry of Environmental Conservation and Forestry (MoECaF) was upgraded in place of The Ministry of Forestry in September 2011 as the focal and coordinating agency for the overall environmental management. The Government entered the set-up of Environmental Conservation Department as a separate organization under the Ministry of Environmental Conservation and Forestry (MoECaF) on 11st October 2012. The Ministry of Environmental Conservation and Forestry promulgated the Environmental Conservation Law on 30th March, 2012. The Environmental conservation and Forestry issued the Environmental Conservation Rules on the 2014 and issued the Environmental Impact Assessment Producer and Emission Quality Standards Guideline on 29th December 2015.

The Project is related to the following laws, rules, procedures and guidelines-

1 The Environmental Conservation Law (2012)
2. The Environmental Conservation Rules (2014)
3. Environmental Impact Assessment Procedure (2015)
4. Emission Quality Standards Guideline (2015)
5. The Myanmar Investment Law (2016)
6. Protection the Rights of National Races Law (2015)
7. The Electricity Law (2014)
8. Factories Act (1951)
9. The Public Health Law (1972)
10. Prevention and Control of Communicable Disease Law (1995)
11. The Control of Smoking and Consumption of Tobacco Product Law (2006)
12. The Myanmar Fire Force Law (2015)
13. The Motor Vehicle Law (2015) and Rules (1987)

14. The Myanmar Insurance Law (1993)
15. Labour Organization Law (2011)
16. The Settlement of Labour Disputes Law (2012)
17. Employment and Skill Development Law (2013)
18. The Minimum Wages Law (2013)
19. Payment of Wages Law (2016)
20. Workmen's Compensation Act (1923)
21. The Leaves and Holiday Act (1951)
22. Social Security Law (2012)
23. Petroleum Act (1934)
24. The Petroleum Rules (1937)
25. Conservation of Water Resources and Rivers Law (2006)
26. Freshwater Fisheries Law (1991)
27. Myanmar Marine Fishery Law (1990)
28. The Protection and Preservation of Cultural Heritage Regions Law (1998)
29. The Protection and Preservation of Antique Objects Law (2015)
30. The Protection and Preservation of Ancient Monument Law (2015)
31. The Forest Law (1992)
32. The Special Economic Zone Law (2014)
33. The Engineering Council Law (2013)
34. Myanmar Port Authority Law (2015)
35. The Export and Import Law (2012)

1. The 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 causes 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 section 25 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 continuously monitor all adverse impacts in the pre-construction phase, construction phase, operation phase, suspension phase, closure phase and post-closure phase, moreover has to implement the EMP with abiding the all conditions included in ECC, relevant laws & rules and this procedure, under paragraph 106.
- The project proponent has to submit, 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 show this monitoring report in public place such as library, hall and website and office of project for the purpose to know this report by public within 10 days from the date which the report is submitted to the Ministry. Moreover has to give the copy of this report, by email or other way which way agreed with the asked person, to any asked person or organization, under paragraph 110.
- The project proponent has to allow inspector to enter and inspect in working time and if it is needed by Ministry has to allow inspector to enter and inspect in the office and work-place of project and other work-place related to this project in any time, under paragraph 113.
- The project proponent has to allow inspector 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. **Emission Quality Standards Guideline (2015)**

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

5. **The 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 above law. This law focuses as follows;

- The project proponent has to lease the land or building owned by government or private with lease agreement and register it by the registration of deeps law, under sub-section (a) and (d) of section 50 of said law.
- The project proponent has to appoint the nationalities 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 51 of said law.
- The project proponent has to appoint the nationalities only in normal work without expertise, in line with the sub-section (c) of section 51 of said law.
- The project proponent has to appoint either foreigner or nationality with the appointment agreement in accord with the law, in line with the sub-section (d) of section 51 of 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 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 section 65 of said law.
- The project proponent has to pay the wages or salary to the employees in accordance with the laws, rules, order and procedures in the suspension period, in line with the sub-section (j) of section 65 of 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 section 65 of 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 section 65 of said law.
- The project proponent has to abide by labour laws, in line with the sub-section (m) of section 65 of said law.
- The project proponent has to pay the compensation to the injured person for damages if damages of environment or socio-economy is occurred by misuse of project, in line with the sub-section (o) of section 65 of 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 section 65 of 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 65 of said law.

- The project proponent has to insure the prescribed insurance by rules, under section 73 of said law.

6. Protection the Rights of National Races Law (2015)

Purpose: to ensure to disclose to residents ethnic nationalities about the project fully, moreover to ensure to cooperate with them. This law focuses the following matters;

Section 5- The project proponent has to disclose to the residents national races all about the project fully.

- The project proponent has to cooperate with the residents national races.

7. The Electricity Law (2014)

Purpose: to ensure the compliance with the conditions of permission for productions of electricity, abiding by any stipulation, implementing with the best practices and paying compensation in line with above law. This law focuses as follows;

- The project proponent will implement the project with the best practices to reduce the damages on the environment, health and socio-economy, also will pay compensation for the damages and will pay the fund for environmental conservation, under sub-section (b) of section 10 of said law.
- The project proponent has to take the certificate of electric safety, issued by the chief-inspector, before the commencement of power generation, under section 18 of said law.
- The project proponent has to be liable for damages to any person or enterprise by failure to abide by the quality standards or rules, regulation, by-law, order and directive issued under said law, according to sub-section (a) of section 21 of said law.
- The project proponent has to be liable for damages to any person or enterprise by negligence of project owner, according to sub-section (a) of section 22 of said law.
- The project owner has to comply with the permission for electric searching and generation, under sub-section (a) and (b) of section 26 of said law.
- The project proponent will inform promptly to chief-inspector and head officer of related office while occurring of accident in electricity generation, under section 27 of said law.
- The project proponent will comply with the standards, rules and procedure. Moreover will allow the inspection by respected governmental department and organization if it is necessary, under section 40 of said law.
- The project proponent will pay the compensation to anyone who is injured or caused to death in electric shock or fire caused by the negligence or omitting of the project owner or representative of project owner, under section 68 of said law.

8. Factories Act (1951)

Purpose: to ensure the safety and cleaning of working place, drinking water, creation of nursing rooms and other needs.

Section 5& 7- The project proponent has to abide by all provisions of this law.

9. The Public Health Law (1972)

Purpose: to ensure the public health include not only employees but also resident people and cooperation with the authorized person or organization of health department. This law focuses as follows;

- The project owner will cooperate with the authorized person or organization in line with the section 3 and 5 of said law.
- ***Section 3***- The project proponent has to abide by any instruction or stipulation for public health.
- ***Section 5***- The project proponent has to allow any inspection, anytime, anywhere if it is needed.

10. 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. This law focuses as follows;

- 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: (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; and
  - (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.

11. 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. This law focuses as follows;

- 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.

12. The 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 matters;

- The project proponent has to institute the specific fire services, under sub-section (a) of section 25 of said law.

- The project owner has to provide materials and apparatuses for fire precaution and prevention, under sub-section (b) of section 25 of said law.

13. The 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 life safety.

14. The Myanmar Insurance Law (1993)

Purpose: the project can cause the damages to the environment and injuries to public so to ensure the needed insurances are insured at Myanmar Insurance. This law focuses the following matters;

- ***Section 15*** - If the project proponent uses the owned vehicles the project owner has to insure the insurance for injured person.
- ***Section 16*** - 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.

15. Labour Organization Law (2011)

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

- ***Section 17*** - The project owner promises to allow the labour 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 labour laws and to summit demands to the employer and claim in accord with the relevant law if the agreement cannot be reached.
- ***Section 18*** - The project proponent promises to demand the re-appointment of worker who is dismissed by the employer without the conformity with the labour laws.
- ***Section 19*** - The project proponent promises to send the representatives to the Conciliation Body in settling a dispute between the employer and the worker.
- ***Section 20*** - The project proponent promises the labour 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 labour laws.
- ***Section 21*** - The project proponent promises the labour organization to participate in solving the collective bargains of the employees in accord with the labour laws.
- ***Section 22*** - The project proponent promises the labour 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 Labour Organization.

16. The Settlement of Labour 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 has to not absent to negotiation within the stipulated time for complaint, under section 38 of said law.
- The project proponent has to not change the existing stipulations for employees within conducting period before Tribunal, under section 39 of said law.
- The project proponent has to 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 has to pay the compensation decided by Tribunal if violates any act or any omission to damage the interest of labour by reducing of product without efficient cause, under section 51 of said Law.

17. 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. This law focuses as follows;

- 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 is 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 above mentioned fund, under sub-section (b) of section 30 of said law.

18. 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. This law focuses as follows;

- 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 section 13 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 parents or one of family dies, under sub-section (g) of section 13 of said law.

19. 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 accordance with the section 3 and 4 of said law.

- The project proponent has to submit with the agreements of employees & reasonable ground to 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.

20. Workmen's Compensation Act (1923)

Purpose: to ensure the compensations to injured employee while implementing in line with the above law. To abide by the prescribed compensations in various kinds of injury. This law focuses as follow;

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

21. 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.

22. Social Security Law (2012)

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. This law focuses as follows;

- 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 myself and together with the fund which has to be paid from their salary by the employees. Moreover the project owner will 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 accidence, under sub-section (b) of section 48 of said law. (but this fund is not related to workmen compensation)
- 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.

23. Petroleum Act (1934)

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

- The project proponent has to obtain the license for importation, transportation and storage of the fuel under section 3 of said law and abide by the stipulations in the license.

24. The Petroleum Rules (1937)

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

- The project proponent will 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. Conservation of Water Resources and Rivers Law (2006)

Purpose: the project proponent will avoid the disposal of stipulated materials into river-creek. This law focuses as follows;

- The project proponent has to avoid any performing to damage to the river, creek and water resource, under sub-section (a) of section 8 of said law.
- 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 of said law.

26. 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 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.

27. Myanmar Marine Fishery Law (1990)

Purpose: according to the sub-section (f) of section 2 of said law, the Myanmar marine fishery water area includes the water area along the sea cost of Myanmar from the high tide mark toward the open sea and on the seaside of the straight line drawn from one extreme end of one bank to the extreme end of the other bank of the river and creek mouths so the project will be nearby Myanmar marine water area, river or creek which is freshwater area.

- The project proponent has to avoid any water pollution and disturbing to fish &other aquatic lives in any Myanmar marine water, under section 39 of said law.

28. 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 disaster or man-made. This law focuses as follow;

- ***Section 13*** - The project proponent has to apply to get the prior permission of Directorate of Ancient-Research to build the road, bridge or dam in the cultural heritage area.
- ***Section 22*** - The project proponent has to not build the building which is not in line with the stipulations prescribed by the Ministry of Culture in the cultural heritage area.

29. 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 follows;

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

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

Purpose: to ensure the protection of ancient monument and information about it if it was in the project area. This law focuses as follows;

- ***Section 12*** - 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.
- ***Section 15*** - The project proponent has to obtain the prior permission of Department of Archaeology and National Museum if the project area is in the prescribed area of Ancient Monument.
- ***Sub-section (f) of Section 20*** - The project proponent has to obtain the prior permission, by written, of Department of Ancient Research and National Museum if the project proponent dispose the chemical and solid waste in the Ancient Monument area.

31. The Forest Law (1992)

- ***Sub-section (a) of Section 12*** - The project proponent has to obtain the approval of Ministry if the project area is included in the forest land or the land administrated by the government which covers the forest under section 1 of said law.

32. The Special Economic Zone Law (2014)

Purpose: the project locates in Dawei special economic zone. According to section 89 of said law the project has to abide by said law so to ensure the responsibilities of project proponent. This law focuses as follows;

- The project proponent has to abide by the any stipulation included in the notification, order, directive and procedure issued by special economic zone administrative committee, under sub-section (f) of section 11 of said law.
- The project proponent has to comply with the stipulations of SEZ administrative committee, under sub-section (p) of section 11 of said law.
- The project proponent has to appoint the nationalities only for normal work without expertise, under section 27 of said law.
- The project proponent has to abide by the standards included in the environmental conservation law and international standards, moreover has to abide by the existing laws to not injure to social and health, under section 35 of said law.
- The project proponent has to appoint the nationalities in the high- technical work and expert work at least 25% in first two years later the date which is commencement of project, and at least 50% in second two years later, and at least 75% in third two years later, under section 75 of said law.
- The project proponent has to abide by the negotiation by the administrative committee if the dispute, between employees and me, is occurred, under sub-section (a) of section 76 of said law.
- The project proponent has to obtain the work permit for foreign employees issued by representative office of Labour department before starting to work, under section 77 of said law.
- The project proponent has to obtain the approval of administrative committee before appointment if it is needed to appoint the foreign employees in administrative and technical work over the limited numbers, under section 78 of said law.
- The project proponent has to pay the cost for compensation and resettlement for project land if housing, buildings, farm, garden, fruit trees or other plantation is in the project area, in accord with the agreement, under sub-section (a) of section 80.
- The project proponent has to coordinate with the administrative committee to facilitate in resettlement process for to not low the original living standards and fulfill their basic needs, under sub-section (b) of section 80 of said law.

- The project proponent has to use the project land in accord with the stipulations, under sub-section (c) of section 80 of said law.
- The project proponent has to not change the physical features of land without the approval of administrative committee, under sub-section (d) of section 80 of said law.
- The project proponent has to inform to the administrative committee if any antique objective or any natural resource or treasure trove is found on or under the land in project area, moreover has to move to the replaced land for project if the original land cannot be allowed to continue the project, under sub-section (e) of section 80 of said law.

33. The Engineering Council Law (2013)

Purpose: to ensure the safety in technical and engineering work in the project. This law focus the following;

- The project proponent has to ensure the employees who are engineers abide 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.
- 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.

34. Myanmar Port Authority Law (2015)

Purpose: to ensure the conservation of water pollution in the port area. This law focus the following;

- The project proponent has to avoid disposing the dangerous material, poisoned material, garbage, sewage or disposal into the water from the port area, under the sub-section (a) of section 23 of said law.

35. The Export and Import Law (2012)

Purpose: to ensure the project proponent to abide by the conditions included in permit if it is needed to import the material for project. This law focuses as follow;

- The project proponent has to abide by the conditions included in permit, under section 7 of said law.

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Environmental Mitigation Measures and Environmental Quality Monitoring Program

Environmental and Social Impact Assessment for Initial Phase Power Plant of Dawei SEZ

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Certified the Environmental Mitigation Measures and Environmental Monitoring Program

Environmental and Social Impact Assessment for Initial Phase Power Plant of Dawei SEZ

Certified Report by

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Environmental Mitigation Measures and
Environmental Quality Monitoring Program

Environmental and Social Impact Assessment for
Initial Phase Power Plant of Dawei SEZ

The Project's environmental mitigation and monitoring measures are as follows:

1. Mitigation Measures and Monitoring Program during Pre-Construction Phase **(Table 1)**
2. Mitigation Measures and Monitoring Program during Construction Phase **(Table 2)**
3. Mitigation Measures and Monitoring Program during Operational Phase **(Table 3)**
4. Mitigation Measures and Monitoring Program during Decommissioning Phase **(Table 4)**

TABLE 1: MITIGATION MEASURES AND MONITORING PROGRAM DURING PRE-CONSTRUCTION PHASE

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Biomass Waste	Loss of vegetation cover and habitat of wildlife.	• The contractor will first conduct a detailed biomass survey of the 37.19 acres construction site to delineate vegetated areas and classified according to tree species, age, crown closure, height and site quality characteristics. The survey results will be used to prepare estimates of volumes of various categories of biomass broken down into: (i) biomass that could be used for economic purposes; (ii) biomass that would have no economic use and would have to be disposed. The estimates should categorize usable biomass based on sizes and potential uses. • The contractor will prepare a biomass removal plan based on the results of surveys that will meet the objectives of biomass waste management. The plan will need to cover: (i) schedule of clearing clearly indicated on the site map; (ii) clearing method; (iii) proposed use of timbers and woods or merchantable biomass; (iv) involvement of local villagers for their use of biomass; and (v) proposed method of disposal of debris and soft vegetation wastes. • The harvesting / biomass removal approach will take into consideration the physical and environmental factors of the site. • Arrangements should be made to enable local villagers to harvest woods for timber or charcoal making before the site clearing operation. Alternatively, the vegetation wastes should be separated into usable timber and woods, and small boughs, twig, and leaves that will need to be disposed. The separated timbers and woods could be sold or given to villagers. The unusable wastes will be disposed off in a landfill site to be selected by the contractor with approval of the concerned authority. • Alternatively, chipping and mulching of unusable vegetation wastes should be carried out. The mulched materials could be later used for landscaping purposes.	• The project manager or representative will occasionally carry out site inspections to monitor the work progress. • The contractor will submit the following reports to the Project Manager: - Weekly progress note - Monthly progress reports - Completion reports	• Contractor • Dawei Power Company Limited

TABLE 1: MITIGATION MEASURES AND MONITORING PROGRAM DURING PRE-CONSTRUCTION PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Biomass Waste (Cont'd)		• The recommended clearance method for the Project is manual cutting (as opposed to mechanical clearing via bulldozer). Chemical defoliants will not be used. Manual clearing (i.e. chainsaw, pruning shears, etc.) will reduce soil disturbance and subsequent sediment transport, leave rooting structures in place as erosion control, and will create social benefit if local residents are engaged to undertake clearance activities. • If clear felling is undertaken, harvesting must be undertaken manually, and the herbaceous / shrub layer should be left behind for moderately steep slopes to minimize erosion. • Areas with steep slopes of greater than 30 degrees will not be logged or cleared for safety and environmental reasons (i.e. slope stability, prevention of erosion and sediment transport into the sea. • Areas designated for landfill or composting are to be clearly indicated in the biomass removal plan. • Open burning of debris and biomass residues will need permission of the Owner Project Manager. If burning is necessary, burning in clear felled areas will be restricted to pile-and-burn techniques, with no broadcast burns conducted to minimize erosion potential. • Cutting and stockpiling at a designated area within the construction site is recommended. Provisions must be made to minimize fire risk of the stockpiles. • After felling of commercial timber, local residents will be given a limited time period to extract non-timber forest products and lesser value biomass from the priority biomass removal areas. Lesser value biomass can be used for building materials, firewood, charcoal / biochar production and other recycle products. • Biomass that needs to be disposed will be mechanically reduced in sizes or shredded into small chips to facilitate disposal by landfill or composting.		

TABLE 1: MITIGATION MEASURES AND MONITORING PROGRAM DURING PRE-CONSTRUCTION PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Air Quality	Increase in air pollutants caused by fugitive dust from site excavation, site filling, compacting and emission from operation of trucks.	• Spray water at and around the construction areas and access roads during site preparation and grading. • Enforce a speed limit for vehicles and trucks in the construction sites not to exceed 40 km/h. • Construction activities shall be kept as planned so that the disturbed areas will be minimized at any time. • Enforce speed limit for trucks not to exceed 40 km/h when passing the communities. • Cover construction materials with canvas or equivalent during transportation, materials should be dampened, if necessary, before transportation. • Restore, resurface, and rehabilitate the disturbed areas as soon as practicable after completion of construction or disturbance. • Prohibit open burning of waste in the construction area. • Establish a vehicle washing facilities to minimize the quantity of material deposited on the roads. • Establish a checkpoint at project gate to ensure the vehicles leaving the project site are following the measures prescribed to reduce dust emissions. • Adopt procedures to avoid construction vehicles idling for excessive periods (e.g. more than 5 minutes) if required to queue to enter the construction sites. • Maintain all equipment and vehicles in proper working conditions according to the manufacturer's specifications. The engines of construction equipment fleet must be routinely maintained by qualified mechanics to ensure their proper conditions during operations.	**Ambient Air Quality** • Undertake routine periodic ambient air quality monitoring (AQM) at locations in the construction site and in sensitive areas over the duration of construction works. Additional monitoring will need to be carried out if complaints are received from affected persons. The AQM during construction will cover at least 24 hour continuous sampling and will cover: - Total suspended particulates - Particulates (PM_{10}) • Monitor and manage the incidence of dust deposition and manage construction vehicle emissions in relation to ambient air quality. **Fugitive Dust** • Monitor regularly (weekly minimum) by inspection or other effective sampling. • The performance of dust filtration systems on construction shed ventilation systems.	• Contractor • Dawei Power Company Limited • Third Party

TABLE 1: MITIGATION MEASURES AND MONITORING PROGRAM DURING PRE-CONSTRUCTION PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Air Quality (Cont'd)		• Take measure to avoid congestion of trucks in areas near communities along the transport routes. A good traffic management plan will be required. • Perform on-site material hauling with trucks equipped with on-road engines (if determined to be less emissive than the off-road engines).	• Spillage or deposition of loose material on roads leaving a construction site. • Monitor twice a year or more frequently if weather conditions required, construction sites, stockpiles, vehicles and roads leaving the construction sites for evidence of dust generation or loose, unstable material with potential for dust. **Vehicle Emissions** • Monitor construction vehicle management with regards to: - Queuing in streets other than those in which arrangements have been made for such action in the construction traffic management plan (on-going) - Vehicle motors idling for periods exceeding 5 minutes while in queues to access construction sites (on-going) • Inspect the position of stationary plant and equipment powered by diesel motors to ensure exhaust emissions are directed away from sensitive activities and neighboring properties (initially on establishment).	

TABLE 1: MITIGATION MEASURES AND MONITORING PROGRAM DURING PRE-CONSTRUCTION PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Noise	Increase ambient noise level at the pre-construction site and communities near the material transport routes.	• The noise reduction at the perimeter could be achieved using temporary metal sheet fence at least 3 m high with adequate length to block the noise emanating to the receptor. • Provide ear plugs or ear muffs to workers operating in the excessive noise areas. • Major construction activities which generate loud noise should be limited to only during the day time. Activities that are necessary to be carried out at nighttime will need approval of the site engineers, and will need to have adequate noise control equipment or measures. • Speeds of vehicles in the construction site will not be more than 40 km/h. • Noise performance requirements of construction equipment will need to be clearly stated in contract specifications. • The EPC contractor will be required to regularly monitor ambient noise levels at the receptors, particularly during the noise generation period such as piling. • The construction environmental management plan will need to include an efficient complaints redress procedure and an efficient corrective action procedure to address the noncompliance of noise performance.	**Noise Monitoring of Construction Equipment and Trucks** • Before commencing the construction, the Contractor will conduct noise testing of trucks to be used in the construction. Subsequently, the Contract will conduct noise testing of the trucks every six months. The Contractor will ensure that the trucks that did not pass the noise test will be replaced by new trucks with less noise, or will be fixed as soon as possible. The Contractor will submit reports of the noise testing to the EHS Manager of the Project Proponent. **Monitoring in Response to Noise/ Vibration Complaint** • The Contractor is to implement measures to receive and respond to complaints about construction noise and vibration made at any time during the construction phase of the Project. Such measures may include a complaints management and correction action system developed and incorporated in this CEMP. Key requirements for the system include: – On receipt of a complaint, implement a complaint response procedure for tracking and responding to the issue(s) and the complaint. – Identify the relevant construction activity at which the complaint is directed.	• Contractor • Dawei Power Company Limited • Third Party

TABLE 1: MITIGATION MEASURES AND MONITORING PROGRAM DURING PRE-CONSTRUCTION PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Noise (Cont'd)			– As soon as practicable, investigate and measure the level of noise and/or vibration from that activity. – Respond to the complainant as soon as practicable upon completion of the investigation and describe the corrective action taken. – Report to the Proponent on the complaint, the activity, the corrective action and the response.	
Road Traffic	• Traffic loads will be increased on existing roads within the study area, small port coastal road and Nga Pitat road, the access road to the power plant construction site. • The pre-construction phase would be congestion of local roads and increase risk of accidents.	**Truck routes and construction site access** • In consultation with the concerned authorities at the national, regional, and township levels, develop and implement a Construction Traffic Management Plan to address the following issues: - Use of established truck routes and arterial roads for the haulage of construction materials and spoil. - Where practicable, provide direct access from worksites to arterial roads to minimize truck traffic in local streets. - Avoid haulage tasks during peak traffic periods as far as practicable. Where haulage in peak periods is unavoidable, such activities are to be managed in accordance with specific traffic management sub-plans provided to the relevant agencies in advance. - Control heavy vehicle movements on small port coastal road to avoid interference with major events, if any. - Investigate the capacity of intersections on haulage routes to minimize impact on intersection operations by heavy vehicles servicing the construction worksites.	• Traffic monitoring will be carried out during transportation activities of the pre-construction works. Therefore, the monitoring will be linked to the work schedule. The contractor will be required to prepare a traffic monitoring program based on the latest construction schedule before commencing the construction. • Record and report number of traffic accidents in the identified impact. • Monitor number of traffic on Nga Pitat Road. Review the adequacy of construction traffic management plan if traffic congestion is observed. • In general, monitoring traffic flows by a third party will be carried out twice a year during peaks of construction-related transportation.	• Contractor • Dawei Power Company Limited • Third Party

TABLE 1: MITIGATION MEASURES AND MONITORING PROGRAM DURING PRE-CONSTRUCTION PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Road Traffic (Cont'd)		- Prepare and implement a comprehensive construction traffic management plan to control truck movements to avoid, or mitigate and manage the impacts of heavy vehicle traffic on the road network. - Exceptional circumstances would arise when no suitable alternative routes are available for specific construction tasks. • Measures to manage the operation of the construction truck fleet for incorporation into a Construction Vehicle Management sub-plan to include: - Monitoring of truck position, speed, route and performance in relation of traffic conditions and schedule requirements. - Management of truck speed and position to avoid queuing on the approaches to the spoil handling and loading facilities. - Management of traffic signals on nominated spoil haulage routes in night-time hours to achieve optimum performance of the truck fleet and to minimize impacts on communities along the routes. - Maintain all vehicles transporting material to and from the construction sites to a high standard (ADR28/01) with regards noise emissions, exhaust emissions, traffic safety and operational safety. - Ensure all vehicles leaving a construction site pass over or through devices designed and maintained to remove soil and other materials. **Construction Traffic Hazards** • Heavy trailer trucks transporting heavy and large plant equipment will have to be directed by a traffic police car or by other vehicle specially designated to handle a guidance of this kind of transportation. • Post warning signs along the right of way where the transmission line construction takes place. **Local Traffic** • Implement management measures to avoid, or minimize increase in traffic caused by the project works in local streets as practicable.		

TABLE 1: MITIGATION MEASURES AND MONITORING PROGRAM DURING PRE-CONSTRUCTION PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Road Traffic (Cont'd)		• Notify the local community about proposed changes to local traffic access arising from construction activities, and provide clear signage of changed traffic conditions and take other measures to ensure safe traffic movement. • Prepare and implement an employee parking policy for the construction worksites to manage the impacts on car parking in the vicinity of worksites and help avoid project parking in local streets. **Traffic Management at the Intersection of Small Port Coastal Road and Nga Pitat Road** • Provide a traffic police or relevant officer to control traffic at the intersection during the transport period. **Pedestrians and Cyclists** • Maintain safe pedestrian and cycle access near construction works (particularly for elderly and children), including to community facilities, such as schools, monastery, open space, and particularly. • Notify the local community, and in particular, local schools, about changes to pedestrian and cycle access during construction near construction works. • Provide traffic controls designed for the safe movement of pedestrians and cyclists near the worksites.		
Archaeological Site	The site clearing and excavation works may have some impact on artifacts which potentially could have archaeological and culture value.	• Site supervisor/foreman shall order construction workers to stop immediately the construction activities in the area of the chance find. • Inform concerned authority (Fine Arts Department), including head of village and township, for proper management if historic or archaeological is found.		• Contractor • Dawei Power Company Limited

TABLE 1: MITIGATION MEASURES AND MONITORING PROGRAM DURING PRE-CONSTRUCTION PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Archaeological Site (Cont'd)		• Delineate and mark clearly the discovered site or area and prohibit physical activities in the area without prior approval of the concerned authority. • Install temporary site protection measures (warning tape and stakes, avoiding signs). • Strictly enforce any no-go area needed to protect the site. • Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be present until the responsible local authorities and the responsible Ministry take over. • If it is necessary to relocate a cemetery and grave yard, cultural ceremony should be arranged prior to the relocation.		
Loss of Britney Creek	Loss of villager's navigation.	• DPC will develop alternative dockyard/boatyard at Chi Oo Creek area. The alternative dockyard/boatyard will be of similar kind or quality to the existing dockyard/boatyard at Britney Creek. • DPC will dredge Chi Oo Creek and upgrade the route to the dockyard/boatyard. • DPC will organize public hearing and clarification for villagers and ship owners who are potentially affected.		• Dawei Power Company Limited
Occupational Health and Safety	Pre-construction activities may have some impacts on worker health, safety and security.	• The Contractor will prepare an OHS management plan and implementation procedures specific to this Project and in line with its corporate OHS policy and procedures. • The Contractor will conduct necessary orientation and training to all construction personnel to ensure that the pre-construction personnel clearly understand the OHS plan and implementation procedures. • The OHS management plan and implementation procedures will cover but not limited to the following subjects:	• Monitoring of OHS performance of the Contractor will be made through: - Daily informal inspections (walk through of the construction sites) - Weekly formal inspections of the work place - Audits - Corrective Action Reports • The daily inspections will observe: (i) adherence of the construction workers	• Contractor • Dawei Power Company Limited

TABLE 1: MITIGATION MEASURES AND MONITORING PROGRAM DURING PRE-CONSTRUCTION PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Occupational Health and Safety (Cont'd)		- Organization and responsibilities of OHS management - Training plan - Communication plan - Contractor responsibilities - Job-specific work requirements - Compliance monitoring and evaluation plan - Audit plan - Reporting system - Documentation system • Develop and implement safety measures for the pre-construction works including treatment strategies that address, accidents, communications, access for emergency services, response coordination and management. • Develop emergency response procedures, and implement in the event of accidents and emergencies. • Provide first aid for the duration of the pre-construction phase.	to the OHS procedures such as wearing of protective equipment in high risk working areas; (ii) working conditions; (iii) readiness of fire and life safety systems as relevant; and (iv) potential new hazards. The daily inspections will be carried out by the Contractor's EHS Manager and Construction Manager, Site Managers, and relevant foremen. The Project EHS Manager will occasionally join the daily inspections. The Contractor's EHS Manager will prepare daily OHS inspection notes as part of the site inspection notes. • The weekly formal inspections will be carried out at weekly intervals and shall be documented using appropriate "Weekly OHS Inspection Checklists". The Contractor's Construction Manager, EHS Manager, and Site Engineers will carry out the weekly inspections. The Owner's EHS Manager will jointly undertake the weekly inspections. Subcontractors will also be required to participate in the weekly inspections. The weekly inspections will include plant, substances, equipment and temporary structures used by subcontractors. • Monitoring results will be discussed in Project OHS monthly review meetings.	

TABLE 2: MITIGATION MEASURES AND MONITORING PROGRAM DURING CONSTRUCTION PHASE

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Air Quality	Increases in air pollutants caused by fugitive dust from site excavation, site filling, compacting and emissions from operation of trucks and heavy construction equipment.	**Fugitive Dust Control** • For construction site including spoil placement sites: - Use watering or other effective techniques on unsealed areas to minimize wheel generated or wind-generated dust. - As soon as the land becomes available, engage in the progressive rehabilitation of construction sites and spoil placement sites with landscaping. • Take measures (e.g. rumble bars and wheel wash bays) to ensure dust-creating material (earth or similar material) is not transported from the construction sites to roads or other areas in the public domain. • Ensure all trucks carrying spoil or other loose material are covered, and if necessary, treated (e.g. mist sprays) prior to leaving the construction sites. • Ensure all loose earth and similar material spilled or otherwise deposited within the construction sites and the transport routes is cleared and removed from trafficked areas as soon as practicable. • At the construction sites and spoil placement sites, monitor meteorological conditions, particularly wind speed and direction and where necessary take measures to avoid impacts of dust on adjacent properties. Such measures may include: - Modification of construction methods - Increase in dust suppression measures - Cessation of work when no other reasonable or practical measure is available • Spray water at and around the construction areas and access roads.	**Ambient Air Quality** • Undertake routine periodic ambient air quality monitoring (AQM) by the contractor, not less than once a month, at locations in the construction site and in sensitive areas over the duration of construction works. Additional monitoring will need to be carried out if complaints are received from affected persons. The AQM during construction will cover at least 24 hour continuous sampling and will cover: - Total suspended particulates - Particulates (PM_{10}) • Monitor and manage the incidence of dust deposition and manage construction vehicle emissions in relation to ambient air quality. **Fugitive Dust** • Monitor regularly (weekly minimum) by inspection or other effective sampling. • The performance of dust filtration systems on construction shed ventilation systems. • Spillage or deposition of loose material on roads leaving a construction site.	• Contractor • Dawei Power Company Limited • Third Party

TABLE 2: MITIGATION MEASURES AND MONITORING PROGRAM DURING CONSTRUCTION PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Air Quality (Cont'd)		• Enforce a speed limit for vehicles and trucks in the construction site not to exceed 40 km/h. Construction activities shall be kept as planned so that the disturbed areas will be minimized at any time. • Enforce a speed limit for trucks not to exceed 40 km/h when passing the communities. • Restore, resurface, and rehabilitate the disturbed areas as soon as practicable after completion of construction or disturbance. • Prohibit open burning of waste in the construction area. • Cover construction material with canvas or equivalent during transportation, materials should be dampened, if necessary, before transportation. • Establish a vehicle washing facilities to minimize the quantity of material deposition on public roads. • Establish a check point at project gate to ensure the vehicles leaving the project site are following the measures prescribed to reduce dust emissions. **Diesel Exhaust Emissions** • Take measures to manage the movement of construction vehicles entering and leaving the construction sites to avoid, or mitigate and manage the potential for vehicle emissions impacting on adjacent properties, except where such residential or sensitive activities in front an arterial road to be used for access to or from the construction site. Measures for construction fleet management are to be provided in the construction vehicle management plan and the construction traffic management plan. Such measures may include avoiding or minimizing queuing on streets approaching the worksites or adjacent to other sensitive activities.	• Monitor performance of mitigation measures in relation to the construction air quality goals. • Monitor twice a year or more frequently if weather conditions required, construction sites, stockpiles, vehicles and roads leaving the construction sites for evidence of dust generation or loose, unstable material with potential for dust. **Vehicle Emissions** • Monitor construction vehicle management with regards to: - Queuing in streets other than those in which arrangements have been made for such action in the construction traffic management plan (on-going). - Vehicle motors idling for periods exceeding 5 minutes while in queues to access construction sites (on-going). • Inspect the position of stationary plant and equipment powered by diesel motors to ensure exhaust emissions are directed away from sensitive activities and neighboring properties (initially on establishment). • Twice a year reports for submission to MONREC.	

TABLE 2: MITIGATION MEASURES AND MONITORING PROGRAM DURING CONSTRUCTION PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Air Quality (Cont'd)		• Adopt procedures to avoid construction vehicles idling for excessive periods (e.g. more than 5 minutes) if required to queue to enter the construction sites. • For stationary plant and equipment powered by diesel motors, take measures to avoid or mitigate and manage the potential impacts of exhaust emissions on adjacent residential or other sensitive activities. For example, ensure all construction vehicles and stationary plant and equipment powered by diesel motors are fitted with emission control measures, and are regularly maintained to manufacturers' specifications. • Maintain all construction equipment in proper working conditions according to the manufacturer's specifications. The engines of the construction equipment fleet must be routinely maintained by qualified mechanics to ensure their proper conditions during operations. • Provide adequate training to the equipment operators in the proper use of equipment. • Use the proper site of equipment for the job. • Perform on-site material hauling with trucks equipped with on-road engines (if determined to be less emissive than the off-road engines). • Encourage and provide carpools, shuttle vans, transit passes and/or secure bicycle parking for construction worker commutes. • Take measures to avoid congestion of trucks in areas near communities along the transport routes. A good traffic management plan will be required.		

TABLE 2: MITIGATION MEASURES AND MONITORING PROGRAM DURING CONSTRUCTION PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Noise	Increase ambient noise level and vibration at the construction site and communities near the material transport routes.	**Design** • The Contract will require the Contractor and his sub-contractors to use construction equipment that generate low level of noise. The Contractor will present alternative construction equipment to demonstrate that the selected equipment adopts best available technologies to minimize noise level. • Before commencing the construction, the Contractor will conduct a noise survey covering the identified sensitive receptors to update the existing baseline data in the Final EIA Report. The noise survey will be manually conducted using a sound level meter following Noise Standard stated on Environmental, Health, and Safety Guidelines for Thermal Power Plant: Noise of International Finance Corporation (December 19, 2008). • Demonstrate through predictive modelling of the proposed construction techniques and monitoring ambient noise readings prior to construction to establish pre-disturbance levels, the likely noise level due to construction works throughout the construction period. • The noise reduction at the perimeter could be achieved using temporary metal sheet fence at least 3 m high with adequate length to block the noise emanating to the receptor. **Construction Noise** • The Contractor will be allowed to carry out construction works, which generate excessive noise level, only during the period between 6.30 a.m. to 6.30 p.m. Mondays to Saturdays. Such construction works on Sundays or public holidays will need approval from the Resident Engineer of the Project Proponent.	**Construction Noise Monitoring** • Noise and vibration monitoring will be carried out during the construction works identified as noise and/or vibration sources are taking place. Therefore, the monitoring will be linked to the work schedule. The Contractor will be required to prepare a noise and vibration monitoring program based on the latest construction schedule before commencing the construction. • Noise and vibration monitoring will be carried out manually using a sound level meter following Noise Standard stated on Environmental, Health, and Safety Guidelines for Thermal Power Plant : Noise of International Finance Corporation (December 19, 2008). • The monitoring locations will be at the construction site and the identified sensitive receptors. • Compliance monitoring by a third party will be carried out twice a year over the construction period. During the construction period, the compliance monitoring should focus on the day on which the construction activities with maximum noise and vibration will be carried out.	• Contractor • Dawei Power Company Limited • Third Party

TABLE 2: MITIGATION MEASURES AND MONITORING PROGRAM DURING CONSTRUCTION PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Noise (Cont'd)		• For construction works beyond standard construction hours, the Contractor shall take reasonable and practical measures to protect the affected sensitive receptors. For example, acoustic screens or noise barriers would be required. • Reasonable and practicable measures to achieve the construction noise targets may include, for example: - Commence advanced notification of works and undertake on-going consultation with potentially affected property owners and occupants. - Establishing temporary noise barriers between construction worksites and sensitive receptors (e.g. residential, schools, community facilities). - Fitting noise-reduction measures to all plant and equipment engaged in the construction works. - Designing worksites to minimize potential noise impacts on nearby sensitive places. - With the consent of owners and occupants of potentially-affected premises, undertake mitigation actions such as temporary modifications to nearby buildings, temporary relocation during construction or other measures to achieve reasonable environmental conditions. • For the power plant construction site, the duration of construction works with excessive noise will be 68 months in total for all phases. The Contractor will undertake predictive modelling of potential construction noise impacts based on the proposed construction methods, the proximity of sensitive places, and the applicable standards.	**Noise Monitoring of Construction Equipment and Trucks** • Before commencing the construction, the Contractor will conduct noise testing of trucks to be used in the construction. Subsequently, the Contract will conduct noise testing of the trucks every six months. The Contractor will ensure that the trucks that did not pass the noise test will be replaced by new trucks with less noise, or will be fixed as soon as possible. The Contractor will submit reports of the noise testing to the EHS Manager of the Project Proponent. **Monitoring in Response to Noise/Vibration Complaint** • The Contractor is to implement measures to receive and respond to complaints about construction noise and vibration made at any time during the construction phase of the Project. Such measures may include a complaints management and correction action system developed and incorporated in this CEMP. Key requirements for the system include: - On receipt of a complaint, implement a complaint response procedure for tracking and responding to the issue(s) and the complaint.	

TABLE 2: MITIGATION MEASURES AND MONITORING PROGRAM DURING CONSTRUCTION PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Noise (Cont'd)		• Major construction activities which generated loud noise should be limited to only during the day time. Activities that are necessary to be carried out at night time will need approval of the site engineers, and will need to have adequate noise control equipment or measures. • Where construction noise impacts are predicted due to specific construction activities, reasonable and practicable mitigation and management measures must be adopted and notified in advance to potentially affected owners and occupants of adjacent properties. If such activities are to occur often during the construction works, a program for a regular, scheduled occurrence should be devised and implemented in consultation with the owners and occupants of nearby properties. • Potentially affected property owners and occupants are to be notified well in advance (7 days or more) as to the scale, extent and duration of construction works, as required by the consultation and communications program. • Provide ear plugs or ear muffs to worker operating in the excessive noise areas. • Speed of vehicles in the construction site will not be more than 40 km/h. • Noise performance requirements of construction equipment will need to be clearly stated in contract specifications. • The EPC contractor will be required to regularly monitor ambient noise levels at the receptors, particularly during the noise generation period such as piling. • The construction environmental management plan will need to include an efficient complaints redress procedure and an efficient corrective action procedure to address the noncompliance of noise performance.	- Identify the relevant construction activity at which the complaint is directed. - As soon as practicable, investigate and measure the level of noise and/or vibration from that activity. - Respond to the complainant as soon as practicable upon completion of the investigation and describe the corrective action taken. - Report to the Proponent on the complaint, the activity, the corrective action and the response. • Twice a year reports for submission to MONREC.	

TABLE 2: MITIGATION MEASURES AND MONITORING PROGRAM DURING CONSTRUCTION PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Seawater Quality and Marine Resources	• Increased turbidity of seawater due to pipe laying and sea bed trenching or excavation. • The increase in turbidity will affect marine organisms such as plankton, benthic organisms and fish at the area related to pipe laying.	The EPC Contractor will be required to implement best management practices in reducing the impacts on seawater quality caused by pipe laying and sea bed trenching or excavation.	• Seawater quality will need to be monitored during pipe laying and sea bed trenching or excavation. • The water samples will be analyzed for dissolved oxygen, Suspended Solids, Total Dissolved Solid, phytoplankton, zooplankton, benthos, fish larvae. • Twice a year reports for submission to MONREC.	• Contractor • Dawei Power Company Limited • Third Party
Wastewater	Wastewater generate from domestic sewage, wash water in construction site and surface runoff.	• **Storm Water/Surface Runoff** – To prevent contamination of the surface runoff, potential contamination sources will be covered with roof. The surface runoff would contain only suspended solids washed out from the open area. – Construct a temporary drainage system to collect the surfaced runoff from the construction area to avoid the discharge of surface runoff directly into the open sea. – A drainage system will be constructed to collect and drain the storm water or surface runoff directly into the sea. To prevent contamination of storm water, potential contamination sources will be covered with roof. The storm water would contain solids washed out from unpaved surface. – The collected storm water will be drained into a retention pond for removal of suspended solids before discharging into the sea. After the construction, the retention pond will be used for wastewater management during the operation phase.	• Monitoring of effluent to be discharged from the construction site will be weekly carried out by the contractor over the construction period. Two grab water samples, one sample at the inlet and another sample at the outlet of the wastewater treatment facility or the retention pond. The samples will be analyzed to determine magnitudes of various quality parameters prescribed in the effluent standards. • The wastewater treatment performance of the contractor will be assessed from the monitoring data. If the final effluent does not meet the quality standards, the treatment efficiency of the retention pond could be raised using a floating aeration system.	• Contractor • Dawei Power Company Limited • Third Party

TABLE 2: MITIGATION MEASURES AND MONITORING PROGRAM DURING CONSTRUCTION PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Wastewater (Cont'd)		- Establish temporary fence surrounded in order to limit the distribution of sediment washed from construction area. • **Domestic Wastewater** - Toilet wastes will be separated from grey water or sullage. - Kitchen and canteen wastewater will be discharged into oil and grease trap tank before draining into the retention pond. - Toilet wastes will be discharged into a septic tank (or more than one septic tanks) with a hydraulic retention time of about 5 days. The volume of toilet wastes is estimated at about 20% of the total volume of domestic wastewater, or about 7.6 m^3/d. - The septic tank effluent will be discharged into the retention pond. Alternatively, toilet wastes will be treated in a package treatment plant using anaerobic process. - Grey water will be discharged into the retention pond. - The retention pond will be designed as an oxidation pond. • **Wash Water** - The concrete wash water and the wheel wash water will be discharged into a concrete settling basin. The effluent will be treated to adjust the pH, if necessary, and reused. The remaining effluent will be discharged into the retention pond.	• Compliance monitoring of wastewater management will also be carried out by a third party every six months. • Twice a year reporting on wastewater performance, and submit to MONREC.	

TABLE 2: MITIGATION MEASURES AND MONITORING PROGRAM DURING CONSTRUCTION PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Wastewater (Cont'd)		• **Construction Wastewater** - Construction wastewater will be mainly wash water. It may contain oil and grease and chemicals. The wash water that contains oil will be treated in a simple oil removal tank before combining with wash water from other sources. The wash water will be discharged into the retention pond. - Water in the retention pond will be used for dust suppression on unpaved areas in the construction site, and also for watering of the green area. - The remaining volume will be discharged through a sewer pipe into the sea.		
Construction Waste	Waste generated from construction activities and workers.	• Design for reuse and recovery: Design for reuse of material components and/or entire buildings have considerable potential to reduce the environmental burdens from construction. Much of this is common sense as, with reuse, the effective life of the materials is extended and thus annualized burdens are spread over a greater number of years. Reuse, in the waste hierarchy is generally preferable to recycling, where additional processes are involved, some of which will have their own environmental burdens. • Design for off-site construction: The benefits of off-site factory production in the construction industry are well documented and include the potential to considerably reduce waste especially when factory manufactured elements and components are used extensively. Its application also has the potential to significantly change operations on site, reducing the amount of trades and site activities and changing the construction process into one of a rapid assembly of parts that can yield many benefits including: Off-site construction is one of a group of approaches to more efficient	• Monitoring of the waste management performance will be carried out through quick daily site inspections and detailed weekly site inspections: - Daily site inspections will include observation of the collection and storage of waste materials in the construction sites and waste disposal areas, and reviewing the daily records. The focusses will be on efficiency of the collection, storage, and disposal; and on the quality of the records. The EHS Managers of the Project Proponent and the Contractor will jointly inspect the sites.	• Contractor • Dawei Power Company Limited • Third Party

TABLE 2: MITIGATION MEASURES AND MONITORING PROGRAM DURING CONSTRUCTION PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Construction Waste (Cont'd)		construction sometimes called Modern Methods of Construction (MMC) that also include prefabrication and improved supply chain management. Technologies used for off-site manufacture and prefabrication include light gauge steel framing systems and modular and volumetric forms of construction which offer great potential for improvements to the efficiency and effectiveness of construction. To assess the suitability of off-site construction, design teams should consider the following questions: – Can the design or any part of the design be manufactured off site? – Can site activities become a process of assembly rather than construction? • Design for materials optimization: Good practice in this context means adopting a design approach that focuses on materials resource efficiency so that less material is used in the design, i.e. lean design, and/or less waste is produced in the construction process, without compromising the design concept. Three main areas offer significant potential for waste reduction. They are: – Minimization of excavation – Simplification and standardization of materials and component choices – Dimensional coordination • Design for waste efficient procurement: Designers have considerable influence on the construction process itself, both through specification as well as setting contractual targets, prior to the formal appointment of a contractor/constructor. Designers need to consider how work sequences affect the generation of construction waste and work with the contractor and other specialist subcontractors to understand and minimize these. Once work sequences that cause site waste are identified and understood, they can often be 'designed out'.	- In weekly site inspections, the EHS Manager will be participated by the Resident Engineer of the Project Proponent and the Construction Manager of the Contractor. The inspection will cover verification of the records, disposal activities, discussion on the performance of the past week, and identification of problems, if any, that affect the waste management performance.	

TABLE 2: MITIGATION MEASURES AND MONITORING PROGRAM DURING CONSTRUCTION PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Construction Waste (Cont'd)		• Design for deconstruction and flexibility: Designers need to consider how materials can be recovered effectively during the life of the building when maintenance and refurbishment is undertaken or when the building comes to the end of its life. • An efficient construction waste management system should be established and implemented. Construction waste will need to be classified and sorted out at source for disposal. The disposal methods will depend on the types of wastes: direct reuse in the construction, sale and recycling of materials, landfilling for inert materials and specific treatment method for each type of hazardous materials. • The Contractor will design and implement a waste segregation system and procedure and communicate it to all construction personnel to strictly adhere to the segregation procedure. • An appropriate number of containers with adequate volume and appropriate materials will be provided at strategic locations to support the segregation. Each waste category will be segregated into recycling, reuse and disposal sub-categories. • Daily collection and transport will be organized and carried out for each sub-category of segregated wastes. • A roofed storage area with adequate space will be provided for storing the segregated wastes waiting for the on-site or off-site reuse or recycling. • The storage area for hazardous waste will need to be specially designed to prevent spills or leaks onto the soil. • Reuse of excavated material as fill at approved fill sites. • Collection and return of packaging materials (e.g. pallets) to suppliers wherever practicable. • Use of recycled materials to the limits of design in concrete, road base, asphalt and other construction materials.		

TABLE 2: MITIGATION MEASURES AND MONITORING PROGRAM DURING CONSTRUCTION PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Construction Waste (Cont'd)		• Remove any contamination inadvertently deposited in recyclable waste material containers. Provide cleanup of excessive contamination at recycling vendor locations when such contamination is not controlled at the project site. • Collection and recycling of used oils by a licensed contractor. • Collection by a licensed contractor of empty oil and fuel drums and other containers for return to recycling facilities. • If applicable, collection and recycling of used oils by a licensed contractor. • If applicable, collection by a licensed contractor of empty oil and fuel drums and other containers for return to recycling facilities. • Disposal of the remaining wastes that are unable to be reused or recycled in the approved landfill site(s). • Preferably, inert wastes such as broken tiles, bricks, plastics should be used for filling the site in areas planned to be vacant space. • Haphazard disposal of construction waste in or off the construction site will be prohibited. • Provide adequate number of refuse bins or containers with tight covers, daily collection of disposal. • No burning of wastes will be allowed. • Non-construction wastes will be contracted to the existing municipal services, if possible. If not, they will need to be disposed off in a small sanitary landfill to be located within the power plant site in designated green areas. • Decomposable wastes such as food wastes and vegetation may be disposed off by composting.		

TABLE 2: MITIGATION MEASURES AND MONITORING PROGRAM DURING CONSTRUCTION PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Construction Waste (Cont'd)		• A Hazardous Waste Management System covering waste classification, separation, collection, storage, transfer and disposal should be set up and operated. The waste management system will comply with applicable regulation of the government, if any. • Hazardous wastes will be handled by a licensed hazardous waste contractor. If this service is not available, the Contractor will need to find safe permanent storage, or other appropriate methods of disposal. • Tracking collections of waste materials at the sites and deliveries to recycling, reuse, salvage, and landfill facilities. • Maintaining on-site logs that include for each load of materials removed from the site: type of material, load weight, recycling/hauling service, and date accepted by recycling service or landfill. • Accessibility to the EHS Manager of the Project Proponent for verification of construction waste recycling. Legible copies of on-site logs, manifests, weight tickets, and receipts. Manifests shall be from recycling and disposal site operators that can legally accept the materials for the purpose of recycling, reuse, salvage, or disposal.		

TABLE 2: MITIGATION MEASURES AND MONITORING PROGRAM DURING CONSTRUCTION PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Road Traffic	• Traffic loads will be increased on existing roads within the study area, small port coastal road and Nga Pitat road, the access road to the power plant construction site. • The construction phase would be congestion of local roads and increase risk of accidents.	**Truck Routes and Construction Site Access** • In consultation with the concerned authorities at the regional, and township levels, develop and implement a Construction Traffic Management Plan to address the following issues: - Avoid haulage tasks during peak traffic periods as far as practicable. Where haulage in peak periods is unavoidable, such activities are to be managed in accordance with specific traffic management sub-plans provided to the relevant agencies in advance. - Control heavy vehicle movements on project related road to avoid interference with major events, if any. - Investigate the capacity of intersections on haulage routes to minimize impact on intersection operations by heavy vehicles servicing the construction worksites. - Prepare and implement a comprehensive construction traffic management plan to control truck movements to avoid, or mitigate and manage the impacts of heavy vehicle traffic on the road network. • Measures to manage the operation of the construction truck fleet for incorporation into a Construction Vehicle management sub-plan to include: - Monitoring of truck position, speed, route and performance in relation of traffic conditions and schedule requirements. - Management of truck speed and position to avoid queuing on the approaches to the spoil handling and loading facilities.	• Traffic monitoring will be carried out during transportation activities of the construction works. Therefore, the monitoring will be linked to the work schedule. The contractor will be required to prepare a traffic monitoring program based on the latest construction schedule before commencing the construction. • Record and report number of traffic accidents in the identified impact areas. • Monitor number of traffic on Nga Pitat Road. Review the adequacy of construction traffic management plan if traffic congestion is observed. • Monitoring traffic flows by a third party will be carried out twice a year during peaks of construction-related transportation. • Twice a year reporting on traffic performance, and submission to MONREC.	• Contractor • Dawei Power Company Limited • Third Party

TABLE 2: MITIGATION MEASURES AND MONITORING PROGRAM DURING CONSTRUCTION PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Road Traffic (Cont'd)		– Management of traffic signals on nominated spoil haulage along the routes. – Maintain all vehicles transporting material to and from the construction sites to a high standard (ADR28/01) with regards noise emissions, exhaust emissions, traffic safety and operational safety. – Ensure all vehicles leaving a construction site pass over or through devices designed and maintained to remove soil and other materials. **Construction Traffic Hazards** • Heavy trailer trucks transporting heavy and large plant equipment will have to be directed by a traffic police car. **Local Traffic** • Implement management measures to avoid, or minimize increase in traffic caused by the project works in local streets as practicable. • Notify the local community about proposed changes to local traffic access arising from construction activities, and provide clear signage of changed traffic conditions and take other measures to ensure safe traffic movement. • Prepare and implement an employee parking policy for the construction worksites. **Traffic Management at the Intersection of Small Port Coastal Road and Nga Pitat Road** • Provide a traffic police or relevant officer to control traffic at the intersection during the transport period.		

TABLE 2: MITIGATION MEASURES AND MONITORING PROGRAM DURING CONSTRUCTION PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Road Traffic (Cont'd)		**Pedestrians and Cyclists** • Maintain safe pedestrian and cycle access near construction works (particularly for elderly and children), including to community facilities, such as schools, monastery, open space and particularly. • Notify the local community, and in particular, local schools, about changes to pedestrian and cycle access during construction near construction works. • Provide traffic controls designed for the safe movement of cyclists near the worksites.		
Archaeological Site	The site clearing and excavation works may have some impact on artifacts which potentially could have archaeological and culture value.	• Site supervisor/foreman shall order construction workers to stop immediately the construction activities in the area of the chance find. • Inform concerned authority (Fine Arts Department), including head of village and township, for proper management if historic or archaeological is found. • Delineate and mark clearly the discovered site or area and prohibit physical activities in the area without prior approval of the concerned authority. • Install temporary site protection measures (warning tape and stakes, avoiding signs). • Strictly enforce any no-go area needed to protect the site. • Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be present until the responsible local authorities and the responsible Ministry take over. • If it is necessary to relocate a cemetery and grave yard, cultural ceremony should be arranged prior to the relocation.		• Contractor • Dawei Power Company Limited

TABLE 2: MITIGATION MEASURES AND MONITORING PROGRAM DURING CONSTRUCTION PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Social Management and CSR Program	**Positive Impacts** • Employment opportunities for the locals and cash flow into the village economy through project spending and employment of the locals. **Negative Impacts** • Exposure of the affected communities to new social norms, value, traditions, practices, and new economic brought by an influx of external workers and cash inflow. • Loss of Britney Creek will obstruct Nga Pitat villagers to their dockyard. • Pipe laying would cause inconvenient of navigation and fishing along the coast. • Loss of some mangrove forest area which is a main protein and income sources of source of Nga Pitat villagers.	**Measures to Enhance Local Economy** • Priority should be given to hiring local people, especially residents of the villages close to the construction site; e.g. Nga Pitat, Nyaung Bin Seik and Mudu (including Ka Myaing swea). • The recruitment process should be fair and transparent and wage rates will need to be commensurate with experiences and qualifications. • Employment terms and conditions will need to comply with the requirements in the national labor law, the social security law and standard wage rate, and other applicable laws and regulations. • Skill training should be provided to local people to be employed in the project construction. • The Project Proponent and the Contractor will contact the Labour Directorate and prepare training program for employees with reference to the laws and regulation of Labour Directorate before commencement of the Project construction. **Measures to Mitigate Negative Impacts** Toward the Influx of Workers • The Contractor will inform villagers, especially Nga Pitat about the construction period and schedule. • Use the construction methods that could minimize the inconveniences to the affected people. Security Risks • All workers should be cleared with the local security authorities regarding criminal record before employment. The EPC Contractor will be required to establish and implement a site security system and appropriate measures, including preventation of drug abuse.	**Stakeholders' Negative Attitudes toward the Project and CSR Program** • Results of the activities under CSR and Public Relations Program will be reported and included in the monthly monitoring reports and twice a year reports for submission to MONREC. • Report on community consulation's activities with stakeholders. • Report immediately in case of complaints from the locals. • Monitoring on the response to complaints caused by the Project impacts through Grievance Redress Process, and by filing system of the process. **Livelihood and Resource Management** • The inspectors will observe and collect information on the number of fishermen navigate and fishing near pipelines laid area and identify their problem, if any. • Twice a year collection samples at intake and outfall pipes laying to analyzed abundance and species of phytoplankton, zooplankton, benthos and fish larvae. • Results of the resource management will be included in the monthly monitoring reports and the twice	**Stakeholders' Negative Attitudes toward the Project and CSR Program** • Dawei Power Company Limited • Public Relations Team **Livelihood and Resource Management** • Contractor • Dawei Power Company Limited • Third Party **Mangrove Management** • Dawei Power Company Limited • Nga Pitat Community • Officials of Department of Fisheries and Forestry will supervise and provide technical support.

TABLE 2: MITIGATION MEASURES AND MONITORING PROGRAM DURING CONSTRUCTION PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Social Management and CSR Program (Cont'd)		<u>Culture and Tradition</u> • Give priority to hiring local people. • All project personnel should be made aware of local cultures, traditions and norms. • A code of conduct should be put in place for workers to strictly observe when interacting with the locals, including restriction to movement outside of the campsite after designated time. • The Project Proponent should establish good relationship with the locals and actively support and participate in traditional and cultural events. <u>Stakeholders' Negative Attitudes toward the Project</u> • Establishment of a community participatory committee. • Establishment of channel for public relation and information disclosure through several public channels such as local media, notice board, placement of leaflet, meeting, participation in local activities, visit the communities, and open house of the Project. • Involvement in grievance redress to make appropriate response to complaints related to the Project impacts. • Establishment good relationship with communities by supporting communities' activities through its annual CSR program such as formal education, health care and sanitation, and religions and culture. • Support socio-economic development via priority given to local employment opportunity, occupation promotion and gender development. • Regular meeting with communities to foresee problems that would arise from the Project implementation, and build up mutual understandings in the area.	a year reports for submission to MONREC. **Mangrove Management** • Monitor mangrove area allocated for participatory management. • Monitor activities related to mangrove zoning, seed and stock collection, reforestation and utilization of mangrove resources. • Monitoring will be carried out by Nga Pitat community with technical support from officials of Department of Fishery and Forestry. • Results of site and activities inspections will be included in the environmental monitoring reports and submitted to MONREC.	

TABLE 2: MITIGATION MEASURES AND MONITORING PROGRAM DURING CONSTRUCTION PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Social Management and CSR Program (Cont'd)		• Reporting on results the project implementation, mitigation measures and monitoring to concerned authorities and communities. Reducing Impacts from Loss of Britney Creek • DPC will develop alternative dockyard nearby Nga Pitat village and upgrade its accessible route. • Clearly demarcate the alignments of the intake and outfall pipes and construction schedule. • The Contractor will install pipelines within short period. Minimizing Impacts on Mangrove Resources • The Project Proponent will provide 30 hectares of mangrove area to implement a mangrove resource management program (MGRMP), aiming to ensure sustainable use of mangrove resource and minimizing coastal erosion. • As the MGRMP will be on implemented based on participatory approach, the Core Mangrove Management Group will be established to mobilize the local participation. • Local people, expertise and local authorities will involve in planning and implementing various activities, comprising: - Survey and zoning for preservation and utilization - Seed and stock collection for mangrove propagation - Reforestation of mangrove - Formulate regulations for sustainable utilization • The locals will be major actors while the Project Proponent and officials of Department of Fisheries and Forestry will provide financial and technical support, respectively.		

TABLE 2: MITIGATION MEASURES AND MONITORING PROGRAM DURING CONSTRUCTION PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Occupational Health and Safety	The construction activities may have some impacts on worker health, safety and security.	• All recruited workers should receive health examinations for screening of major communicable diseases before employment. Subsequently, annual check-ups should be provided. • Symptoms of major communicable disease, if noted, should be immediately reported to the district medical officer for proper treatment. • Provide health awareness training to workers on hygiene and sanitation, communicable and infectious diseases. • The EPC Contractor should provide first-aid service and medical treatment for common illnesses. • Arrangements should be made with a hospital in Dawei for admitting the project personnel with serious medical cases. • Develop and implement safety measures for the construction works including treatment strategies that address fire and chemical hazard, communications, access for emergency services, response coordination and management. • Develop emergency response procedures, and implement in the event of accidents and emergencies. • Provide fire and life safety measures, including ventilation, smoke extraction and firefighting systems for the duration of the construction phase. • The implementation of the OHS plan will be integrated with construction supervision. • The Contractor will implement the OHS plan and procedures as part of its construction supervision. The Contractor's EHS Manager will monitor the OHS performance.	• Monitoring of OSH performance of the contractor will be made through: - Daily informal inspections - Weekly formal inspections of the workplace - Audits - Corrective Action Reports • The daily inspections will observe: (i) adherence of the construction workers to the OHS procedures such as wearing of protective equipment; (ii) working conditions; (iii) readiness of fire and life safety systems as relevant; and (iv) potential new hazards. • The Contractor's EHS Manager will prepare daily OHS inspection notes as part of the site inspection notes. • The weekly formal inspections will be carried out at weekly intervals and shall be documented using appropriate "Weekly OHS Inspection Checklists". The inspections will include plant, substances, equipment and temporary structures used by subcontractors. • Internal audits will be carried out annually or more frequent if the OHS performance is significantly below established targets. • Monitoring results will be discussed in Project OHS monthly review meetings. • Twice a year reporting on OHS performance, and submission to MONREC.	• Contractor • Dawei Power Company Limited

TABLE 3: MITIGATION MEASURES AND MONITORING PROGRAM DURING OPERATIONAL PHASE

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Air Quality	Increases gaseous emission from gas combustion.	• The gas turbine facility has been modelled and designed so as to ensure stack emission will meet prescribed technical specifications. • Low NO_x burners will be used to minimize thermal NO_x emissions. • The Contractor and his supplier will complete the testing and tuning program on the turbines before operational handover to ensure efficient operation of plant. • Ensure that the power plant personnel will be suitably qualified for their assigned tasks. • The Contractor with support of the equipment suppliers shall provide appropriate training to plant operation personnel to enhance their competency in operation and control of turbines using low NO_x burners. The Contractor will propose a training program for plant operators not later than three months before the commissioning, and conduct the training as part of the overall training in parallel with the commissioning. • Regular periodic review of air quality monitoring data (monthly) with comparison of monitoring data with that assumed and predicted in the documents listed under Condition of the Project Approval. • All equipment will be maintained according to Plant Operating Maintenance and Calibration Manuals, Procedures and Schedules. • Each of the exhaust stacks will be fitted with in-stack monitoring equipment linked to the Continuous Emission Monitoring System (CEMS) in order to measure NO_x.	• During commissioning, the Contractor will conduct stack monitoring to verify the stack parameter and emission estimates that were used to produce the modelled predictions and assessment of potential impacts in the Final EIA Report. • Each of exhaust stacks will be fitted with in-stack monitoring equipment linked to the continuous emission monitoring system (CEMS). • This monitoring system will be designed to meet the regulatory requirements stipulated in the EIA Procedure and the ECC for the Project, in particular monitoring of NO_x. • During the first five year of operation, compliance monitoring of ambient air quality will be carried out twice a year, reduced to once a year thereafter. Each monitoring will collect air samples continuously for 24 hours at the sensitive receptors. The collected combined samples will be analyzed for NO_x. The frequency of ambient air quality monitoring could be increased to quarterly or reduced to once a year depending on the results of ambient air quality monitoring.	• Plant Operation Team – Operation Manager – EHS Manager – Project Manager • Third Party

TABLE 3: MITIGATION MEASURES AND MONITORING PROGRAM DURING OPERATIONAL PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Air Quality (Cont'd)		• The gaseous emission control will be complied with IFC Environmental, Health, and Safety Guidelines Thermal Power Plant (2008) and National Environmental Quality (Emission) Guidelines (2015).	• Air quality management and monitoring reports will be submitted to MONREC every six months in the first five year of operation, thereafter, reduced to annual report over the remaining of the Project life.	
Noise	Increase ambient noise level from water intake, gas turbine/generator, HRSG noise radiated form the enclosure and duct noise from the exhaust stack.	• To confirm that the power plant meets the specified noise criteria, the Contractor will ensure that the process equipment to be used will have minimum noise level at source. The Contractor will have minimum noise level at source. The Contractor will review the noise emission data and noise predictions during the detailed design phase, where actual plant specifications and characteristics were known. • Plant layout and siting of process equipment with consideration of distances from the receptors. • Post commissioning noise source emissions and ambient noise monitoring levels will be measured on a periodic basis to confirm the noise levels received at the nearest residential locations are consistent with the noise predictions stipulated in the Project EIA. • The Contractor with support of the equipment suppliers shall provide appropriate training to plant operation personnel to enhance their competency in noise control of equipment. The Contractor will propose a training program for plant operators not later than three months before the commissioning, and conduct the training in as part of the overall training in parallel with the commissioning.	• Daily informal observation of on-site noise levels by the EHS Manager, the Operation Manager, and Gas Turbine Operators. • Initially during the commissioning of the power station, the Contractor will carry out noise monitoring at various locations inside and outside the power plant including the perimeter. The monitoring period and the exact locations as well as the monitoring method will be proposed by the Contractor in due course not later than 30 days before commencing the commissioning. Results of the initial monitoring will be reviewed by the EMS Manager and the Power Plant Manager. • During commercial operation, compliance monitoring of ambient noise level will be carried out by a third party every six months or more frequent as necessary during the first five year after commissioning, and only once a year thereafter. The monitoring sites will be at the following sensitive receptors: Nga Pitat Village, especially Yay Wai Monastery and Nga Pitat School.	• Plant Operation Team - Operation Manager - EHS Manager - Project Manager • Third Party

TABLE 3: MITIGATION MEASURES AND MONITORING PROGRAM DURING OPERATIONAL PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Noise (Cont'd)		• The Contractor shall provide Plant Operation, Maintenance and Calibration Manuals, Procedures and Schedules to ensure all site plant is maintained for optimal performance and reduced noise levels. • Site induction to cover site noise management issues and procedures. • The power plant will operate under specific Operational Procedures developed on-site specifically to manage noise emission from the site. These procedures include operating checklists, and ensuring all doors, vents, louvers and closed as required during operation to limit the releases of noise from the generator/turbine enclosures. • Running all plant as per Operational Procedures. • All plant and equipment, including vehicles, will be properly maintained in order to minimize noise generation. • Conduct routine noise monitoring at sensitive receptors, and adopt appropriate measures to reduce noise levels if it exceeds the standard. • Grow tree along the boundary facing the receptors. • Ensuring all operators or contracted maintenance personnel working on plant on weekends, during evenings or at nighttime understand the noise management issues on-site and complete their work with no noise impacts on the sites near neighbors. • The Site Manager/Community Relations Advisor communicating to the local community through the Community Participation Program any upcoming major outages or maintenance programs that may mean new on-site activities, increased transport to site or any additional planned noise sources.	• As required after a community complaint about the power station. Monitoring will occur as per the Corrective Actions section of this Management Plan. • Results of noise monitoring will be included in the monitoring reports to be submitted to MONREC. • Twice a year reports will be submitted to MONREC in the first five year after commissioning.	

TABLE 3: MITIGATION MEASURES AND MONITORING PROGRAM DURING OPERATION PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Wastewater	Wastewater generated from domestic use of workers.	• The Contractor will prepare detailed design of water cooling system to meet the IFC standard. • The Contractor will prepare detailed design of wastewater treatment facilities based on the following design concept: a) The process wash water contaminated with oil will be segregated for oil removal in an oil separator. The oil-free wash water will then be combined with other wastewater streams for further treatment. b) Wastewater from the demineralization unit and the boiler blow down mixed with quenching water will be combined and neutralized in a neutralization basin before combining with other wastewater streams for further treatment. c) Domestic sewage will be treated in a small treatment plant. The treated effluent will be combined with the effluents from a) and b). • The combined effluent will be discharged into a pond before disposal through a sewer pipe into the sea, about 1 km away. Water in the pond will be used for landscaping. • A drainage system will be provided to collect surface runoff and discharged into the retention pond or directly into the river through the effluent outfall. Surface runoff from open areas contaminated by oil will be separately drained into an oil separator before discharging into the main drainage system. • The Contractor will be required to prepare an operational manual for the wastewater treatment system. The manual will be submitted at least two weeks before the training for wastewater treatment plant operators.	**Design and Commissioning** • About one to two weeks before the commissioning, the contractor will carry out a seawater quality survey covering three stations, the outfall, 1 km upstream of the outfall, and 1 km downstream of the outfall, with current direction of each station. Water samples will be collected at mid-depth from these three locations at high tide slack and at low tide slack. The water sample will be analyzed for pH, temperature, oil and grease, dissolved oxygen, and BOD. • During commissioning, the contractor will conduct a wastewater sampling program to verify volume and characteristics of all wastewater streams. • The contractor will collect samples of treated effluents to determine performance of the cooling water system, oil separation unit, the neutralization unit, and the sewage treatment plant. The final combined effluent discharged from the storage pond will also be collected and analyzed to determine the overall performance of wastewater management. • Seawater quality sampling will be carried at about 100 m distance from discharge point to analyze pH, nitrate, nitrogen, phosphate as P, lead, cadmium, mercury,	• Plant Operation Team - Operation Manager - EHS Manager - Project Manager • Third Party

TABLE 3: MITIGATION MEASURES AND MONITORING PROGRAM DURING OPERATION PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Wastewater (Cont'd)		• Ensure that the cooling water system and wastewater treatment facilities will be operated by suitably qualified personnel. • The Contractor with support of the equipment suppliers shall provide appropriate training to cooling water system and wastewater treatment plant operators to enhance their competency in operation and control their facilities. The Contractor will propose a training program for plant operators not later than three months before the commissioning, and conduct the training as part of the overall training in parallel with the commissioning. • The wastewater treatment system will be efficiently managed. Daily volume of each wastewater stream will be measured and the data kept for monitoring purpose. • Scheduled collection and analysis of wastewater samples from each wastewater stream will be routinely carried out before and after the treatment to provide feedback for the wastewater management and operational controls. • All equipment will be maintained according to Plan Operating, Maintenance and Calibration Manuals, Procedures and Schedules. Adequate number of parts and spares of equipment will be stored to ensure minimum stoppage time of the wastewater treatment facilities. • The operation and control of cooling water system and wastewater treatment facilities will strictly adhere to the procedures in the operational manual.	temperature, oil and grease, dissolved oxygen and total suspended solids. • The contractor will submit a performance evaluation report presenting results of the above monitoring and evaluation of the efficiency of wastewater treatment. • The contract will update the operational manual based on the commissioning results, as necessary. **Commercial Operation** • Routine scheduled monitoring of the discharge of spent cooling water and wastewater treatment facilities will be carried out per the operation manual to provide data for operational control and performance evaluation. The data generated will be systematically collected in a wastewater management information system. • Seawater quality monitoring and marine organism surveys (phytoplankton, zooplankton, fish larvae, and benthos) by a third party will be carried out every six month or more frequent as necessary during the first five year of operation, and reduced to once a year, thereafter throughout the remaining Project life. The seawater quality sampling and analysis requirements will be similar to those of the surveys conducted before the	

TABLE 3: MITIGATION MEASURES AND MONITORING PROGRAM DURING OPERATION PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Wastewater (Cont'd)			commissioning. Marine organisms sampling will be made on abundance and species. • The performance evaluation results will be reported monthly basis. • Results of wastewater and effluent monitoring will be reported to MONREC every six months during the first five years of operation, and annually thereafter throughout the Project life.	
Marine Resources	• Pumping a large volume of seawater could cause impingement and entrainment of marine organisms. • Increases in water temperature caused by discharge of warm spent cooling water impacts on marine organisms.	• Install the pumping pipe from about 1 meter above the sea bed. • Install screen with 10 cm spacing to block the passage of large marine lives, and travelling screens with 10 mm mesh size to prevent entrainment of small marine organisms. • Regularly check and clean the screen of pumping pipe at least 2 times/year. • The temperature of spent cooling water will be controlled by the design, to be within IFC standard and National Environmental Quality (Emission) Guidelines, 25 December 2015.	• Marine resources will need to be monitored twice a year in the first five year of commercial operation. After that, monitoring will be once a year throughout the Project life. • Marine organisms will be analyzed for phytoplankton, zooplankton, fish larvae and benthos.	• Plant Operation Team - Operation Manager - EHS Manager - Project Manager • Third Party

TABLE 3: MITIGATION MEASURES AND MONITORING PROGRAM DURING OPERATIONAL PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Seawater Quality	Increases in water temperature caused by discharge of warm spent cooling water.	• The outfall design adopts best practices for minimizing impacts of thermal discharge on ambient water. • The discharge from the sea bed through diffusers will enhance vertical mixing, thus eliminating thermal stratification. • The temperature of spent cooling water will be controlled by the design, to be within International Finance Corporation (IFC) standard and National Environmental Quality (Emission) Guidelines, 25 December 2015.	• Routine scheduled monitoring of temperature of spent cooling water will be carried out per the operation manual to provide data for operational control and performance evaluation. The data generated will be systematically collected in a seawater quality information system. • The water samples will be analyzed for temperature, pH, dissolved oxygen, Biochemical Oxygen Demand, Chemical Oxygen Demand, Suspended Solids, Total Dissolved Solid, conductivity, Residual chlorine, oil & grease, total coliform, total fecal coliform, phytoplankton, zooplankton, benthos, and fish larvae. • Seawater quality monitoring by a third party will be carried out every six months or more frequent as necessary during the first five year of operation, and reduced to once a year, thereafter throughout the remaining Project life. • Twice a year reporting for submission to MONREC in first five year after commissioning. • Annual report will be submitted MONREC from year 6 onward throughout the Project life.	• Plant Operation Team - Operation Manager - EHS Manager - Project Manager • Third Party

TABLE 3: MITIGATION MEASURES AND MONITORING PROGRAM DURING OPERATION PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Occupational Health and Safety	Impacts on health and safety of operational personnel from excessive noise and temperature inside the power plant, fire, explosion risks and accidents.	• The contractor will design the power plant and associated facilities using equipment that will meet occupational health and safety (OHS) guidelines and standards prescribed in the contract. • Incorporate in the EPC contract, all OHS requirements will be in the design of the power plant and associated facilities, including equipment selection; give due consideration to, but not limited to, the following OHS requirements: (i) integrity of workplace structures; (ii) standard operating procedures for process shutdown, including evacuation plan; (iii) work space and exit; (iv) fire precautions; (v) toilets and showers; (vi) potable water supply; (vii) clean eating area; (viii) lighting; (ix) safe access; (x) first aid; (xi) air supply and ventilation; (xii) work environment temperature; (xiii) noise and vibration; (xiv) electrical safety; (xv) fire and explosions; and (xvi) confined working space. • The Contractor will prepare an OHS management plan and implementation procedures specific to the power plant of this Project and in line with the Owner's OHS policy and procedures. The plan will be submitted not later than one month before commissioning of the power plant and associated facilities. • The contractor will conduct necessary orientation and training to the Owner's power plant operational team to ensure that the operational team clearly understands the OHS plan and implementation procedures.	• Monitoring of OHS performance of the contractor will be made through: - Daily informal inspections (walk through of the construction sites) - Weekly formal inspections of the work place. - Monthly formal inspections of the work place. - Audits - Corrective Actions Reports • The daily inspections will observe: (i) adherence of the operational personnel to the OHS procedures such as wearing of protective equipment in high risk working areas and accidental events; (ii) working conditions; (iii) readiness of fire and life safety systems as relevant; and (iv) potential new hazards. • The daily inspections will be carried out by the Environmental, Health and Safety (EHS) Manager, the Operational Manager, and relevant unit heads. The Plant Manager will occasionally join the daily inspections. The EHS Manager will prepare daily OHS inspection notes as part of the site inspection notes.	• Plant Operation Team - Operation Manager - EHS Manager - Project Manager

TABLE 3: MITIGATION MEASURES AND MONITORING PROGRAM DURING OPERATION PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Occupational Health and Safety (Cont'd)		• The OHS management plan and implementation procedures will cover but not limited to the following subjects: – Organization and responsibilities of OHS management – Training plan – Contractor responsibilities – Safety measures for the power plant's Operation and Maintenance (O&M), including safety in turbine operations, fire, explosion, accidents and chemical hazards – Emergency response procedures – Task-specific work requirements Compliance monitoring and evaluation plan – Audit plan – Reporting system – Documentation system • The implementation of the OHS plan will be integrated with operational control. • The Plant Manager will implement the OHS plan and procedures as part of his operational management. • The EHS Manager will monitor the implementation of OHS procedures to comply with relevant requirements.	• The weekly formal inspections will be carried out at weekly intervals and shall be documented using appropriate "Weekly OHS Inspection Checklists". The EHS Manager and the Operation Manager will carry out the weekly inspections. The weekly inspections will include the same issues as the daily inspections but will be in more details and quantitative. • The monthly formal inspections will review the OHS performance of the month based on results of the weekly inspections. Progress in addressing issues or problems identified in the precedent weekly inspections will be evaluated. • Internal audits will be carried out annually or more frequent if the OHS performance is significantly below established targets. • Monitoring results will be discussed in monthly review meeting on power plant performance. • Monthly monitoring reports except in case of incident when reporting should occur immediately on completion of any investigation required to resolve the incident. • Twice a year reports will be submitted to MONREC in the first five year after commissioning. • Annual report will be submitted to MONREC from year 6 onwards throughout the Project life.	

TABLE 3: MITIGATION MEASURES AND MONITORING PROGRAM DURING OPERATION PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
CSR Program	• Daily living of the people in the surrounding communities may be disturbed or inconvenienced by environmental disturbances caused by the operation such as noise, air quality, not satisfaction with marine resources utilization. • The stakeholders, especially local communities, may have negative attitudes toward the Project which could lead to conflicts, opposition and delay the project implementation.	• The Project Proponent should continue implementation of the CSR program which has been started at the construction phase. • Establish a good mutual understanding between the Project and stakeholders, particularly the local communities through following measures: - Establishment of channel for public relation and information disclosure through various public. - Involvement in grievance redress in order to response to complaints related to the Project impact. - Establishment good relationship with communities by supporting communities' activities such as formal education, health care and sanitation, and religions and culture. - Support socio-economic development via priority given to local employment opportunity, occupation promotion on agriculture, value added on agricultural, fishery and handicraft products, and gender development. - Regular meeting with communities to foresee problems that would arise from the Project implementation, and build up mutual understandings in the area. - Reporting on results the project implementation, mitigation measures and monitoring to concerned authorities and communities. - Involvement in solving problem as promise to the communities. - Continuation of activities by improvement and adjustment activities as necessary for better efficiency of implementation.	• Report on activities undertaken under CSR and Public Relations Program. • Report on community consultation activities with stakeholders. • Monitoring on the response to complaints caused by the Project impacts through Grievance Redress Process. • Results of the activities under CSR Program will be included in the monthly monitoring reports and the twice a year report for submission to MONREC. • Report immediately in case of complaints from the local.	• Dawei Power Company Limited • Public Relation Team

TABLE 3: MITIGATION MEASURES AND MONITORING PROGRAM DURING OPERATION PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Mangrove Management Program	Impact from loss of some mangrove area during pre-construction phase is irreversible. Its area is a main source of protein and income of the locals.	• The Project will support to continue implementation of mangrove resource management program (MGRMP) to ensure sustainable use of mangrove resources and minimizing coastal erosion. The MGRMP will be on participatory approach. Local people, expertise and local authorities will involve in planning and implementing various activities. Details are the same as mitigation measures during construction phase. • Core mangrove management group can be rotated among the members in the communities.	• Monitor mangrove area allocated for participatory management. • Monitor activities related to mangrove zoning, seed and stock collection, reforestation and utilization of mangrove resources. • Monitor on complaints toward the use of mangrove resources. • Monitoring will be carried out by Nga Pitat community. • Results of site and activities inspections will be included in the environmental monitoring reports and submitted to MONREC.	• Dawei Power Company Limited • Nga Pitat community • Supervision by officials from Department of Fisheries and Forestry

TABLE 4: MITIGATION MEASURES AND MONITORING PROGRAM DURING DECOMMISSIONING PHASE

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Air Quality	Increases in air pollutants caused by fugitive dust from structure decommissioning and emissions from operation of trucks and heavy equipment.	**Fugitive Dust Control** • For construction site including spoil placement sites: – Use watering or other effective techniques on unsealed areas to minimize wheel generated or wind-generated dust. – As soon as the land becomes available, engage in the progressive rehabilitation of the progressive rehabilitation of the Project site and spoil placement sites with landscaping. • Take measures (e.g. rumble bars and wheel wash bays) to ensure dust-creating material (earth or similar material) is not transported from the Project site to roads or other areas in the public domain. • Ensure all trucks carrying spoil or other loose material are covered, and if necessary, treated (e.g. mist sprays) prior to leaving the Project sites. • Ensure all loose earth and similar material spilled or otherwise deposited within the Project site and the transport routes is cleared and removed from trafficked areas as soon as practicable. • At the Project site and spoil placement sites, monitor meteorological conditions, particularly wind speed and direction and where necessary take measures to avoid impacts of dust on adjacent properties. Such measures may include: – Modification of demolishing methods – Increase in dust suppression measures – Cessation of work when no other reasonable or practical measure is available • Spray water at and around the working areas and access roads during works.	**Ambient Air Quality** • Monitor and manage the incidence of dust deposition and manage vehicle emissions in relation to ambient air quality. **Dust** • Monitor regularly (weekly minimum) by inspection or other effective sampling: – The performance of dust filtration systems on decommissioning shed ventilation systems. – Spillage or deposition of loose material on roads leaving the Project site. • Monitor performance of mitigation measures in relation to the construction air quality goals. **Vehicle Emissions** • Monitor vehicle management with regards to: – Queuing in streets other than those in which arrangements have been made for such action in the traffic management plan (on-going). – Vehicle motors idling for periods exceeding 5 minutes while in queues to access the Project site (on-going). • Inspect the position equipment powered by diesel motors to ensure exhaust emissions are directed away from sensitive activities and neighboring properties.	• Contractor • Dawei Power Company Limited

TABLE 4: MITIGATION MEASURES AND MONITORING PROGRAM DURING DECOMMISSIONING PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Air Quality (Cont'd)		• Enforce a speed limit for vehicles and trucks in the Project site not to exceed 40 km/h when passing the communities. Decommissioning activities shall be kept as planned so that the disturbed areas will be minimized at any time. • Cover material debris and removal structures with canvas or equivalent during transportation. Some materials should be dampened, if necessary, before transportation. • Establish a vehicle washing facilities to minimize the quantity of material deposition on public roads. • Establish a checkpoint at project gate to ensure the vehicles leaving the project site are following the measures prescribed to reduce dust emissions. • Restore, resurface, and rehabilitate the disturbed areas as soon as practicable after completion of demolition. • Prohibit the open burning of waste in the Project area. • Dust masks should be provided (where applicable) to all workers. **Diesel Exhaust Emission** • Take measures to manage the movement of vehicles entering and leaving the Project site to avoid, or mitigate and manage the potential for vehicle emissions impacting on adjacent properties, except where such residential or sensitive activities in front an arterial road to be used for access to or from the Project site. Measures for management are to be provided in the vehicle management plan and the traffic management plan. Such measures may include avoiding or minimizing queuing on streets approaching the worksites or adjacent to other sensitive activities.	• Report to MONREC will be submitted when completion of decommissioning operation.	

TABLE 4: MITIGATION MEASURES AND MONITORING PROGRAM DURING DECOMMISSIONING PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Air Quality (Cont'd)		• Adopt procedures to avoid vehicles idling for excessive periods (e.g. more than 5 minutes) if required to queue to enter the Project site. • For equipment powered by diesel motors, take measures to avoid or mitigate and manage the potential impacts of exhaust emissions on adjacent residential or other sensitive activities. For example, ensure all vehicles and equipment powered by diesel motors are fitted with emission control measures, and are regularly maintained to manufacturers' specifications. • Maintain all equipment in proper working conditions according to the manufacturer's specification. The engines of the decommissioning equipment must be routinely maintained by qualified mechanics to ensure their proper condition during operation. • Provide adequate training to the equipment operators in the proper use of equipment. • Use the proper size of equipment for the job. • Perform on-site material hauling with trucks equipped with on-road engines (if determined to be less emissive than the off-road engines).		
Noise	Increase ambient noise level at the Project site and communities near the material transport routes.	• The Contract will require the Contractor to use decommissioning equipment that generate low levels of noise. The Contractor will present alternative decommissioning equipment to demonstrate that the selected equipment adopts best available technologies to minimize noise level. • The Contractor will be allowed to carry out decommissioning works, which generate excessive noise levels, only during the period between 6.30 a.m. to 6.30 p.m. Mondays to Saturdays. Such construction works on Sunday or public holidays will need approval from the Resident Engineer of the Project Proponent.	• Noise monitoring will be carried out during the decommissioning works identified as noise sources are taking place. Therefore, the monitoring will be linked to the work schedule. The Contractor will be required to prepare a noise monitoring program based on the latest decommissioning schedule before commencing the decommissioning.	• Contractor • Dawei Power Company Limited

TABLE 4: MITIGATION MEASURES AND MONITORING PROGRAM DURING DECOMMISSIONING PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Noise (Cont'd)		• For decommissioning works beyond standard decommissioning hours, the Contractor shall take reasonable and practical measures to protect the affected sensitive receptors. For example, acoustic screens or noise barriers would be required. • Reasonable and practicable measures to achieve the decommissioning noise targets may include, for example: – Commence advanced notification of workers and undertake on-going consultation with potentially affected property owners and occupants. – Establishing temporary noise barriers between decommissioning worksites and sensitive receptors (e.g. residential, schools, community facilities). – Fitting noise-reduction measures to all plant and equipment engaged in the decommissioning works. • Potentially affected property owners and occupants are to be notified well in advance (7 days or more) as to the scale, extent and duration of decommissioning works, as required by the consultation and communications program. • Provide ear plugs or ear muffs to workers operating in the excessive noise areas. • Major decommissioning activities which generate loud noise should be limited to only during the day time. Activities that are necessary to be carried out at nighttime will need approval of the site engineers, and will need to have adequate noise control equipment or measures. • Speed of vehicles in the construction site will not be more than 40 km/h. • The Contractor will be required to regularly monitor ambient noise levels at the receptors.	• The monitoring locations will be at the Project site and the identified sensitive receptors. • Before commencing the decommissioning, the Contractor will conduct noise testing of trucks to be used. The Contractor will ensure that the trucks that did not pass the noise test will be replaced by new trucks with less noise, or will be fixed as soon as possible. The Contractor will submit reports of the noise testing to the EHS Manager of the Project Proponent. • The Contractor is to implement measures to receive and respond to complaints about decommissioning noise made at any time during the decommissioning phase of the Project. Such measures may include a complaints management and correction action system developed and incorporated in this DEMP. Key requirements for the system include: – On receipt of a complaint, implement a complaint response procedure for tracking and responding to the issue(s) and the complaint. – Identify the relevant decommissioning activity at which the complaint is directed. – As soon as practicable, investigate and measure the level of noise from that activity. – Respond to the complainant as soon as practicable upon completion of the investigation and describe the corrective action taken.	

TABLE 4: MITIGATION MEASURES AND MONITORING PROGRAM DURING DECOMMISSIONING PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Noise (Cont'd)			– Report to the Proponent on the complaint, the activity, the corrective action and the response. • Report to be MONREC will be submitted when completion of decommissioning operation.	
Decommissioning Waste	Waste generated from decommissioning operation and workers.	**Design and Planning** • The Contractor will consult with the EHS Manager of the Project Proponent, ECD, SWB and the township governments the possibility of using existing waste disposal facilities managed by the regional or local governments. If this not possible, the Contractor will need to develop its own disposal facility preferably within the Project site, if possible. • The Contractor will ensure that the design and the proposed decommissioning methods will generate the least amount of wastes. • The Contractor will propose methods for waste reuse and recycling and prepare estimates of the remaining quality of each waste category that will be disposed off. • The Contractor will propose methods of waste transport and disposal. • The Contractor will then prepare and action plan for waste management. The action plan will be submitted to the EHS Manager of the Project Proponent not later than two weeks before commencing the decommissioning.	• Monitoring of the waste management performance will be carried out through quick daily site inspections and detailed weekly site inspections. • Daily site inspections will include observation of the collection and storage of waste materials in the Project sites and waste disposal areas, and reviewing the daily records. The focusses will be on efficiency of the collection, storage, and disposal. The EHS Managers of the Project Proponent and the Contractor will jointly inspect the sites. • In weekly site inspections, the EHS Manager will be participated by the Resident Engineer of the Project Proponent and the Contractor. The inspection will cover verification of the records, disposal activities, discussion on the performance of the past week, and identification of problems, if any, that affect the waste management performance.	• Contractor • Dawei Power Company Limited

TABLE 4: MITIGATION MEASURES AND MONITORING PROGRAM DURING DECOMMISSIONING PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Decommissioning Waste (Cont'd)		**During Decommissioning Operation** • An efficient decommissioning waste management system should be established and implemented. Decommissioning waste will need to be classified and sorted out at source for disposal. The disposal methods will depend on the types of wastes: direct reuse as desire, sale and recycling of materials, landfilling for inert materials and specific treatment method for each type of hazardous materials. • Haphazard disposal of decommissioning waste in or off the Project site will be prohibited. • No burning of wastes will be allowed. • Decommissioning wastes should be handled by the existing municipal solid waste collection and disposal services. If such service is not possible, the decommissioning wastes would need to be disposed off in the Project site. They may be buried in areas designated for green areas. • Non-decommissioning wastes will be disposed off with the decommissioning wastes. • Provide adequate number of refuse binds or containers with tight covers, daily collection of disposal. • Hazardous wastes will be handled by a licensed hazardous waste contractor. If this service is not available, the subcontractor will need to find safe permanent storage, or other appropriate methods of disposal. • A Hazardous Waste Management System covering waste classification, separation, collection, storage, transfer and disposal should be set up and operated. The waste management system will comply with applicable regulation of the government.	• Report to MONREC will be submitted when completion of decommissioning operation.	

TABLE 4: MITIGATION MEASURES AND MONITORING PROGRAM DURING DECOMMISSIONING PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Decommissioning Waste (Cont'd)		• The Contractor will design and implement a waste segregation system and procedure and communicate it to all workers strictly adhere to the segregation procedure. • An appropriate number of containers with adequate volume and appropriate materials will be provided at strategic locations to support the segregation. Each waste category will be segregated into recycling, reuse and disposal sub-categories. • Daily collection and transport will be organized and carried out for each sub-category of segregated wastes. • A roofed storage area with adequate space will be provided for storing the segregated wastes waiting for the on-site or off-site reuse or recycling. • The storage area for hazardous waste will need to be specially designed to prevent spills or leaks onto the soil. • Disposal of the remaining wastes that are unable to be reused or recycled in the approved landfill site(s). • Decomposable wastes such as food wastes and vegetation may be disposed off by composting. • Remove any contamination inadvertently deposited in recyclable waste material containers. Provide cleanup of excessive contamination at recycling vendor locations when such contamination is not controlled at the project site. • If applicable, collection and recycling of used oils by a licensed contractor. • If applicable, collection by a licensed contractor of empty oil and fuel drums and other containers for return to recycling facilities.		

TABLE 4: MITIGATION MEASURES AND MONITORING PROGRAM DURING DECOMMISSIONING PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Road Traffic	• Traffic loads will be increased on existing roads within the study area, small port coastal road and Nga Pitat road, the access road to the power plant decommissioning site. • The decommissioning phase would be congestion of local roads and increase risk of accidents.	**Truck Routes and Site Access** • In consultation with the concerned authorities at the regional, and township levels, develop and implement a Decommissioning Traffic Management Plan to address the following issues: – Avoid haulage tasks during peak traffic periods as far as practicable. Where haulage in peak periods is unavoidable, such activities are to be managed in accordance with specific traffic management sub-plans provided to the relevant agencies in advance. – Control heavy vehicle movements on project related road to avoid interference with major events, if any. – Investigate the capacity of intersections on haulage routes to minimize impact on intersection operations by heavy vehicles servicing the decommissioning worksites. – Prepare and implement a comprehensive decommissioning traffic management plan to control truck movements to avoid, or mitigate and manage the impacts of heavy vehicle traffic on the road network. • Measures to manage the operation of the truck fleet for incorporation into a vehicle management sub-plan to include: – Monitoring of truck position, speed, route and performance in relation of traffic conditions and schedule requirements. – Management of truck speed and position to avoid queuing on the approaches to the spoil handling and loading facilities. – Management of traffic signals on nominated spoil haulage along the routes.	• Traffic monitoring will be carried out during transportation activities of the decommissioning works. Therefore, the monitoring will be linked to the work schedule. The contractor will be required to prepare a traffic monitoring program based on the latest decommissioning schedule before commencing the decommissioning. • Record and report number of traffic accidents in the identified impact areas. • Monitor number of traffic on Nga Pitat Road. Review the adequacy of decommissioning traffic management plan if traffic congestion is observed. • Report to MONREC will be submitted when completion of decommissioning operation.	• Contractor • Dawei Power Company Limited

TABLE 4: MITIGATION MEASURES AND MONITORING PROGRAM DURING DECOMMISSIONING PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Road Traffic (Cont'd)		– Ensure all vehicles leaving a construction site pass over or through devices designed and maintained to remove soil and other materials. **Traffic Hazards** • Heavy trailer trucks transporting heavy and large equipment will have to be directed by a traffic police car or by other vehicle specially designated to handle a guidance of this kind of transportation. **Local Traffic** • Implement management measures to avoid, or minimize increase in traffic caused by the project works in local streets as practicable. • Notify the local community about proposed changes to local traffic access arising from decommissioning activities, and provide clear signage of changed traffic conditions and take other measures to ensure safe traffic movement. • Prepare and implement an employee parking policy for the construction worksites. **Traffic Management at the Intersection of Small Port Coastal Road and Nga Pitat Road** • Provide a traffic police or relevant officer to control traffic at the intersection during the transport period. **Pedestrians and Cyclists** • Maintain safe pedestrian and cycle access near decommissioning work (particularly for elderly and children), including to community facilities, such as schools, monastery, open space and particularly. • Notify the local community, and in particular, local schools, about changes to pedestrian and cycle access during decommissioning near decommissioning works. • Provide traffic controls designed for the safe movement of cyclists near the worksites.		

TABLE 4: MITIGATION MEASURES AND MONITORING PROGRAM DURING DECOMMISSIONING PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Occupational Health and Safety	Impact on health and safety of personnel from excessive noise and accidents.	• The Contractor will design the power plant and associated facilities using equipment that will meet occupational health and safety (OHS) guidelines and standards prescribe in the contract. • The Contractor will prepare an OHS management plan and implementation procedures specific to the decommissioning operation and in line with the Owner's OHS policy and procedures. The plan will be submitted not later than one month before decommissioning operation. • Develop emergency response procedure, implement in the event of accidents and emergency. • The contractor will conduct necessary orientation and training to the Owner's power plant team to ensure that they clearly understand the OHS plan and implementation procedures of decommissioning. • Full surveillance and maintenance during the decommissioning operations shall be carried out.	• Monitoring will be made through: - Daily informal inspections - Weekly formal inspections of the work place - Monthly formal inspections of the work place • The daily inspections will observe: (i) adherence of the workers such as wearing of protective equipment in high risk working areas; (ii) working conditions; and (iii) readiness of fire and life safety systems as relevant. • The daily inspections will be carried out by the EHS Manager and the contractor. The EHS Manager will prepare daily OHS inspection notes as part of the site inspection notes. • The weekly formal inspections will be carried out at weekly intervals and shall be documented using appropriate checklists. The EHS Manager will carry out the weekly inspections. The weekly inspections will include the same issues as the daily inspections but will be in more details and quantitative. • The monthly formal inspections will review the OHS performance of the month based on results of the weekly inspections. Progress in addressing issues or problems identified in the precedent weekly inspections will be evaluated. • Monitoring results will be discussed in monthly review meetings on power plant performance. • Report to MONREC will be submitted when completion of decommissioning operation.	• Contractor • Dawei Power Company Limited

TABLE 4: MITIGATION MEASURES AND MONITORING PROGRAM DURING DECOMMISSIONING PHASE (CONT'D)

Environmental and Social Issues	Impacts	Mitigation Measures	Monitoring Program	Responsibility
Social Management	Daily living of people in the surrounding communities, especially Nga Pitat may be disturbed or inconvenienced by environmental disturbances caused by the decommissioning such as dust, traffic inconveniences and noise and vibration.	• To keep a good mutual understanding between the Project and stakeholders, the Project will continue to solve problems cause by decommissioning activities to the communities.	• Response to problem solving will be included in the monthly monitoring reports. • Report to MONREC will be submitted when completion of decommissioning operation.	Dawei Power Company Limited

TRANSLATION

Form Sor.Vor.Lor.4

(Official Emblem)

PERMIT

CERTIFICATE FOR PREPARATION OF ENVIRONMENTAL IMPACT ASSESSMENT MITIGATION MEASURE AND MORNITORING PROGRAME

Permit No. 25/2558

By virtue of Section 19 of the Enhancement and Conservation of National Environmental Quality Act the National Environment Board (NEB) hereby grants this Permit to TEAM Consulting Engineering and Management Co., Ltd., to certify the Company as Qualified Company for preparation of Environmental Impact Assessment, Mitigation Measures and Monitoring Programe with validity of 3 years effective as from 29 October 2015 – until 28 October 2018 with terms and conditions as following:

(1) Unconditional..

(2) ....

(3) ....

(4) ....

Given on 12 October 2015

(Signed – Mrs. Raviwan Phuridech
Secretary-General

Bureau of Natural Resources and Environmental Policy and Planning

TRANSLATION

(Official Emblem)

Corporate Registration Office of Bangkok,
Department of Commercial Development,
Ministry of Commerce

No. Sor Jor.3 054100

CERTIFICATE

This is to certify that this company has been registered according to the Civil & Commercial Code as a juristic person in the category of Limited Liability Company, Registration No. 0105521011519 on 12 July 1978, with the contents in the documentary registration on the date of issue as follows:

1. The Company's name: "TEAM Consulting Engineering and Management Co., Ltd."

2. The number of the Company's Directors is comprised of 8 persons listed as follows:

   (1) Mr. Prasert Patramai
   (2) Mr. Sanit Rangnoi
   (3) Gen. Wichien Sirisoontorn
   (4) Mr. Peerawat Premchun
   (5) Mr. Wera Sutesopon
   (6) Mr. Thanasarn Khuayjarernpanishk
   (7) Mr. Chawalit Chantararat
   (8) Mr. Issarin Patramai/

3. The number or list of directors who can sign binding to the Company consists of Mr. Prasert Patramai, Mr. Peerawat Premchun, Mr. Thanasarn Khuayjarernpanishk, Mr. Chawalit Chantararat, and Mr. Issarin Patramai. Two of these directors mutually sign with affixation of the corporate common seal.

4. The Company's registered capital: 166,052,000 Baht / One Hundred Sixty-six Million Fifty-two Thousand Baht.

5. The Company's principal office is situated at 151, Nuanchan Road, Nuanchan, Bueng Khum, Bangkok 10230 Thailand.

6. The Company's objectives are comprised of 38 items set forth in the copy of attachment to this corporate certificate of 3 pages, evidenced with the signature of the Registrar reaffirming the certificate, and the official seal of Corporate Registration Office.

Given on: **15 May 2017**

(Signed – Ms. Nanthawan Phong-ampornsophon)

Registrar

Official Seal Affixed

TRANSLATION

(Official Emblem)

Corporate Registration Office of Bangkok,
Department of Commercial Development,
Ministry of Commerce

No. Sor Jor. 3 054100

CERTIFICATE

REMARKS:

1. The previous name of this company was "TEAM Consulting Engineers Co., Ltd." and registered alteration to "TEAM Consulting Engineering and Management Co., Ltd." on 18 April 2000.
2. This Company has already submitted its 2015 Fiscal Balance Sheet.
3. This certificate is to certify only the contents in the documentary registration for legal reason.
4. The registrar may cancel this registration should any essential statements herein be incorrect or false.

The fact should be found for examination.

TRANSLATION

This copy is attached to the Certificate *Registrar* Official Seal Affixed

The company has 38 objectives as follows:

(1) To provide service in all types of architectural and engineering design work, including survey, experiment and research to obtain information for such designs.

(2) To provide service in education, research, analysis, data acquisition, evaluation and summary in any general business projects without limitation.

(3) To provide service or be hired to serve in the technical knowledge, survey, research, analytical, design, evaluation and summary and report on various aspects of architectural development projects and all branches and specialties of engineering (for example: civil, structural, transportation, hydraulic, oceanographic, hydrography, water resources development, industrial, chemical, electrical, survey, mechanical, mining, sanitation and environmental engineering). Also, to improve on those projects so as to give the best quality and most economical results and to prevent waste of resources. The scope of work covers resources in the water, underground, on land and in the air for the private sector, sanitation communities, municipalities, government agencies, international organizations and other countries.

(4) To consult, advise, control operation, provide technical assistance as well as conduct research, experiments, analysis and research into any activities for individuals and juristic persons both in the country and overseas and various international organizations.

(5) To provide management in environmental control through stages of initiating development project, country and town planning, construction, project development, operation, management of resources in the water, underground, on land, in the air, sound and garbage control.

(6) To establish branch offices in Thailand and overseas in all parts of the world in order to reach all or one of the company's objectives.

TRANSLATION

This copy is attached to the Certificate
Registrar
Official Seal Affixed

The company has 38 objectives as follows:

(7) To borrow money, overdraw from banks, financial institutions, government and other organizations. To pawn, mortgage, sell with right of redemption the company's properties as credit guarantee. To make loans to juristic persons or other persons (except acceptance of mortgage of movable and immovable properties.)

(8) To deal in mass transportation, transport of merchandise and all other items by vehicles on land, waterways and air, both within the country and overseas whether it will be by personal or other person's vehicles. This includes purchasing, selling, exchanging, renting, loaning and hire-purchasing land, sea and air vehicles.

(9) To procure concession, permit, patent and other forms of right that is deemed beneficial to the company or affiliated companies.

(10) To enter into limited partnership, to assume responsibility in a limited partnership or be a shareholder in other limited companies regardless of whether such partnerships or companies have the same objectives as ours.

(11) To buy, sell, exchange, rent or let for rent of land, buildings and to bur, sell, appropriate land for sale and build residential buildings and bungalows for rent (except for hire-purchase purpose)

(12) To do business as proprietor or owner of immovable and movable properties to be used as offices, plants and for other uses by the company.

(13) To buy or procure share of other juristic persons that have similar objectives to the company's or that may be beneficial to the company.

(14) To be broker, agent and commission agency in all types of trade and business (except insurance business, association membership recruitment and trade of securities)

No. Sor Jor.3 054100 issued on 15 May 2017

TRANSLATION

This copy is attached to the Certificate *Registrar* Official Seal Affixed

The company has 38 objectives as follows:

(15) To buy, sell, rent, hire-purchase, sell with right for redemption and mortgage immovable properties as well as accept pawning of movable properties.

(16) To engage in trade of rice and granular products, cassava and its products, corn, sesame seeds, beans, pepper, hemp, ceiba, cotton, lac, castor bean, woods, rubber, fruits, forest products, herbs, animal hides, animal horns, sugar, animal feeds and all types of agricultural products.

(17) To engage in trade of machinery, motors, machine tools, labor-saving devices, vehicles, electrical generators and appliances, refrigerators, air-conditioners, electrical fans, electrical rice cooker, electrical iron, water pumps, heater, coolers kitchen utensils, ironware, copperware, bronze ware, sanitary ware, furniture, electric and plumbing equipment as well as spare parts and supplies for the aforementioned items.

(18) To engage in trade of medicines for treatment and prevention of human and animal diseases, medical and chemical supplies, medical and pharmaceutical apparatus, fertilizers, pesticides and insecticides as well as other scientific apparatus.

(19) To engage in trade of papers, stationery, textbooks, printed forms, books, educational equipment, calculators, printers and accessories, newspapers, filing cabinets and all sorts of office equipment and automation.

(20) To do business of operating rice farm, orchard, salt, forestry, rubber plantation, raising of livestock and ranches.

(21) To do business in printing house, providing printing service, printing books and newspapers for sale.

(22) To do business in import and export of goods stated in the objectives.

TRANSLATION

This copy is attached to the Certificate
Registrar
Official Seal Affixed

The company has 38 objectives as follows:

(23) To provide service in legal matters, accounting, engineering, architecture as well as advertising.

(24) To engage in business on guarantee, of liabilities and performance of other persons, including guarantee for persons coming into and travelling out of the country in accordance with laws relating to immigration, revenue and other related laws.

(25) To act as consultant and provide advise on problems regarding commercial and industrial, production, marketing and distribution management.

(26) To do real estate development business by selling and buying land either in cash or credit, renting or high-purchase, including improvement of such land with earth filling, construction of bridges, roads and water drainage, and installation of electricity, water supply including other improvements that will be beneficial to the aforementioned business, for private sector, juristic persons/entities, government authorities, organizations and state enterprises.

(27) To repair, renovate or modify residential and office buildings, roads, bridges, national highways and various types of factories, including to provide consultation service, to design plans and diagrams, estimate construction cost, and install electricity, water supply and drainage systems. In addition, to provide service in dredging moats, canals, ditches, rivers, streams, creeks, marshes, lakes, and excavating reservoirs, tunnels and drainage channels. To improve lanes, roads, sidewalks and drainage pipes. To fill the land with earth. To provide service in wastewater treatment. To offer bids in order to receive contracts for the aforementioned services from private sector, government, juristic persons/entities, organizations or state enterprises.

TRANSLATION

This copy is attached to the Certificate
Registrar
Official Seal Affixed

The company has 38 objectives as follows:

(28) To deal with telecommunications equipment, transceivers, telex, telephones, electronic testing device, medical and industrial X-ray machines, hearing aids, industrial equipment, console, closed-circuit TV's industrial control device, measuring instrument, electrical welding machine, electrical transformers, switchboards, electrical motors, electronic parts and accessories as well as spare parts and accessories of these devices.

(29) To buy, sell, exchange, rent hire-purchase calculating machines and computers both Thai and English languages for use of private sector, sanitary communities, municipalities, government agencies, international organizations and various countries. To provide service on statistic analysis of businesses and industries. To provide service on all types of processing, scientific, engineering, accounting, stock control and telecommunications work including spare parts and accessories of these equipment.

(30) To provide service on consultation, computation, analysis and design of production systems and all types of program development. To provide service in research design, analysis of research result in all branches of related computer and maintenance of machines, computers and all types of calculating machines.

(31) To collect, compile, publish, and distribute statistics and data of agriculture, industry, commerce, finance and marketing. To analyze and evaluate all business operations.

(32) The company reserves the right to issue shares of higher value than stated in the certificates.

(33) To do business and provide service regarding conservation of energy and solution of environmental problems from the use and production of energy.

TRANSLATION

This copy is attached to the
Certificate
Registrar
Official Seal Affixed

The company has 38 objectives as follows:

(34) To carry out trade of construction materials, supplies and equipment, all kinds of tools, paints, painting tools, and building decoration equipment.

(35) To do business on contractual construction of buildings, commercial, residential and office buildings, roads, bridges, dams and tunnels, including construction of other structures, and public works.

(36) To provide service on systems of wastewater treatment and garbage disposal.

(37) To provide service for measurement, investigation, testing, certification, risk assessment including training or consulting to support the safety, occupation health, working environment and related services.

(38) To do business on consultation and providing recommendation to solve the problems concerning Agriculture And Rural Development Sector, Construction Industry Development Sector, Energy Sector, Environment Sector, Industry Sector, Population Sector, Tourism Sector, Transportation Sector, Urban Development Sector, Water Supply And Sanitation Sector, and related services.

(Official Emblem) No. 1-1003-60-4-038532 Issued on 15 May 2017

(TRANSLATION)

Form Bor Or Jor. 4

Computer-Generated Copy

Additional Amendment Registration and/or Special Resolution
of
TEAM Consulting Engineering and Management Co., Ltd.
Registration No. 0105521011519

This text was amended to include in the registrar 4 items as follow;

1. Special Resolution to increase Company's capital to Eighty-three Million Nine Hundred Forty-eight Thousand Baht (83,948,000) by issuing a new common share of Eight Hundred Thirty-nine Thousand Four Hundred and Eighty shares (839,480) with a par value of One Hundred Baht (100)....

2. Additional Amendment of Company's Article No.4 as follow;

   Article No.4 The Transfer of Shares

   4.1 The transfer of shares will be effective by registering the amendments to the shareholders registration.

   4.2 If one of the shareholders dies or become bankrupt, the inheritor or administrator or the one who has right to the shares must bring legal proof to the company. After the Directors deem it to be valid and does not violate the Company' Article, the Company will register the person as the shareholder of the Company.

   4.3 In addition to the provisions of this Article's section, the Directors may impose any regulations as appropriate regarding the shares.

   4.4 The Company will not hold or pledge its shares."

3. Additional Amendment of the Company's Directors list as follow;
   Five Directors have resigned as follow;
   (1) Mr. Suksavasdi Srisupornvanij
   (2) Mr. Amnat Prommasutra
   (3) Mr. Kittipol Bunnim
   (4) Mr. Prasong Wangrattanapranee
   (5) Mrs. Sirinimit Boonyuen
   Three new Directors have been registered (as shown in Form Gor.) as follow;
   (1) Mr. Sanit Rangnoi
   (2) Gen. Wichien Sirisoontorn
   (3) Mr. Issarin Patramai

Signature)..............(Signed).............. Director
(Mr. Prasert Patramai Mr. Thanasarn Khuayjarernpanishk)

 (Signature)..........(Signed)..........Registrar

Request of Documentation No.1003260051/10057 (Ms. Nanthawan Phong-ampornsophon)

(Official Emblem) No. 1-1003-60-4-038532 Issued on 15 May 2017

(TRANSLATION)

Form Bor Or Jor. 4

Computer-Generated Copy

Additional Amendment Registration and/or Special Resolution
of
TEAM Consulting Engineering and Management Co., Ltd.
Registration No. 0105521011519

This text was amended to include in the registrar, total 4 items as follow;

4. To amend the number or list of directors as following;

Item 6. The number or list of directors who can sign binding to the Company consists of Mr. Prasert Patramai, Mr. Peerawat Premchun, Mr. Thanasarn Khuayjarernpanishk, Mr. Chawalit Chantararat, and Mr. Issarin Patramai. Two of these directors mutually sign with affixation of the corporate common seal.

(Signature)..........(Signed).......... Director
(Mr. Prasert Patramai Mr. Thanasarn Khuayjarernpanishk)

 (Signature)..........(Signed).......... Registrar
Request of Documentation No. 1003260051/10057 (Ms. Nanthawan Phong-ampornsophon)

(Official Emblem) No. 1-1003-60-4-038532 Issued on 15 May 2017

(TRANSLATION)

NEW DIRECTORS
of
TEAM Consulting Engineering and Management Co., Ltd.

All Directors have signed and consented to the registrar to verify the accuracy and disclose following information for the official use.

1) Mr. Sanit Rangnoi age 69 years Nationality Thai
☑ Holder of Identification Card No. 3 1 0 0 2 0 0 1 6 0 5 4 4
☐ Other Card No. .... No. ....
101 Panya-Indra Road, Khan Na Yao District, Bangkok Telephone 02-509-9000

Signature ....

2) Gen. Wichien Sirisoontorn age 61 years Nationality Thai
☑ Holder of Identification Card No. 3 1 0 0 6 0 1 3 9 0 5 1 6
☐ Other Card No. .... No. ....
71/65 Seraneeraya Village, Nawongprachapattana Road, Si Kan Sub-district, Don Mueang District, Bangkok Telephone 02-509-9000

Signature ....

3) Mr. Issarin Patramai age 43 years Nationality Thai
☑ Holder of Identification Card No. 3 1 0 0 6 0 0 9 3 0 9 8 3
☐ Other Card No. .... No. ....
11 Ramkhamheang 118, Ramkhamheang Road, Sapansoong Sub-district, Sapansoong District, Bangkok Telephone 02-509-9000

Signature ....

4) .... age ...... years Nationality ....
☐ Holder of Identification Card No. ☐☐☐☐☐☐☐☐☐☐☐☐☐
☐ Other Card No. .... No. ....
Village No. .... Road .... Sub-district, ... District,
Province .... Telephone ....

Signature ....

(Signature) .... (Signed) .... Director
(Mr. Prasert Patramai .... Mr. Thanasarn Khuayjarernpanishk)

 (Signature) .... (Signed) .... Registrar
Request of Documentation No. 1003260051/10057 (Ms. Nanthawan Phong-ampornsophon)

(TRANSLATION)

Articles of Association
of
TEAM Consulting Engineering and Management Co., Ltd.
(Amendment)

By the special resolution of the Ordinary Shareholders' Meeting No. 1/2560 held on 27 April 2017 which resolved to amend Article No. 4 as following:

Article No.4 The Transfer of Shares

4.1 The transfer of shares will be effective by registering the amendments to the shareholders registration.

4.2 If one of the shareholders dies or become bankrupt, the inheritor or administrator or the one who has right to the shares must bring legal proof to the company. After the Directors deem it to be valid and does not violate the Company' Article, the Company will register the person as the shareholder of the Company.

4.3 In addition to the provisions of this Article's section, the Directors may impose any regulations as appropriate regarding the shares.

4.4 The Company will not hold or pledge its shares.

This is to confirm that all above text is correct and consistent with the above meeting resolution.

(Signed).................................. Director
Mr. Prasert Patramai

(Signed).................................. Director
Mr. Thanasarn Khuayjarernpanishk

TRANSLATION

(Official Emblem)

No. Kor.Khor. 0910/4099

Public Debt Management Office
Ministry of Finance
Rama VI Road, Bangkok 10400

22 December 2016

Subject The Extension of the Thai Consultant Registration

To Executive Director
TEAM Consulting Engineering and Management Co., Ltd.

Ref. TEAM Consulting Engineering and Management Co., Ltd.
Letter No. HC/100G/592946 dated 2 December 2016

With reference to the said letter, TEAM Consulting Engineering and Management Co., Ltd. expressed its intention to extend the registration with Thai Consultant Database Centre, Ministry of Finance

Kindly be informed that Thai Consultant Database Centre has now completed your extension for TEAM Consulting Engineering and Management Co., as Thai Consultant Type A, No. 23, TEAM Consulting Engineering and Management Co., Ltd. provides services as Thai Consultant on the study of agriculture and rural development, construction industry, energy, environment, industry, public relations for population, tourism, transport communication, urban and community development, as well as water supply and sanitation since 26 December 2016. Additionally, if TEAM Consulting Engineering and Management Co., Ltd. has additional experience and information as well as any alteration on other information kindly inform Public Debt Management Office every quarterly period for the benefits of updating of information on the Company's current status.

This registration valid 2 years dated from 26 December 2016, so please kindly run your additional registration before the expired date to maintain continual registration.

This letter is therefore herewith transmitted for your information and further reference accordingly.

Respectfully Yours,

(Signed – Mr. Ace Viboolcharern)
Assistant Director
Acting as Director of Public Debt Management Office

Project Loan Office
Thai Consultant Database Centre
Tel. 0 271 7999 Ext. 5717
Fax: 0 2357 3576
www.thaiconsult.pdmo.go.th/

Certificate of Registration

This certificate has been awarded to

TEAM CONSTRUCTION MANAGEMENT CO., LTD.

151 Nuan Chan Road, Nuan Chan, Bueng Kum,
Bangkok 10230 Thailand

in recognition of the organization's Quality Management System which complies with

ISO 9001:2015

The scope of activities covered by this certificate is defined below

Construction Management Consultancy Service and Building Information Modelling

Certificate Number:	**Date of Issue: (Original)**	**Date of Issue:**
84790/A/0001/UK/En	04 December 2017	04 December 2017
Issue No:	**Expiry Date:**	
1	03 December 2020	

Issued by: *On behalf of the Schemes Manager*

UKAS MANAGEMENT SYSTEMS
0043

If there is any doubt as to the authenticity of this certificate, please do not hesitate to contact the Head Office of the Group on info@urs-certification.com.
URS is a member of United Registrar of Systems (Holdings) Ltd, Derby Manor, Derby Road, Bournemouth, BH1 3QB. UK. Company Registration no. 5298466

ที่ สจ.3 054100

สำนักงานทะเบียนหุ้นส่วนบริษัทกรุงเทพมหานคร
กรมพัฒนาธุรกิจการค้า กระทรวงพาณิชย์

หนังสือรับรอง

ขอรับรองว่าบริษัทนี้ ได้จดทะเบียนเป็นนิติบุคคล ตามประมวลกฎหมายแพ่งและพาณิชย์ เมื่อวันที่ 12 กรกฎาคม 2521 ทะเบียนนิติบุคคลเลขที่ 0105521011519 ปรากฏข้อความในรายการตามเอกสารทะเบียนนิติบุคคล ณ วันออกหนังสือนี้ ดังนี้

1. ชื่อบริษัท บริษัท ทีม คอนซัลติ้ง เอนจิเนียริ่ง แอนด์ แมเนจเมนท์ จำกัด
2. กรรมการของบริษัทมี 8 คน ตามรายชื่อดังต่อไปนี้

1. นายประเสริฐ ภัทรมัย	2. นายศานิต ร่างน้อย
3. พลเอกวิเชียร ศิริสุนทร	4. นายพีรวัธน์ เปรมชื่น
5. นายวีระ สุธีโสภณ	6. นายธนสาร ก๋วยเจริญพานิชก์
7. นายชวลิต จันทรรัตน์	8. นายอิศรินทร์ ภัทรมัย/

3. จำนวนหรือชื่อกรรมการซึ่งลงชื่อผูกพันบริษัทได้คือ นายประเสริฐ ภัทรมัย นายพีรวัธน์ เปรมชื่น นายธนสาร ก๋วยเจริญพานิชก์ นายชวลิต จันทรรัตน์ นายอิศรินทร์ ภัทรมัย กรรมการสองในห้าคนนี้ลงลายมือชื่อร่วมกัน และประทับตราสำคัญของบริษัท//
4. ทุนจดทะเบียน 166,052,000.00 บาท / หนึ่งร้อยหกสิบหกล้านห้าหมื่นสองพันบาทถ้วน/
5. สำนักงานแห่งใหญ่ ตั้งอยู่เลขที่ 151 ถนนนวลจันทร์ แขวงนวลจันทร์ เขตบึงกุ่ม กรุงเทพมหานคร/
6. วัตถุที่ประสงค์ของบริษัทมี 38 ข้อ ดังปรากฏในสำเนาเอกสารแนบท้ายหนังสือรับรองนี้ จำนวน 3 แผ่น โดยมีลายมือชื่อนายทะเบียนซึ่งรับรองเอกสารและประทับตราสำนักงานทะเบียนหุ้นส่วนบริษัทเป็นสำคัญ

ออกให้ ณ วันที่ 15 เดือน พฤษภาคม พ.ศ. 2560

(นางสาวนันทวรรณ์ พงศ์อัมพิรุศภณ)

คำเตือน : ผู้ใช้ควรตรวจสอบข้อควรทราบท้ายหนังสือรับรองฉบับนี้ทุกครั้ง

ที่ สจ.3 054100

สำนักงานทะเบียนหุ้นส่วนบริษัทกรุงเทพมหานคร
กรมพัฒนาธุรกิจการค้า กระทรวงพาณิชย์

หนังสือรับรอง

ข้อควรทราบ ประกอบหนังสือรับรอง ฉบับที่ สจ.3 054100

1. บริษัทนี้เดิมชื่อ บริษัท ทีมคอนซัลติ้ง เอนจิเนียร์ จำกัด ได้จดทะเบียน
เปลี่ยนชื่อเป็น บริษัท ทีม คอนซัลติ้ง เอนจิเนียริ่ง แอนด์ แมเนจเมนท์ จำกัด
เมื่อวันที่ 18 เมษายน 2543/

2. นิติบุคคลนี้ได้ส่งงบการเงินปี 2558

3. หนังสือนี้รับรองเฉพาะข้อความที่ห้าง/บริษัทได้นำมาจดทะเบียนไว้เพื่อผลทางกฎหมายเท่านั้น
ข้อเท็จจริงเป็นสิ่งที่ควรหาไว้พิจารณาฐานะ

4. นายทะเบียนอาจเพิกถอนการจดทะเบียน ถ้าปรากฏว่าข้อความอันเป็นสาระสำคัญที่จดทะเบียน
ไม่ถูกต้อง หรือเป็นเท็จ/

ที่ สจ.3 054100 ออกให้ ณ วันที่ 15 เดือน พฤษภาคม พ.ศ. 2560

สำเนาเอกสารนี้แนบท้ายหนังสือรับรอง

วัตถุที่ประสงค์ของ ห้างหุ้นส่วน/บริษัท นี้ มี 38 ข้อ ดังนี้

(1) รับบริการออกแบบงานสถาปัตยกรรม และงานสาขาวิศวกรรมทุกแขนง รวมถึงการสำรวจ ทดลอง ค้นคว้า และวิจัย เพื่อให้ได้มาซึ่งข้อมูลเพื่อการออกแบบนั้นๆ

(2) รับบริการทางด้านการศึกษา ค้นคว้า วิเคราะห์ หาข้อมูล ประเมินผล สรุปผลในโครงการธุรกิจต่างๆ ทั่วไป โดยไม่จำกัดขอบเขต

(3) เพื่อรับจัดหรือรับจ้างหรือรับบริการด้านเทคนิค วิชาการ งานสำรวจ ศึกษา ค้นคว้า วิเคราะห์ วิจัย ออกแบบ ประเมินผล สรุปผล และทำรายงานในโครงการพัฒนาต่างๆ ทางด้านสถาปัตยกรรมและวิชาชีพ วิศวกรรมทุกแขนงและทุกสาขา (โยธา โครงสร้าง ขนส่ง ชลศาสตร์ สมุทรศาสตร์ อุทกศาสตร์ การพัฒนาแหล่งน้ำ อุตสาหกรรม เคมี ไฟฟ้า สำรวจ เครื่องกล เหมืองแร่ สุขาภิบาล สิ่งแวดล้อม) ตลอดจนการปรับปรุงแก้ไขโครงการนั้นๆ ให้ได้ผลลัพธ์ที่มีคุณภาพดีที่สุดและประหยัดที่สุด และการป้องกันความสูญเสียทรัพยากรโดยมีขอบเขตงานครอบคลุมทั้งในน้ำ ใต้ดิน บนดิน และในอากาศ ให้แก่เอกชน สุขาภิบาล เทศบาล หน่วยงานของรัฐบาล องค์การระหว่างประเทศและประเทศต่างๆ

(4) รับปรึกษา ให้คำแนะนำ ควบคุมการดำเนินงาน และการจัดการด้านเทคนิค รวมทั้งการค้นคว้า ทดลอง วิเคราะห์และวิจัย ในกิจการใดๆ แก่บุคคล นิติบุคคล ทั้งในและนอกประเทศ รวมทั้งองค์การระหว่างประเทศต่างๆ

(5) รับจัดการควบคุมสิ่งแวดล้อมทั้งหมด จากการริเริ่มโครงการพัฒนา การวางผังเมือง การศึกษา วิเคราะห์ ค้นคว้า ในด้านอำนวยความสะดวก การวางผังเมือง การก่อสร้าง การพัฒนาโครงการต่างๆ การดำเนินการ และการจัดการในน้ำ ใต้พื้นดิน บนดิน และในอากาศ เสียง และการควบคุมสิ่งปฏิกูล

(6) จัดตั้งสำนักงานสาขาในประเทศไทยและในต่างประเทศไม่ว่าส่วนใดของโลก เพื่อดำเนินการตามวัตถุประสงค์ของบริษัททั้งปวงหรือข้อหนึ่งข้อใด

(7) ทำการกู้ยืม เบิกเงินเกินบัญชีจากธนาคาร สถาบันการเงินต่างๆ หรือบุคคลอื่นๆ และทำการจำนำ จำนอง ขายฝากทรัพย์สินของบริษัทเป็นประกันเครดิตดังกล่าว รวมทั้งให้กู้ยืมเงินแก่นิติบุคคลหรือบุคคลอื่น (ยกเว้นการรับจำนองอสังหาริมทรัพย์และสังหาริมทรัพย์)

(8) ประกอบกิจการขนส่งคนโดยสาร สินค้า พัสดุภัณฑ์ทุกชนิดทุกประเภท โดยยานพาหนะทางบก ทางน้ำ ทางอากาศ ทั้งภายในและภายนอกประเทศ ไม่ว่าด้วยยานพาหนะของตนเองหรือของบุคคลอื่น ตลอดจนทำการซื้อ ขาย แลกเปลี่ยน เช่า ให้เช่า เช่าซื้อ ยานพาหนะทางบก ทางน้ำ และทางอากาศ

(9) จัดให้ได้มาซึ่งสัมปทาน ประทานบัตร นิมิตรสิทธิ์ และสิทธิใดๆ บรรดาที่เห็นว่ามีประโยชน์แก่กิจการของบริษัทหรือบริษัทในเครือเดียวกัน

(10) เข้าเป็นหุ้นส่วนจำกัดความรับผิดชอบในห้างหุ้นส่วนจำกัดหรือเป็นผู้ถือหุ้นในบริษัทจำกัดอื่นใด ไม่ว่าจะมีวัตถุประสงค์ตรงกันหรือไม่ก็ตาม

ที่ สจ.3 054100 ออกให้ ณ วันที่ 15 เดือน พฤษภาคม พ.ศ. 2560

สำเนาเอกสารนี้แนบท้ายหนังสือรับรอง

วัตถุที่ประสงค์ของ ~~ห้างหุ้นส่วน~~/บริษัท นี้ มี......38..........ข้อ ดังนี้

(11) ประกอบกิจการซื้อ ขาย แลกเปลี่ยน เช่า หรือให้เช่าที่ดิน อาคารบ้านเรือน โรง และสิ่งปลูกสร้างทุกชนิด ตลอดจนซื้อ ขาย จัดสรรที่ดินออกเป็นแปลงเล็กๆ เพื่อจำหน่าย ทั้งสร้างที่พักอาศัยหรือบังกาโลให้เช่า (ยกเว้นการให้เช่าซื้อ)

(12) ประกอบกิจการเป็นเจ้าของ ผู้ถือกรรมสิทธิ์ในอสังหาริมทรัพย์ และสังหาริมทรัพย์ เพื่อใช้เป็นสำนักงาน โรงงานและเพื่อประโยชน์อื่นๆ ของบริษัท

(13) ทำการซื้อ จัดให้ได้มา ซึ่งหุ้นของนิติบุคคลอื่น ซึ่งมีวัตถุประสงค์ทำนองเดียวกับบริษัท หรือซึ่งจะเป็นประโยชน์แก่บริษัท

(14) ประกอบกิจการเป็นนายหน้า ตัวแทนและตัวแทนค้าต่างในกิจการค้าและธุรกิจทุกประเภท (เว้นแต่ในธุรกิจประกันภัย การจัดหาสมาชิกให้สมาคมและการค้าหลักทรัพย์)

(15) ประกอบกิจการซื้อ ขาย ให้เช่า เช่าซื้อ ขายฝาก จำนองอสังหาริมทรัพย์ ทั้งนี้รวมทั้งการรับเช่านำเช่าสังหาริมทรัพย์ด้วย

(16) ประกอบกิจการค้าข้าว ผลิตภัณฑ์ข้าว มันสำปะหลัง ผลิตภัณฑ์มันสำปะหลัง ข้าวโพด งา ถั่ว พริกไทย ปอ นุ่น ฝ้าย ครั่ง ละหุ่ง ไม้ ยาง ผลไม้ ของป่า สมุนไพร หนังสัตว์ เขาสัตว์ น้ำตาล อาหารสัตว์ และพืชผลทางการเกษตรทุกชนิด

(17) ประกอบกิจการค้าเครื่องจักร เครื่องยนต์ เครื่องมือกล เครื่องทุ่นแรง ยานพาหนะ เครื่องกำเนิด และเครื่องใช้ไฟฟ้า ตู้เย็น เครื่องปรับอากาศ พัดลม หม้อหุงข้าวไฟฟ้า เตารีดไฟฟ้า เครื่องสูบน้ำ เครื่องทำความร้อน เครื่องทำความเย็น เครื่องครัว เครื่องเหล็ก เครื่องทองแดง เครื่องทองเหลือง เครื่องสุขภัณฑ์ เครื่องเคหภัณฑ์ เครื่องเฟอร์นิเจอร์ อุปกรณ์ไฟฟ้า อุปกรณ์ประปา รวมทั้งอะไหลและอุปกรณ์ของสินค้าดังกล่าวข้างต้น

(18) ประกอบกิจการค้ายารักษาและป้องกันโรคสำหรับคนและสัตว์ เครื่องเวชภัณฑ์ เคมีภัณฑ์ เครื่องมือแพทย์ และเภสัชกรรม ปุ๋ย ยาปราบศัตรูพืชและสัตว์ทุกชนิด เครื่องมือ เครื่องใช้ในทางวิทยาศาสตร์

(19) ประกอบกิจการค้ากระดาษ เครื่องเขียน แบบเรียน แบบพิมพ์ หนังสือ อุปกรณ์การเรียน เครื่องคำนวณ เครื่องพิมพ์ อุปกรณ์การพิมพ์ สิ่งพิมพ์ หนังสือพิมพ์ ตู้เก็บเอกสาร และเครื่องใช้สำนักงานทุกชนิด

(20) ประกอบกิจการทำนา ทำสวน ทำไร่ ทำนาเกลือ ทำป่าไม้ ทำสวนยาง เลี้ยงสัตว์ และกิจการคอกปศุสัตว์

(21) ประกอบกิจการโรงพิมพ์ รับพิมพ์หนังสือ พิมพ์หนังสือจำหน่าย และออกหนังสือพิมพ์

(22) ประกอบกิจการสั่งเข้ามาจำหน่ายในประเทศ และส่งออกไปจำหน่ายยังต่างประเทศซึ่งสินค้าตามที่กำหนดไว้ในวัตถุที่ประสงค์

(23) ประกอบกิจการบริการทางด้านกฎหมาย ทางบัญชี ทางวิศวกรรม ทางสถาปัตยกรรม รวมทั้งกิจการโฆษณา

(24) ประกอบกิจการบริการค้ำประกันหนี้สิน ความรับผิดชอบ และการปฏิบัติตามสัญญาของบุคคลอื่น รวมทั้งรับบริการค้ำประกันบุคคลซึ่งเดินทางเข้ามาในประเทศ หรือเดินทางออกไปต่างประเทศตามกฎหมายว่าด้วยคนเข้าเมือง กฎหมายว่าด้วยภาษีอากร และกฎหมายอื่น

(25) ประกอบธุรกิจบริการรับเป็นที่ปรึกษาและให้คำแนะนำปัญหาเกี่ยวกับด้านบริหารงาน พาณิชยกรรม อุตสาหกรรม รวมทั้งปัญหาการผลิต การตลาดและจัดจำหน่าย

(26) ทำการจัดซื้อที่ดินเพื่อขายและจัดแบ่งขาย ทั้งโดยเงินสดและเงินผ่อน หรือให้เช่า หรือให้เช่าซื้อ รวมทั้งการปรับปรุงที่ดินดังกล่าวให้เหมาะสมแก่การแบ่งขายหรือให้เช่า โดยการถมดิน สร้างสะพาน ถนน ทางระบายน้ำ ติดตั้งไฟฟ้า ประปา ตลอดจนการปรับปรุงอื่นๆ ที่จะเป็นประโยชน์แก่กิจการดังกล่าวให้แก่ เอกชน นิติบุคคล ทางราชการ องค์การหรือรัฐวิสาหกิจต่างๆ

ที่ สจ.3 054100 ออกให้ ณ วันที่ 15 เดือน พฤษภาคม พ.ศ. 2560

สำเนาเอกสารนี้แนบท้ายหนังสือรับรอง

วัตถุที่ประสงค์ของ ห้างหุ้นส่วน/บริษัท นี้ มี......38.........ข้อ ดังนี้

(27) ทำการซ่อมแซม แก้ไข ดัดแปลงอาคารที่พักอาศัย สถานที่ทำการ ถนน สะพาน ทางหลวงแผ่นดิน โรงงานต่างๆ รวมทั้งรับปรึกษา ออกแบบแปลนแผนผัง คำนวณการก่อสร้าง และรับทำการติดตั้งไฟฟ้า ประปา ทำท่อระบายน้ำ ขุดลอกคู คลอง ห้องร่องแม่น้ำ ลำธาร ห้วย หนอง บึง สระ อ่างเก็บน้ำ อุโมงค์ ทางระบายน้ำ ซ่อมแซมแก้ไข เปลี่ยนแปลงตรอก ซอย ถนน ทางเท้า ท่อระบายน้ำ ถมที่ดิน ขจัดน้ำเสีย น้ำโสโครก ตลอดจนประมูล จัดทำ ใช้ช่วงงาน ในกิจการดังกล่าวจากเอกชน นิติบุคคล รัฐบาล องค์การหรือรัฐวิสาหกิจต่างๆ ด้วย

(28) ประกอบกิจการค้าเครื่องมือสื่อสาร โทรคมนาคม วิทยุรับส่ง โทรพิมพ์ โทรศัพท์ เครื่องมือทดสอบ อิเล็กทรอนิกส์ เครื่องเอ็กซเรย์ทางการแพทย์และอุตสาหกรรม เครื่องช่วยหูฟัง เครื่องมือเครื่องใช้เกี่ยวกับอุตสาหกรรม เครื่องเสียง เครื่องโทรทัศน์วงจรปิด เครื่องควบคุมระบบการทำงานทางอุตสาหกรรม เครื่องชั่ง ตวง วัด เครื่องเชื่อมไฟฟ้า หม้อแปลงไฟฟ้า สวิสซ์บอร์ด มอเตอร์ไฟฟ้า อุปกรณ์ชิ้นส่วนอิเล็กทรอนิกส์ รวมทั้งอะไหล่ และอุปกรณ์ของเครื่องดังกล่าว

(29) ประกอบกิจการซื้อ ขาย แลกเปลี่ยน เช่า ให้เช่าซื้อ เครื่องคำนวณและเครื่องคอมพิวเตอร์ทั้งไทย และอังกฤษ เพื่อใช้กับหน่วยงานของเอกชน สุขาภิบาล เทศบาล หน่วยงานรัฐบาล องค์การระหว่างประเทศ และประเทศต่างๆ คำนวณสถิติกิจการอุตสาหกรรม งานธุรกิจ งานประมวลผลทุกชนิด งานวิทยาศาสตร์ งานวิศวกรรมศาสตร์ งานบัญชี สต๊อก งานเกี่ยวกับโทรคมนาคม รวมทั้งอะไหล่และอุปกรณ์เครื่องคอมพิวเตอร์ และเครื่องคำนวณทุกชนิด

(30) บริการให้การปรึษา คำนวณ วิเคราะห์ ออกแบบ ระบบงานผลิต และพัฒนาโปรแกรมทุกชนิด และรับออกแบบงานวิจัย วิเคราะห์ผลงานวิจัยทุกสาขาเกี่ยวกับเครื่องคอมพิวเตอร์ต่างๆ รวมทั้งซ่อมบำรุงรักษาเครื่องจักร แก้ไขปรับปรุงเกี่ยวกับเครื่องคอมพิวเตอร์และเครื่องคำนวณทุกชนิด

(31) ประกอบกิจการจัดเก็บ รวบรวม จัดทำ จัดพิมพ์และเผยแพร่สถิติ ข้อมูลในทางเกษตรกรรม อุตสาหกรรม พาณิชยกรรม การเงิน การตลาด รวมทั้งวิเคราะห์และประเมินผลในการดำเนินธุรกิจต่างๆ

(32) บริษัทมีสิทธิที่จะออกหุ้นในราคาที่สูงกว่ามูลค่าที่กำหนดไว้

(33) เพื่อประกอบธุรกิจและให้บริการเกี่ยวกับการอนุรักษ์พลังงาน หรือการแก้ไขปัญหาสิ่งแวดล้อมจากการใช้และการผลิตพลังงาน

(34) ประกอบกิจการค้าวัสดุก่อสร้าง อุปกรณ์และเครื่องมือเครื่องใช้ในการก่อสร้าง เครื่องมือช่างทุกประเภท สี เครื่องมือทาสี เครื่องตกแต่งอาคารทุกชนิด

(35) ประกอบกิจการรับเหมาก่อสร้างอาคาร อาคารพาณิชย์ อาคารที่พักอาศัย สถานที่ทำการ ถนน สะพาน เขื่อน อุโมงค์ และงานก่อสร้างอย่างอื่นทุกชนิด รวมทั้งการรับงานโยธาทุกประเภท

(36) ประกอบกิจการ ระบบบำบัดน้ำเสีย และ ระบบกำจัดขยะมูลฝอย

(37) ให้บริการในการตรวจวัด ตรวจสอบ ทดสอบ รับรอง ประเมินความเสี่ยง รวมทั้งจัดฝึกอบรมหรือให้คำปรึกษาเพื่อส่งเสริมความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน รวมถึงการให้บริการอื่นๆ ที่เกี่ยวข้อง

(38) ประกอบธุรกิจรับเป็นที่ปรึกษา และให้คำแนะนำในการแก้ไขปัญหาเกี่ยวกับสาขาเกษตรและพัฒนาชนบท สาขาอุตสาหกรรมก่อสร้าง สาขาพลังงาน สาขาสิ่งแวดล้อม สาขาอุตสาหกรรม สาขาประชากรด้านประชาสัมพันธ์ สาขาการท่องเที่ยว สาขาคมนาคมขนส่ง สาขาพัฒนาเมือง และสาขาการประปาและสุขาภิบาล รวมถึงการให้บริการอื่นๆ ที่เกี่ยวข้อง

กรมพัฒนาธุรกิจการค้า
กระทรวงพาณิชย์

เลขที่ออกเอกสาร 1-1003-60-4-038532 วันที่ออกเอกสาร 15 พฤษภาคม 2560

แบบ บอจ. 4

สำเนาถูกต้อง

รายการจดทะเบียนแก้ไขเพิ่มเติม และ/หรือ มติพิเศษ

บริษัท ....ทีม คอนซัลติ้ง เอนจิเนียริ่ง แอนด์ แมเนจเมนท์ ... นันทวรรณ ... พงศ์อัมพรโศภณ)

ทะเบียนเลขที่ ...0105521011519.............................. นายทะเบียน

ข้อความซึ่งได้แก้ไขเพิ่มเติมรายการในทะเบียนที่ได้จดทะเบียนไว้แล้ว มีรายการดังนี้ สำนักงานทะเบียนหุ้นส่วนบริษัทกรุงเทพมหานคร

1. มีมติพิเศษให้เพิ่มทุนของบริษัทเพิ่มขึ้นอีก แปดสิบสามล้านเก้าแสนสี่หมื่นแปดพันบาท (83,948,000) โดยการออก ...หุ้นใหม่ เป็นหุ้นสามัญจำนวน แปดแสนสามหมื่นเก้าพันสี่ร้อยแปดสิบหุ้น (839,480) มูลค่าหุ้นละ หนึ่งร้อยบาท (100).........

2. ให้แก้ไขเพิ่มเติมข้อบังคับของบริษัทข้อ. 4 เป็นดังนี้

ข้อ 4. การโอนหุ้น

4.1 การโอนหุ้นจะมีผลโดยการจดทะเบียนแก้ไขลงในทะเบียนผู้ถือหุ้น

4.2 ถ้าผู้ถือหุ้นคนหนึ่งคนใดตาย หรือล้มละลาย ผู้รับมรดกหรือผู้จัดการมรดกหรือผู้มีสิทธิจะได้หุ้นนั้นจะต้องนำ ต้องนำหลักฐานอันชอบด้วยกฎหมายมาแสดงต่อบริษัท และเมื่อคณะกรรมการเห็นว่าเป็นการถูกต้องและ ไม่ขัดต่อข้อบังคับบริษัทแล้ว จะรับจดทะเบียนบุคคลนั้นเป็นผู้ถือหุ้นของบริษัทต่อไป

4.3 นอกจากบทบัญญัติแห่งข้อบังคับหมวดนี้ คณะกรรมการอาจกำหนดระเบียบใดๆ ตามความเหมาะสมในเรื่อง การจัดการเกี่ยวกับหุ้น

4.4 บริษัทจะถือหรือรับจำนำหุ้นของบริษัทตัวเองไม่ได้"

3. ให้แก้ไขเพิ่มเติมจำนวนกรรมการของบริษัท เป็นดังนี้

กรรมการออกจากตำแหน่ง จำนวน 5 คน คือ

(1) นายสุขสวัสดิ์ ศรีสุภรวาณิชย์

(2) นายอำนาจ พรหมสูตร

(3) นายกิตติพล บุลนิม

(4) นายประสงค์ หวังรัตนปราณี

(5) นางสิรินิมิตร บุญยืน

กรรมการเข้าใหม่ จำนวน 3 คน (ดังปรากฏรายละเอียดในแบบ ก.) คือ

(1) นายศานิต ร่างน้อย

(2) พลเอกวิเชียร ศิริสุนทร

(3) นายอิศรินทร์ ภัทรมัย

(ลงลายมือชื่อ)..กรรมการผู้ขอจดทะเบียน

(...นายประเสริฐ ภัทรมัย.............นายธนสาร ก้วยเจริญพานิชก์...)

หน้า....1......ของจำนวน....2......หน้า (ลงลายมือชื่อ)...นายทะเบียน

เอกสารประกอบคำขอที่ 100 32 600 51 10 0 57 (นางสาวนันทวรรณ พงศ์อัมพรโศภณ.....)

/E/D/TEAM/บอจ.4-กรรมการออก5 เข้า-เพิ่มทุน-วัตถุ-p1.pdf

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แบบ บอจ. 4

สำเนาถูกต้อง

รายการจดทะเบียนแก้ไขเพิ่มเติม และ/หรือ มติพิเศษ

บริษัท ....ทีม คอนซัลติ้ง เอนจิเนียริ่ง แอนด์ แมเนจเมนท์ จำกัด (มหาชน) (นางสาวนันทวรรณ พงศ์อัมพรไพศาล)

ทะเบียนเลขที่ ...0105521011519.......................... นายทะเบียน

ข้อความซึ่งได้แก้ไขเพิ่มเติมรายการในทะเบียนนี้ สำนักงานทะเบียนหุ้นส่วนบริษัทกรุงเทพมหานคร เป็นดังนี้

4. ให้แก้ไขเพิ่มเติมจำนวนหรือชื่อกรรมการลงชื่อผูกพันบริษัท เป็นดังนี้...

............ข้อ 6. จำนวนหรือชื่อกรรมการลงชื่อผูกพันบริษัทได้ คือนายประเสริฐ ภัทรมัย นายพีรวัชน์ เปรมชื่น ....

นายธนสาร ก้วยเจริญพานิชก์ นายชวลิต จันทรรัตน์ นายอิศรินทร์ ภัทรมัย กรรมการสองคนในห้าคนนี้

ลงลายมือชื่อร่วมกัน และประทับตราสำคัญของบริษัท

(ลงลายมือชื่อ).. กรรมการผู้ขอจดทะเบียน

(....นายประเสริฐ ภัทรมัย........นายธนสาร ก้วยเจริญพานิชก์......)

หน้า...2.....ของจำนวน....2......หน้า (ลงลายมือชื่อ)..นายทะเบียน

เอกสารประกอบคำขอที่ 0 0 3 2 6 0 0 5 1 1 0 0 5 7 (....นางสาวนันทวรรณ พงศ์อัมพรไพศาล....)

กรมพัฒนาธุรกิจการค้า
กระทรวงพาณิชย์

เลขที่ออกเอกสาร 1-1003-60-4-038532 วันที่ออกเอกสาร 15 พฤษภาคม 2560

แบบ ก.

กรรมการเข้าใหม่

สำเนาถูกต้อง

ของ

บริษัท ทีม คอนซัลติ้ง เอนจิเนียริ่ง แอนด์ แมเนจเมนท์ จำกัด

ข้าพเจ้ากรรมการทุกคนซึ่งได้ลงลายมือชื่อไว้นี้ ยินยอมให้นายทะเบียนตรวจสอบความถูกต้องและเปิดเผยข้อมูลตามที่ได้ระบุไว้ในรายการจดทะเบียนนี้ เพื่อใช้ประโยชน์ของทางราชการ

(นางสาวนันทวรรณ พงศ์อัมพรโสภณ)
นายทะเบียน
สำนักงานทะเบียนหุ้นส่วนบริษัท กรุงเทพมหานคร

(1) นายศานิต ร่างน้อย อายุ 69 ปี สัญชาติ ไทย

☑ ถือบัตรประจำตัวประชาชนเลขที่ 3-1002-00160-54-4

☐ ถือบัตรอื่น ๆ (ระบุ) .... เลขที่ ....

อยู่บ้านเลขที่ 101 หมู่ที่/หมู่บ้าน .... ถนน ปัญญาอินทรา

ตำบล/แขวง คันนายาว อำเภอ/เขต คันนายาว จังหวัด กรุงเทพมหานคร

หมายเลขโทรศัพท์ 02-509-9000

(ลงลายมือชื่อ) ....

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☑ ถือบัตรประจำตัวประชาชนเลขที่ 3-1006-01390-51-6

☐ ถือบัตรอื่น ๆ (ระบุ) .... เลขที่ ....

อยู่บ้านเลขที่ 71/65 หมู่ที่/หมู่บ้าน เศรณีรายา ถนน นวงประชาพัฒนา

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หมายเลขโทรศัพท์ 02-509-9000

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☐ ถือบัตรอื่น ๆ (ระบุ) .... เลขที่ ....

อยู่บ้านเลขที่ 11 หมู่ที่/หมู่บ้าน ซอยรามคำแหง 118 แยก 33-6-1 ถนน รามคำแหง

ตำบล/แขวง สะพานสูง อำเภอ/เขต สะพานสูง จังหวัด กรุงเทพมหานคร

หมายเลขโทรศัพท์ 02-509-9000

(ลงลายมือชื่อ) ....

(4) .... อายุ .... ปี สัญชาติ ....

☐ ถือบัตรประจำตัวประชาชนเลขที่ ☐-☐☐☐☐-☐☐☐☐☐-☐☐-☐

☐ ถือบัตรอื่น ๆ (ระบุ) .... เลขที่ ....

อยู่บ้านเลขที่ .... หมู่ที่/หมู่บ้าน .... ถนน ....

ตำบล/แขวง .... อำเภอ/เขต .... จังหวัด ....

หมายเลขโทรศัพท์ ....

(ลงลายมือชื่อ) ....

(ลงลายมือชื่อ) .... กรรมการผู้ขอจดทะเบียน

(นายประเสริฐ ภัทรมัย นายธนสาร ก้วยเจริญพานิชก์)

หน้า 1 ของจำนวน 1 หน้า

(ลงลายมือชื่อ) นางสาวนันทวรรณ พงศ์อัมพรโสภณ นายทะเบียน

เอกสารประกอบคำขอที่ 1003860051110057

(........)

ถ้ากรรมการเป็นชาวต่างประเทศ ให้ระบุชื่อและที่อยู่เป็นภาษาอังกฤษกำกับไว้ด้วย

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สำเนาถูกต้อง

ข้อบังคับ

ของ

(นางสาวนันทวรรณ พงศ์อัมพรโศภณ)
นายทะเบียน
สำนักงานทะเบียนหุ้นส่วนบริษัท กรุงเทพมหานคร

บริษัท ทีม คอนซัลติ้ง เอนจิเนียริ่ง แอนด์ แมเนจเมนท์ จำกัด

(ฉบับแก้ไขเพิ่มเติม)

โดยมติพิเศษของที่ประชุมสามัญผู้ถือหุ้น ครั้งที่ 1/2560 เมื่อวันที่ 27 เมษายน 2560 ให้แก้ไขเพิ่มเติมข้อบังคับของบริษัท ข้อ 4. เป็นดังนี้

ข้อ 4. การโอนหุ้น

4.1 การโอนหุ้นจะมีผลโดยการจดทะเบียนแก้ไขลงในทะเบียนผู้ถือหุ้น

4.2 ถ้าผู้ถือหุ้นคนหนึ่งคนใดตาย หรือล้มละลาย ผู้รับมรดกหรือผู้จัดการมรดกหรือผู้มีสิทธิจะได้หุ้นนั้นจะต้องนำหลักฐานอันชอบด้วยกฎหมายมาแสดงต่อบริษัท และเมื่อคณะกรรมการเห็นว่าเป็นการถูกต้องและไม่ขัดต่อข้อบังคับบริษัทแล้ว จะรับจดทะเบียนบุคคลนั้นเป็นผู้ถือหุ้นของบริษัทต่อไป

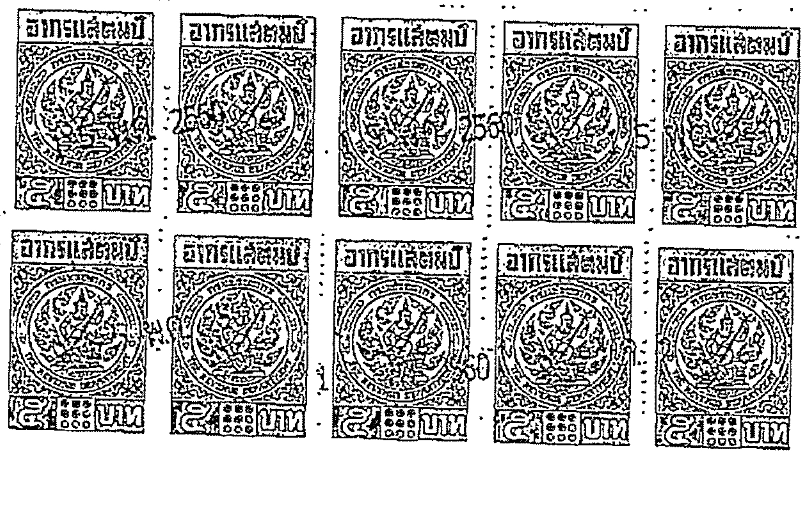
4.3 นอกจากบทบัญญัติแห่งข้อบังคับหมวดนี้ คณะกรรมการอาจกำหนดระเบียบใดๆ ตามความเหมาะสมในเรื่องการจัดการเกี่ยวกับหุ้น

4.4 บริษัทจะถือหรือรับจำนำหุ้นของบริษัทตัวเองไม่ได้

ขอรับรองว่าเป็นข้อความถูกต้องตรงกับมติที่ประชุมดังกล่าวข้างต้น

ลงชื่อ ______________ กรรมการ
(นายประเสริฐ ภัทรมัย)

ลงชื่อ ______________ กรรมการ
(นายธนสาร ก้วยเจริญพานิชก์)



ที่ กค 0910/๔๐๙๗

สำนักงานบริหารหนี้สาธารณะ
กระทรวงการคลัง
ถนนพระรามที่ 6 กทม. 10400

๒๒ ธันวาคม 2559

เรื่อง แจ้งผลการต่อทะเบียนที่ปรึกษาไทย

เรียน กรรมการบริหารบริษัท ทีม คอนซัลติ้ง เอนจิเนียริ่ง แอนด์ แมเนจเมนท์ จำกัด

อ้างถึง หนังสือบริษัท ทีม คอนซัลติ้ง เอนจิเนียริ่ง แอนด์ แมเนจเมนท์ จำกัด ที่ HC/100G/592946 ลงวันที่ 2 ธันวาคม 2559

ตามหนังสือที่อ้างถึง ได้แจ้งความประสงค์เพื่อขอต่อทะเบียนที่ปรึกษากับศูนย์ข้อมูลที่ปรึกษาไทย กระทรวงการคลัง นั้น

สำนักงานบริหารหนี้สาธารณะขอเรียนว่า ศูนย์ข้อมูลที่ปรึกษาไทย กระทรวงการคลัง ได้ต่อทะเบียนให้บริษัท ทีม คอนซัลติ้ง เอนจิเนียริ่ง แอนด์ แมเนจเมนท์ จำกัด เป็นที่ปรึกษาระดับ A หมายเลข 23 ให้บริการในฐานะที่ปรึกษาสาขาเกษตรและพัฒนาชนบท สาขาอุตสาหกรรมก่อสร้าง สาขาพลังงาน สาขาสิ่งแวดล้อม สาขาอุตสาหกรรม สาขาประชากร ด้านประชาสัมพันธ์ สาขาการท่องเที่ยว สาขาคมนาคมขนส่ง สาขาพัฒนาเมือง และสาขาการประปาและสุขาภิบาล เรียบร้อยแล้ว โดยมีผลตั้งแต่วันที่ 26 ธันวาคม 2559 ทั้งนี้ หากที่ปรึกษามีการเปลี่ยนแปลงข้อมูลบุคลากรที่ปรึกษา โปรดแจ้งให้สำนักงานบริหารหนี้สาธารณะทราบภายใน 30 วัน นับจากวันที่มีการเปลี่ยนแปลงข้อมูล เพื่อให้ข้อมูลที่ปรึกษาถูกต้องและเป็นปัจจุบัน

อนึ่ง เนื่องจากผลการต่อทะเบียนจะมีอายุ 2 ปี นับจากวันที่ 26 ธันวาคม 2559 ดังนั้น จึงขอได้โปรดดำเนินการต่อทะเบียนก่อนวันครบกำหนด 30 วัน เพื่อรักษาสถานภาพของการเป็นที่ปรึกษา

จึงเรียนมาเพื่อโปรดทราบ และใช้เป็นหลักฐานต่อไป

ขอแสดงความนับถือ

เอด วิบูลย์เจริญ

(นายเอด วิบูลย์เจริญ)
ที่ปรึกษาด้านหนี้สาธารณะ ปฏิบัติราชการแทน
ผู้อำนวยการสำนักงานบริหารหนี้สาธารณะ

ศูนย์ข้อมูลที่ปรึกษาไทยฯ
โทร. 0 2271 7999 ต่อ 5717
โทรสาร. 0 2357 3576
ติดต่อได้ที่ www.thaiconsult.pdmo.go.th

Certificate of Registration

This certificate has been awarded to

TEAM CONSTRUCTION MANAGEMENT CO., LTD.

151 Nuan Chan Road, Nuan Chan, Bueng Kum,
Bangkok 10230 Thailand

in recognition of the organization's Quality Management System which complies with

ISO 9001:2015

The scope of activities covered by this certificate is defined below

Construction Management Consultancy Service and Building Information Modelling

Certificate Number:	**Date of Issue: (Original)**	**Date of Issue:**
84790/A/0001/UK/En	04 December 2017	04 December 2017
Issue No:	**Expiry Date:**	
1	03 December 2020	

Issued by: *On behalf of the Schemes Manager*

UKAS MANAGEMENT SYSTEMS
0043

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ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ
အမျိုးသားစီမံကိန်းနှင့် စီးပွားရေးဖွံ့ဖြိုးတိုးတက်မှုဝန်ကြီးဌာန

ကုမ္ပဏီမှတ်ပုံတင်လက်မှတ်

အမှတ် ၁၀၀ အက်ဖ်စီ / ၂၀၁၂-၂၀၁၃

မြန်မာနိုင်ငံ ကုမ္ပဏီများ အက်ဥပဒေအရ တိုတယ်(လ်) ဘစ်စနက်(စ်) ဆလူးရှင်း ကုမ္ပဏီ လီမိတက် အား ပေးရန်တာဝန် ကန့်သတ်ထားသော လီမိတက် ကုမ္ပဏီအဖြစ် ၂၀၁၂ နှစ်၊ စက်တင်ဘာ လ၊ ၁၁ ရက်နေ့တွင် မှတ်ပုံတင်ခွင့်ပြုလိုက်သည်။

ညွှန်ကြားရေးမှူးချုပ်(ကိုယ်စား)
(နန်းရီရီသန်း၊ ညွှန်ကြားရေးမှူး)
ရင်းနှီးမြှုပ်နှံမှုနှင့်ကုမ္ပဏီများညွှန်ကြားမှုဦးစီးဌာန

THE GOVERNMENT OF THE REPUBLIC OF THE UNION OF MYANMAR
MINISTRY OF NATIONAL PLANNING AND ECONOMIC DEVELOPMENT

CERTIFICATE OF INCORPORATION

NO. 100 FC of 2012-2013

I hereby certify that TOTAL BUSINESS SOLUTION COMPANY LIMITED. is this day incorporated under the Myanmar Companies Act and that the company is Limited.

Given under my hand at Nay Pyi Taw this ELEVENTH day of SEPTEMBER, TWO THOUSAND AND TWELVE

FOR DIRECTOR GENERAL
(Nang Yi Yi Than, Director)
Directorate of Investment and Company Administration

ဤကုမ္ပဏီမှတ်ပုံတင် လက်မှတ်သည် (၁၁-၉-၁၂) မှ (၁၀-၉-၁၇) ရက်နေ့ အထိ (၅)နှစ် သက်တမ်းအတွက်သာ ဖြစ်သည်။ သက်တမ်း မကုန်ဆုံးမီ (၃)လအလိုတွင် သက်တမ်းတိုးရန် ရင်းနှီးမြှုပ်နှံမှုနှင့် ကုမ္ပဏီများညွှန်ကြားမှု ဦးစီးဌာနသို့ လျှောက်ထားရမည်။

ညွှန်ကြားရေးမှူးချုပ်(ကိုယ်စား)
(သီတာအောင်၊ဒုတိယညွှန်ကြားရေးမှူး)

ISSUDE DATE 19 DEC

REVISED DRAFT FINAL REPORT
ESIA FOR INITIAL PHASE POWER PLANT OF DAWEI SEZ

TABLE OF CONTENT

PAGE

LIST OF ABBREVIATION

CHAPTER 1 : EXECUTIVE SUMMARY

1.1 CONTEXT OF THE PROJECT 1-1
1.1.1 Project Background and Preparation 1-1
1.1.2 MOECAF's Comments on Scoping Report 1-2
1.1.3 Related Projects and Developments 1-2
1.1.4 Presentation of the Project Proponent and the EIA Consultant 1-2
1.2 OVERVIEW OF THE POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK 1-2
1.2.1 Corporate Environmental and Social Policies 1-2
1.2.2 Overview of Policy and Legal Framework in Myanmar 1-3
1.2.3 International Conventions, Treaties and Agreements 1-3
1.2.4 Myanmar Government Institutional Framework 1-3
1.2.5 International Policies, Guidelines, and Standards 1-4
1.3 PROJECT DESCRIPTION AND ALTERNATIVES 1-4
1.3.1 Presentation of the Project and Description of Alternatives 1-4
1.3.2 Comparison and Selection of the Project Alternatives 1-7
1.4 DESCRIPTION OF THE ENVIRONMENT 1-8
1.4.1 Setting the Study Limits 1-8
1.4.2 Physical Components 1-8
1.4.3 Biological Components 1-9
1.4.4 Socio-economic Components 1-9
1.4.5 Cultural Components 1-11
1.4.6 Vision Components 1-11
1.5 IMPACT ASSESSMENT METHODOLOGY AND APPROACH 1-11
1.5.1 Methodology 1-11
1.5.2 Impact Assessment during Pre-Construction and Construction Phases 1-13
1.5.3 Impact Assessment during Operational Phase 1-14
1.5.4 Impact Assessment during Decommissioning Phase 1-21

PAGE

CHAPTER 1 : EXECUTIVE SUMMARY (CONT'D)

1.5.5 Risk Assessment 1-23
1.5.5.1 Conceptual Framework 1-23
1.5.5.2 Environmental Risk Management-Construction Phase 1-23
1.5.5.3 Environmental Risk Management-Operational Phase 1-24
1.6 CUMULATIVE IMPACT ASSESSMENT 1-25
1.7 ENVIRONMENTAL MANAGEMENTN PLANS 1-27
1.7.1 Scope of Environmental Management Plans 1-27
1.7.2 Application of the Owner-EMPs 1-27
1.7.3 Project's EHS Policy and Commitments, and Legal Requirements 1-27
1.7.4 Summary of CEMP and Arrangements for the Implementation 1-28
1.7.5 Summary of OEMP and Arrangements for the Implementation 1-29
1.7.6 Implementation of Corporate Social Responsibility (CSR) 1-30
1.7.7 Implementation of Grievance Redress Mechanism 1-31
1.7.8 Summary of DEMP 1-31
1.7.9 Emergency Response Plan 1-31
1.8 PUBLIC CONSULTATION AND DISCLOSURE 1-34
1.8.1 Purposes of the Consultation during the Preparation of EIA Report 1-34
1.8.2 Methodology and Approach 1-34
1.8.2.1 Identification of Stakeholders and Group Affected by the Project 1-34
1.8.2.2 Methods of Consultations 1-35
1.8.2.3 Approach to the Public Meetings 1-35
1.8.3 Summary of Consultation Activities Undertaken 1-35
1.8.4 Summary of Main Comments Received from Stakeholders 1-38
1.8.5 Significant Impacts in the View of Stakeholders to be Addressed in the Mitigation Measures 1-39
1.8.6 How These Comments were taken in Account 1-39
1.8.7 Project Information Disclosure 1-39
1.8.8 Recommendations for Future Consultations 1-39
1.9 CONCLUSIONS AND RECOMMENDATIONS 1-40
1.9.1 Conclusions 1-40
1.9.2 Recommendations 1-41

PAGE

CHAPTER 2 : CONTEXT OF THE PROJECT

2.1 BACKGROUND ON PROJECT DEVELOPMENT AND THE EIA 2-1
2.1.1 Project Preparation 2-1
2.1.2 MOECAF's Comments on Scoping Report 2-1
2.2 CONTEXT OF THE PROJECT 2-2
2.2.1 Project Background 2-2
2.2.2 Status of Project Preparation 2-3
2.3 RELATED PROJECTS AND DEVELOPMENTS 2-3
2.4 PRESENTATION OF THE PROJECT PROPONENT AND THE EIA CONSULTANT 2-3
2.5 PRESENTATION OF THE ENVIRONMENTAL AND SOCIAL EXPERT 2-4
2.6 PROJECT DEVELOPER'S ENDORSEMENT OF THE EIA REPORT 2-7
2.6.1 Project Developer 2-7
2.6.2 The EIA Preparation Team 2-7
2.7 STRUCTURE OF THE EIA REPORT 2-7

CHAPTER 3 : OVERVIEW OF THE POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

3.1 CORPORATE ENVIRONMENTAL AND SOCIAL POLICIES 3-1
3.1.1 ISO 14001 Standard 3-1
3.1.2 OHSAS 18001 3-1
3.1.3 Project Management of Environmental and Social Impacts 3-2
3.2 POLICY AND LEGAL FRAMEWORK IN MYANMAR 3-2
3.2.1 Laws and Regulations Related to Environmental Protection and Social Impact Management 3-3
3.2.1.1 The National Environmental Policy (1994) 3-3
3.2.1.2 The Environmental Conservation Law (2012) 3-3
3.2.1.3 The Environmental Conservation Rules (2014) 3-4
3.2.1.4 Environmental Impact Assessment Procedure (2015) 3-5
3.2.1.5 Emission Quality Standards Guidelines (2015) 3-6
3.2.1.6 Basel Convention (1989) (Control of Transboundary Movements of Hazardous Wastes and their Disposal) 3-6
3.2.1.7 Protocol on Liability and Compensation for Damage Resulting from Transboundary Movements of Hazardous Wastes and Their Disposal (1989) 3-8

PAGE

CHAPTER 3 : OVERVIEW OF THE POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK (CONT'D)

3.2.1.8	The Myanmar Investment Law (2016)	3-9
3.2.1.9	Protection the Right of National Races Law (2015)	3-10
3.2.1.10	The Electricity Law (2014)	3-10
3.2.1.11	Factories Act (1951)	3-11
3.2.1.12	The Public Health Law (1972)	3-11
3.2.1.13	Prevention and Control of Communicable Disease Law (1995)	3-12
3.2.1.14	The Control of Smoking and Consumption of Tobacco Product Law (2006)	3-12
3.2.1.15	The Explosives Act (1887)	3-12
3.2.1.16	The Explosive Substances Act (1908)	3-13
3.2.1.17	The Myanmar Fire Force Law (2015)	3-13
3.2.1.18	The Motor Vehicle Law (2015) and Rules (1987)	3-13
3.2.1.19	The Myanmar Insurance Law (1993)	3-13
3.2.1.20	Labour Organization Law (2011)	3-14
3.2.1.21	The Settlement of Labour Disputes Law (2012)	3-14
3.2.1.22	Employment and Skill Development Law (2013)	3-15
3.2.1.23	The Minimum Wages Law (2013)	3-15
3.2.1.24	Payment of Wages Law (2016)	3-16
3.2.1.25	Workmen's Compensation Act (1923)	3-17
3.2.1.26	The Leave and Holiday Act (1951)	3-17
3.2.1.27	Social Security Law (2012)	3-17
3.2.1.28	Petroleum Act (1934)	3-18
3.2.1.29	The Petroleum Rules (1937)	3-18
3.2.1.30	Conservation of Water Resources and Rivers Law (2006)	3-19
3.2.1.31	Freshwater Fisheries Law (1991)	3-19
3.2.1.32	Myanmar Marine Fishery Law (1990)	3-19
3.2.1.33	The Protection and Preservation of Cultural Heritage Regions Law (1998)	3-19
3.2.1.34	The Protection and Preservation of Antique Objects Law (2015)	3-20
3.2.1.35	The Protection and Preservation of Ancient Monument Law (2015)	3-20
3.2.1.36	The Forest Law (1992)	3-20

PAGE

CHAPTER 3 : OVERVIEW OF THE POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK (CONT'D)

3.2.1.37 The Special Economic Zone Law (2014) 3-20
3.2.1.38 The Engineering Council Law (2013) 3-22
3.2.1.39 Myanmar Port Authority Law (2015) 3-22
3.2.1.40 The Export and Import Law (2012) 3-22
3.2.1.41 The Protection of Wildlife and Conservation of Natural Areas Law (1994) 3-22
3.2.1.42 Territorial Sea and Maritime Zones Law (1977) 3-22
3.2.1.43 Law Relating to the Fishing Rights of Foreign Fishing Vessels (1989) 3-23
3.2.1.44 Law Relating to Aquaculture (1989) 3-23
3.2.1.45 The Fishing Rights of Foreign Fishing Vessels (1989) 3-23
3.3 INTERNATIONAL CONVENTIONS, TREATIES AND AGREEMENTS 3-23
3.4 MYANMAR GOVERNMENT INSTITUTIONAL FRAMEWORK 3-24
3.4.1 Arrangement at the National and Sector Level 3-24
3.4.2 Arrangements at the Project Area 3-25
3.5 INTERNATIONAL POLICIES, GUIDELINES AND STANDARDS 3-29
3.5.1 IFC's Standards and Guidelines 3-29
3.5.2 World Bank's Pollution Prevention and Abatement Handbook 1998 Toward Cleaner Production 3-33
3.6 GUIDELINES AND STANDARDS APPLICABLE TO THIS PROJECT 3-33

CHAPTER 4 : PROJECT DESCRIPTION AND ALTERNATIVES

4.1 PRESENTATION OF THE PROJECT AND DESCRIPTION OF ALTERNATIVES 4-1
4.1.1 Project Description 4-1
4.1.2 Description of Project Alternatives 4-46
4.2 COMPARISON AND SELECTION OF THE PROJECT ALTERNATIVES 4-47
4.2.1 Fuel Alternatives 4-47
4.2.2 Alternatives for Cooling Water System 4-48
4.2.3 Alternatives for the Project Site 4-49

PAGE

CHAPTER 5 : DESCRIPTION OF THE ENVIRONMENT

5.1 SETTING THE STUDY LIMITS 5-1
5.1.1 Geographical Study Limit 5-1
5.1.2 Contextual Study Limit 5-1
5.1.3 Laboratory Test Limit 5-4
5.2 PHYSICAL COMPONENTS 5-4
5.2.1 Overview of the Study Area 5-4
5.2.2 Meteorology 5-6
5.2.3 Geography/Topography 5-14
5.2.4 Geology 5-17
5.2.5 Seismology 5-17
5.2.6 Soils 5-17
5.2.7 Hydrology 5-23
5.2.8 Oceanographic Condition 5-23
5.2.9 Erosion and Sedimentation 5-26
5.2.10 Air Quality 5-26
5.2.11 Noise and Vibration 5-31
5.2.12 Seawater Quality 5-33
5.2.13 Groundwater Quality 5-38
5.2.14 Sediment Quality 5-41
5.3 BIOLOGICAL COMPONENTS 5-44
5.3.1 Terrestrial Resource 5-44
5.3.2 Marine Ecology 5-58
5.3.3 Fisheries 5-77
5.4 SOCIO-ECONOMIC COMPONENTS 5-85
5.4.1 Studied Villages 5-85
5.4.1.1 Information Collection 5-85
5.4.1.2 Demography 5-87
5.4.1.3 Communities 5-87
5.4.1.4 Education 5-87
5.4.1.5 Vulnerable Groups 5-88
5.4.1.6 Minority Groups 5-88
5.4.1.7 Gender Situation 5-89
5.4.1.8 Religion 5-89

PAGE

CHAPTER 5 : DESCRIPTION OF THE ENVIRONMENT (CONT'D)

5.4.1.9 Political and Social Organizations 5-89
5.4.2 Economic Profile 5-89
5.4.2.1 Employment 5-89
5.4.2.2 Traditional Production System 5-91
5.4.2.3 Household Income and Expenditure 5-91
5.4.2.4 Land Ownership 5-93
5.4.2.5 Local Businesses 5-94
5.4.2.6 Agriculture 5-94
5.4.2.7 Forestry 5-94
5.4.2.8 Fisheries/Aquaculture 5-95
5.4.2.9 Industries 5-96
5.4.2.10 Mineral Development 5-96
5.4.2.11 Tourism 5-96
5.4.3 Health Profile 5-97
5.4.3.1 Access to Health Services 5-97
5.4.3.2 Access to Water Supply 5-97
5.4.3.3 Mortality and Morbidity 5-97
5.4.3.4 Nutrition Levels 5-98
5.4.3.5 Communicable Diseases 5-99
5.4.4 Infrastructure Facilities 5-99
5.4.4.1 Water Use and Water Supply 5-99
5.4.4.2 Hospital, Medical Clinic 5-99
5.4.4.3 School and Religious Facilities 5-99
5.4.4.4 Road Transportation 5-100
5.4.4.5 Navigation 5-106
5.4.4.6 Airport 5-106
5.4.4.7 Transmission Lines 5-106
5.4.4.8 Electricity 5-106
5.4.4.9 Pipelines 5-106
5.4.4.10 Energy Sources 5-106
5.4.4.11 Waste Management 5-106
5.4.5 Unexploded Ordinance (UXO) 5-106
5.4.6 Land Use 5-107

PAGE

CHAPTER 5 : DESCRIPTION OF THE ENVIRONMENT (CONT'D)

5.5 CULTURAL COMPONENTS 5-110
5.6 VISUAL COMPONENTS 5-110
5.6.1 Aesthetic 5-110
5.6.2 Point of Interests 5-110
5.6.3 Landscape 5-110

CHAPTER 6 : IMPACT AND RISK ASSESSMENT AND MITIGATION MEASURES

6.1 INTRODUCTION 6-1
6.2 IMPACT ASSESSMENT METHODOLOGY AND APPROACH 6-1
6.2.1 Scope of Assessment 6-1
6.2.2 The Conceptual Framework 6-1
6.2.3 Methodology for the Impact Assessment of Each Environmental Issue 6-5
6.3 PRE-CONSTRUCTION PHASE 6-10
6.3.1 Pre-Construction Activities 6-10
6.3.2 Relevant Environmental and Social Issues 6-10
6.3.3 Environmental Issues 6-11
6.3.3.1 Fugitive Dust 6-11
6.3.3.2 Gaseous Emissions 6-14
6.3.3.3 Noise 6-15
6.3.3.4 Site Clearing Wastes 6-19
6.3.3.5 Road Traffic 6-20
6.3.3.6 Impact on Archaeological Site 6-25
6.3.4 Social Issues 6-26
6.3.4.1 Loss of Britney Creek 6-26
6.3.4.2 Occupational Health and Safety 6-29
6.4 CONSTRUCTION PHASE 6-29
6.4.1 Construction Activities 6-29
6.4.2 Relevant Environmental and Social Issues 6-31
6.4.3 Environmental Issues 6-32
6.4.3.1 Fugitive Dust 6-32
6.4.3.2 Gaseous Emissions 6-35
6.4.3.3 Noise 6-37

PAGE

CHAPTER 6 : IMPACT AND RISK ASSESSMENT AND MITIGATION MEASURES (CONT'D)

6.4.3.4 Wastewaters 6-43
6.4.3.5 Construction Wastes 6-46
6.4.3.6 Road Traffic 6-52
6.4.3.7 Impact on Archaeological Site 6-55
6.4.4 Social Issues 6-56
6.4.4.1 Local Economy 6-56
6.4.4.2 Livelihood 6-57
6.4.4.3 Infrastructure and Services 6-62
6.4.5 Culture and Tradition 6-63
6.4.6 Community Health, Safety and Security 6-63
6.4.7 Stakeholders' Negative Attitudes toward the Project 6-65
6.5 OPERATIONAL PHASE 6-68
6.5.1 Nature of Project Operation 6-68
6.5.2 Relevant Environmental and Social Issues 6-69
6.5.3 Environmental Issues 6-70
6.5.3.1 Gaseous Emissions (NO_x) 6-70
6.5.3.2 Noise 6-109
6.5.3.3 Wastewaters 6-114
6.5.3.4 Cooling Water Intake 6-118
6.5.3.5 Thermal Discharge 6-120
6.5.4 Social Issues 6-125
6.5.4.1 Occupational Health and Safety 6-125
6.5.4.2 Community Health, Safety and Security 6-127
6.5.4.3 Community Development Supports and Corporate Social Responsibility (CSR) 6-129
6.5.4.4 Mangroves Management Program 6-130
6.6 DECOMMISSIONING PHASE 6-130
6.6.1 Decommissioning Activities 6-130
6.6.2 Relevant Environmental and Social Issues 6-131
6.6.3 Environmental Issues 6-131
6.6.3.1 Fugitive Dust 6-131
6.6.3.2 Gaseous Emissions 6-133
6.6.3.3 Noise 6-135

PAGE

CHAPTER 6 : IMPACT AND RISK ASSESSMENT AND MITIGATION MEASURES (CONT'D)

6.6.3.4 Decommissioning Wastes 6-136
6.6.3.5 Road Traffic 6-139
6.6.4 Social Issue 6-142
6.6.4.1 Occupational Health and Safety 6-142
6.7 RISK ASSESSMENT 6-143
6.7.1 Conceptual Framework 6-143
6.7.2 Environmental Risk Management-Construction Phase 6-147
6.7.3 Environmental Risk Management-Operational Phase 6-151
6.7.4 Environmental Risk during Decommissioning Phase 6-159

CHAPTER 7 : CUMULATIVE IMPACT ASSESSMENT

7.1 INTRODUCTION 7-1
7.2 METHODOLOGY AND APPROACH 7-1
7.2.1 Scope of the CIA 7-1
7.2.2 Air Quality Impact Assessment 7-2
7.3 CUMULATIVE IMPACTS ON AIR QUALITY 7-2
7.3.1 Case 1-35 m Stack Height for All New Power Plants 7-3
7.3.2 Case 2-70 m Stack Height for All New Power Plants 7-8

CHAPTER 8 : ENVIRONMENTAL MANAGEMENT PLANS

8.1 THE CONCEPTUAL FRAMEWORK 8-1
8.1.1 Scope of Environmental Management Plans 8-1
8.1.2 Application of the Owner-EMPs 8-2
8.1.3 Scope of Project Environmental Management 8-3
8.2 PROJECT'S EHS POLICY AND COMMITMENTS, AND LEGAL REQUIREMENTS 8-3
8.2.1 Owner's Policy 8-3
8.2.2 Legal Requirements 8-6
8.3 SUMMARY OF CEMP 8-8
8.3.1 Arrangements for the Implementation of Mitigation Measures 8-8
8.3.2 Monitoring, Evaluation and Reporting 8-8
8.3.3 Corrective Actions 8-9
8.3.4 Organization 8-10

PAGE

CHAPTER 8 : ENVIRONMENTAL MANAGEMENT PLANS (CONT'D)

8.3.5 Public Consultation and Disclosure 8-10
8.3.6 Audit 8-14
8.3.7 Responsible Agencies for Environmental Management Plan 8-14
8.3.8 Responsible Agencies for Environmental Monitoring Program 8-17
8.4 SUMMARY OF OEMP 8-20
8.4.1 Mitigation Measures and Plans 8-20
8.4.2 Environmental Management System (EMS) 8-20
8.4.3 Monitoring, Evaluating and Reporting 8-20
8.4.4 Corrective Actions 8-20
8.4.5 Organization 8-21
8.4.6 Public Consultation and Disclosure 8-21
8.4.7 Audit 8-22
8.4.8 Responsible Agencies for Environmental Management Plan 8-24
8.4.9 Responsible Agencies for Environmental Monitoring Program 8-25
8.5 SUMMARY OF DEMP 8-28
8.5.1 Mitigation Measures and Plans 8-28
8.5.2 Monitoring, Evaluating and Reporting 8-28
8.5.3 Corrective Actions and Organization 8-28
8.5.4 Public Consultation and Disclosure 8-28
8.5.5 Responsible Agencies for Mitigation and Monitoring during Decommissioning Phase 8-29
8.6 EMERGENCY RESPONSE PLAN 8-29
8.6.1 Emergency Procedures 8-30
8.6.2 Fire Fighting Plan 8-32
8.6.3 Contingency Plan 8-34
8.6.4 Accidental Plan 8-35
8.6.5 Evacuation Plan 8-36
8.6.6 Recovery Plan 8-36

PAGE

CHAPTER 9 : PUBLIC CONSULTATION AND DISCLOSURE

9.1 PURPOSES OF THE CONSULTATION DURING THE PREPARATION OF EIA REPORT 9-1

9.2 METHODOLOGY AND APPROACH 9-1

9.2.1 Identification of Stakeholders and Group Affected by the Project 9-1

9.2.2 Methods of Consultations 9-3

9.2.3 Approach to the Public Meetings 9-5

9.3 SUMMARY OF CONSULTATION ACTIVITIES UNDERTAKEN 9-5

9.4 SUMMARY OF MAIN COMMENTS RECEIVED FROM STAKEHOLDERS 9-10

9.4.1 The First Period of Consultation Meeting 9-10

9.4.2 The Second Period of Consultation Meeting 9-11

9.4.3 Significant Impacts in the View of Stakeholders to be Addressed in the Mitigation Measures 9-13

9.5 HOW THESE COMMENTS WERE TAKEN INTO ACCOUNT 9-15

9.6 PROJECT INFORMATION DISCLOSURE 9-15

9.7 THE THIRD PUBLIC CONSULTATION MEETING 9-18

9.8 RECOMMENDATIONS FOR FUTURE CONSULTATIONS 9-22

CHAPTER 10 : CONCLUSIONS AND RECOMMENDATIONS

10.1 CONCLUSIONS 10-1

10.2 RECOMMENDATIONS 10-2

APPENDICES

Appendix 2A Overall Plan for the Dawei SEZ Initial Phase Development

Appendix 2B Brief Information on EGCO and ITD

Appendix 2C Names of Members of the EIA Study TEAM

Appendix 2D Total Business Solution Company Certification

Appendix 3A Corporate Environmental and Social Policies of ITD and EGCO

Appendix 5A Results of Soil Quality

Appendix 5B Results of Air Quality

Appendix 5C Results of Noise Measurements

Appendix 5D Results of Seawater Quality

Appendix 5E Results of Groundwater Quality

Appendix 5F Results of Sediment Quality

APPENDICES (CONT'D)

Appendix 5G	Laboratory Certification
Appendix 5H	Questionnaires to Interview Key Informants and Villagers
Appendix 5I	Results of Traffic Counting
Appendix 6A	Calculation of Construction Material Quantity
Appendix 6B	Training Program
Appendix 6C	Types of Natural Gas Explosion
Appendix 6D	Risk Assessment during Operation Phase of the LNG Terminal Project
Appendix 9A	Name List of Participants Who Attended the Two Periods of Public Consultation Meetings
Appendix 9A-1	Name List of Villagers Who Attended the First Consultation Meeting in Mudu
Appendix 9A-2	Name List of Villagers Who Attended the First Consultation Meeting in Nyaung Bin Seik
Appendix 9A-3	Name List of Villagers Who Attended the First Consultation Meeting in Nga Pitat
Appendix 9A-4	Name List of Government Officials Who Attended the Second Consultation Meeting at ITD Meeting Hall
Appendix 9A-5	Name List of Villagers Who Attended the Second Consultation Meeting in Nga Pitat
Appendix 9A-6	Name List of Villagers Who Attended the Second Consultation Meeting in Nyaung Bin Seik
Appendix 9A-7	Name List of Villagers Who Attended the Second Consultation Meeting in Mudu
Appendix 9B	Minutes of Meeting of Each Consultation Meeting
Appendix 9B-1	The First Period of Consultation Meeting
Appendix 9B-2	The Second Period of Consultation Meeting
Appendix 9C	Project Information Posted on the Website
Appendix 9D	Slides and Handouts of the Two Periods of Meeting
Appendix 9D-1	Slides and Handouts of the First Consultation Meeting
Appendix 9D-2	Slides and Handouts of the Second Consultation Meeting
Appendix 9E	Name List of Participants Who Attended the Third Consultation Meeting
Appendix 9F	Minute of Meeting during the Third Public Consultation Meeting (by Project)
Appendix 9F-1	Slides and Handouts of the Third Consultation Meeting
Appendix 9F-2	The Resettlement and Compensation Steps
Appendix 9G	Minute of Meeting during the Third Public Consultation Meeting (by Overall)

LIST OF FIGURES

FIGURE **PAGE**

1.7-1 Grievance Management Process during Construction Phase 1-32
1.7-2 Grievance Management Process during Operation Phase 1-33

2.5-1 Organizational Structure of the EIA Study Team 2-6

3.4-1 Organizational Structure of State and Region Government 3-26
3.4-2 Organizational Structure of Dawei Special Economic Zone (DSEZ).......... 3-27

4.1-1 Location of Proposed Project Site 4-2
4.1-2 Layout DSEZ Area 4-3
4.1-3 Project Location 4-7
4.1-4 Intake and Outfall Pipeline Laying 4-11
4.1-5 Tentative Layout of the Intake and Outfall Pipes 4-13
4.1-6 Tentative Project Implementation Schedule 4-15
4.1-7 Preliminary Energy Balance Diagram for the Project 4-25
4.1-8 Plot Plan 4-33
4.1-9 Preliminary Water Balance Diagram of the Project 4-35
4.1-10 Preliminary Organization Chart 4-36

5.1-1 Project Study Area of ESIA for Initial Power Plant Project 5-2
5.2-1 Districts and Townships of Tanintharyi Region 5-5
5.2-2 Monsoon Wind Direction Passing Through Myanmar 5-9
5.2-3 Wind Speed and Wind Direction Measurement Stations for Project Study 5-11
5.2-4 Wind Rose from Wind Speed and Wind Direction Measurement of the Project 5-13
5.2-5 Topographic Condition of the Proposed Project Site 5-16
5.2-6 Geological Map of Tanintharyi Region 5-18
5.2-7 Seismic Hazard Map of Tanintharyi Region 5-19
5.2-8 Soil Map in Tanntharyi Region 5-20
5.2-9 Soil Sampling Station for Project Study 5-22
5.2-10 Locations of Deployed Tide Gauges 5-24
5.2-11 Bathymetry of Andaman Sea near Proposed Project Site 5-25

FIGURE **PAGE**

5.2-12 Air Quality and Noise Measurement Stations for Project Study 5-30

5.2-13 Location of Seawater and Marine Ecology Sampling 5-34

5.2-14 Location of Groundwater Sampling.. 5-39

5.3-1 Study Area and Sampling Plots on Power Plant Project Area.................... 5-45

5.3-2 Study Area and Sampling Plots within 5 m Radius of Power Plant Area... 5-46

5.3-3 Location of Four Islands with Confirmed Existence of Coral Reefs.......... 5-72

5.3-4 Nesting Area of Leatherback Turtle at Nga Pitat Beach............................ 5-74

5.3-5 Locations of Seagrass Areas 5-76

5.3-6 Fishing Ground of Fishermen from Nga Pitat, Sakhanthit and Pan Din In Village... 5-78

5.4-1 Project Location and Project Affected Villages... 5-86

5.4-2 Location of Traffic Counting Station.. 5-101

5.4-3 Existing Land Use within Project Study Area 5-109

6.2-1 Impact Analysis Logic 6-2

6.2-2 Mitigation Measure Concept... 6-4

6.2-3 Environmental Risk Management Logic 6-5

6.2-4 Methodology for the Impact Assessment of Each Environmental Issue 6-7

6.3-1 Alternative Dockyard.. 6-28

6.4-1 Noise Levels of Various Piling Methods 6-41

6.4-2 The Proposed Area for Mangrove Rehabilitation...................................... 6-60

6.5-1 Isoplete of 1-Hour Average Concentration of NO_2 (Phase 1 (GEPP#1))... 6-82

6.5-2 Isoplete of 24-Hour Average Concentration of NO_2 (Phase 1 (GEPP#1)) 6-83

6.5-3 Isoplete of Annual Average Concentration of NO_2 (Phase 1 (GEPP#1))... 6-84

6.5-4 Isoplete of 1-Hour Average Concentration of NO_2 (Phase 2 (GEPP#1, HRSG1, HRSG2))... 6-85

6.5-5 Isoplete of 24-Hour Average Concentration of NO_2 (Phase 2 (GEPP#1, HRSG1, HRSG2))... 6-86

6.5-6 Isoplete of Annual Average Concentration of NO_2 (Phase 2 (GEPP#1, HRSG1, HRSG2))... 6-87

6.5-7 Isoplete of 1-Hour Average Concentration of NO_2 (Phase 3 (GEPP#1, HRSG1, HRSG2, GEPP#2)).. 6-88

6.5-8 Isoplete of 24-Hour Average Concentration of NO_2 (Phase 3 (GEPP#1, HRSG1, HRSG2, GEPP#2)).. 6-89

FIGURE **PAGE**

6.5-9 Isoplete of Annual Average Concentration of NO_2 (Phase 3 (GEPP#1, HRSG1, HRSG2, GEPP#2)) 6-90

6.5-10 Isoplete of 1-Hour Average Concentration of NO_2 (Phase 4 (GEPP#1, HRSG1, HRSG2, GEPP#2, HRSG3, HRSG4)) 6-91

6.5-11 Isoplete of 24-Hour Average Concentration of NO_2 (Phase 4 (GEPP#1, HRSG1, HRSG2, GEPP#2, HRSG3, HRSG4)) 6-92

6.5-12 Isoplete of Annual Average Concentration of NO_2 (Phase 4 (GEPP#1, HRSG1, HRSG2, GEPP#2, HRSG3, HRSG4)) 6-93

6.5-13 Isoplete of 1-Hour Average Concentration of NO_2 (Phase 5 (GEPP#1, HRSG1, HRSG2, GEPP#2, HRSG3, HRSG4, HRSG5)) 6-94

6.5-14 Isoplete of 24-Hour Average Concentration of NO_2 (Phase 5 (GEPP#1, HRSG1, HRSG2, GEPP#2, HRSG3, HRSG4, HRSG5)) 6-95

6.5-15 Isoplete of Annual Average Concentration of NO_2 (Phase 5 (GEPP#1, HRSG1, HRSG2, GEPP#2, HRSG3, HRSG4, HRSG5)) 6-96

6.5-16 Isoplete of 1-Hour Average Concentration of NO_2 (Phase 2 (GEPP#1, HRSG1_BYPASS, HRSG2_BYPASS)) 6-97

6.5-17 Isoplete of 24-Hour Average Concentration of NO_2 (Phase 2 (GEPP#1, HRSG1_BYPASS, HRSG2_BYPASS)) 6-98

6.5-18 Isoplete of Annual Average Concentration of NO_2 (Phase 2 (GEPP#1, HRSG1_BYPASS, HRSG2_BYPASS)) 6-99

6.5-19 Isoplete of 1-Hour Average Concentration of NO_2 (Phase 3 (GEPP#1, HRSG1_BYPASS, HRSG2_BYPASS, GEPP#2)) 6-100

6.5-20 Isoplete of 24-Hour Average Concentration of NO_2 (Phase 3 (GEPP#1, HRSG1_BYPASS, HRSG2_BYPASS, GEPP#2)) 6-101

6.5-21 Isoplete of Annual Average Concentration of NO_2 (Phase 3 (GEPP#1, HRSG1_BYPASS, HRSG2_BYPASS, GEPP#2)) 6-102

6.5-22 Isoplete of 1-Hour Average Concentration of NO_2 (Phase 4 (GEPP#1, HRSG1_BYPASS, HRSG2_BYPASS, GEPP#2, HRSG3_BYPASS, HRSG4_BYPASS)) 6-103

6.5-23 Isoplete of 24-Hour Average Concentration of NO_2 (Phase 4 (GEPP#1, HRSG1_BYPASS, HRSG2_BYPASS, GEPP#2, HRSG3_BYPASS, HRSG4_BYPASS)) 6-104

6.5-24 Isoplete of Annual Average Concentration of NO_2 (Phase 4 (GEPP#1, HRSG1_BYPASS, HRSG2_BYPASS, GEPP#2, HRSG3_BYPASS, HRSG4_BYPASS)) 6-105

6.5-25 Isoplete of 1-Hour Average Concentration of NO_2 Phase 5 (GEPP#1, HRSG1_BYPASS, HRSG2_BYPASS, GEPP#2, HRSG3_BYPASS, HRSG4_BYPASS, HRSG5_BYPASS)) 6-106

6.5-26 Isoplete of 24-Hour Average Concentration of NO_2 Phase 5 (GEPP#1, HRSG1_BYPASS, HRSG2_BYPASS, GEPP#2, HRSG3_BYPASS, HRSG4_BYPASS, HRSG5_BYPASS)) 6-107

FIGURE **PAGE**

6.5-27 Isoplete of Annual Average Concentration of NO_2 Phase 5 (GEPP#1, HRSG1_BYPASS, HRSG2_BYPASS, GEPP#2, HRSG3_BYPASS, HRSG4_BYPASS, HRSG5_BYPASS)) 6-108

6.5-28 Preliminary Water Balance Diagram of the Project 6-115

6.5-29 Schematic Categarization of Plume Geometry According to Physical Processes 6-121

6.5-30 Thermal Plume at Spring Tide 6-122

6.5-31 Thermal Plume at Neap Tide 6-123

6.5-32 Thermal Plume at Mean Tide 6-124

6.7-1 Simple Risk Matrix 6-145

6.7-2 Risk Matrix for the Construction Phase 6-148

6.7-3 Risk Classification Matrix-Operation Phase 6-156

7.3-1 Isoplete of 1-Hour Average Concentration of NO_2 for Case I: Cumulative Power Demand in Year 2045 7-4

7.3-2 Isoplete of 24-Hour Average Concentration if NO_2 for Case I: Cumulative Power Demand in Year 2045 7-5

7.3-3 Isoplete of Annual Average Concentration of NO_2 for Case I: Cumulative Power Demand in Year 2045 7-6

7.3-4 Isoplete of 1-Hour Average Concentration of NO_2 for Case II: Cumulative Power Demand in Year 2045 7-10

7.3-5 Isoplete of 24-Hour Average Concentration of NO_2 for Case II: Cumulative Power Demand in Year 2045 7-11

7.3-6 Isoplete of Annual Average Concentration of NO_2 for Case II: Cumulative Power Demand in Year 2045 7-12

8.1-1 Application of the EIA-EMP 8-3

8.1-2 PDCA Cycle for Environmental Management 8-3

8.3-1 Organization for Project Construction 8-11

8.3-2 Grievance Management Process 8-13

8.4-1 Tentative Organization for Power Plant O&M and Environmental Management 8-21

8.4-2 Grievance Redress Process 8-23

9.2-1 Villages and Community in the Study Area 9-4

LIST OF TABLE

TABLE		PAGE
1.5-1	Levels of Impact of the Issue in Environment Management	1-12
1.5-2	Impact of Environmental Issues in the Pre- Construction and Construction Phases	1-15
1.5-3	Impact of Environmental and Social Issues in the Operation Phase	1-19
1.5-4	Impact of Environmental and Social Issues in the Decommissioning Phase	1-22
1.6-1	Predicted Cumulative Maximum NO_2 Concentrations in Ambient Air for Cumulative Power Demand in Year 2045	1-26
1.7-1	Content of the EIA Procedure Relevant to the EMPs	1-28
1.8-1	The First Period of Consultation Meetings with the Project's Stakeholders	1-36
1.8-2	The Second Period of Consultation Meetings with the Project's Stakeholders	1-37
3.3-1	Relevant International Treaties Signed by Myanmar	3-24
3.4-1	Roles and Responsibilities of Relevant Departments Functioning in DSEZ	3-28
3.6-1	International Ambient Environmental Quality Standards	3-34
3.6-2	National Emission Standards	3-35
3.6-3	National Effluent Standards	3-36
3.6-4	Emission Standards for Natural Gas Fueled Power Plant	3-36
4.1-1	Summary of Salient Features of Major Project Facilities	4-8
4.1-2	Property Specifications for LNG	4-24
4.1-3	Estimated Water Requirements	4-34
4.1-4	Performance Target for Emission Control	4-37
4.2-1	Comparison of Coal-Fired and Gas-Fired Power Plant Alternatives	4-47
4.2-2	Comparison of Three Alternatives for Cooling Water Systems	4-48
5.2-1	Villages in the Study Area	5-6
5.2-2	Average Rainfall at Dawei Station	5-7
5.2-3	Climatic Data for the Period 2013-2014 in DSEZ	5-8
5.2-4	Results of Wind Speed and Direction Measurements	5-12
5.2-5	Analytical Result of Soil Sampling within Project Study Area	5-21

TABLE **PAGE**

5.2-6 The Data of Monthly Water Level in Small Port Area in Year 2013 and 2014 (January-September) ... 5-26

5.2-7 Results of the Air Quality Measurements (Dry Season) ... 5-28

5.2-8 Results of the Air Quality Measurements (Wet Season) ... 5-28

5.2-9 Noise Level Measurement at 2 Sampling Stations during January 21-24, 2015 (Dry Season) ... 5-32

5.2-10 Noise Level Measurement at 2 Sampling Stations during October 7-10, 2015 (Wet Season) ... 5-32

5.2-11 Results of Seawater Quality Sampling, 21 January 2015 ... 5-36

5.2-12 Results of Seawater Quality Sampling, 7-8 October 2015 ... 5-37

5.2-13 Results of Groundwater Quality Analysis at each Station ... 5-40

5.2-14 Results of Sediment Quality Analysis at each Station, 21 January 2015 ... 5-42

5.2-15 Results of Sediment Quality Analysis at each Station, 7-8 October 2015 .. 5-43

5.3-1 Results of Plankton Samplings and Analysis (January, 2015) ... 5-61

5.3-2 Results of Fish Larvae Samplings and Analysis (January, 2015) ... 5-63

5.3-3 Results of Benthos Sampling and Analysis (January, 2015) ... 5-64

5.3-4 Results of Plankton Samplings and Analysis (October, 2015) ... 5-66

5.3-5 Results of Fish Larvae Samplings and Analysis (October, 2015) ... 5-69

5.3-6 Results of Benthos Sampling and Analysis (October, 2015) ... 5-70

5.3-7 Distribution of Coral Reef of Islands around Proposed Power Plant Project ... 5-71

5.3-8 List of Species Observed in this Study (January 2015) ... 5-79

5.4-1 Distribution of Sample Size for the Socio-Economic Survey in 3 Villages ... 5-85

5.4-2 Population in the Project Study Area ... 5-87

5.4-3 Education Level of Villagers in the Project Study Area ... 5-88

5.4-4 Identified Vulnerable Group in the Project Study Area ... 5-88

5.4-5 Household Occupation by Village in the Project Study Area ... 5-90

5.4-6 Employment Rate in the Project Study Area ... 5-90

5.4-7 Average Annual Household Income and Expenditure in Year 2014 ... 5-91

5.4-8 Major Sources of Income and Expenditure in Year 2014 ... 5-92

5.4-9 Village Area and Land Holding ... 5-93

5.4-10 Livestock Raising ... 5-94

5.4-11 Five Leading Causes of Morbidity/Mortality in Launglon and Yebyu Township ... 5-98

5.4-12 Nutrition Information in Launglon and Yebyu Township ... 5-98

TABLE **PAGE**

5.4-13 Number of Schools and Religious Facilities 5-99
5.4-14 Passenger Car Equivalent Factor of Each Vehicle 5-103
5.4-15 Traffic Carrying Capacity and Highway Types 5-104
5.4-16 Range of V/C Ratio for Traffic Condition Classification 5-104
5.4-17 Existing Traffic Condition within Project Study Area 5-105
5.4-18 Land Use Types in the Study Area 5-107

6.2-1 Levels of Impact of the Issue in Environment Management 6-8
6.3-1 Identified Environmental and Social Issues to be Managed during Pre-Construction Work 6-11
6.3-2 Calculations of Ambient Noise Levels at the Receptor 6-17
6.3-3 Types and Areas of Land Use in Project Site 6-19
6.3-4 Estimates of Biomass Generated by Land Clearing 6-19
6.3-5 Impacts of Transport of Construction Materials on Existing Traffic 6-22
6.4-1 Identified Environmental and Social Issues to be managed during Construction Phase 6-31
6.4-2 Noise Levels of Construction Equipment Related to the Project 6-38
6.4-3 Calculations of Ambient Noise Levels at the Receptor 6-42
6.4-4 Amount of Construction Wastes for Non-residential Buildings 6-47
6.4-5 Impacts of Transport of Construction Materials on Existing Traffic 6-54
6.5-1 Identified Environmental and Social Issues to be Managed during Operation Phase 6-70
6.5-2 Receptors within 10 Km × 10 Km Square Area with the Power Plant Site at Its Center 6-71
6.5-3 Emission Standards for Natural Gas Fired Combustion Turbine 6-72
6.5-4 Ambient Air Quality Standard 6-72
6.5-5 Emission Data of Gas Engines and Gas Turbine Stacks Used in Air Quality Modeling 6-75
6.5-6 Emission Data of Gas Turbine bypass Stacks Used in Air Quality Modeling 6-76
6.5-7 Summary of Air Quality Modeling Results Under Normal Operation Condition 6-78
6.5-8 Summary of Air Quality Modeling Results Under Emergency Operation Condition 6-79
6.5-9 Overall Summary of NO_2 Predictions-Phases 1 to 5 6-80
6.5-10 Estimation of Greenhouse Gas Emission during Operation 6-81

TABLE **PAGE**

6.5-11 Noise Levels of Equipment and Facilities of Power Plants 6-110

6.5-12 Calculations of Noise Levels at the Receptor 6-113

6.5-13 Estimates of Wastewater Volume 6-114

6.5-14 Density of Marine Organisms in Station SW1 6-119

6.6-1 Identified Environmental and Social Issues to be managed during Decommissioning Phase 6-131

6.7-1 Mitigation Measures for Environmental Risk Management during Construction Phase 6-149

7.2-1 Required Power Supply Capacity for DSEZ 7-2

7.3-1 Predicted Cumulative Maximum NO_2 Concentration in Ambient Air for Power Demand in Year 2045-Case 1 7-3

7.3-2 Predicted Cumulative Maximum NO_2 Concentration in Ambient Air for Power Demand in Year 2045-Case 2 7-8

8.2-1 Content of the EIA Procedure Relevant to the EMPs 8-7

8.3-1 Anticipated Impacts at Various Months of the Construction 8-9

8.3-2 Budget Estimate for Mitigation Measures during Six Years of Construction Phase 8-16

8.3-3 Budget Estimate for Environmental Monitoring during Six Years of Construction Phase 8-19

8.4-1 Budget Estimate for Mitigation Measures during 30 Years of Operation Phase 8-26

8.4-2 Budget Estimate for Environmental Monitoring during 30 Years of Operation Phase 8-27

9.2-1 Villages and Community in the Study Area 9-3

9.3-1 The First Period of Consultation Meetings with the Project's Stakeholders 9-6

9.3-2 The Second Period of Consultation Meetings with the Project's Stakeholders 9-7

9.4-1 Significant Impacts in the View of Stakeholders and Mitigation Measures 9-13

9.7-1 The Third Public Consultation Meeting with the Project's Stakeholders 9-18

9.7-2 Questions and Answers from the Third Consultation Meeting 9-19

LIST OF PHOTOS

PHOTO **PAGE**

4.1-1 Existing Proposed Power Plant Site....4-4

4.1-2 Nga Pitat Village....4-4

4.1-3 Pa Yain Byu Reservoir....4-4

5.2-1 Wind Speed and Wind Direction Station....5-14

5.2-2 Landforms in the Study Area....5-15

5.2-3 Air Quality and Noise Measurement Station within 5 Km Radius of Power Plant....5-29

5.2-4 Seawater Sampling Activities....5-35

5.2-5 Groundwater Sampling Activities at each Station....5-38

5.2-6 Collection of Sediment in the Study Area....5-41

5.3-1 The Existing Forestry within the Power Plant Site and Area 5 Km Radius of Power Plant Site....5-47

5.3-2 Plant Species within Power Plant Site....5-49

5.3-3 Plant Species within Area 5 Km Radius of Power Plant Site....5-51

5.3-4 Least Concern Species within Power Plant Site and Vulnerable Species in 5 Km Radius of Power Plant Site (IUCN, 2013)....5-53

5.3-5 Wildlife Species within the Power Plant Site and Area 5 Km Radius of Power Plant Site....5-55

5.3-6 Marine Ecological Sampling Activities....5-59

5.3-7 Nga Pitat Beach (399300E 1569824N, WGS Zone 84)....5-75

5.3-8 Fishery Related Activities....5-82

5.3-9 Economic Species....5-83

5.4-1 Mangroves Resources in the Study Area....5-95

5.4-2 Mooring Area and Shipyard in Mangroves Forest....5-95

5.4-3 Fishing in the Sea and Along Sea Shore....5-96

5.4-4 Views at Nabule Beach....5-96

5.4-5 Views at Muangmagan Beach....5-97

5.4-6 Traffic Counting and Existing Condition of Road within Project Study Area....5-102

5.4-7 Typical Scenes of Land Use in the Study Area....5-108

5.6-1 Overview Visual Components in the Project Area....5-110

PHOTO **PAGE**

9.3-1 The First Consultation Meetings with Concerned Agencies and the Locals 9-8

9.3-2 The Second Consultation Meetings with Concerned Agencies, the Locals and NGO 9-9

9.6-1 Disclosure of the Project Information and Invitation to the First Meeting in Three Villages 9-15

9.6-2 Disclosure of the Project Information and Invitation to the Second Meeting in Three Villages 9-16

9.7-1 The Third Public Consultation Meeting with Concerned Agencies, the Locals and NGO 9-20

LIST OF ABBREVIATION

AERMOD	Atmospheric Dispersion Modeling
AGA	American Gas Association
AQMs	Air Quality Management System
AQQS	Ambient Air Quality Standards
ARI	Acute Respiratory Illness
ASME	American Society of Mechanical Engineers
ASMS	Ambient Air Quality Monitoring Stations
ASTM	American Society of Testing Materials
BAT	Best Available Techniques
BFPs	Boiler Feed Pumps
BLEVE	Boiling Liquid Expanding Vapor Explosion
BOD	Biochemical Oxygen Demand
BOD5	Biochemical Oxygen Demand in Five Days
Btu	British thermal unit
CERMP	Construction Environmental Risk Management Plan
CCGT	Combined Cycle Gas Turbines
CDL	Construction, Demolition, and Land-Clearing
CEMP	Construction EMP
CEMs	Continuous Emissions Monitoring System
CGM	Complaints and Grievance Mechanism
CIA	Cumulative Impact Assessment
CO	Carbon Monoxide
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
COD	Chemical Oxygen Demand
CPC	Community Participatory Committee
CSR	Corporate Social Responsibility
DA	Degraded Airshed
DBH	Diameter at Breast Height
DDA	Dawei Development Association
DEM	Digital Elevation Model
DEMP	Decommissioning EMP

DLN	Dry Low Nitrogen Oxides
DO	Dissolved Oxygen
DOEP	Department of Electric Power
DOH	Department of Highways
DPC	Dawei Power Company Limited
DSEZ	Dawei Special Economic Zone
DSEZMC	DSEZ Management Committee
ECC	Environmental Compliance Certificate
ECD	Environmental Conservation Department
EGAT	Electricity Generating Authority of Thailand
EGCO	Electricity Generating Public Company Limited
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMS	Social Management System
EPC	Engineering Procurement Construction
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
EMS	Environmental Management System
ENCC	Environmental Conservation Committee
EPA	Environmental Protection Agency
EPC	Engineering, Procurement and Construction
ERA	Environmental Risk Assessment
ERMP	Environmental Risk Management Plan
ESHS	Environmental, Social, Health and Safety
ESMS	Environmental and Social Management System
GBH	Girth at Breast Height
GE	Gas Engine
GHGS	Greenhouse Gases
GIIP	Good International Industry Practice
GLC	Ground Level Concentrations
GSUT	Generator Step-up Transformer
GT	Gas Turbine
GWP	Global Warming Potential
HAZOP	Hazard and Operability Study
HRSG	Heat Recovery Steam Generators

IEE	Environmental Examination
IFC	International Finance Corporation
IMDC	International Marine and Dredging Consultants
ITD	Italian Thai Development Public Company Limited
LC	Least Concern Species
LNG	Liquefied Natural Gas
LNHE	Laboratoire National d'Hydraulique et Environnement
LTSA	Long Term Service Agreement
MER	Monitoring, evaluating, and reporting
MGRMP	Mangrove Resource Management Program
MIE	Myandawei Industrial Estate Company Limited
MMBtu	Million British thermal unit
MMC	Modern Methods of Construction
MMSCDF	Million Standard Cubic Feet per Day
MMSCF	Million Standard Cubic Feet
MOECAF	Ministry of Environmental Conservation and Forestry
MONREC	Ministry of Natural Resources and Environmental Conservation
Mt	Metric ton
NDA	Non-Degraded Airshed
NFPA	National Fire Protection Association
NOAA	National Oceanic and Atmospheric Administration
NO_x	Nitrogen Oxide
NT	Near Threatened Species
PCE	Passenger Car Equivalents
PCU	Passenger Car Unit
PDCA	Plan-Do-Check-Act
PPAH	Pollution Prevention and Abatement Handbook
PPP	Public - Private Participation
PRMP	Project Risk Management Plan
PS	Performance Standards
OEM	Original Equipment Manufacturer
OEMP	Operation EMP
OHS	Occupational Health and Safety
O&M	Operation and Maintenance
R.O.W.	Right-of-Way

SCR	Selective Catalytic Reduction
SO_x	Sulfur Oxide
SRTM	Shuttle Radar Topographic Mission
STG	Steam Turbine Generator
STP	Standard Pressure Temperature
SWB	Supporting Working Body
SWOP	Safe Worker Observation Program
TB	Tuberculosis
TBS	Total Business Solution
TC	Traffic Counting
TDS	Total Dissolved Solid
TOR	Terms of Reference
TSP	Total Suspended Particle
UMD	Upper Meteorological Data
V/C	Volume Capacity Ratio
VECs	Valued Environmental Components
VH	Viral Hepatitis
WHO	World Health Organization

အခန်း (၁)

အစီရင်ခံစာ အကျဉ်းချုပ်

၁.၁ စီမံကိန်း အစီအစဉ်

၁.၁.၁ စီမံကိန်းနောက်ခံနှင့်ပြင်ဆင်မှုများ

လျှပ်စစ်ဓါတ်အား ပေးစီမံကိန်း အစဦးကဏ္ဍအတွက် ပတ်ဝန်းကျင်နှင့်လူမှုဆိုင်ရာထိခိုက်မှုဆန်းစစ်ခြင်း (ESIA) ပြုလုပ်ခြင်း၏ အဓိကရည်ရွယ်ချက်များမှာ စီမံကိန်းဆောင်ရွက်လည်ပတ်စဉ်ကာလအတွင်း သဘာဝ ပတ်ဝန်းကျင်နှင့် လူမှုဆိုင်ရာ စီမံခန့်ခွဲခြင်းများအတွက် ခိုင်မြဲသော အခြေခံကျစေရန်ဖြစ်ပါသည်။

ဤစီမံကိန်းသည် ထားဝယ်အထူးစီးပွားရေးဇုန် တွင် ဓါတ်ငွေ့ လည်ပတ်စက် နှင့် သဘာဝဓါတ်ငွေ့ ရည်စက်ရုံ ပေါင်းစပ်လည်ပတ်ခြင်းဖြင့် လျှပ်စစ်ဓါတ်အားထုတ်လုပ်ခြင်း တို့ အပြင် ၎င်းနှင့် ဆက်စပ်လျှက် ရှိသော စက်ပစ္စည်းများကို တပ်ဆင်သွားပါမည်။ စီမံကိန်းသည် စုစုပေါင်း ၄၂၀ မဂ္ဂါဝပ် စွမ်းရည်ရှိသော လည်ပတ်နိုင်စွမ်း အဆင့်ဆင့်ရရှိရန်အတွက် အပိုင်းများခွဲ၍ တပ်ဆင်ဆောင်ရွက်သွားမည် ဖြစ်သည်။ ၎င်း၏ ရည်ရွယ်ချက် ရေးဆွဲထားသော အစဦးကဏ္ဍ ဖွံ့ဖြိုးတိုးတက်ရေး တွင် အခြေခံဖွံ့ဖြိုးတိုးတက်မှု၏ အဓိက အဆုံးအဖြတ်ပေးနိုင်သော အစိတ်အပိုင်း တစ်ခုဖြစ်လာမည်။ ထားဝယ်အထူးစီးပွားရေးဇုန်သည် မြန်မာ့လျှပ်စစ်ဓာတ်အားဝန်ကြီးဌာန၏ နိုင်ငံတော်ဖြန့်ဝေရေးလိုင်းကြောင်းမှ ပံ့ပိုးမှုအစီအစဉ်အတွင်းပါဝင်မှုမရှိသောကြောင့် ထားဝယ်အထူးစီးပွားရေးဇုန်အတွင်း အခြေခံအဆောက်အဦဖွံ့ဖြိုး တိုးတက်မှုအတွက် အကျပ်အတည်းဖြစ်နိုင်သော အစိတ်အပိုင်းတစ်ခုဖြစ်သည်။

သစ်တောရေးရာနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနမှ ထုတ်ပြန်သော ၂၀၁၃ခုနှစ် သဘာဝ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေများနှင့် ၂၀၁၄ခုနှစ် သဘာဝပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှု လေ့လာဆန်းစစ် ခြင်းနည်းလမ်းများအရ ၅၀မဂ္ဂါဝပ်ထက်ပိုလွန်သော လျှပ်စစ်ဓာတ်အားပေးစက်ရုံအတွက် လုပ်ငန်းတည်ဆောက် ခွင့် ပြုချက်မရမီ ၎င်း၏သဘာဝပတ်ဝန်းကျင် ထိခိုက်သက်ရောက်မှုလေ့လာဆန်းစစ်ခြင်း အစီရင်ခံစာ (EIA) ကို ပြင် ဆင်ရန် လိုအပ်သဖြင့် ထားဝယ်လျှပ်စစ်ဓာတ်အားဖြန့်ဝေရေး ကုမ္ပဏီ (DPE) သည် TEAM Consulting Engineering and Management ကုမ္ပဏီနှင့် Total Business Solution (TBS) တို့မှအကြံပေးအဖွဲ့ဝင်များ ပူးပေါင်း၍ သဘာဝ ပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှု လေ့လာခြင်းပြုလုပ်၍ ယခုအစီရင်ခံထားရှိအပ်ပါသည်။

စီမံကိန်းအကောင်အထည်ဖော်သူ၏ ကတိကဝတ်ပြုမှုများမှာ -

- စီမံကိန်းအစီရင်ခံစာ၏ စီမံကိန်းဖော်ပြချက် (အခန်း ၂) တွင် ဖော်ပြထားသော သဘောတူညီချက်များကို လိုက်နာစောင့်ထိန်းရန်
- သဘာဝပတ်ဝန်းကျင် ထိခိုက်သက်ရောက်မှု ထိန်းသိမ်းကွပ်ကဲခြင်း အစီအစဉ် (EMP) တွင် ဖော်ပြထားသော အစီအစဉ်ခွဲတစ်ခုဖြစ်သည့် CEMP၏ နောက်ဆက်တွဲ (၆-က) ၆က-၁ မှ ၆က-၁၂ အထိလည်းကောင်း၊

အစီအစဉ်ခွဲ OEMP၏ နောက်ဆက်တွဲ (၇-က) ၇က-၁ မှ ၇က-၇ အထိလည်းကောင်း၊ အစီအစဉ်ခွဲ တစ်ခုဖြစ်သော DEMP၏ နောက်ဆက်တွဲ (၇-ခ) ၇ခ-၁ မှ ၇ခ-၆ အထိ လိုက်နာစောင့်ထိန်းရန်

- အခန်း (၈)၏ သဘာဝပတ်ဝန်းကျင် ထိခိုက်သက်ရောက်မှု ထိန်းသိမ်းကွပ်ကဲခြင်းအစီအစဉ် (EMP)တွင် ဖော်ပြထားသော သဘောတူညီချက်များကို လိုက်နာစောင့်ထိန်းရန်တို့ဖြစ်ပါသည်။

TEAM ကုမ္ပဏီသည် ထိုင်းနိုင်ငံအသိအမှတ်ပြု ပတ်ဝန်းကျင်ဆိုင်ရာ မူဝါဒနှင့် စီမံကိန်းရေးဆွဲရေးရုံး (ONEP) မှ EIA လုပ်ကိုင်ခွင့် အသိအမှတ်ပြုလက်မှတ်ရထားသော ကုမ္ပဏီတစ်ခုဖြစ်ပြီး ၄င်းအသိအမှတ်ပြုလက်မှတ်ကို ECD၏ တရားဝင်မှတ်ချက်များကဏ္ဍအပြီးတွင် ဖော်ပြထားပါသည်။

၁.၁.၂ သစ်တောရေးရာနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန (MOECAF) ၏ လေ့လာမှုအစီရင်ခံစာ အပေါ် သဘောထားမှတ်ချက်

လေ့လာမှုအစီရင်ခံစာကို ၂၀၁၅ခုနှစ်နိုဝင်ဘာလတွင်တင်ပြအစီရင်ခံခဲ့ပါသည်။သစ်တောရေးရာနှင့်သဘာဝပတ်ဝန်းကျ တ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနမှ အခန်း (၂) ၏ ၂.၁.၂ အခန်းကဏ္ဍကို ထပ်မံဖြည့်စွက်မွမ်းမံပေးပါရန်အကြံပြုပြန် ကြားခဲ့ပါသည်။

၁.၁.၃ ဆက်စပ်စီမံကိန်းများနှင့်ဖွံ့ဖြိုးတိုးတက်မှု

လျှပ်စစ်ဓာတ်အားပေးစီမံကိန်းသည် အရေးကြီးသောဆိပ်ကမ်းငယ်နှင့် သဘာဝဓာတ်ငွေ့ရည် (LNG) စီမံကိန်း နှင့်ဆက်စပ်လျှက်ရှိပြီး ၄င်းစီမံကိန်းများကိုလည်းတပြိုင်တည်း တည်ဆောက်အကောင်အထည်ဖော်ခြင်းဖြင့်လျှပ်စစ် ဓာတ်အား ပံ့ပိုးပေးနိုင်မည်ဖြစ်သည်။

၁.၁.၄ စီမံကိန်းထောက်ခံအားပေးခြင်း နှင့် ပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှုလေ့လာဆန်းစစ်ခြင်းအကြံပေးချက်

အီတလီယံထိုင်းအများပိုင်ကုမ္ပဏီမှ ဤစီမံကိန်းအတွက် ထားဝယ်လျှပ်စစ်ဓာတ်အားပေးကုမ္ပဏီ (DPC) ကို သွယ်ဝိုက်သောနည်းအားဖြင့် ၁၀၀% အစုရှယ်ယာဝင်အဖြစ်ဖွဲ့စည်းထားရှိသည်[၁]။ အထူးသဘောတူညီချက်အရ ထားဝယ်လျှပ်စစ်ဓာတ်အားပေးကုမ္ပဏီသည် မဟာဗျူဟာကျစွာ စီစဉ်နိုင်သောအတွေ့အကြုံရင့်ကျက်သည့် အကြံပေး ပ ပညာရှင်လိုအပ်ပါသည်။ ၂၀၁၅ခုနှစ်အောက်တိုဘာလတွင် ထားဝယ်အထူးစီးပွားရေးဇုန်စီမံခန့်ခွဲရေးကော်မတီသို့ လျှပ်စစ်ဓာတ်အား လည်ပတ်ရေးအများပိုင်ကုမ္ပဏီ (EGCO) အားထည့်သွင်းစဉ်းစားရန်အဆိုပြုထားပါသည်။ ကော်မတီ၏ အတ အတည်ပြုချက် ရရှိပြီးလျှင် အီတာလီယံထိုင်းကုမ္ပဏီ နှင့် လျှပ်စစ်ဓာတ်အားလည်ပတ်ရေး အများ ပိုင်ကုမ္ပဏီ(EGCO) တို့မှ ၅၀% အစု ရှယ်ယာဝင်အဖြစ် ထားဝယ်လျှပ်စစ်ဓာတ်အားပေးကုမ္ပဏီ DPC မှ ၅၀% အဖြစ် အသီးသီးထည့်ဝင်ရမည်ဖြစ်သည်။

၁.၂ မူဝါဒများ၊ ဥပဒေဆိုင်ရာနှင့် ဖွဲ့စည်းဆောင်ရွက်ပုံဆိုင်ရာ လေ့လာသုံးသပ်ချက်

၁.၂.၁ ပေါင်းစည်းထားသော လူမှုရေးနှင့်သဘာဝပတ်ဝန်းကျင်ဆိုင်ရာမူဝါဒများ

စီမံကိန်းတည်ဆောက်စဉ်နှင့်လည်ပတ်ကာလများအတွက် လူမှုရေးနှင့်သဘာဝပတ်ဝန်းကျင်ဆိုင်ရာ စီမံခန့်ခွဲခြင်းလမ်းညွှန်မှုများ ပြုလုပ်ရန်အတွက် ပေါင်းစည်းထားရှိအပ်သော လူမှုရေးနှင့်သဘာဝပတ်ဝန်းကျင်ဆိုင်ရာ မူဝါဒများ ဖွဲ့စည်းရန်ထောက်ခံအပ်ပါသည်။ ထိုကိစ္စနှင့်စပ်လျဉ်း၍ စီမံကိန်းအားအပြည့်ပြည့်ဆိုင်ရာ သဘာဝပတ်ဝန်းကျင်စီမံခန့် ခွဲခြင်း ISO 14001 နှင့်အညီစီမံခန့်ခွဲနိုင်မည်ဖြစ်သည်။ အကျိုးဆက်အားဖြင့် စီမံကိန်းနှင့်ပတ်သက်သောသဘာဝ ပတ်ဝန်းကျင်ဆိုင်ရာစီမံခန့်ခွဲမှုစနစ် (EMS) ကိုလည်ပတ်ခြင်းဖြင့် ISO 14001 နှင့်လည်း ကိုက်ညီစေမည်ဖြစ်ပါသည်။

၁.၂.၂. မြန်မာနိုင်ငံ၏ မူဝါဒများ နှင့် ဥပဒေ မူဘောင်များ အပေါ် လေ့လာသုံးသပ်ချက်

ဤစီမံကိန်း၏ သဘာဝပတ်ဝန်းကျင်ဆိုင်ရာ စီမံခန့်ခွဲမှုနှင့် သက်ဆိုင်သော မူဝါဒနှင့် ဥပဒေဖွဲ့စည်းမှုများကို အပိုင်း (၄) ပိုင်း ခွဲခြားနိုင်ပါသည်။ အပိုင်းတစ်ခုစီ၏ အခြေအနေကို အောက်တွင် အကျဉ်းချုပ်ဖော်ပြထားရှိပါသည်။

ပတ်ဝန်းကျင်စီမံခန့်ခွဲခြင်း၏ ဥပဒေအခြေခံများအတွက် အမျိုးသား ပတ်ဝန်းကျင်ဆိုင်ရာ မူဝါဒ၏ ဆောင်ရွက်ချက်များဖြစ်သော ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ (၂၀၁၂) နှင့် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနည်းဥပဒေများ (၂၀၁၄)၏ အသေးစိတ်ရှင်းလင်းအကောင်အထည်ဖော်မှုများ ပါဝင်သည်။ ၎င်းဥပဒေ ၂ခုသည် နိုင်ငံတော်၏ ပတ်ဝန်းကျင်ဆိုင်ရာ စီမံခန့်ခွဲမှု၏ အခြေခံဥပဒေမူဘောင်များအဖြစ် ပါဝင်ထောက်ပံ့ပေးပါသည်။

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း (၂၀၁၅ခုနှစ်၊ ဒီဇင်ဘာလ ၂၉ရက်)နှင့် အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု)လမ်းညွှန်ချက်များ (၂၀၁၅ခုနှစ်၊ ဒီဇင်ဘာလ ၂၉ရက်) သည် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေတွင် သတ်မှတ်ထားသော ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA)လုပ်ငန်းစဉ်၏ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု ဖွံ့ဖြိုးတိုးတက်ရေးလုပ်ဆောင်မှုများ၏ အဓိကဥပဒေ ၂ခုဖြစ်ပါသည်။

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(၁) Italian-Thai Development Public Company Limited (ITD) နှင့် Rojana Industrial Park Company Limited (ROJANA) တို့ပူးပေါင်း၍ ၂၀၁၅ခုနှစ်၊ ဧပြီလ ၉ရက်နေ့တွင် Myandawei Industrial Estate Company Limited (MIE) အဖြစ် စတင်အကောင်အထည်ဖော်ဆောင်ရွက် ခဲ့ကြပါသည်။ MIE တွင် ကျွမ်းကျင်စီမံခန့်ခွဲမှုအသင်းနှင့် အတူးအကြံပေးများ၏ဦးဆောင်မှုဖြင့် ထားဝယ်စက်မှုဇုန်နှင့်ဆက်စပ် အဆောက်အဦးများ၊ မြို့နယ်များကို အကောင်အထည်ဖော်ဆောင်ရွက်ပါသည်။

EIAနှင့်ဆက်စပ်နေသော စီမံကိန်းအကြိုဆောက်လုပ်ရေး၊ စီမံကိန်းဆောက်လုပ်ရေး၊ လုပ်ငန်းလည်ပတ်မှုနှင့် လုပ်ငန်းဖျက်သိမ်းမှုကာလများ၏ ဥပဒေဆိုင်ရာလိုအပ်ချက်များတွင် အခြားစီမံခန့်ခွဲမှုဥပဒေများဖြစ်သော ပတ်ဝန်းကျင်ဆိုင်ရာ၊ လူမှုရေးနှင့် ယဉ်ကျေးမှုဆိုင်ရာ ဥပဒေများကို လိုက်နာဆောင်ရွက်ရပါမည်။ ၎င်းတို့တွင် (၁) စီမံကိန်းလုပ်ဆောင်မှုများ၏ ပတ်ဝန်းကျင်ဆိုင်ရာထိခိုက်မှုများ (၂) ပတ်ဝန်းကျင်လူထုနှင့် ဝန်းထမ်းများ၏ ကျန်းမာရေးနှင့် လုံခြုံမှု (၃) လူမှုရေးဆိုင်ရာ ထိခိုက်မှုများ (၄) ယဉ်ကျေးမှုဆိုင်ရာ ထိခိုက်မှုများ (၅) သစ်တော၊ တောရိုင်းတိရိစ္ဆာန်နှင့် သဘာဝဇီဝမျိုးစုံမျိုးကွဲနှင့်ဆက်စပ်နေသော ဂေဟဗေဒအရင်းအမြစ်များ (၆) ရေအရင်းအမြစ်၊ ကမ်းရိုးတန်းနှင့် အဏ္ဏဝါပတ်ဝန်းကျင်စသည်တို့ပါဝင်သည်။

စီမံကိန်းနေရာ၏ အဓိကဥပဒေမှာ မြန်မာ့အထူးစီးပွားရေးဇုန်ဥပဒေ (၂၀၁၄)သည် ပို့ကုန်လုပ်ငန်းများအားပံ့ပိုးပေးခြင်းနှင့် လိုအပ်သည့် အပိုထောက်ပံ့ပေးခြင်းများကို လုပ်ဆောင်ပေးခြင်းဖြင့် ၎င်းလုပ်ငန်းများကို လွယ်ကူ ချောမွေ့စွာ ဖွံ့ဖြိုးတိုးတက်စေရန် ကူညီထောက်ပံ့ပေးပါသည်။

၁.၂.၃ အပြည်ပြည်ဆိုင်ရာလုပ်ထုံးလုပ်နည်းများ ၊ အစဉ်အလာနှင့်သဘောတူညီချက်များ

သဘာဝပတ်ဝန်းကျင်နှင့်ပတ်သက်ဆက်နွယ်သော အပြည်ပြည်ဆိုင်ရာ လုပ်ထုံးလုပ်နည်းများ ၊ အစဉ်အလာ နှင့် သဘောတူညီချက်များစွာကို မြန်မာနိုင်ငံမှသဘောတူညီစွာ လက်မှတ်ရေးထိုးပြီးစီးခဲ့ပါသည်။ ဤလုပ်ထုံးလုပ်နည်းများထံမှ ပတ်သက်ဆက်နွယ်သောအချက်များကို အစီရင်ခံစာ အခန်း ၃.၃. တွင် အကျယ်တဝင့် ဖော်ပြထားရှိပါသည်။

၁.၂.၄ မြန်မာနိုင်ငံတော်အစိုးအဖွဲ့၏ မူဘောင်များ

ဤစီမံကိန်းနှင့်ပတ်သက်သော သဘာဝပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှု လေ့လာဆန်းစစ်ချက်များ ဆိုင်ရာ ဗဟိုသဘာဝပတ်ဝန်းကျင် ထိန်းသိမ်းရေးဌာနမှ ဒေသဆိုင်ရာသဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဌာန နှင့် အခြားသော သက်ဆိုင်ရာဒေသအစိုးရအဖွဲ့အစည်းများ၊ ခရိုင်နှင့်မြို့နယ်အဖွဲ့အစည်းများ ပူးပေါင်းပါဝင်စေလျက် စီမံခန့်ခွဲခြင်းဖြစ်သည်။

စီမံကိန်းအကောင်အထည်ဖော်ဆောင်သောကာလများတွင် ထားဝယ်အထူးစီးပွားရေးဇုန်စီမံကွပ်ကဲမှုကော်မတီ နှင့် ထားဝယ်အထူးစီးပွားရေးဇုန်အထောက်အကူပြုအဖွဲ့တို့မှ ရင်းနှီးမြှုပ်နှံသူ (သို့) အခြားသောအစိုးရအဖွဲ့အစည်းများ မှ ဖြစ်ပေါ်လာသောကိစ္စရပ်များကို ပံ့ပိုးကူညီ၍ ဖြေရှင်းပေးရန်တာဝန်ရှိသည်။

၁.၂.၅ အပြည်ပြည်ဆိုင်ရာ မူဝါဒများ လမ်းညွှန်မှုနှင့်စံနှုန်းများ

၂၀၁၅ ခုနှစ် ၊ ဧပြီလ (၂၂) ရက်နေ့တွင် ထုတ်ပြန်သော မြန်မာနိုင်ငံတော် သဘာဝပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေးနောက်ဆုံးအဆင့်မူကြမ်းများအရ လမ်းညွှန်ချက်နှင့်အညီ စီမံကိန်းတည်ဆောက်စဉ်နှင့်အကောင်အထည်

ဖော်ကာလများအတွက် ပူးပေါင်း၍သက်ဆိုင်သောစံနှုန်းများကိုဖော်ပြထားရှိသည်။ သို့သော်လည်း နိုင်ငံတော်၏ သဘာဝ ပတ်ဝန်းကျင်ဆိုင်ရာစံချိန်စံနှုန်းအချို့ ပျက်ကွက်နေမှုကြောင့် အခြားသက်ဆိုင်သော အပြည်ပြည်ဆိုင်ရာ သဘာဝ ပတ်ဝန်းကျင်စံချိန်စံနှုန်းများကို အစားထိုးကျင့်သုံးသွားရမည်ဖြစ်သည်။ သို့သော်လည်းစီမံကိန်း၏ လျှပ်စစ်ဓာတ်အားပေး စက်ရုံမှ လွှတ်ထုတ်သောမီးခိုးငွေ့များကိုထိန်းသိမ်းရန်တိကျသည့်အစားထိုးကျင့်သုံးမှုမှာ ပင်လယ်ကမ်းရိုးတန်းအပူချိန်နှင့် ညစ်ညမ်းမှုကို အစီရင်ခံစာ ၏ အခန်း ၃.၆-၁ မှ ၃.၆ -၄ အထိ ဖော်ပြထားရှိသည်။

၁.၃ စီမံကိန်းဖော်ပြချက်နှင့် အခြားသောရွေးချယ်နည်းလမ်းများ

၁.၃.၁ စီမံကိန်းတင်ပြချက်နှင့် အခြားသောနည်းလမ်းဖော်ပြချက်များ

(က) စီမံကိန်းဖော်ပြချက်

အခန်းကဏ္ဍနှင့်ကဏ္ဍငယ်များ

စီမံကိန်းတွင် စွမ်းအင်ကဏ္ဍနှင့် လျှပ်စစ်စွမ်းအားလည်ပတ်ခြင်း ကဏ္ဍငယ်ဟူ၍ ပါဝင်သည်။

စီမံကိန်းအရွယ်အစား

စီမံကိန်း၏အသားတင်စွမ်းအင် ၄၂၀ မဂ္ဂါဝပ်ဖြစ်သည်။ ထားဝယ်အထူးစီးပွားရေးဇုန်၏အဒမ်မန်ပင်လယ် ကမ်းခြေမှ အနောက်ဘက် မီတာ ၂၀၀ အကွာ ၊ ဒီရေရောက်ချောင်း၏ အရှေ့ဘက် (၁) ကီလိုမီတာ အကွာအဝေးရှိ ကမ်းရိုးတန်းတွင် ၃၇.၁၉ ဧကကျယ်ဝန်းသောနေရာ၌ စီမံကိန်းအဆောက်အအုံကို တည်ဆောက်မည်ဖြစ်သည်။ ၎င်းနေရာ သည်သစ်ပင်နည်းပါးသောသဲများဖြင့်ဖုံးလွှမ်းလျှက်ရှိသည့် မြေလွတ်မြေရိုင်းနေရာဖြစ်ပါသည်။ မြေပြင်အနေအထားမှာ ပြန့်ပြူးညီညာသော်လည်းမြေမျက်နှာပြင်မြင့်တက်လာစေရန်ဖြည့်တင်းပေးရန်လိုအပ်ပါသည်။ စီမံကိန်းနေရာနှင့်အနီးဆုံးရွာ မှာ ငပိတက်ဖြစ်သည်။ အစီရင်ခံစာ၏ ပုံ ၄.၁ - ၃ တွင် စီမံကိန်းတည်နေရာနှင့် ပတ်ဝန်းကျင်မြေပုံကို ဖော်ပြထားရှိသည်။

အခြေခံအဆောက်အအုံများ

စီမံကိန်းကို သဘာဝဓါတ်ငွေ့လည်ပတ်စက် (၉) ခုဖြင့် အပိုင်း (၃) ခု ပါဝင်သော လျှပ်စစ်ဓါတ်အားပေးစက်ရုံနှင့် တွဲဖက်တပ်ဆင်လည်ပတ်ရမည်ဖြစ်သည်။ (၁၁၅) ကီလိုဗို့ ဓါတ်အားပေးလိုင်းမှာမူ အခြားသောစီမံကိန်းအစိတ်အပိုင်းနှင့် ဆက်သွယ်ရာတွင်တည်ဆောက်ရန်ဖြစ်သည်။ သိသာထင်ရှားသော စီမံကိန်းသတင်းအချက်အလက်များနှင့်အထောက် အပံ့အစိတ်အပိုင်းများ အခြေခံအဆောက်အအုံများ၏အကျဉ်းချုပ်ကို အစီရင်ခံစာ၏ဇယား ၄.၁-၁ တွင်ဖော်ပြ ထားရှိသည်။ လျှပ်စစ်ဓါတ်အားပေး စက်ရုံ၏ အအေးခံစနစ်ကို ပင်လယ်ရေဖြတ်သန်းခြင်းဖြင့်သာ လည်ပတ်မည်ဖြစ်သည်။

အကောင်အထည်ဖော်ခြင်းအစီအစဉ်

စီမံကိန်းအဆင့်အားလုံးတည်ဆောက်ခြင်းအပြီးသတ်ပြည့်စုံစေရန် ခြောက်နှစ်လျာထားပါသည်။ သို့သော်လည်း စီမံကိန်းအဆင့်တိုင်းအတွက် ထားဝယ်အထူးစီးပွားရေးဇုန်စီမံခန့်ခွဲမှုကော်မတီမှ

လိုအပ်ချက်များကိုပြီးပြည့်စုံမှုအပေါ် သဘောတူညီချက်ဖြင့် စီမံကိန်းဆက်လက်ဆောင်ရွက်ရန်ဖြစ်သည်။ သဘာဝဓာတ်ငွေ့စက်ရုံအတွက်တည်ဆောက်မှု အချိန်ကာလမှာ ငှါးရှေ့ဆက်ရမည့်သဘောတူညီချက်ရရှိပြီးသည့်ကာလမှစတင်၍ အချိန် (၁၂)လကြာမြင့်မည် ဖြစ်သည်။ ဓါတ်ငွေ့တွဲဖက်တာဘိုင်စက်ရုံ (CCGT) အတွက်မူ (၂၄)လ ကြာမြင့်မည်ဖြစ်သည်။ ပင်မအစီရင်ခံစာ၏ ၄-၁-၆ တွင် စီမံကိန်းအကောင် အထည်ဖော်မည့်အစီအစဉ်ပုံစံကို ဖော်ပြထားရှိပြီးဖြစ်ပါသည်။ ထိုအစီအစဉ်များမှာ သက်ဆိုင်ရာဌာန၏ စက်မှုဖုန်ဖွံ့ဖြိုးတိုးတက်ရေး၊ သဘာဝဓာတ်ငွေ့ရည်ပိုက်လိုင်းစီမံကိန်းများအတွက် လိုအပ်သောအချိန်ကာလများ၊ အစီရင်ခံစာများ သုံးသပ်ခြင်းနှင့်အတည်ပြုချက်များအပေါ်မူတည်၍ပြောင်းလဲမှုရှိနိုင်ပါသည်။ တည်ဆောက်ရေးလုပ်ငန်း စတင်ရန် သဘောတူညီချက်မှာ ၂၀၁၈ နှစ်ဦးပိုင်းဖြစ်နိုင်ပါသည်။

စီမံကိန်းအကြိုကာလ

စီမံကိန်းမတိုင်မီအကြိုကာလဆောင်ရွက်ချက်များအဖြစ် စီမံကိန်းနေရာပြုပြင်စီမံခြင်းနှင့်နေသားတကျ ဖြစ်စေရန်၊ ယာယီ အသုံးအဆောင်များ ပံ့ပိုးပစ္စည်းများ တည်ဆောက်ခြင်းတို့ပါဝင်ပါသည်။

စီမံကိန်းကာလ

(၁) တည်ဆောက်ရေးလုပ်ငန်းများ

တည်ဆောက်ရေးလုပ်ငန်းများတွင် မြို့ပြလုပ်ငန်းများတည်ဆောက်ခြင်းနှင့် စက်ပစ္စည်းပိုင်းဆိုင်ရာများ လျှပ်စစ်လုပ်ငန်းများပါဝင်သည်။ ကမ်းနီးမြေပြင်တည်ဆောက်မှုလုပ်ငန်းများတွင် အဆောက်အအုံအားအုတ်မြစ်ချခြင်း ၊ မြေကြီးအတွင်း သို့တိုင်များရိုက်သွင်းခြင်း၊ ကွန်ကရစ်ကြမ်းခင်းများ၊ သံမဏိအဆောက်အဦးများအတွက်သံမဏိပစ္စည်းများ နှင့်လိုအပ်သော ပံ့ပိုးပစ္စည်းများတည်ဆောက်တပ်ဆင်မှုများ၊ ရေစီးမြောင်းများနှင့်ရေဆိုးသန့်စင်စနစ်များအစရှိသည်တို့ ပါဝင်ကြပါသည်။ ပင်လယ်ကမ်းနီးတည်ဆောက်မှုအတွက်မူ ပင်လင်ရေရယူခြင်းနှင့်ရေထွက်ပိုက်များတပ်ဆင်ခြင်းတို့ပါ ဝင်သည်။

စက်ပစ္စည်းပိုင်းနှင့် လျှပ်စစ်လုပ်ငန်းများတွင် အသုံးပြုပစ္စည်းကိရိယာများ တည်ဆောက်တပ်ဆင်ခြင်းနှင့် လုပ်ငန်း အစီအစဉ်များ ၊ ပင်လယ်ရေစုပ်ယူရန် ရေတွန်းစက်များ ၊ ပိုက်များနှင့် ထိန်းချုပ်စနစ်များ တပ်ဆင်ခြင်းတို့ပါဝင်ကြပါသည်။

(၂) တည်ဆောက်ရေးအတွက် သွင်းအားစုများ

တည်ဆောက်ရေးအတွက် အောက်ဖော်ပြပါ သွင်းအားစုများလိုအပ်ပါသည် -

လူအင်အား	-	တည်ဆောက်မှုအမြင့်ဆုံးအချိန်တွင် လူဦးရေ (၆၀၀) ခန့်
ရေချို	-	တစ်နေ့လျှင် ရေ (၈၀) ကုဗမီတာ

(၃) တာဝန်ယူစီစဉ်ဆောင်ရွက်ခြင်း

စီမံကိန်းအကောင်အထည်ဖော်ဆောင်ရွက်ရာတွင်တည်ဆောက်မှုဆိုင်ရာလုပ်ငန်းများ၄င်းဆောင်ရွက်မှု အတွက် ထောက်ပံ့ရေးနှင့်နည်းလမ်းများကို တာဝန်ယူစီစဉ်ဆောင်ရွက်ခြင်းများဟု အဆိုပြုကမ်းလှမ်းချက်ထားရှိသည်။

မြို့ပြဆိုင်ရာနှင့်စက်ပစ္စည်းတည်ဆောက်မှုဆိုင်ရာ အသေးစိတ်တာဝန်ယူစီစဉ်ဆောင်ရွက်ခြင်းများ၏ ဆောင်ရွက်ပုံစံများကို သဘာဝပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှုလေ့လာဆန်းစစ်ခြင်း အစီရင်ခံစာတွင်ဖော်ပြထားရှိသည်။ စီမံကိန်းအဆိုပြု သဘောထားများကို စီမံကိန်းမန်နေဂျာ ဦးဆောင်သောအဖွဲ့အားဖြင့် ကြီးကြပ်စီမံနိုင်စေရန် ဖွဲ့စည်းထားရှိသည်။

စီမံကိန်းလည်ပတ်ကာလ

လျှပ်စစ်ဓါတ်အားပေးစက်ရုံကို တစ်နှစ်ပတ်လုံးလည်ပတ်နိုင်စေရန် ဝန်အားကိုအခြေခံ၍လည်ပတ်စေရပါမည်။ စီမံကိန်းအခြေအနေနှင့် မူဘောင်များကိုခွင့်ပြုနိုင်သောအစီအစဉ်ဖြင့်ထိန်းသိမ်း၍ဝယ်ယူဆောင်ရွက်နိုင်ရန် ပြဋ္ဌာန်းထားရှိရမည်။

(၁) **သွင်းအားစုများ**

အောက်ဖော်ပြပါ သွင်းအားစုများကို ပုံမှန်လည်ပတ်နိုင်ရန် လိုအပ်သည်။

လူအင်အား - အလွန်ဆုံးအားဖြင့် (၅၀) ဦး

သဘာဝဓါတ်ငွေ့ - (၆၈) MMSCFD

အအေးခံစနစ်အတွက်ပင်လယ်ရေ - တစ်နေ့လျှင် ၆၇၅၂၁၀ ကုဗမီတာ

ရေချို - တစ်နေ့လျှင် ၁၈၁၅ ကုဗမီတာ (သောက်သုံးရေအဖြစ်)

(၂) **ထုတ်လုပ်မှု**

လျှပ်စစ်ဓာတ်အားပေးစက်ရုံလည်ပတ်ခြင်းကြောင့် ထုတ်လွှတ်နိုင်သောလျှပ်စစ်စွမ်းအားပမာဏမှာ ၁၁၅ကီလို ဗို့ဖြစ်ပြီးစက်ရုံနှင့်ကပ်လျက်ရှိတည်ရှိသောစစ်မစီးဆင်းသည့် ခလုတ်ရုံကြီးများမှဓာတ်အားကိုတိုက်ရိုက်ထုတ်လွှတ်ပေးပို့ မည်ဖြစ်သည်။

(၃) **လျှပ်စစ်ဓါတ်အားပေးစက်ရုံ လည်ပတ်ခြင်းနှင့် စီမံခန့်ခွဲမှုအဖွဲ့**

အတွေ့အကြုံရှိသောကျွမ်းကျင်အဖွဲ့တစ်ဖွဲ့မှ နေ့စဉ်တာဝန်ယူဆောင်ရွက်လည်ပတ်စေခြင်း၊ ပြဿနာများ ဖြေရှင်းခြင်း၊ ထိန်းသိမ်းမှုအတွက်အစီအစဉ်ချမှတ်ဆောင်ရွက်နိုင်ခြင်းနှင့်ပင်ရင်းစက်ပစ္စည်းများထုတ်လုပ်သူ နှင့် ပူးပေါင်း ဆောင်ရွက်မှသာလျှင် ရေရှည်သဘောတူတာဝန်ယူဆောင်ရွက်နိုင်မည်ဖြစ်သောကြောင့် လည်ပတ်မှုမတိုင်မီကပင်စတင် စမ်းသပ်ဆောင် ရွက်သင့်သည်။

၄င်းစီမံခန့်ခွဲမှုအဖွဲ့မှ ဦးဆောင်၍ ဥက္ကဌ ၏ လမ်းညွှန်မှုဖြင့် အဓိကဌာနများအဖြစ်လည်ပတ်မှုဌာန၊ ထိန်းသိမ်းမှု ဌာန နှင့် စီမံအုပ်ချုပ်မှုဌာန (၃) ဌာန ပါဝင်ရမည်။ လည်ပတ်မှုဌာနတွင် သဘာဝပတ်ဝန်းကျင် ၊ လူမှုရေး ၊လုပ်ငန်းခွင် လုံခြုံရေး နှင့် ကျန်းမာရေးကဏ္ဍများကိုထည့်သွင်း၍ စက်ရုံကို လည်ပတ်စေရပါမည်။

(၄) **စက်ရုံလည်ပတ်စဉ် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းမှုစီမံကွပ်ကဲခြင်း**

စီမံကိန်းတည်ဆောက်ပုံစံတွင် အောက်ပါအဆောက်အအုံနှင့်ပံ့ပိုးမှု အစိတ်အပိုင်းများကိုစက်ရုံ လည်ပတ်စဉ် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းမှု စီမံကွပ်ကဲခြင်းအတွက် ထည့်သွင်းရေးဆွဲရမည်။

- သဘာဝဓါတ်ငွေ့လည်ပတ်မှုကို dry NO_x နည်းပညာအားဖြင့် အပူချိန်မြှင့်တင်ခြင်းနှင့်နိုက်ထြိုဂျင်အောက်ဆိုဒ်ထုတ်လွှတ်မှုနည်းပါးစေခြင်း
- အဆက်မပြတ်ထုတ်လွှတ်မှုကိုစောင့်ကြည့်ကြီးကြပ်စနစ် (CEMS) တွင် နိုက်ထြိုဂျင်ဒိုင်အောက်ဆိုဒ်၊ အောက်စီဂျင် ၊ ကာဗွန်ဒိုင်အောက်ဆိုဒ်၊ ဖောက်ထွင်းမမြင်ရခြင်း ၊ ပါဝင်သော ပစ္စည်းများနှင့် စီးဆင်းမှုစေးပြစ်မှုနှင့် မီးခိုးငွေ့ အပူချိန်များ။
- ရေဆိုးစွန့်စနစ်အတွက်သန့်စင်ရန်အစီအစဉ်နှင့်အထောက်အပံ့နည်းလမ်းများ၊ သန့်စင်ပြီးရေများကိုလည်းအသုံးလက်ခံနိုင်သောစံချိန်စံနှုန်းအတိုင်းပြည့်မှီစေခြင်းဖြင့်ပင်လယ်တွင်းသို့စွန့်ပစ်ခြင်း
- အသံဆူညံမှုကိုလည်း အဆိုပြုထားသည့်အနိမ့်ဆုံးအခြေအနေတွင်ထိန်းသိမ်းထားနိုင်ရန် စောင့်ကြည့်ထိန်းချုပ်ထားရန် ပြင်ဆင်ထားရှိရမည်။ အသံဆူညံမှုအတွက်ဖော်ပြထားသော အဖြေများကို အခန်း (၆) တွင် တင်ပြထားရှိသည်။

စီမံကိန်းတည်ဆောက်ပုံစံတွင် လုပ်ငန်းခွင်လုံခြုံရေးနှင့် ကျန်းမာရေး (OHS) ကို လိုအပ်ချက်ဖြည့်တင်းမှုအဖြစ် ထည့်သွင်းရမည်။ အဆောက်အဦ ပိသုကာပုံစံများနှင့် အလှဆင်မှုပုံစံများကို စက်ရုံ၏သဘာဝနှင့်ပတ်ဝန်းကျင်အနေအထားများအရ ထည့်သွင်းစဉ်းစားရမည်။ ပတ်ဝန်းကျင်လေထုအရည်အသွေးထိန်းသိမ်းမှု အထောက် အပံ့ (ASMS) ကိုလည်း လိုအပ်ချက်အဖြစ် သတ်မှတ်ပေးရမည်။

ပိတ်သိမ်းခြင်းကာလ

စီမံကိန်းအလုပ်များ ပြီးဆုံးသွားချိန်တွင် ဓါတ်အားပေးစက်ရုံ ကို (၁) ဖြုတ်ချခြင်း (သို့) (၂) အဟောင်းနေရာတွင် အဆင့်မြှင့်အသစ်အဖြစ်ပို၍ခေတ်မီသောစက်ကိရိယာအစားထိုးခြင်းတစ်ခုခုဖြစ်နိုင်သည်။ နျူကာလီယားဓါတ်အားပေးစက်ရုံနှင့် မတူညီသောသဘာဝ(သို့) သတ္တုတွင်းများနှင့်မတူညီသောကြောင့် ၄င်းကိုသဘာဝပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှုအနည်းဆုံးဖြစ်အောင်လျှော့ချခြင်းအားဖြင့် ပိတ်သိမ်းပစ်ရန်ဖြစ်သည်။

(ခ) စီမံကိန်း အခြားသောရွေးချယ်နည်းလမ်းများဖော်ပြချက်

စီမံကိန်း၏အစီအစဉ်သဘောသဘာဝကိုလေ့လာစဉ်းစားရာတွင်
အောက်ဖော်ပြပါအခြားသောရွေးချယ်နည်းလမ်း သုံးမျိုးကိုထည့်သွင်းရမည်။ ၄င်းတို့မှာ (၁) လောင်စာရွေးချယ်မှုနည်းလမ်းကိုကျောက်မီးသွေး နှင့် သဘာဝဓါတ်ငွေ့ (၂) အအေးခံစနစ် ရွေးချယ်နည်းလမ်းအဖြစ် ပင်လယ်ရေတွင်းဖြတ်သန်းစီးခြင်း (သို့)ပင်လယ်ရေ/ရေချိုကိုအပိတ်အအေးခံ

စနစ်အဖြစ်အသုံးပြုခြင်း (၃) စီမံကိန်းနေရာကိုရွေးချယ်နည်းလမ်းအဖြစ် စီမံကိန်းအစဦးကာလတွင်စက်မှုဇုန်အတွင်း ထားရှိခြင်း နှင့် ပင်လယ်ကမ်းရိုးတန်းနေရာတွင် သဘာဝဓါတ်ငွေ့ရည်စက်ရုံ အနီးထားရှိခြင်းတို့ဖြစ်ကြပါသည်။

၁.၃.၂ စီမံကိန်းရွေးချယ်နည်းလမ်းများကို နှိုင်းယှဉ်ချက်

က. လောင်စာရွေးချယ်နည်းလမ်းများ

စီမံကိန်းသဘောသဘာဝအရ ကျောက်မီးသွေးထက် သဘာဝဓါတ်ငွေ့ကိုသာအသုံးပြုရန် အများဆုံး နှစ်သက်သည့်နည်းလမ်းအဖြစ်နှိုင်းယှဉ်စဉ်းစားရာတွင် သဘာဝဓါတ်ငွေ့၏အားသာချက်အကျိုးပြုချက်များမှာ (၁)ဓါတ်အား ပေးစက်ရုံအသုံးပြုမှုကာလတိုခြင်း (၂) လည်ပတ်ရာတွင်လည်း ပြင်ဆင်ရန်လွယ်ကူခြင်း (၃) ညစ်ညမ်းမှုထိန်းချုပ်ရန် စက်ကိရိယာပိုမိုနည်းပါးခြင်း (၄) အခြေခံအဆောက်အအုံပံ့ပိုးကိရိယာနည်းပါးခြင်း (၅) မြေပြင်တွင်နေရာယူမှုနည်းခြင်း (၆) အပူချိန်မြင့်မားမှု ကောင်းမွန်ခြင်း (၇) အအေးခံရန် လိုအပ်မှုလျော့နည်းခြင်း (၈) ပြည်သူတို့၏ ငြင်းဆန်မှုနည်းပါး ခြင်းတို့ဖြစ်ကြပါသည်။ တစ်ခုတည်းသော ဆိုးကျိုးမှာကျောက်မီးသွေးနှင့် နှိုင်းယှဉ်လျှင်လည်ပတ်သော စက်ကိရိယာစရိတ် အနည်းငယ်မြင့်မားခြင်းသာဖြစ်သည်။သို့သော်လည်းအားသာချက်ပိုမိုများပြားသည့်အလေးပေး ရွေးချယ်မှုဖြစ်သင့်ပါသည်။

(ခ) အအေးခံစနစ်ရွေးချယ်ခြင်းနည်းလမ်း

၄င်းအအေးခံခြင်းစနစ်ကို ရေအတွင်းဖြတ်သန်းစီးဆင်းစေခြင်းကို အများဆုံးအပူချိန်လျော့ချမှုအဖြစ် ပင်လယ် ကမ်းခြေနှင့်အနီးဆုံးဓါတ်အားပေးစက်ရုံများတွင်အသုံးပြုခြင်း (သို့) ရေချိုရေငံစပ်မြစ်ချောင်းများမှရေကို အပိတ်အအေးခံ စနစ်အဖြစ်အသုံးပြုခြင်းသည်ပိုမိုခက်ခဲစေသည်။ သို့ရာတွင် ပင်လယ်တွင်းဂေဟစနစ်ကိုထိခိုက် ပျက်စီးစေသည်။ သို့ဖြစ်၍ ရေကိုဖြတ်သန်းစီးဆင်းသောနည်းလမ်းကိုလူကြိုက်အများဆုံးအသုံးပြုစနစ်အဖြစ်ရွေးချယ်သည်။ သို့ဖြစ်ပါ၍ ဤစက်ရုံ၏ ပြင်ဆင်ချိန်ကာလတွင် စီမံကိန်းသဘာဝအရရေကိုဖြတ်သန်းစီးဆင်းသောနည်းလမ်းကိုသာ အအေးခံစနစ်အဖြစ် အခြေခံမည်။ နည်းပညာနှင့်ကုန်ကျစရိတ် ရှုထောင့်အားဖြင့်မူ အပိတ်အအေးခံစနစ် နှင့် နှိုင်းယှဉ်၍စဉ်းစားလျှင်လည်း ပင်လယ်ရေတွင်းအနေအထားနှင့် ထိခိုက်သက်ရောက်မှုအသေးစိတ်ကိုတွက်ချက်နှိုင်းယှဉ်၍ကွာဟချက်များကို ထည့်သွင်း စဉ်းစားရမည်ဖြစ်သည်။

ဂ။ စီမံကိန်းအခြားရွေးချယ်နေရာများ

စီမံကိန်းရွေးချယ်အဆိုပြုနေရာ နှစ်နေရာအား အောက်ပါအခြေခံ အချက်အလက်များ ပေါ်တွင်မူတည်၍ စဉ်းစားရွေးချယ်ရပါမည်။ (၁) ဓာတ်ငွေ့ပိုက်လိုင်းကုန်ကျစရိတ်နှင့် ထောက်ပံ့စွန့်စားရမှုများ (၂) ဓာတ်အားပေးစက်ရုံ၏ လိုအပ် ချက်ဖြစ်သော အအေးခံစနစ် (၃) စက်ပစ္စည်းများ သယ်ယူပို့ဆောင်မည့် ဓါတ်အားပေးစက်ရုံအဝင်အထွက်လမ်းနှင့် လမ်းပန်း ဆက်သွယ်ရေးတို့ဖြစ်ကြပါသည်။ ကမ်းခြေအနီးတဝိုက်နေရာများကို ပိုမိုနှစ်သက်ရွေးချယ်စဉ်းစားရန်မှာ ထောက်ပံ့ရန် ကုန်ကျ စရိတ်လျော့နည်းမှုနှင့် အအေးခံစနစ်အတွက် ပင်လယ်ရေရရှိမှု လွယ်ကူခြင်းတို့ဖြစ်သည်။

၁.၄ ပတ်ဝန်းကျင်အခြေအနေဖော်ပြချက်

၁.၄.၁ လေ့လာမှုနောက်ခံနှင့် အကန့်အသတ်များ

(က) ပတ်ဝန်းကျင်အနေအထား

လေ့လာရေးယာအကျယ်အဝန်းမှာ ရေပြင်နှင့်မြေပြင် ၅ကီလိုမီတာ အချင်း ရှိသောစီမံကိန်းဧရိယာ၊ စုစုပေါင်း ၇၈.၆ စတုရန်ကီလိုမီတာ (သို့)၂၀၀၀ ဧကအကျယ်အဝန်းရှိပါသည်။ ဧရိယာအကျယ်အဝန်း အဓိပ္ပာယ်ဖွင့်ဆိုချက်မှာရေပြင် ၉၀၀၀ ဧကကို ပြဆိုသဖြင့် ထားဝယ်စီးပွားရေးဇုန်တစ်ခုလုံး အကျုံးဝင်ပါသည်။

ပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှုလေ့လာဆန်းစစ်ချက်လုပ်ငန်းစဥ်များအရစီမံကိန်း ကန့်သတ်ချက်များမှာ ရုပ်ပိုင်းဆိုင်ရာအစိတ်အပိုင်း ၊ သက်ရှိဇီဝများ၊ ယဉ်ကျေးမှုနှင့်လူမှုစီးပွားအစိတ်အပိုင်းနှင့် စက္ခုအာရုံအစိတ်အပိုင်းများပါ ဝင်ပါသည်။

ပတ်ဝန်းကျင်လေ့လာမှုဧရိယာအကျယ်အဝန်း၊သတင်းအချက်အလက်များကို စီမံကိန်းလေ့လာသူပညာရှင်များ ကွင်းဆင်းလေ့လာမှုနှင့် သတင်းရရှိနိုင်သည့် ဌာနဆိုင်ရာများထံမှ စုစည်းတင်ပြမည်ဖြစ်သည်။

(ခ) ဒေသတွင်းအုပ်ချုပ်ရေး

စီမံကိန်းလေ့လာရာဒေသအဖြစ် လောင်းလုံမြို့နယ်အတွင်းရှိကျေးရွာနှစ်ရွာနှင့် ရေဖြူမြို့နယ်အတွင်းရှိ ကျေးရွာ တစ်ရွာ၊စုစုပေါင်းကျေးရွာသုံးရွာပါဝင်သည်။ ၎င်းတို့မှာငပိတက်ရွာ၊ညောင်ပင်ဆိပ်နှင့် မုဒူးကျေးရွာတို့ ဖြစ်ကြပါသည်။ ငပိတက်ကျေးရွာမှာ ထားဝယ်အထူး စီးပွားရေးဇုန်၏ ပြင်ပတွင်ရှိပါသည်။

၁.၄.၂ ရုပ်ပိုင်းဆိုင်ရာ အစိတ်အပိုင်းများ

စီမံကိန်းလေ့လာနေရာသည်အဒမ်မန်ပင်လယ်ကိုမျက်နှာပြုလျှက်ရှိသော ကမ်းရိုးတန်းမြေပြန့်လွင်ပြင်နှင့်ဆက်စပ်လျှက်ရှိသောဒီရေတက်ရောက်ရာနေရာကိုကန့်လန့်ဖြတ်တည်ရှိသည်။ ၎င်းဒေသတွင်စီးပွားရေးအတွက် အဓိကလုပ်ငန်းအဖြစ်ငါးဖမ်းခြင်းမှလွဲ၍မရှိပါ။ စီမံကိန်းဧရိယာနှင့်အနီးဆုံးအဖြစ် ၁.၂၃ ကီလိုမီတာ ဝေးကွာသောငပိတက်ရွာမှာ ငါးဖမ်းလုပ်ငန်းလုပ်ကိုင်ရာနေရာလည်းဖြစ်သည်။ အခြားသောအဓိကစီးပွားရေးလုပ်ငန်းများ မရှိသေးသောကြောင့်စီမံကိန်း ဒေသ၏သဘာဝပတ်ဝန်းကျင်မှာ ယနေ့တိုင် ညစ်ညမ်းမှုမရှိနိုင်သေးပါ။ ကွင်းဆင်း လေ့လာမှု တွေ့ရှိချက်များမှာ အောက်ပါ အတိုင်းဖြစ်ပါသည်။

- ကမ္ဘာ့ဘဏ်သတ်မှတ်စံနှုန်းနှင့် ကိုက်ညီသော လေထုဝန်းကျင်အနေအထား
- ကမ္ဘာ့ဘဏ်သတ်မှတ်စံနှုန်းနှင့် ကိုက်ညီသည့် စံပြုအသံတုန်ခါနှုန်းနှင့် အသံဝန်းကျင်
- ရေနေမှုနာရယူရာကမ်းရိုးတန်း နေရာသုံးခုစလုံး၏ သန့်ရှင်းမှုမှာ အောက်စီဂျင်ပါဝင်မှုမြင့်မားရုံမျှမက အခြားသတ္တုနှင့် သက်ရှိညစ်ညမ်းမှုပါဝင်မှုနည်းပါးပါသည်။

- ကုန်းတွင်းမြေအောက်ရေရယူရာ ရေတွင်
  ရေတွင်းနစ်တွင်းမှာလည်း သန့်ရှင်း၍ သောက်သုံးရေအဖြစ်အသုံး ပြုနိုင်ပါ သည်။
- ပင်လယ်တွင်းအနည်အနစ်နမူနာသဲကြမ်းများတွင်လည်း သက်ရှိညစ်ညမ်းမှုနှင့် သတ္တုများပါဝင်မှုနည်း၍ မှုနည်း၍ ညစ်ညမ်းမှုမရှိပါ။

၁.၄.၃ သက်ရှိအစိတ်အပိုင်းပါဝင်မှုများ

စီမံကိန်းလေ့လာနေရာတွင်မည်သည့် သစ်တောမျှရှိမနေသော်လည်း ယခင်ကသစ်တောကိုခုတ်ထွင်ရှင်းလင်းထားသဖြင့် ယခုလက်ရှိအခြေအနေတွင် ဒီရေရောက်တော၊ ပင်လယ်ကမ်းနီး ခြုံနွယ်ပင်များ ရောနှောလျက် ရွက်ကြွေတောသစ်ပင်များ ပေါက်ရောက်လျက်ရှိပါသည်။

စီမံကိန်းလေ့လာနေရာအတွင်းတွင် အနည်းဆုံးသစ်ပင်မျိုးစိတ်ပေါင်း ၁၄၅ မျိုးခွဲခြား သတ်မှတ်နိုင်ပါသည်။ မျိုးစိတ်အနည်းစုမှာ ပျောက်ကွယ်ရန်စိုးရိမ်ရ၍ ထိခိုက်နစ်နာလွယ်ကူသော အခြေအနေတွင်ရှိသည်။ မျိုးစိတ်ပေါင်း ၉၀ ဝန်းကျင်များမှ တောရိုင်းသစ်ပင်များအဖြစ် ကွင်းဆင်းလေ့လာမှတ်တမ်းတင်၍ ခွဲခြားသတ်မှတ်ထားရှိသည်။ ပင်လယ်တွင်းဂေဟစနစ်မှာလည်းကောင်းမွန်သောအခြေအနေအဖြစ်ဖော်ပြထားရှိနိုင်ပြီး ပင်လယ်တွင်းရှိအပင်ငယ်များ၊ သတ္တဝါငယ်များ နှင့် ငါးမျိုးများ၏သိပ်သည်းမှုနှင့် မျိုးကွဲများစွာရှိနေပါသည်။ ငါးဖမ်းလုပ်ငန်းများမှာလည်း အတိုင်းအတာပမာဏအားဖြင့် နည်းပါး၍အပြင်းအထန်လုပ်ကိုင်ခြင်းမရှိပါ။ ကမ်းရိုးတန်းတလျှောက်တွင် ငါးမျိုးစိတ်ပေါင်းများစွာနှင့် ရေနေသတ္တဝါများဖြစ်ကြသော ပုဇွန်၊ ဂဏန်းများစွာပေါကြွယ်လျက်ရှိပါသည်။ အများဆုံးတွေ့ရှိနိုင်သောငါးမျိုးစိတ်များမှာ ပလာတူးငါးမျိုးများအဝါရောင်အပြောက်ရှိကျောက်ငါးများဖြစ်ကြပါသည်။ မျိုးစိတ်(၄)ခုမှာ ပျောက်ကွယ်လုနီးပါးစိုးရိမ်ရသော အခြေအနေတွင်ရှိသော်လည်း မျိုးစိတ် (၁၀)ခု မှာမူအနည်းဆုံးသက်ဆိုင်သော အနေအထားတွင်ရှိသည်။

၁.၄.၄ လူမှုစီးပွားအစိတ်အပိုင်း

က လူမှုစီးပွားအခြေအနေ

စီမံကိန်းလေ့လာနေရာ၏ လူမှုစီးပွားအခြေအနေကို ရပ်ကျေးလူထုအား တွေ့ဆုံမေးမြန်း၍လည်းကောင်း၊ ကျေးရွာရပ်ကွက်၏အရေးပါသော လူကြီးများ၏သတင်းအချက်အလက်များ၊ လေ့လာတွေ့ရှိချက်များပေါ်တွင်မူတည်၍ ဖော်ပြအပ်ပါသည်။ အဓိကတွေ့ရှိရသောရွာသုံးရွာ၏ လူမှုစီးပွားအခြေအနေများ၏အကျဉ်းချုပ်များမှာအောက်ပါအတိုင်းဖြစ်ပါသည်။

- စီမံကိန်းလေ့လာနေရာ၏လူဦးရေစုစုပေါင်းမှာ - ၄၀၁၉ ရှိ၍အိမ်ထောင်စု ၉၅၄ ရှိသဖြင့် တစ်အိမ်ထောင်တွင်ပျှမ်းမျှ လူဦးရေ (၄)ဦးမှ (၅)ဦးခန့်ရှိပြီး အမျိုးသမီး အမျိုးသားအချိုးမှာ ၁.၀၂ အချိုး ၁ ဖြစ်ပါသည်။

- သို့ဖြစ်၍ အမျိုးသမီး၊ အမျိုးသားဦးရေမှာ တူညီလုနီးပါးရှိပြီး ၄င်းတို့၏ ဆောင်ရွက်မှု အခန်း ကဏ္ဍများမှာ လည်း တစ်ဦးနှင့်တစ်ဦးပံ့ပိုးကူညီမှုရှိကြပါသည်။
- စီမံကိန်းလေ့လာရာရွာများတွင် နေထိုင်သူများမှာကျေးလက်နေလူထုဖြစ်ကြပါသည်။ တရွာတည်း နေထိုင်သော ရွာသူ/ရွာသားအချင်းချင်း ရင်းနှီးစွာရိုင်းပင်းကူညီလေ့ရှိကြပါသည်။
- ရွာသုံးရွာစလုံးတွင် ဆိုးရွားသောကျန်းမာရေးအခြေအနေမရှိပါ။ ဆေးရုံမှာမူ ရေဖြူနှင့် မောင်းမကန်ရွာ တွင်သာရှိပြီး ၄င်းရွာများမှာ ၄ကီလိုမီတာမှ ၁၇ကီလိုမီတာ အကွာအဝေးတွင်တည်ရှိသည်။
- ကမ်းရိုးတန်းရွာများဖြစ်သည့်အားလျော်စွာ ငပိတက်နှင့် ညောင်ပင်ဆိပ်ရွာများတွင် ငါးဖမ်းခြင်း၊ ကမ်းစပ် ရေတိမ်ရှိသတ္တဝါများ ဖမ်းယူ ရောင်းချခြင်း သည်စိုက်ပျိုးရေးလုပ်ငန်းအတွက် အထောက် အပံ့ပေးသော စီးပွားရေးဖြစ်ကြပါသည်။ သို့ဖြစ်၍ရေလုပ်ငန်းသည်အသားဓါတ်ထောက်ပံ့ခြင်း နှင့် မိသားစု ဝင်ငွေ ရရှိရန်အဓိကကျသည်။ ဒီရေရောက်တောများမှာလည်း စားရေးနေရေးအတွက် အဓိကကျသောအရင်း အမြစ်များဖြစ်ကြသည်။
- မုဒူး နှင့် ကမြိုင်ဆွဲရွာများ၏ အဓိကအသက်မွေးဝမ်းကြောင်းမှာဥယျာဉ်ခြံစိုက်ပျိုးခြင်းဖြစ်သည်။ ၄င်း ကမြိုင်ဆွဲရွာမှာစီမံကိန်းရွာ (၃)ရွာ တွင်အဝေးဆုံးဖြစ်သည်။ သစ်တောနှင့်ဥယျာဉ်ခြံမြေများမှာအစား အစာနှင့် လောင်စာအတွက်အဓိကအရင်းအမြစ်ဖြစ်သည်။ သစ်မာနှင့်ထင်းစုဆောင်းခြင်းကို အဆောက် အဦများနှင့်လောင်စာအတွက် အသုံးပြု၍ အချို့ရွာသားများမှာ မီးသွေးရောင်းချကြသည်။
- စီမံကိန်းဧရိယာအတွင်း စီးပွားရေးဖြစ်စက်ရုံများမရှိကြပါ။ ငပိတက်ရွာဆိပ်ကမ်းအနီးရိုးရာဓလေ့ အခြေခံ သော အိမ်တွင်းစီးပွားရေးလုပ်ငန်းအချို့ရှိပါသည်။
- အိမ်ထောင်စုတစ်ခု၏နှစ်စဉ်ပျှမ်းမျှဝင်ငွေမှာ ၃၈၆၀ အမေရိကန်ဒေါ်လာနှင့်ညီမျှပြီး အသုံးစရိတ်မှာ ၃၀၈၂ အမေရိကန်ဒေါ်လာနှင့် ညီမျှပါသည်။
- အိမ်ထောင်စုတစ်စု၏တစ်နှစ်လျှင် ပျမ်းမျှအသုံးစရိတ်မှာ ပျမ်းမျှဝင်ငွေနှင့်တူညီသလောက်ရှိသဖြင့် အိမ်ထောင် အများစုမှာ စုဆောင်းငွေမရှိကြဘဲ သာမန်အားဖြင့် အကြွေးတင်လေ့ရှိပါသည်။
- အလုပ်လက်မဲ့ဦးရေရှားပါးပါသည်။ ကျေးရွာသူ/သားများသည် ကိုယ်ပိုင်ငါးဖမ်းနှင့်စိုက်ပျိုးခြင်းကို လုပ်ကိုင်ကြပါသည်။
- ကျေးရွာသူ/သား အများစုမှာ မူလတန်းအဆင့်ပညာရေးကို တက်မြောက်ကြပါသည်။
- ထိခိုက်နစ်နာလွယ်ကူသူစာရင်းတွင် ထည့်သွင်းစဉ်းစားခံရမည့်ဦးရေမှာ နည်းပါးလှပါသည်။ လူမှု တည်ဆောက် ဖွဲ့စည်းပုံအရသက်ကြီးရွယ်အို၊ ထိခိုက်နစ်နာလွယ်ကူသူများကို မိမိတို့မိသားစုဝင်များ ဆွေမျိုးသား ချင်းနှင့်အိမ်နီးချင်းများက ဝိုင်းဝန်းစောင့်ရှောက်ပါသည်။

ခ   မြေအသုံးချမှု

စီမံကိန်းလေ့လာနေရာတစ်ဝက်မျှလောက်ရှိ ဧက ၂၀၀၀၀ သည် ပင်လယ်ရေမျက်နှာပြင်ဖြစ်သည်။ လေ့လာနေရာ၏ ကုန်းတွင်းပိုင်းဖြစ်သောရွာများနှင့် စိုက်ပျိုးမြေများမှာစီမံကိန်းဧရိယာ၏ ၄၅%ဖြစ်ပြီး ခုတ်ထွင်ရှင်း လင်းပြီးဖြစ်သော သစ်တောမြေ ၄၀%နီးပါးနှင့် အခြားသော အသုံးချမှုများနှင့် ရေနှာမြေမှာ ၂၀% နီးပါးဖြစ်သည်။

ဂ   အခြေခံအဆောက်အအုံများ

စီမံကိန်းလေ့လာနေရာသည် အခြေခံအဆောက်အအုံနှင့်အထောက်အပံ့ပစ္စည်းများ လုံလောက်မှုမရှိသောနေရာ ဖြစ်သည်။

"လမ်း" - စီမံကိန်းနေရာ၏တစ်ခုတည်းသောအဓိကလမ်းကို အီတာလီယံထိုင်းကုမ္ပဏီမှ ထားဝယ်အထူးစီးပွား ရေးဇုန်အတွက်တည်ဆောက်သည်။ ၎င်းလမ်းနှင့်ရွာလမ်းများမှာကတ္တရာလောင်းခြင်းမရှိသော မြေသားလမ်းများ မြေသားလမ်းများဖြစ်၍ ယာဉ် အသွားအလာနည်းပါးသည်။ မြေသားလမ်းဖြစ်သောကြောင့် ကြမ်း၍ဖုန်ထူသည်။

"လျှပ်စစ်ဓါတ်အား"- စီမံကိန်းလေ့လာနေရာတွင် အစိုးရလျှပ်စစ်ဓါတ်အား ဖြန့် ဖြန့်ဝေပံ့ပိုးပေးခြင်းမရှိပါ။ ရွာသားများ ၏ ပုဂ္ဂလိကကိုယ်ပိုင်အသေးစားမီးစက်များဖြင့်သာကိုယ်တိုင်ပံ့ပိုးခြင်း (သို့မဟု (သို့မဟုတ်) အခြားပုဂ္ဂလိကပိုင်မီးစက်များ ဖြင့်ပံ့ပိုး ခြင်းသာရှိပါသည်။

"ရေဖြန့်ဝေခြင်း"- စီမံကိန်းလေ့လာနေရာတွင် ဖြန့်ဝေသေ ရေပို ရေပိုက်လိုင်းစနစ်မရှိပါ။ ရွာသုံးရွာစလုံးတွင် ရေတွင်း ရေကန်နှင့် မိုးရေကိုသာသုံးစွဲသောက်သုံးရသည်။

"အမှိုက်စွန့်စနစ်"- စွန့်ပစ်ပစ္စည်းများနှင့်မိလ္လာစနစ်တို့အတွက် စနစ်တကျသတ်မှတ်ထားခြင်းမရှိပါ။ ရေဆိုး ရေဆိုး များကို မြေကြီးပေါ်တွင်သာသွန်ချခြင်း၊ လောင်းချခြင်း၊ အကယ်၍မြောင်းရှိပါက မြောင်းတွင်းသို့ မြောင်းတွင်းသို့ တိုက်ရိုက်သွန်ချစီးဝင် စေပါသည်။

၁.၄.၅   ယဉ်ကျေးမှုဆိုင်ရာ အစိတ်အပိုင်းများ

"ဘာသာရေး နှင့် ယုံကြည်ကိုးကွယ်ခြင်း"- လူအများစုမှာ ထားဝယ်ဒေသရှိ ဗ မာလူမျိုးများဖြစ်ကြပြီး ထေရ ထေရဝါဒ ကိုးကွယ်ယုံကြည်ကြသူများဖြစ်ကြသည်။ ဒေသန္တရထားဝယ်စကားကို ပြောကြသည်။

"ရှေးရာဇဝင် ထုံးစံနှင့် သမိုင်းနောက်ခံ" - ကျေးရွာတိုင်းတွင် ဘုန်းကြီးကျောင်းများ စေတီပုထိုးများ နှင့် သင်္ချိုင်းရှိ သင်္ချိုင်းရှိသည်။ အရေးကြီးတန်ဖိုးထားသော သမိုင်းဝင်နေရာသည် နဘုလည် ဒေသတဝိုက်တွင်တည်ရှိသည်။

"အသက်မွေးဝမ်းကြောင်း အတွက် သဘာဝသယံဇာတ"- အသက်မွေးမှုအတွက် ပ င်လယ် က ကမ်းရိုးတန်းနေ ရွာသားများ အဓိကမှီခိုအားထားရသည့် ပင်လယ်နှင့်ဒီရေရောက်တောမှ သဘာဝအ သဘာဝအရင်းအမြစ်များသာဖြစ်သည်။ င ပိတက် ရွာသားများသည်ဒီရောက်တောမှ ထွက်ကုန်များကိုအသုံးပြု၍ ပြင်ကြီး ပြင်ကြီးချောင်း သည် ၎င်းတို့၏ငါးဖမ်းလှေများ အားလေပြ င်း မုန်တိုင်းအတွက် အကာအရံသဖွ

အကာအရံသဖွယ်ဖြစ်သည်။ မုဒုံးရွာသားများသည် ကုန်းတွင်းပိုင်းသယံဇာတများကို မှီခိုအားထား သည့်အလျောက် အ
အဓိကစိုက်ပျိုးယာများမှာစပါးနှင့် အခြားနှစ်ရှည်ပင်များကိုရိုးရှင်းသောနည်းလမ်းများဖြင့်စိုက်ပျိုးကြသည်။အိမ်မွေး
အိမ်မွေးတိရစ္ဆာန်များကို မိသားစုစားသုံးရန် နှင့် အနည်းငယ်သာ ရောင်းချမှု ပြုသည်။

"အဓိကဌာနဆိုင်ရာ နှင့် အဖွဲ့အစည်းများ"- ရပ်ကျေးလူထုများသည် ၎
၎င်းတို့၏ဖွဲ့စည်းထားသော ကျေးရွာအုပ်ချုပ် မှုအဖွဲ့အစည်းများ၊ လူမှုခေါင်းဆောင်များ၊ ရပ်ရွာအ[ ]
ရပ်ရွာအကြီးအကဲများကိုရှိသေမှုရှိကြသည်။ လူငယ်အဖွဲ့ နှင့် အရံမီးသတ် တပ်ဖွဲ့များမှာ ရပ်ရွာအကျိုးအတွက်တက်ကြွစွာပါဝင်
ါဝင်ဆောင်ရွက်ကြသူများဖြစ်သည်။ အဓိကရပ်ကျေးအခြေပြုအဖွဲ့မှာ ထားဝယ် ဖွံ့[ ] ဖိုးတိုးတက်ရေးအဖွဲ့အစည်း (DDA)
ဖြစ်သည်။

၁.၄.၆ စက္ကူပသာဒ အစိတ်အပိုင်းများ

စီမံကိန်းလေ့လာနေရာသည် ကမ်းရိုးတန်းနှင့်တောင်တန်းများနောက်ခံရှိသည့် ရှည်လျားလှသောကမ်းစပ် တစ်ခု
ကဲ့သို့ဖြစ်သည်။ မျက်စိပသာဒဖြစ်လှသောရှုခင်းမရှိလှပါ။ န ဘုလည်နှင့်မောင်းမကန်ကမ်းခြေတို့မှာ သာယာလှပသည့်
ကမ်းခြေအဖြစ် ခရီးသွားများအားဆွဲဆောင်လျက်ရှိသော အလားအလာကောင်းမွန်သည့်နေရာများဖြစ်သည်။ သို့ေ
သို့သော် ၎င်းနေရာများမှာ စီမံကိန်းနေရာနှင့် (၇)ကီလိုမီတာနှင့် (၁၁) ကီလိုမီတာ ဝေးကွာကြပါသည်။

၁.၅ ထိခိုက်သက်ရောက်မှုဆန်းစစ်လေ့လာမှုချဉ်းကပ်နည်းလမ်း

၁.၅.၁ နည်းစနစ်

တည်ဆောက်စဉ်နှင့်လည်ပတ်ကာလများတွင် သဘာဝပတ်ဝန်းကျင် ထိခိုက်သက်ရောက်မှု လေ့လာဆန်းစစ်ခြင်း နည်းစနစ်များမှ သဘာဝပတ်ဝန်းကျင်နှင့်လူမှုရေးရာကိစ္စရပ်များအတွက် ခြုံငုံမိစေပါသည်။ စီမံကိန်းအဆင့်တိုင်းတွင် ပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှု လေ့လာဆန်းစစ်ချက်ကို ပတ်သက်ဆက်နွယ်သောပတ်ဝန်းကျင်နှင့် လူမှုရေးဆိုင်ရာ ကိစ္စရပ်များအားဖြင့်ဖော်ထုတ်သတ်မှတ်ရမည်။ အကျိုးဆက်အားဖြင့်ထိခိုက်သက်ရောက်မှုလေ့လာဆန်းစစ်ချက်တစ်ခုချင်း စီမှာ အောက်ဖော်ပြပါအတိုင်းဖြစ်သည်။

(၁) စီမံကိန်းအချက်အလက်ပေါ်မူတည်၍ ပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှု ခန့်မှန်းခြေပမာဏကို တွက်ချက်ရပါ မည်။ ဥပမာအားဖြင့် ပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှုပမာဏမှာ ကုန်တင်ကားများ၏အရေအတွက်နှင့် ပြေးဆွဲသည့်အခေါက်ရေများမှာလိုအပ်သောတည်ဆောက်ပစ္စည်းသယ်ပို့ခြင်းနိုက်တြိုဂျင်အောက်ဆိုဒ်ထုတ်လွှတ်မှုပမာဏ

(၂) ကိစ္စရပ်များအတွက် ပမာဏအနည်းဆုံးလျှော့ချနိုင်စေသော အကောင်းဆုံးအလေ့အကျင့်ကို ဖြစ်ရန် အတွက် စီမံကိန်းပုံစံ၊ တည်ဆောက်နည်းလမ်း (သို့) တည်ဆောက်မှုအလေ့အကျင့်များသတ်မှတ်ရန်၊ အကယ်၍ ဖြစ်နိုင်လျှင် သက်ဆိုင်သောနည်းလမ်းဥပဒေများတွဲဖက်ကျင့်သုံးခြင်း၊ ဥပမာအားဖြင့်လောင်ကျွမ်းထွက်ရှိသည့် နိုက်တြိုဂျင်

အောက်ဆိုဒ်ထုတ်လွှတ်မှုအနိမ့်ဆုံး လျှော့ချအသုံးပြုခြင်းတွင် သတ်မှတ်စံနှုန်းအတိုင်းဖြစ်ရန်နှင့် အသံဆူညံမှုအရင်း အမြစ်များမှ နိမ့်ချခြင်း

(၃) အမျိုးမျိုးသတ်မှတ်ထားရှိသည့်ကျန်ရှိသောပမာဏ အညွှန်းကိန်းများနှင့်နှိုင်းယှဉ်တိုင်းတာ၍ ထိရောက်သော လျှော့ချနည်းလမ်းများကိုတွက်ချက်အစီရင်ခံခြင်း။ ဥပမာအားဖြင့်နိုက်ထြိုဂျင်အောက်ဆိုဒ် လျှော့ချလောင်ကျွမ်းနည်းလမ်းနှင့် နိုက်ထြိုဂျင်အောက်ဆိုဒ်ပမာဏကို ထိရောက်သောနည်းလမ်းအားဖြင့် တွက်ချက်တိုင်းတာခြင်း (သို့) မီးခိုးခေါင်းတိုင်တွင် နိုက်ထြိုဂျင်အောက်ဆိုဒ်ပါဝင်မှု ပမာဏ တိုင်းတာနိုင်သောနည်းလမ်း၊

(၄) လက်တွေ့အသုံးချလွယ်ကူသောနည်းလမ်းများနှင့် ကျန်ရှိနေသောအရင်းအမြစ်များနှင့် ပမာဏ စံနှုန်းများနှင့်နှိုင်းယှဉ်ခြင်း။ အကယ်၍ကျန်ရှိနေသောပမာဏနှင့်လက်တွေ့အသုံးချစံနှုန်းနှင့် မကိုက်ညီပါကလိုအပ်သောလျှော့ချနည်းလမ်းများကို ထပ်မံထည့်သွင်းတိုင်းတာပေးရန်၊ ဥပမာအားဖြင့် စွန့်ပစ်ရေဆိုးပမာဏနှင့် ညစ်ညမ်းမှုအနည်းဆုံးလျှော့ချစေခြင်းဆောင်ရွက်မှုကိုလက်တွေ့ အသုံးချအကောင်းဆုံးလေ့ကျင့်မှု၊ စွန့်ပစ်ရေဆိုးကို သတ်မှတ်စံချိန်စံနှုန်းများအတိုင်း စွန့်ပစ်စီးဝင်စေခြင်း၊

(၅) ပတ်ဝန်းကျင်အရည်အသွေးများ၏ ထိခိုက်သက်ရောက်မှု ပမာဏတိုင်းတာတွက်ချက်ရန်၊ ဥပမာအားဖြင့် မီးခိုးခေါင်းတိုင်မှ ထုတ်လွှတ်သော နိုက်ထြိုဂျင်အောက်ဆိုဒ် ပျံ့လွင့်မှုပမာဏကိုစီမံကိန်းဧရိယာအတွင်း တိုင်းတာသတ်မှတ်ခြင်း၊ ရလဒ်မှာ စီမံကိန်းဧရိယာ၏ အမျိုးမျိုးသော နေရာများတွင် မြင့်တက်နေလိမ့်မည်။

(၆) ပတ်ဝန်းကျင်အရည်အသွေးစံချိန်စံနှုန်းများ၊ အရည်အသွေးများအားဖြင့်အသုံးချနည်းလမ်းများ နှိုင်းယှဉ်ခြင်း၊ ထုတ်လွှတ်နိုက်ထြိုဂျင်အောက်ဆိုဒ်သည် စံချိန်စံနှုန်းထက်မြင့်တက်နေသောကိစ္စရပ်တွင်မည်သို့သောအကြောင်းကြောင့်ဖြစ်စေ ထုတ်လွှတ်မှုကိုလျှော့ချစေခြင်း၊ သန့်စင်စေခြင်းဖြင့်နိုက်ထြိုဂျင်အောက်ဆိုဒ်ပါဝင်မှု မြင့်တက်နေခြင်း ကို လျှော့ချခြင်း၊

(၇) ပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှုကြီးကြပ်ကွပ်ကဲမှုတွင် အရေးပါ၍ဦးစားပေးသိသာသည့် ထိခိုက်သက်ရောက်မှုကိုဖြေရှင်းရန်၊ ဤကဲ့သို့ ပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်သောကိစ္စရပ်များကို အခြေခံမှတ်ကျောက် (၆) ချက်ပေါ်တွင်မူတည်၍ အဆင့်(၅)ဆင့်ခွဲခြားသတ်မှတ်ခြင်းကို ဇယား ၁.၅-၁ တွင်ဖော်ပြထားရှိသည်။ ၄င်းမှတ် ကျောက်များကို သတ်မှတ်ထားသောကိစ္စရပ်တစ်ခုချင်းစီအလိုက်လိုအပ်သလို ပြင်ဆင်မွမ်းမံရပါမည်။

ဇယား၁.၅.၁ ပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှုစိစစ်ကြည့်ခြင်းတွင် ထိခိုက်မှုအဆင့်အတန်း

ထွက်ချက်ခြင်း	ထိခိုက်သက်ရောက်မှုအဆင့်(သို့) ပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှုစိစစ်ခွဲခြင်း သိသာထင်ရှားမှု				
	သိသာထင်ရှား အရေးပါ	အဓိက	သင့်တင့်	သေးငယ်	မသိသာမထင်ရှား
ကိစ္စရပ်များ၏ပမာဏ	အလွန်ကြီးမား	ကြီးမား	အသင့်အတင့်	သေးငယ်	အရေးမကြီး
ကိစ္စရပ်တို့၏သဘာဝ	နဂိုအတိုင်း မဖြစ်နိုင်	နဂိုအတိုင်း မဖြစ်နိုင်	နဂိုအတိုင်း ဖြစ်နိုင်	နဂိုအတိုင်း ဖြစ်နိုင်	နဂိုအတိုင်း ဖြစ်နိုင်
အချိန်ကာလ	အမြဲတမ်း	အချိန်ကြာ	အတော်အသင့် အချိန်တို	အချိန်တို	အလွန်တိုတောင်း
စီမံကိန်းအကောင် အထည် ဖော်ပြီးတိုင်းတာသတ်မှတ်ခြင်း					
-ကျန်ရှိသည့်ပမာဏကို ပတ်ဝန်းကျင် ပမာဏအားဖြင့် စံချိန်စံနှုန်းပြည့်မီခြင်း	မရှိ	မရှိ	ရှိ	ရှိ	ရှိ
-ထိခိုက်နစ်နာသောစီမံကိန်းဧရိယာ၏ရလဒ်ကိုပတ်ဝန်းကျင်စံချိန်စံနှုန်းဖြည့်မီခြင်း	မရှိ	ရှိ	ရှိ	ရှိ	ရှိ
ထိခိုက်သက်ရောက်နေရာ၏တုန့်ပြန်နိုင်မှု	အလွန်မြင့်မား	မြင့်မား	အသင့်အတင့်	နိမ့်	အတော်အသင့်

စီမံကိန်းအကြိုကာလ တည်ဆောက်ဆဲနှင့် လည်ပတ်ကာလများတွင် အဓိကပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှုအန္တရာယ်များကို သတ်မှတ်ဖော်ပြထားရှိ၍ ကြိုတင်ဆန်းစစ်လေ့လာခြင်းကို ပတ်ဝန်းကျင်နှင့်လူမှုစီးပွား၊ အချက်အလက်များအပေါ် အခြေခံ၍ စမ်းသပ်လေ့လာထားရှိရမည်။ ၎င်းအပြင်စီမံကိန်းတည်ဆောက်စဉ်နှင့် လည်ပတ်စဉ်ကာလ အဓိကတွေ့ရှိချက်များ၏ အနှစ်ချုပ်မှာ အောက်ပါအတိုင်းဖြစ်သည်။

၁.၅.၂ စီမံကိန်းအကြိုကာလနှင့် တည်ဆောက်ဆဲကာလထိခိုက်သက်ရောက်မှုများ

စီမံကိန်းအကြိုကာလနှင့် စီမံကိန်းကာလများ၏ စီမံကိန်းလုပ်ဆောင်ချက်များသည် တူညီနေသောကြောင့် ၎င်း ၎င်းကာလ ၂ ခု၏ ထိခိုက်သက်ရောက်မှုများသည် တူညီသော လုပ်ငန်းဆောင်တာ လုပ်ဆောင်မှုများမှဖြစ်ပေါ်သော သက်သက်ရောက်မှုများ ဖြစ်ပါသည်။ ထို့ကြောင့် စီမံကိန်းအကြိုကာလနှင့် စီမံကိန်းကာလများ၏ ထိခိုက်သက်ရောက်မှုနှင့် လျော့လျော့ချမှုနည်းလမ်းများကို အတူတကွဖော်ပြပါမည်။

က. ထိခိုက်သက်ရောက်မှုဆန်းစစ်ချက်

အားလုံးသော စီမံကိန်းနေရာများတွင် စီမံကိန်းတည်ဆောက်မှုများကြောင့် စီမံကိန်းအကြိုကာလနှင့်စီမံကိန်း ကာလတွင် ကာလတိုနှင့်တန်ပြန်ထိခိုက်သက်ရောက်မှုများ ရှိနိုင်သည်။ ယေဘုယျအားဖြင့် သဘာဝပတ်ဝန်းကျင် နှင့် လူမှုရေးကိစ္စရပ်များအား စီမံခန့်ခွဲခြင်းနှင့် စပ်လျဉ်းသောအရင်းအမြစ်များမှာ-

ပတ်ဝန်းကျင်ဆိုင်ရာထိခိုက်သက်ရောက်မှုများဖော်ပြချက်များ -

- **ဖုန်မှုန့်များလွင့်ခြင်း** - စီမံကိန်းတည်နေရာရှင်းလင်းခြင်း၊ တူးဖော်မြေညှိခြင်းနှင့် ယန္တယားများ သယ်ယူပို့ဆောင်ခြင်း၊ ကုန်တင်ယာဉ်ကြီးများ မြေသားလမ်းတွင်သွားလာမှုများကြောင့် ထွက်ရှိလာသော ဖုန်မှုန့်များ
- **ဓာတ်ငွေ့များထွက်ရှိခြင်း** - ဒီဇယ်သုံးစက်အသုံးပြုလည်ပတ်ခြင်း၊ ယာဉ်များနှင့်စက်ယန္တယားများ အသုံးပြုမှု ထွက်ရှိသောဓာတ်ငွေ့များ
- **ဆူညံသံ** - တည်ဆောက်မှုအမျိုးမျိုး စက်ယန္တယားများ၏ အသံများအထူးအားဖြင့် စက်ယန္တယားကြီးများအားဖြင့် တိုင်များရိုက်သည့် ဆူညံသံများ
- **စွန့်ပစ်ရေဆိုးများ** - အလုပ်သမားများ၏ အသုံးပြုစွန့်ပစ်ရေများ၊ ဆေးကြောရေများနှင့် မြေမျက်နှာပြင်ပေါ်သို့ စွန့်ပစ်သောရေများ
- **တည်ဆောက်မှုစွန့်ပစ်ပစ္စည်းများ** - သစ်ပင်များခုတ်ထွင်ရှင်းလင်းခြင်း၊ အန္တရာယ်ရှိပစ္စည်းများစွန့်ပစ်ခြင်း၊ ပုတ်သိုးဆွေးမြေ့ပစ္စည်းများနှင့် အလုပ်သမားများ၏ စွန့်ပစ်ပစ္စည်းများ
- **ယာဉ်အသွားအလာ** - စက်ရုံပစ္စည်းများ၊ ယန္တယားအစိတ်အပိုင်းများနှင့် တည်ဆောက်မှုမှစွန့်ပစ်ပစ္စည်းများ သယ်ယူပို့ဆောင်ခြင်း
- **ပင်လယ်တွင်းသတ္တဝါတို့၏ဂေဟစနစ်နှင့်အသက်မွေးမှု** - ပင်လယ်ရေသွင်းပိုက် နှင့် ရေထုတ်ပိုက်များ တည်ဆောက်ခြင်းကြောင့်ဖြစ်ပေါ်မှု

လူမှုရေးဆိုင်ရာ ထိခိုက်သက်ရောက်မှု ဖော်ပြချက်များ -

- **ဇုစ်နီမြစ်ကောခြင်းသည်** ဇုစ်နီမြစ်အတွင်းတွင်ရှိသော စီမံကိန်းနေရာ မြေဖို့ခြင်းလုပ်ငန်းများကြောင့် ဖြစ်သည်။
- **ဒေသတွင်းစီးပွားရေးသည်** စီမံကိန်းအလုပ်အကိုင်များကြောင့် ဝင်ငွေရရှိမှုများဖြစ်ပေါ်လာပါသည်။ ဝင်/ထွက်ပိုက်လိုင်းသည် လူသွားလမ်းအောက်၊ ချောင်းနှင့် ပင်လယ်ကြမ်းပြင်တို့၏ အသက်မွေးဝမ်းကြောင်းမှုပေါ်မူတည်နေပါသည်။

- **အဆောက်အအုံများနှင့် ဝန်ဆောင်မှုများသည်** ဒေသခံများနှင့် စီမံကိန်းဆောက်လုပ်ရေးဝန်ထမ်းများအပေါ်တွင် ကန့်သတ်ထားသော အသုံးပြုမှုများရှိသည်။
- **ယဉ်ကျေးမှုနှင့်ရိုးရာအစဉ်အလာများသည်** ဆောက်လုပ်ရေးဝန်းထမ်းများဆီမှ ပြောင်းလဲကူးစက်လာနိုင်ပါသည်။
- **ဒေသခံပြည်သူများ၏ ကျန်းမာရေးဘေးအန္တရာယ်ကင်းရှင်းရေးနှင့် လုံခြုံရေးတို့သည်** အလုပ်သမားများပေါ် မူတည်နေပါသည်။
- **စီမံကိန်းနှင့် ပတ်သက်၍ မလိုလားသော သဘောထားကို** အနီးအနားရှိ ရပ်ရွာလူထုတွင် တွေ့ရှိရပါသည်။ အထက်ပါ သဘာဝပတ်ဝန်းကျင်နှင့်လူမှုအဟန့်အတားများမှာ စီမံကိန်းတည်ဆောက်စဉ်အခိုက်အတန့်အတွင်း ပေါ်ပေါက်စေနိုင်ပြီး စီမံကိန်းပြီးဆုံးသွားပါက မူလအခြေအနေအတိုင်းပုံမှန်ရောက်ရှိနိုင်ပါသည်။ ရွာသုံးရွာနှင့်စီမံကိန်း တည်နေရာသည် သိသာထင်ရှားလွန်းသော ထိခိုက်သက်ရောက်မှုရှိနိုင်သည့် အကွာအဝေးတွင်တည်ရှိနေခြင်းမရှိပါ။

ခ. ထိခိုက်သက်ရောက်မှုဆန်းစစ်ခြင်းရလဒ်နှင့် အဆိုပြုလျှော့ချနည်းလမ်းများကိုတင်ပြဆင်မှု

တိကျသောကိစ္စရပ်တစ်ခုချင်းစီအတွက် ထိခိုက်သက်ရောက်မှုဖော်ပြချက်များကို လေ့လာဆန်းစစ်ခြင်းနှင့် ခြုံငုံ မိစေသောအဆိုပြုလျှော့ချနည်းလမ်းများ၏ အနှစ်ချုပ်ကို ဇယား ၂.၅.၂တွင် ဖော်ပြထားရှိသည်။

ယေဘုယျလေ့လာချက်အဖြစ် တည်ဆောက်ဆဲကာလအခိုက်သက်ရောက်မှုမှာ သေးငယ်သောပမာဏသာ ဖြစ်၍ ထိရောက်သောနည်းလမ်းကို ဖော်ပြတည်ထောင်ခြင်းဖြင့် လျှော့ချနိုင်ပါသည်။

ဇယား ၁.၅.၂

တည်ဆောက်ဆဲကာလပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှုကိစ္စရပ်များ

ကိစ္စရပ်	ပင်မအရင်းအမြစ်	ပမာဏ	လက်ခံရောက်ရှိမှု	ခန့်မှန်းထိခိုက်သက်ရောက်မှု	အဆိုပြုလျှော့ချနည်းလမ်း	ကြွင်းကျန်ထိခိုက်သက်ရောက်မှုအရေးပါခြင်း
ဖုန်မှုန့်လွင့်ခြင်း	စီမံကိန်းမြေနေရာပြင်ဆင်ခြင်းယာဉ်များသွားလာမှုနှင့်မြေသားလမ်းတွင်တည်ဆောက်ပစ္စည်းများယန္တယားများသယ်ယူခြင်း	ခန့်မှန်းခြေအားဖြင့် ၄၆.၉ g/s	တည်ဆောက်ရေးအလုပ်သမားများ ၂.၂၃ ကီလိုမီတာအကွာတွင်ရှိပေါ်တက်ရွာသူ/သားများ	ခန့်မှန်း Tsp အဆင့် ၁၇၀.၃၂ µg/m³ ဖြင့် နိုင်း ယှဉ်သောစံနှုန်း ၂၃၀ µg/m³ ထက်မကျော်လွန်ပါ။	သာမန်လုပ်ထုံးလုပ်နည်းအဓိကအားဖြင့် ရေကိုအချိန်ခြား၍ ဖြန်းပေးခြင်းသည် ဖုန်မှုန့်များလွင့်ခြင်း၏ ၇၅%လျှော့ကျစေသည်။	အသင့်အတင့်အားဖြင့်ဦးစားပေးထိန်းချုပ်ခြင်းဖြင့် မထင်ရှားပါ။
အသံဆူညံမှု	တည်ဆောက်မှုလုပ်ငန်းများစက်ယန္တယားကြီးများဖြင့်တည်ဆောက်ခြင်း၊ အဆောက်အဦအခြေချရာတွင်တိုင်များကိုစက်ယန္တရားကြီးများအားဖြင့်ရိုက်သွင်းခြင်း	ကြီးမားသောယန္တယားများ အတွက် ၉၂.၇၇ dB (A) နှင့် တိုင်များရိုက် ခြင်းအတွက် ၁၀၅.၇၇ dB(A)	တည်ဆောက်ရေးအလုပ်သမားများ ၂.၂၃ ကီလိုမီတာအကွာရှိပေါ်တက်ရွာသူ/သားများ	တိုင်များရိုက်သွင်းရန်စက်ယန္တယားကြီး (၃)ခုအား ဖြင့်တပြိုင်နက်ရိုက်သွင်းခြင်း၊ အသံဆူညံမှုရလဒ် ၁၀၅.၇၇ dB (A) ဆူညံမှု	ကန့်ထရိုက်တာသည်သင့်တော်သော အသံဖြစ်ပေါ်မှုနှင့် အသံလအသံလက်ခံရာသို့ဆူညံသံများကိုဟန့်တားစေသည့်အတားအဆီးများကိုဖန်တီးခြင်း၊	လစ်လျူရှုနိုင်သည့်အဆင့်ထိန်းချုပ်မှု
စွန့်ပစ်ရေဆိုးများ	အလုပ်သမားများ၏စွန့်ပစ်အညစ်အကြေးများ၊ စက်ယန္တရားများဆေးကြောသန့်စင်ခြင်း နှင့် ယာဉ်များဆေးကြောခြင်း	နေ့စဉ်အသုံးပြု ရေ ၉၀ m³ / day ဆေးကြောမှုဖြင့်ထွက်ရှိသောရေတာ ပတ်လျှင်ပမာဏ ၂m³/ week	ပင်လယ်တွင်းသို့ ၈၀၀ m အကွာအဝေး	စွန့်ပစ်ရေဆိုးများပါဝင်မှု ကြောင့်ညစ်ညမ်းမှုအနည်း ငယ်ရှိဘိလပ်မြေများယန္တရား များဆေးကြောမှုမှ ထုထည်အနည်းငယ် မြေကြီးပေါ်သို့စွန့်ပစ်စီးဆင်းစေသည့် မထင်ရှားသောပမာဏ	အားလုံးသောစွန့်ပစ်ရေဆိုးများကိုသန့်စင်၍ စံချိန်းစံနှုန်းနှင့် အညီ စွန့်ပစ်ရန်	အသင့်အတင့်အားဖြင့်ဦးစားပေးထိန်းချုပ်ခြင်းဖြင့် မထင်ရှားပါ။

ကိစ္စရပ်	ပင်မအရင်းအမြစ်	ပမာဏ	လက်ခံရောက်ရှိမှု	ခန့်မှန်းထိခိုက်သက်ရောက်မှု	အဆိုပြုလျှော့ချနည်းလမ်း	ကြွင်းကျန်ထိခိုက်သက်ရောက်မှုအရေးပါခြင်း
တည်ဆောက်မှုမှစွန့်ပစ်ခြင်း	စီမံကိန်းမြေနေရာရှင်းခြင်းနှင့် မြေညှိခြင်းတွင် ယန္တရားကြီးများအားဖြင့် အသုံးပြုရာမှထွက်ရှိခြင်း၊ အန္တရာယ်ရှိစွန့်ပစ်ပစ္စည်းများ၊ အလုပ်သမားများနေ့စဉ်အသုံးပြုပစ္စည်းများမှ ထွက်ရှိပစ္စည်းများ	တည်ဆောက်မှုကြောင့်စွန့်ပစ်ခြင်း ပျမ်းမျှပမာဏတစ်နေ့နေ့လျှင် ၁.၆၇၂ တန် တည်ဆောက်မှုကြောင့်မဟုတ်သော စွန့်ပစ်မှုမှ ပျမ်းမျှပမာဏတနေ့လျှင် ၉၆ ကီလိုဂရမ်၊အန္တရာယ်ရှိစွန့်ပစ်ပမာဏ တနေ့လျှင် ၂၂ ကီလိုဂရမ်	မြေကြီးအတွင်းနှင့်စွန့်ပစ်ရာနေရာ	ထိခိုက်သက်ရောက်မှု ပမာဏကြိုတင်ခန့်မှန်းမရ၊ မြေပေါ် (သို့) မြေအောက်အတွင်း စွန့်ပစ်နေရာ၊ သိသာသောထိခိုက်သက်ရောက်မှုအတွက် ထည့်သွင်းစဉ်းစားရန်	သင့်တော်သော ဒီဇိုင်းနှင့်ငံနှင့် ကောင်းမွန်သောပုံစံအားဖြင့် အရင်းအမြစ်ကို လျှော့ချခြင်းနှင့် တည်ဆောက်မှုစီမံကြီးကြပ်ခြင်း	သေးငယ်သဖြင့် သိသာထင်ရှားခြင်းမရှိ၊ အကယ်၍အသင့်အတင့်အားဖြင့် ဦးစားပေးထိန်းချုပ်ခြင်း
ယာဉ်အသွားအလာ	စီမံကိန်းနေရာအား မြေပြုပြင်ဖြည့်တင်းရန် သယ်ယူပို့ဆောင်ခြင်း	စီမံကိန်းနေရာပြုပြင်ခြင်းခန့်မှန်းမြေအားဖြင့် ရက် (၆၀) နှင့် ၁-၂ မီတာ မြေဖို့ခြင်းအတွက် တစ်နေ့လျှင် ၅၄၃ ခေါက်ယာဉ်အသွားအလာ	ကမ်းခြေရှိ လမ်းနှင့် ပင်ပိတက်ရွာနှင့် ဆက်စပ်လျှက်ရှိသော လျှပ်စစ်ဓာတ်အားပေးစက်ရုံ	ITD လမ်းတွင် ကုန်တင်ယာဉ်များဖြင့် ပြည့်ကျပ်ခြင်း	-စီမံကိန်းနေရာမြေပြုပြင်ခြင်းကို အမြန်ဆုံးပြီးစီးအောင်ဆောင်ရွက်စေခြင်း -နေ့စဉ်ယာဉ်သွားလာမှုအခေါက်ရေလျှော့ကျရန် မြေပြုပြင်ရေး ကာလအားရက် (၁၂၀) အထိတိုးမြင့်ခြင်း -ယာဉ်အသွားအလာစီမံကွပ်ကဲခြင်း -ယာဉ်အမြန်နှုန်းစီမံကွပ်	သိသာထင်ရှား ဤဦးစီးပေးအဆင့်မြင့်စွာထိန်းချုပ်ခြင်း

ကိစ္စရပ်	ပင်မအရင်းအမြစ်	ပမာဏ	လက်ခံရောက်ရှိမှု	ခန့်မှန်းထိခိုက်သက်ရောက်မှု	အဆိုပြုလျှော့ချနည်းလမ်း	ကြွင်းကျန်ထိခိုက်သက်ရောက်မှုအရေးပါခြင်း
					ကဲခြင်း	
လူမှုရေးဆိုင်ရာ ကိစ္စရပ်များ						
ဖျစ်နီဖျစ်တိမ်ကောခြင်း	စီမံကိန်းလုပ်ငန်းများကြိုတင်ပြင်ဆင်ခြင်း၊ ဖျစ်နီမြစ်အတွင်းပါဝင်နေနေသော စီမံကိန်းနေရာအားမြေဖို့ခြင်းလုပ်ငန်းများဆောင်ရွက်ခြင်း	ခန့်မှန်းခြေစုစုပေါင်းဧရိယာ - ၂၄၅.၁၉ ဧက	ပေါ်ပိတက်ကျေးရွာသူကျေးရွာသားများ	သဘော်ကျင်း (သို့) ရွာသူရွာသားများ၏ ရေကြောင်းသွားလာမှုကို ပိတ်ဆို့ထားခြင်း	အစားထိုး သဘော်ကျင်း/ လှေဆိပ်ကို အကောင်အထည်ဖော်ခြင်း	- သေးငယ်သော ထိခိုက်သက်ရောက်မှု - အနည်းငယ်ဦးစားပေးထိန်းချုပ်ခြင်း
ဒေသခံစီးပွားရေး	အလုပ်အကိုင်ရရှိခြင်းဖြင့် ဒေသခံစီးပွားရေးဝင်ငွေ စီးဆင်းခြင်း	ဝင်ငွေနှုန်းတစ်လ လျှင် ၄၈၅၀၀ ဒေါ်လာ မျှ ဝင်ငွေရှိနိုင်သည်	တည်ဆောက်မှုကြောင့် စီမံကိန်းအနီးရှိရွာများ မှမိသားစုများ အကျိုးရှိနိုင်ပါသည်။	အလုပ်အကိုင်ရရှိစေခြင်းဖြင့် တိုက်ရိုက်/သွယ်ဝိုက်သောနည်းအားဖြင့်ဝင်ငွေတဖက်တလမ်းရရှိသောကောင်းကျိုးရှိနိုင်ပါသည်။	(မြှင့်တင်နည်းလမ်းများ) လျှပ်စစ်ဓာတ်အားပေး ကုမ္ပဏီကန်ထရိုက်ယူသူမှ ဒေသခံများကိုဦးစားပေးငှား ရမ်းခြင်း၊ ဒေသခံတို့မှ လုပ် အားနှင့် အစားအစာပံ့ပိုးခြင်း	ဒေသခံစီးပွားရေးဖွံ့ဖြိုးသောကောင်းကျိုး အခြေအနေမြင့်မားသောဦးစားပေးအပေးအစီအစဉ်
အသက်မွေးမှု	ပင်လယ်ကြမ်းခင်းတွင် ရေသွယ်ယူပိုက်နှင့် ရေထုတ်ပိုက်များမြေအောက်လျှောက်လမ်း ချောင်းလက်တက်၊	ပေါ်ပိတက်ရွာသူ/သားများ	ပေါ်ပိတက်ရွာသူ/သားများ၏ လှေသဘော်များဆိုက်ကပ်ဝင်ထွက်ရာနေရာ၊ တနိုင်တပိုင် ငါးဖမ်းလုပ်ငန်းလုပ်ကိုင်ကြသူများ	တနိုင်တပိုင်ငါးဖမ်းလုပ်ငန်းလုပ်ကိုင်ကြသူများကသိကအောက်ဖြစ်ခြင်း	တည်ဆောက်ရေးကာလကာလတွင်ပေါ်ပိတက်ရွာသူ/သားများ ထိခိုက်မှုလျှော့ချပေးသော အစီအစအစဉ်များနှင့် တည် ဆောဆောက်ဆဲကာလတွင် ပိုက်လိုင်းများ၏	သေးငယ်သော ထိခိုက်သက်ရောက်မှု အဆင့်မြင့်စွာ ထိန်းချုပ်ဦးစားပေးခြင်း

ကိစ္စရပ်	ပင်မအရင်းအမြစ်	ပမာဏ	လက်ခံရောက်ရှိမှု	ခန့်မှန်းထိခိုက်သက်ရောက်မှု	အဆိုပြုလျှော့ချနည်းလမ်း	ကြွင်းကျန်ထိခိုက်သက်ရောက်မှုအရေးပါခြင်း
					တည်နေရာ သတ်မှတ်ထားရှိခြင်းဖြင့် သတိပြုနိုင်စေရန် လူထုအားအသိပေးခြင်း ပိုက်လိုင်းချရှိန်တိုတောင်းအောင်ပြုခြင်း	
အခြေခံအဆောက်အအုံနှင့် ဝန်ဆောင်မှု	ကန့်သတ်အခြေခံအဆောက်အအုံများ၊ ဝန်ဆောင်မှုများကို ပြိုင်ဆိုင်အသုံးပြုခြင်းအထူးအားဖြင့် လမ်းနှင့် ဆေးရုံ	မောင်းမကန်မှ စီမံကိန်း တည်ရှိနေရာသို့ဆက်သွယ်သော လမ်းကိုအသုံးပြုခြင်း လုပ်သားအင်အား ၆၀၀အတွက်ဆေးရုံ	ယေဘူယျအားဖြင့် ဒေသခံပြည်သူများ	လမ်းတွင်ယာဉ်အသွားအလာကြပ်ခြင်း၊ အထူးအားဖြင့် ကမ်းခြေလမ်းဆေးအုံအသုံးပြုမှုအပြိုင်အဆိုင် များခြင်း	ယာဉ်ကြောနှင့် အသွားအလာတိုင်းတာခြင်း၊ စီမံကိန်းကြောင့်ပျက်စီးယိုယွင်းသော လမ်းပိုင်းကိုပြုပြင်ခြင်း စီမံကိန်း တည်ဆောက်နေရာတွင် ရှေးဦးသူနာပြုစုခြင်း ဝန်ဆောင်မှုထားရှိပေးခြင်း	အသင့်အတင့်ဦးစားပေးပေးအစီအစဉ်
ယဉ်ကျေးမှု နှင့် ဓလေ့ထုံးစံ	အခြားသောစီမံကိန်းနေရာမှ အလုပ်သမားများ	အလုပ်သမား၆၀၀ တွင် အများစုသော ဒေသခံပြည်သူများ အားထည့်သွင်းစဉ်းစားခြင်း	အနီးအနားရှိရွာများ	မသိသာမထင်ရှား	- ဒေသခံတို့၏ရိုးရာဓလေ့ထုံးစံ၊ တန်ဘိုးထားမှု၊ သတ်မှတ်ချက်များကို နည်းလည်သဘောပေါက်ခြင်း၊ -အလုပ်သမားများ အတွက်စာချုပ်စာတမ်းသဘော တူညီချက်ဖြင့် အလုပ်ခန့် ထားခြင်း	အသင့်အတင့် ဦးစားပေးအစီအစဉ်

ကိစ္စရပ်	ပင်မအရင်းအမြစ်	ပမာဏ	လက်ခံရောက်ရှိမှု	ခန့်မှန်းထိခိုက်သက်ရောက်မှု	အဆိုပြုလျော့ချနည်းလမ်း	ကြွင်းကျန်ထိခိုက်သက်ရောက်မှုအရေးပါခြင်း
					-ဒေသခံပြည်သူ တို့နှင့် ကောင်းမွန်ပြေပြစ်သော ဆက်ဆံရေး - အကယ်၍သမိုင်းဝင် အမွေအနှစ်တွေ့ရှိပါက သက်ဆိုင်ရာဒေသအာဏာပိုင်အဖွဲ့ တို့ချက်ခြင်း အသိပေးခြင်း	
ဒေသခံပြည်သူ တို့ကျန်းမာရေး ဘေးကင်းလုံခြုံရေး	စီမံကိန်းအလုပ်သမားများ	အန္တရာယ်နည်းပါး	အနီးအနားရှိရွာများ	အသက်မွေးမှုနိမ့်ကျသဖြင့် ဖြစ်ပေါ်နိုင်ခြေရှိ နောက်ဆက်တွဲအားဖြင့် ဒေသခံရွာသူ/သားများ	အလုပ်သမားများ၏ ကျန်းမာရေးစောင့်ရှောက်မှု အလုပ်သမားများ၏ လုံခြုံရေးစစ်ဆေးခြင်း	အသင့်အတင့်ဦးစားပေး

ကိစ္စရပ်	ပင်မအရင်းအမြစ်	ပမာဏ	လက်ခံရောက်ရှိမှု	ခန့်မှန်းထိခိုက်သက်ရောက်မှု	အဆိုပြုလျော့ချနည်းလမ်း	ကြွင်းကျန်ထိခိုက်သက်ရောက်မှုအရေးပါခြင်း
စီမံကိန်းနှင့်ပတ်သက်၍ ဒေသခံများ၏ မလိုလားသောသဘောထားများ	စီမံကိန်းအား မလိုလားသောသဘောထား	သိသာထင်ရှားသော ထိခိုက်သက်ရောက်မှု	အနီးပတ်ဝန်းကျင်ရှိ ကျေးရွာများ	- စီမံကိန်းပြီးမြောက်မှုအား ႇအားနေးကွေးစေခြင်း - စီမံကိန်းအား အတိုက်အခံဖြစ်စေခြင်း	-ရပ်ရွာတိုးတက်မှုကိုထောက်ပံ့ပေးခြင်း (လူမှုစီးပွားပူးပေါင်းတာဝန်ခံမှု အစီအစဉ် CSR) - ပညာရေး၊ ကျန်းမာရေး စောင့်ရှောက်မှု၊ ဘာသာရေးနှင့်ယဉ်ကျေးမှုကဏ္ဍများ -လူမှုစီးပွားဖွံ့ဖြိုးတိုးတက်မှုကိုထောက်ပံ့ပေးခြင်း - အလုပ်အကိုင်အခွင့်အလလမ်းများ၊ အလုပ်အကိုင်မြှင့်တင်ရေး၊ ကျား/မရေးရာ ဖွံ့ဖြိုးတိုးတက်ခြင်း	အဆင့်မြင့်စွာ ထိန်းချုပ်ခြင်း

၁.၅.၃ စီမံကိန်းလည်ပတ်စဉ်ထိခိုက်သက်ရောက်မှုဆန်းစစ်ခြင်း

က ပတ်ဝန်းကျင်ကိစ္စရပ်များသတ်မှတ်ခြင်း

ဤစီမံကိန်းလည်ပတ်စဉ်ကာလတွင် လျှပ်စစ်ဓာတ်အားပေးစက်ရုံစီမံကွပ်ကဲခြင်းကိုအောက်ပါ ကိစ္စရပ်များ အားဖြင့်ဆောင်ရွက်ရမည်ဖြစ်သည်။

ပတ်ဝန်းကျင်ဆိုင်ရာထိခိုက်သက်ရောက်မှုများဖော်ပြချက်များ -

ဓာတ်ငွေ့လွှတ်ထုတ်ခြင်း- နိုက်ထြိုဂျင်အောက်ဆိုဒ်အပါအဝင် သဘာဝဓာတ်ငွေ့များလောင်ကျွမ်းမှုကြောင့် ထွက်ပေါ်လာသော လေထုညစ်ညမ်းမှု

ဝန်းကျင်ဆူညံမှု - သဘာဝဓာတ်ငွေ့စက်လည်ပတ်ခြင်း၊ တာဆိုင်စက်လည်ပတ်ခြင်း အပူထိန်းအငွေ့ပို့ စက်လည်ပတ်ခြင်း၊ (HRSG) တို့မှ ဖြစ်ပေါ်သောအသံများ

စွန့်ပစ်ရေဆိုးများ - ရေနွေးအငွေ့ပို့စက်မှ အအေးခံ၍ ထွက်ရှိသောရေများ၊ လုပ်သားများ၏ စွန့်ပစ်ရေများ၊ စက်ပစ္စည်းများမှ စွန့်ပစ်ရေများ၊

အအေးခံရေရယူခြင်း - အအေးခံစနစ်မှရယူခြင်း

အပူထွက်ခြင်း - အအေးခံစနစ်မှ ထွက်ရှိခြင်း

လုပ်ငန်းခွင်လုံခြုံစိတ်ချရခြင်း နှင့်ကျန်းမာရေး - လျှပ်စစ်ဓာတ်အားပေးစက်ရုံအနီးရှိရွာများ

လူမှုရေးဆိုင်ရာ ထိခိုက်သက်ရောက်မှု ဖော်ပြချက်များ -

ဒေသခံများတိုးတက်ရေးဆိုင်ရာထောက်ပံ့မှု - ဒေသခံများအား ကောင်းမွန်သော ထောက်ပံမှုများဓါတ်အားပေးစက်ရုံအနီးရှိဒေသခံများ၏

ကျန်းမာရေး လုံခြုံမှုနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး တို့ဖြစ်ပါသည်။ လူမှုရေးရာနှင့်သဘာဝပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှုများကိုလုံလောက်စွာစီမံကြီးကြပ်ခြင်းအားဖြင့်သတ် မှတ်ထား ရှိသောနည်းလမ်းများ၊ ဥပဒေများအားဖြင့် ဖြည့်ဆည်း၍လျှော့ချစေရမည်ဖြစ်သည်။

စီမံကိန်းတည်ရှိရာနေရာ မှာပြန့်ပြူး၍ သဘာဝအလှအပမရှိသောနေရာဖြစ်သဖြင့်သိသာထင်ရှား မြင်နိုင်သော ညစ်ညမ်းမှုမဖြစ်နိုင်ပါ။ စီမံကိန်းသွင်ပြင်အရ ရှည်လျားမြင့်မားသောအဆောက်အဦနှင့်မီးခိုးခေါင်းတိုင်သာဖြစ်၍ မျက်စိ ပသာဒအတွက် အနှောင့်အယှက်မဖြစ်စေပါ။

ထိုအပြင်စီမံကိန်းတည်ရှိရာနေရာတွင် ရှေးဟောင်းယဉ်ကျေးမှုအမွေအနှစ်(သို့)အရေးကြီးလူသိများသော အဆောက်အဦမရှိပါ။ သို့ဖြစ်ပါ၍စီမံကိန်းမှ ဒေသခံယဉ်ကျေးမှုနှင့်ရှေးဟောင်းအမွေအနှစ်များကိုတိုက်ရိုက်အားဖြင့်ထိ ခိုက်သက်ရောက်မှုမရှိပါ။

၁. အဆိုပြုစမ်းသပ်လျှော့ချနည်းလမ်းများ၏ရလဒ်များ

ပထမကိစ္စရပ်ငါးခု၏ ထိခိုက်သက်ရောက်မှုလုပ်ငန်းခွင်လုံခြုံစိတ်ချရမှု နှင့် ကျန်းမာရေးကိစ္စရပ်များ၏ရလဒ်များ ကို ဇယား ၁.၅-၃ တွင်ဖော်ပြထားရှိပါသည်။ အသံဆူညံမှုနှင့် လေထုအရည်အသွေး အသေးစိတ်ဖော်ပြချက်များ ကိုပင်မ အစီရင်ခံစာတွင် ဖော်ပြအပ်ပါသည်။

ယေဘုယျအားဖြင့်နိုက်ထြိုဂျင်ပမာဏနည်းပါးစွာလောင်ကျွမ်းခြင်းဖြင့်၄င်းမှထွက်ရှိသော နိုက်တြိုဂျင်အောက်ဆိုဒ် ပမာဏကိုကျဆင်းစေသည်။ အသံဆူညံမှုအတွက်သိသာထင်ရှားခြင်းမရှိပါ။ စွန့်ပစ်ရေဆိုးများ၏ပမာဏမှာ ပင်လယ် ရေတွင်းစီးဝင်သောပမာဏအားဖြင့် နှိုင်းယှဉ်ပါကအလွန်ပင်နည်းပါးပါသည်။ ပင်လယ်တွင်းရှိ သတ္တဝါငယ်များဆုံးရှုံးမှု ပမာဏမှာလည်းသိသာထင်ရှားမှုမများပါ။ သို့ဖြစ်ပါ၍စီမံကိန်းလည်ပတ်စဉ်ကာလတွင် သဘာဝပတ်ဝန်းကျင်ထိခိုက် သက်ရောက်မှုမများပါ။ သတ္တဝါငယ်များဆုံးရှုံးမှုပမာဏမှာလည်းသိသာထင်ရှားမှုမများပါ။ သို့ဖြစ်ပါသောကြောင့် စီမံကိန်း လည်ပတ်စဉ်ကာလတွင် သဘာဝပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှုပမာဏအနည်းငယ်သာဖြစ်သောကြောင့်အစဉ်အလာ အတိုင်း တိုင်းတာမှုများအားဖြင့် ထိခိုက်သက်ရောက်မှုမရှိနိုင်ပါ။

လျှပ်စစ်ဓါတ်အားပေးစီမံကိန်းနှင့်တွဲလျက်သဘာဝဓာတ်ငွေ့ရည်ပိုက်လိုင်းစီမံကိန်းတည်ရှိရာနေရာများရှိ ဒေသခံ ပြည်သူလူထုလုံခြုံမှုအတွက်အဓိကအန္တရာယ်ရှိနိုင်သောကိစ္စရပ်မှာ မီးလောင်ကျွမ်းမှုနှင့်ပေါက်ကွဲမှုဖြစ်နိုင်ပါသည်။ သို့သော် လည်းရွာသုံးရွာစလုံး၏ အကွာအဝေးမှာထိခိုက်သက်ရောက်မှုကျရောက်နိုင်သော အကွာအဝေးမဟုတ်ပါ။ ထိုကိစ္စရပ်ကို အန္တရာယ်ရှိနိုင်သော လေ့လာဆန်းစစ်ချက်တွင် ဆွေးနွေးထားရှိမည်။

ဒေသခံပြည်သူလူထု၏ အသက်မွေးမှုအတွက်စီမံကိန်းမှ လုပ်သားအင်အား(၅၀)ဦးကိုသာခန့်ထားနေရာချပေး နိုင်သဖြင့် စီမံကိန်းပံ့ပိုးမှုနည်းပါးပါသည်။ ဒေသပြည်သူများ ဖြည့်ဆည်းထောက်ပံ့မှုကို ထည့်သွင်းစဉ်းစားသင့်ပါသည်။

ဇယား ၁.၅.၃

တည်ဆောက်ဆဲကာလပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှုကိစ္စရပ်များ

ကိစ္စရပ်	ပင်မအရင်းအမြစ်	ပမာဏ	လက်ခံရောက်ရှိမှု	ခန့်မှန်းထိခိုက်သက်ရောက်မှု	အဆိုပြုလျော့ချနည်းလမ်း	ကြွင်းကျန်ထိခိုက်သက်ရောက်မှုအရေးပါခြင်း
သဘာဝပတ်ဝန်းကျင်ဆိုင်ရာကိစ္စရပ်များ						
ဓာတ်ငွေ့လွှတ်ထုတ်ခြင်း	တာဘိုင်စက်တွင် သဘာဝဓါတ်ငွေ့များ လောင်ကျွမ်းမှု	NO_2 ၁၄.၃၂ g/s ပါဝင်သော NO_x လောင်ကျွမ်းမှုကို ၆.၂၃ g/s ထက်လျော့ကျခြင်း	ပျံ့လွင့်နိုင်သောကျေးရွာများဖြစ်သည့် မှုဒူးကမြိုင်ဆွဲနှင့်ညောင်ပင်ဆိပ်	စီမံကိန်းလည်ပတ်ချိန်မြေပြင်တွင် NO_2ပါဝင်မှုအမြင့်ဆုံး ကို AQQSခွင့်ပြုချက် တန်ဘိုးအမြင့်ဆုံးနှင့်နှိုင်း ယှဉ်ထားရှိ	နိမ့်သော NO_x လောင်ကျွမ်းခြင်း မှတပါး NO_2 ထပ်မံလျော့ချရန် မလိုအပ်ပါ	သိသာထင်ရှားမှုမရှိ၊ မြင့်မားသောဦးစားပေး အစီအစဉ်
အသံဆူညံမှု	သဘာဝဓာတ်ငွေ့ စက်ရုံလည်ပတ်ခြင်း၊ တာဘိုင်စက်လည် ပတ်ခြင်း၊ အပူထိန်းအငွေ့ပျံ စက်လည်ပတ်ခြင်း၊ (HRSG) တို့မှ အသံများ	စုစုပေါင်း ၁၂၂ dB(A)	ဆူညံမှုအများဆုံးကျရောက်နိုင်သောနေရာများ မှာ ရေပိုင်းဘုန်းတော်ကြီးကျောင်းနှင့် ငပိတက်ရွာမူလတန်းကျောင်း	အကယ်၍အသံဆူညံမှုသည် ၈၅ dB(A) ထက်ကျော်လွန်မှုမရှိပါက လက်ခံရောက်ရှိမှုအတွက်သိသာထင်ရှားခြင်းမရှိနိုင်ပါ။ စံနှုန်းထက်ကျော်လွန်မှုမရှိ။	ထပ်မံဆောင်ရွက်ရန်မလို အပ်ပါ	လစ်လျူရှုနိုင်သည့် အဆင့်၊ အမြင့်ဆုံးထိန်း ချုပ်မှု
စွန့်ပစ်ရေဆိုးများ	-ဘွိုင်လာမှထွက်ခြင်း -နေ့စဉ်သုံးစွန့်ထုတ်ခြင်း -စက်ရုံဆေးကြောသန့်စင်ခြင်း	၁၈၆.၉၆ m^3/d ၂.၈ m^3/d ၇၀၇.၀၄ m^3/d	စက်ရုံတည်နေရာမှ ရွှေဘက်မျက်နှာစာ ၈၀၀ မီတာ အကွာအဝေးရှိ ပင်လယ်တွင်းစွန့်	နေ့စဉ်သုံးစွန့်ထုတ်ခြင်း မှညစ်ညမ်းမှုပမာဏမှာပင်လယ်ရေ ပမာအားဖြင့်နှိုင်းယှဉ်လျှင်နည်းပါး သည်။ထိုပမာဏကိုပင်လယ်ရေ တွင်းသို့စွန့်ထုတ် လျှင်ပင်	ဖြစ်နိုင်ခြေအနည်းဆုံးပမာဏရှိသည့်စွန့်ထုတ်မှု အတွက် နည်းပညာအရ ထပ်မံလျော့ချရန်မရှိနိုင်ပါ	သိသာထင်ရှားမှုမရှိ၊ အသင့် အတင့်အားဖြင့် ဦးစား ပေးထိန်းချုပ်ခြင်း။

ကိစ္စရပ်	ပင်မအရင်းအမြစ်	ပမာဏ	လက်ခံရောက်ရှိမှု	ခန့်မှန်းထိခိုက်သက်ရောက်မှု	အဆိုပြုလျော့ချနည်းလမ်း	ကြွင်းကျန်ထိခိုက်သက်ရောက်မှုအရေးပါခြင်း
	-သတ္တုများ လျှော့ချခြင်း စုစုပေါင်း	၈၂.၅၆ m³/d ၉၇၉.၃၆ m³/d	ထုတ်နေရာ	ပင်လယ်တွင်းသတ္တဝါတို့ ဂေဟစနစ် နှင့် ရေအရည်အသွေး ထိခိုက်သက်ရောက်မှုမရှိနိုင်ပါ		
အအေးခံ ရေရယူခြင်း	အအေးခံ စနစ်	၆၇၅.၂၀၀ m³/d	ပင်လယ်တွင်ရှိသေးငယ်လှသောရေနေ သတ္တဝါငယ်များ နှင့်အပင်ငယ်များ	ပင်လယ်တွင်ရှိသေးငယ်လှသော ရေနေသတ္တဝါငယ်များနှင့်အပင်ငယ် များသိပ်သည်းဆနည်းပါးသော ပင်လယ်အောက်ခြေ ကြမ်းခင်း အထက် ၁ မီတာအကွာ မှရေများ ကိုစုတ်ယူ၍အအေးခံစနစ်အတွက် အသုံးမည်ဖြစ်ရာ ၄င်းသေးငယ်လှ သောရေနေသတ္တဝါငယ်များ နှင့်အပင်ငယ်များမှာ ပင်လယ် ရေမျက်နှာပြင်အပေါ်ယံတွင်သာ သိပ်သည်းထူထပ်စွာရှိနေပါသည်။ ထို့အပြင် ၄င်းတို့၏ သက်တမ်းမှာ တိုတောင်းလှသောကြောင့်မျိုးပွါး နိုင်စွမ်းမြန်ဆန်လှပါသည်။ ပင်လယ်ရေအောက်ရေရယူမှု အတွက်၄င်းအပေါ်ထိခိုက်သက် ရောက်မှုနည်းပါးပါသည်။	ကောင်းမွန်သောပုံစံ နှင့် အနည်းဆုံးထိခိုက်သက် ရောက်စေသောစနစ်အား ဖြင့် စွန့်ပစ်သောရေအပူချိန်	ကမ်းခြေအနီးတဝိုက်ထိခို က်သက်ရောက်မှုအနည်း ငယ်၊အသင့်အတင့် အားဖြင့် ဦးစားပေး ထိန်းချုပ်ခြင်း
လူမှုရေးဆိုင်ရာ ကိစ္စရပ်များ						
လုပ်ငန်းခွင် လုံခြုံစိတ်ချရမှု နှင့်	-သံခါတ် ထုတ်လွှတ်ခြင်းမရှိ	-	စက်ရုံလည်ပတ်သူ များသာ	လုပ်ငန်းခွင်လုံခြုံစိတ်ချရမှုနှင့် ကျန်းမာရေးကိစ္စရပ်များကိုသတ်	-လျှပ်စစ်ခါတ်အားပေး စက်ရုံနှင့်စက်ပစ္စည်းများ	သီသာထင်ရှား၍ အထူးဦးစားပေးဆောင် ရွက်ရန်

ကိစ္စရပ်	ပင်မအရင်းအမြစ်	ပမာဏ	လက်ခံရောက်ရှိမှု	ခန့်မှန်းထိခိုက်သက်ရောက်မှု	အဆိုပြုလျော့ချနည်းလမ်း	ကြွင်းကျန်ထိခိုက်သက်ရောက်မှုအရေးပါခြင်း
ကျန်းမာရေး ကိစ္စရပ် များ	-အပူချိန် -အသံဆူညံမှု -ကန့်သတ်နေရာ -လျှပ်စစ်ဘေး အန္တရာယ် -ဓါတုဘေးအန္တရာယ်			မှတ်ထားရှိသောနည်းလမ်းများ၊ ဥပဒေများအားဖြင့်ထိရောက်စွာစီမံကြီးကြပ်ခြင်း	အားလုံးကိုလုပ်ငန်းခွင်လုံခြုံစိတ်ချရမှု နှင့် ကျန်းမာရေး ကိစ္စရပ်များထည့်သွင်းစဉ်း စား ပေးရန် -လုပ်ငန်းခွင်လုံခြုံစိတ်ချရ မှု နှင့်ကျန်းမာရေးကိစ္စရပ် များစီမံခန့်ခွဲမှုကိုထိရောက် စွာအကောင်အထည်ဖေါ်ဆောင်ရွက်ရန် -စက်ရုံလည်ပတ်သော လုပ်သားများအတွက်သင် တန်းပေးရန်	
ဒေသခံပြည်သူ လူထုဖွံ့ဖြိုး တိုးတက်ရေး ထောက်ပံ့မှု	စီမံကိန်းအားဖြင့် လူမှုရေးဆိုင်ရာ ထောက်ပံ့ပေးခြင်း	ပတ်ဝန်းကျင်ရှိ ရွာများ၊ အထူးအားဖြင့် ငပိတက် ညောင်ပင်ဆိပ် ကမြိုင်ဆွဲ ရွာ အပါအဝင်ဖြစ် သောမုဒုံ ကျေးရွာများ	ဒေသခံရွာသူ/သားများ	ကောင်းကျိုးသက်ရောက်မှုများ အဖြစ် -ဒေသခံရွာများ၏ ပညာရေး လူမှုစီးပွား၊ ရေနှင့် မိလာစနစ်၊ယဉ်ကျေးမှုနှင့်အာဟာရများအားထောက်ပံ့ ပေးခြ ပေးခြင်း - စီမံကိန်းတိုင်ကြားစာဒကတ က်ခြင်းများအတွက် ဆက်သွယ်ရေး အစီအစဉ် - ဒီရေရောက်တောအား စနစ်တကျအသုံးပြုခြင်းဖြင့် ရေရှည်တည်တန့်ခိုင်မြဲသောအသက်မွေးမှုပုံစံ	- လူမှုစီးပွား ပူးပေါင်းတာဝန်ခံမှုအစီအစဉ် (CSR) - ဆုံးရှုံးနစ်နာမှုအတွက် ပြင်ဆင်ရန် ဖြေလျှော့ခြင်း လုပ်ထုံးလုပ်နည်း - လူမှုရေးထောက်ပံ့မှု အစီအစဉ် - ဒီရေတောအရင်းအမြစ် စီမံခန့်ခွဲခြင်း အစီအစဉ်များကို အကောင်အထည်ဖော် ဆောင်ရွက်ခြင်း	သိသာထင်ရှား၍ မြင့်မားသောဦးစား ပေးအစီအစဉ်

ကိစ္စရပ်	ပင်မအရင်းအမြစ်	ပမာဏ	လက်ခံရောက်ရှိမှု	ခန့်မှန်းထိခိုက်သက်ရောက်မှု	အဆိုပြုလျော့ချနည်းလမ်း	ကြွင်းကျန်ထိခိုက်သက်ရောက်မှုအရေးပါခြင်း
ဒေသခံပြည်သူတို့ ကျန်းမာရေး ရေးဘေးကင်း လုံခြုံရေး	ဓာတ်ငွေ့ထုတ်လွှတ်ပုံ့ပိုး ခြင်းနှင့် တာဘိုင်လည်ပတ်ခြင်းအတွက် စွန့်စား မှုများ	အထူးအားဖြင့် ငပိတက် ကျေးရွာလူထု	ဒေသခံရွာသူ/ သားများ	မီးဘေးအန္တရာယ်နှင့် ပေါက်ကွဲနိုင်မှုများ	စွန့်စားမှုဘေးအန္တရာယ်ထိန်းချုပ်စီမံခန့်ခွဲခြင်း	သိသာထင်ရှားမရှိသော် လည်းမြင့်မားသော ဦးစားပေးအစီအစဉ်

၁.၅.၄ စီမံကိန်းပိတ်သိမ်းကာလထိခိုက်သက်ရောက်မှုဆန်းစစ်ခြင်း

က ပတ်ဝန်းကျင်ကိစ္စရပ်များသတ်မှတ်ခြင်း

ဤစီမံကိန်းပိတ်သိမ်းစဉ်ကာလတွင် လျှပ်စစ်ဓာတ်အားပေးစက်ရုံ စီမံကွပ်ကဲခြင်းကို အောက်ပါကိစ္စရပ်များအားဖြင့် ဆောင်ရွက်ရမည်ဖြစ်သည်။

ပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်ပါဝင်မှုများ

ဖုန်မှုန့်လွင့်ခြင်း - စက်ရုံဖျက်သိမ်းမှု၊ မြေတူးခြင်း နှင့်ဖျက်သိမ်းစက်ပစ္စည်းများ သယ်ဆောင်ခြင်း ကြောင့် စက်ယန္တယာဉ်ကြီးများ မြေသားလမ်းပေါ်တွင် သွားလာလှုပ်ရှားခြင်းများကြောင့် ဖြစ်ပေါ်လာမည်

ဓာတ်ငွေ့များထွက်ရှိခြင်း - ဒီဇယ်သုံးစက် အသုံးပြုလည်ပတ်ခြင်း၊ ယာဉ်များနှင့် စက်ယန္တယာဉ်များ အသုံးပြုမှု ထွက်ရှိသောဓာတ်ငွေ့များ

ဝန်းကျင်ဆူညံမှု - သဘာဝဓာတ်ငွေ့စက်လည်ပတ်ခြင်း၊ တာဆိုင်စက်လည်ပတ်ခြင်း အပူထိန်းအငွေ့ပျံ စက်လည်ပတ်ခြင်း၊ (HRSG) တို့မှ ဖြစ်ပေါ်သောအသံများ

ဖျက်သိမ်းမှုမှစွန့်ပစ်ပစ္စည်းများ-စက်ရုံမှ ပျက်ဆီးပစ္စည်းများ၊ တူးဆွခြင်းမှ ထွက်ရှိသောအကြွင်းအကျန် အပိုင်းအစများ၊ အန္တရာယ်ရှိသောပစ္စည်းများနှင့် နေ့စဉ်သုံးစွန့်ပစ်ပစ္စည်းများ

ယာဉ်အသွားအလာ-စက်ရုံမှပျက်ဆီးပစ္စည်းများ၊အကြွင်းအကျန်အပိုင်းအစများ၊စက်ပစ္စည်းများသယ်ယူ ပို့ဆောင်ခြင်း

လူမှုရေးထိခိုက်သက်ရောက်မှုများ - အဖြစ် စက်ရုံပိတ်သိမ်းစဉ်ကာလတွင် လုပ်သားများ၏ လုပ်ငန်းခွင် လုံခြုံ စိတ်ချရခြင်း နှင့်ကျန်းမာရေး ကိုဆောင်ရွက်ရမည်။

ဤလူမှုရေးရာနှင့်သဘာဝပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှုများကိုလုံလောက်စွာစီမံကြီးကြပ်ခြင်းအားဖြင့် နဂို မူလအခြေအနေသို့ပြန်လည်ရောက်ရှိအောင် ပြည့်စုံစွာဆောင်ရွက်စေခြင်းဖြင့်ကုစားပြောင်းနိုင်စေရန်ဖြစ်ပါသည်။ ၄င်းတို့၏ နောက်ဆက်တွဲအကျိုးသက်ရောက်မှုများကျရောက်နိုင်သောကျေးရွာသုံးရွာနှင့်စီမံကိန်းတည်နေရာအကွာအဝေးမှာထည့် သွင်း စဉ်းစားနိုင်ဖွယ်သိသာထင်ရှားသောသက်ရောက်မှုမရှိနိုင်ပါ။

ခ. အဆိုပြုစမ်းသပ်လျော့ချနည်းလမ်းများ၏ရလဒ်များ

ပထမကိစ္စရပ်တစ်ခုချင်းစီ၏ ခြုံငုံထိခိုက်သက်ရောက်မှုများ၏ ရလဒ်များကို ဇယား ၁.၅-၄ တွင်ဖော်ပြထားရှိ ပါသည်။

ယေဘူယျအားဖြင့် စီမံကိန်းပိတ်သိမ်းစဉ်ကာလတွင် ပတ်ဝန်းကျင်နှင့်လူမှုရေးထိခိုက်သက်ရောက်မှုပမာဏမှာ သေးငယ်သဖြင့် လုပ်ရိုးလုပ်စဉ်အားဖြင့် ထိရောက်စွာ ရင်ဆိုင်ဖြေရှင်းနိုင်ပါသည်။

ဇယား ၁.၅-၄

စီမံကိန်းပိတ်သိမ်းကာလပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှုကိစ္စရပ်များ

ကိစ္စရပ်	ပင်မအရင်းအမြစ်	ပမာဏ	လက်ခံရောက်ရှိမှု	ခန့်မှန်း ထိခိုက်သက်	အဆိုပြုလျှော့ချနည်းလမ်း	ကြွင်းကျန်ထိခိုက်သက်ရောက်မှုအရေးပါခြင်း
သဘာဝပတ်ဝန်းကျင်ဆိုင်ရာကိစ္စရပ်များ						
ဖုန်မှုန့်များနှင့် ဓာတ်ငွေ့လွှတ်ထုတ်ခြင်း	တည်ဆောက်ရေး လုပ်ငန်းများ ဖျက်သိမ်းခြင်း၊ ယာဉ်သွားလာ မှုများကို မြေသားလမ်းတွင် သယ်ယူ ပို့ ဆောင်ခြင်း	ခန့်မှန်းခြေ ၄၆-၉ g/s	ဖျက်သိမ်းမှုပါဝင် ဆောင်ရွက်သောလုပ်သားများနှင့် ၂.၂၃ကီလိုမီတာအကွာရှိငပိတက်ရွာ သူ/သားများ	ခန့်မှန်းTsp အဆင့် ၁၇၀.၃ µg/m3 ထက် မကျော်လွန်ပါနိုင်း ယှဉ် စံနှုန်း ၂၃၀µg/m3	သာမန်လုပ်ထုံးလုပ်နည်း အဓိကအားဖြင့်ရေကို အချိန် ခြား၍ ရေဖြန်းပေးခြင်းသည် ဖုန်မှုန့်များ လွင့်ခြင်း၏၇၅% ကို လျှော့ကျစေပါသည်။	အသင့်အတင့်အားဖြင့် ဦးစားပေးထိန်းချုပ်ခြင်း ဖြစ်၍ သိသာထင်ရှားမှု မရှိ
အသံဆူညံမှု	လေးလံသောစက် ပစ္စည်း များ ယန္တယားများအား ဖြုတ်သိမ်းစဉ် ဖြစ်ပေါ်ခြင်း	ကြီးမားသော စက်ယန္တယားများ အတွက် ၉၂.၇၇	ဖျက်သိမ်းမှုပါဝင် ဆောင်ရွက်သောလုပ်သားများနှင့် ၂.၂၃ ကီလိုမီတာ အကွာရှိ ငပိတက်ရွာသူ/ သားများ	အသံဆူညံမှုရလဒ် ၉၂.၇၇ dB(A) စက် ယန္တယားများဖြုတ်သိမ်းမှုဖြစ်ပေါ်လာခြင်း	အသံလက်ခံရာနေရာများ သို့ဆူညံမှုကိုဟန့်တားစေနိုင်သည့် သင့်တော်သော လုပ်လုပ်ဆောင်မှုကိုဆောင်ရွက် စေ[ ]စေခြင်းကို ကန်ထရိုက်တာမှ ဆောင်ရွက်ရန်လိုအပ်သည်။	လစ်လျူရှုနိုင်သည့် အဆင့်၊ အမြင့်ဆုံးထိန်း ချုပ်မှု
ဖျက်သိမ်းမှု၏ စွန့်ပစ် အကြွင်း	စက်ယန္တရားယားများ၏ အကျိုးအပဲ့အစအနများ၊ အကြွင်း အကျန်များ၊ အန္တရာယ်ရှိစွန့်ပစ်	နောင်နှစ်၃၀အတွက် ခန့်မှန်းရန် အခက်အခဲသော် လည်းစီမံကိန်းတည်	စွန့်ပစ်ပစ္စည်းများ စုပုံနေရာမြေကြီးနှင့် မြေပေါ်ရေမျက်နှာပြင်	မြေပေါ်၊ မြေအောက် အတွင်းစွန့်ပစ်နေ	ကောင်းမွန်သောပုံစံအား ဖြင့်အရင်းအမြစ်ကို လျှော့ချခြင်းနှင့် တည်ဆောက်မှု	သေးငယ်သဖြင့် သိသာထင်ရှားခြင်း မရှိ၊ အကယ်၍အသင့် အတင့်အားဖြင့် ဦးစား

ကိစ္စရပ်	ပင်မအရင်းအမြစ်	ပမာဏ	လက်ခံရောက်ရှိမှု	ခန့်မှန်း ထိခိုက်သက်ရောက်မှု	အဆိုပြုလျော့ချနည်းလမ်း	ကြွင်းကျန်ထိခိုက်သက်ရောက်မှုအရေးပါခြင်း
အကျန်များ	ပစ္စည်း များနှင့်နေ့စဉ်စွန့်ပစ်ပစ္စည်း များ	ဆောက်စဉ် ကာလထက်နည်းပါးမည် ဟုယူဆနိုင်ပါသည်။		ရာထိခိုက်သက်ရောက် မှု ပမာဏကြိုတင်ခန့်မှန်း ရန် ခက်ခဲသော် ငြားထိခိုက်သက်ရောက်နိုင်ခြေရှိပါသည်။	စီမံကြီးကြပ်ခြင်း	ပေးထိန်းချုပ်ခြင်း
ယဉ်အသွားအလာ	စက်ယန္တယားများ ဖျက်သိမ်း သယ်ပို့ခြင်း	နောင်နှစ်၃၀အတွက် ယာဉ်သွားလာမှုကိုခန့်မှန်းရန်ခက်ခဲသော်လည်း စီမံကိန်းတည်ဆောက် စဉ်ကာလထက်လျော့ကျနိုင်မည် ဟု ယူဆ ရသည်။	ကမ်းခြေလမ်းနှင့် ငပိတက်ရွာဆက်စပ်လျက်ရှိသောလမ်း	ITD ကမ်းခြေကမ်းကားကြပ်ခြင်း	ဖျက်သိမ်းခြင်းလုပ်ငန်းကိုတက်နိုင်သရွေ့မြန်ဆန်စေခြင်း - ယာဉ်အသွားအလာ ထိန်းချုပ်ခြင်း - ကုန်တင်ယာဉ်များ အမြန်နှုန်း ထိန်းချုပ်ခြင်း	သိသာထင်ရှား၍ အဆင့်မြင့်ဦးစားပေးထိန်းချုပ်ခြင်း
လူမှုဆိုင်ရာကိစ္စရပ်များ						
လုပ်ငန်းခွင်ဆိုင်ရာလုံခြုံ မှုနှင့် ကျန်းမာရေး	- အပူချိန် - အသံဆူညံမှု - လျှပ်စစ်ဘေး အန္တရာယ် - ဓာတုဘေးအန္တရာယ်	-	လုပ်ငန်းခွင်အလုပ်သမားများ	လုပ်ငန်းခွင်ဆိုင်ရာလုံခြုံမှုနှင့်ကျန်းမာရေးဆိုင်ရာကိစ္စရပ်အားလုံး ကိုထိရောက်စွာစီမံ	- ဖျက်သိမ်းမှုပုံစံနှင့် စက်ပစ္စည်းများကို လုပ်ငန်းနှင့် ဆိုင်ရာလုံခြုံမှုနှင့်ကျန်းမာရေးဆိုင်ရာကိစ္စရပ်များအားလုံးဖြင့်ထည့် သွင်းစဉ်းစား	သိသာထင်ရှားမှု မရှိသော်လည်း မြင့်မားသောဦးစားပေးထိန်း ချုပ်ခြင်း

ကိစ္စရပ်	ပင်မအရင်းအမြစ်	ပမာဏ	လက်ခံရောက်ရှိမှု	ခန့်မှန်း ထိခိုက်သက်	အဆိုပြုလျှော့ချနည်းလမ်း	ကြွင်းကျန်ထိခိုက်သက်ရောက်မှုအရေးပါခြင်း
				ခန့်ခွဲရန် နှင့် ငှင်းလုပ်ငန်းခွင်ဆိုင်ရာ လုံခြုံမှု နှင့် ကျန်းမာရေးဆိုင်ရာနည်းဥပဒေများ ကိုပါတပေါင်း တည်းထုတ် ပြန်အသုံးပြုရန် လိုအပ်ပါသည်။	ရွေးချယ်ရန် ဖြစ်သည်။	

၁.၅.၅ ဘေးအန္တရာယ်ဆန်းစစ်လေ့လာခြင်း

၁.၅.၅.၁ သဘောထားအမြင်မူဘောင်

ပင်မအစီရင်ခံစာအခန်း ၆.၆.၁တွင်သဘာဝဘေးအန္တရာယ်၏အဓိပ္ပါယ်ဖွင့်ဆိုချက်၊ ၎င်းဘေးအန္တရာယ်ကို ဆန်းစစ်လေ့လာမှုစီမံကွပ်ကဲခြင်း နှင့် လုပ်ငန်းစဉ်များကိုဆွေးနွေးတင်ပြထားပါသည်။ ၎င်းသဘောထားအမြင်၏ အနှစ်ချုပ်အားဖြင့် သဘာဝဘေးအန္တရာယ်တစ်ခုသည် စီမံကိန်းတည်ဆောက်ခြင်းကြောင့်ထွက်ပေါ်လာသောများပြားသည့် စွန့်စားရမှုများကိုစီမံကြီးကြပ်ကွပ်ကဲခြင်းကို စီမံကိန်းတည်ဆောက်ဆဲနှင့်လည်ပတ်ကာလများတွင်အခြားသောကဏ္ဍများ နှင့် အပြိုင်ဆောင်ရွက်ရမည်။ အခြေခံသဘောထားအမြင်၊ စွန့်စားရမှုများ၊ အန္တရာယ်များကိုစီမံကွပ်ကဲခြင်းသည်ပင် သဘာဝပတ်ဝန်းကျင်ဘေးအန္တရာယ်ကို စီမံကွပ်ကဲခြင်းဖြစ်သည်။

ထိုသဘောထားအမြင်များ၊ စီမံကိန်းအခြေခံကြီးကြပ်မှုများ အပေါ်ခြေတည်၍ဤစီမံကိန်း၏သဘာဝပတ်ဝန်းကျင်အန္တရာယ်စီမံကွပ်ကဲခြင်းကို ထည့်သွင်းစဉ်းစားရာတွင် “ကိစ္စရပ်တခုခုဖြစ်ပေါ်လာသည်ဖြစ်စေ၊မဖြစ်ပေါ်သည်ဖြစ်စေ” အကယ်၍ စီမံကိန်းအောင်မြင်သော်လည်း ထိုစီမံကိန်းမှ ထွက်ပေါ်လာသောနောက်ဆက်တွဲဆိုးကျိုးထွက်လာပါကသဘာဝပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုလိုအပ်ချက်တွင် ၏ ပတ်ဝန်းကျင်ထိန်းသိမ်းစောင့်ရှောက်ရေးနှင့်သစ်တောရေးရာဝန်ကြီးဌာနနှင့်အခြားအာဏာပိုင်တို့၏သဘောတူညီချက်၊ စီမံကိန်းပိုင်ဆိုင်သူများ အထူးအားဖြင့်စီမံကိန်းဒေသခံရွာများ၏သဘောထား မှတ်ချက်များကို လေးစား လိုက်နာရမည်ဖြစ်သည်။

ပတ်ဝန်းကျင်အန္တရာယ်ရှိမှုစီမံခန့်ခွဲခြင်းအစီအစဉ်တွင်ပါဝင်သောအချက်များမှာ- (၁) စီမံကိန်း၏ သဘာဝပတ်ဝန်းကျင် အတွက်အလျှော့ပေးခြင်းအကျိုးဆက်များ၊ မသေချာမရေရာသော ကိစ္စရပ်များ ပေါ်ထွက်လာခြင်းကို သတ်မှတ်ခြင်း (၂) သတ်မှတ်ထားသည့်ကိစ္စရပ်တိုင်းအတွက် အသက်မွေးမှုဆန်းစစ်ခြင်းနှင့် အကျိုးဆက်တွင် ဆက်စပ်နေသော ပတ်ဝန်းကျင် အန္တရာယ်နှင့် ၎င်း၏ အဆင့်အတန်း (၃) အန္တရာယ်ရှိသောကိစ္စရပ်၏ နောက်ကွယ်ရှိအကြောင်းရင်းများကို ဖော်ထုတ်ခြင်း (၄)သတ်မှတ်သည့်အန္တရာယ်၏အကြောင်းရင်းကိုလျှော့ချစေသော နည်းလမ်း (၅) ၎င်းအန္တရာယ်အဆင့်အတန်းများ ၏ အဓိက၊ အသင့်အတင့် နှင့် သေးငယ်အဆင့်များကို ၎င်းတို့၏ နောက်ဆက်တွဲသိသာထင်ရှားမှုများပေါ်ထွက်လာခြင်း၊ အသက်မွေးမှုတို့ပေါ်တွင်အခြေခံ၍အဆင့်အတန်းခွဲခြားသတ်မှတ်ခြင်း။ ၎င်းရလဒ်အဆင့်အတန်းများကို စီမံကိန်းတခုလုံး အတွက်ဖော်ပြ၍ ရိုးရှင်းသော အခြေအနေအားဖြင့် တင်ပြရမည်။ (ပင်မအစီရင်ခံစာပုံစံ ၆.၆-၁တွင် ကြည့်ရှုနိုင်သည်)

၁.၅.၅.၂ တည်ဆောက်ဆဲကာလသဘာဝဝန်းကျင်ဆိုင်ရာ အန္တရာယ်စီမံကွပ်ကဲမှု

စီမံကိန်းတည်ဆောက်ဆဲကာလ သဘာဝန်းကျင်ဆိုင်ရာအန္တရာယ်စီမံကွယ်ကဲမှုအစီအစဉ်ကို အထက်ပါ သဘောထားအမြင်များ နှင့် စီမံကိန်းတည်ဆောက်မှုသဘာဝတို့အပေါ်တွင်မူတည်၍စွန့်စားရမှုအန္တရာယ်(၂)မျိုး အားဖြင့် သတ်မှတ်သည်။

- ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနှင့် သစ်တောရေးရာဝန်ကြီးဌာန(သို့) အခြားသော သက်ဆိုင်ရာအာဏာပိုင်တို့၏ဖော်ပြထားရှိအပ်သောသဘာဝပတ်ဝန်းကျင်ဆိုင်ရာလိုအပ်ချက်များကို စီမံကိန်းမှလိုက်နာဆောင်ရွက်မှုမရှိခြင်း။

• စီမံကိန်းပိုင်ဆိုင်သူများ အထူးအားဖြင့် အနီးတဝိုက်ရှိ ဒေသခံပြည်သူများနှင့် ဆန့်ကျင်ခြင်း

ထို့အပြင် လျှပ်စစ်ဓါတ်အားပေးစက်ရုံအားစမ်းသပ်ခြင်းနှင့် စုံစမ်းရေးကော်မတီဖွဲ့စည်းထားရှိခြင်းအားဖြင့်စီမံကိန်း လည်ပတ်စဉ် ပေါက်ကွဲလောင်ကျွမ်းစေတတ်သည့် အန္တရာယ်ဆန်းစစ်လေ့လာခြင်းတွင် ထည့်သွင်းရမည်။

၄င်းဖော်ပြသတ်မှတ်ထားရှိသည့် စွန့်စားမှုအန္တရာယ်နှင့် ရလဒ်များ စီစစ်ချက်ကို ပင်မအစီရင်ခံစာ၏ ဇယား ၆.၆-၁ တွင်ဖော်ပြထားရှိသည်။ ထိုတွင်အကျိုးဆက်ဖြစ်ပေါ်နိုင်မှုများနောက်ကွယ်ရှိ အကြောင်းရင်းများနှင့် လျော့နည်းသက်သာစေသည့်လျှော့ချနည်းလမ်းများအတွက်လုံလောက်ပါသည်။ အနှစ်သာရအားဖြင့် ပထမစွန့်စားမှုအန္တရာယ်အတွက် စီမံကွပ်ကဲခြင်းကို သေချာစေရန် (၁) စီမံကိန်းတည်ဆောက်ခွင့်ရကန်ထရိုက် နှင့် တဆင့်ခံကန်ထရိုက်ယူသူတို့သည် သဘာဝပတ်ဝန်းကျင်နှင့်ထိခိုက်သက်ရောက်မှုတို့အတွက် လိုအပ်ချက်များကိုရှင်းလင်းစွာသဘောပေါက်နားလည် ရမည့်အပြင်၄င်းတို့ ပူးပေါင်းပါဝင်ဆောင်ရွက်သော စီမံကိန်းတည်ဆောက်စဉ်ပုံစံကိုလည်းသိရှိရပါမည်။ (၂) ၄င်းစီမံကိန်းတည်ဆောက်ခွင့်ရစာချုပ်သည် သဘာဝပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှုစီမံကွပ်ကဲရေးကို တိကျရှင်းလင်းစွာနား လည်၍ တာဝန်သိစိတ်ဖြင့်ဆောင်ရွက်ရမည်။ (၃) ထိရောက်၍အကျိုးရှိသောအကြံပေးကြီးကြပ်သူအားဖြင့်ကန်ထရိုက်နှင့် တဆင့်ခံကန်ထရိုက်ယူသူတို့အားစီမံကြီးကြပ်စေရမည်။ (၄) ပြောင်းလဲမှုအတွက်စီမံကွပ်ကဲခြင်းနည်းလမ်းကိုလည်း တင်းကြပ်စွာထားရှိခြင်းဖြင့်သာ စီမံကိန်းပုံစံ၊ စက်ပစ္စည်းများတည်ဆောက်ပုံနည်းလမ်းများ အစိတ်အပိုင်းများကို ပြောင်းလဲ မှုပြုရမည်။

ဒုတိယစွန့်စားမှုအန္တရာယ်အတွက် စီမံကွပ်ကဲခြင်းသည် ပြည်သူလူထု၏သတင်းအချက်အလက်များ ပွင့်လင်းမြင်သာရှိမှု၊ ဒေသခံပြည်သူတို့၏ဖွံ့ဖြိုးရေးအထောက်အပံ့များ၊ သက်ဆိုင်ရာဒေသအာဏာပိုင် အဖွဲ့အစည်းများ အားဖြင့်ပတ်သက်ဆက်နွယ်နေပါသောကြောင့်ပြည်သူတို့၏သဘောထားမှတ်ချက်များအားဖြင့် စီမံခန့်ခွဲမှုကိုထိရောက် စေရပါမည်။

စီမံကိန်းတည်ဆောက်စဉ် ပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှုအတွက် လိုက်နာလေးစားမှုမရှိသောစွန့်စားမှုအန္တရာယ်ကိုထည့်သွင်းစဉ်းစားခြင်း၊ ပြပြင်မွမ်းမံခြင်းနှင့်ဒေသခံတို့နှင့်ဆန့်ကျင်သောအသေးစားစွန့်စားမှုအန္တရာယ်တို့ကိုလည်း ထည့်သွင်းစဉ်းစားရန်သင့်ပါသည်။

၁.၅.၅.၃ စီမံကိန်းလည်ပတ်ကာလသဘာဝဝန်းကျင်ဆိုင်ရာအန္တရာယ်စီမံကွပ်ကဲမှု

စီမံကိန်းလည်ပတ်ကာလသဘာဝဝန်းကျင်ဆိုင်ရာအန္တရာယ်စီမံကွပ်ကဲမှု အစီအစဉ်ကိုအထက်ပါသဘောထားအမြင်မှုဘောင် နှင့် စီမံကိန်းသဘောသဘာဝအပေါ်တွင်အခြေခံ၍ဆောင်ရွက်ရမည်။ စီမံကိန်းလည်ပတ်ကာလတွင်အန္တရာယ်(၂)မျိုး အားထည့်သွင်းစဉ်းစားသင့်သည်။ ပထမအမျိုးအစားမှာဘေးအန္တရာယ်ဖြစ်စေသောဓာတ်ငွေ့ယိုစိမ့်ခြင်းအပါအဝင်သဘာဝဓာတ်ငွေ့လောင်ကျွမ်းခြင်း၏ အကျိုးဆက်များဖြစ်သောပေါက်ကွဲခြင်း၊ မီးလောင်ကျွမ်းခြင်း၊ အတွင်းပိုင်းစက်များပေါက်ကွဲခြင်းမီးလောင်ကျွမ်းခြင်း၊ အတွင်းပိုင်းစက်များပေါက်ကွဲခြင်း၊ စက်ပစ္စည်းချို့ယွင်းပျက်ဆီးခြင်းတို့ကို ခြုံငုံမိစေပါသည်။ ဒုတိယအမျိုးအစားမှာ လျှပ်စစ်ဓာတ်ကူးမှုမရှိသောညစ်ညမ်းခြင်းများကိုထိန်းချုပ်ခြင်း အထူးအားဖြင့်ဓာတ်ငွေ့လွှတ်ထုတ်ခြင်းနှင့် ရေဆိုးစွန့်ထုတ်ခြင်းများကိုခြုံငုံမိစေသည်။ ၄င်းအန္တရာယ်များစီမံကွပ်ကဲမှု (၂)မျိုးအားဆွေးနွေးစိစစ်ခြင်း ကို အခန်း ၆.၆.၃ တွင် ဖော်ပြထားရှိသည်။

စီမံကိန်းလည်ပတ်ကာလအန္တရာယ်များစီမံကွပ်ကဲခြင်းနည်းလမ်းများ၏ဆွေးနွေးမှုကိုမူ အခန်း ၆.၆.၃ တွင် ဖော်ပြအစီရင်ခံအပ်ပါသည်။ အနှစ်သာရအားဖြင့် ၎င်းနည်းလမ်းများတွင်လုပ်ငန်းလုပ်ဆောင်ခွင့်ရရှိသူ ကန်ထရိုက်ကို သေချာစေသောအချက်အလက်များဖြစ်သည့် (၁) စီမံကိန်းလည်ပတ်စဉ်အန္တရာယ်များနှင့်ပတ်သက်သော လိုအပ်ချက်များ ကိုကောင်းစွာသဘောပေါက်နားလည်ခြင်း (၂)သဘာဝဓာတ်ငွေ့လောင်ကျွမ်းလည်ပတ်သောလျှပ်စစ်ဓာတ်အားပေးစက်ရုံ၏ကန့်သတ်ချက်များပုံစံများနှင့် အမျိုးမျိုးသောလုံခြုံစိတ်ချရမှုအတွက်လမ်းညွှန်ချက်များနှင့်စံချိန်စံနှုန်းများ (၃) အရည်အသွေးထိန်းချုပ်ပုံစံ၊ ထုတ်လုပ်ခြင်း၊ စက်များတပ်ဆင်တည်ဆောက်ခြင်း၊ လည်ပတ်ခြင်းနည်းလမ်းများ နှင့် လေ့ကျင့်သင်ကြားပေးခြင်းများကိုဖွဲ့စည်းတည်ထောင်ထားခြင်း (၄)စက်ရုံနှင့် စီမံကိန်းပုံစံကန့်သတ်ချက်များပြီးစီးပါကလုပ်ငန်းခွင်အန္တရာယ်ကင်းစိတ်ချလုံခြုံရန်စနစ်တကျစစ်ဆေးဆောင်ရွက်ခြင်းအစီအစဉ် (HAZOP) ကိုအသေးစိတ်ဆောင်ရွက်ခြင်း (၅) အားလုံးသောအန္တရာယ်ကင်းဝေးလုံခြုံရေးအစီအစဉ်များနည်းလမ်းကို စမ်းသပ်ခြင်း၊ စုံစမ်းစီစစ်ရေးကော်မတီဖွဲ့ခြင်းများကို အသေးစိတ်ပြင်ဆင်ခြင်း (၆)အားလုံးသောဘေးအန္တရာယ်များကင်းဝေးလုံခြုံစေခြင်းအတွက်စီမံကိန်းလည်ပတ် ကွပ်ကဲမှုနည်းလမ်းများကိုလည်း အသေးစိတ်ရေးဆွဲပြင်ဆင်ခြင်း (၇) လျှပ်စစ်ဓာတ်အားပေးစက်ရုံလည်ပတ်ရေးအဖွဲ့အတွက်ခိုင်မာတင်းကြပ်သောလုပ်ငန်းခွင်သင်တန်းများကိုဆောင်ရွက်စေခြင်း (၈) အရေးပေါ်အခြေအနေတုန့်ပြန်မှုအစီအစဉ်များပြင်ဆင်ခြင်းတို့ဖြစ်ကြပါသည်။ လျှပ်စစ်ဓာတ်အားပေးစက်ရုံလည်ပတ်ရေးအဖွဲ့သည် နည်းပညာအရည်အသွေး နှင့် စီမံအုပ်ချုပ်မှုအရည်အချင်းပြည့်ဝ၍ လုပ်ငန်းခွင်ဘေးအန္တရာယ်ကင်းလုံခြုံမှုအစီအစဉ်များကိုတင်းကြပ်စွာအကောင်အထည်ဖော်ဆောင်နိုင်ရန်သေချာစေရပါမည်။ ထို့အပြင်အရေးပေါ်အခြေအနေပေါ်ပေါက်လာသော အခါတွင်လည်းအသင့်အခြေအနေတွင်မှန်ကန်စွာအကောင် အထည်ဖော်ဆောင်ရွက်နိုင်ရပါမည်။

ညစ်ညမ်းမှုအန္တရာယ်ထိန်းသိမ်းကွပ်ကဲခြင်းစီမံအုပ်ချုပ်မှုအတွက် တိကျသောတိုင်းတာမှုမရှိနိုင်ပါ။ ဓာတ်ငွေ့ထုတ်လွှတ်ခြင်းနှင့်ရေဆိုးစွန့်စနစ်စီမံကွပ်ကဲခြင်းဖြင့်သာစီမံအုပ်ချုပ်ရမည်ဖြစ်သည်။

စီမံကိန်းလည်ပတ်မှုအန္တရာယ်များသည် အသင့်အတင့်အားဖြင့်ကြီးကြပ်ကွပ်ကဲရမည့်အန္တရာယ်များဖြစ်ပြီး ညစ်ညမ်း မှုအန္တရာယ်များမှာမူသေးငယ်သော အဆင့်တွင်သာရှိပါသည်။

၁.၆ ထိခိုက်သက်ရောက်မှု အစုအဝေးကို ဆန်းစစ်ခြင်း

ထားဝယ်အထူးစီးပွားရေးဇုန်သည် မြန်မာ့လျှပ်စစ်စွမ်းအားကော်ပိုရေးရှင်း၏နိုင်ငံတော်လျှပ်စစ်ဖြန့်ဝေပေးမှုစနစ်အတွင်းပါရှိမနေသောကြောင့် ထားဝယ်အထူးစီးပွားရေးဇုန်လျှပ်စစ်ဓာတ်အားပေးစက်ရုံတည်ဆောက်ပြီးစီးလျှင် ဓာတ်အားဖြန့်ဝေမှုတိုးမြင့်လာနိုင်မည်ဖြစ်သည်။ သို့ဖြစ်ပါ၍ ထိခိုက်သက်ရောက်မှုအစုအဝေးကိုတင်ပြခြင်းမှာ ပိုမို၍ကျိုးကြောင်းဆီလျော်အဓိပ္ပါယ်ရှိသောအနာဂါတ်တစ်ခုဖြစ်ပါသည်။

ဤအစုအဝေး၌ ဝန်းကျင်အတွင်းနိုက်တြိုဂျင်ဒိုင်အောက်ဆိုဒ်ပါဝင်မှုများကိုဓာတ်အားပေးရုံ (၂)ခု အတွက် ခန့်မှန်းတွက်ချက်ရမည်ဖြစ်သည်။ သဘာဝဓာတ်ငွေ့နှင့် တွဲဖက်၍လည်ပတ်သောစက်ရုံ(၂)ခုစာပေါင်းစပ်စွမ်းအား ၈၄၀ မဂ္ဂါဝပ်၏လေထုအတွင်းထိခိုက်သက်ရောက်မှုသည်ပင်သိသာထင်ရှားမှုမရှိနိုင်ပါ။ ယခုလက်ရှိပတ်ဝန်းကျင်အတွင်းနိုက်တြိုဂျင်ဒိုင်

အောက်ဆိုဒ်ပါဝင်မှုအဆင့်ကိုအခြေခံ၍ ၃၀% ကိုလေထုအတွင်းမှစုပ်ယူစဉ်တွင်ပင်စက်မှုဖုန်အတွက် နိုက်ထြိုဂျင်ဒိုင်အောက်ဆိုဒ်ကိုအသုံးပြုနိုင်ပါသေးသည်။

ဇယား ၆.၅-၄ နှင့် ၆.၅-၅ တို့မှ အချက်အလက်များရရှိနိုင်ပါသည်။ ခန့်မှန်းခြေအားဖြင့် နိုက်ထြိုဂျင်ဒိုင်အောက်ဆိုဒ်ပါဝင်မှုအမြင့်ဆုံးနှင့်ရောက်ရှိနိုင်သောနေရာများ၏ လေ့လာချက်ကို ဇယား ၁.၆-၁ တွင် ဖော်ပြပါသည်။

ဇယား ၁.၆-၁

ဝန်းကျင်ရှိနိုက်တြိုဂျင်ဒိုင်အောက်ဆိုဒ်ပါဝင်မှုအနည်းဆုံးခန့်မှန်းအစုဝေး

ရလဒ်များ	စီမံကိန်းလျှပ်စစ်ဓာတ်အားပေးစက်ရုံ (အဆင့်(၅))			စီမံကိန်းလျှပ်စစ်ဓာတ်အားပေးစက်ရုံ (အဆင့်(၅))နှင့် အခြားသောလျှပ်စစ်ဓာတ်အားပေးစက်ရုံ (အဆင့်(၅))		
	နိုက်တြိုဂျင်ဒိုင်အောက်ဆိုဒ် (µg/m³)			နိုက်တြိုဂျင်ဒိုင်အောက်ဆိုဒ် (µg/m³)		
	၁နာရီ	၂၄နာရီ	၁နှစ်	၁နာရီ	၂၄နာရီ	၁နှစ်
လေ့လာနေရာအားလုံး						
- အမြင့်ဆုံးမြင့်တက်လာနိုင်သောပါဝင်မှု	၇၅.၂၀	၂၃.၆၄	၄.၀၄	၁၀၁.၄၈	၃၀.၉၅	၅.၁၆
- ဝန်းကျင်လေထုစံချိန်စံနှုန်း %	၃၇.၆၀	၁၅.၇၆	၁၀.၁၀	၅၀.၇၄	၂၀.၆၃	၁၂.၉၀
- အမြင့်ဆုံးပမာဏတည်နေရာ	DSE2 ဧရိယာ	DSE2 ဧရိယာ	DSE2 ဧရိယာ			
- မြေပုံအညွှန်း	၃၉၈၃၀၇E ၁၅၇၂၆၂၄N	၃၉၈၁၀၇ E ၁၅၇၂၀၂၄ N	၃၉၉၁၀၇ E ၁၅၇၂၃၂၄ N	၃၉၉၂၀၇E ၁၅၇၂၃၂၄ N	၃၉၈၅၀၇ E ၁၅၇၂၈၂၄ N	၃၉၈၆၀၇ E ၁၅၇၂၉၂၄ N
- အကွာအဝေး (မီတာ)/စီမံကိန်းနေရာမှ ဦးတည်ရာ	၃၃၂/N	၅၉၃ /W	၅၅၅/ E	၁၂၀၅ / N	၄၁၉/ N	၅၁၈/N
- အမြင့်ဆုံးပါဝင်မှုအဆင့် (Background)	၃၄	၁၈	မရှိပါ	၃၄	၁၈	မရှိပါ
- နောက်ခံအကြောင်းအချက်အပါအဝင် အ[ ] အမြင့်ဆုံး အသားတင်ပမာဏ	၁၀၉.၂၀	၄၁.၆၄	၄.၀၄	၁၃၅.၄၈	၄၈.၉၅	၅.၁၆
- ဝန်းကျင်လေထုစံချိန်စံနှုန်း%	၅၄.၆၀	၂၇.၇၆	၁၀.၁၀	၆၇.၇၄	၃၂.၆၃	၁၂.၉၀
တုန့်ပြန်ထိခိုက်လွယ်ကူသောနေရာများ						
- ပါဝင်မှုအဆင့်များ	၂၃.၆၃-၃၈.၇၅	၁.၁၅-၃.၉၁	၀.၁၁-၀.၅၀	၆၀.၆၃-၇၈.၈၅	၂.၈၉-၇.၇၉	၀.၂၁-၀.၈၄
- ဝန်းကျင်လေထုစံချိန်စံနှုန်း%	၁၁.၈၂-၁၉.၃၈	၀.၇၇-၂.၆၁	၀.၂၈-၁.၂၅	၃၀.၃၀-၃၉.၄၀	၁.၉၃-၅.၁၁	၀.၅၃-၂.၁၀
- အမြင့်ဆုံးပမာဏတည်နေရာ	မှဒူးရွာ	ကမြိုင်ဆွဲရွာဝန်းကျင်	ညောင်ပင်ဆိပ်ရွာ	ကမြိုင်ဆွဲရွာဝန်းကျင်	ကမြိုင်ဆွဲရွာဝန်းကျင်	ညောင်ပင်ဆိပ်ရွာ
- အမြင့်ဆုံးပါဝင်မှုအဆင့် (Background)	၃၄	၁၈	မရှိပါ	၃၄	၁၈	မရှိပါ
- နောက်ခံအကြောင်းအချက်အပါအဝင်အမြင့်	၅၇.၆၃- ၇၂.၇၅	၁၉.၁၅-၂၁.၉၁	၀.၁၁-၀.၅၀	၉၄.၆၃-၁၁၂.၈၅	၂၀.၈၉-၂၅.၉၇	၀.၂၁-၀.၈၄

ရလဒ်များ	စီမံကိန်းလျှပ်စစ်ဓာတ်အားပေးစက်ရုံ (အဆင့်(၅))			စီမံကိန်းလျှပ်စစ်ဓာတ်အားပေးစက်ရုံ (အဆင့်(၅))နှင့် အခြားသောလျှပ်စစ်ဓာတ်အားပေးစက်ရုံ (အဆင့်(၅))		
	နိုက်ထြိုဂျင်ဒိုင်အောက်ဆိုဒ် ($\mu g/m^3$)			နိုက်ထြိုဂျင်ဒိုင်အောက်ဆိုဒ် ($\mu g/m^3$)		
	၁နာရီ	၂၄နာရီ	၁နှစ်	၁နာရီ	၂၄နာရီ	၁နှစ်
ဆုံး အသားတင်ပမာဏ						
- ဝန်းကျင်လေထုစံချိန်စံနှုန်း%	၂၈.၈၂-၃၆.၃၈	၁၂.၇၇-၁၄.၆၀	၀.၂၈-၁.၂၅	၄၇.၃၀-၅၆.၄၀	၁၃.၉၃-၁၇.၃၁	၀.၅၃-၂.၁၀
- စံနှုန်း	၂၀၀[၁]	၁၅၀[၂]	၄၀[၁]	၂၀၀[၁]	၁၅၀[၂]	၄၀[၁]

အရင်းအမြစ်- ၁/သဘာဝပတ်ဝန်းကျင်၊ ကျန်းမာရေး နှင့် လုံခြုံရေးလမ်းညွှန်ချက် ကမ္ဘာ့ဘဏ်အုပ်စု၊ အပြည်ပြည်ဆိုင်ရာဘဏ္ဍာရေးအဖွဲ့၏ ပတ်ဝန်းကျင်လေထု ပတ်ဝန်းကျင်လေထုအရည်အသွေး နှင့် ဝန်းကျင်လေထုလွတ်ထုတ်ခြင်း (၂၀၀၇)

၂/ လျှပ်စစ်အပူအား၊ ဓာတ်အားပေးစက်ရုံအသစ်များလမ်းညွှန်ချက်၊ ညစ်ညမ်းမှုလျော့ကျစေခြင်းနှင့် ကာကွယ်ခြင်းလက်စွဲ၊ ကမ္ဘာ့ဘဏ်အုပ်စု၊ ၁၉၉၈ (ဇူလိုင်)

၁.၇ သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းကွပ်ကဲခြင်းအစီအစဉ်

၁.၇.၁ သဘာဝပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှု ထိန်းသိမ်းကွပ်ကဲခြင်းအခွင့်အလမ်းများ

သဘာဝပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှု လေ့လာဆန်းစစ်ခြင်းလုပ်ငန်းစဉ်များဖော်ပြချက်တွင် သဘာဝပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှုဆန်းစစ်ခြင်း၊ စုံစမ်းလေ့လာခြင်းပြင်ဆင်ရန်အတွက် အစီအစဉ်နှစ်ရပ်ထားရှိရမည်ဖြစ်ပါသည်။ တစ်ရပ်မှာစီမံကိန်းတည်ဆောက်ဆဲကာလ (CEMP) အတွက်ဖြစ်၍ အခြားတစ်ခုမှာမူစီမံကိန်းလည်ပတ် ကာလ (OEMP) အတွက်ဖြစ်ပါသည်။ ထိုစုံစမ်းလေ့လာခြင်းနှစ်ရပ်ကိုအသေးစိတ်နှိုင်းယှဉ်ထားမှုအကျဉ်းချုပ်ကို သဘာဝပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှုလေ့လာဆန်းစစ်ခြင်း (ETA) အစီရင်ခံစာတွင်ဖော်ပြထားရှိသည်။ သို့သော် ပြားလည်း ဤစီမံကိန်း၏ပြင်ဆင်ခြင်းကဏ္ဍတွင် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းကွပ်ကဲမှုနှစ်ရပ်ဖြစ်သောစီမံကိန်းတည်ဆောက်ဆဲကာလ နှင့် လည်ပတ်ကာလတို့အတွက် ကွဲလွဲမှုနည်းပါးသောအခြေခံစည်းမျဉ်းစည်းကမ်းနှင့်လမ်းညွှန်မှုများပင်ဖြစ် ပါသည်။ ထိုသဘာဝပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှုထိန်းသိမ်းကွပ်ကဲခြင်းများသည် စီမံကိန်းကြော်ငြာပေးသူ (သို့) စီမံကိန်းပိုင်ရှင်အဖြစ်ကိုယ်စားပြုသည်။ စီမံကိန်းတည်ဆောက်ခွင့်ကန်ထရိုက်ရရှိသူသည် နောက်ဆုံးအဆင့်တည်ဆောက်ပုံစံနှင့်စီမံကိန်းတည်ဆောက်မှုအစီအစဉ်အားအခြေခံ၍ ထိခိုက်သက်ရောက်မှုအစုအဝေးကိုဆန်းစစ်ခြင်းပိုင်ရှင်အဖြစ်အသေးစိတ်ချဲ့တွင်ပြင်ဆင်ရန်လိုအပ်ပါသည်။ ၎င်းကန်ထရိုက်ရရှိသူသည်ပင်စီမံကိန်းလည်ပတ်ကာလအတွက်လည်း အသေးစိတ်ထိခိုက်သက်ရောက်မှုအစုအဝေးကိုဆန်းစစ်ခြင်းအားစီးပွားရေးလုပ်ငန်းစတင်မလည်ပတ်မီအမှန်တကယ်လည်ပယ်လည်ပတ်မည့်စီမံကိန်းတည်ဆောက်ပုံ၊
ဓာတ်အားပေးစက်ရုံလုပ်ငန်းအပ်နှံမှုရလဒ်များနှင့်နောက်ဆုံးပိတ်အချောသတ်စီမံကိန်း
လည်ပတ်ပုံ အဆင့်ဆင့်ကိုအခြေခံ၍ ထည့်သွင်းရပါမည်။

၁.၇.၂ သဘာဝပတ်ဝန်းကျင်စီမံကွပ်ကဲခြင်းပိုင်ရှင်၏ အသုံးချခြင်း

စီမံကိန်းတည်ဆောက်စဉ် တည်ဆောက်ခွင့်ရကန်ထရိုက်သည်စီမံကိန်းတည်ဆောက်ဆဲကာလ သဘာဝပတ်ဝန်းကျင် ထိခိုက်သက်ရောက်မှုထိန်းသိမ်းကွပ်ကဲခြင်း (CEMP) ကိုစီမံကိန်းမန်နေဂျာ၏ ကြီးကြပ်မှုဖြင့် အကောင်အထည်ဖော်ဆောင်ရွက်ရမည်။ ပိုင်ရှင်၏တည်ဆောက်ခွင့်ရအဖွဲ့မှပြန်လည် ဆန်းစစ်ရန်နှင့်စီမံကိန်းလည်ပတ်စဉ် သဘာဝပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှုထိန်းသိမ်းကွပ်ကဲခြင်း (OEMP) နောက်ဆုံးအဆင့်ကို စီမံကိန်း လည်ပတ် ကာလတွင် အကောင်အထည်ဖော်ဆောင်ရွက်ရန် ဖြစ်သည်။

၁.၇.၃ စီမံကိန်း၏ သဘာဝပတ်ဝန်းကျင်၊ ကျန်းမာရေးနှင့် လုံခြုံရေး(EHS)ဥပဒေဆိုင်ရာ လိုအပ်ချက်များ

စီမံကိန်းတည်ဆောက်စဉ်နှင့် လည်ပတ်စဉ်ကာလများတွင် သဘာဝပတ်ဝန်းကျင်ဆိုင်ရာ စီမံကွပ်ကဲမှုကို သဘာဝပတ်ဝန်းကျင်ကျန်းမာရေးနှင့်လုံခြုံရေး (EHS) ဥပဒေများ၏လမ်းညွှန်ချက်ဖြင့် ရည်ရွယ်တည်တန့်ဖွံ့ဖြိုးခိုင်မာအောင်ဖွဲ့စည်းရမည့်အပြင် ဥပဒေဆိုင်ရာလိုအပ်ချက်များကိုလက်တွေ့ကျကျဖော်ဆောင်နိုင်စေရပါမည်။ အကျိုးဆက်အားဖြင့်

စီမံကိန်းသဘောတရားအခြေခံများအား သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးစီမံကွပ်ကဲမှုစနစ် (EMS) ဖြင့်ဖွဲ့စည်း ကွပ်ကဲ၍ ISO ၁၄၀၀၁ လိုအပ်ချက်များအားပြည့်မီစေရပါမည်။

စီမံကိန်း၏သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးစီမံကွပ်ကဲမှုအား ဥပဒေဆိုင်ရာလိုအပ်ချက်များဖြင့်ပေါင်းစည်း၍ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးစီမံကွပ်ကဲမှုစနစ် (EMP) ကို ၂၀၁၃ ခုနှစ် လျှပ်စစ်ဆိုင်ရာဥပဒေမူကြမ်း ၂၀၁၃ ခုနှစ်သဘာဝ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးစည်းမျဉ်းစည်းကမ်းများမူကြမ်းနှင့် ၂၀၁၄ခုနှစ် သဘာဝပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှု လေ့လာဆန်းစစ်ခြင်းနည်းလမ်းများမူကြမ်းတို့တွင် ဖော်ပြထားရှိပြီးဖြစ်သည်။ လိုအပ်ချက်များအားလုံးကို သဘာဝ ပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှုလေ့လာဆန်းစစ်ခြင်းနည်းလမ်းများအားဖြင့်ခြုံငုံမိစေ၍ အနှစ်ချုပ်အဖြစ်ပင်မအစီရင်ခံ စာဇယား ၈.၂-၁ နှင့် အောက်ပါဇယား ၁.၇-၁ တွင်ညွှန်းဆိုအပ်ပါသည်။

ဇယား ၁.၇-၁

သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းကွပ်ကဲခြင်းနှင့် ဆက်နွယ်သော EIA နည်းလမ်းများ

အကြောင်းအရာ	**ပတ်သက်ဆက်နွယ်သောဥပဒေများ**
ပတ်ဝန်းကျင်ထိန်းသိမ်းကွပ်ကဲခြင်းပါဝင်မှုများ	၆၃
စီမံကိန်းအတည်ပြုလိုအပ်ချက်များ	
- ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဆိုင်ရာလေးစားလိုက်နာဆောင်ရွက်မှု သက်သေခံလက်မှတ်	၇၀
- ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဆိုင်ရာ လေးစားလိုက်နာမှုအခြေအနေ	၈၇၊ ၈၉၊ ၉၀၊ ၉၁၊ ၉၂၊ ၉၃၊ ၉၄၊ ၉၆၊ ၉၇၊ ၉၈
- တည်ဆောက်ဆဲ နှင့် လည်ပတ်စဉ်ကာလပတ်ဝန်းကျင်ထိခိုက်သက် ရောက်မှုထိန်းသိမ်းကွပ်ကဲခြင်း အစီရင်ခံစာတင်သွင်းမှု	၉၁၊ ၉၄
EMP များအားပြန်လည်စစ်ဆေးခြင်းနှင့် ပြုပြင်မွမ်းမံခြင်း	၉၄၊ ၉၇၊ ၉၈၊ ၉၉
ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးစီမံကွပ်ကဲမှုများအကောင်အထည်ဖော်ခြင်း	၁၀၂၊ ၁၀၃၊ ၁၀၄
စောင့်ကြည့်ကြီးကြပ်ခြင်းနှင့် အစီရင်ခံခြင်း	
- စောင့်ကြည့်ကြီးကြပ်ခြင်း တာဝန်ဝတ္တရားများ	၁၀၆၊ ၁၀၇
- စောင့်ကြည့်ကြီးကြပ်မှုအစီရင်ခံစာ တင်သွင်းခြင်း	၁၀၈
- စောင့်ကြည့်ကြီးကြပ်ခြင်းဆိုင်ရာ အစီရင်ခံစာ မာတိကာ	၁၀၉
- စောင့်ကြည့်ကြီးကြပ်မှုပိတ်သိမ်းခြင်း	၁၁၀
- သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနှင့် သစ်တောရေးရာဝန်ကြီးဌာန မှ စစ်ဆေးခြင်း	၁၁၁-၁၂၂

မှတ်ချက်။ ။ ᵃ/ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဆိုင်ရာ လိုက်နာဆောင်ရွက်မှု သက်သေခံလက်မှတ်

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း အပိုဒ် ၁၀၂ (က) အရ စီမံကိန်းအဆိုပြုသူသည် မိမိကိုယ်တိုင်ကြောင့်ဖြစ်စေ မိမိကိုယ်စားဆောင်ရွက်ရန် ခန့်ထားခြင်း သို့မဟုတ် ငှားရမ်းခြင်း သို့မဟုတ်

အခွင့်အာဏာပေးခြင်း ပြုထားသည့် ကန်ထရိုက်တာ၊ လက်ခွဲဆောင်ရွက်ပေးသူ ဆပ်ကန်ထရိုက်တာ၊ အရာရှိ၊ အလုပ်သမား၊ ကိုယ်စားလှယ် သို့မဟုတ် အတိုင်ပင်ခံများ၏ ပြုလုပ်မှု သို့မဟုတ် ပျက်ကွက်မှုကြောင့်ဖြစ်စေ ပေါ်ပေါက်သည့် ဆိုးကျိုးသက်ရောက်မှုများ အားလုံးတို့အတွက် တာဝန်ရှိသည်။

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း အပိုဒ် ၁၀၃ အရ စီမံကိန်းအဆိုပြုသူသည် ပတ်ဝန်းကျင်စီမံကိန်းခွဲမှုအစီအစဉ်၊ စီမံကိန်းကတိကဝတ်အားလုံးနှင့် စည်းကမ်းချက်များကို အပြည့်အဝ အကောင်အထည်ဖော်ရမည့်အပြင် ယင်း၏ကိုယ်စား စီမံကိန်းကိုဆောင်ရွက်ပေးသူ ကန်ထရိုက်တာနှင့် လက်ခွဲဆောင်ရွက်ပေးသူ ဆပ်ကန်ထရိုက်တာများ အားလုံးက စီမံကိန်းအတွက် လုပ်ငန်းများဆောင်ရွက်ရာတွင် သက်ဆိုင်ရာ ဥပဒေ၊ နည်းဥပဒေများ၊ ဤလုပ်ထုံးလုပ်နည်း၊ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်နှင့် စည်းကမ်းချက်များအားလုံးကို အပြည့်အဝလိုက်နာဆောင်ရွက်စေရန် တာဝန်ရှိသည်။

၁.၇.၄ သဘာဝပတ်ဝန်းကျင်စီမံကွပ်ကဲခြင်း ကန်ထရိုက် (CEMP) ၏ အနှစ်ချုပ်နှင့် အကောင်အထည်ဖော်ရန် စီစဉ်မှုများ

ဆောက်လုပ်ရေး ပတ်ဝန်းကျင်ဆိုင်ရာ စီမံခန့်ခွဲခြင်း အစီအစဉ် (CEMP) အကောင်အထည်ဖော်မှု

စီမံကိန်းသဘောတရားများသေချာစေမှုမှာ စီမံကွပ်ကဲမှုကန်ထရိုက် (CEMP) အားဖြင့် အတူပူးပေါင်းပါဝင်စေ လျက်အားလုံးသောလျှော့ချနည်းလမ်းများကို စီမံကွပ်ကဲမှုပိုင်ရှင်အားဖြင့်လျှပ်စစ်ဓာတ်အားပေးစက်ရုံစီမံကိန်းနှင့် ၎င်းနှင့် ဆက်စပ်ထောက်ပံ့မှုပုံစံများ၊ တည်ဆောက်နည်းပညာများနှင့် ကန့်သတ်ခြင်းများတွင် အသေးစိတ်ပုံစံအားဖြင့်ပါရှိရမည်။ ၎င်းကိစ္စရပ်များကို စီမံကိန်းတည်ဆောက်ဆဲကာလတွင် စီမံကွပ်ကဲရန်ဖြစ်သည်။ (၁) ယေဘူယျတည်ဆောက်ပုံ(၂) အသံနှင့်တုန်ခါခြင်း (၃)စွန့်ပစ်စနစ် (၄)လေထုအရည်အသွေးစီမံကွပ်ကဲခြင်း (၅)ရေဆိုးစွန့်စနစ်အစီအမံ (၆) ယာဉ်ကြော ထိန်းသိမ်းမှု (၇)လုပ်ငန်းခွင်လုံခြုံရေးနှင့်ကျန်းမာရေး (၈)အရင်းအမြစ်များစီမံခန့်ခွဲခြင်း နှင့် (၉)လူမှုစီးပွား ပူးပေါင်းတာဝန်ခံမှု အစီအစဉ် (CSR) (၁၀) ဒီရေတော အရင်းအမြစ် စီမံခန့်ခွဲခြင်း တို့ဖြစ်ကြပါသည်။ ဖော်ပြပါကိစ္စရပ်တိုင်းတွင် တဆင့်ခံစီမံကွပ်ကဲမှုအစီအစဉ်ကိုပြင်ဆင်ထားရှိခြင်းအားဖြင့် ၎င်းအစီအစဉ်များ ကို အတွဲ(၂) နောက်ဆက်တွဲ ၆(A) တွင် ဖော်ပြထားရှိသည်။

စီမံကိန်း စီမံခန့်ခွဲမှု အ   ဖွဲ့အစည်းတွင် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုသည် အဓိ အဓိက အခန်းကဏ္ဍတစ်ခုတွင် ပါဝင်နေပြီး ၎င်းဖွဲ့စည်းမှုကို စာတမ်း၏ ပုံ ၈.၃-၁ တွင် ဖော်ပြထားပါသည်။

တာဝန်ယူဆောင်ရွက်မှုများ

ကန်ထရိုက်တာသည် ဆောက်လုပ်ရေးကြီးကြပ်မှု အတိုင်ပင်ခံမှတဆင့် ပိုင်ရှင်၏ စီမံကိန်း မန်နေဂျာ၏ ကြီးကြပ်မှုဖြင့် CEMP ကန်ထရိုက်တာအား ခန့်အပ်ထားသည်။ ကန်ထရိုက်တာသည် CEMP ကန်ထရိုက်တာ၏ လုပ်ငန်းဆောင်တာများပြီးမြောက်အောင်မြင်ရန် EHS မန်နေဂျာထားရှိခြင်းဖြင့် စောင့်ကြပ်ကြည့်ရှုစေသည်။

ပိုင်ရှင်၏ စီမံကိန်းမန်နေဂျာမှ ပတ်ဝန်းကျင်ဆိုင်ရာ ညွှန်ကြားချက်များအဖြစ်ဖော်ပြထားသော မှန်ကန်သော လုပ်ဆောင်မှုများကို လိုက်နာမှုရှိ/မရှိ ဆုံးဖြတ်ခြင်းအားဖြင့် ကန်ထရိုက်တာကို ညွှန်ကြားသည်။ ကန်ထရိုက်တာသည် မှန်ကန်သော လုပ်ဆောင်မှုများနှင့် ဆက်စပ်၍ EHS ကိုလိုက်နာမှု မရှိသော လုပ်ဆောင်မှုများကို ကိုင်တွယ်ဖြေရှင်းရန် ကိုယ်ပိုင်နည်းလမ်းများ အကောင်အထည်ဖော်ရန် လိုအပ်ပါသည်။ ကန်ထရိုက်တာသည် လိုက်နာမှုမရှိသော လုပ်ဆောင်မှုများနှင့် ပတ်သတ်၍ ပြဿနာအရင်းအမြစ်ကို စုံစမ်းရန် လိုအပ်ပြီး ၎င်းပြဿနာအရင်းအမြစ်အတွက် သို့စီမံကိန်း မန်နေဂျာထံသို့ ကန်ထရိုက်တာမှ တင်ပြရပါမည်။ ကန်ထရိုက်တာသည် အရေးပေါ်တုန့်ပြန်မှုအစီအစဉ်ကို ကြိုတင်ပြင်ဆင်ထားပြီး ၎င်းအရေးပေါ်တုန့်ပြန်မှု အစီအစဉ်ကို အကောင်အထည်ဖော်ရန် လိုအပ်သော စွမ်းဆောင်ရည်များရှိရန် လိုအပ်သည်။

စောင့်ကြည့်လေ့လာခြင်း

ကန်ထရိုက်တာ၏ ပတ်ဝန်းကျင်ဆိုင်ရာ စွမ်းဆောင်မှုများဖြစ်သော စောင့်ကြည့်လေ့လာခြင်း၊ အကဲဖြတ်ခြင်းနှင့် စာတမ်းပြုစုခြင်း (MER) တို့သည် သက်ဆိုင်ရာ ထိခိုက်သက်ရောက်မှု ပြဿနာများကို စောင့်ကြည့်လေ့လာခြင်း စာတမ်း တစ်စုံကို ဌာနတွင်းအတွက်တင်ပြပြီး အခြားတစ်စုံကို MONREC သို့ ၆လ တစ်ကြိမ် တင်ပြရမည် ဖြစ်ပါသည်။

စောင့်ကြည့်လေ့လာခြင်းအတွက် ဘက်ဂျက်သည် တတိယအဖွဲ့အစည်းအတွက်သာ ခွင့်ပြုပြီး ၎င်းကို အထက်တွင်ဖော်ပြထားသော စောင့်ကြည့်လေ့လာခြင်းအဖွဲ့မှ စောင့်ကြည့်လေ့လာခြင်းလုပ်ငန်းအတွက် မဟုတ်ပေ။

တတိယအဖွဲ့အစည်းမှ စောင့်ကြည့်လေ့လာခြင်း လုပ်ငန်းများဖြစ်သော ဆောက်လုပ်ရေးလုပ်ငန်းကာလ၏ လေထုအရည်အသွေး၊ အသံဆူညံမှု၊ ရေဆိုး၊ အဏ္ဏဝါအရင်းအမြစ်နှင့် ယာဉ်ကြောသွားလာခြင်းများကို တစ်နှစ် ၂ကြိမ် တိုင်းတာရပါမည်။ စီမံကိန်း၏ ပတ်ဝန်းကျင်နှင့် စွမ်းဆောင်ရည် စောင့်ကြည့်လေ့လာခြင်းနှင့် အကဲဖြတ်လေ့လာခြင်း လုပ်ငန်းများ အတွက် ယာယီသဘောတူညီထားသော ခန့်မှန်းခြေ ကုန်ကျစရိတ်မှာ အမေရိကန် ၁၁၈,၈၀၀ (၂၀၁၆ခုနှစ် ဈေးနှုန်း) ဖြစ်ပြီး ဇယား ၈.၃-၃ တွင် ဖော်ပြထားပါသည်။

တည်ဆောက်မှုပထမနှစ်ပြီးဆုံးလျှင် စီမံကိန်းအားစစ်ဆေးခြင်းကိုဆောင်ရွက်ရန်နှင့် စီမံကိန်းပြီးဆုံးလျှင် နောက်ထပ်တစ်ကြိမ်စစ်ဆေးပေးရန် ဖြစ်သည်။

၁.၇.၅ စီမံကိန်းလည်ပတ်စဉ်ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးစီမံကွပ်ကဲမှုအနှစ်ချုပ်

လုပ်ငန်းလည်ပတ်မှု ပတ်ဝန်းကျင်ဆိုင်ရာ စီမံခန့်ခွဲခြင်း အစီအစဉ် (OEMP) အကောင်အထည်ဖော်မှု

စီမံကိန်းလည်ပတ်စဉ်ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးစီမံကွပ်ကဲမှုမှာ တည်ဆောက်ဆဲကာလပတ်ဝန်းကျင်ထိန်းသိမ်း ရေးစီမံကွပ်ကဲခြင်း နှင့် နှိုင်းစာလျှင် ပို၍နည်းပါးသောဆောင်ရွက်မှုဖြစ်သည့်အပြင်ပိုမိုရိုးရှင်းသော ပတ်ဝန်းကျင်စီမံ ကွပ်ကဲမှုပုံစံဖြစ်သည်။ ပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှုလျော့ချခြင်းများမရှိတော့သောလျှပ်စစ် ဓာတ်အားပေးစက်ရုံ ကိုသာပုံမှန်စစ်ဆေးခြင်းနှင့်ထိန်းသိမ်းခြင်းလုပ်ငန်းများသာဖြစ်သည်။ လျှပ်စစ်ဓာတ်အားပေးစီမံကိန်းစီမံကွပ်ကဲမှုအဖွဲ့သည်

အသံဆူညံမှု၊ လေထုအရည်အသွေး၊ စွန့်ပစ်ရေဆိုးများလုပ်ငန်းခွင်ဘေးအန္တရာယ်ကင်းဝေးလုံခြုံရေး နှင့် ကျန်းမာရေးများ ကိုအဖွဲ့ငယ်များဖွဲ့စည်းစေလျက် အကောင်အထည်ဖော်ဆောင်ရွက်ရန်ဖြစ်သည်။ ၎င်းအပြင်ရပ်ကျေးလူထုအထောက် အကူပြုအစီအစဉ်ကိုလည်း ဆောင်ရွက်နိုင်ရန်အတွဲ (၂) အချပ်ပို ၇.က တွင်ဖော်ပြထားရှိသည်။

လျှပ်စစ်ဓာတ်အားပေး စီမံကိန်းစီမံကွပ်ကဲရေးအဖွဲ့ကိုလည်း ရှိရင်းသော ပတ်ဝန်းကျင်စီမံကွပ်ကဲမှုစနစ် (EMS) အားဖြင့်လုပ်ငန်းစဉ်များကိုလည်းပတ်ထိန်းသိမ်းစီမံနိုင်စေရန်ဖွဲ့စည်းတည်ထောင်ရမည်ဖြစ်သည်။ ပတ်ဝန်းကျင်စီမံကွပ်ကဲမှု စနစ်သည် (၅၀)ဦးထက်လျော့နည်းသောအလုပ်သမားများ၏ လုပ်ငန်းခွင်ဘေးအန္တရာယ်ကင်းဝေးလုံခြုံရေးနှင့်ကျန်းမာရေး အပေါ်အထူးအလေးပေးဆောင်ရွက်ခြင်းနှင့် လေထုနှင့်ရေထုအရည်အသွေးများ၊ အသံတုန်ခါမှုနှုန်း နှင့် ပင်လယ်တွင်းရှိ သက်ရှိတို့၏ဂေဟစနစ်များ၊ ပင်လယ်တွင်းမှရေရယူသုံးစွဲခြင်းနှင့်စွန့်ထုတ်ခြင်းတို့နှင့်သက်သက်ဆက်နွယ်သောပြောင်းလဲမှု များကိုစောင့်ကြည့်ကြီးကြပ်ခြင်းများကိုဆောင်ရွက်ရမည်။

စောင့်ကြည့်ကြီးကြပ်ခြင်း၊ အကဲဖြတ်ခြင်းနှင့် အစီရင်ခံတင်ပြခြင်းတို့တွင် လေထုအရည်အသွေး၊ အသံဆူညံမှု အဆင့်နှင့်ရေအရည်အသွေးများအား စောင့်ကြည့်ကြီးကြပ်ခြင်းအစီအစဉ်ပါရှိရပါမည်။ ပတ်ဝန်းကျင်ဆိုင်ရာ အစီရင်ခံစာကို MONREC နှင့် အခြားသက်ဆိုင်ရာ အာဏာပိုင်အဖွဲ့အစည်းများအား ၆လ တစ်ကြိမ်ပေးပို့ တင်ပြရမည် ဖြစ်ပါသည်။

ဓါတ်အားပေးစက်ရုံစီမံခန့်ခွဲရေးအဖွဲ့အစည်း၏ ကဏ္ဍတစ်ခုဖြစ်သော ပတ်ဝန်းကျင်ဆိုင်ရာ စီမံခန့်ခွဲခြင်း ဖွဲ့စည်းပုံကို အစီရင်ခံစာ၏ ပုံ ၈.၄-၁ တွင် ဖော်ပြထားပါသည်။

တာဝန်ယူ ဆောင်ရွက်မှုများ

OEMP သည် ဓါတ်အားပေးစက်ရုံ၏ O&M အဖွဲ့အစည်း၏ အစိတ်အပိုင်းတစ်ခုအဖြစ် ဆောင်ရွက် အကောင်အထည်ဖော်ထားသည်။ လုပ်ငန်းလည်ပတ်ခြင်း ကာလတွင် ပတ်ဝန်းကျင်စီမံခန့်ခွဲခြင်းလုပ်ဆောင်ချက်များသည် လုပ်ရိုးလုပ်စဉ် အလှည့်ကျဖြစ်ပြီး ၎င်းဓါတ်အားပေးစက်ရုံ ပတ်ဝန်းကျင်ဆိုင်ရာ လုပ်ဆောင်မှုများသည် ဓါတ်အားပေးစက်ရုံ အဖွဲ့အစည်းမှ တာဝန်ယူ ဆောင်ရွက်သွားမည် ဖြစ်ပါသည်။

စောင့်ကြည့်လေ့လာခြင်း

ပတ်ဝန်းကျင်ဆိုင်ရာ စွမ်းဆောင်ရည် စောင့်ကြည့်လေ့လာမှုကို စီမံကိန်းသက်တမ်း တစ်လျှောက်လုံးတွင် လုပ်ဆောင်သွားမည် ဖြစ်ပါသည်။ အတွင်းပိုင်း စောင့်ကြည့်လေ့လာခြင်း ဆောင်ရွက်မှုများသည် မကြာခဏလုပ်ဆောင် သွားရန် လိုအပ်ပါသည်။ တတိယအဖွဲ့အစည်းမှ တရားဝင် စောင့်ကြည့်လေ့လာမှုများ ပြုလုပ်ရာတွင် ကာလ ၂ခုခွဲ၍ လုပ်ဆောင်ရပါမည်။ ပထမကာလမှာ တည်ဆောက်ပြီးစီးသည့်မှစ၍ နောက်ပိုင်း ပထမ ၅နှစ် နှင့် ဒုတိယကာလမှာ ၆နှစ်မြောက်မှစ၍ စီမံကိန်းသက်တမ်း တစ်လျှောက်ဖြစ်ပါသည်။

ဘတ်ဂျက်သတ်မှတ်ချက်တွင် တတိယအဖွဲ့အစည်းမှ တာဝန်ယူဆောင်ရွက်သော လေထုအရည်အသွေး၊ အသံဆူညံမှု၊ ရေဆိုးနှင့် အဏ္ဏဝါအရင်းအမြစ်များအား စောင့်ကြည့်လေ့လာခြင်းနှင့် အကဲဖြတ်လေ့လာခြင်းများ ပါဝင်သည်။

စီမံကိန်း၏ ပတ်ဝန်းကျင်ဆိုင်ရာနှင့် စွမ်းဆောင်ရည်ဆိုင်ရာ စောင့်ကြည့်လေ့လာခြင်းနှင့် အကဲဖြတ်လေ့လာခြင်း၏ ယာယီသဘောတူညီထားသော ခန့်မှန်းခြေ နှစ်စဉ် ကုန်ကျစရိတ်ကို ဇယား (၈.၄-၂)တွင် ဖော်ပြထားပါသည်။

ဒေသခံများအား ထောက်ပံ့ပေးခြင်းအားဖြင့် စီမံခန့်ခွဲမှု တစ်စိတ်တစ်ဒေသကို ပြီးမြောက်စေပြီး မှန်ကန်သော လုပ်ဆောင်မှုကို ဖြစ်ပေါ်စေပါသည်။ ၎င်းအစီအစဉ်ကို အစီအစဉ်ခွဲတွင် ဆွေးနွေးသွားမည် ဖြစ်ပါသည်။

၁.၇.၆ လူမှုစီးပွားရေးပေါင်းတာဝန်ခံမှု အစီအစဉ် (CSR) အကောင်အထည်ဖော် ဆောင်ရွက်စေခြင်း

စီမံကိန်း သက်တမ်းတစ်လျှောက်တွင် CSR အစီအစဉ်ကို ဆောင်ရွက်ပြီး အကောင်အထည်ဖော်ခြင်းအားဖြင့် ဒေသခံပြည်သူ၊ အာဏာပိုင်များနှင့် စီမံကိန်း အကောင်အထည်ဖော်သူများကြား ကောင်းမွန်သော နားလည်မှုများ ဖြစ်ပေါ်စေခြင်းကို ရည်ရွယ်ပါသည်။ CSR အကောင်အထည်ဖော်ခြင်းကို စီမံကိန်းကာလအားလုံးတွင် ဆောင်ရွက်မည် ဖြစ်ပါသည်။ ထောက်ပံ့မှုများတွင် ပညာရေး၊ ကျန်းမာရေးစောင့်ရှောက်မှု၊ ဘာသာရေးနှင့် ယဉ်ကျေးမှု၊ အလုပ်အကိုင်အခွင့်အလမ်းများ ဖန်တီးပေးခြင်းဖြင့် လူမှုစီပွားဖွံ့ဖြိုးတိုးတက်စေခြင်း၊ စိုက်ပျိုးရေးကဏ္ဍတွင် အလုပ်အကိုင် အခွင့်အလမ်းများ ပွင့်လန်းလာစေခြင်း၊ လက်မှုလုပ်ငန်းများ တိုးတက်စေခြင်းနှင့် ငါးဖမ်းလုပ်ငန်းတိုးတက်စေခြင်း၊ ကျား/မဆိုင်ရာ ဖွံ့ဖြိုးတိုးတက်ခြင်း၊ ဒေသခံပြည်သူများနှင့် ပုံမှန်တွေ့ဆုံခြင်းနှင့် စီမံကိန်းလုပ်ငန်းများ အကောင်အထည်ဖော်ဆောင်ရွက်ခြင်း၊ သက်ရောက်မှုများလျော့ချခြင်းနှင့် စောင့်ကြည့်လေ့လာခြင်းဆိုင်ရာ ရလဒ်များကို တင်ပြခြင်း စသည်တို့ပါဝင်သည်။

၁.၇.၇ ဆုံးရှုံးနစ်နာမှုအတွက် ပြင်ဆင်ရန် ဖြေလျော့ခြင်း လုပ်ထုံးလုပ်နည်းကို အကောင်အထည်ဖော်ဆောင်ရွက်ခြင်း

စီမံကိန်းအကောင်အထည်ဖော်သူနှင့် ဒေသခံများအကြား ဖြစ်ပေါ်လာသော ပဋိပက္ခများဖြေရှင်းရာတွင် စီမံကိန်းသက်တမ်းတစ်လျောက် ဒေသခံများ ဆုံးရှုံးနစ်နာမှုအတွက် ပြင်ဆင်ရန် ဖြေလျော့ခြင်း လုပ်ထုံလုပ်နည်းအတိုင်း အကောင်အထည်ဖော်ဆောင်ရွက်သွားမည် ဖြစ်ပါသည်။ ၎င်းလုပ်ထုံးလုပ်နည်းတွင် ပြည်သူမှတိုင်ကြားထားသော ပြဿနာများနှင့် စီမံကိန်းပြီးမြောက်အောင်မြင်ကြားတွင် ထိရောက်သော ဖြေရှင်းမှုများကို လျှင်မြန်စွာ ဆောင်ရွက်ရမည် ဖြစ်ပါသည်။ စီမံကိန်းကာလအားလုံးအတါက် တူညီသော လုပ်ဆောင်မှုများကို ပြုလုပ်ရမည် ဖြစ်ပါသည်။

ဆောက်လုပ်ရေးကာလနှင့် စီမံကိန်းလည်ပတ်ရေးကာလများ၏ ဆုံးရှုံးနစ်နာမှုအတွက် ပြင်ဆင်ရန် ဖြေလျော့ခြင်း လုပ်ထုံးလုပ်နည်း ဖော်ပြချက်ကို ပုံ ၁.၇-၁နှင့် ပုံ ၁.၇-၂ တွင် ဖော်ပြထားပါသည်။

၁.၇.၈ စီမံကိန်းဖျက်သိမ်းမှု ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးစီမံကွပ်ကဲမှု (DEMP) အနှစ်ချုပ်

DEMP သည် CEMP ထက် လုပ်ဆောင်မှုနည်းပါးပြီး ပိုမိုရိုးရှင်းပါသည်။ ဓါတ်အားပေးစက်ရုံ ထိန်းသိမ်းခြင်းနှင့် လုပ်ရိုးလုပ်စဉ် စစ်ဆေးခြင်းများ ပြုလုပ်ခြင်းဖြင့် သဘာဝပတ်ဝန်းကျင်ဆိုင်ရာ ထိခိုက်သက်ရောက်မှုကို လျော့ချခြင်း

အစီအမံကို သက်သာစေပါသည်။ ၎င်းဓါတ်အားပေးစက်ရုံ စီမံခန့်ခွဲမှု အဖွဲ့အစည်းသည် အစီအစဉ်ခွဲများ ဖြစ်သော လေထုအရည်အသွေး၊ အသံဆူညံမှု၊ စွန့်ပြစ်ပစ္စည်းများ၊ ယာဉ်သွားလာမှု၊ လုပ်ငန်းခွင်ဘေးအန္တရာယ်ကင်းရှင်းရေးနှင့် ကျန်းမာရေး (OSH) စီမံခန့်ခွဲမှုနှင့် ပတ်ဝန်းကျင် လူမှုရေး စီမံခန့်ခွဲမှု စသည်တို့ကို အကောင်အထည်ဖော် ဆောင်ရွက်ရပါမည်။ ၎င်းအစီအစဉ်ခွဲများကို သင့်တော်သော စောင့်ကြည့်လေ့လာမှုများ ပြုလုပ်သွားမည်ဖြစ်ပါသည်။ စောင့်ကြည့်လေ့လာခြင်းအစီရင်ခံစာ၏ ရလဒ်များသည် ရိုးရှင်းပြီး နားလည်လွယ်ရပါမည်။ စီမံကိန်း ဖျက်သိမ်းမှုလုပ်ငန်းများ ပြီးစီးသွားသည့် အချိန်တွင် MONREC သို့ အစီရင်ခံစာတင်ပြရမည် ဖြစ်ပါသည်။

၎င်းအစီအစဉ်ခွဲများ၏ အကောင်အထည်ဖော်ဆောင်ရွက်ခြင်းနှင့် စောင့်ကြည့်လေ့လာခြင်း လုပ်ငန်းစဉ်များကို အတွဲ ၂၏ နောက်ဆက်တွဲ ၇ ခ တွင် ဖော်ပြထားပါသည်။

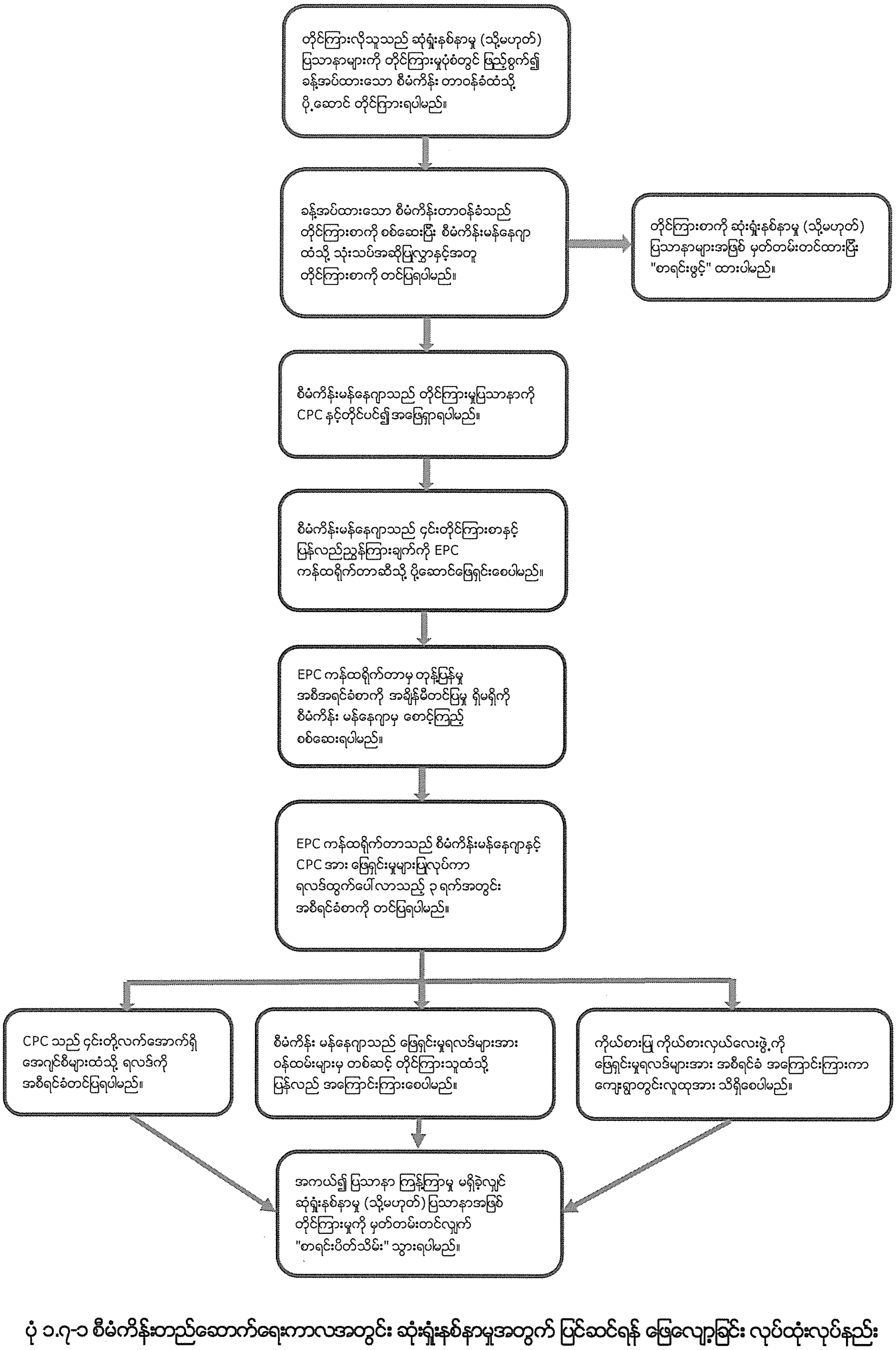
ပတ်ဝန်းကျင်စီမံခန့်ခွဲခြင်း၏ လုပ်ငန်းဖြစ်သော ဆုံးရှုံးနစ်နာမှုအတွက် ပြင်ဆင်ရန် ဖြေလျှော့ခြင်း လုပ်ထုံးလုပ်နည်းကဲ့သို့ CPC ကိုလဲ စီမံကိန်းလည်ပတ်မှုကာလမှစ၍ ယခုစီမံကိန်းပိတ်သိမ်းခြင်း ကာလအထိ ဆက်လက်ဆောက်ရွက်ရမည် ဖြစ်ပါသည်။

၁.၇.၉ အရေးပေါ်အခြေအနေတုန့်ပြန်မှုအစီအစဉ်

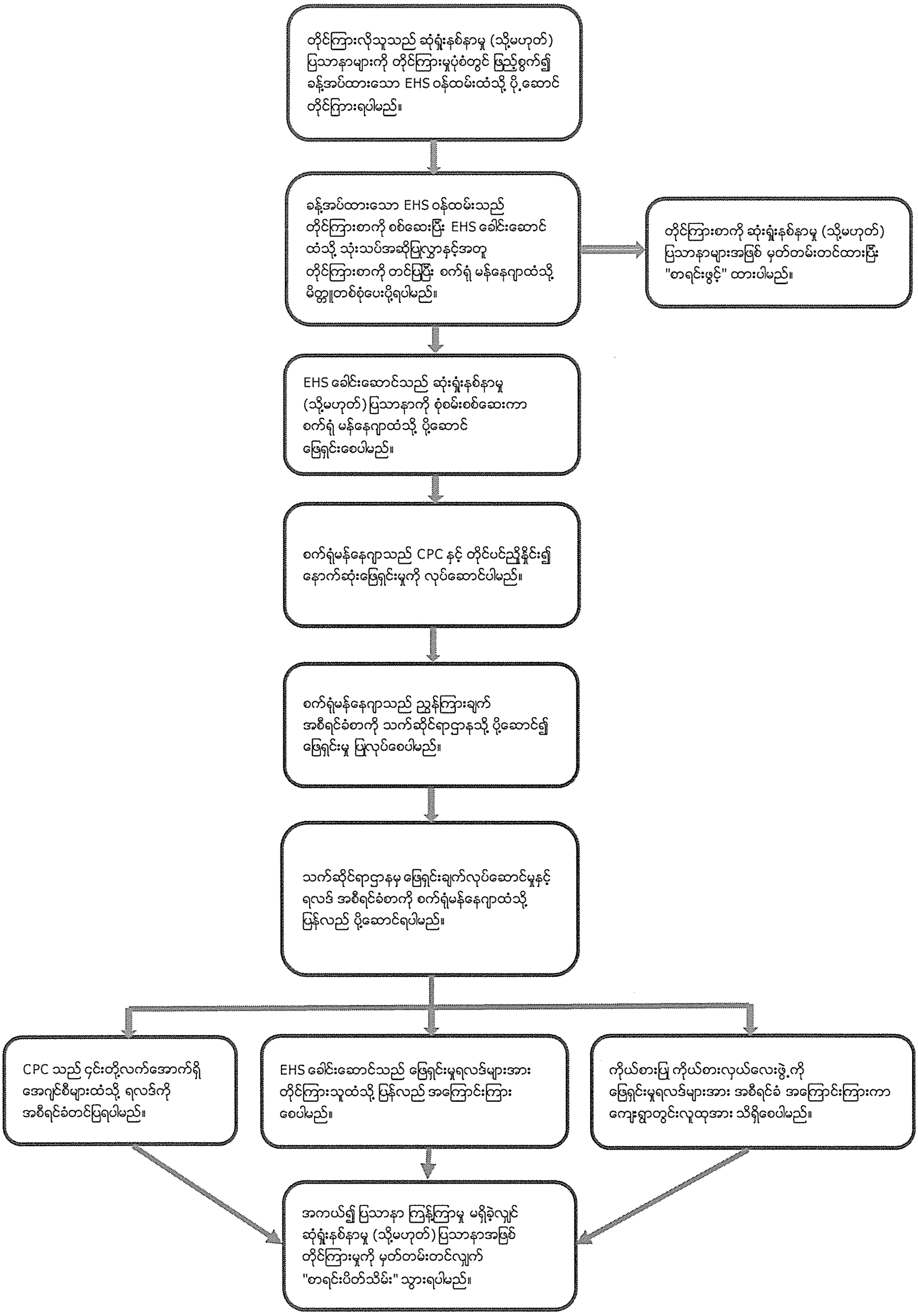
စီမံကိန်းအကြိုတည်ဆောက်ကာလ၊ တည်ဆောက်ဆဲကာလ၊ စီမံကိန်းလည်ပတ်ကာလနှင့် ပိတ်သိမ်းကာလများ အအတွင်း ဖြစ်ပေါ်လေ့ရှိသောမတော်တဆမှုများနှင့် အရေးပေါ်ဖြစ်တတ်သည့် ကိစ္စရပ်များအတွက်လည်း တုန့်ပြန်ဆောင်ရွက်မှုများကို ရင်ဆိုင်ကျော်လွှားနိုင်ရန် အစီအစဉ်များကို ကြိုတင်ပြင်ဆင်ထားရှိရမည်။ ၎င်းကာလ လေးရပ်စလုံး အတွက် ဖြစ်နိုင်ဖွယ်ရှိသော မတော်တဆမှုများ အရေးပေါ်ဖြစ်မှုများ၏ သဘာသဘာဝနှင့် ပမာဏများ၊ လုပ်ငန်းများ၊ မတော်တဆဖြစ်မှုနှင့် မီးလောင်ကျွမ်းမှုများကိုပါ ထည့်သွင်းစဉ်းစားရမည်။ လျှပ်စစ်ဓာတ်အားပေးစက်ရုံ မူလအခြေအနေအတိုင်းပြန်လည်ရောက်ရှိစေခြင်းနှင့် ထိခိုက်ဒဏ်ရာရရှိမှုအနည်းဆုံးဖြစ်စေရန်၊ အသက်၊ အိုးအိမ် နှင့် ပိုင်ဆိုင်မှုများ ဆုံးရှုံးမှုနည်းနိုင်သမျှနည်းအောင်နှင့် တည်ဆောင်မှုနှောင့်နှေးကြန့်ကြာခြင်းများကိုထိရောက်သောနည်းလမ်း များ အားဖြင့် အရေးပေါ်တုန့်ပြန်မှုအစီအစဉ်ကို စီမံခန့်ခွဲရမည်။

၎င်းအရေးပေါ်အခြေအနေတုန့်ပြန်ဆောင်ရွက်မှုများသည် လုပ်ငန်းခွင်လုံခြုံရေးနှင့် ကျန်းမာရေးစနစ်၏ အစိတ်အပိုင်းတစ်ခုအဖြစ်ပါဝင်ထားရှိရမည်။ စီမံကိန်းအတွက်လိုအပ်သော အထောက်အပံ့များ ကူညီပံ့ပိုးမှုများကို အောက်ဖော် ပြပါ အနိမ့်ဆုံးအဆင့်အားဖြင့် ပံ့ပိုးထားရှိရမည်မှာ- ရှေးဦးသူနာပြုပစ္စည်းကိရိယာများအပြည့်အစုံပါရှိသော ဆေးပေးခန်း၊ မီးသတ်ကရိယာများ၊ အရေးပေါ်အခြေအနေအတွက်ဒေသတွင်း ဆေးရုံဆေးပေးခန်းသို့ ဆက်သွယ်သွားလာရန် လမ်းကြောင်းနှင့် လိုအပ်သော ပံ့ပိုးကူညီမှု အစီအစဉ်များ၊ ဒေသခံအရံမီးသတ်တပ်ဖွဲ့နှင့် အခြားသက်ဆိုင်ရာ ဒေသအာဏာပိုင် အဖွဲ့အစည်းများ၊ ရဲဌာနများ၏ ဆက်သွယ်ရေးလမ်းကြောင်း၊ ဖုန်းနံပါတ်များ စသည်တို့ ဖြစ်ကြပါသည်။

အရေးပေါ်အခြေအနေတုန့်ပြန်မှုအစီအစဉ်တွင် အရေးပေါ်အခြေအနေအစီအစဉ်များအတွက် မီးညှိမ်းသတ်မှု နည်းလမ်းအစီအစဉ်များ၊ အရေးပေါ်အစီအစဉ်များ၊ ကယ်ဆယ်ရေးအစီအစဉ်နှင့် ပြန်လည်ထူထောင်ရေးအစီအစဉ်များ ပါဝင်ရပါမည်။ အစီအစဉ်တစ်ခုချင်းအတွက် အသေးစိတ်ဆောင်ရွက်ချက်များကို အရေးပေါ်အခြေအနေတုန့်ပြန်မှု အစီ အစဉ် အခန်း ၈.၆ တွင် ဖော်ပြထားရှိသည်။



ပုံ ၁.၇-၁ စီမံကိန်းတည်ဆောက်ရေးကာလအတွင်း ဆုံးရှုံးနစ်နာမှုအတွက် ပြင်ဆင်ရန် ဖြေလျှော့ခြင်း လုပ်ထုံးလုပ်နည်း



ပုံ ၁.၇-၂ စီမံကိန်းလည်ပတ်မှုကာလအတွင်း ဆုံးရှုံးနစ်နာမှုအတွက် ပြင်ဆင်ရန် ဖြေလျော့ခြင်း လုပ်ထုံးလုပ်နည်း

၁.၈ ပွင့်လင်းမြင်သာမှု နှင့် လူထုဆွေးနွေးခြင်းများ

၁.၈.၁ ပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှုလေ့လာဆန်းစစ်ခြင်းအစီရင်ခံမှုပြင်ဆင်စဉ် လူထုဆွေးနွေးခြင်းရည်ရွယ် ချက်များ

ပွင့်လင်းမြင်သာမှုနှင့် လူထုဆွေးနွေးခြင်းကိုဆောင်ရွက်ခြင်းသည် ပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှုလေ့လာဆန်းစစ်ခြင်းကိုစူးစမ်းဆောင်ရွက်ခြင်းအစိတ်အပိုင်းတစ်ခုဖြစ်၍ ၎င်းတွင်ရည်ရွယ်ချက်သုံးခုပါဝင်သည်။

- စီမံကိန်းတည်ဆောက်ဆဲနှင့် လည်ပတ်ကာလများနှင့် ပတ်သက်သည့်သတင်းအချက်အလက်များ၊ ပတ်ဝန်းကျင် ထိခိုက်သက်ရောက်ခြင်းနှင့် လူမှုရေးကိစ္စရပ်များ၊လျော့နည်းသက်သာစေသည့်ဖြေလျော့ခြင်းနည်းလမ်းများ ကို စီမံကိန်းပိုင်ဆိုင်သူများအား အသိပေးခြင်း။
- စီမံကိန်းမှထိခိုက်သက်ရောက်ခြင်းများလျော့နည်းသက်သာစေသည့်ဖြေလျော့ခြင်းနည်းလမ်းများအပေါ် စီမံကိန်းပိုင်ဆိုင်သူများ၏ သဘောထားအမြင်များကိုရှာဖွေခြင်း။
- ကိစ္စရပ်များနှင့် လိုအပ်ချက်များပေါ်ပေါက်ဖြစ်ပွားလာပါက အတူတကွပူးပေါင်းပါဝင်ဆွေးနွေးဆန်းစစ်ခြင်း ဤသို့လူထုပူးပေါင်းပါဝင်ဆွေးနွေးခြင်း၏ ရလဒ်များမှာစီမံကိန်းအတွက်ပတ်ဝန်းကျင်ထိန်းသိမ်းစောင့်ရှောက်ခြင်း နှင့် လူမှုဆိုင်ရာစီမံကွပ်ကဲခြင်းတွင် အသုံးကျသောဖွဲ့စည်းတည်ဆောက်မှုဖြစ်သည်။

၁.၈.၂ နည်းစနစ်နှင့် ကိုင်တွယ်ဖြေရှင်းပုံ

ပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှုလေ့လာဆန်းစစ်ခြင်း အစီရင်ခံစာအတွက် ပြင်ဆင်စဉ်ကာလတွင်လူထုဆွေးနွေးပွဲနှစ်ကြိမ်ပြုလုပ်ခဲ့ရာ ပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှု လေ့လာဆန်းစစ်ခြင်းနည်းလမ်းများညွှန်ကြားချက်များ အတိုင်းဆောင်ရွက်ခဲ့ပြီးဖြစ်ပါသည်။ နည်းစနစ်နှင့်ကိုင်တွယ်ဖြေရှင်းပုံမှာ အောက်ပါအတိုင်းဖြစ်ပါသည်။

၁.၈.၂.၁ စီမံကိန်းပိုင်ဆိုင်သူများနှင့် ထိခိုက်သက်ရောက်ခံရသူများ၏ ထုတ်ဖော်ချက်များ

ပွင့်လင်းမြင်သာမှုနှင့် လူထုဆွေးနွေးပွဲများသည် အောက်ပါစီမံကိန်းပိုင်ဆိုင်သောအုပ်စုများအပေါ်တွင်ဗဟိုပြု သည်။ စီမံကိန်း၏ပတ်ဝန်းကျင်၊ဒေသတွင်းအုပ်ချုပ်ရေးနှင့်လူမှုရေးကိစ္စရပ်များအတွက် ပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှုလေ့လာဆန်းစစ်ခြင်းအစီအစဉ်စီမံခန့်ခွဲရေးအတွက် နိုင်ငံတော်အဆင့်၊ ဒေသဆိုင်ရာ နှင့် မြို့နယ်ကျေးရွာများဆိုင်ရာ အစိုးရအဖွဲ့အစည်းများတွင် တိုက်ရိုက်တာဝန်ရှိသည်။

အမျိုးမျိုးသောဌာနဆိုင်ရာများသည်များစွာသောကဏ္ဍများနှင့်ရပ်ကျေးအခြေပြုအဖွဲ့အစည်းများဖွံ့ဖြိုးတိုးတက်ရေးအတွက်တာဝန်ယူဆောင်ရွက်ရမည်။ စီမံကိန်းတည်နေရာ၏အချင်း၅ကီလိုမီတာပတ်လည်ရှိရွာသုံးရွာနှင့် ကျေးလက်

ဝန်းကျင်ဖြစ်သော လောင်းလုံမြို့နယ်အတွင်းရှိညောင်ပင်ဆိပ်နှင့်ငပိတက်ရွာ၊ ရေဖြူမြို့နယ်အတွင်းရှိ ကမြိုင်ဆွဲကျေးရွာ ပါဝင်သော မူဒူးရွာတို့ ဖြစ်ကြပါသည်။

၁.၈.၂.၂ လူထုဆွေးနွေးပွဲနည်းစနစ်များ

စီမံကိန်းအကြောင်းအရာများကိုအဓိကထားတင်ပြဆွေးနွေးခြင်းဖြင့်ပွင့်လင်းမြင်သာရှိစေခြင်းဆွေးနွေးတိုင်ပင်ခြင်း ဖြင့်ပြီးပြည့်စုံစေပါသည်။

၁.၈.၂.၃ လူထုဆွေးနွေးပွဲကိုင်တွယ်ဖြေရှင်းပုံ

လူထုဆွေးနွေးပွဲများတွင် အောက်ဖော်ပြပါ ကိုင်တွယ်ဖြေရှင်းနည်းလမ်းများအားဖြင့် သဘောတူလက်ခံပါ သည်။

- မြို့နယ်အုပ်ချုပ်ရေးမှူးများကျေးရွာအုပ်ချုပ်ရေးမှူးများ၏ စီစဉ်ဖိတ်ကြားမှုဖြင့်အစည်းအဝေးတည်နေရာ၊ စီမံကိန်း နှင့်ပတ်သက်ဆက်နွယ်သော ကိစ္စရပ်များကိုဆွေးနွေးခြင်းများကိုကျေးရွာတိုင်းတွင် ပြုလုပ်ဆောင်ရွက်ပါသည်။
- စီမံကိန်းကိုပံ့ပိုးကူညီသောကိုယ်စားလှယ်နှင့် အကြံပေးပုဂ္ဂိုလ်တို့အတူပူးပေါင်းပါဝင်၍အစည်းအဝေးကိုဆောင် ရွက်စေသည်။ ၎င်းတို့မှစီမံကိန်းအနှစ်သာရအပါအဝင်စီမံကိန်းဆိုင်ရာအချက်အလက်များ၊ ဖွံ့ဖြိုးတိုးတက်ရေး အစီအစဉ် ပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှုလေ့လာဆန်းစစ်ခြင်းအပါအဝင် ထိခိုက်သက်ရောက်မှုအတွက် ရှင်းလင်းဖြေကြားချက်များကိုတင်ပြဆွေးနွေးပါသည်။ စီမံကိန်းဆောင်ရွက်သောကိုယ်စားလှယ်နှစ်ဦးမှမေးမြန်း ချက်များကို ပြန်လည်ဖြေကြားရှင်းလင်းကြပါသည်။
- ဒုတိယအကြိမ်အစည်းအဝေးအတွက်မှ အဓိကထိခိုက်သက်ရောက်မှုများနှင့်လျော့နည်းသက်သာစေသည့် လျှော့ချနည်းလမ်းများနှင့် ထိခိုက်သက်ရောက်မှုကို နည်းနိုင်သမျှနည်းစေရန်တင်ပြရမည်ဖြစ်သည်။
- အစည်းအဝေးပြီးဆုံးလျှင် လွတ်လပ်ပွင့်လင်းစွာဆွေးနွေးမေးမြန်းခြင်း

၁.၈.၃ ဆွေးနွေးအကြံပြုဆောင်ရွက်ချက်များအနှစ်ချုပ်

နှစ်ကြိမ်ခွဲ၍ ပြုလုပ်သောဆွေးနွေးပွဲများမှာ ၂၀၁၅ခုနှစ် အောက်တိုဘာလ (၆)ရက်မှ (၈)ရက်အထိ ပထမ အကြိမ်နှင့် ၂၀၁၅ခုနှစ်ဒီဇင်ဘာလ (၁)ရက်မှ (၃)ရက်အထိ ဒုတိယအကြိမ်တို့ဖြစ်ကြပါသည်။ ၎င်းဆွေးနွေးပွဲအနှစ်ချုပ် ကိုဇယား ၁.၈.၁နှင့် ၁.၈.၂ တို့တွင် ပြသထားရှိပါသည်။ ရွာသုံးရွာရှိ အစည်းဝေးတက်ရောက်သူများ၏ အမည်စာရင်း ကိုလည်းနောက်ဆက်တွဲ ၉(က)တွင်ဖော်ပြထားရှိသည်။

ဇယား ၁.၈-၁

ပထမအကြိမ်စီမံကိန်းပိုင်ဆိုင်သူများနှင့် အစည်းအဝေး

အစည်းအဝေး ရက်စွဲ/အချိန်	အမည်	ရာထူးနှင့်အဖွဲ့အစည်းဌာန	နေရာ
၆-၁၀-၂၀၁၅	စီမံကိန်းအထောက်အကူပြုအဖွဲ့ (SWB) စုစုပေါင်း (၆)ဦး		
၉း၀၀ ၁၀း၃၀ နာရီ	၁။ ဦးအောင်ကျော်ငြိမ်း	အတွင်းရေးမှူး၊ မြန်မာ့ဆိပ်ကမ်းအာဏာပိုင်	စီမံကိန်းအထောက်အကူပြုအဖွဲ့ရုံး
	၂။ ဦးအောင်ဖုန်းသန်း	SWB အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန	
	၃။ ဦးသက်ဦး	အလုပ်သမားဦးစီးဌာန	
	၄။ ဦးခင်ထွန်း	လူဝင်မှုကြီးကြပ်ရေးဦးစီးဌာန	
	၅။ ဦးကျော်မင်းဦး	စခန်းမှူး၊ ပြည်သူ့ရဲတပ်ဖွဲ့	
	၆။ ဦးဝေလင်းဇော်	အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန	
၆-၁၀-၂၀၁၅	တိုင်းဒေသကြီးရုံး (တိုင်း နှင့် ခရိုင်/မြို့နယ်အဆင့်များ)		
၁၁း၃၀ - ၁၂း၀၀ နာရီ	၁။ ဒေါ်လဲ့လဲ့ထွေး	ရေဖြူမြို့နယ်အုပ်ချုပ်ရေးမှူး၊ မြို့နယ်အထွေထွေ အုပ်ချုပ်ရေးမှူးရုံး) -၁ဦး	ရေဖြူမြို့နယ်ရုံး
၁၄း၀၀- ၁၅း၀၀ နာရီ	၂။ ဦးတင်သိန်း	အတွင်းရေးမှူး(တနင်္သာရီတိုင်းဒေသကြီးအစိုးရအဖွဲ့ရုံး)(၁)ဦး	တိုင်းဒေသကြီးရုံး
၁၆း၃၀-၁၇း၃၀ နာရီ	၃။ ဦးအောင်ခိုင်စိုး	ဒု/ညွှန်မှူး၊ သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးရုံးထားဝယ်မြို့၊ တနင်္သာရီတိုင်း	ECD ရုံး
၇-၁၀-၂၀၁၅	စီမံကိန်းဒေသတွင်းရှိကျေးရွာလူထု (ပြည်သူလူထု)		
၉း၃၀- ၁၁း၀၀ နာရီ	၁။ မုဒူးနှင့်ကမြိုင်ဆွဲ ကျေးရွာသူ/သားများ	-ကျေးရွာအုပ်ချုပ်ရေးမှူး၊ကျေးရွာလူထုနှင့်ရပ်မိရပ်ဖများ (စုစုပေါင်း ၃၇ဦး) -ဦးအောင်ခိုင်စိုး (ဒု/ညွှန်မှူး) သဘာဝပတ်ဝန်းကျင် ထိန်းသိမ်း ရေးရုံး၊ ထားဝယ်မြို့၊ တနင်္သာရီတိုင်း	မုဒူးကျေးရွာ အုပ်ချုပ်ရေးမှူး အိမ်ရှေ့မဏ္ဍပ်
၈-၁၀-၂၀၁၅	စီမံကိန်းဒေသတွင်းရှိကျေးရွာလူထု (ပြည်သူလူထု)		
၉း၃၀-၁၁း၀၀ နာရီ	၁။ ညောင်ပင်ဆိပ်ရွာ သူ/သားများ	ကျေးရွာအုပ်ချုပ်ရေးမှူး၊ ကျေးရွာလူထုနှင့် ရပ်မိရပ်ဖများ (စုစုပေါင်း-၄၀ဦး)	ညောင်ပင်ဆိပ်ရွာ ဘုန်းတော်ကြီး ကျောင်း
၁၄း၀၀-၁၅း၃၀ နာရီ	၂။ ငပိတက်ရွာ သူ/ သားများ	(စုစုပေါင်း-၆၇ဦး)	ငပိတက်ကျေးရွာစု ဝေးခန်းမ

ဇယား ၁.၈.၂

ဒုတိယအကြိမ်စီမံကိန်းပိုင်ဆိုင်သူများနှင့် အစည်းအဝေး

အစည်းအဝေး	အမည်	ရာထူးနှင့်အဖွဲ့အစည်း/ဌာန	နေရာ
၂-၁၂-၂၀၁၅	ဒေသအစိုးရအဖွဲ့အစည်းများ (တိုင်း၊ ခရိုင်နှင့် မြို့နယ်အဆင့် (စုစုပေါင်း-(၂၀)ဦး		
၉း၀၀- ၁၁း၀၀	၁။ ဦးခင်မောင်ချို	ညွှန်ကြားရေးမှူး၊ထားဝယ်ခရိုင်အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန	အီတာလီယံ (ထိုင်း) အစည်း အဝေးခန်းမ
နာရီ	၂။ ဦးထွန်းဝေဦး	လက်ထောက်အင်ဂျင်နီယာ၊ထားဝယ်ခရိုင်လျှပ်စစ်ဓာတ်အား ဖြန့်ဖြူးရေးဌာန	
	၃။ ဦးအောင်ဟွမ်သန်း	အထောက်အကူပြုအဖွဲ့၊ အထွေထွေအုပ်ချုပ်ရေးဦးစီး ဌာန	
	၄။ ဦးသက်ဦး	အထောက်အကူပြုအဖွဲ့၊ အလုပ်သမားဦးစီး ဌာန	
	၅။ ဦးခင်မောင်ဝင်း	အထောက်အကူပြုအဖွဲ့၊ မြန်မာ့ဆိပ်ကမ်းအာဏာ ပိုင်	
	၆။ ဦးကျော်မော်ထွန်း	အထောက်အကူပြုအဖွဲ့၊ လူဝင်မှုကြီးကြပ်ရေးဌာန	
	၇။ ဦးအောင်ခိုင်စိုး	ဒု/ညွှန်မှူး၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၊ တနင်္သာရီတိုင်းဒေသကြီး။	
	၈။ ဦးထွန်းဝင်းမြင့်	ညွှန်မှူး၊ တနင်္သာရီတိုင်းငါးလုပ်ငန်းဦးစီးဌာန	
	၉။ ဦးကျော်နိုင်	ရေဖြူမြို့နယ်အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန	
၂-၁၂-၂၀၁၅	စီမံကိန်းဒေသအတွင်းရှိ ကျေးရွာလူထု (ပြည်သူလူထု)		
၁၃း၃၀-၁၅း၀၀	ငပိတက်ရွာသူ/သားများ	ကျေးရွာအုပ်ချုပ်ရေးမှူး၊ ကျေးရွာကော်မတီ၊ ရပ်မိရပ်ဖများ နှင့် ကျေးရွာသူ /သားများ (စုစုပေါင်း ၈၂ဦး)	ငပိတက်ကျေးရွာ စုဝေးခန်းမ
၃-၁၂-၂၀၁၅	စီမံကိန်းဒေသအတွင်းရှိ	ကျေးရွာလူထု(ပြည်သူလူထု)	
၉း၀၀-၁၁း၀၀ နာရီ	၂။ မုဒူးနှင့် ကမြိုင်ဆွဲရွာသူ/သားများ	ကျေးရွာအုပ်ချုပ်ရေးမှူး၊ ကျေးရွာကော်မတီ၊ ရပ်မိရပ်ဖများ နှင့် ကျေးရွာသူ/သားများ စုစုပေါင်း (၇၉)ဦး	မုဒူးကျေးရွာ ဘောလုံးကွင်း
၁၃း၀၀-၁၅း၀၀ နာရီ	၃။ ညောင်ပင်ဆိပ်ကျေးရွာသူ/သားများ	ကျေးရွာအုပ်ချုပ်ရေးမှူး၊ ကျေးရွာကော်မတီရပ်မိရပ်ဖများ နှင့် ကျေးရွာသူ/သားများ စုစုပေါင်း (၆၆ဦး)	ညောင်ပင်ကျေးရွာ ဘုန်းတော်ကြီးကျောင်း
၄-၁၂-၂၀၁၅	အစိုးရမဟုတ်သောအဖွဲ့အစည်း		
၁၃း၀၀-၁၄း၃၀ နာရီ	ထားဝယ်အမျိုးသမီးအဖွဲ့အစည်း	မမာလာနှင့် အဖွဲ့ဝင်များ (စုစုပေါင်း (၉)ဦး	၇၀၂၊ရွှေတောင်စားလမ်း၊ မြောက်ရပ်ကွက်၊ ထားဝယ်မြို့

၁.၈.၄ စီမံကိန်းပိုင်ဆိုင်သူတို့၏ သဘောထားမှတ်ချက်များအနှစ်ချုပ်

စီမံကိန်းအတွက် ဆွေးနွေးပွဲနှစ်ရပ်စလုံးဆောင်ရွက်စဉ်တွင် စီမံကိန်းပိုင်ဆိုင်သူ အုပ်စုတခုချင်းထံမှ သဘောထားမှတ်ချက်များ၊ တုန့်ပြန်မှုများရှိခဲ့ကြပါသည်။ စီမံကိန်းဆောင်ရွက်နေသူနှင့် အတိုင်ပင်ခံအကြံပေးပုဂ္ဂိုလ်များအား ဖြင့် ၄င်းမေးခွန်းများ၊ သဘောထားမှတ်ချက်များနှင့် ဆွေးနွေးမှုများကိုရှင်းလင်းဖြေကြားပေးခဲ့သော အသေးစိတ်ဖော် ပြချက်ကို နောက်ဆက်တွဲ ၉(ခ) တွင် ဖော်ပြထားရှိသည်အဓိကသက်ဆိုင်သော အနှစ်ချုပ်မှာ အောက်ပါအတိုင်းဖြစ် သည်။

၁.၈.၅ သဘောထားမှတ်ချက်များအပေါ်မည်သို့ထည့်သွင်းစဉ်းစားဆောင်ရွက်မည်

လူထုဆွေးနွေးစည်းဝေးပွဲများမှ ရလဒ်များကိုအသုံးပြု၍ သဘာဝပတ်ဝန်းကျင်နှင့် လူမှုရေးစီမံအုပ်ချုပ်မှုအစီအစဉ်များကိုအကောင်အထည်ဖော်ဆောင်ရွက်ရန်ဖြစ်ပြီး ဒေသခံကျေးလက်လူထုဖွံ့ဖြိုးတိုးတက်ရေးအတွက် လူမှုအကျိုးတူပူးပေါင်းဆောင်ရွက်ခြင်း (CSR) အစီအစဉ်ဖြင့် ဆောင်ရွက်ရန် ဖြစ်သည်။

၁.၈.၆ စီမံကိန်းသတင်းအချက်အလက်များထုတ်ဖော်ချက်

စီမံကိန်းဆွေးနွေးမှုနှင့် သတင်းအချက်အလက်များထုတ်ဖော်ခြင်းကို ပထမအကြိမ် နှင့် ဒုတိယအကြိမ် လူထုဆွေးနွေးပွဲများကျင်းပသည့် ကျေးရွာလူထုစုဝေးရာတွင်သိသာထင်ရှားသော ကဒ်ထူစက္ကူအကြီးစားများဖြင့်ဖော်ထုတ်ဆွေးနွေးခဲ့ပါသည်။ ထို့အပြင်စီမံကိန်းနှင့်ပတ်သက်သော သတင်းအချက်အလက်များပတ်ဝန်းကျင် ထိခိုက်သက်ရောက်မှုလေ့လာဆန်းစစ်ခြင်း (EIA) အစီအစဉ်များနှင့် ပတ်ဝန်းကျင်နှင့်လူမှုဆိုင်ရာစစ်တမ်းများအပါအဝင် ဆောင်ရွက်မှုများအကျဉ်းချုပ်ကို မြန်မာဘာသာအားဖြင့် ကျေးရွာသူ/သားများအား လက်ကမ်းစာဆောင် များအားဖြင့် ပုံပိုးဖြန့်ဝေခဲ့ပါသည်။

၁.၈.၇ အနာဂတ်လူထုဆွေးနွေးပွဲအတွက်ထောက်ခံချက်များ

လူထုဆွေးနွေးပွဲများများကို စီမံကိန်းအကောင်အထည်ဖော်ဆောင်ရွက်စဉ် တွင် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးစီမံကွပ်ကဲမှု၏ အစိတ်အပိုင်းအဖြစ်ဆောင်ရွက်ရမည်။ စီမံကိန်းတည်ဆောက်စဉ် လူထုဆွေးနွေးပွဲမှာအဓိကအားဖြင့် ဒေသခံတို့အတွက်အမျိုးမျိုးသော ပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်အဟန့်အတားအနှောက်အယှက်များကိုနည်းပါးအောင်လျှော့ချခြင်းနည်းလမ်းများနှင့်ပတ်သက်ဆက်နွယ်ပါသည်။ စီမံကိန်းလည်ပတ်ကာလအတွက် လူထုဆွေးနွေးပွဲများမှပတ်ဝန်းကျင် နှင့် လူမှုရေးရာစီမံကွပ်ကဲမှုများအတွက် လျှော့နည်းသွားမည်ဖြစ်ပြီးပုံမှန်လုပ်ဆောင်ရမည်ဖြစ်သည်။ အဆိုပြုဖွဲ့စည်း ထားသောအဖွဲ့ (၃)ဖွဲ့ပါဝင်သည့်အဖွဲ့မှ လူထုဆွေးနွေးပွဲအတွက် တာဝန်ယူ၍ စီစဉ်ဆောင် ရွက်ရမည်ဖြစ်သည်။

၁.၉ သုံးသပ်ခြင်းနှင့်ထောက်ခံချက်များ

၁.၉.၁ သုံးသပ်ချက်များ

သဘာဝပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှုလေ့လာဆန်းစစ်ရှာဖွေခြင်းရလဒ်များမှတဆင့် စီမံကိန်းတည်ဆောက်မှုကြောင့် သဘာဝပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှုကို လျှော့နည်းလျှော့ချရန်ဖြစ်သည်။

၁.၉.၂ အကြံပြုထောက်ခံချက်များ

ဤသဘာဝပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှုလေ့လာဆန်းစစ်ရှာဖွေခြင်း၏ရလဒ်များကိုအကောင်အထည်ဖော်ဆောင်ရွက်ရန် အကြံပြုထောက်ခံချက်များမှာ

၁) အဆိုပြုသဘာဝပတ်ဝန်းကျင်ထိခိုက်သက်ရောက်မှုလျှော့ချခြင်းနည်းလမ်းများနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းကွပ်ကဲမှုလိုအပ်ချက်များကို "စီမံကိန်း၏လိုအပ်ချက်များနှင့်သဘောတူညီမှုကန့်သတ်ချက်များ" (TOR) တွင် ရှင်းလင်းပြတ်သားစွာဖော်ပြ၍ စီမံကိန်းတည်ဆောက်ခွင့်ရသဘောတူညီချက်စာချုပ်၊ တည်ဆောက်ရေးကြီးကြပ်ကွပ်ကဲသဘောတူညီချက်စာချုပ်များတွင်တိကျစွာဖော်ပြရမည်ဖြစ်သည်။

၂) စီမံကိန်းတည်ရှိရာနေရာကိုလည်းပြုပြင်ဖြည့်ဆည်းဖောင်ရွက်ခြင်း၊ အကယ်၍ဖြစ်နိုင်ပါက အမြန်ဆုံးစတင်နိုင်ရန်နှင့် ယာဉ်အသွားအလာလျှော့ချခြင်း

၃) အဆိုပြုထားသည့်အဖွဲ့(၃)ဖွဲ့ပါရှိသောကော်မတီကိုအမြန်ဆုံးဖွဲ့စည်းဆောင်ရွက်စေခြင်းဖြင့်လူထုဆွေးနွေးပွဲများနှင့်သဘောထားဖော်ထုတ်ခြင်းများကိုဆက်လက်ဆောင်ရွက်ရှင်သန်စေရန်တို့ဖြစ်ကြပါသည်။

၄) စီမံကိန်းသည် ISO 14001 နှင့် OHSAS 18001 ကို အကောင်အထည်ဖော်လိုက်နာစေခြင်းအားဖြင့် ပိုမိုကောင်းမွန်သော သဘာဝပတ်ဝန်းကျင်ကာကွယ်စောင့်ရှောက်ရေးနှင့် ရေရှည်တည်တံ့သော ပတ်ဝန်းကျင်ထိန်းသိမ်းစောင့်ရှောက်ခြင်းနှင့် လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေးစီမံခန့်ခွဲမှုများ ဖြစ်ပေါ်စေပါသည်။

၅) စီမံကိန်းလုပ်ငန်းများဖြစ်သော တည်ဆောက်ရေးနှင့် လည်ပတ်ရေးကာလများအတွင်း ပတ်ဝန်းကျင်ဆိုင်ရာလေ့လာစောင့်ကြည့်ခြင်း အစီအစဉ်များပြုလုပ်ရာတွင် တိုင်းတာ ကောက်ယူထားသော နမူနာများကို မြန်မာနိုင်ငံအသိအမှတ်ပြု အစိုးရ (သို့မဟုတ်) ပုဂ္ဂလိက အဆင့်မီ ဓါတ်ခွဲခန်းများတွင် ဓါတ်ခွဲစစ်ဆေးရပါမည်။

CHAPTER 1

EXECUTIVE SUMMARY

CHAPTER 1

EXECUTIVE SUMMARY

1.1 CONTEXT OF THE PROJECT

1.1.1 Project Background and Preparation

The main objectives of the Environmental Social Impact Assessment (ESIA) for the Initial Phase Power Plant Project are to establish a solid groundwork for environmental and social management of the Project during its construction and operation.

This Project will install multiple units of gas engine generators and a natural gas-fired combined cycle power plant and associated facilities in Dawei Special Economic Zone (DSEZ). The Project will be implemented in phases to achieve generation capacity in steps with a total capacity of 420 MW. Its objective is to initially support operations of industries to be established in an area in DSEZ designated as the Initial Phase Development. As DSEZ has no access to the supply from the national power grid, the Project will be a critical component of the infrastructure development in DSEZ.

According to the Environmental Conservation Law (2014) and the Environmental Impact Assessment Procedure (2015) issued by the Ministry of Natural Resources and Environmental Conservation (MONREC), an EIA study is required for this Project as the capacity of the power plant is more than 50 MW. Dawei Power Company Limited (DPC) engaged TEAM Consulting Engineering and Management Co., Ltd. (TEAM) and Total Business Solution (TBS), herein after referred to as the EIA Consultant, to conduct the EIA study.

This EIA study is comprehensively prepared following the EIA Procedure, relevant laws and guidelines of Myanmar. The Consultant has concluded environmental and social issues, impacts, mitigation measures, monitoring programs, responsibilities and cost estimates of each issue during the pre-construction, construction, operation and decommissioning phases and inserted at the front page of the EIA report.

The Project Proponent commits:

- To abide by the agreements mentioned in the report's Project Description (Chapter 2)
- To abide by the EMP described/mentioned in Annex 6A-1 to 6A-12 of (6A) Sub-plan of CEMP, Annex 7A-1 to 7A-7 of (7A) Sub-plan of OEMP and, Annex 7B-1 to 7B-6 of (7B) Sub-plan of DEMP
- To abide by the agreements mentioned in Chapter 8 of EMP

TEAM also attaches the Certificate of Recognition to conduct EIA, by the Office of Environmental Policy and Planning (ONEP), Thailand for reference, as shown after Official Final Comment of ECD.

1.1.2 MOECAF's Comments on Scoping Report

The Scoping Report was submitted in November 2015. The Ministry of Environmental Conservation and Forestry (MOECAF) had recommendations to revise and re-submit the scoping report by adding information in various sections, as stated in ***Section 2.1.2*** of ***Chapter 2***.

1.1.3 Related Projects and Developments

The Project is critically linked to the small port and Liquefied natural gas (LNG) terminal project which will be developed and implemented in parallel to the Project for supplying natural gas to the Project.

1.1.4 Presentation of the Project Proponent and the EIA Consultant

DPC was established for this Project by Italian Thai Development Public Company Limited (ITD) with indirect shareholding percentage of 100%[1]. According to the Concession Agreement, DPC is required to propose a strategic partner who has experience in power project. In October 2015, Electricity Generating Public Company Limited (EGCO) has been proposed to DSEZ MC for consideration. After approval by DSEZ MC, ITD and EGCO will hold indirect shareholding percentage in DPC of 50% and 50%, respectively.

1.2 OVERVIEW OF THE POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

1.2.1 Corporate Environmental and Social Policies

The Project Proponent will formulate a corporate environmental and social management policy to guide its environmental and social management during the construction phase and the operation phase of the Project. In this regard, the Project Proponent will manage environmental aspects of the Project in accordance with the ISO 14001 environmental management system and OHSAS 18001 occupational health and safety management systems. Consequently, the Project Proponent will establish an environmental management system (EMS) for the project and will operate the EMS to meet the requirements of ISO 14001 and OHSAS 18001, and their guidelines.

[1] Italian-Thai Development Public Company Limited (ITD) and Rojana Industrial Park Public Company Limited (ROJANA) have cooperated to establish Myandawei Industrial Estate Company Limited (MIE) on April 9th, 2015. MIE is to develop the Dawei Industrial Estate and related Infrastructure and Utilities, together with Township under the synergy of the professional management team and the specialized advisors.

1.2.2 Overview of Policy and Legal Framework in Myanmar

National policy and legal framework relevant to environmental management of this Project can be divided into four categories. The essence of each category can be briefly concluded as follows:

The legal foundation for environmental management is the National Environmental Policy which was translated into actions by the Environmental Conservation Law (2012) and elaborated for implementation by the Environmental Conservation Rules (2014). The two legal documents provide the comprehensive legal framework for environmental management of the country.

Environmental Impact Assessment Procedure (29 December 2015), and National Environmental Quality (Emission) Guidelines (29 December 2015) are two key legal instruments for environmental management of development activities through the EIA process as stipulated in the Environmental Conservation Law.

In addition to legal requirements related to EIA, the Project will have to comply with other laws in its management of environmental, social and cultural aspects during its pre-construction, construction, operations and decommissioning. These aspects include: (i) environmental impacts from the project activities (ii) health and safety of community and employees; (iii) social impact; (iv) cultural impact; (v) ecological resources associated to forest, wildlife and natural area; and (vi) water resource, coastal and marine environment.

Laws specific to the Project Site is the Special Economic Zones Law (2014) will facilitate in developing export oriented industries, by providing incentives and additional needed supply chin industries.

1.2.3 International Conventions, Treaties and Agreements

Myanmar has signed several international conventions, treaties and agreements related to the environment. The relevant ones are shown and elaborated in the Main Report, ***Section 3.3***.

1.2.4 Myanmar Government Institutional Framework

The EIA process for this Project will be administered by the central Environmental Conservation Department (ECD) in coordination with the regional ECD and various concerned government organizations at the regional, township, and district levels.

During the project implementation, the DSEZ Management Committee and the DSEZ Supporting Working Body will be responsible for facilitating the resolution of issues raised by the government parties or the developers/investors.

1.2.5 International Policies, Guidelines, and Standards

Myanmar National Environmental Quality (Emission) Guidelines, dated on 29 December 2015 will be adopted as the base guidelines and standards for environmental management during the entire period of Project implementation. The international guidelines and standards will be adopted only when the national guidelines and standards do not exist. The guidelines for thermal pollution of coastal waters are presented in ***Table 3.6-1*** to ***3.6-4*** of ***Section 3.6*** in the main report.

1.3 PROJECT DESCRIPTION AND ALTERNATIVES

1.3.1 Presentation of the Project and Description of Alternatives

A. Project Description

Sector and Subsector

The Project is in the energy sector and the power or electricity generation subsector.

Project Size

The Project will have a net generation capacity of 420 MW. The project facilities will be constructed on approximately 37.19 acres of coastal land in DSEZ, about 800 m from Andaman Sea to the west, and 1 km from a small tidal creek to the east. The site is vacant and sparsely covered with some sand dune vegetation commonly found in the region. The site is relatively flat and will need to fill to raise its elevation. The closet village to the site is Nga Pitat. ***Figure 4.1-3*** in the main text is a map showing the project site and the described surroundings.

Facilities and Infrastructure

The Project will install 9 units of gas engine generators, 5 units of combustion gas turbine, 5 unit of Heat Recovery Steam Generator and 3 steam turbines with associated facilities, excluding a 115-kV transmission line that will be constructed under another project. Salient information on the project facilities and infrastructure are summarized in ***Table 4.1-1*** in the main text. The power plant will use a sea water once-through cooling system, which will be processed through intake and outfall pipes. They will be laid from the power plant to two designated offshore locations.

Detailed designs of the cooling water system and its technical features are presented in ***Figure 4.1-4*** and described in ***Section 4.1.1*** of the main text. A tentative layout of the intake and outfall pipes are shown in ***Figure 4.1-5*** of the main text.

The site can be accessible to the power plant site with the coastal road which will be constructed under the proposed LNG terminal and small port project. The access road would be linked to roads adjacent to the project site to improve the safety, comfort and continuity of traffic flow on the project.

The Administration and Office Building will be constructed with inclusive of spaces with minimum requirements as defined in Myanmar laws and regulation and/or International Architectural Standard, and sufficient facilities/equipment for the staff.

Implementation Schedule

The overall construction period for all phases is planned to complete in 6 years. However, the Notice to Proceed for each phase (NTP) will be entitled to be released by DSEZ MC upon fulfillment of the requirement under the Concession Agreement. For gas engine plants, the construction period will be 12 months from the issuance of the NTP. For CCGT, the construction period will be 24 months form the issuance of the NTP. ***Figure 4.1-6*** in the main text is a bar chart showing tentative project implementation schedules. The schedules are subject to change depending on the development progress of industrial estate, the LNG terminal and gas pipeline, and the time required for project review and approval by the concerned authorities. The construction could commence by the beginning of 2018.

Pre-Construction Phase

Activities in the pre-construction phase will involve site filling and compaction, construction of temporary facilities and utilities.

Construction Phase

(1) Construction Works

The construction will involve civil works and mechanical and electrical works. The onshore civil works will cover piling, foundation works, concrete floors, erection of steel building structure and support for process equipment, installation of building walls and roof, and construction of drainage and wastewater treatment structure. The offshore civil works will cover laying the intake and outfall pipes.

The mechanical and electrical works will involve installation and erection of process and utility equipment, sea water intake pumps, stack, process piping, cabling, and installation of control instrument.

(2) Inputs for the Construction

The construction will require the following inputs:

- Personnel: about 600 persons at peak of construction
- Freshwater: about 80 m^3/day

(3) Contractual Arrangement

The Project will be implemented on an engineering, procurement and construction (EPC) contract package. Details on the contractual arrangements for civil works and mechanical and electrical works will be worked out and presented in the EIA report. The Project Proponent will set up a team led by a project manager to oversee and manage the contracts.

The Project personnel responsible for employing contractors must prepare safety plan during pre-construction and construction period, to be harmonized with relevant rules, regulations and principles regarding preventing of work related accident.

Operation Phase

The power plant will be operated as a base load plant throughout the year, albeit the allowable scheduled maintenance as mandated in the terms and conditions of the power purchase agreement.

(1) Inputs

The operations will regularly require the following inputs:

- Personnel: not more than 50 persons
- Natural gas: 65 MMSCFD
- Sea water for cooling purpose: 675,210 m^3/day
- Freshwater: about 1,815 m^3/ day (for process use and domestic consumption)

(2) Output

The generated electricity will be dispatched from the power plant via a 115-kV conventional air insulated switchyard located in the plant boundary at two voltage levels, 115 kV directly from the switchyard.

(3) Organization for Power Plant Operation and Management

An experienced team of professionals will be responsible for day-to-day operations, troubleshooting, scheduled and unscheduled maintenances, and coordination with the contractor under the Long Term Service Agreement (LTSA) which may be entered into prior to the CCGT commercial operation date.

The O&M team will be led by a president and will be organized into 3 main divisions- operation, maintenance and administration division. The operation division will have positions dedicated for environmental, social, safety and occupational health aspects of the power plant operation.

(4) Environmental Management during Operations

The Project will be designed to include the following equipment or facilities for environmental management during operations:

- The gas turbine units will be retrofitted with Dry NO_x technology to increase thermal efficiency and reduce NO_x emission.
- Install a Continuous Emissions Monitoring System (CEMS) in the stack for monitoring stack emission of nitrogen oxides, oxygen, temperature and others.
- Install facilities for the treatment of wastewater. The treated effluent will meet the applicable effluent quality standards and acceptalbe for disposal into the sea or a nautral receiving waters.

- Noise emissions are to be kept to a minimum. The noise study has reviewed the suitability of these proposed noise limits, estimated most likely noise levels, and prepared recommendations for noise control and monitoring. Results are presented in ***Chapter 6***.

The Project facilities will be designed to fully meet occupational health and safety (OHS) requirements for thermal power plants. In addition, architectural designs of all buildings and landscape designs will consider compatibility with the natural features of the site and the surrounding areas. Need for the ambient air quality monitoring stations (ASMS) will be determined.

Decommissioning Phase

At the end of its working life, the most appropriate decommissioning alternative will be chosen. Decommissioning activities will be performed with protection of health and safety of workers and the public, and prevent the spread of contamination. Full surveillance and maintenance during the decommissioning operations shall be carried out, particularly to assure that structures intended to contain contamination remain in an acceptable condition. Post-decommissioning activities will be determined based upon environmental regulatory requirements.

B. Description of Project Alternatives

In planning the Project, the Project Proponent considered alternatives in the following three subjects: (i) fuel alternatives-between coal and natural gas; (ii) cooling water system alternatives-among once-through cooling water system by using sea water, closed cooling water system by using sea water and close cooling water system by using fresh water; and (iii) project site alternatives-site inside the initial phase industrial estate area and site in the coastal area near the LNG terminal.

1.3.2 Comparison and Selection of the Project Alternatives

A. Fuel Alternatives

The Project Proponent considered natural gas the most preferred alternative compared to coal considering its advantages over coal as follows: (i) shorter construction period of the power plant; (ii) more flexibility in operations; (iii) less requirements for pollution control; (iv) less requirements for supply infrastructure; (v) smaller foot print; (vi) higher thermal efficiency; (vii) less cooling water requirement; and (viii) less public opposition. The only disadvantage would be slightly higher cost of power generation compared to coal. However, the advantages far outweigh this disadvantage.

B. Alternatives for Cooling Water System

The once-through cooling water system is most common among thermal power plants located near the sea or large river estuaries as the closed cooling water system using sea water is more difficult to operate. Unless impacts on marine ecosystems are significant, the once-through cooling water system is always the most preferred alternative. Therefore, the Project Proponent selected the once-through cooling water system as base case.

C. Alternatives for the Project Site

The two site alternatives are relatively compared based on the following considerations: (i) cost of gas pipeline and supply risk; (ii) the need for the power plant to use sea water for cooling purpose; and (iii) access and transport of plant equipment to site. The coastal area site was the more preferred alternative considering lower fuel supply cost and availability of sea water supply for cooling water system.

1.4 DESCRIPTION OF THE ENVIRONMENT

1.4.1 Setting the Study Limits

A. Study Area and Scope of the Environment

The study area covers water and land areas within a 5 km radius of the Project site, a total area of about 78.6 km^2 or nearly 20,000 acres. As defined, the study area covers about 9,000 acres of sea water area. Most of the area is in DSEZ.

The scope of the Environment is prescribed in the EIA Procedure to cover physical, biological, socio-economic, cultural and visual components.

Information on environmental settings of the study area was collected from secondary sources and limited field surveys carried out by the Consultant.

B. Local Administration

The study area covers three villages and one community, of which two villages are in Launglon Township and one village is in Yebyu Township, all in Dewei District. The villages are Nga Pitat, Nyaung Bin Seik and Mudu (including Ka Myaing swea). Except Nga Pitat, the other two villages are situated in DSEZ.

1.4.2 Physical Components

The study area is relatively flat coastal area facing the Andaman Sea. A tidal creek traverses the study area. The entire area has no major economic activities apart from fishing and agriculture. The fishing community nearest the Project site is Nga Pitat village which is at about 2.23 km from the site. As the study area has no major economic activities, its natural environment is still unpolluted. Results from the field surveys are as follows:

- Values of all ambient air quality parameters met World Bank's air quality standards.The air-shed of the study area still has a large assimilative capacity.
- Levels of ambient noise and vibration met World Bank's noise and vibration standards.
- Coastal water at three sampling stations was clean as indicated by high levels of dissolved oxygen and very low concentrations of heavy metals and organic pollutants.

- Groundwater in two survey wells was fresh and suitable for drinking.
- Sea bed sediment samples consisted of coarse and medium sand and were not contaminated by heavy metals and organic pollutants.

1.4.3 Biological Components

The study area has no conservation forest although patches of degraded forest areas still exist consisting of mangrove forest, beach forest, mixed forest, and deciduous forest.

At least 145 plant species were identified in the area. Few species are listed as Near Threatened Species (NT) and Vulnerable Species. Nearly 90 small wildlife species were recorded in the surveys, and most are classified as Least Concern Species (LC).

The marine ecosystem was healthy as indicated by densities and diversities of phytoplankton, zooplankton, benthos and fisheries. Fishing activities are still small scale and are not intensive. The coastal water was still rich in fish species and aquatic animals, such as crabs and prawns. Economic importance species are grouper, snapper, emperor, cat fish, mackerel and tuna and trevally. Four species were classified as Near Threatened Species (NT) while ten species were classified as Least Concern Species (LC).

1.4.4 Socio-economic Components

A. Socio-economic Conditions

Information about socio-economic conditions of the study area was derived mainly from interviews of key informants and observations made in the three villages in the study area as mentioned above. Key findings on socio- economic conditions of these communities are summarized below:

- The study area has a total population of 4,019 living in 954 households, an average household size of 4-5 persons, and a female to male ratio of 1.02 to 1.
- Female and male populations in the communities are nearly equal in number, and their roles are supportive to each other.
- The people in the study area are rural type people. They have close relationship and help each other in the same village.
- There were no serious health problems in the three villages. Hospital services are available only in Yebyu and Maungmagan, about 4 to17 km from individual village.
- In the two coastal villages of Nga Pitat and Nyaung Bin Seik, fishing and collecting aquatic animals were main economic activities supplemented by agriculture. Fish and other marine products are the primary sources of protein and cash income for them. Mangroves are major resources for their livings.

- Farming was the main occupation of people in Mudu Village and Ka Myaing swea, which is farthest from the sea among the three villages. Forest is also resources for food and energy for them. Apart from collecting woods for building and fuel, villagers also produce charcoal for sale.
- There are no commercial industries in this area. The cottage industry of shipyard in Nga Pitat Village is based on traditional practice.
- Average household income was about 3,860 USD equivalent per annum while the annual expense was about 3,082 USD equivalent.
- The average annual household expenditure was similar to the average annual household income. Therefore, most households in the villages would have no saving and households with debt would be common.
- Unemployment was low as villagers were self-employed in fishing and agriculture.
- Most people received only primary education.
- Persons who could be considered vulnerable were small in number. By social structure, the vulnerable groups were taken care of by their families, relatives and neighbours.

B. Land Use

Nearly half of the 20,000 acre study area is sea area. Of the land portion of the study area, villages and agricultural areas covered about 45% of the area, degraded forests accounted for nearly 40% and miscellaneous uses accounted for nearly 20%.

C. Infrastructure

The study area is inadequate in infrastructure and facilities.

Road: The only major road in the study area is the road constructed by ITALIAN-THAI DEVELOPMENT PLC. (ITD) for DSEZ. This road and village roads are unpaved laterite roads with light traffic. The roads are rough and dusty.

Electricity: There is no public electricity supply in the study area. Villages have to get electricity from small generators owned by themselves or other persons.

Water Supply: There are no piped water supply systems in these three villages. Villagers use groundwater (bored and shallow wells) and rain water.

Waste Management: There are no proper solid waste management and sanitation system in the study area. Waste water is directly discharged onto land or into drainage channels, if any.

1.4.5 Cultural Components

Religions and Beliefs: The majority of people belong to Dawei ethnic group of Bamar, practicing Theravada Buddhism and speaking the native language of Dawei.

Sites of Traditional and Historical Value: Temples and cemeteries exist in every village. An important historical and religious site of Na Bule is nearby, but beyond the project area.

Natural Resources Use for Livelihoods: The coastal villagers rely mostly on marine and mangroves resources for their livelihoods. Nga Pitat villagers utilize mangroves and Britney creek as storm shelters for their fishing boats. Mudu community lives on land resources. Their major crops are paddy and fruits produced by simple cultivation methods. Livestock raising is practiced in small-scale mainly for household consumption.

Key Institutions and Organizations: The local communities pay respect to their formal and informal leaders. Only youth groups and firefighting teams are active in some villages. The key community base organizations are Tavoyan Women's Union and Dawei Development Association-DDA.

1.4.6 Vision Components

The study area has a coastal scenery with mountains as distant background. Its landscape has no appeal. Na Bule and Maungmagan beaches are beautiful beaches with tourism potentials but these two places are 7 km and 11 km from the Project site, respectively.

1.5 IMPACT ASSESSMENT METHODOLOGY AND APPROACH

1.5.1 Methodology

The EIA investigation covers environmental and social issues of the Project construction and operation phases as prescribed in the EIA Procedure. For each Project phase, the EIA investigation began by identifying relevant environmental and social issues and receptors based on the nature of Project works and the physical, ecological, and socio-economic characteristics of the study area. Subsequently, the impact assessment of each identified issue was carried out in steps as follows:

1) Estimate magnitude of the environmental issue based on Project information. Examples of the magnitude of environmental issue are the number of truck trips that will be required for transporting construction materials, and the emission rates of NO_X.

2) Identify best practicable measures to minimize the magnitude of the issue, through design, construction method, or good construction practices, if possible, and to comply with applicable laws and regulations. For example, use low NO_x burner to minimize the emission load of NO_x and comply with the emission standard, and noise reduction at sources to minimize the noise level.

3) Estimate the remaining magnitude of the issue based on the efficiency of the mitigation measures reported in various references. For example, the amount of NO_x emission with the low NO_x burner technology can be calculated from the efficiency of this technology or from the supplier's guaranteed concentration of NO_x in the flue gas.

4) Compare the remaining magnitude of the issue with applicable source standards. If the remaining magnitude of the issue does not meet the applicable source standards, additional measures will be required to further reduce the remaining magnitude of the issue. For example, best practicable measures will be implemented to minimize the wastewater volume and the amount of pollutants. If the wastewater to be discharged from the power plant does not meet the effluent quality standard, the wastewater must be treated to produce the effluent that meets the effluent quality standard.

5) Calculate or estimate the impact of the remaining magnitude of the issue on ambient environmental quality. For example, calculate the dispersion of the remaining amount of NO_x in the flue gas in the ambient air around the Project site. The results will be increases in NO_x in the ambient air at various locations around the Project site.

6) Compare the resulting ambient environmental quality with the applicable ambient environmental quality standard. Despite the emission standard is met, the resulting ambient NO_x level may be higher than the maximum permissible level of NO_x in the ambient air quality standards by any reasons. In this case, the impact of NO_x emission on ambient air quality could be reduced by treatment of the stack gas to reduce the NO_x emission or by increasing the stack height.

7) Determine the significance of the impact and the priority of the environmental issue in environmental management. The impact of an environmental issue is divided into 5 levels based on six criteria or considerations as shown in ***Table 1.5-1***. The criteria will need to be modified to make them specific and relevant to each environmental issue.

TABLE 1.5-1
LEVELS OF IMPACT OF THE ISSUE IN ENVIRONMENT MANAGEMENT

Consideration	Level of Impact or Significance of the Issue in Environmental Management				
	Critical	Major	Moderate	Minor	Insignificant
Magnitude of the issue	Very large	Large	Medium	Small	Very small
Nature of the issue	Irreversible	Irreversible	Reversible	Reversible	Reversible
Duration of the issue	Permanent	Long	Relatively short	Short	Very short
After implementing best available measures					
-the remaining magnitude can meet the source standards	No	No	Yes	Yes	Yes
Impacts of the remaining magnitude on ambient env quality					
-resulting ambient env quality can meet the ambient standards	No	Yes	Yes	Yes	Yes
Sensitivity of the impacted area	Very High	High	Medium	Low	Relatively Low

Key environmental impacts including risks during the pre- construction, construction and operational phases of the Project were identified and preliminarily assessed based on nature and scope of the Project, environmental and socio-economic settings, and the nature of Project construction and operation. Key findings are summarized below.

1.5.2 Impact Assessment During Pre-Construction and Construction Phases

Due to overlapping and continuation performance of project activities during the two phases of pre- construction and construction at the project site, impacts arisen in these two phases would be similar as generated from the same sources. Therefore, the Consultant has integrated the impacts and mitigation measures of these two phases together.

A. Impact Assessment

Project activities during the pre- construction and construction phases at the project site would create short-term and reversible environmental disturbances common to all construction projects. These common environmental and social issues need to be managed in relation to their sources are:

Environmental Impacts comprise:

- **Fugitive dust** from site clearing, excavation works, transportation of materials, movement of heavy vehicles and haulage trucks on unpaved road
- **Gaseous emissions** from use of diesel-powered, vehicles and generator sets
- **Noise** from various types of machinery, especially piling machines
- **Wastewater** from domestic sewage, wash water and surface runoff
- **Construction waste** from vegetation, spoiled materials, material debris, hazardous waste and domestic wastes
- **Traffic** from transportation of construction wastes, materials, and plant equipment
- **Marine ecology** from laying of intake and outfall pipeline

Social Impacts comprise:

- **Loss of Britney Creek** from filling of section of Britney Creek within the Project site
- **Local economy** from income generation by the Project employment
- **Livelihood** from laying the intake and outfall pipelines at underneath walking tract, creek and seabed
- **Infrastructure and services** from competing use of limited infrastructure and services between the locals and construction workers
- **Culture and tradition** from in-migrated construction workers
- **Community health, safety and security** from labour influx
- **Stakeholders' negative attitudes toward the Project** from nearby communities

These environmental and social disturbances will be transient and the affected environment will return to normal as soon as the activities are completed. Their consequences or impacts on the three villages would not be significant considering the distances between the villages and the construction site.

B. Results of Impact Assessment and Proposed Preliminary Mitigation Measures

The impact of each identified issue was assessed and overall proposed mitigation measures are summarized in ***Table 1.5-2***.

In overview, environmental issues in the construction phase are small in magnitude and could be effectively addressed using well-established conventional measures.

1.5.3 Impact Assessment during Operational Phase

A. Identified Environmental Issues

The power plant management will have to manage the following issues:

Environmental Impacts comprise:

- **Gaseous emissions** of air pollutants generated by combustion of natural gas, including NO_x
- **Ambient noise** of gas engine generators, gas turbine generators, heat recovery steam generation equipment (HRSG); steam turbine generators
- **Wastewaters** from HRSG blow down and quench water, domestic sewage, plant wash water, demineralization unit
- **Cooling water intake** from cooling water system
- **Thermal discharge** from cooling water system
- **Occupational health and safety** of power plant personnel, particularly excessive noise and heat in the working areas inside and outside the power plant.

Social Impacts comprise:

- **Community development support** positive impact to provide community
- **Community health, safety and security** of communities near the power plant

These environmental (and social) issues have to be adequately managed to minimize their impacts and fulfil legal and social obligations.

Visual pollution caused by the power plant will not be an issue as the Project area is flat and has no places of natural beauties. The appearance of the Project's tall structures, particularly the power plant stack would not create an unsightly view of the Project area.

The Project area has no known sites of cultural or archaeological importance. The operation of power plant will also use only about 50 workers. Therefore, the Project operations will have no direct impacts on the local cultural and archaeological heritages.

TABLE 1.5-2

IMPACT OF ENVIRONMENTAL AND SOCIAL ISSUES IN THE PRE-CONSTRUCTION AND CONSTRUCTION PHASES

Issues	Major Sources	Magnitude	Receptor	Predicted Impacts	Proposed Mitigation Measures	Significance of Residual Impacts
Environmental Issues						
Fugitive dust and gaseous emissions	Site preparatory works, movement of vehicles and construction equipment on unpaved surface	Estimated at about 46.9 g/s.	Construction workers, Nga Pitat village 2.23 km away	Predicted TSP level at the receptor about 170.37 µg /m^3 compared to standard of not exceeding 230 µg /m^3	Conventional practices, mainly periodic water spraying which should reduce fugitive dust by 75% suppression	- Insignificant - Medium control priority
Noise	Heavy construction machines and equipment during site compaction and civil works. Percussive piling during the first stage of foundation works.	- 92.77 dB(A) for heavy equipment - 105.77 dB(A) for percussive piling	Construction workers, Nga Pitat village 2.23 km away from project site	3 percussive piling machines operate at the same time, noise at receptor will result in 105.77 dB(A)	The contractor is required to have appropriate noise performance and sound barrier at the perimeter to block the noise emanating to the receptor.	- Negligible - High control priority
Wastewater	Sewage from workers Concrete wash water Wheel wash water Surface runoff	- Domestic sewage 90 m^3/day - Wash waters- concrete wash waters 2 m^3/week	In the sea, 800 m away	- Small pollution from sewage water - Small volume from concrete wash water - Insignificant from surface runoff	All wastewater will be treated to meet the effluent standards.	- Insignificant - Medium control priority
Construction wastes	Site clearance, spoils and excavated materials, construction material debris, hazardous waste, domestic wastes from site workers	- Construction wastes average 1.672 tons/day - Non construction wastes average 96 kg/day - Hazardous wastes 22 kg/day	Soil and ground water at the waste disposal site	Not possible to predict the impacts on soil and ground water at the disposal sites. Considering as insignificant impacts are most likely.	Reduction at sources through appropriate design and construction management	- Minor to insignificant - Medium control priority

TABLE 1.5-2

IMPACT OF ENVIRONMENTAL AND SOCIAL ISSUES IN THE PRE-CONSTRUCTION AND CONSTRUCTION PHASES (CONT'D)

Issue	Major Sources	Magnitude	Receptor	Predicted Impacts	Proposed Mitigation Measures	Significance of Residual Impacts
Road traffic	Transport of site filling materials	Assuming the site filling period of 60 days and 1-2 m filling, the traffic load would be 543 truck trips/day	Small port coastal road and he junction of Nga Pitat to the power plant site	Heavy congestion at small port coastal road	- Commence the site clearing and filling as soon as possible - Extend the filling period to 120 days to reduce the daily traffic load. - Traffic management - Truck fleet management	- Significant - High control priority
Social Issues						
Loss of Britney Creek	Site preparatory work, filling of section of Britney Creek within the project site	Estimated the total area 245.19 acres	Nga Pitat villagers	Obstruct villager's navigation to the dockyard	Develop alternative dockyard/boatyard	- Small impact - Low control priority
Local economy	Cash inflow into the economy and employment	Cash flow in the local economy could be 48,500 US$ per month	Families in the nearby villages to benefit from the construction	Positive impacts in terms of opportunities for income generation from direct and indirect employment	(Enhancement measures) EPC contractor to prioritize hiring local people as many as possible Procurement of foods and services from local sources	- Benefits would be substantial compared to local economic conditions. - High priority
Livelihood	Laying the intake and outfall pipelines at underneath walking tract, creek and seabed	Nga Pitat villagers	Nga Pitat villagers who go to mooring area. Small-scale fisherman	Inconvenient of villagers and small scale fisherman	- Consultation with villagers about the mitigation procedure during construction. - Demarcation the area of the laying intake and outfall pipelines, and notice the construction period in the public. - Install pipelines with short period	- Small impact - High control priority

TABLE 1.5-2

IMPACT OF ENVIRONMENTAL AND SOCIAL ISSUES IN THE PRE-CONSTRUCTION AND CONSTRUCTION PHASES (CONT'D)

Issue	Major Sources	Magnitude	Receptor	Predicted Impacts	Proposed Mitigation Measures	Significance of Residual Impacts
Infrastructure and services	Competing use of limited infrastructure and services, particularly roads and hospitals	- Significant use of the main road link between Maungmagan to the project site - Limited use of hospitals for 600 workers	Local people in general	- Road congestion, particular at the coastal road - Competition of hospital resources	- Measures in traffic issue Repair road damages caused by the Project - Establish facilities and First Aid Service at the construction site	Medium priority
Culture and tradition	construction workers from other areas	Small considering of about 600 workers would be mostly locals.	Nearby villages	Insignificant	- Aware of local cultures, traditions and norms - Enforce code of conduct for workers - Establish good relationship with local - Concerned authorities will be immediately informed if archaeological artifacts are found.	Medium priority
Community health, safety and security	Construction workers	Low risks	Nearby villages	Low likelihood of occurrence and small consequences on the villagers	Health screening of workers Security check on workers	Medium priority
Stakeholders' negative attitudes toward the Project	Negative attitudes toward the Project	Significant impact	Nearby villages	- Delay the Project implementation - Opposition to the Project	- Support community development (CSR Program): education, health care and sanitation, religions and culture - Support socio-economic development: employment opportunity, occupation promotion, gender development	High priority

B. Results of Impact Assessment and Proposed Preliminary Mitigation Measures

The impact of the first five issues and OHS was assessed and the results are summarized in ***Table 1.5-3***. Details of noise prediction and air quality modelling are presented in the main text.

In overview, the use of low NO_x burner minimizes the NO_x emission problem. Noise impact on the receptor will not be significant. Wastewater from all sources is very small compared to the dilution volume of the coastal water. The losses of small marine organisms will not be significant. Therefore, all environmental issues in the operational phase are small in magnitude and they could be effectively addressed using well-established conventional measures.

For public safety of communities near the gas pipeline and power plant, the main concern is risks from fires and explosions of the power plant. The impacts on nearby communities will not be significant due to the distance from the power plant. This subject is discussed in the risk assessment.

Impacts on livelihoods of people living near the Project facilities would be small considering only 50 workers will be employed. Provision of community supports should be considered.

TABLE 1.5-3

IMPACT OF ENVIRONMENTAL AND SOCIAL ISSUES IN THE OPERATION PHASE

Issues	Major Sources	Magnitude	Receptors	Predicted Impacts	Proposed Mitigation Measures	Significance of Residual Impacts
Environmental Issues						
Gaseous emission	Combustion of natural gas in the turbine combustors	NO_2 14.32 g/s, with low NO_x burner reduced to 6.23 g/s	Communities within the dispersion area, namely Mudu, Ka Myaing swea, Nyaung Bin Seik	Maximum ground level concentrations of NO_2 of the project operations compared with the permissible maximum value in the AQQS	No need for further reduction of NO_2 apart from the reduction by low NO_x burner	- Insignificant - High control priority
Noise	HRSG, turbine generators, steam Piping	All 122 dB(A)	The most noise sensitive receptor is Yay Wai Monastery and Nga Pitat School	If noise at the boundary not exceeding 85 dB(A), noise impact on the receptor will not be significant. The noise standards can be met.	No additional measures required.	- Negligible - High control priority
Wastewater	- Boiler blow down - Domestic sewage - Plant wash water - Wastewater from the demineralization unit - Total wastewater	- 186.96 m^3/d - 2.8 m^3/d - 707.04 m^3/d - 82.56 m^3/d - 979.36 m^3/d	Discharged point at the sea, about 800 m away from the front boundary of the construction site	Pollution load of domestic sewage is very small compared to the dilution volume of the coastal waters. The inorganic wastewaters will not have any impacts on the seawater quality and the marine ecosystem.	The figures represent the possible minimum volume, so that not technically feasible to reduce these wastewaters volume at sources	- Insignificant - Medium control priority
Cooling water intake	Cooling water system	675,210 m^3/day	Marine organisms such as phytoplankton and zooplankton	Seawater will be abstracted from about 1 m above the sea bed, the density of phytoplankton and zooplankton are highest at surface due to high light intensity. In addition, plankton have short life cycle and can reproduce very quickly. The impact of seawater intake on plankton is considered low.	Design of seawater intake and pumping system will consider minimizing the impacts on marine organisms.	- Negligible - Low control priority
Thermal Discharge	Cooling water system	676,300 m^3/day	Marine organisms such as phytoplankton and zooplankton	The modelling results show that the temperature increase will be less than 3°C at about 100 m from the discharge point. The impacts of thermal discharge on aquatic resources would also be insignificant.	The outfall design already adopts best practices for minimizing impacts of thermal discharge on ambient water.	- Low near the coast line - Medium control priority

TABLE 1.5-3
IMPACT OF ENVIRONMENTAL AND SOCIAL ISSUES IN THE OPERATION PHASE (CONT'D)

Issues	Major Sources	Magnitude	Receptors	Predicted Impacts	Proposed Mitigation Measures	Significance of Residual Impacts
Social Issues						
Occupational , Health and Safety	- Non-ionizing radiation - Heat - Noise - Confined spaces - Electrical hazards - Chemical hazards	Not applicable	Operational personnel	All OSH issues will need to be effectively managed to comply with applicable OSH Regulations	- Plant design and equipment selection to consider all OSH issues - Set up and efficiently implement an OSH management system - Training plant operators	- Significant - High control priority
Community development support	Social support by the Project	Surrounded villages, especially Nga Pitat, Nyaung Bin Seik and Mudu Village (including Ka Myaing swea)	Local villagers	Positive impact on: - Support education, socio-economic, sanitation, nutrition and culture, etc. - Channel to communicate with the Project, especially complaints - Improve livelihood via sustainable use of mangrove resources	Establishment of: - CSR program - Grievance redress mechanism - Social support program - Mangrove resources management program	- Significant - High control priority
Community health, safety and security	Risks related to the gas supply system and gas turbine operations	Mainly on Nga Pitat communities	Local villagers	Fire and explosion risks	Risk management	- Low - High control priority

1.5.4 Impact Assessment during Decommissioning Phase

A. Identified Environmental Issues

During the decommissioning phase of this Project, the power plant management will have to manage the following issues:

Environmental Impacts comprise:

- **Fugitive dust** from demolition work, excavation works, transportation of excavated materials movement of heavy vehicles and haulage trucks on unpaved road.
- **Gaseous emissions** from use of diesel-powered and vehicles.
- **Noise** from machinery and demolition activities.
- **Demolition waste** from spoiled and excavated materials, material debris, hazardous waste and domestic wastes.
- **Traffic** from transportation of material debris, some structures and equipment.

Social Impacts will be occupational, safety and health of the operational staff and workers on decommissioning works.

These environmental and social disturbances will be transient and the affected environment will return to normal as soon as the activities are completed. Their consequences or impacts on the three villages would not be significant considering the distances between the villages and the Project site.

B. Results of Impact Assessment and Proposed Preliminary Mitigation Measures

The impact of each identified issue was assessed and overall proposed mitigation measures are summarized in ***Table 1.5-4***.

In overview, environmental issues in the decommissioning phase are small in magnitude and could be effectively addressed using well-established conventional measures.

TABLE 1.5-4

IMPACT OF ENVIRONMENTAL AND SOCIAL ISSUES IN THE DECOMMISSIONING PHASE

Issues	Major Sources	Magnitude	Receptor	Predicted Impacts	Proposed Mitigation Measures	Significance of Residual Impacts
Environmental Issues						
Fugitive dust and gaseous emissions	Demolition works, movement of vehicles and equipment on unpaved surface	Estimated at about 46.9 g/s.	Demolition workers, Nga Pitat village 2.23 km away from the project site	Predicted TSP level at the receptor about 170.37 µg /m^3 compared to standard of not exceeding 230 µg /m^3.	Conventional practices, mainly periodic water spraying which should reduce fugitive dust by 75% suppression	- Insignificant - Medium control priority
Noise	Heavy machinery and equipment during demolition activities	92.77 dB(A) for heavy equipment	Demolition workers, Nga Pitat village 2.23 km away from project site	By operation of machinery at the same time, noise at receptor will result in 92.77 dB(A).	The contractor is required to have appropriate noise performance and sound barrier at the perimeter to block the noise emanating to the receptor.	- Negligible - High control priority
Demolition wastes	Spoils and excavated materials, material debris, hazardous waste and domestic wastes	Difficult to estimate the waste in 30 year ahead, assuming to be smaller than construction activities	Soil and ground water at the waste disposal site	Not possible to predict the impacts on soil and ground water at the disposal sites. Considering as insignificant impacts are most likely.	Reduction at sources through good design and construction management	- Minor to insignificant - Medium control priority
Road traffic	Transport of site demolition materials	Difficult to estimate the traffic load in 30 year ahead, assuming to be smaller than construction activities	Small port coastal road and he junction of Nga Pitat to the power plant site	Congestion at small port coastal road	- Commence the site clearing and demolition as soon as possible - Traffic management - Truck fleet management	- Significant - High control priority
Social Issues						
Occupational , Health and Safety	- Heat - Noise - Electrical hazards - Chemical hazards	Not applicable	Demolition workers	All OSH issues will need to be effectively managed to comply with applicable OSH Regulations.	Design and equipment selection to consider all OSH issues	- Low - High priority control

1.5.5 Risk Assessment

1.5.5.1 Conceptual Framework

Section 6.6.1 of the main report discusses the concept and meaning of an environmental risk, objectives of environmental risk management, and the environmental risk management planning process. In essence, an environmental risk is one of several risks of the Project that will have to be planned and managed as part of Project risk management during the construction phase and the operational phase of a project in parallel with other categories of project risks. The concept and principle of project risk management are therefore applicable to environmental risk management.

Based on the concept and principle of project risk management, an environmental risk in the context of this Project is considered as: *"an event which may or may not occur, but if it occurs it will have negative consequences on the achievement of the Project's environmental management objectives, i.e. compliance with environmental performance requirements prescribed by MONREC and other authorities, and as agreed or committed with the stakeholders, particularly the surrounding communities."*

Environmental risk management planning involves: (i) identify uncertain events (risk events) which may occur with consequences on environmental compliance of the Project; (ii) for each identified event, assess its likelihood of occurrence and the level of its consequences on environmental compliance; (iii) identify underlying causes of the risk event; (iv) devise risk mitigation measures to address the identified causes of the risk; (v) classifying the risk into major, moderate and minor risks based on its likelihood of occurrence and significance of its consequences; and (vi) propose arrangements for implementing the risk mitigation measures. The results of risk classification for the entire project could be presented in a simple risk matrix (see ***Figure 6.6-1*** in the main text).

1.5.5.2 Environmental Risk Management-Construction Phase

Environmental risk management planning for the construction phase was conducted based on the above conceptual framework and the nature of construction works, two risk events were identified.

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

In addition, the testing and commissioning of the power plant could involve fire and explosion risks which are similar to risks during operation. The risk during the testing and commissioning was therefore included in the operational risk assessment.

The two identified risks were analyzed and the results are presented in ***Table 6.6-1*** of the main text, covering their consequences, underlying causes and mitigation measures. In essence, the measures for managing the first risk event are to ensure that: (i) the EPC contractor and subcontractors clearly understand environmental performance

requirements of the Project that they have to incorporate in designs and comply with during construction; (ii) the EPC contract is clear and specific on environmental management obligations of the EPC contractor and subcontractors; (iii) supervision of the EPC contractor and subcontractors by the supervision consultants will be efficient and effective; and (iv) changes in design, materials, equipment, construction methods, and environmental requirements must be strictly processed in the change management procedure.

Measures for managing the second risk will be related to public information disclosure, community development support, collaboration with the concerned authorities, and efficient management of the public complaint management process.

The environmental non-compliance risks during construction should be considered moderate risk while the public opposition risk should be considered minor risk.

1.5.5.3 Environmental Risk Management-Operational Phase

Environmental risk management planning for the operational was conducted based on the above conceptual framework and the nature of operation of the Project's power plant. During the operational phase, two categories of risk events should be considered. The first category covers recognized hazards in gas-fired power plants include gas leakage with consequential fire and explosions, internal explosions, and failure of rotating machinery. The second category covers non-compliance with pollution control requirements, particularly gaseous emissions and wastewater disposal. The two categories of risks were discussed and analyzed in ***Section 6.6.3*** of the main text.

Measures for managing the operational risks are discussed in ***Section 6.6.3*** of the main text. In essence, the measures will involve contractual arrangements to ensure that the EPC contractor: (i) clearly understands design requirements regarding operational risks; (ii) incorporates various safety guidelines and standards for gas-fired power plants in the design and specifications; (iii) establishes effective systems and procedures for quality control of design, manufacturing, installation, construction, operational procedures, and operator training; (iv) conducts a detailed HAZOP study after the designs and specifications are completed; (v) prepares a detailed program for testing and commissioning that incorporates all safety measures, such as the use of inert gas in gas purging; (vi) prepares detailed O&M procedures covering all risky operations; (vii) design and conduct rigorous training of power plant operational team; and (viii) prepares an emergency response plan. The power plant operational team will need to ensure adequate technical and management capacity to strictly implement the safety management procedures and be ready to implement the emergency response plan whenever the need arises.

No specific measures will be required for managing the pollution control risks. The risks could be managed through the environmental management related to gaseous emissions and wastewater management.

The operational risks were considered moderate risks while the pollution control risks should be considered minor risks.

1.6 CUMULATIVE IMPACT ASSESSMENT

As DSEZ has no access to supply from the national power grid, the power generation capacity for DSEZ will have to be increased after the power plant of this Project operates at full capacity. Therefore, to make the Cumulative impact assessment (CIA) of this Project more meaningful, the CIA should be conducted for a plausible scenario of new power plant project in DSEZ.

The cumulative impacts on NO_2 concentrations in the ambient air in 2045 are investigated for the 5,864 MW generation. The investigation is made in two case: (i) all new power plants will adopt the stack height of 35 m as in the Project's power plant; and (ii) all new power plants will adopt the stack height of 70 m which is recommended as Good Engineering Practice Stack Height Regulation of the EPA of State of Tennessee, approved on October 19, 1988.

The air quality prediction results clearly indicate that the study area could accommodate a total 5,864 MW power production in 2045 provided that all new power plants will use the natural gas-fired combined cycle process and a stack height of 70 m. If the stack height is less than 70 m, the air quality standards will not be met unless NO_x is to be further reduced. Based on the existing background level of NO_2, about 30% of the absorptive capacity of the air-shed would still be available for industrial activities which could generate NO_2.

The data taken from ***Table 6.5-4*** and ***Table 6.5-5*** in the main text. The predicted maximum concentrations of NO_2 and locations in the study area are given ***Table 1.6-1***.

TABLE 1.6-1

PREDICTED IMPACTS OF NO_2 CONCENTRATION IN AMBIENT AIR FOR CUMULATIVE POWER DEMAND IN YEAR 2045

Results	Cumulative Power Demand In Year 2045					
	Case I: Project Power Plant (Phase 5) and 14 Power Plants with 35 Meter Stack Height			Case II: Project Power Plant (Phase 5) and 14 Power Plants with 70 Meter Stack Height		
	NO_2 (µg/m³)			NO_2 (µg/m³)		
	1-hr	24-hr	1-yr	1-hr	24-hr	1-yr
In the entire study area						
- maximum incremental increase in concentration	193.13	43.17	10.56	162.18	30.08	7.50
- % of ambient air quality standard	96.57	28.78	26.40	81.09	20.05	18.75
- location of the maximum value	Andaman Sea	Britney Creek	DSEZ Area	Andaman Sea	Britney Creek	DSEZ Area
- Coordinate (UTM(WGS84))	393707E, 1577324N	397007E, 1573724N	400207E, 1575324N	393707E, 1577324N	398007E, 1571924N	400207E, 1575324N
- Distance (meter) /direction from project site	6,750/NW	1,920/NW	630/NE	6,750/NW	100/SW	630/NE
- maximum concentration of background level	34	18	NA	34	18	NA
- net maximum concentration including background level	227.13	61.17	10.56	196.18	48.08	7.50
- % of ambient air quality standard	113.57	40.78	26.40	98.09	32.05	18.75
In only sensitive areas						
- ranges of concentrations	130.32-150.24	9.52-12.47	2.22-2.71	119.44-131.46	8.24-11.63	1.96-2.53
- % of ambient air quality standard	65.16-75.12	6.35-8.31	5.55-6.78	59.72-65.73	5.49-7.75	4.90-6.33
- location of the maximum value	Nga Pitat	Nyaung Bin Seik	Nyaung Bin Seik	Nga Pitat	Nyaung Bin Seik	Nyaung Bin Seik
- maximum concentration of background level	34	18	NA	34	18	NA
- net maximum concentration including background level	164.32-184.24	27.52-30.47	2.22-2.71	153.44-165.46	26.24-29.63	1.96-2.53
- % of ambient air quality standard	82.16-92.12	18.35-20.31	5.55-6.78	76.72-82.73	17.49-19.75	4.90-6.33
Standard	**200[1/]**	**150[2/]**	**40[1/]**	**200[1/]**	**150[2/]**	**40[1/]**

Source: 1/Environmental, Health, and Safety Guidelines: Environmental Air Emissions and Ambient Air Quality of International Finance Corporation (IFC), World Bank Group, 2007

2/Thermal Power: Guidelines for New Plants, Pollution Prevention and Abatement Handbook, World Bank Group, July 1998

1.7 ENVIRONMENTAL MANAGEMENT PLANS

1.7.1 Scope of Environmental Management Plans

As prescribed in the EIA Procedure, the EIA investigation prepares two environmental management plans (EMPs)-one for the construction phase (CEMP) and one for the operational phase (OEMP). The two EMPs have considerable details compared to brief EMPs in most EIA reports. Nevertheless, at this Project planning stage, the two EMPs are invariably framework or conceptual plans providing principles and guidelines for environmental management of the Project during construction and operation. The two EMPs presented in the main text are considered and referred to as the Project Proponent or Owner EMPs. The EPC contractor will be required to elaborate the Owner-CEMP to prepare a detailed Contractor-CEMP based on the final designs and construction plan to be prepared by the EPC contractor. The EPC contractor will also have to elaborate the Owner-OEMP to prepare a detailed Contractor OEMP in due course before the commercial operation based on the actual construction, results of plant commissioning, and final operational procedures.

1.7.2 Application of the Owner-EMPs

During construction, the EPC contractor will implement the Contractor-CEMP under the supervision of the Project Manager. The Owner's power plant operation team will review and revise the Contractor-OEMP as appropriate to prepare its own final OEMP for implementation during the operational phase.

1.7.3 Project's EHS Policy and Commitments, and Legal Requirements

Environmental management of the Project during construction and operation will be guided by the EHS policy of the Project Proponent to be established with commitment of sustainable development principle, and by applicable legal requirements. Consequently, the Project Proponent will establish an environmental management system (EMS) for the project and will operate the EMS to meet the requirements of ISO 14001 and OHASS 18001.

Environmental management of the Project will comply with legal requirements pertinent to the EMP prescribed in the draft Electricity Law 2013, the Environmental Conservation Rule 2014, the EIA Procedure (29 December 2015), and Myanmar National Environmental Quality (Emission) Guidelines (29 December 2015).

The requirements prescribed in the EIA Procedure cover all issues of environmental management as summarized in ***Table 8.2-1*** of the main text and presented herein as ***Table 1.7-1*** for ready reference.

TABLE 1.7-1

CONTENT OF THE EIA PROCEDURE RELEVANT TO THE EMPs

Subject	Relevant Articles
Content of the EMPs	63
Project Approval Requirements	
- Issuance of an ECC[1]	70
- Conditions of the ECC[1]	87, 89, 90, 91, 92, 93, 94, 96, 97, 98
- Submission of an CEMP and OEMP	91, 94
Revision and updating the EMPs	94, 97, 98, 99
Implementing the EMPs	102, 103, 104
Monitoring and Reporting	
- Responsibility for Monitoring	106, 107
- Submission of Monitoring Report	108
- Content of Monitoring Report	109
- Disclosure of Monitoring Report	110
- Inspection by MONREC	111-122

Remark: [1/] Environmental Compliance Certificate

According to **Article 102 (a)**, the Project Proponent shall bear full legal and financial responsibility all of the Project Proponent's actions and omissions and those of its contractors, subcontractors, officers, employees, agents, representatives, and consultants employed, hired, or authorized by the Project acting for or on behalf of the Project, in carrying out work on the Project.

Article 103 states that the Project Proponent shall fully implement the EMP, all Project commitments, and conditions, and is liable to ensure that all contractors and subcontractors of the Project comply fully with all applicable Laws, the Rules, this Procedure, the EMP, Project commitments and conditions when providing services to the Project.

1.7.4 Summary of CEMP and Arrangements for the Implementation

Implementation of Construction Environmental Management Plan (CEMP)

The Project Proponent will ensure that the Contractor-CEMP will incorporate all mitigation measures as prescribed in the Owner-CEMP in preparing detailed designs of the power plant and its associated facilities, construction methods, and specifications. The issues will be managed during the construction phase: (i) general construction, (ii) noise and vibration; (iii) waste management; (iv) air quality management, (v) wastewater management; (vi) traffic management, (vii) OSH management, (viii) resource management, (ix) CSR and (x) mangrove resource management program. A sub-management plan for each

of the identified issues is prepared and the twelve sub-plans are presented in ***Appendix 6A of Volume II***.

An environmental management will be a functional unit in the project management organization, as structures in ***Figure 8.3-1*** of the main text.

Responsibilities

The Contractor will implement the Contractor-CEMP under supervision of the Owner's Project Manager through the Construction Supervision Consultant. The Contractor will field an EHS manager to be in charge of all aspects of the implementation of the Contractor-CEMP.

The Contractor will be instructed by the Owner's Project Manager to take corrective actions for any identified non-compliance with prescribed environmental indicators. The Contractor is required to establish own procedure for corrective actions related to EHS non-compliances. The Contractor will be required to conduct an investigation of the non-compliance to determine its root causes and formulate effective actions to correct the root causes. The Contractor will report to the Project Manager the results of taking corrective actions. The Contractor will also be required to prepare an emergency response plan and establish adequate capacity for implementing the emergency response plan.

Monitoring

Monitoring, evaluating, and reporting (MER) of the environmental performance of the Contractor will include scheduled monitoring of the indicators related to each impact issue as indicated in each sub-plan. The Contractor will submit monitoring reports every 6 months, one for internal use and another for reporting to MONREC.

Budget is allocated for monitoring carried out by a third party only, but not for internal monitoring as it will be undertaken by monitoring team as mentioned above.

Monitoring by the third party will be officially carried out for air quality, noise, wastewater, marine resources and traffic twice a year over the construction period. Total cost of monitoring and evaluation of the Project's environmental and performance is provisionally estimated, as shown in ***Table 8.3-3*** of the main text.

An audit is proposed at the end of the first year of construction and another audit at project completion.

1.7.5 Summary of OEMP and Arrangements for the Implementation

Implementation of Operation Environmental Management Plan (OEMP)

The OEMP will require much less activities and a much simpler EMS compared to those of the CEMP. No environmental impact mitigation measures will be required apart from routine inspection and maintenance of power plant. The power plant management organization will implement sub-plans of noise, air quality, wastewater, OSH management and community support program, as presented in ***Appendix 7A of Volume II***.

The power plant management organization will set up a simple Environmental Management System (EMS) for its O&M activities. This EMS will focus more on occupational health and safety of power plant workers which are less than 50 persons, and on monitoring of changes in air and water quality, noise level and marine ecology at the area related to intake and discharge point of the seawater.

The MER will include scheduled monitoring of air quality, noise and water quality. Environmental reports will be prepared for submission to MONREC and other concerned authorities every 6 months.

An environmental management will be a functional unit in the power plant management organization, as structures in ***Figure 8.4-1*** of the main text.

Responsibilities

The OEMP will be implemented by the power plant O&M team as part of the O&M of the power plant. During the operational phase, environmental management activities will be routine and the power plant organization will be responsible for environmental performance of the power plant.

Monitoring

Monitoring of environmental performance will be carried out through the project life. Internal monitoring will be performed frequently as required. Monitoring by the third party will be officially undertaken within 2 period separations. The first period will be for the first five year after commissioning and the second period will be from the 6th year onwards throughout the project life.

A budget will be allocated for monitoring and evaluation carried out by the third party, covering air quality, noise, wastewater and marine resources. Total cost of monitoring and evaluation of the Project's environmental and performance is provisionally estimated as shown in ***Table 8.4-2*** of the main text.

Corrective actions are described as part of the management of the implementation of the community support. The process is discussed in the sub-plans.

1.7.6 Implementation of Corporate Social Responsibility (CSR)

Aiming at creating good understanding between the stakeholders and the Project Proponent, the Project will establish and implement CSR throughout the Project life. The same CSR implementation would be applied for all phases. The support will be on education, health care and sanitation, religions and culture, socio-economic development in the form of giving priority on employment opportunity, occupation promotion on agriculture, handicraft promotion and fishery product, gender development, regular meeting with communities, and reporting on results the project implementation, mitigation measures and monitoring.

1.7.7 Implementation of Grievance Redress Mechanism

With the aim of solving the conflicts between the stakeholders and the Project Proponent, the Project will establish and implement grievance redress process throughout the Project life. The process is proposed as mechanism for ensuring that public complaints and concerns related to the Project implementation will be effectively addressed as soon as possible. The same process will be applied for all phases.

Figure 1.7-1 and ***Figure 1.7-2*** illustrate grievance redress process during construction and operation phases respectively.

1.7.8 Summary of DEMP

The DEMP will require much less activities and a much simpler EMS compared to those of the CEMP. No environmental impact mitigation measures will be required apart from routine inspection and maintenance of power plant. The power plant management organization will implement sub-plans of air quality, noise, waste, traffic, OSH management and social environmental management. Monitoring on these sub-plans will be carried out accordingly. The monitoring report will be simple and straight forward to the results. Report to MONREC will be submitted when completion of decommissioning operation.

Appendix 7B of Volume II presents implementation and monitoring activities of these sub-plans.

Function of environmental management, CPC as well as a grievance redress process will be continued from operation phase to this phase.

1.7.9 Emergency Response Plan

The emergency response plan will be prepared to cope with accidents and emergencies which may occur during the pre-construction, construction, operation and decommissioning phases. Considering the nature and magnitude of these four phases, the emergency response plan would deal with work accidents and accidental fires. The effective plan will help the emergency situation of the power plant to return to normal situation as early as possible and minimize injuries and loss of lives, damage to properties, and construction delay.

The emergency response plan will be a part of the OSH system. Facilities to be provided on site will contain at minimum the following: fully equipped first aid station, fire-fighting equipment, arranged access to emergency services of the local hospital, and direct communication link with local fire brigades and other relevant government authorities and the local police station.

The emergency response plan will comprise: emergency procedures, firefighting plan, contingency plan, accidental plan, evacuation plan and recovery plan. Details of each pan are described in ***Section 8.6-Emergency Response Plan*** of the main text.

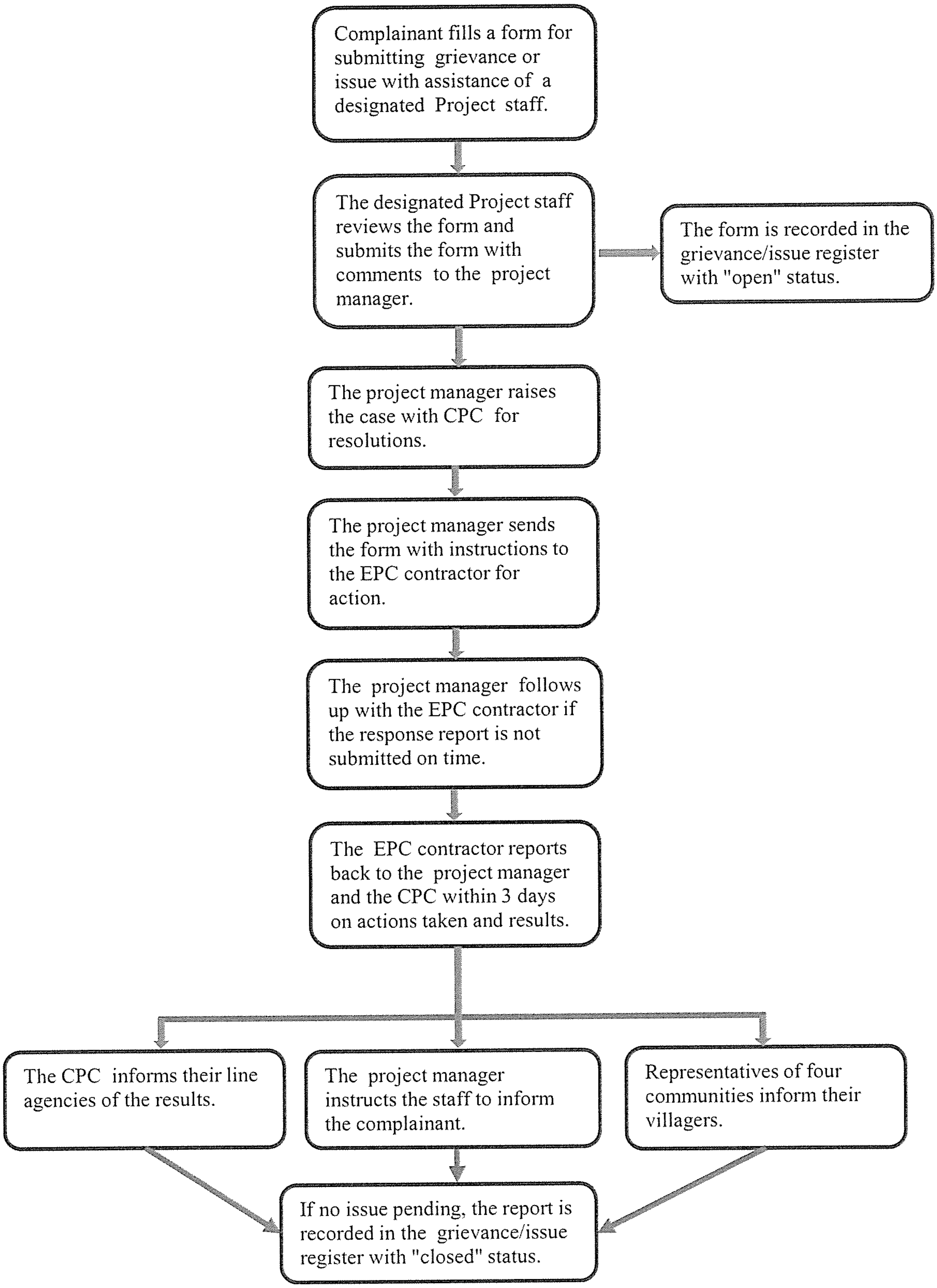


FIGURE 1.7-1 : GRIEVANCE MANAGEMENT PROCESS DURING CONSTRUCTION PHASE

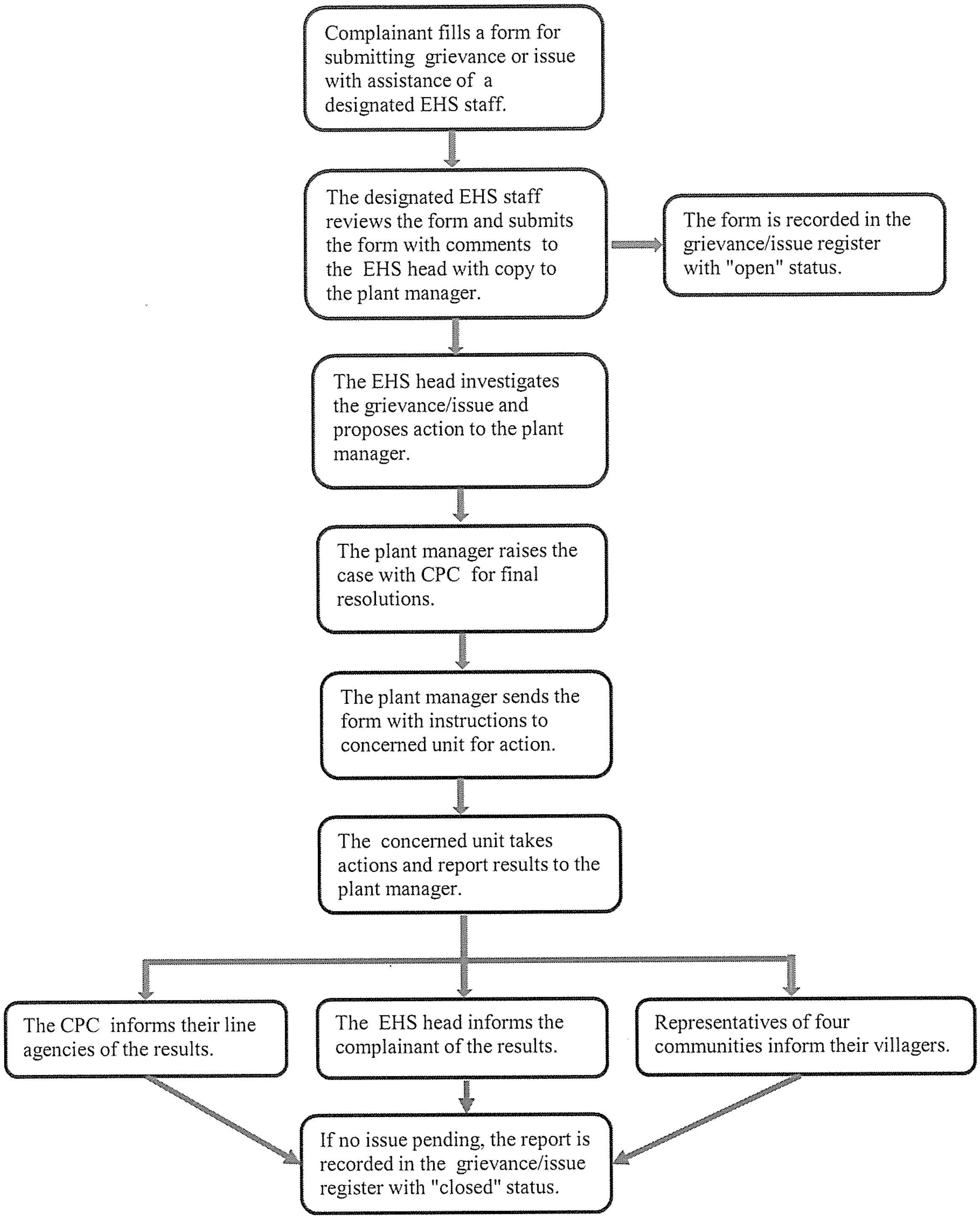


FIGURE 1.7-2 : GRIEVANCE REDRESS PROCESS DURING OPERATION PHASE

1.8 PUBLIC CONSULTATION AND DISCLOSURE

1.8.1 Purposes of the Consultation during the Preparation of EIA Report

Public consultation and disclosure was carried out as part of the EIA investigation. It has three purposes:

- Informing the stakeholders about the Project, environmental and social issues related to Project construction and operation, and mitigation measures to minimize environmental and social impacts
- seeking views of the stakeholders on the Project and mitigation measures
- Participation and partnership where issues and needs are jointly discussed and assessed.

Results of the public consultation were useful to the formulation of environmental and social management plans for the Project.

1.8.2 Methodology and Approach

Public Consultation during preparation of EIA report was conducted in two periods, following the Administrative Instruction of Environmental Impact Assessment Procedure. The methodology and approach is as follows:

1.8.2.1 Identification of Stakeholders and Group Affected by the Project

The public consultation and disclosure was focused on the following groups of Project stakeholders:

- Government agencies at the national, regional and local levels with direct responsibilities for the administration of the EIA process for environmental, local administration and social clearance of the Project.
- Various government departments responsible for development of various sectors, and community based organizations
- Three villages and one community situated in 5 kilometers radius of the Project site, namely Nga Pitat and Nyaung Bin Seik in Launglon Township and Mudu which includes Ka Myaing swea in Yebyu Township.

1.8.2.2 Methods of Consultations

The main method used in consultation was public meetings, complemented by disclosure of project information through presentation.

1.8.2.3 Approach to the Public Meetings

The following approach to the public meetings was adopted:

- Each meeting at the community level was organized with assistance of Township Administration and village headmen in inviting participants, and in making arrangements for the meeting venue and issuing invitations.

- Representatives of the Project Proponent and the Consultant jointly conducted the meeting. They provided information on brief Project information including Project development plan, the EIA study including clarifications on issues related to impacts of the Project. Representatives of two parties responded for answering questions from the meeting or clarifying points raised in the meeting.

- For the second period of meeting, major impacts and mitigation measures to minimize the impacts were presented in addition.

- The meeting then provided an open forum for discussions.

1.8.3 Summary of Consultation Activities Undertaken

The two periods of consultation meeting were held between 6 to 8 October, 2015 and 1 to 3 December, 2015 respectively. The summary is shown in ***Table 1.8-1*** and ***Table 1.8-2***. Name of villagers in the three villages and one community who attended the meetings are listed in ***Appendix 9A*** of the main text.

TABLE 1.8-1

THE FIRST PERIOD OF CONSULTATION MEETINGS WITH THE PROJECT'S STAKEHOLDERS

Meeting Dates/time	Name	Position and Organization	Venue
6 October 2015	**SWB-Support Working Group (total of 6 persons)**		
9.00-10.30 hrs.	1. Mr. Aung Kyaw Nyien	Secretary/Myanmar Port Authority	SWB Office
	2. Mr. Aung Hone Than	Officer, Administration Department	
	3. Mr. U Thet Oo	Officer, Labour Department	
	4. Mr. Khin Htun	Officer, Immigration Department	
	5. Mr. Kyaw Min Oo	Chief Officer, Myanmar Police Force	
	6. Mr. Wai Linn Zaw	Officer, Administration Department	
6 October 2015	**Government Authorities at Regional and Local Levels**		
11.30-12.00 hrs.	1. Mr. Daw Let Let Htwe	Head of Yebyu Township Administration (1 person)	Yebyu Township Office
14.00-15.00 hrs.	2. Mr. U Tin Thein	Secretary of Tanintharyi Regional Government Office (1 person)	Tanintharyi Regional Government Office
16.30-17.30 hrs.	3. Mr. U Aung Khine Soe	Deputy Director of Environmental Conservation Department for Tanintharyi Region (1 person)	ECD Office, Dawei
7 October 2015	**The General Public : Local Community Groups**		
9.30-11.00 hrs.	1. Mudu and Ka Myaing swea Villagers	• Village headman, village committee, community leaders and villagers (total of 73 persons) • U Aung Khine Soe, Deputy Director of Environmental Conservation Department in Dawei (1 person)	At the house of Mudu Village Headman
8 October 2015	**The General Public : Local Community Groups**		
9.30-11.00 hrs.	1. Nyaung Bin Seik Villagers	Village headman, village committee, community leaders and villagers (total of 40 persons)	The temple of Nyaung Bin Seik Village
14.00-15.30 hrs.	2. Nga Pitat Villagers	Village headman, village committee, community leaders and villagers (total of 67 persons)	Community hall of Nga Pitat Village

TABLE 1.8-2

THE SECOND PERIOD OF CONSULTATION MEETINGS WITH THE PROJECT'S STAKEHOLDERS

Meeting Dates/time	Name	Position and Organization	Venue
2 December 2015	**Government Authorities at Regional and Local Levels (total of 20 persons)**		
9.00-11.00 hrs.	1. Mr. U Khin Maung Cho	Directory of General Administration Department of Dawei District (7 persons)	ITD Meeting Hall
	2. Mr. U Htun Wai Oo	Electric Power Corporation of Dawei District (1 person)	
	3. Mr. U Aung Hom Than	SWB: General Administration Department (1 person)	
	4. Mr. U Thet Oo	SWB: Department of Labor (2 persons)	
	5. Mr. U Khin Maung Win	SWB: Myanmar Port Authority (1 person)	
	6. Mr. U Kyaw Maw Htun	SWB: Immigration (2 persons)	
	7. Mr. U Aung Khine Soe	Deputy Director of Environmental Conservation Department for Tanintharyi Region (3 persons)	
	8. Mr. U Htun Win Myint	Director of Regional Fishery Officer (2 persons)	
	9. Mr. U Kyaw Naing	General Administration Department of Yebyu Township (2 persons)	
2 December 2015	**The General Public : Local Community Groups**		
13.30-15.00 hrs.	1. Nga Pitat Villagers	Village headman, village committee, community leaders and villagers (total of 82 persons)	Community hall of Nga Pitat Village
3 December 2015	**The General Public : Local Community Groups**		
9.00-11.00 hrs.	2. Mudu and Ka Myaing swea Villagers	Village headman, village committee, community leaders and villagers (total of 89 persons)	At the public playground of Mudu Village
13.00-15.00 hrs.	3. Nyaung Bin Seik Villagers	Village headman, village committee, community leaders and villagers (total of 66 persons)	The temple of Nyaung Bin Seik Village
4 December 2015	**NGO**		
13.00 – 14.30 hrs.	Tavoyan Women's Union	Ms. Ma Marlar (total of 9 persons)	702, Shwe Taung Sar Road, North Village, Dawei

1.8.4 Summary of Main Comments Received from Stakeholders

During the two periods of consultation meetings, there were comments and feedbacks from each group of stakeholders. The Project's Proponent and Consultant had responded and clarified those comments as details attached in ***Appendix 9B*** of main text. Major concerns can be summarized as follows:

(1) Government Authorities

The first period of consultation meeting:

- Recommendation on following official bureaucracy of activities to be implemented by the Project
- Notification of negative views of local NGOs
- Recommendation on responding to all questions raised by communities
- Recommendation on protection of mangrove forest, not to be exploited by the project development.

The second period of consultation meeting:

- Impact of Thermal Plume on the marine resources
- Water pollution from the power plant operation
- Impact of water discharged from the cooling system on aquatic animals
- Suggest to provide electricity to nearby community, at the lower rate

(2) Local Communities

The first period of consultation meeting:

- Concerns on emission and other negative impacts might be caused by the Project
- Concerns on monitoring system of the Project implementation
- Poor road condition in the communities
- Concerns on inaccessibility to mangroves resources, and suggestions on environmental protection to ensure sustainable use of the resources
- Expectation of electricity supply from the Project

The second period of consultation meeting:

- Negative impact from laying pipeline on the seabed which might make marine resources declined and limitation of fishing area
- The project impacts during construction and operation periods
- Employment opportunity with the Project in relation to age limitation and unskilled labour of villagers
- Asking about current status of the EIA study and its entire procedure
- Asking about organization to monitor the project impacts

- Suggestion to monitor on short and long term impacts from the project implementation
- Request to provide electricity to their village, as Nga Pitat is the nearest village to the Project site

(3) Non-Governmental Organization (NGO)

Tavoyan Women's Union concerned on the misunderstandings between the Project developer and villagers regarding land compensation in the past. However they were satisfied with clarifications from the Project developer and accepted invitation to see the compensation documents. They proposed to participate the public consultation meeting at the village level in the future. This was agreeable with the Project developer and Consultant.

1.8.5 Significant Impacts in the View of Stakeholders to be Addressed in the Mitigation Measures

Significant impacts in the view of stakeholders from 2 rounds of consultation as mentioned above were summarized. The consultant had prepared preventive and mitigation measures including monitoring accordingly. Its summary is shown in ***Table 9.4-1*** of ***Chapter 9***.

1.8.6 How These Comments were taken in Account

Results of all the public consultation meetings will be utilized for implementation of environmental and social management plans of the Project as well as community support development programs within the Corporate Social Responsibility (CSR) context.

1.8.7 Project Information Disclosure

Public consultation and information disclosure for the first and second consultation periods were in form of public meetings together with posting information at the well-known visible places in the communities. The Project information, EIA procedures and activities including the environment and social survey were summarized in Myanmar language and provided in the handout to villagers.

1.8.8 Recommendations for Future Consultations

Public consultation will be carried out during the project implementation as part of environmental management. Public consultation during the pre-construction and construction would mainly concern with measures to minimize various environmental disturbances which some communities may experience. Public consultation during the operational and decommissioning phases would be less intended as environmental and social management become predictable and routine. The proposed CPC will serve as venue for public consultation.

Not later than fifteen (15) days after submission of the EIA report, the Project Proponent will make interview with local newspapers in Dawei about the EIA study of the Project. Apart from this, EIA report will be disclosed at the website of the Project Proponent, and available at the office of Dawei Power Company Limited.

1.9 CONCLUSIONS AND RECOMMENDATIONS

1.9.1 Conclusions

From the EIA investigation results, the Project will have minimum environmental impacts through:

1) The design of (i) use of low NO_X burners in the gas turbine generators, so that NO_X emission loads will be very small; (ii) use of seawater for cooling system; and (iii) no provision for back-up fuel (distillate oil) as only natural gas will be used.

2) During Project pre-construction and construction, all environmental issues could be readily addressed using conventional measures and good environmental practices in the design and construction.

3) During Project operation, NO_X emission loads will be very small. The impacts on ambient air quality will be insignificant for stack heights 35 m. With application of proposed mitigation measures and more than 2 km a distance far from the closet village of Nga Pitat, noise impact will be insignificant to the locals. Discharge of wastewater in Andaman Sea will have no impact on seawater quality and the marine ecosystem due to proper treatment in the power plant site in combination of good quality with high level of dissolved oxygen in Andaman Sea.

4) During short period of Project decommissioning, all environmental issues could be readily addressed using conventional measures and good environmental practices in the design and demolition.

5) The identified environmental risks of the Project in the construction phase could be managed through contractual arrangements and close supervision of the EPC contractor. The likelihood of occurrence of fires and explosions during operation phase will be minimized through incorporating risk management objectives in the designs, selection of equipment, quality construction, and operation and maintenance. However, an emergency response plan and operational procedures will have to be in place for commissioning and commercial operation.

6) The proposed CEMP and OEMP are adequate at this stage of project planning for the EPC contractor to prepare the contract specific CEMP and OEMP based on the designs, specifications, construction plan, operation plan and methods to be developed by the EPC contractor.

7) Concerns on environmental impacts of the Project and expectations of community supports from the Project were expressed in the consultation meetings by the stakeholders. All concerns could be readily responded to by the Project during the pre-construction, construction and operation. Community supports could be provided through a CSR program.

1.9.2 Recommendations

To implement the results of this EIA investigation, the Consultant recommends that:

1) Proposed environmental mitigation measures and environmental management requirements be clearly stated and incorporated in the TOR for the procurement of EPC contract and construction supervision contract, and in the EPC contract and construction supervision contract.

2) Filling of the Project site be carried out in phases, if possible, and started as soon as possible to minimize the traffic load.

3) The proposed CPC be set up as soon as possible to serve as a means for continuing public consultation and disclosure.

4) The Project should develop ISO 14001 and OHSAS 18001 for better compliance with environmental protection and conservation for sustainable environment and occupational health and safety management.

5) The Project should send the collected samples related to environmental monitoring program during construction and operation phases to analyze at the assigned qualified laboratory under Myanmar government or qualified private laboratory.

CHAPTER 2

CONTEXT OF THE PROJECT

CHAPTER 2

CONTEXT OF THE PROJECT

2.1 BACKGROUND ON PROJECT DEVELOPMENT AND THE EIA

2.1.1 Project Preparation

This proposed project entitled "The Initial Phase Power Plant Project" (the Project) is to be developed by the Dawei Power Company Limited, (DPC). The project site is adjacent to the proposed liquefied natural gas (LNG) terminal and is near the industrial estate to be established under the Initial Phase Development of Dawei Special Economic Zone. The selected project site covers about 37.19 acres of coastal land. The large land tract of industrial estate are is about 8 km long along the beach, and about 21 km from Dawei Town-the administrative center of Tanintharyi Region.

The Project to be developed in phases, in full development, will have a net generation capacity of about 420 MW using a number of gas engine generators and a combined cycle gas-fired power plant. The Project will also construct associated facilities to supply electricity to industrial consumers in the DSEZ. The operation of power plant will rely solely on the natural gas. The power plant will be operated as a based load plant throughout the year. The electricity will be conveyed via a 115-kV transmission line from the project site to the distribution grids serving DSEZ areas.

According to the Environmental Conservation Law (2013) and the Environmental Impact Assessment Procedure (2015) issued by the Ministry of Natural Resources and Environmental Conservation (MONREC), an EIA study is required for this Project as the capacity of the power plant is more than 50 MW. DPC engaged TEAM Consulting Engineering and Management Co., Ltd. (TEAM) and Total Business Solution (TBS), herein after referred to as the EIA Consultant, to conduct the EIA study. The first stage of the EIA study is the scoping or screening stage for which a scoping report is required to present results of the screening.

2.1.2 MOECAF's Comments on Scoping Report

As required in the EIA process, DPC submitted the Scoping Report prepared by the EIA Consultation to the Environmental Conservation Department (ECD) of the Ministry of Environmental Conservation and Forestry (MOECAF) in November 2015. MOECAF had recommendations as follows:

1) Revise and re-submit the scoping report, by adding information about:
   - Relevant laws and regulation to the Project;
   - Myanmar Government Institution;
   - More details of related project of LNG;

- Emergency Response Plan in pre-construction, construction and operation phases;
- Public consultation and information disclosure procedure;
- Detailed design and organization structure chart;
- Complete design and layout of alternative selection of the Project,
- Mitigation measures for biodiversity at 4 phases of pre-construction, construction, operation and decommissioning phases;
- Agreement of the Project proponent to follow Myanmar rule and regulations, especially DSEZ law; and
- Certificate of the third party who prepare the ESIA report.

2) For ESIA preparation

- Consult with Government Authorities, affected villages and NGO;
- Attitudes of participants in each meeting has to be recorded in the Minute of Meeting, and put in EIA report; and
- Display Minutes of Meeting in the villages

2.2 CONTEXT OF THE PROJECT

2.2.1 Project Background

The Project is a key infrastructure component of the Initial Phase Development of DSEZ which will cover about 7 km^2. Eventually, the industrial estate is expected to expand to cover 27 km^2. Other infrastructure facilities to be developed in the Initial Phase Development of DSEZ include: (i) two-lane road; (ii) boil-off gas power plant; (iii) temporary power plant; (iv) LNG terminal; (v) township; (vi) telecommunication; and (vii) water reservoir. ***Appendix 2A*** presents brief information on the Initial Phase Development of DSEZ.

The Project will be critical to the success of the development of industrial estate in the DSEZ because DSEZ does not have access to national power grid or any other reliable power source.

The Project is proposed in response to Terms of Reference issued jointly in August 2014 by DSEZ Management Committee (DSEZ MC) and DSEZ Development Company Limited. As a result of DSEZ MC's selection process, the project company, DPC, entered into a concession agreement with DSEZ MC in August 2015 which grants DPC the concession right to plan, develop, own and operate the proposed power plant.

2.2.2 Status of Project Preparation

DPC plans to install the generation facilities by phases in accordance with the power demand growth in DSEZ. This will be achieved through the supply by a multiple units of gas engine generators in the initial phase, followed by the gas turbine generators capable of operating in open cycle mode, and combined cycle mode. In total, the power plant complex will have a generation capacity of 420 MW. Information on project facilities and project design concept is presented in ***Chapter 4-Project Description and Alternatives.***

The detailed design has been submitted to DSEZ MC since October 2015 in compliance with the requirement under the Concession Agreement. The EIA study has been conducted in accordance with such submitted technical information. The EIA study has made use of the technical study, especially the detailed design of the cooling water system and the thermal plume study.

Project construction is scheduled to start in early 2018. In the event that all conditions for project development under the Concession Agreement are achieved as planned, the project construction for all phases will be completed in late 2023 (see ***Chapter 4***). As the construction will be carried out in phases, the Project will be able to start commercial operation in early 2019.

2.3 RELATED PROJECTS AND DEVELOPMENTS

The Project is related to the LNG Terminal Project to be implemented in parallel. The LNG Terminal Project will supply natural gas to the Project.

Together with other infrastructure projects to be developed in parallel, the Project will be critical to the success of the development of industrial estate in the DSEZ. Without the Project, no industries will be interested in locating in the DSEZ industrial estate. Electricity generation by individual industries in the industrial estate will not be acceptable to the industries.

2.4 PRESENTATION OF THE PROJECT PROPONENT AND THE EIA CONSULTANT

DPC was established for this Project by Italian Thai Development Public Company Limited (ITD)[1] with indirect shareholding percentage of 100%. According to the Concession Agreement, DPC is required to propose a strategic partner who has experience in power project. In October 2015, Electricity Generating Public Company Limited (EGCO) has been proposed to DSEZ MC for consideration. After approval by DSEZ MC, ITD and EGCO will hold indirect shareholding percentage in DPC of 50% and 50%, respectively. Brief information on both partners relevant to this Project is presented in

[1] Italian-Thai Development Public Company Limited (ITD) and Rojana Industrial Park Public Company Limited (ROJANA) have cooperated to establish Myandawei Industrial Estate Company Limited (MIE) on April 9th, 2015. MIE is to develop the Dawei Industrial Estate and related Infrastructure and Utilities, together with Township under the synergy of the professional management team and the specialized advisors.

Appendix 2B. DPC will be staffed with qualified and experienced personnel to operate and manage the proposed power plant in the most efficient manner.

The Project Proponent has the following registered address:

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

At this early stage of project development and formation of DPC, ITD in Bangkok represents DPC in all matters required by the EIA Procedure. The person authorized by ITD to resend to MONREC in all EIA matter is:

Mr. Thunya Siltorn

Chief Operation Officer

2034/132-161, Italthai Tower

Bangkok 10310, Thailand

2.5 PRESENTATION OF THE ENVIRONMENTAL AND SOCIAL EXPERT

The EIA Consultant is formed by professional staff of TEAM Consulting Engineering and Management Co., Ltd., Thailand (TEAM), and Total Business Solution Co., Ltd., Myanmar (TBS). Brief background Information on TEAM and TBS is presented below:

TEAM

TEAM is one of the key subsidiaries of TEAM Group of Companies (TGC). Through its subsidiaries, TGC provides a wide range of consulting services from project conception through project planning and feasibility study, detailed design, construction supervision, and project management. The services cover various physical and utility infrastructures including urban mass transit system, water resources management, water supply, wastewater, ports, power plants, housing, urban planning, environmental management, regional development planning, public event design and organizing, and management planning. Consequently, TGC can provide comprehensive services covering all aspects of development projects and business management. TGC has completed assignments not only in Thailand but also in neighboring countries, particularly Lao PDR, Viet Nam, Cambodia, and Myanmar.

TBS

Total Business Solution Co. Ltd., (TBS) is registered and located in Yangon. Since its inception in 2012, TBS, in collaboration with TGC, has been providing consulting services to the private and public sectors in Myanmar. The two partners with their combined strengths provide one-stop service to assist investors in project development or setting up and operating businesses in Myanmar. Their services have gained recognition from Myanmar and foreign investors involved in development projects including port, industrial estate, power transmission, flood control, drainage and sewerage system, environmental and social management, and business establishment.

The EIA Team

The EIA study for this Project is conducted by a multidisciplinary team consisting of professionals in various related disciplines. The EIA study team consists of a core study and planning group and a technical support group. The Team Leader manages technical aspect of the EIA study. The Team Coordinator assists the Team Leader in coordinating among members of the EIA team and among the EIA team, Project Proponent, Environmental Conservation Department, and other concerned government agencies, especially agencies in the concerned townships of Yebyu and Launglon.

The core study and planning group of the EIA study team consists of qualified and experienced professionals in various technical areas relevant to major environmental and social impacts of the Project, including: (i) air pollution; (ii) noise and vibration; (iii) marine ecology; (iv) water pollution; (v) social impact assessment; (vi) public participation; (vii) waste management; (viii) occupational health and safety; and (ix) environmental management planning. The environmental management planning expert will assist the Team Leader in ensuring that the Scoping Report and the final EIA report will meet all requirements prescribed in the Administrative Instruction of EIA, EIA Procedure and the EIA Guidelines, and that proposed environmental management plans will be practical and implementable.

The core study and planning group will be supported by a technical support group consisting of professionals in various disciplines relevant to the environmental and social contexts of the Project, including: (a) environmental sciences; (b) socio-economics; (c) public health; (d) terrestrial ecology; (e) civil engineering; (f) coastal engineering; and (f) power plant engineer.

Names of members of the EIA study team are given in ***Appendix 2C***.

TBS has been certified on the third party to prepare the EIA report (***Appendix 2D***).

A simple organizational structure for conducting and managing the EIA study is shown in ***Figure 2.5-1***.

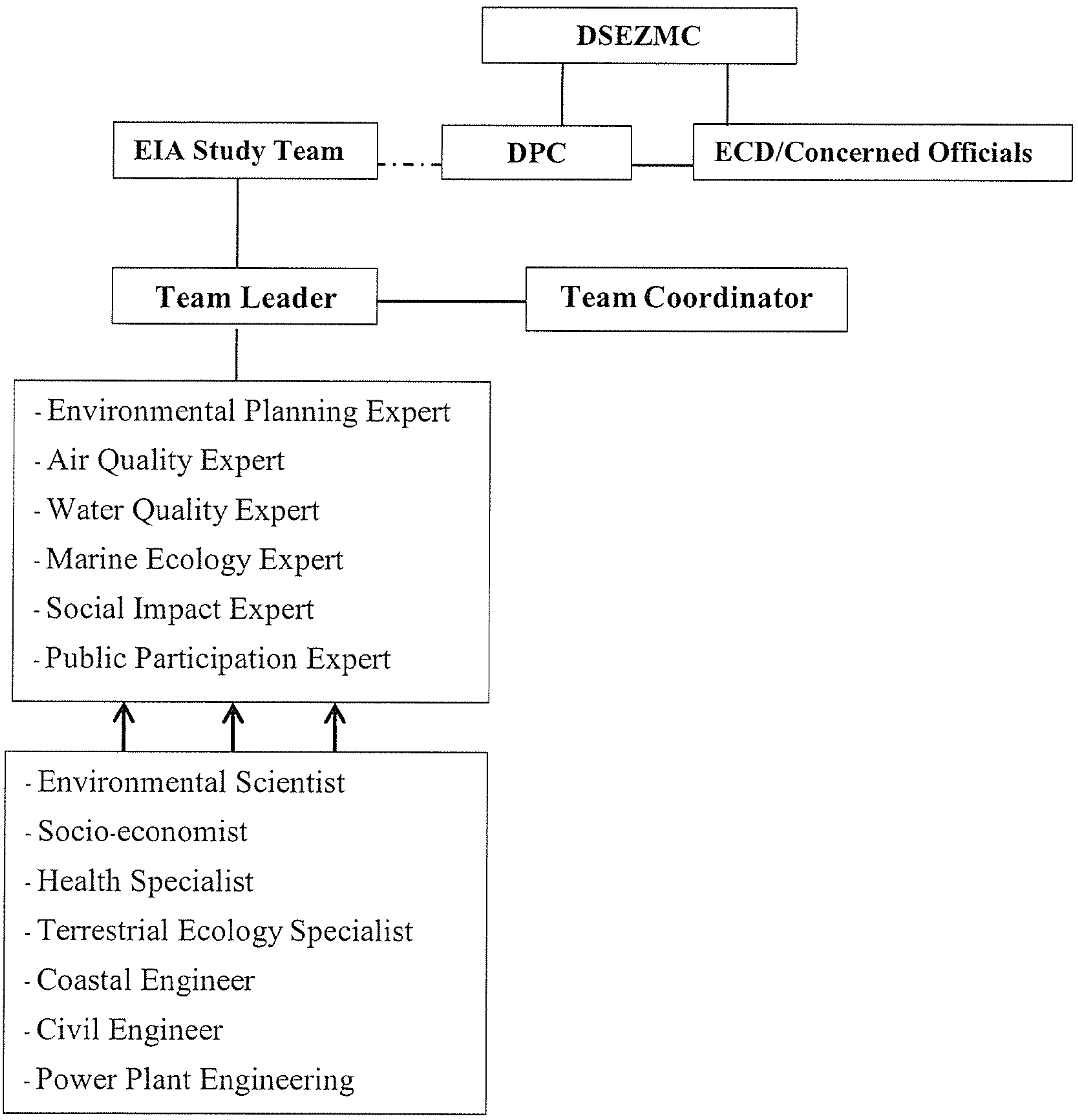


FIGURE 2.5-1: ORGANIZATIONAL STRUCTURE OF THE EIA STUDY TEAM

2.6 PROJECT DEVELOPER'S ENDORSEMENT OF THE EIA REPORT

2.6.1 Project Developer

DPC on behalf of the project consortium gives full endorsement of this EIA report and is fully committed to the implementation of all measures, including the provision of the necessary funds and human resources.

In addition, DPC will follow every commitment states in the report.

2.6.2 The EIA Preparation Team

The EIA Preparation Team of TEAM and TBS certifies that all data described in this report is a true.

2.7 STRUCTURE OF THE EIA REPORT

This EIA Report is structured as recommended in Appendix 5-EIA Table of Contents in the EIA Guidelines. It consists of two-volumes-**Volume I-Main Report** and **Volume II-Environmental Management Plan**.

After introductory chapter, the text in the main report is presented in 8 chapters.

Chapter 3-Policy, Legal and Institutional Framework: This chapter presents policy, legal and institutional framework, environmental and social standards and guidelines that are applicable to this Project. It also presents corporate policies on environmental and social management that the Project Developer is committed to implement during the construction and operational phase of the Project.

Chapter 4-Project Description and Alternatives Selection: This chapter present technical information on project plan, layout, design, construction approach and plan, and operating plan that are derived based on comparative analysis of various alternatives. The methodologies, the result of the comparative analysis and reasons of selected alternative are explained in this chapter. Detailed description of the selected alternative is also included

The information in this chapter is the basis for identification of environmental and social changes that could have impacts on the environment during the construction and operation.

Chapter 5-Description of the Surrounding Environment: This chapter defines the study area and limits of the study, and describes various environmental components of the study area, including physical, biological, socio-economic, cultural and visual components. The information is the basis for assessing the magnitude and significance of environmental and social impacts of the identified environmental and social changes in Chapter 4.

Chapter 6-Impact and Risk Assessment and Mitigation Measures: This chapter proposes appropriate management and physical measures for mitigating the impacts identified in Chapter 6. Environmental and social compliance risk will be identified and measures will be proposed to manage the risks.

Chapter 7-Cumulative Impact Assessment: This chapter presents an assessment of cumulative impacts, i.e. combined impacts of the Project and other projects, existing and planned projects.

Chapter 8-Environmental Management Plan: This chapter summarizes the conceptual framework and principles of environmental management to be applied in the project construction and operation. The mitigation measures proposed in Chapter 6 are consolidated into two environmental management plans-Construction Phase EMP and Operational Phase EMP. The two EMPs have been prepared following the basic management cycle. Details of each plan are presented in Volume II.

Chapter 9-Public Consultations and Disclosure: This chapter presents results of public consultation and disclosure conducted as part of the scoping study and as part EIA study. The presentation is focused on process of consultation involving the affected communities and the project stakeholders including recommendations for future consultations.

Chapter 10-Conclusions and recommendations: This section should present the main conclusions of the EIA report, and recommendations of future actions to be taken.

Appendices: The main report has appendix in each chapter containing detailed information to support the presented findings in various chapters in the main text.

CHAPTER 3

OVERVIEW OF THE POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

CHAPTER 3

OVERVIEW OF THE POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

3.1 CORPORATE ENVIRONMENTAL AND SOCIAL POLICIES

As the Project Proponent, Dawei Power Company Limited (DPC) is a new company, it has not yet formulated environmental and social policies. However, its two major shareholders, ITD[1] and EGCO, have corporate environmental and social policies (see ***Appendix 3A***). Therefore, the two partners will ensure that the Project Proponent will be committed to make its best efforts to minimize environmental impacts of the Project during construction and operation. The Project Proponent will formulate its own corporate environmental and social policies in due course based on the policies of its key partners. During the operation of the power plant, the Project Proponent will strive to strengthen its environmental management with the goal to be accredited ISO14001[2] and OHASS 18001[3]:

3.1.1 ISO 14001 Standard

ISO 14001 is the most important standard within the ISO 14000 series. ISO 14001 specifies the requirements of an environmental management system (EMS) for small to large organizations. An EMS is a systemic approach to handling environmental issues within an organization. DPC is accredited ISO 14001 and will therefore follow this standard in its environmental management of this Project.

3.1.2 OHSAS 18001

OHSAS 18001 is an international standard giving requirements related to Health and Safety Management Systems. OHSAS 18001 enables an organization to have control over, and knowledge of, all relevant hazards resulting from normal operations and abnormal situations, and improve its performance. DPC is accredited OHSAS 18001 and will therefore follow this standard in its management of occupational health and safety of its personnel in the operation of the Project facilities. It will also ensure that the Contractor will follow OSH requirements in the construction contract.

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[1] Italian-Thai Development Public Company Limited (ITD) and Rojana Industrial Park Public Company Limited (ROJANA) have cooperated to establish Myandawei Industrial Estate Company Limited (MIE) on April 9th, 2015. MIE is to develop the Dawei Industrial Estate and related Infrastructure and Utilities, together with Township under the synergy of the professional management team and the specialized advisors.

[2] The ISO 14001 standard is the most important standard within the ISO 14000 series. ISO 14001 specifies the requirements of an environmental management system (EMS) for small to large organizations. An EMS is a systemic approach to handling environmental issues within an organization.

[3] OHSAS 18000 is the name given to the family of international standards relating to occupational health and safety management. It consists of two separate parts: OHSAS 18001 - The Occupational Health and Safety Management Systems Specification, and OHSAS 18002 - Provides guidelines for the implementation of OHSAS 18001.

3.1.3 Project Management of Environmental and Social Impacts

In managing the environmental and social impacts of the Project, the Project Proponent will carry out the following tasks:

- Develop a comprehensive Environmental, Health, and Safety (EHS) Management System for implementing the environmental management plan (EMP) to be prepared as part of the EIA of the Project. The EHS Management System will be activated starting from the commencement of construction;

- Implement the EMP and as part of project and operational management with due diligence audit to be conducted at appropriate interval during the construction and operational phases of the Project;

- In implementing the EMP during the project construction, the nominated EPC contractors will be required to prepare and implement contract specific EHS measures for the construction of the Initial Phase Power Plant Project;

- During the operational phase, EHS management will be an integral part of the operational management of the Initial Phase Power Plant Project;

- Establish adequate environmental and social safeguards capabilities;

- Encourage public participation in the EHS management as related to the surrounding communities; and

- Maintain information generated in the EHS management and prepare EHS performance reports as required by the corporate management and the concerned authorities of the Government.

3.2 POLICY AND LEGAL FRAMEWORK IN MYANMAR

National policy and legal framework relevant to environmental management of this Project can be divided into four categories:

(1) Policy and legal framework which provide the foundation for environmental management;

(2) Regulations which govern the EIA process, the processing of EIA documents for the issuance of environmental clearance certificate, and implementation of the environmental management plans;

(3) Laws and regulations related to environmental protection, environmental quality standards and social management requirements; and

(4) Laws specific to the project site.

The national policy and legal framework will need to agree with international treaties and agreements which Myanmar is a signatory. In addition, they should be in line with international standards and guidelines.

3.2.1 Laws and Regulations related to Environmental Management, Social Impact Management

3.2.1.1 The National Environmental Policy (1994)

The National Environmental Policy was promulgated by the Government on 5 December 1994 marking the beginning of the country's endeavor in environmental management. The National Environment Policy is a one- paragraph statement, which proclaims the government's commitment to the principle of sustainable development. It states:

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

In essence, the National Environmental Policy calls for the integration of environment and development to achieve sustainable development in the country and to give environmental protection a priority in promoting economic development. Implicitly, the Policy covers not only the physical environment but also the biological environment, the socio-economic environment, and cultures and heritage. The Policy has established the basis of Myanmar's environmental statutory framework.

The Project Proponent has to follow the National Environmental Policy in order to conserve the environment and prevent its degradation.

3.2.1.2 The Environmental Conservation Law (2012)

The Environmental Conservation Law (2012) was enacted by the national assembly on 30th March, 2012 to establish a legal basis for environmental management of the country. Environmental Conservation Law is to enable to implement the Myanmar National Environmental Policy, and lay down the basic principles and give guidance for systematic integration of the matters of environmental conservation in the sustainable development process. Then, forms the environmental conservation committee, and determines the duties and powers of Minister. The Law specifies environmental emergency, environmental quality standards, environmental conservation, management of urban environment, conservation of natural resources and cultural heritage, prior permission, insurance, prohibitions, offences and penalties, and miscellaneous with the Environmental Conservation Committee (ECC), the Ministry of Natural Resource and Environmental Conservation (MONREC), and environmental quality standards issued by the Ministry.

The project proponent has to pay the compensation for damages if the project will causes injuries to environment under **Section 7 (o)** 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 **Section 25** 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.**

3.2.1.3 The Environmental Conservation Rules (2014)

The Environmental Conservation Rules was prepared by MONREC for implementing the Environmental Conservation Law. The available document in English has issued on 5 June 2014 pending approval of the Government. In essence, the Project Proponent has to follow the Environmental Conservation Rules prescribed:

1) Functions, duties, activities, and authorities of MONREC and the Environmental Conservation Department of MONREC related to the various work areas indicated in the titles of Chapters 2 to 14;

2) Responsibility of investors to have an EIA prepared for submission to MONREC;

3) Composition, functions and responsibility of the EIA Report Review Body which consists of experts from various relevant government organizations;

4) The need for investors to apply for a prior permission before executing investment plans; and

5) Institutional arrangements for cooperation and coordination between ECD and other government organizations at the national, region and state levels.

It is noted that the contents related to various aspects of the EIA are already prescribed in the EIA Procedure.

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 **Rule 68 (a)**.

The project proponent has to avoid performing to damage to ecosystem and the environment generated by said ecosystem, under **Rule 68 (b)**.

3.2.1.4 Environmental 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 **Paragraph 102 (a)**.

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 **Paragraph 102 (b)**.

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 continuously monitor all adverse impacts in the pre-construction phrase, construction phrase, operation phrase, suspension phrase, closure phrase and post-closure phrase, moreover has to implement the EMP with abiding the all conditions included in ECC, relevant laws & rules and this procedure, under **Paragraph 106**.

The project proponent has to submit, 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 show this monitoring report in public place such as library, hall and website and office of project for the purpose to know this report by public within 10 days from the date which the report is submitted to the Ministry. Moreover has to give the copy of this report, by email or other way which way agreed with the asked person, to any asked person or organization, under **Paragraph 110**.

The project proponent has to allow inspector to enter and inspect in working time and if it is needed by Ministry has to allow inspector to enter and inspect in the office and work-place of project and other work-place related to this project in any time, under **Paragraph 113**.

The project proponent has to allow inspector 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**.

3.2.1.5 Emission Quality Standards (2015)

MONREC issued the National Environmental Quality (Emission) Guidelines on 29th December 2015. The objectives are to provide the basis for regulation and control of noise and vibration, air emissions, and liquid discharges from various sources in order to prevent pollution for purposes of protection of human and ecosystem health.

These Guidelines have been primarily excerpted from the International Finance Corporation (IFC) Environmental Health and Safety (EHS) Guidelines, which provide technical guidance on good international industry pollution prevention practice. The Guidelines are generally considered to be achievable in new facilities by existing technology at reasonable costs. Application of these Guidelines to existing facilities may involve the establishment of site-specific targets, with an appropriate timetable for achieving them.

The Project Proponent has to follow the National Environmental Quality (Emission) Guidelines to prevent pollution that might affect from the project activities.

3.2.1.6 Basel Convention (1989) (Control of Transboundary Movements of Hazardous Wastes and their Disposal)

The Project Proponent has to follow the Basel Convention which was done at Basel on the 22 day of March 1989, consisting of 29 Articles. The essence of some key Articles are as follows:

Article 1: Scope of the Convention

The scope defines various kinds of wastes that are subject to transboundary movement shall be "hazardous wastes".

Article 4: General Obligations

(a) Parties exercising their right to prohibit the import of hazardous wastes or other wastes for disposal shall inform the other Parties of their decision pursuant to **Article 13-Transmission of Information**.

(b) Parties shall prohibit or shall not permit the export of hazardous wastes and other wastes to the Parties which have prohibited the import of such wastes, when notified pursuant to subparagraph (a) above

(c) Parties shall prohibit or shall not permit the export of hazardous wastes and other wastes if the State of import does not consent in writing to the specific import, in the case where that State of import has not prohibited the import of such wastes.

Each Party shall take the appropriate measures to:

(a) Ensure that the generation of hazardous wastes and other wastes within it is reduced to a minimum, taking into account social, technological and economic aspects

(b) Ensure the availability of adequate disposal facilities, for the environmentally sound management of hazardous wastes and other wastes that shall be located, to the extent possible, within it, whatever the place of their disposal

(c) Ensure that persons involved in the management of hazardous wastes or other wastes within it take such steps as are necessary to prevent pollution due to hazardous wastes and other wastes arising from such management and, if such pollution occurs, to minimize the consequences thereof for human health and the environment

(d) Ensure that the transboundary movement of hazardous wastes and other wastes is reduced to the minimum consistent with the environmentally sound and efficient management of such wastes, and is conducted in a manner which will protect human health and the environment against the adverse effects which may result from such movement

(e) Not allow the export of hazardous wastes or other wastes to a State or group of States belonging to an economic and/or political integration organization that are Parties, particularly developing countries, which have prohibited by their legislation all imports, or if it has reason to believe that the wastes in question will not be managed in an environmentally sound manner, according to criteria to be decided on by the Parties at their first meeting

(f) Prevent the import of hazardous wastes and other wastes if it has reason to believe that the wastes in question will not be managed in an environmentally sound manner.

Article 9: Illegal Traffic

In case of a transboundary movement of hazardous wastes or other wastes deemed to be illegal traffic as the result of conduct on the part of the exporter or generator, the State of export shall ensure that the wastes in question are:

(a) Taken back by the exporter or the generator or, if necessary, by itself into the State of export, or, if impracticable

(b) Are otherwise disposed of in accordance with the provisions of this Convention, within 30 days from the time the State of export has been informed about the illegal traffic or such other period of time as States concerned may agree. To this end the Parties concerned shall not oppose, hinder or prevent the return of those wastes to the State of export.

Article 10: International Co-operation

1. The Parties shall co-operate with each other in order to improve and achieve environmentally sound management of hazardous wastes and other wastes.

3.2.1.7 Protocol on Liability and Compensation for Damage Resulting from Transboundary Movements of Hazardous Wastes and Their Disposal (1989)

The Project Proponent has to follow the Protocol on Liability and Compensation for Damage Resulting from Transboundary Movements of Hazardous Wastes and Their Disposal. The essence of some key Articles are as follows:

Article 1: Objective

The objective of the Protocol is to provide for a comprehensive regime for liability and for adequate and prompt compensation for damage resulting from the transboundary movement of hazardous wastes and other wastes and their disposal including illegal traffic in those wastes.

Article 3: Scope of Application

The Protocol shall apply to damage due to an incident occurring during a transboundary movement of hazardous wastes and other wastes and their disposal, including illegal traffic, from the point where the wastes are loaded on the means of transport in an area under the national jurisdiction of a State of export. Any Contracting Party may by way of notification to the Depositary exclude the application of the Protocol, in respect of all transboundary movements for which it is the State of export, for such incidents which occur in an area under its national jurisdiction, as regards damage in its area of national jurisdiction. The Secretariat shall inform all Contracting Parties of notifications received in accordance with this Article.

Article 6: Preventive Measures

1. Subject to any requirement of domestic law any person in operational control of hazardous wastes and other wastes at the time of an incident shall take all reasonable measures to mitigate damage arising therefrom.

2. Notwithstanding any other provision in the Protocol, any person in possession and/or control of hazardous wastes and other wastes for the sole purpose of taking preventive measures, provided that this person acted reasonably and in accordance with any domestic law regarding preventive measures, is not thereby subject to liability under the Protocol.

3.2.1.8 The Myanmar Investment Law (2016)

The Project Proponent has to follow the details management of land or building owned by Union and land registration contract that: (a) the investor who obtains permit or endorsement has the right to obtain a long-term lease of land or building from the owner (private, the relevant government organization, or the Union) in order to do investment. Citizen investors may invest in their own land or building in accordance with relevant laws. (d) the investor shall register the land lease contract at the Office of Registry of Deeds, under **Section 50 (a) (d)** of said law.

The Project Proponent has to follow: (b) the investor may appoint of any citizen who is a qualified person as senior manager, technical and operational expert, and advisor in his investment within the Union, (c) the investor shall appoint only citizens for works which does not require skill, (d) the investor shall appoint skilled citizen and foreign workers, technicians, and staff by signing an employment contract between employer and employee, in accordance with the labor laws and rules, under **Section 51 (b) (c) (d)** of said law.

The Project Proponent has to follow the duties and responsibilities of investor that shall to do and comply with the customs, traditions and traditional culture of the ethnic groups in the Union, under labour law in order to investment, under **Section 65 (g) (i) (j) (k) (l) (m) (o) (p)** and **(q)** as follows:

(g) The investor shall abide by applicable laws, rules, procedures and best standards practiced internationally for this investment so as not to cause damage, pollution, and loss to the natural and social environment and not to cause damage to cultural heritage.

(i) The investor shall close and discontinue the investment only after payment of compensation to employees in accordance with applicable laws for any breach of employment contracts, closure of investment, sale and transfer of investment, dis continuation of investment, or reduction of workforce.

(j) The investor shall pay wages and salaries to employees during the period of suspension of investment for a credible reason.

(k) The investor shall pay compensation and indemnification to the relevant employee or his successor for injury, disability, disease and death due to the work.

(l) The investor shall supervise foreign experts, supervisors and their families who employ in their investment to abide by the applicable laws, rules, orders and directives, and the culture and traditions of Myanmar.

(m) The investor shall respect and comply with the labour laws.

(o) The investor shall pay effective compensation for loss incurred to the victim, if there are damage to the natural environment and socioeconomic losses caused by logging or extraction of natural resources which are not related to scope of the permissible investment, except from carrying out the activities required to conduct investment in a permit or an endorsement.

(p) The investor shall allow the Commission to inspect in any places, when the Commission informs the prior notice to inspect the investment.

(q) The investor shall take in advance permit or endorsement of the Commission may administer the investments which need to obtain prior approval under the

Environmental Conservation Law, and the procedures of environmental impact assessment, and shall submit the situation of environmental and social impact assessment to the Commission along the period of activities of the investments which obtained permit or endorsement of the Commission.

The Project Proponent has to insure the types of insurance stipulated in the provision of the rules at any insurance enterprise which is entitled to carry out insurance businesses within the Union, under **Section 73** of said law.

3.2.1.9 Protection the Right of National Races Law (2015)

The Project Proponent has explain the detail of project and cooperate with the national races who resided in the project area, under **Section 5** of said law.

3.2.1.10 The Electricity Law (2014)

This law states which related to the Project are described in **Section 10 (b)**, **18**, **21 (a)**, **22 (a)**, **26 (a) (b)**, **27**, **40**, and **68** as follows:

The Project Proponent has to carry out an environmental impact assessment in order to minimize the impact on the environment and has to pay compensation for the impact and contribute to the environmental conservation fund, under **Section 10 (b)** of said law.

The Project Proponent has to ensure that the license holder can engage in electric power generation and distribution only after having received the electrical hazards safety certificate from the chief inspector, under **Section 18** of said law.

The Project Proponent has to be liable for damage to any person or enterprise by failure to abide by the law, rules, regulations, procedures, orders and direction or the specified quality, standards and norms, under **Section 21 (a)** of said law.

The Project Proponent has to be liable for damage to any person or enterprise by negligence of project owner, under **Section 22 (a)** of said law.

The Project Proponent has to ensure that the license holder must comply with **Section 26 (a) (b)** of said law, the following:

(a) Electrical power must be generated as specified in the license.

(b) In electric power generation, transmission and distribution; electrical power must be generated as specified in the license and instruments for measuring electric power and protective equipment must be systematically used and maintained in accordance with the stipulations.

The project has to ensure that the license holder and the authorized person must inform the chief inspector and the relevant department in charge immediately if an electrical hazard has accidentally occurred when generating, transmitting, distributing or consuming electric power, under **Section 27** of said law.

The Project Proponent has to ensure that the license holder comply with the rules, norms and procedures issued by the ministry and accept necessary inspections by the relevant government departments and organizations, under **Section 40** of said law.

The Project Proponent has to ensure that, if the license holder negligent or irresponsible of persons who assigned by him has caused injury, disability or death by electrocution or fire, these aggrieved person has the right to request compensation from the license holder, under **Section 68** of said law as follows:

(a) If the aggrieved person is entitled to compensation according to the existing labour compensation law, the compensation specified in this law.

(b) If the aggrieved person is not entitled to compensation according to the existing labour compensation law, the compensation specified in the rules, issued under this law.

3.2.1.11 Factories Act (1951)

The Factories Act (1951) is relevant to the OHS issue of this Project. This Act describes about health, safety, welfare, special applications and extensions, working hours of adults, employment of young persons, punishments and procedure which related the project during construction and operation phase.

The Project Proponent has to ensure the safety and cleaning of workplace, drinking water, creation of nursing rooms and other needs. The Project Proponent has to abide by all provision of this law, under **Section 5** and **7** of said law.

3.2.1.12 The Public Health Law (1972)

The purpose of this law is to ensure the public health include not only employees but also resident people and cooperation with the authorized person or organization of health department. The Project Proponent will cooperate with the authorized person or organization in line with the **Section 3** and **5** of said law as follows:

Section 3: The Project Proponent has to abide by any instruction or stipulation for public health.

Section 5: The Project Proponent has to allow any inspection, anytime, anywhere if it is needed.

3.2.1.13 Prevention and Control of Communicable Diseases Law (1995)

The Project Proponent has to ensure the healthy work environment and prevention the communicable disease by the cooperation with the relevant health department. This law focuses as follows:

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 **Section 3 (a)** 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, under **Section 9** of said law, if the following are occurred:

(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.

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

The Project Proponent has to ensure that the person in charge shall do under **Section 9 (a) (b) (c) (d)** of said law. This law focuses as follows:

(a) keep the captain and mark referring that it is a non-smoking area at the place mentioned in section.

(b) arrange the specific place where smoking is allowed as mentioned in section 7, and keep the caption and mark also referring that it is a specific place where smoking is allowed.

(c) supervise and carry out measures so that no one shall smoke at the non-smoking area.

(d) accept the inspection when the supervisory body comes to the place for which he is responsible.

3.2.1.15 The Explosives Act (1887)

Fine of punishment for explosive manufacturing, processing or importing described under **Section 6 (3)**.

The Project Proponent has to follow the explosive act for the transportation and import of explosive with any carriage or vessel, major hazard of static electricity sparks, gas leakage and internal explosions during construction phase which related with **Section 7 (1), 8** and **13**.

3.2.1.16 The Explosive Substances Act (1908)

The Project Proponent has to follow the Act which stated that any person who unlawfully and maliciously causes, by any explosive substance, an explosion of a nature likely to endanger life or to cause serious injury to property shall, whether any injury to person or property has been actually caused or not, be punished with transportation for life or any shorter term, to which a fine may be added, or with imprisonment for a term which may extend to ten years, to which a fine may be added, under **Section 3** of this Act.

3.2.1.17 The Myanmar Fire Force Law (2015)

The Project Proponent has to follow the directive of the Department of Fire Brigade to reserve fire bridge, and provide fire safety equipment to protect the emergency and accident plan for public who resided in the project area, under **Section 25 (a) (b)** of said law.

3.2.1.18 The Motor Vehicle Law (2015) and Rules (1987)

The Project Proponent has to follow the detail section of motor vehicle rules to avoid the negative impact of air and noise pollution, occupation health and safety, and socio-safety for who lived near the project area, under this law.

The Project Proponent should announces local community to follow the law for road safety and should explain to workers, vehicle drives should follow the law of motor vehicle to avoid road accident, air and noise pollution during pre-construction and construction phases of said law.

3.2.1.19 The Myanmar Insurance Law (1993)

This law describes how to overcome financial difficulties by effecting mutual agreement of insurance against social and economic losses.

The Project Proponent use the owned vehicle the project owners has to insure the insurance for injured person, under **Section 15** of said law.

The Project Proponent has follows as an entrepreneur or an organization operating an enterprise which may cause loss to State-owned property or which may cause damage to the life and property of the public or which may pollution to the environment shall effect compulsory General Liability Insurance with the Myanmar Insurance, under **Section 16** of said law.

3.2.1.20 Labour Organization Law (2011)

This law aims to protect the rights of the worker, to have good relations among the workers between employers, enable to form and carry out the labour organizations systematically and independently. The followings describe in the Labour Organization Law which is related with the Project, that the Project Proponent has to follow:

Section 17: The Labour organizations have the right to carry out freely in drawing up their constitution and rules, in electing their representatives, in organizing their administration and activities or in formulating their programmes. The Labour organizations have the right to negotiate and settle with the employer if the workers are unable to obtain and enjoy the rights of the workers contained in the labour laws and the submit demand to the employer and claim in accord with the relevant law if the agreement cannot be reached.

Section 18: The labour organization has the right to demand the relevant employer to re-appoint a worker of such worker is dismissed by the employer and if there is cause to believe that the reasons of such dismissal were based on labour organization membership or activities, or were not in conformity with the labour laws.

Section 19: The labour organization have the right to send representative to the Conciliation Body in settling a dispute between the employer and the worker. Similarly, they have the right to send representatives to the Conciliation Tribunals formed with the representatives from the various levels of labour organizations.

Section 20: The employer and the complaining workers in respect of worker's rights or interests contained in the labour laws, the representatives of the labour organization also have the right to participate and discuss.

Section 21: The labour organizations have the right to participate in solving the collective bargains of the workers in accord with the labour laws.

Section 22: The labour organizations shall carry out peacefully in carrying out holding of meetings, going on strike and carrying out other collective activities in accord with their procedure, regulations, by-laws and any directives prescribed by the relevant Labour Federation.

3.2.1.21 The Settlement of Labour Disputes Law (2012)

The Project Proponent has to negotiate and coordinate in respect of the compliant within the prescribed period without sufficient cause for employee under **Section 38** of said law.

The Project Proponent has to alter the conditions of service relating to employee concerned in such dispute at the consecutive period before commencing the dispute during construction phase under **Section 39** of said law.

The Project Proponent has to not lock-out or strike without accepting negotiation, conciliation and arbitration by Arbitration Body in accord with this law in respect of a dispute under **Section 40** of said law.

The Project Proponent has to pay the compensation in the amount determined by the Arbitration Body or Tribunal if any act or omission to reduce the worker's benefits under **Section 51** of said law.

3.2.1.22 Employment and Skill Development Law (2013)

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 program in accord with the work requirement in line with the policy of the skill development team to develop skill relating to the employment for the workers who are proposed to appoint and working at present under **Section 14** of said law.

The Project Proponent has to put the fund monthly as put in fees without fail for to total wages not less than 0.5% under **Section 30 (a)** of said law.

The Project Proponent has to put money not to deduct from the wage and salary of the employees under **Section 30 (b)** of said law.

3.2.1.23 The Minimum Wages Law (2013)

The Project Proponent has to follow the duties of the employer which specified that the minimum wages should to pay for the worker who works for the Project during pre-construction and construction phases in **Section 12, 13 and 18** of said law as follows:

Section 12: The employer has to pay the wages in line with the minimum wage stipulated under this law.

Section 13 (a) (b) (c) (d) (e) (f) (g): The employer shall inform the rates of minimum wage relating to the business and advertise it at the workplace to enable to be seen by the relevant worker. Prepare and maintain the list, schedule, documents and wages of the workers correctly, then report them to the relevant department. Accept the inspection and allow them entry to the commercial, production and service business, agricultural and livestock breeding workplaces and give necessary assistance. If the workers cannot work due to sickness, shall give them holiday for medical treatment, and if the funeral matter of the member of the family of worker or his parent occurs shall give holiday without deducting from the minimum wage, in accord with the stipulations under this law.

Section 18 (d) (e): The inspection officer has the right to enter and inspect the relevant commercial, production and service workplaces, agricultural and livestock breeding workplaces with the rules, notifications, orders, directives and procedures, then report to the Department. If there are outside workers at employer, has the right to inspect information relating to such outside workers, in accord with the stipulations of this law.

3.2.1.24 Payment of Wages Law (2016)

The Project Proponent has to pay the wage in local currency or foreign currency recognized by the Central Bank of Myanmar. An employee will receive the payment for 60 days when he/she is in Alternative Civil Service, under **Section 3** of said law.

The Project Proponent has to coordinate with the payment of Wages Act (2016), the employer must pay for part-time, daily, weekly, other part-time, temporary, or piecework when the work is done OR at the agreed time, and the time frame not exceed one month. Wages for the permanent work must pay per monthly basis, upon termination, within 2 days. If a resignation letter is submitted, wages must be paid at the ending day of the payment period. Wages must be paid to the legally recognized heir within 2 working days after the day he/she has died, under **Section 4** of said law.

The Project Proponent has to submit with the agreements of employees and reasonable ground to 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 understand that the employer can deduct from wages for absences except when such absence is during a public holiday or entitled leave, accommodation charges and transportation charges, meal allowances, charges for water and electricity, taxes and errors in payment shall be allowed for deduction. The employer can deduct from pre-issued, expensed and saved (or) contributed amount according to the law upon the employee contract, and deduct with the judgment of the Court of Arbitrator Jury Council, under **Section 7** of said law.

The Project Proponent has to follow that the employer cannot deduct except the deduction in accordance with section 7 and section 11, under **Section 8** of said law.

The Project Proponent has to ensure that the total amount of other deductions, except when the employee fails to perform their duties, shall not be more than 50% of the employee's wages, under **Section 9** of said law.

The Project Proponent has to states clearly that the employer must get the permission prior to making deductions from wages and publicly posted. Fines must not exceed the value of damage caused by the action or cost of performance failure of the employee, do not deduct without allowing an appeal from the employee and deduct more than 5%. No deduction is allowed from a worker under 16 years old. The time frame for deductions shall be set upon an agreement from both sides, deductions shall be carried out within the limited time frame upon the agreement of the Township Arbitration Council. Every deduction must be well documented, and submit a monthly report to the Department concerning deductions, under **Section 10** of said law.

The Project Proponent has to specify that fine for performance failure by the employees; direct damage which is either international or due to negligence, and a breach of the employment contract or any rules for which a fine had been previously set, under **Section 11** of said law.

The Project Proponent has to ensure that take action if a worker encounters any unreasonable deduction from wages or payment is not made by the due date, under **Section 12** of said law.

The Project Proponent has 30 days to appeal to the Director General, Department of Factory and Labour Law Inspection if employees are not satisfied with the orders. The Director General, Department of Factory and Labour Law Inspection's decision will be the final decision, under **Section 13** of said law.

The Project Proponent has to pay the overtime wages if an employee carries out overtime work as set by the law, under **Section 14** of said law.

3.2.1.25 Workmen's Compensation Act (1923)

The Project Proponent has to pay the compensation in respect of any injury caused under circumstances in line with the provision of **Section 13** of said law.

3.2.1.26 The Leave and Holiday Act (1951)

The Project Proponent has to allow the leave and holidays in line with the law. This law specifies that every employee can leave and have a holidays which described under this Act. They shall be granted by his employer that public holidays with full wages or pay, and who has completed a period of 12 months' continuous. The Project Proponent has to make any agreement or contract of service whereby an employee agrees to take leave or holidays on terms less favourable than those provided in this Act shall be null and void in so far as it purports to reduce the liability of an employer. Any change in ownership of any trade, industry or establishment shall not affect the employee's rights under this Act.

3.2.1.27 Social Security Law (2012)

The Project Proponent has to register to the respected social security office, under **Section 11 (a)** of said law.

The Project Proponent has to pay the social security fund for four types of social security including (i) health and social care fund, (ii) family assistance fund, (iii) invalidity benefit, superannuation benefit, and survivors' benefit fund, (iv) unemployment benefit fund, under **Section 15 (a)** of said law.

The Project Proponent has to deduct contributions to pay by employee from their wages together with contribution to be paid employee, and pay to the social security fund during construction phase of project. The employer has to incur the expense for such contribution under **Section 18 (b)** of said law.

The Project Proponent has to pay the fund for employment injury. This fund is not related to workmen compensation, under **Section 48 (b)** of said law.

The Project Proponent has to prepare and keep records and lists correctly of worker's daily attendance, appointment of new workers, employing worker by changing of work, termination, dismissal and resignation, promotion and paying remuneration and has to inform the relevant township social security office if changes in number of workers and establishment, change of employer, change of business, suspension of work, and close-down of work, and employment injury, decease and contracting diseases during construction phase under **Section 75** of said law.

3.2.1.28 Petroleum Act (1934)

The Project Proponent has to follow the control over petroleum about import, transport and storage of petroleum, under **Section 3 (1) (2)** of said law, as follows:

Section 3 (1): No one shall import, transport or store any petroleum save in accordance with the rules made under section 4.

Section 3 (2): Save in accordance with the conditions of any license for the purpose which he may be required to obtain by rules made under section 4, no one shall import 11 (petroleum Class A) and no one shall transport or store any petroleum.

3.2.1.29 The Petroleum Rules (1937)

This rule states clearly that the Project Proponent has to follow the transport petroleum rules, included transportation by ship, vehicle and pipeline.

The Project Proponent has to follow the transport petroleum rules in **Chapter III**, which describes about the prevention of accidents that all due precaution shall be taken at all times to prevent accident by fire or explosion, prevention of escape of petroleum during transport especially into any drain, sewer, harbour, river or water course. Empty receptacles, receptacle for class I Petroleum, and receptacle for class II Petroleum be kept securely closed unless they have been thoroughly cleaned and freed from petroleum vapor. The Project Proponent has to ensure that no person shall deliver any petroleum to any one in Bangladesh other than the holder of storage license or his authorized agent or a Port Authority or railway administration. Transport by water, petroleum in bulk shall not be carried by water except in ship or other vessel licensed under these rules, and the petroleum shall be stored in such part of the ship or other vessel and in such manner as may be approved by the Chief Inspector. No ship or other vessel shall carry petroleum in bulk if it is carrying passengers, or any inflammable cargo other than petroleum or coal. Before any petroleum is discharged from a ship or vessel the holds of such vessel shall be thoroughly ventilated, on the master of vessel responsibility. Loading and discharge of petroleum in bulk shall be by armoured hose and metal pipe. Smoking, fire and lights prohibited during loading and unloading. Whereas the transport on land vehicles, the Project Proponent has to ensure that no fire or other artificial light capable of igniting inflammable vapour shall be allowed on any vehicle containing petroleum in bulk, and necessary to approve vehicle for transport in bulk.

The Project Proponent has to follow the transportation of petroleum by pipelines in **Chapter IV**, which operations for the winning of natural petroleum or natural gas or both are carried on or within the limits of refineries and installations. Prevention of excessive pressure in the pipeline, an automatic by pass relief valve and a reliable pressure gauge shall be placed on the common discharge pipe at pumping stations. Provided that this rule shall not apply to a pipeline connecting railway siding with installations if the length of such pipeline does not exceed 1.6 kilometers.

3.2.1.30 Conservation of Water Resources and Rivers Law (2006)

The Project Proponent has to ensure that no person carry out any act or channel shifting with the aim to ruin the water resources and rivers and creeks, under **Section 8 (a)** of said law

The Project Proponent has to avoid the violation of the conditions prescribed by the directorate for prevention of water pollution and change of watercourse in rivers and creeks, under **Section 24 (b)** of said law.

3.2.1.31 Freshwater Fisheries Law (1991)

The Project Proponent has to ensure that no one cause harassment of fish and other aquatic organisms or pollution of the water in a freshwater fisheries waters, under **Section 40** of this law.

3.2.1.32 Myanmar Marine Fishery Law (1990)

The Project Proponent has to ensure that no person dispose of living aquatic creatures or any material into the Myanmar Marine Fisheries Waters to cause pollution of water or to harass fishes and other marine organisms, under **Section 39** of said law.

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

This law aims to minimize impacts of development projects on the local heritage and cultural settings. The purposes of this law are to implement the protection and preservation policy with respect to perpetuation of cultural heritage that has existed for many years, promote public awareness and participation in the protection and preservation of cultural heritage regions, and carry out protection and preservation of the cultural heritage regions in conformity with international conventions committed to by the State.

The Ministry of Culture has the duty under this law to scrutinize applications of permission for construction and assess whether;

- It can cause obstruction of the view of the cultural heritage region.
- It is clear of the ancient monument or ancient site.
- It can obstruct the surrounding natural landscape.
- It can undermine the grandeur of the ancient monument.
- It can affect the security of the cultural heritage.
- It can cause environmental pollution.

The Project Proponent has to apply to get the prior permission of Directorate of Ancient-Research to build the road, bridge or dam in the culture heritage area, under **Section 13** of said law.

The Project Proponent has to not 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.

3.2.1.34 The Protection and Preservation of Antique Objects Law (2015)

The Project Proponent has to follow this law that the person who finds an object which has no owner or custodian, he shall promptly inform the relevant Ward or Village-Tract Administrator if he knows or it seems reasonable to assume that the said object is an antique object under **Section 12** of said law.

3.2.1.35 The Protection and Preservation of Ancient Monument Law (2015)

The Project Proponent has to follow, if a person who finds an ancient monument of over one hundred years old and above or under the ground or above or under the water which has no owner or custodian knows or it seems reasonable to assume that the said monument is an ancient monument, he shall promptly inform the relevant Ward or Village-Tract Administrative Office, under **Section 12** of said law.

The Project Proponent has to obtain the prior permission of Department of Archaeology and National Museum if the project 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, of Department of Ancient Research and National Museum if the Project Proponent dispose the chemical and solid waste in the Ancient Monument area, under **Section 20 (f)** of said law.

3.2.1.36 The Forest Law (1992)

The Project Proponent has to ensure that whoever, within a forest land and forest covered land at the disposal Government is desirous of carrying out any development work or economic scheme shall obtain the prior approval of the Forestry Ministry, and who is desirous of carrying out educational or research work or conducting a training course or a study tour shall obtain the prior sanction of the Director-General or the Forest Officer empowered by him, under **Section 12 (a)** of said law.

3.2.1.37 The Special Economic Zone Law (2014)

The Special Economic Zone (SEZ) Law was initially promulgated on 27th January 2011, and then the law was further amended and enacted in January 2014. This facilitates in developing export oriented industries, by providing incentives and additional needed supply chain industries.

The Project Proponent has to follow the functions and duties of management committees as follows: (f) specifying in notifications, orders, directives and procedures,

particulars to be followed by the investors, (p) supervising environmental conservation and protection in special economic zone in accordance with the existing laws, scrutinizing the system to dispose industrial waste from the factories, requesting developers and investors to comply with the stipulations, under **Section 11 (f) (p)** of said law.

With reference to organizational structure of Myanmar Special Economic Zone, the Developer commits to follow the described process, established by the management of Management Committee, under Myanmar Special Economic Zone Law.

The Project Proponent has to appoint the 100% citizen-owned, 100% foreign-owned, or owned by a joint venture between citizens and foreigners for normal work, under **Section 27** of said law.

The Project Proponent has to follow the standards and norms contained in the Myanmar Environmental Conservation Law and International Standards and norms, and must prevent social and health impacts in accordance with the existing laws, under **Section 35** of said law.

The Project Proponent has to provide amongst skilled workers, technicians and staff, at least 25% must be citizens during the first two years from the commencement of commercial operations, at least 50% must be citizens during the second two years, and at least 75% must be citizens during the third two years, under **Section 75** of said law.

The Project Proponent has to ensure that the relevant management committee negotiate and mediate in the disputes arising between the employer and the employees, technicians or staff. If no settlement has been reached following negotiations and mediation by such committee, the parties shall accept the decision under the Trade Dispute Act of the Union of Myanmar, under **Section 76** of said law.

The Project Proponent has to follow the work permits for foreign employees who are working in the special economic zone shall be issued by the labour department representative office at the one stop service department in the special economic zone, under **Section 77** of said law.

The Project Proponent has to follow, if an investor wishes to employ foreign employees for technology and management work in addition to the specific numbers, he may employ them with the approval of the relevant management committee, under **Section 78** of said law.

The Project Proponent has to (a) pay the agreed expenditures for transfer, resettlement and compensation if houses, buildings, gardens, paddy fields, fruit bearing plants and plantations on the land are required to be cleared or transferred, (b) negotiate with the management committee in order to ensure that the persons who have to leave the land do not fall below their previous standard of living, their fundamental needs are fulfilled and the transfer is easy and smooth, (c) use the permitted land in accordance with the prescribed regulations, (d) not modify or alter the topography or contour of the permitted land without the permission of the management committee, (e) report immediately to the management committee if natural mineral resources, antiques or treasures unrelated to the permitted business and not included in the original agreement are found above or under the land. If the management committee so permits, the developer or investor may continue to

operate on the land. Otherwise, the developer or investor shall transfer to a substituted area, under **Section 80 (a) (b) (c) (d) (e)** of said law.

3.2.1.38 The Engineering Council Law (2013)

This law describes about the engineering as specified by the council. The Project Proponent has to follow, if whoever has received a registration certificate is found to have breached any rules contained in the registration certificate or violated any prohibition contained in a rule, directive enacted under this law. The executive committee may take the following administrative actions; (a) giving a warning, (b) assessing a suitable fine, (c) suspending the registration certificate, and (d) canceling the registration certificate, under **Section 34** of said law.

The Project Proponent has to follow that no one shall perform any engineering and technological work which are specified as being dangerous to the public by a rule enacted under this law, without having received a registration certificate issued by the council, except for engineers appointed in a government department or an organization in the performance of their duties, under **Section 37** of said law.

3.2.1.39 Myanmar Port Authority Law (2015)

The Project Proponent has to avoid disposing the dangerous material, poisoned material, garbage, sewage or disposal into the water from the port area, under **Section 23 (a)** of said law.

3.2.1.40 The Export and Import Law (2012)

The Project Proponent has to ensure that a person who obtained any license shall not violate the conditions contained in the license, under **Section 7** of said law.

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

The Project Proponent has to (i) protect wildlife, wild plants and conserve natural areas; (ii) contribute to natural scientific research; and (iii) establish zoological and botanical gardens. This law therefore covers protection and conservation of wildlife, ecosystems and migratory birds, including the protection of endangered species of wildlife and their natural habitats.

3.2.1.42 Territorial Sea and Maritime Zones Law (1977)

The Project Proponent has to follow the exclusive economic zone of Myanmar where is an area beyond and adjacent to the territorial sea and extends to a distance of 200 nautical miles from the baselines, under **Section 17** of said law.

The Project Proponent has to ensure that no one conduct any activity in the exclusive economic zone in relation to exploration, exploitation or research, without the prior express permission of the Council of Ministers. Nothing in this section shall apply to fishing in accordance with law by a citizen of Myanmar, under **Section 20** of said law.

3.2.1.43 Law Relating to the Fishing Rights of Foreign Fishing Vessels (1989)

The Project Proponent has to ensure that no foreign fishing vessel shall without a permit or a license, enter the Myanmar fisheries waters engaging in the fishery, under **Section 31** of said law.

The Project Proponent has to ensure that no person dispose of from aboard the fishing vessel living creatures or any material to cause pollution of the water media or to harass the fishes and other marine organisms, under **Section 36** of said law.

3.2.1.44 Law Relating to Aquaculture (1989)

The Project Proponent has to ensure that no person do any activities of aquaculture without license such as obstructing navigation and flowing of water or polluting the water within the fisheries water, importing live fish into the country and exporting live fish out of the country without the permission of the Department, under **Section 29** of said law.

The Project Proponent has to follow, if a person convicted under section 31 or 32 again commits the same offence he shall be punishable with twice the quantum of punishment prescribed under **Section 33** of said law.

3.2.1.45 The Fishing Rights of Foreign Fishing Vessels (1989)

The Project Proponent has to ensure that no foreign fishing vessel shall without a permit or a license, enter the Myanmar fisheries waters engaging in the fishery, under **Section 31** of said law.

The Project Proponent has to ensure that no person dispose of from aboard the fishing vessel living creatures or any material to cause pollution of the water media or to harass the fishes and other marine organisms, under **Section 36** of said law.

3.3 INTERNATIONAL CONVENTIONS, TREATIES AND AGREEMENTS

Myanmar has signed several international conventions, treaties and agreements related to the environment. Some of them are shown in ***Table 3.3-1***.

TABLE 3.3-1

RELEVANT INTERNATIONAL TREATIES SIGNED BY MYANMAR

No.	International Environmental Conventions/ Protocols/ Agreements	Date of Signature	Date of Ratification	Date of Member	Cabinet Approval Date
1	Plant Protection Agreement for the South-East Asia and the Pacific Region, Rome, 1956		4-11-1959 (Adherence)	4/11/1959	
2	United Nations Framework Convention on Climate Change, New York, 1992 (UNFCCC)	11/6/1992	25-11-1994 (Ratification)		41/94 9-11-94
3	Convention on Biological Diversity, Rio de Janeiro, 1992	11/6/1992	25-11-1994 (Ratification)		41/94 9-11-94
4	The Convention for the Protection of the World Culture and Natural Heritage, Paris, 1972		29-4-1994 (Acceptance)		6/94 9-2-94
5	ASEAN Agreement on the Conservation of Nature and Natural Resources, Kuala Lumpur, 1985	16/10/1997			
6	Catagena Protocol on Biosafety, Cartagena, 2000	11/5/2001			13/2001 22-3-01
7	Kyoto Protocol to the Convention on Climate Change, Kyoto, 1997		13-8-2003 (Accession)		26/2003 16-7-03
8	Convention on the International Maritime Organization, 1948	6/7/1951	25-11-1994 (Ratification)		
9	MARPOL 73/78, 1978	4/8/1988			
10	United Nations Convention on the Law of the Sea, 1982	21/8/1996			

3.4 MYANMAR GOVERNMENT INSTITUTIONAL FRAMEWORK

3.4.1 Arrangement at the National and Sector Level

At the national level, the Environmental Conservation Committee (ENCC) serves as mechanism for inter-ministerial coordination. Authorities and functions of ENCC are prescribed in Articles 7 to 13 of the EC Rules Environment of the Republic of the Union of Myanmar.

One of ENCC's main functions related to this Project is to oversee the management of the EIA process by MONREC through ECD. ECD will serve as coordinator among various concerned sector departments to ensure that the EIA and implementation of EMP will address environmental and social issues of concerns of relevant sector departments.

The EIA process for this Project will be administered by the central ECD in coordination with the regional ECD and various government organizations at the regional, township, and district levels.

3.4.2 Arrangements at the Project Area

A. Institutional Framework of Myanmar Government

Myanmar's Subnational Administrative Structure

The Republic of the Union of Myanmar is composed of seven (7) regions, named in the 2008 Constitution. There are 6 self-administered zones or divisions and 1 union territory. In detail, there are 325 townships and 67 districts in Myanmar's states and regions, according to Myanmar Information Management Unit (2011), Myanmar Statistical Year book (2011), and Ministry of National Planning and Economic Development. The smallest formal administrative unit is called "village", with various groups (towns, village, and urban) can be grouped into townships. Collections of townships are organized as districts and can be turned the form into regions or state (collections of districts).

State and region governments comprise of an unicameral, partially elected state or region Hluttaw, an executive led by a Chief Minister and a cabinet of state/region ministers, and state or region judicial institutions.

Some constitutional roles and duties of state and region government associated to the Project are demonstrated as follows:

Article 188

The Region or State Hluttaw shall have the right to enact laws for the entire or any part of the Region or State related to matters prescribed in Schedule Two of the Region or State Hluttaw Legislative List.

Article 249

Subject to the provisions of the Constitution, the executive power of the Region or State Government extends to the administrative matters which the Region or State Hluttaw has power to make laws. Moreover, it also extends to the matters which the Region or State Government is permitted to perform in accord with any Union Law.

Article 256

The Region or State Government:

(a) Shall, in carrying out the functions of the Region or State Ministries, their subordinate governmental departments and organizations, manage, guide, supervise and inspect in accord with the provisions of the Constitution and the existing laws;

(b) May, relating to the performance of the civil service organizations discharging duties in their Region or State concerned, supervise, inspect and coordinate in accord with the law.

Article 257

The Region or State Government may, for enabling the performance of the functions to be carried out in accord with the Union Law for Civil Services and in coordination with the Union Government in advance:

(a) Form Civil Services organizations relating to the Region or State as necessary;

(b) Appoint the required number of Civil Services personnel.

Organization structure of state and region government is illustrated in ***Figure 3.4-1*** below. There are nine (9) ministries and twelve (12) union ministries.

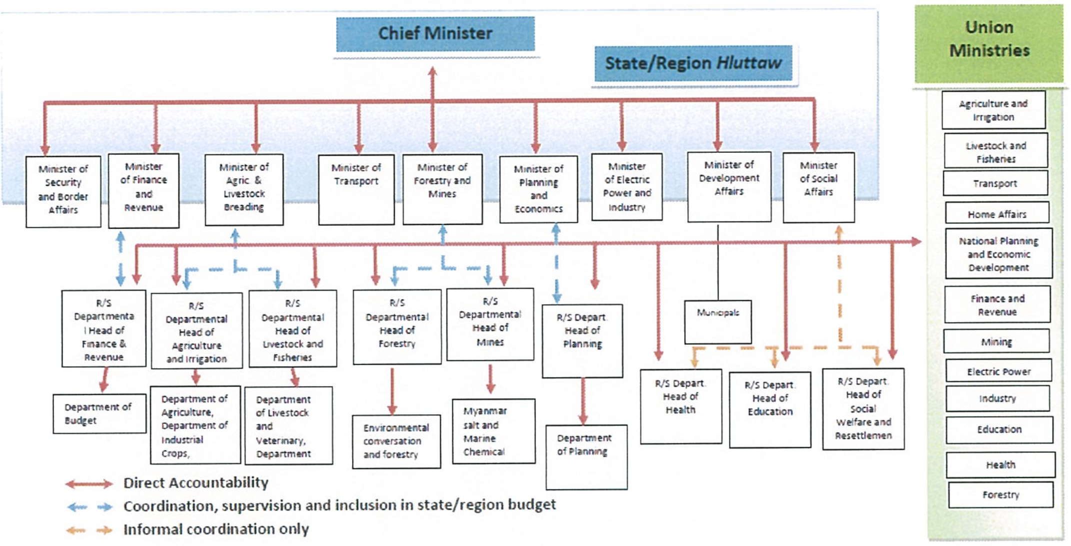


FIGURE 3.4-1: ORGANIZATIONAL STRUCTURE OF STATE AND REGION GOVERNMENT

B. Institutional Framework of Management Government of the DSEZ

Dawei Special Economic Zone Management Committee

This Project will be implemented as a public - private participation (PPP) project under a concessional arrangement between the Project Proponent and the Dawei Special Economic Zone Management Committee. ***Figure 3.4-2*** shows an organizational structure for the development of DSEZ which is organized as prescribed by the Special Economic Zone Law (2011). The development of the Dawei Special Economic Zone (DSEZ) is carried out under the framework set by the Dawei Special Economic Zone Law. Under this law, two bodies were established-the Dawei Special Economic Zone Management Committee and the Dawei Special Economic Zone (DSEZ) Working Body to take charge of DSEZ management and general administration affairs.

The DSEZ Management Committee (DSEZMC) is essentially responsible for facilitating resolving issues between the Government, the Central Body and developers/investors. The Committee's wide-ranging and important responsibilities include,

but are not limited to: supervising and inspecting matters regarding implementation of investment and establishment plans, land use, environmental conservation, waste control, health, education, finance and taxation, development, communication, security, infrastructure and coordinating with the relevant governmental departments.

With reference to organizational structure of Dawei Special Economic Zone (DSEZ), the Project Proponent commits to follow the described process, established by the Dawei Special Economic Zone Management Committee (DSEZMC), under Dawei Special Economic Zone Law.

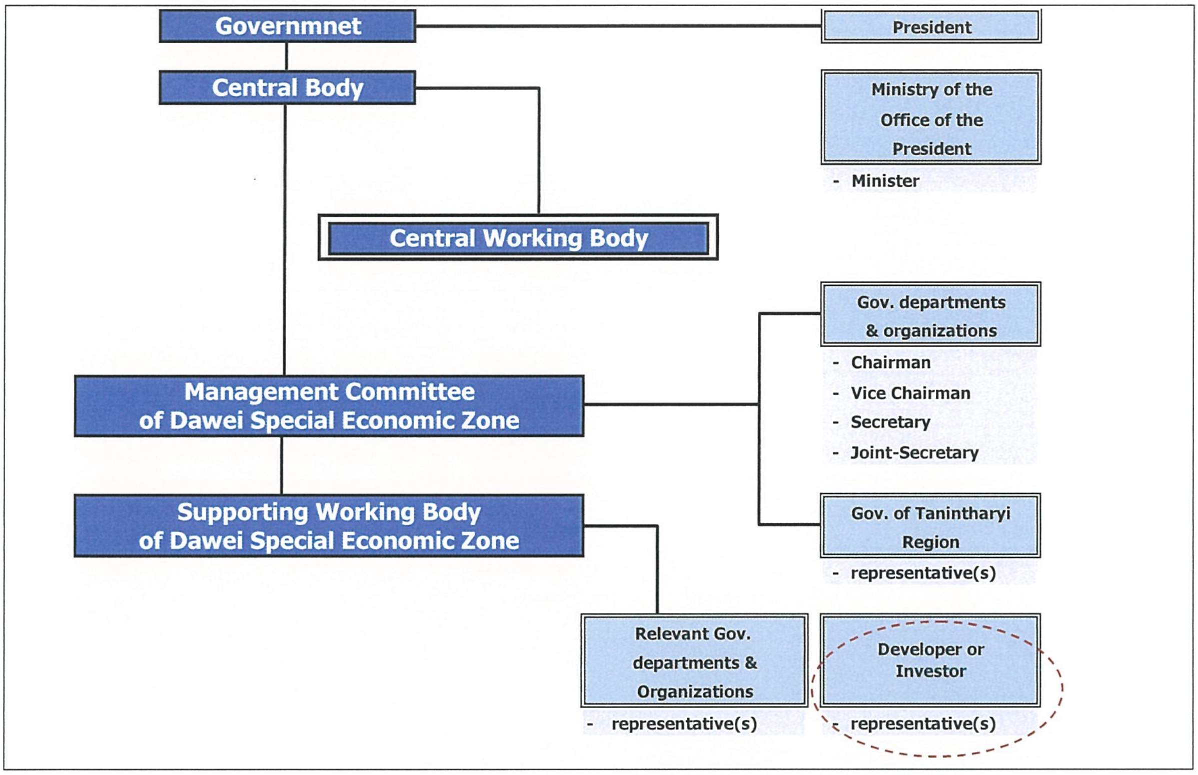


FIGURE 3.4-2: ORGANIZATIONAL STRUCTURE OF DAWEI SPECIAL ECONOMIC ZONE (DSEZ)

C. Other Relevant Agencies

There are 14 representatives of relevant government agencies and organizations from respective ministries involved in development activities of the Supporting Working Body (SWB) in the project area. Their key responsibilities are summarized in ***Table 3.4-1***.

TABLE 3.4-1

ROLES AND RESPONSIBILITIES OF RELEVANT DEPARTMENTS FUNCTIONING IN DSEZ

No.	Department	Roles and Responsibilities
1	Department of General Administration	Management and monitoring to cooperate and negotiate with local peoples
2	Department of Human Settlement and Housing	The Department of Human Settlement & Housing Development is upgrading the living standard of the people by promoting the urban and regional development, by establishing industrial zones at the new satellite towns.
3	Department of Immigration and National Registration	Responsible for checking and permission for immigrant staffs, workers and visitors to the project area
4	Myanmar Port Authority	Responsibility to regulate and administer the coastal ports of Myanmar.
5	Myanmar Police force	Establish civil jurisdictions in the project area
6	Department of Labour	- Workers' legal rights and privileges and encourage fair labour practices with a view to establishing cordial relations between employers and workers according to the existing Laws in Myanmar - Registering foreign workers in Myanmar according to directive of the Myanmar Foreign Investment Commission.
7	Directorate of Trade	Responsible for the formulation of trade policies and plans with the aim to regulate the smooth flow of internal and external trade.
8	Department of Development Affairs	Responsible for the urban development.
9	Department of Road Transportation	Passenger transportation service for inter-city transportation and intra-city transportation, to carry out the transportation services of local goods and export items. The Directorate of Road Transport carries out registration of motor vehicles and driving licenses.
10	Department of Investment and Company Administration	Responsible for register the incorporation and administration of companies, in accordance with the provisions of the Myanmar Companies Act, 1914.
11	Department of Custom	Responsible for levy duty on imported goods in accordance with the existing laws, rules and regulations, to oversee the imports and exports whether they are complied with the existing laws and regulations or not and to investigate and prevent illegal imports and exports.
12	Department of Law, Court and Justice	For giving legal advice on matters relating to international conventions and regional agreements, and also on matters of bilateral or multilateral treaties, memorandums of understanding, memorandums of agreement, local and foreign investments and other instruments that are to be ratified by the Union of Myanmar.
13	Department of Municipality	Dealing with locally affairs, to the close contact with the daily life of the citizens.
14	Representative from Tanintharyi Division	To communicate with Local Government.

3.5 INTERNATIONAL POLICIES, GUIDELINES AND STANDARDS

International policies, guidelines and standards relevant to environmental and social impacts of projects that are referred to by most countries are those issued by the World Health Organization (WHO), the U.S. Environmental Protection Agency (EPA), the World Bank, and the International Finance Corporation (IFC). The policies, guidelines and standards of the World Bank and IFC are cross referenced and complementary as the IFC is an organization of the World Bank Group. They are also adopted by most development organizations such as the Asian Development Bank. It should be noted that the guidelines and standards recommended by the World Bank and IFC, especially those related to environmental pollution, also gave due consideration to the guidelines and standards of the EPA and WHO.

Only those international policies, guidelines and standards relevant to this Project are discussed herein.

3.5.1 IFC's Standards and Guidelines

IFC's standards and guidelines relevant to this Project are described in two documents:

- Performance Standards on Environmental and Social Sustainability, January 1, 2012;
- Environmental, Health, and Safety-General Guidelines, April 30, 2007; and
- Environmental, Health, and Safety Guidelines for Thermal Power Plants (December 19, 2008).

The first document describes eight performance standards on environmental and social sustainability which IFC requires its clients to apply throughout the project life cycle.

The second document provides general guidelines for environmental, health and safety (EHS) for development projects.

The third document provides EHS guidelines specific to thermal power plant projects.

Essential requirements in the three IFC documents pertaining to this Project are summarized below.

A. Performance Standards on Environmental and Social Sustainability, January 1, 2012

IFC prescribes eight Performance Standards to which its clients will need to comply throughout the investment life of IFC. The eight performance standards (PS) are:

Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts

Performance Standard 2: Labor and Working Conditions

Performance Standard 3: Resource Efficiency and Pollution Prevention

Performance Standard 4: Community Health, Safety, and Security

Performance Standard 5: Land Acquisition and Involuntary Resettlement

Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

Performance Standard 7: Indigenous Peoples

Performance Standard 8: Cultural Heritage

The eight PSs cover all environmental and social aspects of development projects.

Major requirements of each PS are summarized as follows:

PS1- Assessment and Management of Environmental and Social Risks and Impacts

PS1 requires the client, in coordination with other responsible government agencies and third parties as appropriate, to conduct a process of environmental and social assessment, and establish and maintain an environmental and social management system (ESMS) *appropriate to the nature and scale of the project and commensurate with the level of its environmental and social risks and impacts*. The ESMS will incorporate the following elements: (i) policy; (ii) identification of risks and impacts; (iii) management programs; (iv) organizational capacity and competency; (v) emergency preparedness and response; (vi) stakeholder engagement; and (vii) monitoring and review. These requirements are explained in details in the PS document and associated guidelines.

PS2-Labor and Working Conditions

PS2 requires the client to: (i) formulate and implement human resources policies and procedures appropriate to its size and workforce that set out its approach to managing workers consistent with the requirements of this Performance Standard and national law; (ii) provide reasonable working conditions and terms of employment; (iii) treat migrant workers on substantially equivalent terms and conditions to non-migrant workers carrying out similar work; (iv) establish grievance mechanism; (v) refrain from using child labor and forced labor; and (vi) provide a safe and healthy work environment, taking into account inherent risks in its particular sector and specific classes of hazards in the client's work areas, including physical, chemical, biological, and radiological hazards, and specific threats to women. These requirements will also be applied to workers of the contractors through effective contractual arrangements between the client and the contractors.

PS3-Resource Efficiency and Pollution Prevention

PS3 requires the client's project to: (i) efficiently use energy and water; and (ii) use best available techniques (BAT) in pollution control.

PS4-Community Health, Safety, and Security

This PS requires the client to: (i) evaluate the risks and impacts to the health and safety of the Affected Communities during the project life-cycle; and (ii) establish preventive and control measures consistent with good international industry practice (GIIP), such as in the World Bank Group Environmental, Environmental, Health and Safety Guidelines (EHS Guidelines) or other internationally recognized sources. The requirements are elaborated in the PS document. Some of the requirements, such as hazardous materials management, are similar to those in PS3. In essence, safety aspects to the communities and operators will need to be fully considered in engineering design, construction and operations of all Project facilities, including support facilities or infrastructure. Health risks will also be included.

PS5-Land Acquisition and Involuntary Resettlement

This PS requires the client to avoid land expropriation, physical displacement, and adverse impacts on livelihoods and ways of life of people in the project area. The process of land acquisition has to ensure community engagement, fair compensation for loss of land, properties, and livelihood; grievance mechanism, and appropriate resettlement and livelihood restoration planning and implementation.

PS6- Biodiversity Conservation and Sustainable Management of Living Natural Resources

PS6 requires the EIA to consider direct and indirect project-related impacts on biodiversity and ecosystem services and identify any significant residual impacts. As a matter of priority, the client should seek to avoid impacts on biodiversity and ecosystem services. When avoidance of impacts is not possible, measures to minimize impacts and restore biodiversity and ecosystem services should be implemented. Given the complexity in predicting project impacts on biodiversity and ecosystem services over the long term, the client should adopt a practice of adaptive management in which the implementation of mitigation and management measures are responsive to changing conditions and the results of monitoring throughout the project's lifecycle.

PS7-Indigenous Peoples

PS7 requires the EIA to identify all communities of Indigenous Peoples within the project area of influence who may be affected by the project, as well as the nature and degree of the expected direct and indirect economic, social, cultural (including cultural heritage), and environmental impacts on them. Adverse impacts on Affected Communities of Indigenous Peoples should be avoided where possible. Where alternatives have been explored and adverse impacts are unavoidable, the client will minimize, restore, and/or compensate for these impacts in a culturally appropriate manner commensurate with the nature and scale of such impacts and the vulnerability of the Affected Communities of Indigenous Peoples.

PS8-Cultural Heritage

PS8 requires the client to: (i) protect cultural heritage from the adverse impacts of project activities and support its preservation; and (ii) promote the equitable sharing of benefits from the use of cultural heritage. The EIA will need to identify sites of

cultural heritage and assess their value or importance at the community, provincial and national levels.

It should be noted that all the eight PSs are in line with the Government's policy and regulations. For this Project, PS5, PS7 and PS8 are not relevant as pointed out in Chapters 5 and 6.

B. Environmental, Health, and Safety-General Guidelines, April 30, 2007

This publication provides general EHS guidelines covering the following subjects:

Environment covering: (i) air emissions and ambient air quality; (ii) energy conservation; (iii) wastewater and ambient water quality; (iv) water conservation; (v) hazardous materials management; (vi) waste management; (vii) noise; and (viii) contaminated land.

Occupational Health and Safety covering: (i) general facility design and operation; (ii) communication and training; (iii) physical hazards; (iv) chemical hazards; (v) biological hazards; (vi) radiological hazards; (vii) personal protective equipment; (viii) special hazard environments; and (ix) monitoring.

Community Health and Safety covering: (i) water quality and availability; (ii) structural safety of project infrastructure; (iii) life and fire safety (L&FS); (iv) traffic safety; (v) transport of hazardous materials; (vi) disease prevention; and (vii) emergency preparedness and response.

Construction and Decommissioning covering: (i) environment; (ii) occupational health and safety; and (iii) community health and safety.

C. Environmental, Health, and Safety Guidelines for Thermal Power Plants (December 19, 2008)

This publication provides EHS guidelines and standards specific to thermal power plant projects. It covers the following subjects:

- Environment covering: (i) air emissions; (ii) energy efficiency and greenhouse gas emissions; (iii) water consumption and aquatic habitat alteration; (iv) effluents; (v) solid wastes; (vi) hazardous materials and oil; and (vii) noise.
- Occupational Health and Safety covering issues described in the General EHS Guidelines and additional issues specific to thermal power plants, including: (i) non-ionizing radiation; (ii) heat; (iii) noise; (iv) confined spaces; (v) electrical hazards; (vi) fire and explosion hazards; (vii) chemical hazards; and (viii) dust.
- Community Health and Safety covering issues described in the General EHS Guideline and additional issues specific to thermal power plants, including: (i) water consumption; and (ii) traffic safety.
- Performance Indicators and Monitoring Guidelines for Environment and Occupational Health and Safety.

3.5.2 World Bank's Pollution Prevention and Abatement Handbook 1998 Toward Cleaner Production

The World Bank's Pollution Prevention and Abatement Handbook (PPAH) is a comprehensive document providing guidelines for industrial pollution control and recommends emission and ambient standards to be applied in environmental management. The recommended standards have taken into account the standards enforced by the EPA and recommended by WHO. They are referred to in the IFC's EHS Guidelines.

The PPAH has several sector-specific guidelines. There are two specific sections of "Thermal Power: Guidelines for New Plants", pages 413 to 426, and "Thermal Power: Rehabilitation of Existing Plant", pages 427 to 429 which are relevant to the Project.

3.6 GUIDELINES AND STANDARDS APPLICABLE TO THIS PROJECT

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

Table 3.6-1 presents international ambient environmental quality standards to be adopted as the national ambient environmental quality standards have not yet been issued. ***Table 3.6-2*** presents national emission standards to be adopted for stack gas emissions. ***Table 3.6-3*** presents national quality standards for effluents to be discharged into the coastal waters via the internal storm sewer system. In addition, the Project will control emission at stack following the IFC Environmental, Health, and Safety Guidelines for Thermal Power Plants (2008) (***Table 3.6-4***).

TABLE 3.6-1
INTERNATIONAL AMBIENT ENVIRONMENTAL QUALITY STANDARDS

Subjects	Parameters	Values	References
Ambient Air Quality			
24-hour average	TSP	230 μg/m^3 [a/]	[a/] Thermal Power: Guidelines for New Plant, Pollution Prevention and Abatement Handbook WORLD BANK GROUP, 1998
	NO_2	150 μg/m^3 [a/]	[b/] Environmental, Health, and Safety Guidelines: Environment Air Emissions and Ambient Air Quality of International Finance Corporation, 2007
	PM_{10}	150 μg/m^3 [a/,b/]	[c/] National Environmental Quality (Emission) Guidelines, Myanmar, 2015
		50 μg/m^3 [c/]	
	SO_2	150 μg/m^3 [a/]	
		125 μg/m^3 [b/]	
		20 μg/m^3 [c/]	
1-hour average	NO_2	200 μg/m^3 [b/]	
Ambient Noise Levels			
- Industrial and commercial area	Leq (24 hrs)	70 dB(A) [a/,b/]	[a/] Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, U.S. EPA (U.S. Environmental Protection Agency). 1974
	Leq (1 hr)	70 dB(A) daytime [d/]	[b/] Notification of Guidelines for Community Noise, World Health Organization (WHO), 1999
		70 dB(A) nighttime [d/]	[c/] Environmental, Health, and Safety Guidelines: General EHS GUIDELINES: ENVIRONMENTAL NOISE MANAGEMENT of International Finance Corporation, 2007
- Residential areas	Leq (1 hr)	55 dB(A) daytime [c/,d/]	[d/] National Environmental Quality (Emission) Guidelines, Myanmar, 2015
		45 dB(A) nighttime [c/,d/]	
	Lmax	110 dB(A) [b/]	
Vibration			
Industrial buildings and residential buildings	Peak Particle Velocity	5 mm/s	DIN4150
Coastal Water Quality	DO	Not less than 4 mg/L	ASEAN MARINE WATER QUALITY Management Guidelines and Monitoring Manual, 2008
	pH	5.0-9.0	
	Nitrate Nitrogen	60 μg/L	
	Phosphates as P	15 μg/L for coastal	
		45 μg/L for estuarine	
	Lead	8.5 μg/L	
	Cadmium	10 μg/L	
	Mercury	0.16 μg/L	
	Oil and grease	0.14 mg/L	
	Total suspended solids	Permissible 10% maximum increase over seasonal average concentration.	
Sediment Quality		Maximum limits	International Association for Impact Assessment (IAIA) NOAA Screen Quick Reference Table, 2004
	Total Chromium	81 mg/kg	
	Total Arsenic	8.2 mg/kg	
	Total Lead	46.7 mg/kg	
	Total Cadmium	1.2 mg/kg	
	Total Zinc	150 mg/kg	
	Total Copper	34 mg/kg	
	Total Mercury	0.15 mg/kg	

TABLE 3.6-1

INTERNATIONAL AMBIENT ENVIRONMENTAL QUALITY STANDARDS (CONT'D)

Subjects	Parameters	Values	References
Groundwater Quality	pH at 25° C Nitrate Nitrite Cadmium Lead Arsenic Cyanide Chloride	6.5-8.5 50 mg/L 3 mg/L 0.003 mg/L 0.01 mg/L 0.01 mg/L 0.17 mg/L 250 mg/L	WHO's Guidelines for Drinking Water Quality, 2011
Thermal Heat Flux	Safe level of exposure at the property line of LNG storage facility	5 kW/m^2 (1,600 Btu/hr ft^2)	NFPA 59A (standards for the production facility)

TABLE 3.6-2

NATIONAL EMISSION STANDARDS

Parameter	Standard	Note
Combustion turbine/ Natural Gas		
Particulate matter, PM_{10}	-	
SO_2	-	
NO_X	100 mg/Nm^3	For natural gas (all turbine types; unit >50 MW)
Reciprocation engine/ Natural Gas		
Particulate matter, PM_{10}	-	
SO_2	-	
NO_X	200 mg/Nm^3	

Source: National Environmental Quality (Emission) Guidelines, Myanmar, 29 December, 2015.

TABLE 3.6-3
NATIONAL EFFLUENT STANDARDS

Subjects	Parameters	Maximum Concentration
Effluent Quality -Thermal Power	Arsenic	0.5 mg/l
	Cadmium	0.1 mg/l
	Chromium (total)	0.5 mg/l
	Copper	0.5 mg/l
	Iron	1 mg/l
	Lead	0.5 mg/l
	Mercury	0.005 mg/l
	Oil and grease	10 mg/l
	pH	6-9 S.U.[a]
	Temperature increase	<3° C[b]
	Total residual chlorine	0.2 mg/l
	Total suspended solids	50 mg/l
	Zinc	1 mg/l
Site Runoff and Wastewater Discharges (Construction Phase)	Biological Oxygen Demand	30 mg/l
	Chemical Oxygen Demand	125 mg/l
	Oil and grease	10 mg/l
	pH	6-9
	Total coliform bacteria	400 cell/100 ml
	Total nitrogen	10 mg/l
	Total phosphorus	2 mg/l
	Total suspended solids	50 mg/l

Note: [a] Standard unit

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

Source: National Environmental Quality (Emission) Guidelines, Myanmar, 29 December, 2015.

TABLE 3.6-4
EMISSION STANDARDS FOR NATURAL GAS FUELED POWER PLANT

Combustion Technology	Parameter	Standard[1/]
Combustion Turbine	Nitrogen Oxides (NO_X)	51 mg/Nm^3 at 15% O_2
Reciprocating Engine	Nitrogen Oxides (NO_X)	200 mg/Nm^3 at 15% O_2

Note: [1/]IFC Environmental, Health, and Safety Guidelines Thermal Power Plants, 2008

Source: Dawei Power Company Limited, 2015

CHAPTER 4

PROJECT DESCRIPTION AND ALTERNATIVES

CHAPTER 4

PROJECT DESCRIPTION AND ALTERNATIVES

4.1 PRESENTATION OF THE PROJECT AND DESCRIPTION OF ALTERNATIVES

4.1.1 Project Description

A. Sector and Subsector

The Project will involve physical development in the energy sector, power or electricity generation subsector.

The Project will construct a natural gas-fired power plant and associated facilities in Dawei Special Economic Zone (DSEZ) to supply electricity to industrial consumers in the industrial estate to be developed in DSEZ. Project facilities to be constructed are: (i) a 420-MW (net) combination of gas engine power plant and combined cycle power plant using natural gas as primary fuel; (ii) a once-through cooling water system using sea water as coolant; (iii) a switch yard; (iv) a short access road connecting the power plant site with the existing road in DSEZ; (v) a gas-regulating station; (vi) office and control buildings; and (vii) utility systems inside the power plant premise.

B. Project Size

The Project will have a net generation capacity of 420 MW. The Project will occupy a land area of about 37.19 acres or 150,500 m^2.

C. Project Location

Overview of DSEZ

The project facilities will be constructed on a 37.19 acre land plot in DSEZ, especially in a 0.15 km^2 area designated as industrial estate area in DSEZ. This large land tract is about 8 km long along the beach of Maungmagan Bay, about 21 km from Dawei- the administrative center of Tanintharyi Region. ***Figure 4.1-1*** is a map of Tanintharyi Region showing the location of DSEZ.

At present, DSEZ is still in a very early stage of development and is still not ready for industries to establish. The area is served by an unpaved access road coming from the Thai border. The existing infrastructure facilities in the area include a nearly completed small port and a raw water reservoir of Pa Yain Byu with a storage capacity of about 7.7 million m^3. Water supply and electricity supply systems have not yet been developed.

Figure 4.1-2 is a map of DSEZ showing existing conditions and facilities, and locations of the project components. This map is supported by some photographs of DSEZ in ***Photos 4.1-1*** to ***4.1-3***. The project area is described in more details in ***Chapter 5- Description of the Environment***.

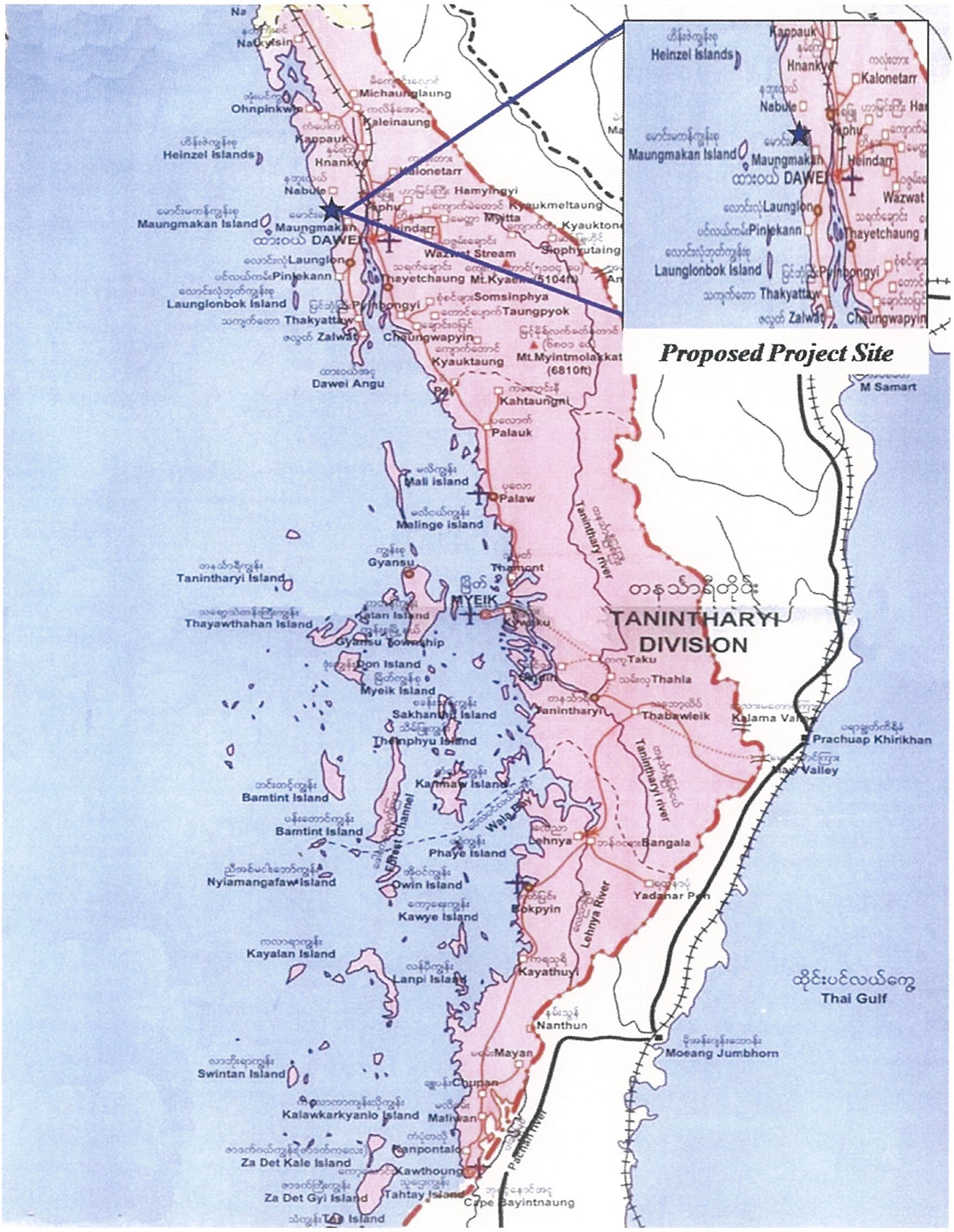


FIGURE 4.1-1 : LOCATION OF PROPOSED PROJECT SITE

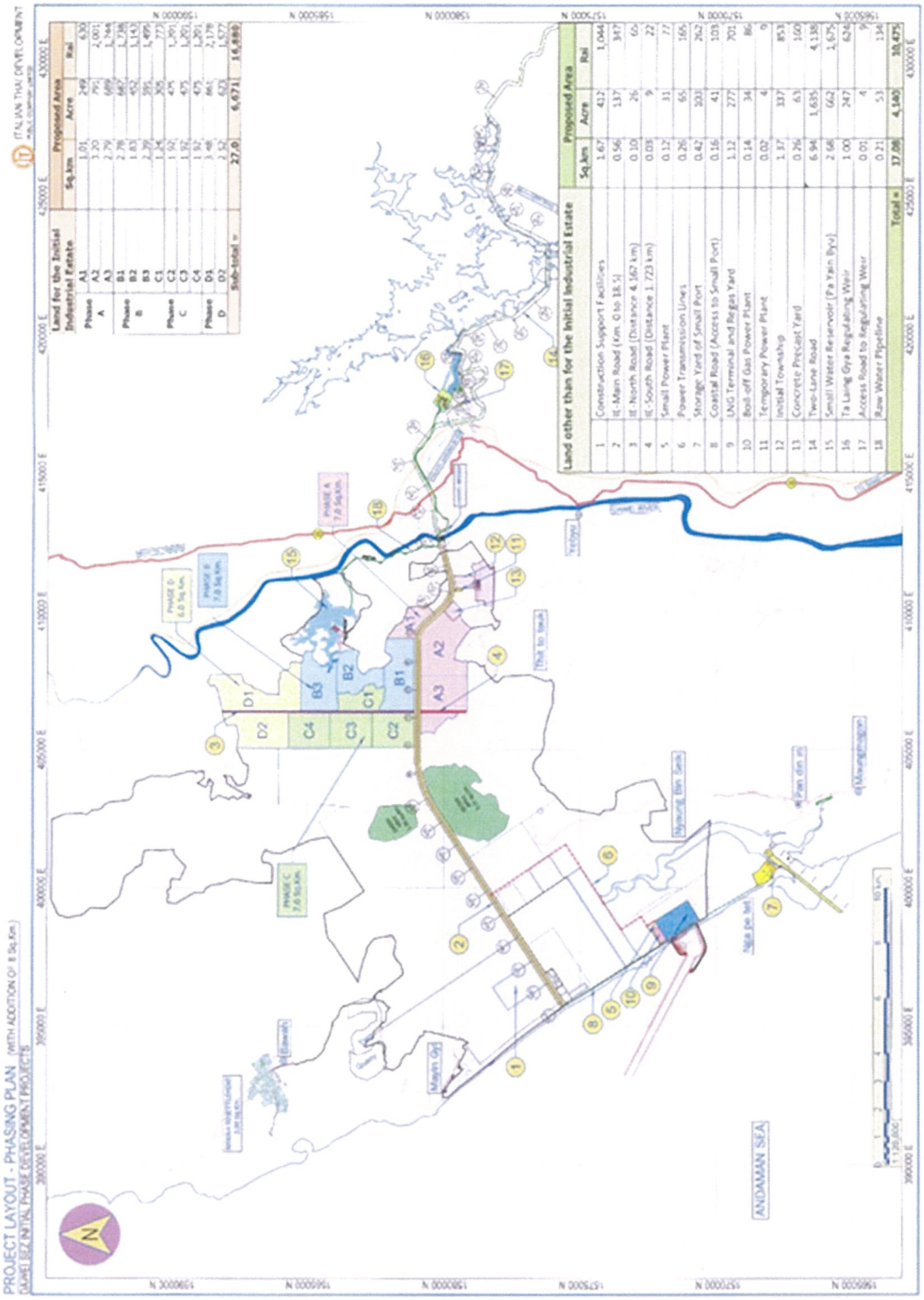


FIGURE 4.1-2 : LAYOUT DSEZ AREA

PHOTO 4.1-1 : EXISTING PROPOSED POWER PLANT SITE

PHOTO 4.1-2: NGA PITAT VILLAGE

PHOTO 4.1-3: PA YAIN BYU RESERVOIR

Project Site

The Project site covers 37.19 acres of land. The power plant area is about 250 m x 360 m and its support facilities (intake and outfall area and site access way) are 110 x 550 m. At present, this land plot is vacant and has only some fauna and flora species commonly found in coastal land in Myanmar. The site is relatively flat at an average elevation of about 1-2 m above mean sea level (AMSL). The site is about 800 m from Andaman Sea to the west, and 1 km from a small tidal creek to the east. The gas pipeline to supply the power plant is from the adjacent liquefied natural gas (LNG) terminal and regasification plant to the south. There are three villages close to the site. One village is the fishing village of Nga Pitat and the other two villages are Nyaung Bin Siek and Mu Du which are further inland and on the opposite side of the tidal creek.

Figure 4.1-3 is a map showing the project site and the described surroundings.

D. Facilities and Infrastructure

The physical development of the Project will cover the following facilities and infrastructure: (i) 420 MW (net) combination of gas engine power plant and combined cycle power plant using natural gas as fuel; (ii) once-through cooling water system using sea water as coolant; (iii) switch yard; (iv) short access road connecting the power plant site with the existing road in DSEZ; (v) emergency diesel generators; (vi) water demineralization plant; (vii) gas-regulating station; (viii) diesel oil unloading and storage tanks; (ix) utility systems inside the power plant premise, including water treatment plant, firefighting system, wastewater treatment plant, drainage, and communication system; and (x) support facilities including office and control buildings; internal road, access road, and guard houses. A 115-kV transmission line, approximately 17.5 km. long, from the project site boundary will be constructed under another project for conveying electricity from the project site to the distribution grids serving DSEZ areas.

Figure 4.1-3 shows a preliminary layout of project facilities. Salient information on the project facilities and infrastructure are summarized in ***Table 4.1-1***.

Site Access

The site can be accessible to the power plant site with the coastal road which will be constructed under the proposed LNG terminal and small port project. The main entrance gate of the power plant premises will be on the southwest side of the power plant premises and face to the sea.

The access road would be linked to roads adjacent to the project site to improve the safety, comfort and continuity of traffic flow on the project, and the layout plan was so formulated that accessibility to municipal infrastructure for each living zone might be improved. Design road elevation will be determined considering surrounding ground elevation that it would be possible to facilitate the drainage of storm water and wastewater.

Standard requirements for access road geometry will be following with the requirements of Myanmar laws and regulation and international standards.

Type of access road should use the following criteria and information:

Two 3.0 m (9.0 ft) asphalt concrete paved lanes with 1.5 m (4.5 ft) asphalt concrete paved shoulders	100 mm (4”) Asphaltic Concrete 200 mm (8”) Aggregate Base 100 mm (4”) Aggregate Sub-base

Road markings and signs shall be provided. To control storm drainage, the storm drainage shall be installed before starting construction work. The access to site needs to ensure that such access is suitable for the equipment to be transported to the site.

Gas Engine Generators

Tentative nine (9) gas engines under consideration will be of the medium-speed, four-stroke, lean-burn, pre-chamber, spark-ignited, port-injected, trunk-piston, turbocharged and intercooled design. The engine has an embedded engine control system, controlling the combustion process individually in each cylinder. Nominal unit gross power output will be around 10 MW.

Gas Turbine Generators

Tentatively, five (5) gas turbines under consideration will be cold end drive gas turbines with their gross capacity in the range of 50 MW at Reference Site Condition. The gas turbines would incorporate Dry Low NO_x (DLN) combustion technology. The gas turbines may or may not include air inlet chilling for power augment. The gas turbines will be located outdoor and in its weather and noise proof enclosure. Each gas turbine has a dedicated HRSG and a bypass exhaust stack.

The 2-on-1 combined cycle mode is rated at 140 MW (net) at site ambient condition, while the 1-on-1 combined cycle mode is rated at 70 MW (net).

Each set of gas turbine package includes gas turbine and associated equipment, such as inlet air filter and cooling/heating, lube oil system, instrument and control system.

The turbine combustion system will use Dry Low NO_x system to increase thermal efficiency and reduce NO_x emissions. Its features provide enhanced NO_x control at base load and allows for an extended turndown of gas turbine load, within CO emissions compliance.

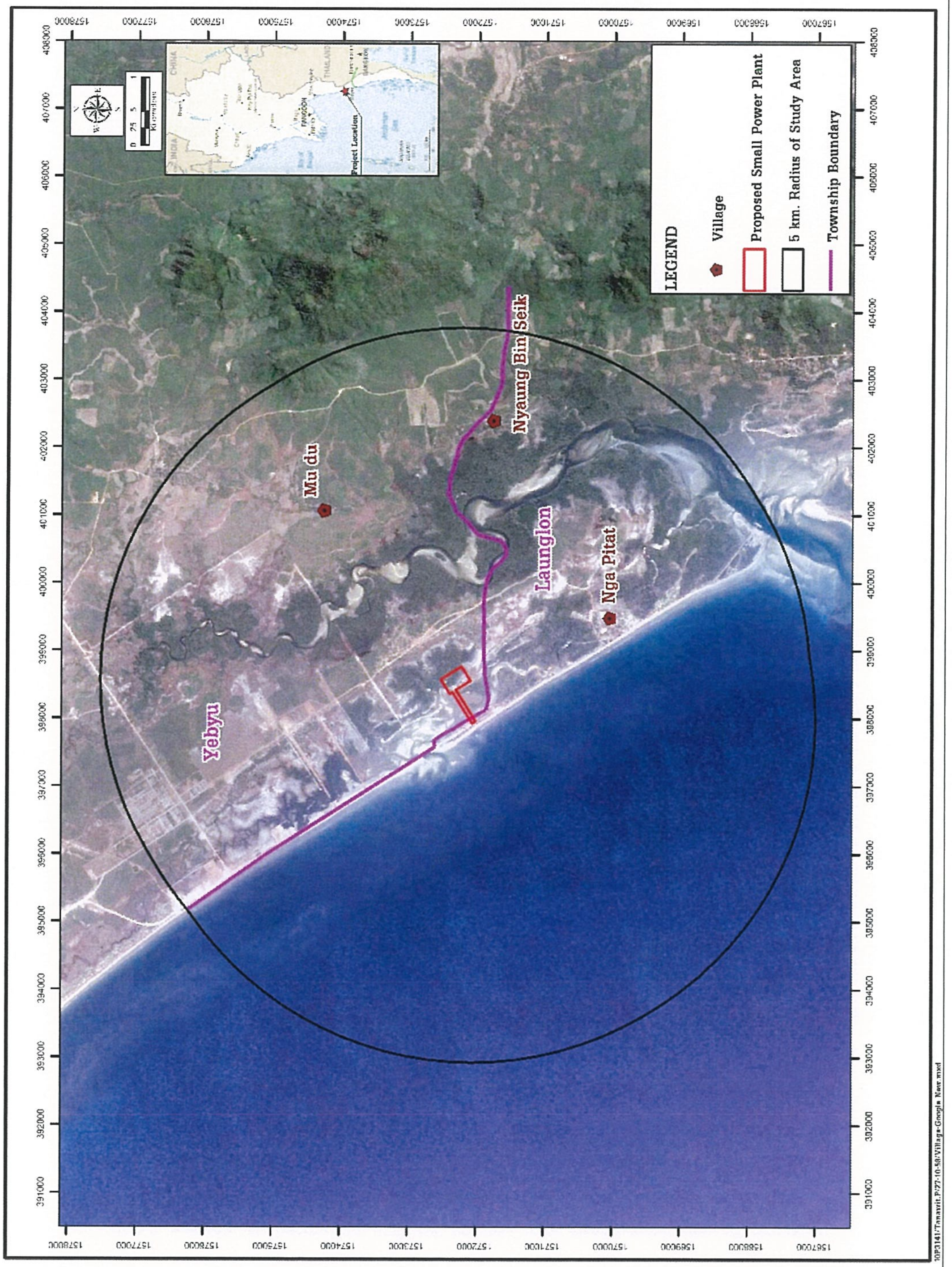


FIGURE 4.1-3 : PROJECT LOCATION

TABLE 4.1-1
SUMMARY OF SALIENT FEATURES OF MAJOR PROJECT FACILITIES

Facilities	Key Information	Purposes or Functions
Site Access	Length 550 m and width 110 m consisting of a two-lane access road of asphaltic surface and vacant area	Connect the power plant to the existing road in DSEZ
Gas regulating station	Equipped with gas pressure reducer, flare system, and control system	Receive natural gas from the gas pipeline and regulate the pressure
Gas pressure booster	Equipped with gas compressor, gas filter, and control system	Boost gas pressure receiving from gas regulating station to meet minimum combustion turbine gas inlet pressure and feed the natural gas to the power plant turbine combustors
Gas engines	Nine units of gas engine.	Generate electricity from natural gas.
Gas turbines	Five units of combustion gas turbine. Each unit to be equipped with dry low NO_x burners to minimize NO_x emission and its auxiliary systems	Generate electricity from natural gas.
Heat recovery steam generators (HRSG)	Five units, one for each combustion gas turbine	Recovery of heat energy from hot gas released from the combustion gas turbines and generate steam for steam cycle power generation
Steam turbines	Three unit of steam turbine. Each unit is equipped with surface condenser, main steam stop and control valves with associated bypass and attemperator, emergency load rejection, control system and its auxiliary system	Generate electricity using steam generated by HRSG
Cooling water system	Once-through seawater cooling system, capacity 675,210 m^3/day, using sea water as coolant. Intake pipe inner diameter 2.2 m, 2.3 km long. Intake pump and structure Outfall pipe inner diameter 2.2 m, 1.7 km long, to be partially laid on the sea bed and tunneled toward inland.	Supply the cooling water to surface condenser in order to condense the exhaust steam from the steam turbine for recycling
Switch yard	Air insulated switchyard with total 14 bays for 115kV transmission.	Receive low-medium voltage power from generator, step up the power voltage and then transmit power to the electrical grid.
Water Treatment Plant	Seawater Reverse osmosis, capacity 75.5 m^3/hr	Desalination plant for production of service and potable water for demineralization plant feed and other plant use.
Demineralization plant	Reverse osmosis plus electro-deionization, capacity 31 m^3/hr	Treated water for boiler feed and Gas Turbine Inter-Cooler Spray, if required
Gas Turbine Stack	Individual Stack for each Gas Turbine Main: Diameter 3 m. and height 35 m. HRSG By-pass, Diameter 3 m. and height 30 m.	Discharge flue gas from Gas Turbine
Gas Engine Stack	Common Stack but separate flue for multiple Gas Engines, equivalent diameter 3 m. and height 30 m.	Discharge flue gas from Gas Engines

Heat Recovery Steam Generator

The Heat Recovery Steam Generator (HRSG) is specifically designed to match the operating characteristics of the gas turbine available and provide optimum performance for the total power plant cycle. The HRSG is designed to be fully integrated into the combined-cycle system and include required inlet/outlet ductwork, structural supports, piping and accessories.

The HRSG is located downstream of the gas turbine (GT) diffuser, and recovers GT-exhaust heat for use in the water/steam-cycle to power the steam turbine.

The HRSG is a double-pressure level with unfired, natural circulation type configured for vertical or horizontal exhaust flow perpendicularly through tube heat transfer sections. The inlet duct of the HRSG will be connected to the diverter damper of the bypass stack.

The HRSG stack (main stack) is equipped with an automatic stack closure damper that closes upon plant shutdown to reduce HRSG heat loss, the time required for the next plant start-up, and the cyclic stress of the start. The HRSG proper will be designed and fabricated by a leading HRSG vendor in accordance with ASME Boiler and Pressure Vessel Code.

Steam Turbine

A single-casing condensing Steam Turbine is proposed for the Project.

Tentatively, three (3) steam turbines with gross capacity of 28-44 MW each will be installed. Each unit requires the main steam at 55-72 bar and 470-562°C. Each unit is equipped with surface condenser, main steam stops and control valves with associated bypass and attemperator, emergency load rejection, control system and its auxiliary system.

Cooling Water System

The cooling water system will be the once-through process using sea water, which will be processed through intake and outfall pipes.

Details of Intake and Outfall Pipes

A 2.2 m diameter intake pipe will be extended from the intake pumping station to about 2.3 km including inland and offshore sections. The pipe will be laid on the sea bed for offshore section, trenched under the beach sand for shore area toward coastal road, tunneled underneath coastal road, and then laid underground toward the power plant area. Its end will be at about 11.57 m under water at low tide and 14.43 m at high tide.

A 2.2 m diameter outfall pipe will be extended offshore from the power plant to about 1.7 km, including the inland and offshore sections. The inland section will be laid underground and tunneled underneath coastal road while the shore area will be trenched under the sand and laid on the sea bed for offshore section. The warm spent cooling water will be released through a series of diffusors at about 9.57 m under water at low tide and 12.43 m at high tide.

The design of the seawater intake and pumping system will install two screens with mesh size of 10 cm. (bar screen) and 10 mm. (travelling screen) at the entrance of cooling water intake point in order to prevent large marine organisms and small marine organisms from entrainment impact.

Detailed designs of the cooling water system and its technical features are presented in ***Figure 4.1-4*** and briefly described below:

Flotation and submersion (for offshore)

- Flotation and Submersion technique is used for pipe sections in the open ocean. The pipes will be assembled on land. The pipe is filled with air and, if necessary, additional buoyancy is added, so that pipe will float.
- Next phase of work is to install the concrete weights. They are fixed to the pipeline at a certain center distance depend on the calculation. The concrete weights can be installed on shore or off shore.
- Before start of the sinking, the route has to be marked properly by buoys floating at the sea surface. It is also very important to listen to the local weather forecast. There should be very little wind and waves during the sinking process.
- The sinking start when the total pipeline is positioned in the correct route by barges.
- At the end of the sinking process an inspection by divers should be performed to check, if corrections are necessary.

Trenching (for seashore area)

- Trenching or excavation in the beach sands requires building steel sheet pile walls to keep the sand out. The sheet pile walls are built normal to the beach line to avoid the longshore current.
- Trestles and sheet pile trenches are constructed. The depth of trench should be long enough to prevent seepage pressures from underground.
- The end of the trench has to be closed by a temporary sheet pile closure to prevent surges inside that would prevent the setting of pipe sections.
- Once the trestle and trench are complete, the pipe sections are set. They are lowered just ahead of their design position. The pipe is adjusted to grade by a small amount of rock beforehand or by sandbags afterward.
- Backfill is then placed uniformly on each side to ensure against displacement. Once the pipeline is through the surf zone, it may be laid directly on the seafloor.

Pipe Jacking (underneath coastal road)

- This method does not disturb the traffic flows at road.
- Initially, the pilot drill will be used to penetrate the borehole and followed with casing tubes. The pipeline will be protected by casing tube.
- The actual pipeline is inserted and pulled out through the borehole by hydraulic jack.
- Once the laying of pipeline is completed, the casing tubes will be removed.

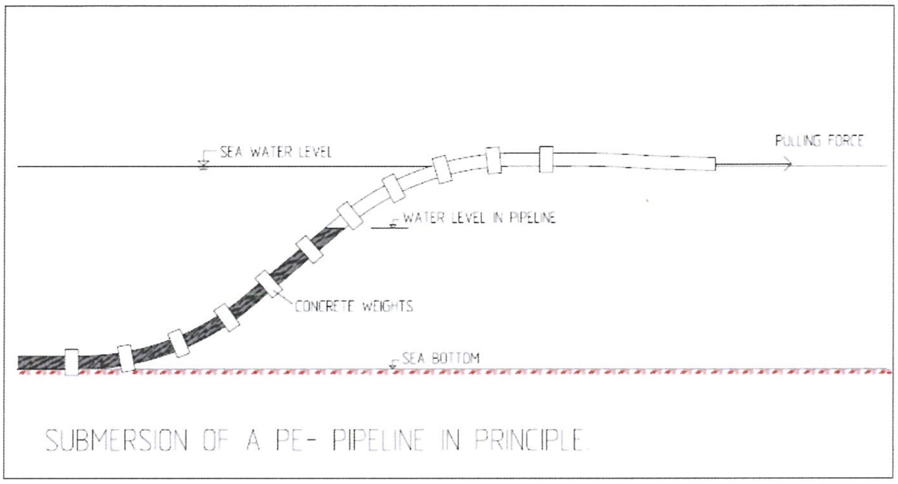


FIGURE 4.1-4 : INTAKE AND OUTFALL PIPELINE LAYING

Figure 4.1-5 shows a tentative layout of the intake and outfall pipes.

Administration and Office Building

The Administration and Office Building shall be reinforced concrete structures on piling foundation and the building shall be enclosed with the building walls.

The Administration and Office Building shall include spaces with minimum requirements as defined in Myanmar laws and regulation and/or International Architectural Standard.

The following facilities/equipment shall be provided with the Administration and Office Building, but not limited to.

- Manager rooms

The manager room shall be equipped with working desk, chair, rack, sofa and table (5 persons), cabinet, air conditioner and other necessary office equipment, furniture and supplies to perform normal duties smoothly and steadily.

- Office rooms

The office room shall be equipped with desks, chairs, racks, meeting table, partition, cabinet, air conditioner and other necessary office equipment, furniture and supplies to perform normal duties smoothly and steadily.

- Spare part room

The spare part room shall be provided for measurement equipment and spare parts for steady operation of the power plant.

- Meeting room

The meeting room shall be equipped with desk, chair, notice board, air conditioner and other necessary office equipment.

- Pantry room

Pantry room shall be equipped with a hot water supply facilities, a small kitchen, a refrigerator, etc.

- Toilet for men and women (Separate)

Toilets shall provide water closets, hand basins, urinals (for men's), shower room and washroom accessories. Washroom accessories include toilet paper holder, shower head and valves, and mirror.

- Main stair and fire escape stair

In addition, the EPC Contractor shall be provided facilities and equipment in addition specified in the above as follows:

- Necessary equipment for maintaining safe and comfortable environment, such as lighting, air conditioning, water supply and sewage disposal, fire protection, etc.
- Necessary office equipment, furniture and supplies to execute safe and smooth tasks of operation and maintenance in the power station, such as working desks, chairs, telephones, racks, cabinets, etc.
- Communication system
- Transmission rate of internet shall be enough comfortably.

Temporary Facilities

Construction lay down and work areas will be prepared at the Project site for construction work. The EPC contractor for the power plant will be required to provide the following temporary facilities needed during the construction period:

- Lay down area during construction time as required. If necessary, an additional temporary lay down area near the Project site will also be provided.
- Perimeter fences and guard houses for security and safety of the Project site during construction.
- Tanks or ponds for storing fresh water to be supplied by trucks from local sources.
- Wastewater treatment and disposal system
- Project management office to be located in the project site.

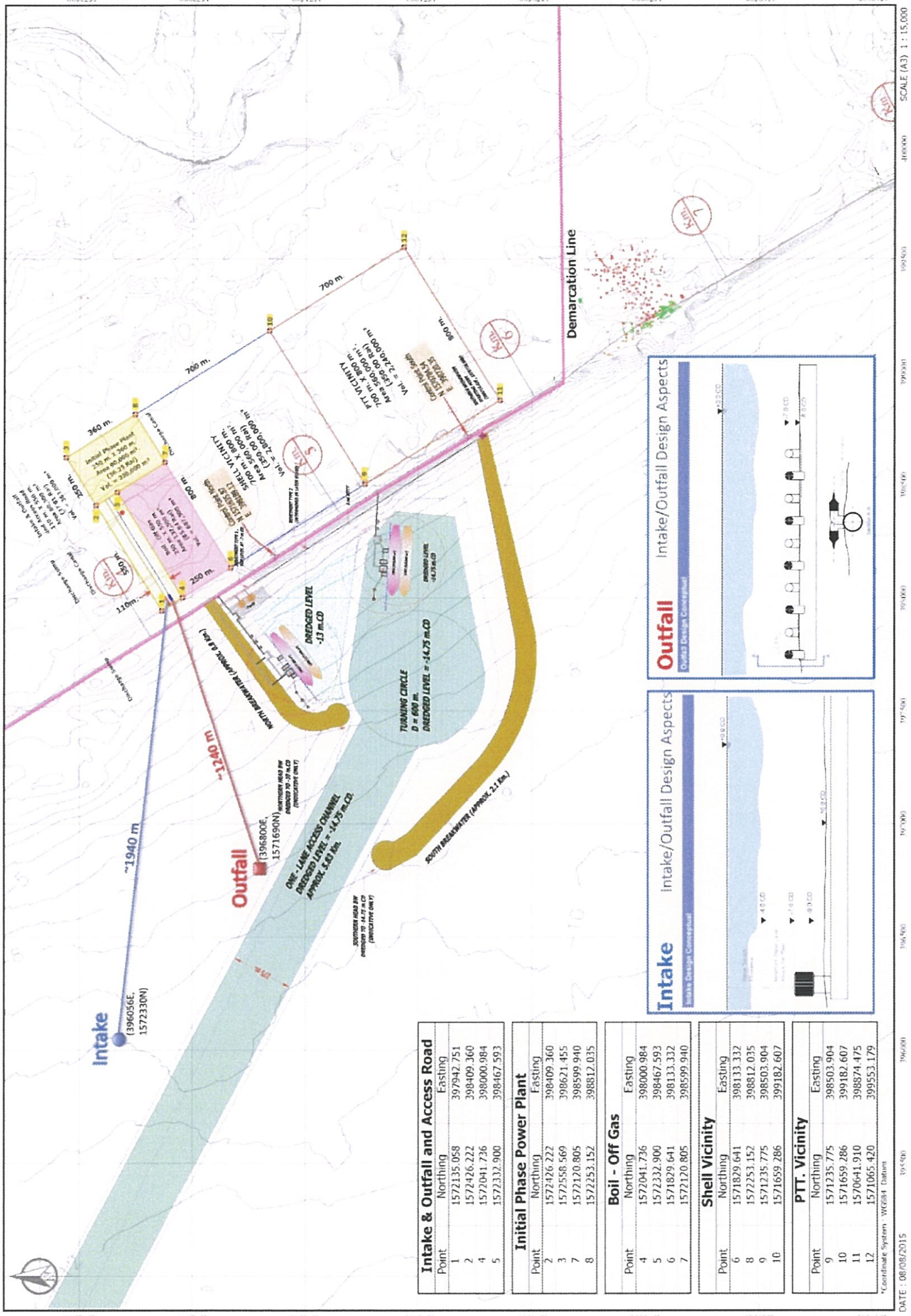


FIGURE 4.1-5 : TENTATIVE LAYOUT OF THE INTAKE AND OUTFALL PIPES

E. Time Schedule

The overall construction period for all phases is planned to complete in 6 years. However, the Notice to Proceed for each phase ("NTP") will be entitled to be released by DSEZ MC upon fulfillment of the requirement under the Concession Agreement. For gas engine plants, the construction period will be 12 months from the issuance of the NTP. For CCGT, the construction period will be 24 months from the issuance of the NTP. The project will be considered physically completed when the power plant fully installed Gas Engine Plants and CCGT Plants as designed.

- First Phase, 40 MW (net) Gas Engine Power Plant, commenced commercial operation in the beginning of 2019.
- Second Phase, 140 MW (net) Combined Cycle Power Plant, commenced commercial operation in the beginning of 2020.
- Third Phase, 30 MW (net) Gas Engine Power Plant, commenced commercial operation in the beginning of Q3 2021.
- Forth Phase, 140 MW (net) Combined Cycle Power Plant, commenced commercial operation in the beginning of 2022.
- Fifth Phase, 70 MW (net) Combined Cycle Power Plant, commenced commercial operation in the beginning of 2024.

Nonetheless, the construction period could be further compressed to accelerate the increase in generation capacity if the power demand warrants.

Figure 4.1-6 is a bar chart showing tentative project implementation schedules. The schedules are subject to change depending on the development progress of the industrial estate, the LNG terminal and gas pipeline, and the time required for project review and approval by the concerned authorities. The construction could commence by the beginning of 2018.

ID	Task Name	Duration
1	**Phase 1: Installation of Multiple Gas Engines**	**12 mons**
2	NTP: Phase 1	0 mons
3	COD: Phase 1	0 mons
4	Civil Works	4 mons
5	Gas Engine	10 mons
6	Balance of Plant	8 mons
7	Commisioning and Reliability Test	2 mons
8	**Phase 2: 2 on 1 Combined cycle**	**24 mons**
9	NTP: Phase 2	0 mons
10	GT1 First Fire	0 mons
11	GT2 First Fire	0 mons
12	GT,ST Synchonization	0 mons
13	Plant Performance Test	0 mons
14	Reliability Test	0 mons
15	COD: Phase 2	0 mons
16	Engineering	15 mons
17	Gas Turbine #1	20 mons
18	Gas Turbine #2	20 mons
19	HRSG #1	18 mons
20	HRSG #2	18 mons
21	Steam Turbine	20 mons
22	Gas Compressor	16 mons
23	Water Treatment and Demineralized System	16 mons
24	Cooling water System	16 mons
25	Compressed air system	12 mons
26	GSU & AUX Transformer	15 mons

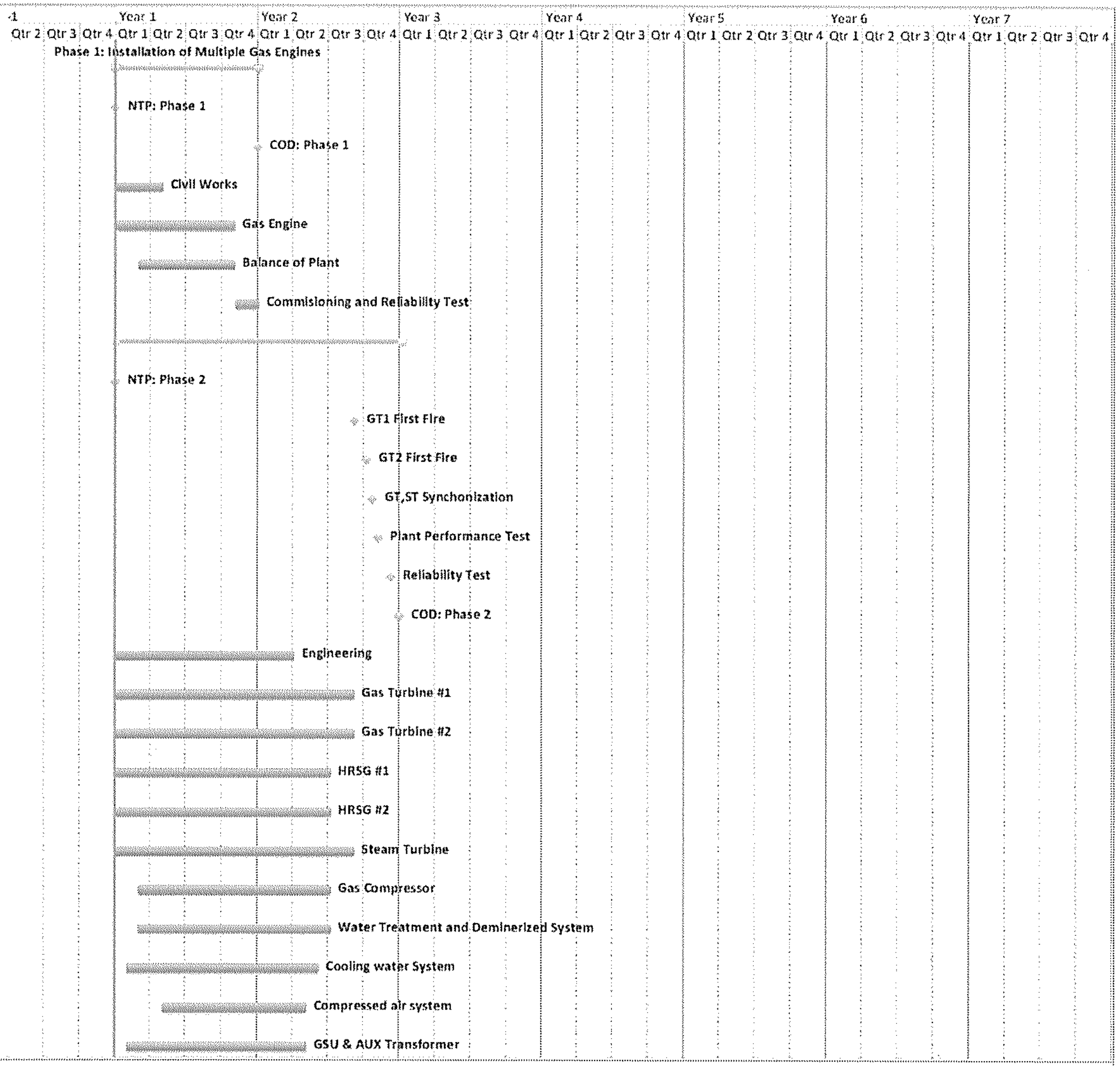


FIGURE 4.1-6 : TENTATIVE PROJECT IMPLEMENTATION SCHEDULE

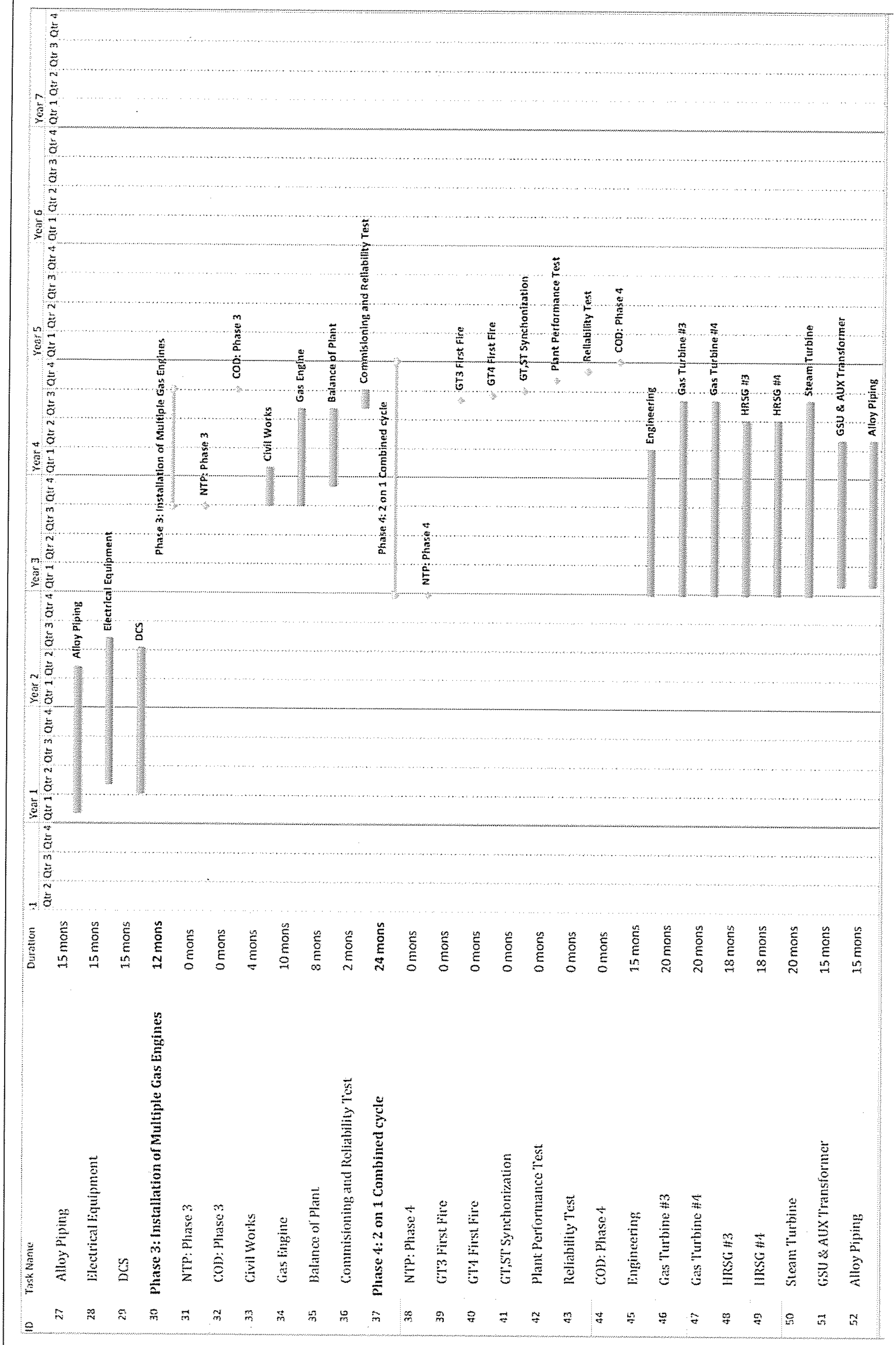


FIGURE 4.1-6 : TENTATIVE PROJECT IMPLEMENTATION SCHEDULE (CONT'D)

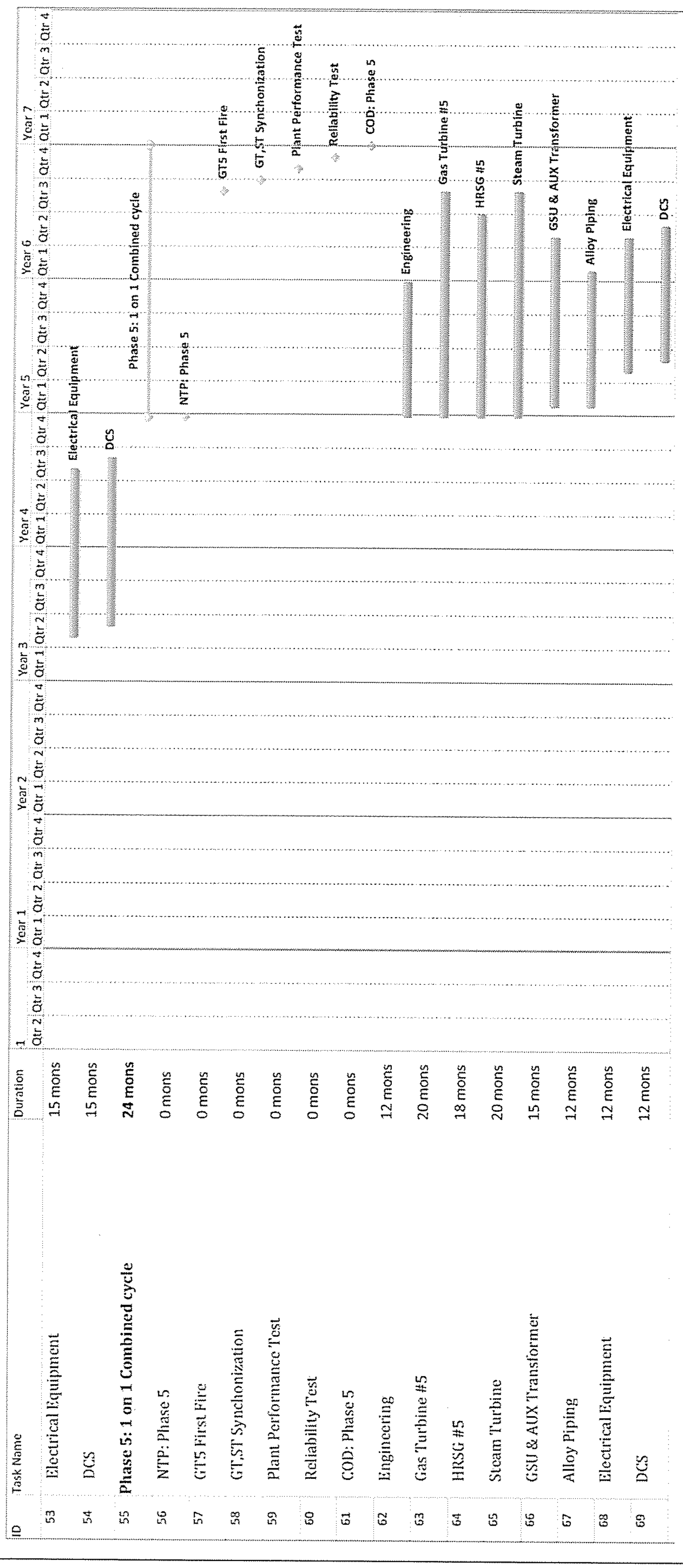


FIGURE 4.1-6 : TENTATIVE PROJECT IMPLEMENTATION SCHEDULE (CONT'D)

F. Pre-Construction Phase

Land Acquisition

The Project does not need to acquire land. The area required is to be provided by DSEZ MC to the Project.

Site Preparation

Site preparation will involve land clearance, filling and compaction of the sites. The existing ground level of the Project site is approximately +4.0 to +5.0 m Chart Datum (CD), equivalent to +1.0 to +2.0 m Mean Sea Level (MSL). The planned coastal road under the LNG terminal and small port project will be designed to be at +6.9 CD. As it is located near the sea, it is prudent to fill the site to raise its elevation to +7.0 m CD to minimize flood risks from extreme sea levels, tidal action, and tsunami.

For the 37.19 acre site, about 683,000 m^3 of laterite will be required for filling. The filling materials will be taken from nearest borrow pits and transported by dumper trucks to the Project site over a distance of about 20 km. This would take from 45 minutes to one hour for the trip from the filling material sources to the Project site.

Construction of Temporary Facilities and Utilities

Construction lay down and work areas will be prepared at the Project Site for construction work. The contractor for the project will be required to provide the following temporary facilities:

- Perimeter fences and guard house needed to guarantee the security of the project site during construction;
- Offices for the Project Proponent, Contractor, and consultants, including communications;
- Power supply for construction;
- Water supply for construction;
- Sewage disposal system for the pre-construction and construction period;
- Drainage system to control the effluent especially during the wet season;
- Site roads based on the final layout; and
- Worker camps

G. Construction Phase

Construction Work

During the construction phase of the Project, the following activities and works will be expected at the project site:

- Construction and provision of temporary works, facilities, and utilities to be used during the construction;

- Delivery, loading, and unloading of main and support equipment and machineries, construction machineries, and construction materials;
- Temporary storage of equipment until commencement of installation;
- Temporary storage of construction machineries and materials;
- Construction, installation, erection, and testing of the equipment in the facilities;
- Construction of plant buildings, facilities, internal roads, and other related units;
- Construction waste disposal;
- Pre-commissioning, commissioning, start-up and putting into operation of the equipment and machineries; and
- Performance testing and trial run of the facilities

Materials

Construction materials will included cement, sand, aggregates, steel bars for reinforcement, steel members, formwork, backfilling materials (such as sand, laterite, crushed stones), concrete or steel piles, masonry, geotextiles and geo-membrane, pipes and fittings, coding and wrapping materials, precast or prefabricated or pre-stressed members and structures, asphalt and pavement, architectural finishing, and other related construction materials. It is anticipated that most construction materials will be available and will be sourced locally.

Equipment and Machineries

The construction will require, but not be limited to, the following equipment and machineries:

- Piling equipment
- Heavy-lift cranes
- 25 ton, 50 ton, and Hiab cranes
- Forklifts
- Excavators and Backhoes
- Grader and Compactor
- Dump truck
- Water truck
- Small Pick-up truck and Van
- Rebar cutter and bender
- Concrete vibrator
- Water pump
- Welding machines

Labour Force

During the construction phase of the power plant, it is anticipated that the on-site peak manpower, including site engineers, supervisors, and workers will be about 600 persons. Estimates of the personnel are as follows:

Type of Skill	Number of Persons
Skilled Labor up to Professional	50
Semi-skilled Labor	100
Unskilled Labor	450

Contractual Arrangement

The Project will be implemented on an engineering, procurement and construction (EPC) contract package. Details on the contractual arrangements for civil works and mechanical and electrical works will be worked out and presented in the EIA report. The Project Proponent will set up a team led by a project manager to oversee and manage the contracts.

Occupational Health and Safety

The project personnel responsible for employing contractors must prepare safety plan during pre-construction and construction period. The plan must be harmonized with relevant rules, regulations and principles regarding preventing of work related accident. The plan will be specified with major criteria as follows:

- **Scope of Work and Detail of the Project**

Responsible employee of a contractor must comprehend details of the project, scope of work and employee's responsibility.

- **Management**

Contractors will inspect the design of constructing plan emphasizing on safety in construction and operational periods before execution of construction. The contractors will assign an employee who has proper qualification; to attend training and has acceptable safety performance to be responsible for planning, presenting and developing safety plan.

- **Control of Contractor**

Contractor selection will depend mainly on the result of attitude assessment on safety administration and responsibility and past experience of their safety performance. In addition, the project will also conduct proficiency test, examine and evaluate contractors during operation period.

- **Coordination**

Coordinating unit of the project will compose of representatives of Initial Phase Power Plant Project, occupational health and safety committee of the

contractor, committee for preparing the meeting of the contractor and an accident reduction team. Furthermore, daily safety work will be summarized to ensure increasing safety awareness to each personnel.

- **Training**

Training will be provided to modify personnel's behavior. Training will be arranged at beginning of employment for educating basic safety and Safe Worker Observation Program (SWOP). These trainings will highlight on both practice and communicative means of safety for individual delivery to workers.

- **Detail of Working Method**

Theory and philosophy will be used to make a plan; meanwhile, documentation procedures will be used for work implementation. Besides, details of working methods will be provided for describing scope of work, operating plan of assignment, step of work, risk area and risk reducing method, individual protective device, license and delegating authority document, essential equipment and importance of environment.

- **Risk Assessment**

Risk of occupational health and safety will be specified, evaluated and measured in terms of probability of happening and severity. In addition, administrative section will take a responsibility to verify and operate methods or measures for alleviating various unexpected risks.

- **Evaluation**

The project will usually take a responsibility to observe daily work, monthly safety evaluation and individual safety evaluation in order that an operator will increase carefulness to work for more safety.

- **Safety Awareness and Consciousness**

The project will be responsible for arranging safety awareness and consciousness of contractors. To promote this, the project will take a responsibility to contribute to every contractor's participation with persuasion, awareness building, and consciousness stimulation; include stimulation of administrative section's responsible for project's safety management.

- **Individual Protective Devices**

A need of personal protective equipment which is more than hard helmet, safety glasses, safety shoes and globes will depend on need evaluation of each activity. The project will place high priority to works concerning or touching hazardous, toxic and contaminated materials.

- **Medical Service**

The project will conduct sufficient assessment of medical service within the areas of the project location. To contribute this, a professional nurse or a medical assistant will be hired to work in the project's site for emergency treatment and other sickness. In addition, safety officer and medical staff will also take responsibility to monitor injured condition for preventing stop job due to accident from work.

- **Occupational Health**

Healthiness of employee, workers, contractors and local dwellers is the most important for formulating occupational health and safety. To achieve this plan, contractors will be fully supported to perform its responsibilities on occupational health, safety and environment of the project.

- **Accidental Report**

Each accident happening will be examined by administrative section, chief of employee and safety officer of contractors in order to co-analyze cause of the accident and indicated results. In addition, they will be searching for protecting method to probable cause of unsafe incident and officially inform the project.

- **Public Relation**

Public relation disseminating success of safety work of a contractor is very important to promote behavior modification. To encourage this, contractors will be provided with pocket book, leaflet or sign broad in the project area in order to promote positive practices of occupational health and safety.

- **Environment**

The project will be responsible for assigning a contractor to manage administrative work harmonizing with the project's policy, rules, related regulations and other requirements in the report of environmental impact assessment. To do this, the contractor will take responsibilities to recruit employees who have proper qualification and experiences in noise level control, solid waste management, air pollutant and wastewater control and public relation activities for contributing to the project.

- **Practical Method in Emergency**

Good preparedness for emergency is a basic principle of safety work. To achieve this, the project will be responsible for providing emergency plan consisting of emergency treatment, emergency evacuation, and restrain of incident and safety which will be designed to operate for a specific project.

- **Practical Method to Violating Regulation**

An announcement of stop work will be informed when there is an unsafe work or environment. The announcement will equipped with details of unsafe behavior and risk situation including indication of solving method to be conducted.

Contractor may cancel employment contract or impose entrance prohibition to an outsourcing or employees when there is fact or surrounding condition confirming that those employees or outsourcing has committed unsafe conducts.

H. Operation Phase

Modes of Operation

The power plant will be operated as a based load plant throughout the year, albeit the allowable scheduled maintenance as mandated in the terms and conditions of the power purchase agreement.

Inputs for Operation

(1) Fuels

(a) Source

The Gas Engines and CCGTs will be designed to run on natural gas only. Natural gas is supplied to the gas regulating station by the adjacent LNG terminal through the gas pipeline.

(b) Properties of natural gas

The natural gas to be used by the power plant will meet the following property requirements:

Gross Heating Value (Volume Based):

Minimum	980 Btu/SCF
Maximum	1,200 Btu/SCF

Hydrocarbon composition and Nitrogen content within the following range:

Methane	80.00 mol% minimum
Ethane	15.00 mol% maximum
Propane	5.00 mol% maximum
i-Butane	2.00 mol% maximum
n-Butane	2.00 mol% maximum
i-Pentane	0.50 mol% maximum
n-Pentane	0.50 mol% maximum
Hexane	0.10 mol% maximum
Nitrogen	1.50 mol% maximum
Carbon dioxide	0.10 mol% maximum

Table 4.1-2 shows property specifications for LNG.

TABLE 4.1-2

PROPERTY SPECIFICATIONS FOR LNG

Component	Unit	Lean LNG Example Spec	In-between LNG Example Spec	Rich LNG Example Spec
CO_2	% mol	0	0	0
N_2	% mol	0.4	0.25	0.1
C_1	% mol	99.6	92.2	84.8
C_2	% mol	0.0	5.95	11.9
C_3	% mol	0.0	1.4	2.78
IC_4	% mol	0.0	0.1	0.2
NC_4	% mol	0.0	0.1	0.2
IC_5	% mol	0.00	0	0.01
NC_5	% mol	0.00	0	0.01
C_6	% mol	0	0	0
C_7	% mol	0	0	0
C_{8+}	% mol	0	0	0
C_6	% mol	0	0	0
C_8	% mol	0	0	0
N_2	% mol	0	0	0
HHV^{real}	Btu/scf.	1010	1083	1156

(c) Required Volume

In full phase operation, the power plant will consume approximately 65 MMSCFD (million standard cubic feet per day) of natural gas. ***Figure 4.1-7*** shows a preliminary heat and mass balance diagram for the Project.

(d) Handling and Storage

The natural gas supply will be from the gas pipeline extending from the LNG terminal to the gas regulating station of the power plant. The tie-in location is indicated by a red circle in ***Figure 4.1-8***. The gas supply pipeline will not be included in this EIA study.

Diesel oil will be supplied by tanker trucks. The oil will be transferred from the tanker trucks at the unloading station using mobile or fixed pumps to storage tanks. The diesel oil storage tanks will have a total capacity adequate for emergency diesel generator operation during the interruption period.

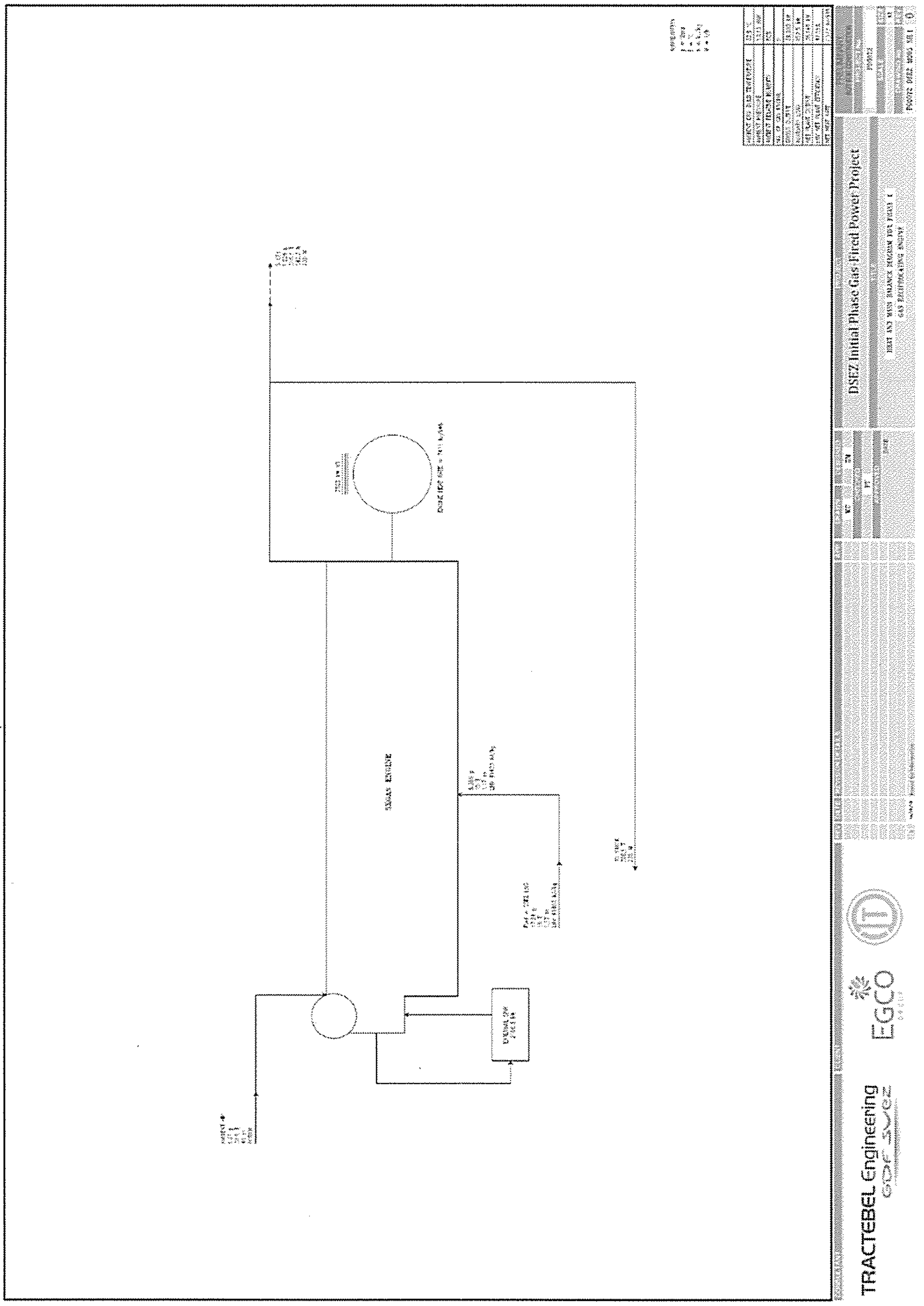


FIGURE 4.1-7 : PRELIMINARY ENERGY BALANCE DIAGRAM FOR THE PROJECT

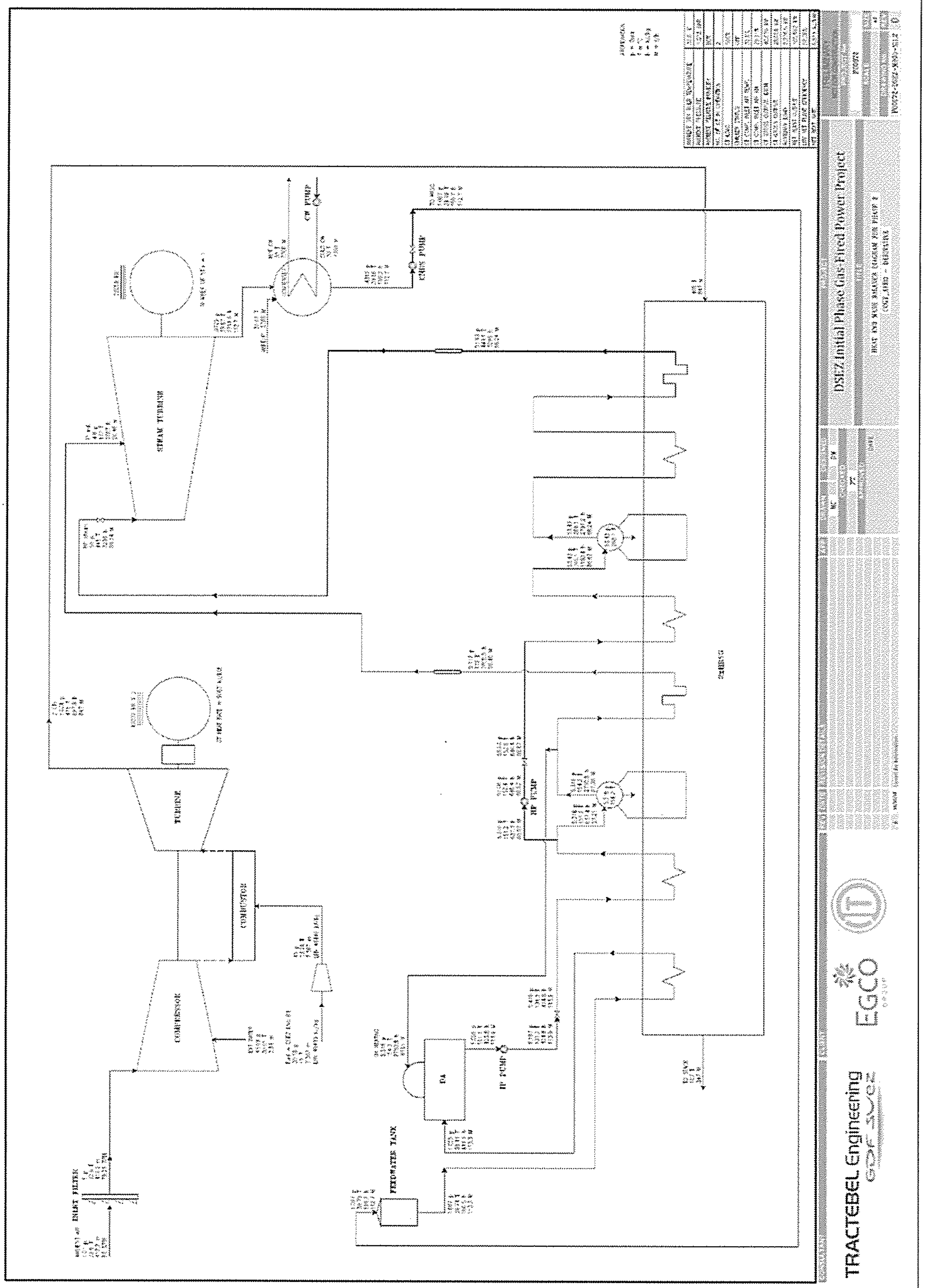


FIGURE 4.1-7: PRELIMINARY ENERGY BALANCE DIAGRAM FOR THE PROJECT (CONT'D)

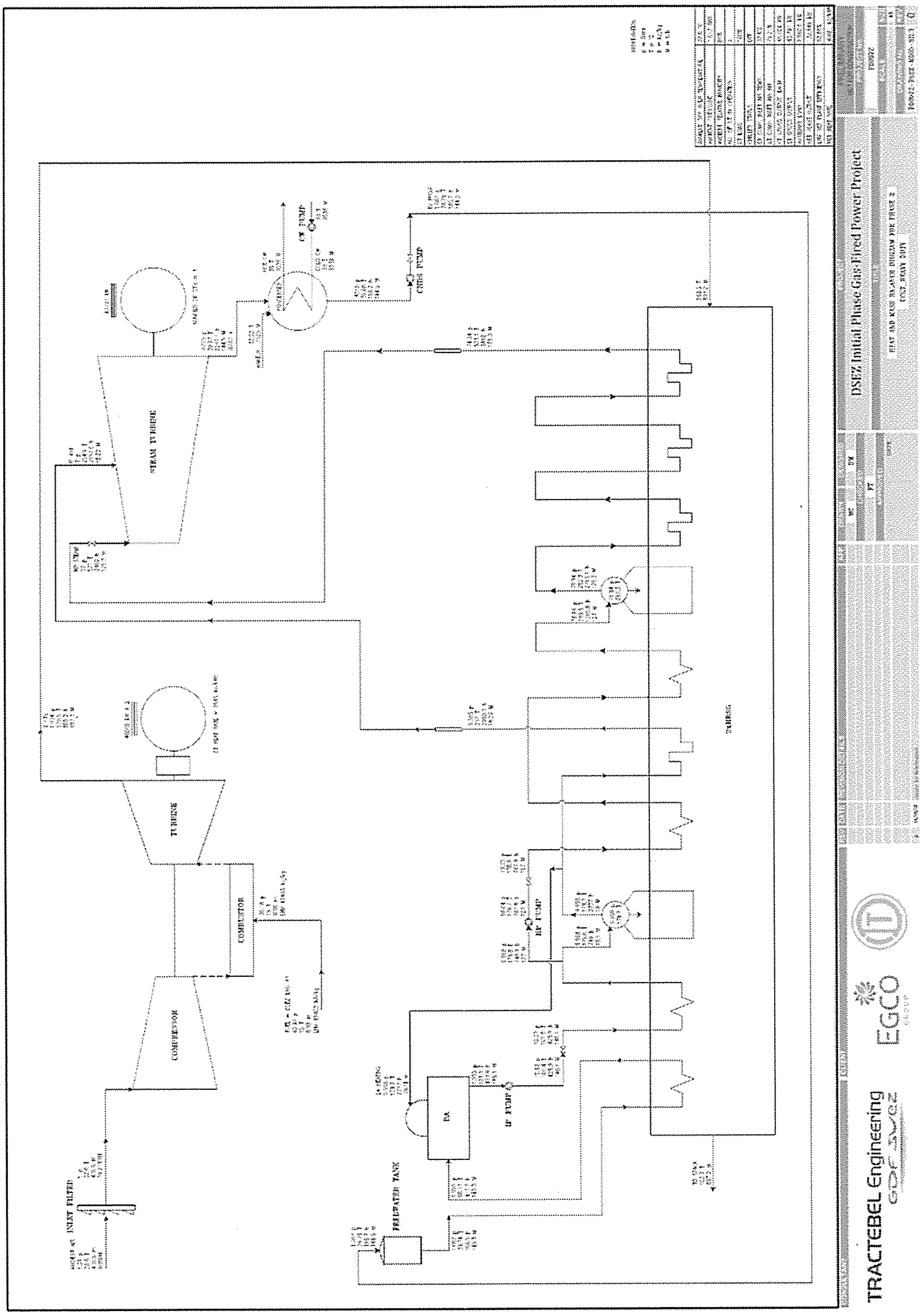


FIGURE 4.1-7: PRELIMINARY ENERGY BALANCE DIAGRAM FOR THE PROJECT (CONT'D)

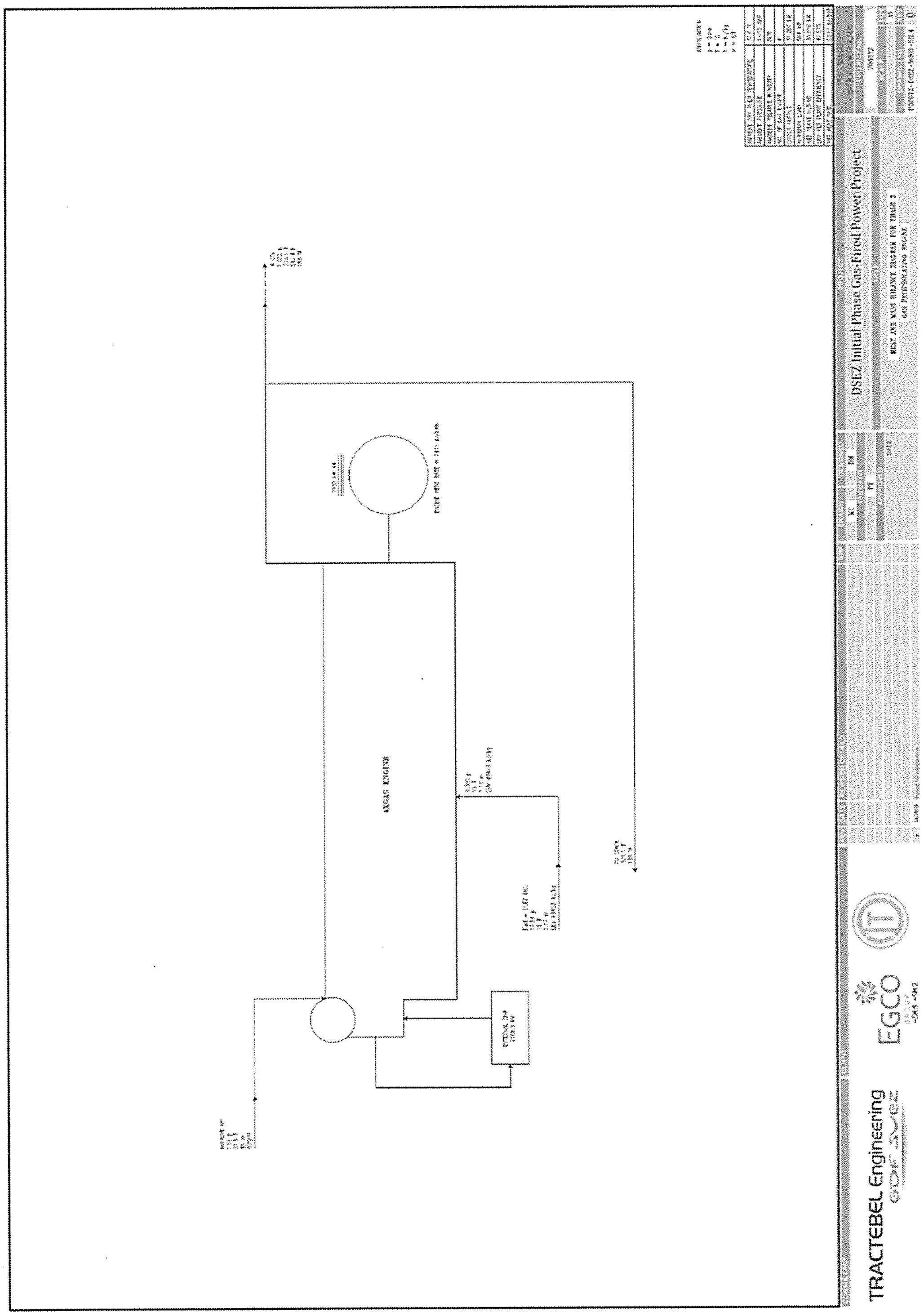


FIGURE 4.1-7: PRELIMINARY ENERGY BALANCE DIAGRAM FOR THE PROJECT (CONT'D)

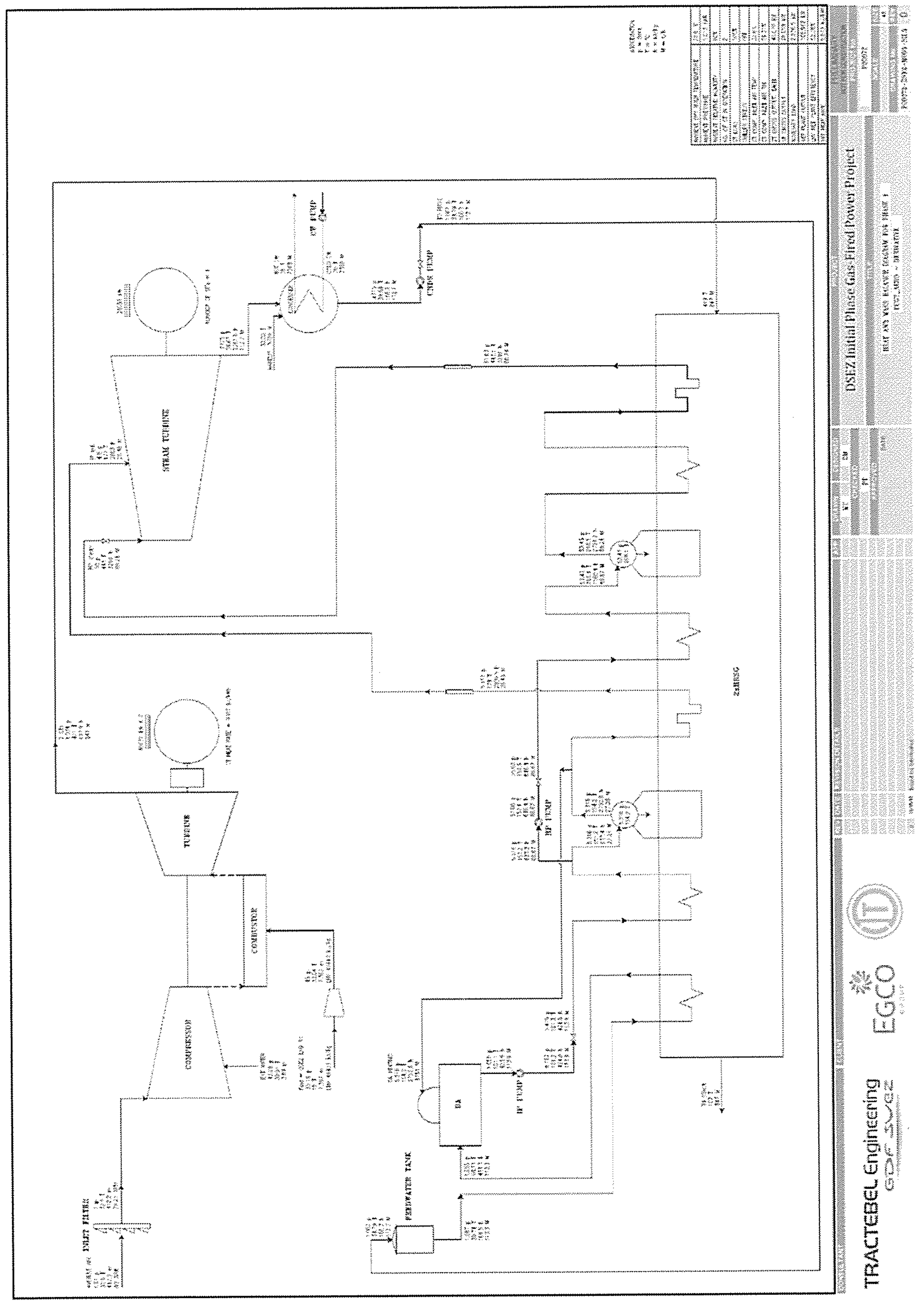


FIGURE 4.1-7: PRELIMINARY ENERGY BALANCE DIAGRAM FOR THE PROJECT (CONT'D)

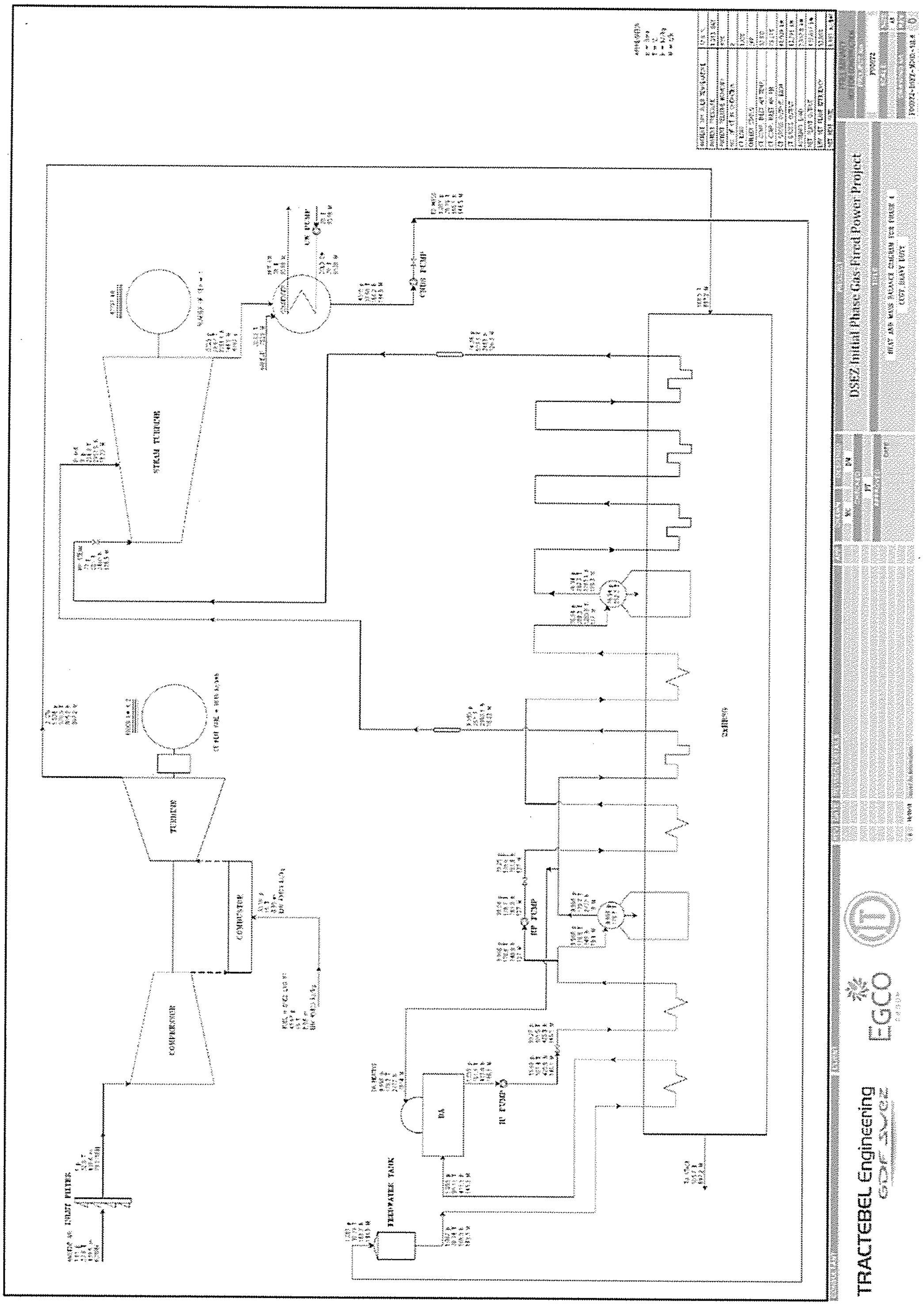


FIGURE 4.1-7: PRELIMINARY ENERGY BALANCE DIAGRAM FOR THE PROJECT (CONT'D)

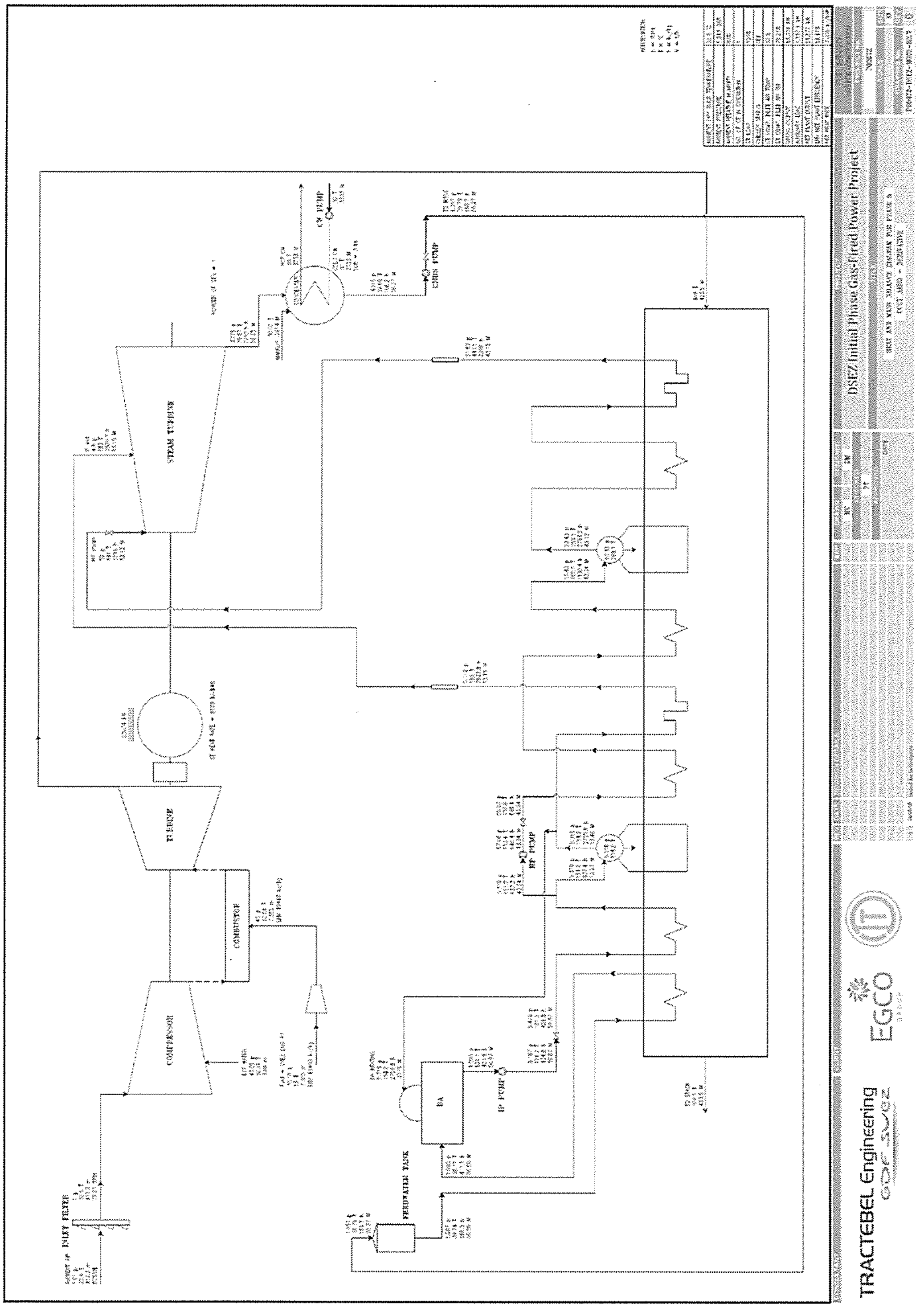


FIGURE 4.1-7: PRELIMINARY ENERGY BALANCE DIAGRAM FOR THE PROJECT (CONT'D)

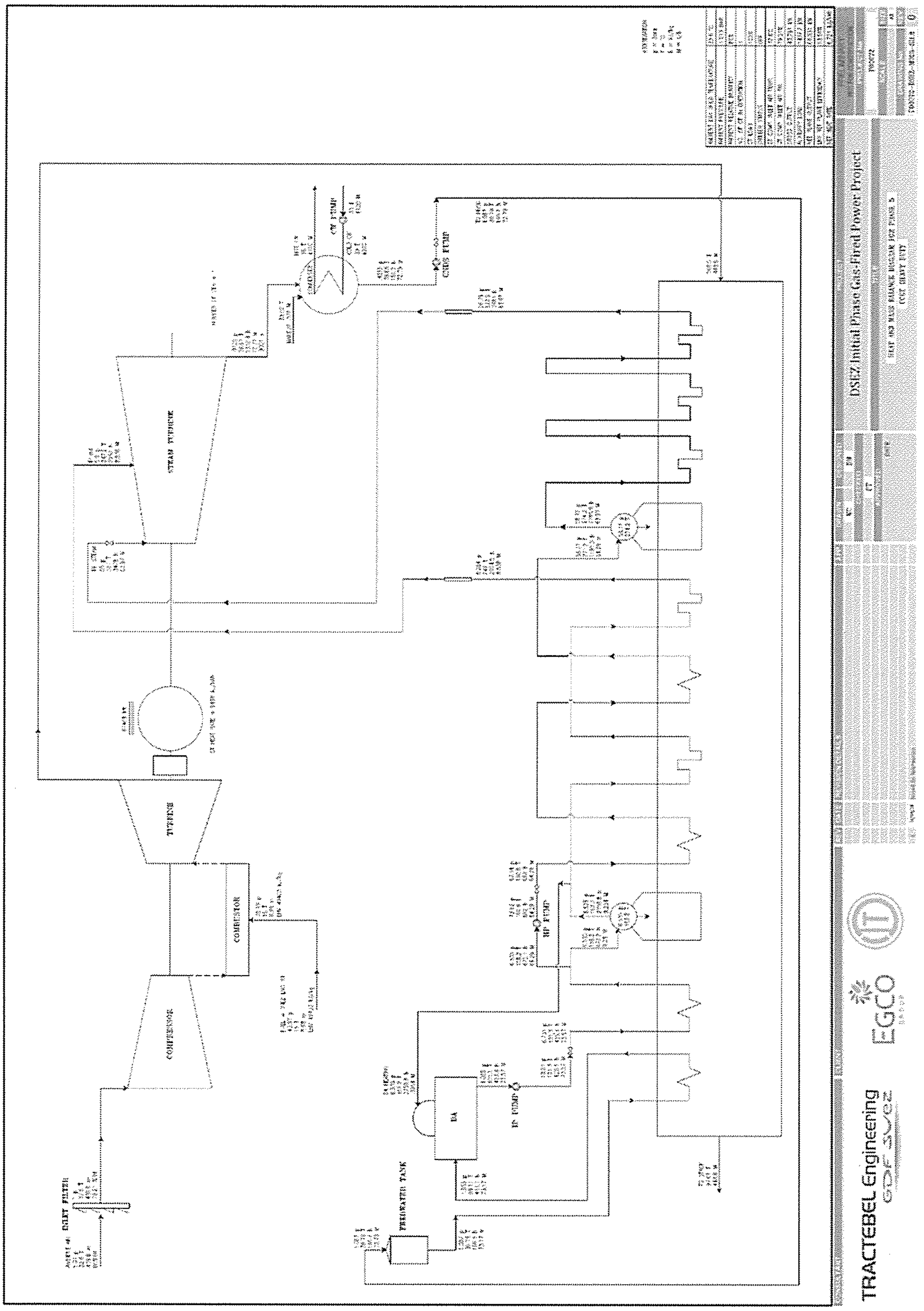


FIGURE 4.1-7: PRELIMINARY ENERGY BALANCE DIAGRAM FOR THE PROJECT (CONT'D)

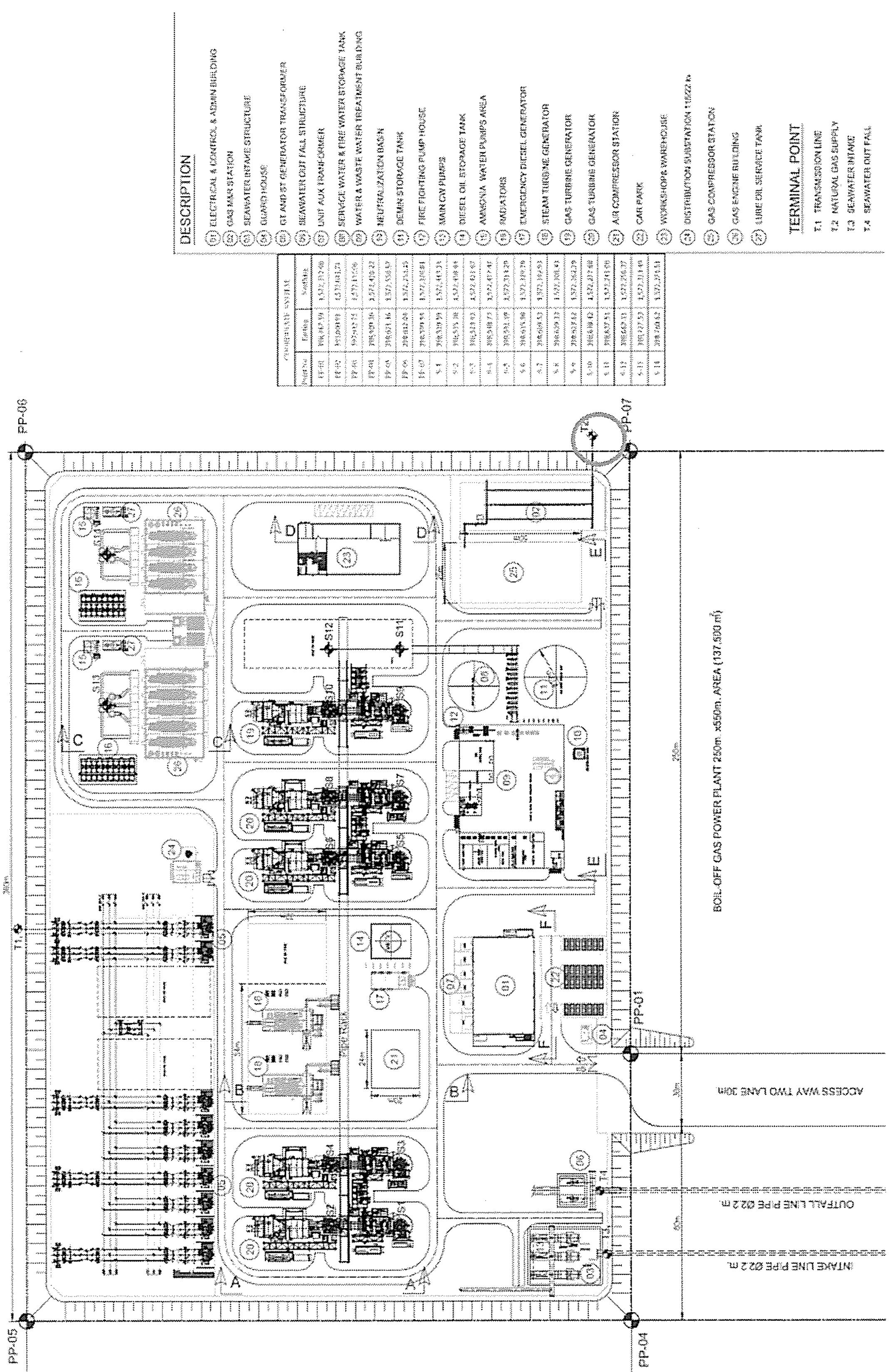


FIGURE 4.1-8 : PLOT PLAN

(2) Water

(a) Water Requirements

As for the commitment to minimize impact to the environment, the design and operation of the power plant will seek to optimize water consumption to a minimum.

Sea water requirement for the once-through cooling system is estimated at 675,210 m^3/day, assuming that the sea water intake and discharge temperature to/from condenser is 30 °C and 38 °C, respectively.

In addition to sea water for cooling purposes, clean freshwater will be required for various uses. The estimates of water requirements at full operation are shown below in ***Table 4.1-3***.

TABLE 4.1-3
ESTIMATED WATER REQUIREMENTS

Use	Quantity
Demineralization plant feed	975 m^3/day
Service water supply	840 m^3/day
Total	**1,815 m^3/day**

Note: Based on 24 hour operation.

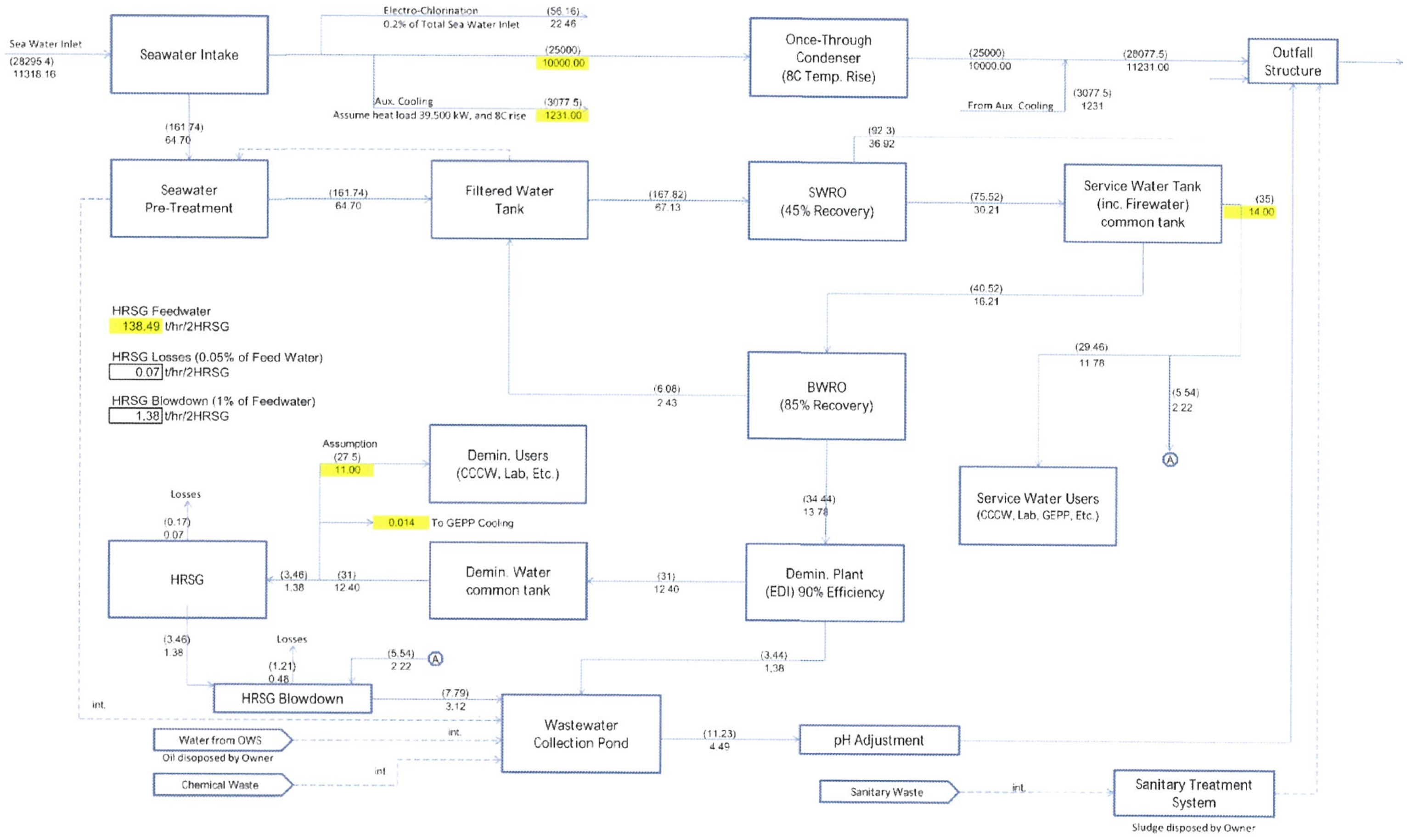
This freshwater will be generated from sea water using an appropriate desalination process. The seawater feedstock for the desalination process is estimated at about 3,890 m^3/day based on the reverse osmosis plus electro-deionization process for desalination. This additional sea water requirement for desalination is less than 1% of the volume of cooling water.

In total, 679,100 m^3/day of seawater will be pumped, utilized and about 676,300 m^3/day will be discharged back to the sea.

Figure 4.1-9 shows a preliminary water balance diagram of the power plant.

Output

The generated electricity will be dispatched from the power plant via a 115-kV conventional air insulated switchyard located in the plant boundary at two voltage levels, 115-kV directly from the switchyard.



Calculation Assumptions
- Seawater Temperature Rise is set at 8C.
- Boiler Blowdown Loss is set at 1% of Feedwater.
- Boiler Other Losses is set at 0.05% of Feedwater.
- Total Service Water is set at 14 T/hr.
- Reverse Osmosis and EDI % recovery is as shown on diagram.
- Electro-Chlorination Inlet Flow is set at 0.2% of Total Seawater Inlet.
- Boiler Feedwater and Seawater Inlet of Condenser is referred to Reference Case's HMBD.
- Seawater Inlet to auxiliary cooling water heat exchanger is based on 39,500 kw equivalent rejection.

Reference Case Information
- 1 x 2-on-1 SGT-800 base load, full condensing is referred.
- Design Condition is 1.013 bar(A), 37.15 C, 80% RH.
- Condenser Pressure is set at 0.091 bar.
- Seawater inlet teperature is 30C.
- Fuel gas composition is based on "In Between" composition.

Flow Definition
- Unit of Mmeasure: T/hr
- Figure in parenthsis is defined for full phase water flow
- Figure not in parenthsis is defined for 1 x 2-on-1 block
- "int." is intermitant flow

FIGURE 4.1-9: PRELIMINARY WATER BALANCE DIAGRAM OF THE PROJECT

Organization for Power Plant Operation and Management

Operation and maintenance (O&M) of the Project assets during commercial operation after phase 5 would require about 50 staff. As the power plant is highly automated, the number of staff may be less than 50. An experienced O&M team will be deployed by the Company to be responsible for day-to-day operations, trouble shooting, scheduled/unscheduled maintenances, and coordination with the contractor under the Long Term Service Agreement (LTSA) which may be entered into prior to the CCGT commercial operation date.

Figure 4.1-10 presents a tentative organizational structure for the O&M of the power plant and its associated facilities. A President will be responsible for the overall management. The organization will be divided into 3 main divisions-operation, maintenance and administration division. The operation division will have positions dedicated for environmental, social, safety and occupational health aspects of the power plant operation. This subject will be discussed in the EMP for the operation phase.

(b) Sources

In early phase of the Project, phase 1, Gas Engine will operate as open-cycle of which the required amount of raw water is only for makeup of the cooling system. Raw water is planned to be delivered from Pa Yain Bu reservoir by truck. Raw water storage tank will have a buffer capacity of two (2) days for power plant operation.

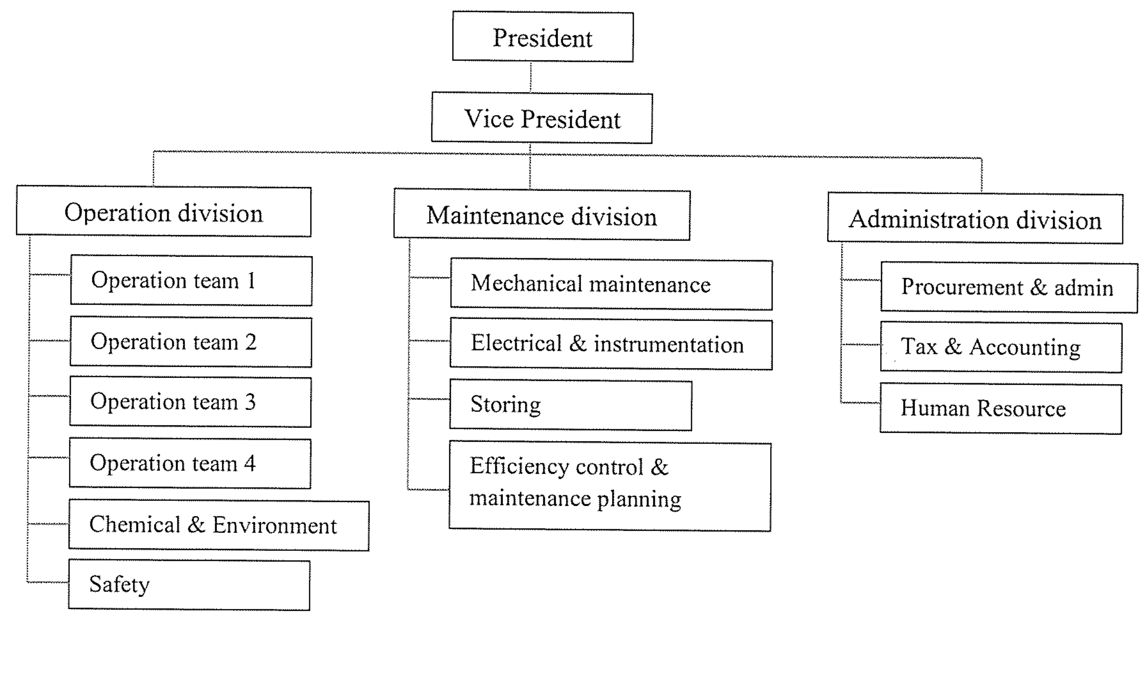


FIGURE 4.1-10: PRELIMINARY ORGANIZATION CHART

I. Environmental Management during Operations

At this stage of project preparation, the Project Proponent tentatively proposes the following environmental management practices during the project operational phase.

Stack Emission Control

The gas turbine units will be equipped with Dry Low NO_x technology to increase thermal efficiency and reduce NO_x emission. The Project Proponent will manage the stack emission to meet the performance in ***Table 4.1-4*** below.

TABLE 4.1-4

PERFORMANCE TARGET FOR EMISSION CONTROL

Source	Technical proposal	Unit
Gas Turbine (Natural gas)	51 (NDA/DA)	mg/Nm^3
Gas Engine (Natural gas)	200 (NDA/DA)	mg/Nm^3

Remark: * Air emission is referencing dry gas, excess O_2 content of 15%

NDA = Non-degraded airshed; DA = Degraded airshed (poor air quality)

Source: IFC Environmental, Health, and Safety Guidelines for Thermal Power Plants, Dated 19th December 2008.

To monitor and evaluate its emission control performance, the Project Proponent considers to install a Continuous Emissions Monitoring System (CEMS) in the stack. The CEMS will be capable of measuring concentrations of the Nitrogen Oxides (NO_x) only (based on the IFC's EHS guideline). Oxygen as well as temperature and others could also be monitored as required.

Wastewater Treatment

The Project Proponent will install facilities for the treatment of wastewater to ensure that the treated effluent will meet the applicable effluent quality standards and acceptable for disposal into the sea or a natural receiving waters.

The wastewater collection and treatment system shall cover, but not be limited to, the following wastewater streams:

- Boiler blow down
- Chemical drain (from HRSG chemicals injection and water treatment)
- Laboratory wastewater
- Oily drains (from workshop, diesel generator, fuel forwarding skid, turbine oil room, etc.)
- Carbon and multi-media filter backwash
- Sanitary wastewater
- Surface drain (non-contaminated area)

The wastewater will be separated into two combined streams-inorganic and organic wastewater streams. The inorganic stream will be treated by physico-chemical methods such as neutralization and precipitation. The organic stream will be treated by biological methods such as waste stabilization ponds or activated sludge process.

This approach will be adopted in the design of power plant. In the EIA investigation, the Consultant will prepare design guidelines for wastewater treatment and disposal. In principle, the final effluent should be used within the Project area for gardening and quenching of the boiler blow down, if possible.

Noise Emission

Noise emissions are to be kept to a minimum. The following noise limits will be maintained in any frequently occupied area of the power plant:

- 85 dB (A) at a distance of 1 meter from the source or from the noise insulation enclosure, if any.
- 90 dB (A) at a distance of 1 meter from the source for the steam safety valves.

The target noise level in control rooms and office is 55-60 dB (A) depending on the location inside the plant.

In terms of off-site noise levels, the EPC contractor will guarantee that the sound pressure level emitted by Supplier's scope of supply at normal operating mode and including existing background noise level will not exceed:

- 70 dB (A) at the Facility boundary lines, Leq (24), (based on existing background noise level not exceeding 65 dB (A))
- Annoyance noise, L (90), should not be greater than 10 dB (A) at the nearest community receptor.

In the EIA investigations, the Consultant has studied the potential noise problems during the construction and operation. The noise study has reviewed the suitability of these proposed noise limits, estimated most likely noise levels, and prepared recommendations for noise control and monitoring. Results are presented in ***Chapter 6.***

Occupational Safety and Health

The Project Proponent ensures that the power plant and its associated facilities will be designed in compliance with applicable OHS requirements for thermal power plants, such as noise, vibration, and hazardous works.

The Project will be responsible for preparing occupational health and safety plan with detail covering every steps of operation in order to ensure the project operation reaching high-level of occupational health and safety. The objectives of the occupational health and safety plan are as follows:

- To prevent accident and contact to any material which may cause injury, sickness, property lost of employees of the project, employees of contractors, visitors and other people.

- To encourage an operation seriously following the project's policy and practice of occupational health and safety in accordance with legal framework of Thai laws and safety policy of the project.
- To select and train every employee to ensure capability and professional practice for carrying out their responsibility in harmonizing mainly with occupational health and safety and emergency plan.
- To manage workplace to be in safe and hygienic condition by designing safe device and practice.
- To provide safety devices in good condition and ready to use.
- To provide basic infrastructures such as sanitation systems, washing and cleaning rooms / drinking water and canteen which are hygienic enough to satisfy the needs of employees.

- **Harmonization with Safety Regulation**

The project will be responsible for preparing safe work plan in pre-operational period. The designed plan will be specified occupational health and safety policy and practice.

- **Enforcement of Safety Operational Practice**

The safety manager, safety officer, employee and visitors must practice requirement specifying in the plan without any exception. The project will be responsible for conducting measures such as warning, firing and chasing employees from the power plant (if necessary) if any person is in violation of the safety regulation and plan and causes any damages.

- **Requirement**

The project will be responsible for practicing requirement of regulations and means of practice relating to the power plant operation.

- **Safety Devices**

The project will be responsible for providing proper and adequate personal safety devices for employees, visitors, and other persons being around in the areas of the power plant. In addition, the power plant will give equal attention possible risk in workplace where employees are working.

A basic personal safety devices will be provided by the project such as hard helmet, safety glasses, ear plug or ear muff, safety belt, fire extinguisher, gloves, coat and first aid set. All of these safety devices will be placed at a specified location for convenient uses. These devices will be kept in good condition and periodically examined to be ready to use.

- **Maintenance of Safety Devices**

The project will be responsible for monitoring and checking machines and equipment such as mechanical engine, electric equipment, lighting system, scaffolding, ladder, pallet, safety devices, etc. Therefore, maintenance and cleaning will be periodically done in order to reduce accidents and severity.

- **Safety Board**

The project will take responsibility to place safety sign or warning which clarifies safety requirements and means of practice at clearly observable place.

- **Responsibility of Safety Officer**

Personnel who have proper qualification and experience will be appointed as safety officer. This officer will be assigned to take responsibility of occupational health and safety, handle and enforce safety plan. The officer will be under the supervision of safety manager. Both of them will take responsibility to periodically inspect and evaluate safety operation of the project.

There will be a monitoring of employee's practice to enforce regulations of occupational health and safety. To do this, a supervisor will be responsible for conducting monitoring of employee's practice. The supervisor will monitor employee's on daily basis in accordance with supervising hierarchy. The monitoring will be executed continuously and evaluation of each supervisor's performance on occupational health and safety be officially made at least once year.

- **Requirement, Role, and Function of Safety Officer**

Safety manager will be responsible for controlling to ensure proper and safe operation. Moreover, safety manager will have authority to enforce safety regulation in order that employee practices safely. The safety manager will also be responsible for representative of the project to practice occupational health and safety and report result of an operation to general manager. Meanwhile, safety officer will be responsible for monitoring to ensure that safety operation and the policy of the company is in accordance with official regulations. Personnel working as security officer will be assigned to permanently work in the project site throughout operation period to monitor security of the project area and all other surrounding parts.

- **Qualification of Safety Officer**

Personnel working as safety manager and safety officer must has proper qualification, attended training on security. Personnel taking function as safety manager and safety officer must also pass specific training on project design and operation.

- **First Aid and Life Saving Devices**

All first aid devices will be kept in clean, hygienic and secured place.

- **Requirement and Safety Control during Fire**

When fire happens around the area of the project, practitioner must obey instruction of fire controlling team. The team will take leading role to manage all operation until completely control fire to normal situation. After this, controlling responsibility will be turned back to the project once again.

- **Practice on Requirement during Fire**

The project will take a responsibility to stipulate procedure for controlling emergency for example firefighting will be put in the procedure in order to immediately control the fire.

Firefighting device will be selective device suitable for continuous operation under climate of the site area in accordance with international standards such as National Fire Protection Association: NFPA.

Not only fire controlling device, lighting system will be maintained in good condition and ready to use. Training on effectively using of device will be organized for person in charge. The fire controlling team will make decision on various requirements of controlling fire.

Additionally, the project will take a responsibility to provide fire extinguisher equipped in every machine and placed at driver's seat or other place where employee can immediately pick up if fire happens.

- **Requirement for Fire Prevention Measures**

The main criteria taken into account during the design phase of the power plant includes the Fire Prevention Measures e.g., designing of fire prevention system, construction materials, construction technique etc. Fire Prevention System shall be in accordance with the International Standard such as NFPA (American National Fire Protection Association). The Project Fire Prevention System in accordance NFPA Regulations includes:

- Standard for the Portable Fire Extinguishers: NFPA 10
- Standard for Low-, Medium-, and High-Expansion Foam: NFPA 11
- Standard on Carbon Dioxide Extinguishers Systems: NFPA 12
- Standard for the Installation of Sprinkler Systems: NFPA 13
- Standard for Water Spray Fixed Systems for Fire Protection: NFPA 15
- National Fire Alarm and Signaling Code: NFPA 72
- Recommend Practice for Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter Stations: NFPA 850

- **Safety Requirement for the Project**

Occupational health and safety is important criteria for both design and operation periods. The power plant project will be designed, system tested and operated in accordance with regulations, laws and standards. In addition, practical means of other electric equipment and machine passing examination will be used according to legal requirements. Furthermore, every operating employee will be trained in order to improve capability to use various equipment correctly and effectively.

The project will study on safety criteria (for example risk assessment) during design period to indicate any severe hazards which may be happened. To reduce

risk to an acceptable level, design, safety administration practice and specific property of installed equipment will be considered.

- **Safety Plan during Operational Period**

The project will be responsible for gathering safety requirements and practices in emergency and include into the safety plan. The prepared safety plan will specify major safety criteria and security practice during operational period. Topics of safety plan will include:

- **Overview of Occupational Health and Safety Policy**

Safety plan will specified an overview of occupational health and safety policy for all employees to practice.

- **Requirement and Standard**

Safety plan will specify requirements and standards relating to overall operation and each section of the project.

- **Responsibility and Structure of Organization**

Safety plan will have specific responsibility and structure of the organization with personnel responsibility details and supervising hierarchy. The project will take a responsibility to appoint safety committee in accordance with legal requirement. The committee will take function to develop policy and safety practice; encourage employee practice relating requirements and laws; respond to and examine unsafe environment in the area of workplace and establish resolving measures. Additionally, the committee will take function to verify accident and sickness concerning to employee's working, promote and support safety activities at work.

- **Risk Activities Identification**

Main activities during operation period which may have risk to health and safety will be specified in safety plan.

- **Control, Protection and Practice for Safety**

Safety plan will specify details of control, protection and practice for safety composing of:

- Safety implementation
- Safety practice
- Special working system for example working requiring permission (Permit-to-Work)
- Use of personal protecting devices
- Monitoring and examining of employee's practice and workplace

- **First Aid**

Safety plan will specify first aid devices, other medical devices, emergency treatment devices and route to hospital.

- **Practice for Supporting Emergency**

Safety plan will specify practice for supporting emergency and others which must be prepared such as main personnel's function, telephone number and address for emergency, controlling practice, evacuation, route to hospital, contact and coordinating systems for emergency, etc.

- **Safety Evaluation of the Project**

Safety plan will specify requirement for monitoring and examining efficiency of safety implementation.

- **Result Report**

Safety plan will specify result report, accidental report, safety report, and process of investigation and other verification which will explain flow of report, relative employee, and safety notice board.

- **Occupational Health**

Safety plan will specify activity of occupational health and provision of examination and medical monitoring.

- **Training**

Safety plan will specify curriculum of training on safety for new recruitment. The curriculum covers knowledge concerning safety policy and practices which will be in line with safety legal requirement, practice and standard relevant to safety practice in accordance with the company policy and requirement of occupational health and safety.

- **Posting Notice and Giving Safety Information**

Copies of safety plan will be posted for announcement and placed at entrance-and-exit of office buildings in the project. Parts of the safety plan will be copied and posted at main areas around the project for giving guideline and immediate and easy observation by employees, visitors and others who are around in the project area. In addition, poster or announcement will be displayed to completely provide safety information in accordance with legal requirement.

Buildings and Landscaping

The architectural design philosophy for the proposed power station, to be developed further during project implementation, will ensure that the orientation of buildings and structures and the type of landscaping will complement the natural features of the site to improve the project's visual amenity. All buildings and structures will be designed and constructed to blend in with the surrounding environment (for example,

through the use of appropriate non-reflective materials and colors). Paved walkway will be constructed to connect all buildings and major plant areas. The general layout of buildings and structures will be designed for effective operation and maintenance.

A landscaping plan will be developed by the EPC contractor to provide effective screening of the power station site. Perimeter screening plantations will comprise fast growing species backed by locally sourced native species. Landscaping will take into account the risk posed by wildfire and include effective fire breaks either as mineral earth fire breaks or mown open spaces.

Improvement of ecosystem function will be a key objective of the landscaping plan. Local tress such as coconut tree, mango, jack fruit, etc., shall be provided.

After the construction and erection works are completed, the remaining exposed surfaces of the plant site will be treated to limit erosion from surface water during heavy rains by placing crushed stone.

In the ESIA investigations, the Consultant will elaborate these requirements to prepare specific requirements to be put into the EPC contract.

Storm Water and Wastewater Management

Storm water management will include: (a) a storm water retention pond; (b) treatment and discharge of runoff from the power station, various maintenance areas, and drains from the station service areas; and (c) the diversion of overland flows around the power plant facilities. Three separate drainage systems will be installed for wastewater segregation The waste water streams will include clean storm runoff, floor drains (oil bearing wastes), and plant process wastes.

All rain falling on the power station bench may be contaminated by oily substances from vehicle parking area and workshop, warehouse floors and entrances, and plant repair bays. All potentially contaminated water will be directed to a storage tank via triple interceptor traps to remove oily substances. Interceptor traps will be located adjacent to the power block.

After passing through the triple interceptor traps, oil-free storm water will be directed to a sedimentation pond for removal of suspended sediment before overflowing into the main storm drainage system.

Runoff from various areas in the power plant premises will be controlled through land slope ditches and channeled to the runoff storage areas.

Wastewater requiring treatment will be conveyed to the centralized wastewater treatment facility to reduce various pollutants to levels that meet the applicable effluent standards.

The storm water management system will be constructed early in the construction program to enable effective control of storm water runoff as soon as practicable, thus minimizing construction delays due to heavy rainfall.

In the EIA investigations, the Consultant has elaborated these requirements to prepare specific requirements to be incorporated in the EPC contract.

J. Decommissioning / Closure Phase

At the closure phase of the power plant, the following typical decommissioning procedures shall be strictly implemented to ensure safety during the operations and minimize their environment impact.

- **Determination of Action**

During the transition phase toward deactivation and decommissioning of the power plant, the end-of-life assessment shall be carried out, the result of which shall be a basis for determination of subsequent action. Once a decision has been made to proceed with decommissioning, the decommissioning project scoping document must be prepared to define the ultimate decommissioning objective (e.g., demolition) and end-points, and establish conceptual initial estimates of technical scope, cost, and schedule for the project. Decommissioning end-points are the detailed specification of conditions to be achieved for a facility's spaces, systems, and major equipment; they drive the development and analysis of alternatives subject to the authority and other stakeholder's review and comment.

- **Choosing the Decommissioning Alternative**

Choosing the most appropriate decommissioning alternative involves identification of candidate alternatives followed by execution of a parallel series of activities and studies. Included among these activities and studies are site characterization, risk assessment, safety analysis, and stakeholder participation. Ultimately, a record of decision, or other suitable decision document is produced identifying the most appropriate decommissioning alternative.

- **Engineering and Planning**

The scope and detail of the decommissioning project plan should be commensurate with the scope and complexity of the decommissioning project. The decommissioning project plan should incorporate the measures necessary to protect the health and safety of workers and the public and to prevent the spread of contamination during decommissioning operations. The decommissioning project plan should provide for change control. When completed and approved, the decommissioning project plan will replace the decommissioning project scoping document, constituting the new technical, cost, and schedule baselines for the project, and will become the technical specifications for performing the work.

The readiness review may be performed by a third-party to ensure that appropriate procedures are in place to effectively implement the decommissioning project plan. The readiness review confirms, before decommissioning operations start, that workers are trained and that the organization performing the decommissioning operations is prepared.

- **Decommissioning Operations**

Follow the comprehensive engineering and planning, decommissioning activities should be performed to achieve the established end points and should protect the

health and safety of workers and the public and prevent the spread of contamination during decommissioning activities. Integrated health and safety management procedure shall be strictly enforced and regularly updated to ensure that the safety basis is current, adequate and documented.

Full surveillance and maintenance during the decommissioning operations shall be carried out, particularly to assure that structures intended to contain contamination remain in an acceptable condition, that contamination remains under control, that contamination does not migrate, and that the location, nature, and condition of contamination is known. The surveillance and maintenance program will evolve as facility systems reach their fully decommissioned state.

Waste management for characterizing waste, estimating and minimizing quantities of waste generated, and processing, handling, packaging, storing, and transporting waste generated throughout the decommissioning activities shall also be implemented.

At the end of operations, the Phase-Out surveillance and maintenance activities shall be conducted, followed by issuance of the complete project decommissioning report.

- **Post-Decommissioning Action**

Additional post-decommissioning activities will be determined based upon environmental regulatory requirements, including continuing site control activities, as necessary, pending property or facility release or transfer to another authorized party; or administrative actions consistent with the decommissioning end state and/or site plan. For instances, site may be transferred to remedial action for final cleanup of adjacent soil or groundwater in accordance with environmental regulatory requirements and future land and facility uses.

4.1.2 Description of Project Alternatives

In planning the Project, the Project Proponent considered alternatives in the following three subjects: (i) fuel alternatives; (ii) cooling water system alternatives; and (iii) project site alternatives.

A. Fuel Alternatives

The TOR document issued by DSEZ Management Committee and the DSEZ Development Corporation states that it envisions the proposed power plant under the Project to be gas-based power generation considering its short implementation period and operational flexibility. The geographical characteristics of DSEZ would rule out hydropower and renewable energy alternatives for obvious reasons-no suitable dam site for hydropower development and area constraint for renewable energy development. Therefore, only a coal-fired power plant is alternative to a gas-fired power plant. These two fuel sources are technically possible considering the coastal location of the power plant.

B. Cooling Water System Alternatives

Three alternatives for cooling water system are considered: (i) once-through cooling water system using sea water; (ii) closed cooling water system using sea water; and (iii) closed cooling water system using freshwater from the existing Pa Yain Bu reservoir.

C. Power Plant Site Alternatives

Two alternatives for power plant site are considered: (i) power plant to be located adjacent to the LNG terminal and (ii) power plant to be located within the Initial Estate area.

4.2 COMPARISON AND SELECTION OF THE PROJECT ALTERNATIVES

4.2.1 Fuel Alternatives

The Project Proponent had compared the coal and natural gas alternatives and concluded that gas-based generation would be the most preferred alternative. Typical coal-fired and gas-fired power plants can be compared as shown in ***Table 4.2-1***.

TABLE 4.2-1

COMPARISON OF COAL-FIRED AND GAS-FIRED POWER PLANT ALTERNATIVES

Consideration	Coal-Fired	Gas-Fired
Construction period	3-5 years	1-2 years
Operation flexibility	Less flexible	More flexible
Cost of generation	Low	Higher
Extent and severity of environmental pollution in not controlled	Greater	Much less
Requirements for fuel supply infrastructure	More	Less
Area requirement	Large	Small
Process water requirement	Larger	Smaller for combined cycle
Acceptance to the public	Low	Higher

4.2.2 Alternatives for Cooling Water System

The Project Proponent had considered various aspects of the three alternatives for cooling water systems including their potential environmental impacts as shown in ***Table 4.2-2***. At this stage of project preparation, the Project Proponent ruled out the freshwater alternative as the capacity of freshwater storage from Pa Yain Bu reservoir will be about 7.7 million m^3 per year. This water volume will not be economical for the power plant's use for cooling purpose. The power plant would require about 5 to 6 million m^3 of water per year for a closed cooling water system. Consequently, the selection was confined to only the remaining two alternatives, both using sea water.

TABLE 4.2-2

COMPARISON OF THREE ALTERNATIVES FOR COOLING WATER SYSTEMS

Consideration	Once Through - Seawater	Closed System - Seawater	Closed System - Freshwater
Water availability constraint	No	No	Freshwater must be taken from Pa Yain Bu reservoir, supply constraint considering small reservoir volume and competing demand by industries
Water requirement, m^3/d	675,210	12,000	12,000
Thermal discharge	Large thermal discharge from 676,300 m^3/d of warm spent cooling water	None	None
Death of fish and phytoplankton	Larger, a larger volume of sea water is pumped into the system	Smaller, less volume of intake	None
Other environmental impacts	None	Salt drift downwind and discharge of cooling water blowdown with high salt content	Discharge of polluted blowdown from the cooling tower
Thermal efficiency	Higher	2-5% lower	2-5% lower
Operational problem	Low	Highest, salinity increases in the recirculating cooling water	Moderate

The once-through cooling water system is most common among thermal power plants located near the sea or large river estuaries. Thermal efficiency of steam-based power plants using the once-through cooling water system is reportedly 2% to 5% higher than those using closed cooling water systems. Closed cooling water systems using sea water are more difficult to operate than the once-through systems. Unless impacts on marine ecosystems are significant, the once-through cooling water system is always the most preferred alternative.

Therefore, at this stage of project preparation, the Project Proponent selected the once-through cooling water system as base case. Technical and cost aspects of the closed cooling water system using sea water will be studied in details if impacts of the once-through cooling water system are certain to be significant.

4.2.3 Alternatives for the Project Site

The power plant is proposed to be located adjacent to the LNG terminal which will supply natural gas to the power plant, thus reducing the investment cost for the gas supply line and ensuring reliability of the gas supply. This location is near the sea and will thus minimize the investment cost of the sea water intake and disposal system, and ensure reliability of the sea water supply. Transportation to and from the power plant at this location will incur minimum cost and difficulty because it is close to the existing small port.

Alternatively, the power plant could be located inside the Initial Industrial Estate project, where the demand for the electricity concentrates. The industrial estate area is about 3.6 km north of the site of the proposed LNG Terminal Project. In this alternative, the investment cost and interruption risk for electrical transmission line system will be less than the first alternative. However, the second alternative has major disadvantages, compared to the first alternative, in (i) higher investment cost and interruption risk for the fuel supply system and sea water supply system; and (ii) higher cost and difficulty in transportation. These disadvantages will clearly out-weigh the advantages to be gained in the transmission line system.

Therefore, the first alternative for the Project site is more suitable than the second alternative considering both technical and cost aspects.

CHAPTER 5

DESCRIPTION OF THE ENVIRONMENT

CHAPTER 5

DESCRIPTION OF THE ENVIRONMENT

5.1 SETTING THE STUDY LIMITS

In the Environmental Impact Assessment (EIA) study, it is necessary to establish baseline information on the environmental and socio-economic settings of an area, which could receive directly and indirectly impacts from the Project construction and operation. The baseline information serves two purposes. Firstly, it is used, in conjunction with the information on the Project, for identification of potential impacts of the Project and assessment of their significance. Secondly, it serves as the benchmark for evaluating environmental and social management performance of the Project construction and operation.

For the purpose of establishing baseline information on the environment, the study limits are to consist of geographical limit and contextual limit to guide the baseline information collection.

5.1.1 Geographical Study Limit

The geographical study limit is defined as an area surrounding the project site from which the baseline information collection should be collected. In this Scoping Study, the geographical study limit is about 5 km extending from the center of the project site. This geographical study limit covers 78.57 km^2 of circular area around the project site as shown in a map in ***Figure 5.1-1***. This area is referred to in subsequent sections of this Scoping Report as "the study area". The study area should cover sensitive receptors of environmental impacts of the Project during project construction and operations. However, the air pollution study will cover a larger area than the study area if sensitive receptors are found to exist beyond the 5 km limit.

As the project site is on the coastal area, the study area covers coastal waters and land area.

5.1.2 Contextual Study Limit

The EIA Guidelines defines the contextual study limit to consist of five groups of components: (i) physical components; (ii) biological components; (iii) socio-economic components; (iv) cultural components; and (v) visual components. Considering the nature of this Project and its potential environmental issues, the composition of each main component is presented below:

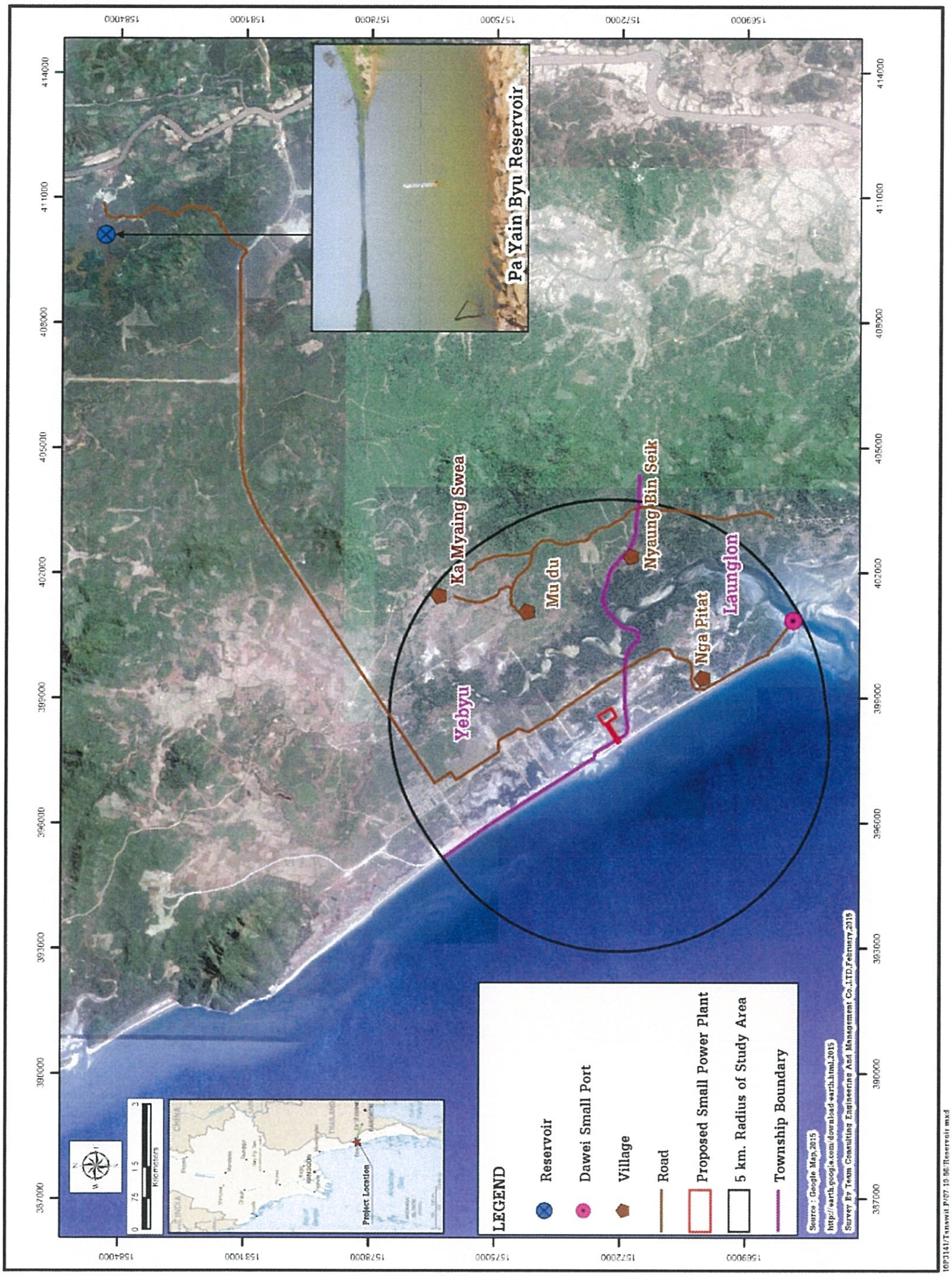


FIGURE 5.1-1 : PROJECT STUDY AREA OF ESIA FOR INITIAL POWER PLANT PROJECT

(1) Physical Components

- Meteorology
- Geography/Topography
- Geology
- Seismology
- Soils
- Hydrology
- Oceanographic Condition
- Erosion and Sedimentation
- Air Quality
- Noise and Vibration
- Seawater Quality
- Groundwater Quality
- Sediment Quality

(2) Biological Components

- Terrestrial Ecology (Forestry and Wildlife)
- Marine Ecology
- Endangered Marine Species
- Fisheries

(3) Socio-economic Components

- Population
- Health Conditions
- Gender Issues
- Main Economic Activities
- Level of Education
- Vulnerable Group
- Land Use
- Infrastructure
  - Roads
  - Traffic counting
  - Electricity
  - Water supply
  - Waste management

(4) Cultural Components

- Religions and Belief
- Sites of Traditional and Historical Value
- Natural Resources Use for Livelihoods
- Key Institutions and Organizations

(3) Visual Components

- Scenic Areas and Locations
- Landscape

The following sections briefly describe each component with details in appendices as appropriate. The methods of information collection are also described as deemed necessary.

5.1.3 Laboratory Test Limit

For this study, all of laboratory test for various parameters such as soil quality, air quality, noise level and water quality, etc. were carried out in Thailand. However, these test are planned to be at a qualified laboratory in Myanmar in the future.

5.2 PHYSICAL COMPONENTS

5.2.1 Overview of the Study Area

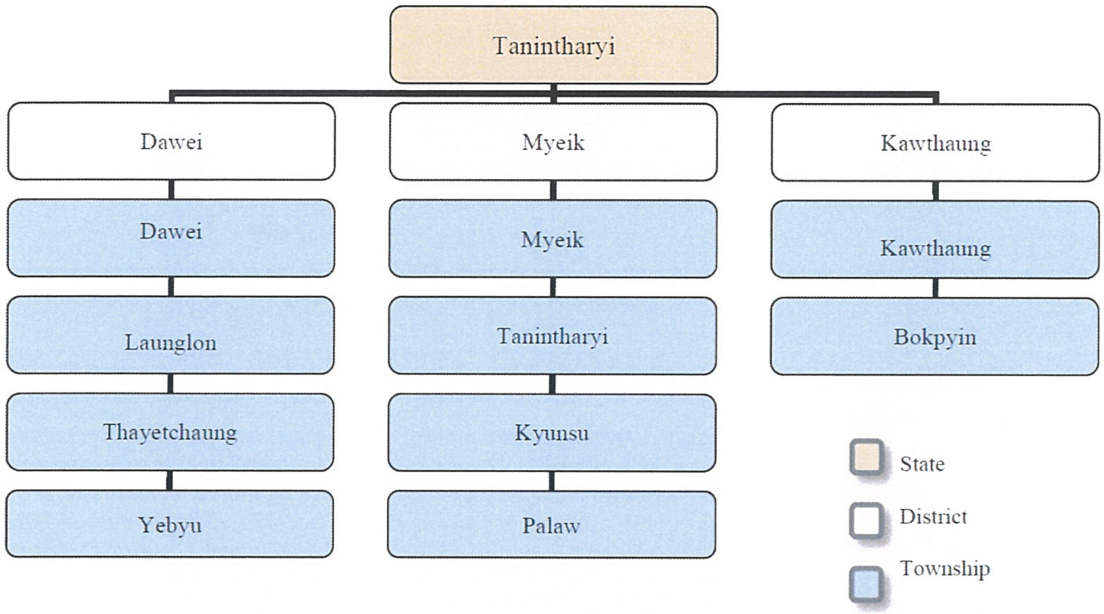
A. Tanintharyi Region in a Nutshell

The study area is in the Dawei Special Economic Zone (DSEZ) located in the coastal area of Tanintharyi Region (see map in ***Figure 5.2-1***). A brief regional profile is presented below:

Capital	Dawei
Number of districts	3
Number of townships	10
Number of wards	83
Number of village tracts	264
Number of villages	1,250
Total population (Est.2012)	1,713,447
Area	43,328 km^2. There are many islands off the coast, the large Mergui Archipelago in the southern and central coastal areas and the smaller Moscos Islands off the northern shores
Borders • North: • East • West • South	 Mon State Thailand Andaman Sea Ranong Province, Thailand
Latitude	14° 5'2.98"N
Longitude	98° 12'E5.67"E
Ethnicities	Bamar, Rakhine, Mon, Shan, Karen, Salone, Malay (Bashu)
Main economic activities	Fishing, Forestry, Mining, Agriculture

Source: Tanintharyi Region Profile, updated June 2014, UNHCR, South-East Myanmar Information Management Unit (*data.unhcr.org/thailand/download.php?id=221*)

The districts and townships of the Region are shown in ***Figure 5.2-1***. The Region is sparsely populated as indicated by its overall population density of 39.6 persons/km^2.



Source: Tanintharyi Region Profile, updated June 2014, UNHCR, South-East Myanmar Information Management Unit (*data.unhcr.org/thailand/download.php?id=221*)

FIGURE 5.2-1: DISTRICTS AND TOWNSHIPS OF TANINTHARYI REGION

The DSEZ is in Dawei District which has four townships. The total population of Dawei District[1] was estimated at 492,277 in 2014, consisting of 146,271 in Dawei Township, 118,301 in Launglon Township, 105,599 in Thayetchaung Township, and 122,106 in Yebyu Township.

On most social development indicators, Tanintharyi Region fares comparably to the national average, but access to basic services in remote islands is noted as a concern. Although the Region has significant reserves of natural resources (mainly natural gas and metals), poverty incidence (at 33 percent) is higher than the national average (26 percent).

B. The Study Area

The study area as defined in ***Section 5.1*** has a total area of about 19,415 acres (78.6 km^2), of which about 8,994 acres is coastal water area, and the remaining 10,420 acres covers three villages and one community in two townships; namely Yebyu (1 village and 1 community) and Launglon (2 villages) as shown in ***Figure 5.2-1***. ***Table 5.2-1*** provides names of the villages and their approximate distance from the Project site which is located in the administrative area of Nga Pitat Village, Launglon Township.

[1] Source: www.citypopulation.de/php/myanmar-admin.php?adm1id=0601

TABLE 5.2-1

VILLAGES IN THE STUDY AREA

Township	Village	Approx. km from the Project Site
Launglon	Nga Pitat	2.23 km.
	Nyaung Bin Seik	3.67 km.
Yebyu	Mudu	4.03 km.
	Ka Myaing swea (Community)	4.53 km.
Total 2 townships	**3 villages and 1 community**	

5.2.2 Meteorology

(1) Methodology for Data Collection and Analysis

The description of climatic conditions of the study area is based on two secondary information sources:

- Rainfall data recorded at Dawei Meteorological Station from 1999 to 2014.
- Meteorological data recorded at ITALIAN-THAI Development Public Company Limited (ITD) Meteorological Station in DSEZ for 2013 and 2014. The data include air temperature, air pressure, relative humidity, and wind speeds and directions.

The monthly data from the two sources are shown in ***Table 5.2-2*** and ***Table 5.2-3***, respectively.

(2) Climatic Conditions

In general, the regional climate is significantly influenced by the south-west and north-east monsoons as shown in ***Figure 5.2-2***. The south-west monsoon from the Indian Ocean and Andaman Sea passes through the south peninsula around mid-May, bringing with it moisture-laden winds and causing heavy rain and air humidity. The north-east monsoon from the main land starts to pass through the region from November to February.

TABLE 5.2-2
AVERAGE RAINFALL AT DAWEI STATION

Station: Dawei Meteorological Station

Year: 1999-2014

Latitude: 14° 06' N **Longitude**: 98° 13' E

Unit: mm

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Annual
1999	52	7	120	916	747	1,145	525	1,341	755	410	176	1	6,195
2000	12	25	49	267	815	1,131	1,377	1,247	927	285	6	0	6,141
2001	7	6	113	6	980	1,311	986	1,974	323	184	21	9	5,920
2002	0	0	13	47	972	959	1,278	1,471	1,346	116	114	15	6,331
2003	1	1	189	68	566	904	1,431	1,205	706	256	0	0	5,327
2004	3	11	57	8	931	1,030	665	1,370	268	109	0	0	4,452
2005	0	8	8	20	419	1,234	1,664	1,011	857	186	120	6	5,533
2006	0	24	67	215	759	738	2,081	1,880	604	448	0	0	6,816
2007	1	0	0	117	610	620	1,460	1,228	815	454	7	0	5,312
2008	0	52	47	188	975	1,026	1,038	766	1,149	259	51	0	5,551
2009	0	0	47	283	416	1,223	1,825	903	1,107	440	6	0	6,250
2010	31	0	0	0	411	478	478	832	417	381	0	40	3,068
2013	48	61	36	30	273	886	1,793	1,021	1,070	293	74	1	5,586
2014	0	0	5	29	296	1,199	1,583	1,336	981	258	136	0	5,823
Average	**11**	**14**	**54**	**157**	**655**	**992**	**1,299**	**1,256**	**809**	**291**	**51**	**5**	**5,593**

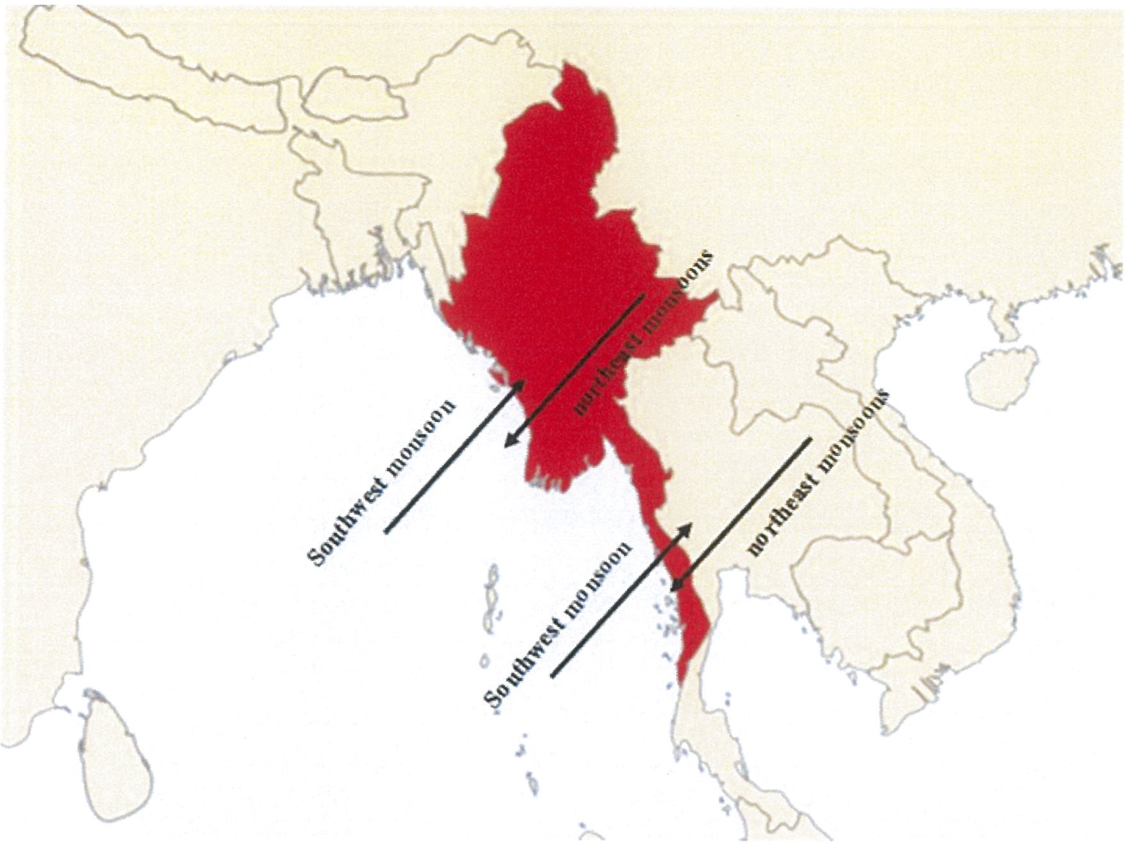
Source: Dawei Meteorological Station, 2015

TABLE 5.2-3
CLIMATIC DATA FORTHE PERIOD 2013-2014 IN DSEZ

Station: Italian-Thai Development Public Co., Ltd. Meteorological Station
Year: 2013-2014
Latitude: 14° 15' N **Longitude**: 98° 02' E

Observed Items	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
	Temperature (Celsius)													
Max	2013	34.3	35.4	36.2	36.9	35.5	33.4	32.5	32.6	32.9	34.3	36.0	33.9	34.5
	2014	34.7	33.3	36.6	35.3	35.2	34.1	32.9	33.4	33.1	35.4	35.7	35.8	34.6
Min	2013	17.1	19.7	17.9	21.2	22.9	23.3	22.4	22.4	22.9	22.2	19.4	13.5	20.4
	2014	13.7	16.0	17.3	22.2	23.4	23.4	22.9	22.5	22.6	22.3	19.5	19.0	20.4
Mean	2013	25.5	27.6	27.7	28.8	28.5	26.9	25.7	26.3	26.3	27.1	27.5	24.2	26.8
	2014	23.8	25.1	27.0	29.2	28.6	27.0	26.4	26.2	26.3	27.6	27.3	27.0	26.8
	Air Pressure (mbar)													
Max	2013	1017.5	1016.1	1016.6	1013.5	1011.4	1012.1	1011.6	1012.5	1012.7	1014.5	1014.9	1018.0	1014.3
	2014	1021.0	1017.1	1017.4	1015.9	1014.4	1013.7	1013.1	1014.0	1014.9	1016.0	1016.0	1016.5	1015.8
Min	2013	1007.8	1006.0	1006.0	1004.7	1003.2	999.9	964.6	1000.5	1003.9	1004.6	1005.3	1006.2	1001.1
	2014	1008.9	1006.6	1006.7	1006.3	1005.3	1001.2	1004.5	1006.5	1003.0	1006.3	1007.4	1007.2	1005.8
Mean	2013	1012.4	1010.8	1010.8	1008.8	1008.2	1006.3	1007.3	1008.0	1008.5	1010.6	1010.3	1012.2	1009.5
	2014	1014.2	1011.9	1012.1	1010.8	1010.0	1017.6	1008.9	1010.2	1010.7	1011.7	1012.0	1012.1	1011.9
	Relative Humidity (%)													
Max.	2013	96.4	94.7	94.6	94.6	93.9	94.4	94.3	94.2	94.6	94.9	94.0	93.3	96.4
	2014	95.9	96.4	92.9	93.3	93.7	93.7	94.2	94.4	95.0	95.0	95.2	93.8	96.4
Min.	2013	24.8	27.5	28.7	40.3	45.7	55.8	10.8	5.4	57.5	41.1	33.7	28.5	57.5
	2014	19.0	35.8	19.5	50.1	47.3	56.5	64.1	60.2	57.6	39.2	34.4	27.9	64.1
	Wind (m/s)													
Max. Wind Speed	2013	9.1	13.3	11.7	16.1	18.0	23.4	18.1	24.7	8.3	7.0	7.7	8.7	24.7
	2014	9.6	5.8	6.1	5.2	6.4	7.2	8.8	6.7	7.1	6.6	7.4	43.3	43.3
Average Wind Speed	2013	2.8	2.6	2.9	2.7	2.6	3.0	2.9	3.0	2.3	2.5	2.7	3.5	2.8
	2014	3.1	2.6	2.6	2.5	2.5	2.7	2.6	2.2	2.1	2.6	2.7	3.4	2.6

Source: Italian-Thai Development Public Co., Ltd., 2015



Source: adapted from Meteorological and Hydrological Department, Yangon, Myanmar, 2010

FIGURE 5.2-2: MONSOON WIND DIRECTION PASSING THROUGH MYANMAR

The study area has tropical monsoon climate characterized by three seasons.

The winter season normally begins in November and lasts until February. During this period, the weather is relatively cold and dry due to the northeast monsoon. The monthly mean minimum temperatures are normally in the range 13.5-19.7°C.

The summer season follows the winter season, normally from March to April. The climate in this period is relatively warm and humid with average temperatures between 27.0-29.2°C and the monthly mean maximum temperatures are between 35.3-36.9°C. During March and April, a transition period prevails during which the northeast monsoon begins to withdraw and the air mass movements bring warm air to the region from southeast directions. Some light rainfalls, known as the pre-monsoon rain, could be expected during this period.

The rainy season normally begins in April and lasts until the end of November. Intense rainfalls normally occur in May till October as indicated by the monthly amount of rainfalls. The total annual rainfall from 1999 to 2014 was between 3,068 to 6,816 mm with significant annual variation.

(3) Wind Speed and Wind Direction

The data on wind speeds and wind direction have not yet been routinely and systematically collected in the Dawei SEZ area. The Consultant therefore collected data on wind speeds and wind directions at two stations both dry (January 2015) and wet seasons (October 2015) at which air quality and noise data were also collected. ***Figure 5.2-3*** is a map showing the locations of the two air sampling stations. ***Photo 5.2-1*** shows photographs of the sampling stations. It should be noted that noise measurements were also carried out at the same locations. The locations of the two stations are:

Station A1: Mudu Village, Yebyu Township, Dawei District, Tanintharyi Region (UTM 402425E, 1576727N)

Station A2: Nga Pitat Village, Launglon Township, Dawei District, Thanintharyi Region (UTM 399344E, 1569815N)

These two stations A1 and A2 were selected based on their proximity to sensitive receptors related to air quality, i.e. Mudu and Nga Pitat Village along the wind directions of the project site. Station A1 is about 4.73 km from the Project site and Station A2 about 1.47 km.

The measurement of wind speeds and directions was made at 10 meters above ground level. The results of measurements are summarized in ***Table 5.2-4***. The wind rose profice at each station is shown in ***Figure 5.2-4***.

The results can be summarized as follows:

For the dry season, the prevailing winds direction was West-northwest (WNW) at Station A1 and Northeast (NE) at Station A2. These data indicate that the local wind directions are consistent with the north-east monsoon direction occurred during the measurement period in January. The wind speeds were between 0.0-2.2 and 0.8-4.5 m/s while the percentage of calm wind (wind speeds <1 knot) were around 50.0 and 0.0% at Station A1 and A2, respectively. These wind speed data indicated a low level of dispersion of air pollutants emitted from the Project's power plant.

For the wet season, the prevailing winds direction was West (W) at Station A1 and East-northeast (ENE) and Northeast (NE) at Station A2. These data indicate that the local wind directions are consistent with the southwest monsoon direction occurred during the measurement period in October. The wind speeds were between 0.0-2.7 and 0.4-6.4 m/s while the percentage of calm wind (wind speeds <1 knot) were around 68.0 and 0.0% at Station A1 and A2, respectively. These wind speed data indicated a low level of dispersion of air pollutants emitted from the Project's power plant.

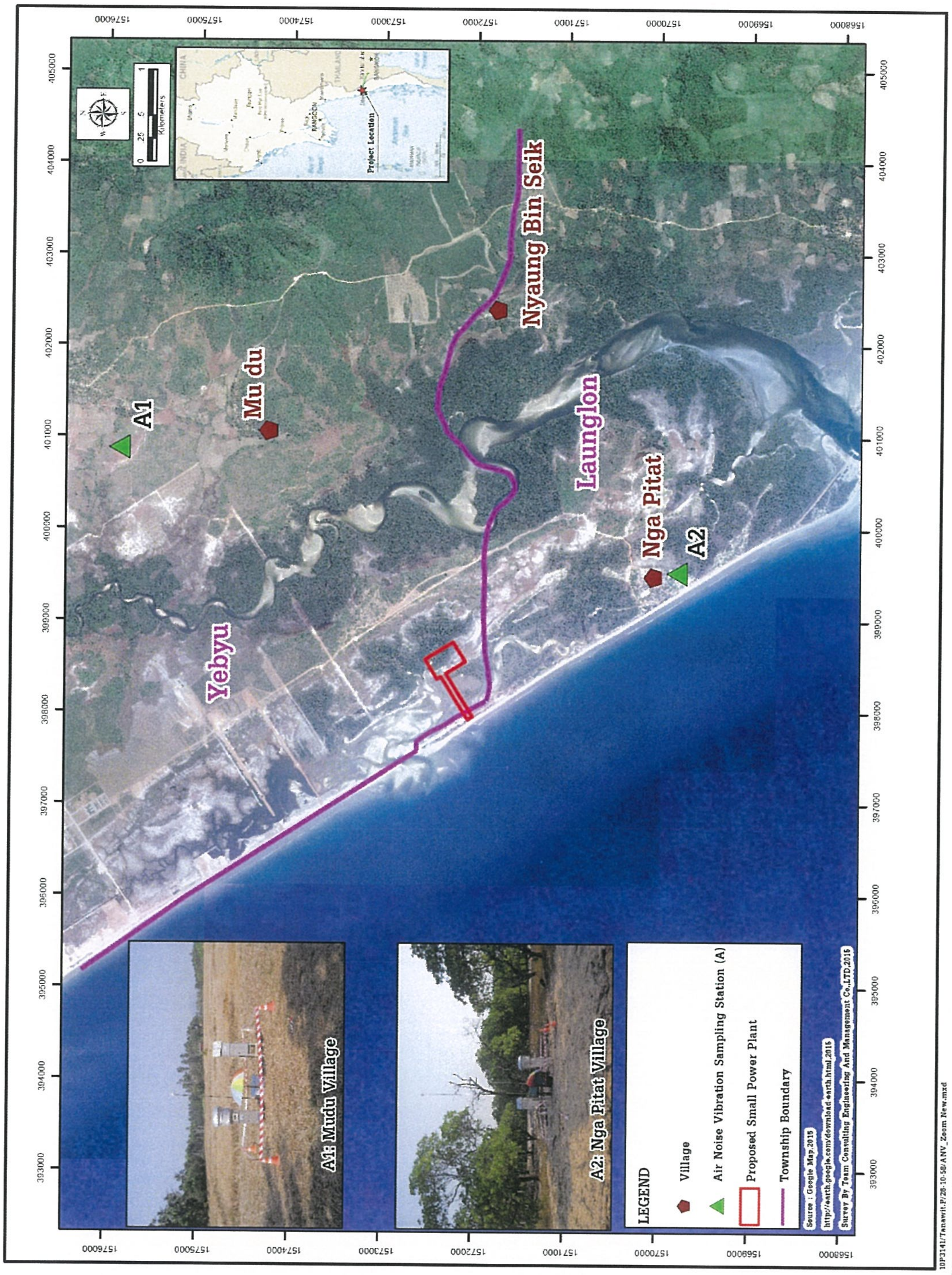
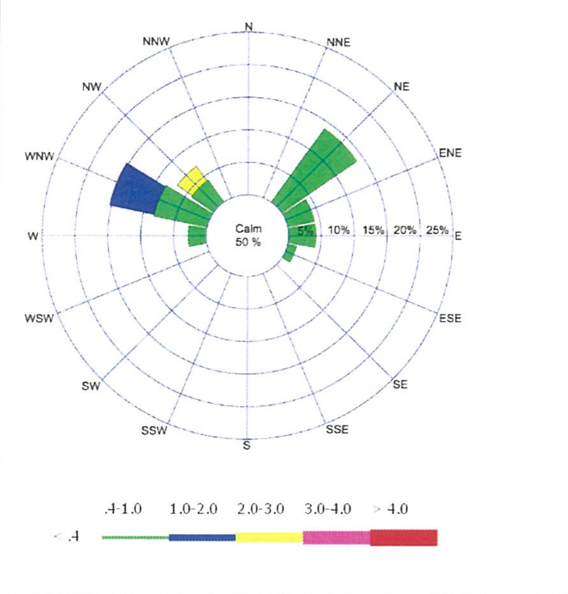


FIGURE 5.2-3: WIND SPEED AND WIND DIRECTION MEASUREMENT STATIONS FOR PROJECT STUDY

TABLE 5.2-4
RESULTS OF WIND SPEED AND DIRECTION MEASUREMENTS

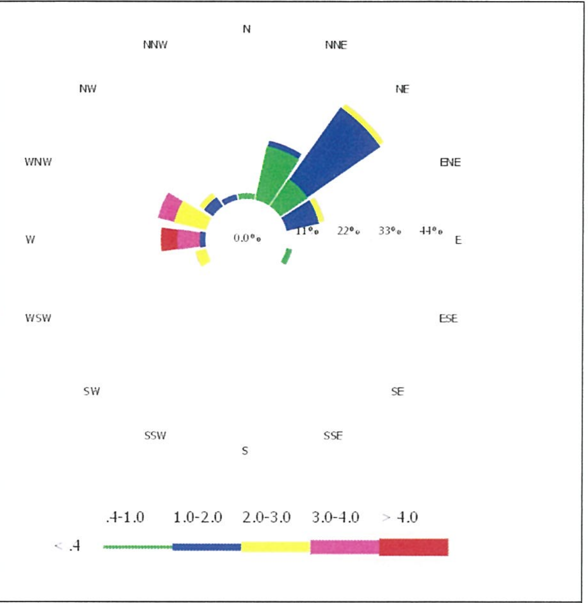
Station	Distance from Project Site (km)	Wind Speed (m/s)		Prevailing Winds Direction		% Calm Wind	
		Dry Season	Wet Season	Dry Season	Wet Season	Dry Season	Wet Season
Station A1: Mudu Village, Yebyu Township, Dawei District, Tanintharyi Region	4.73	0.0-2.2	0.0-2.7	WNW (16.7%), NE (13.9%)	W (9.72%) WSW (8.3%)	50.0	68.0
Station A2: Nga Pitat Village, Launglon Township, Dawei District, Thanintharyi Region	1.47	0.8-4.5	0.4-6.4	NE (40.3%), NNE (13.9%)	ENE (19.4%) NE (19.4%)	0.0	0.0

Source: Field Survey by TEAM Consulting Engineering and Management Co., Ltd.
Dry Season sampling during January 21-24, 2015
Wet Season sampling during October 7-10, 2015



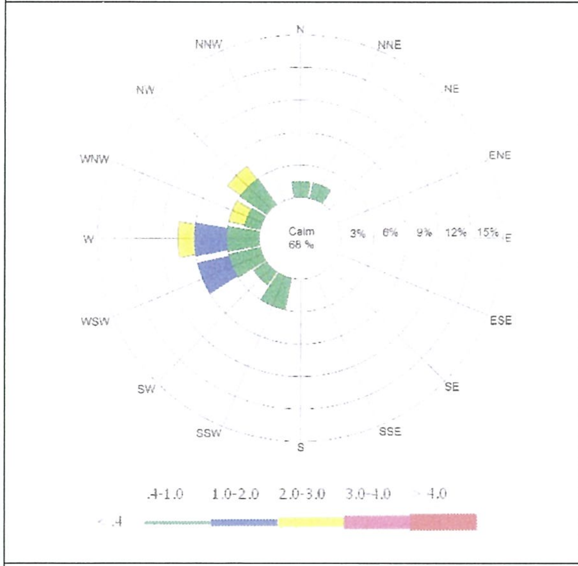
Station A1:

Wind Speed/Direction Measurement at Mudu Village during January 21-24, 2015



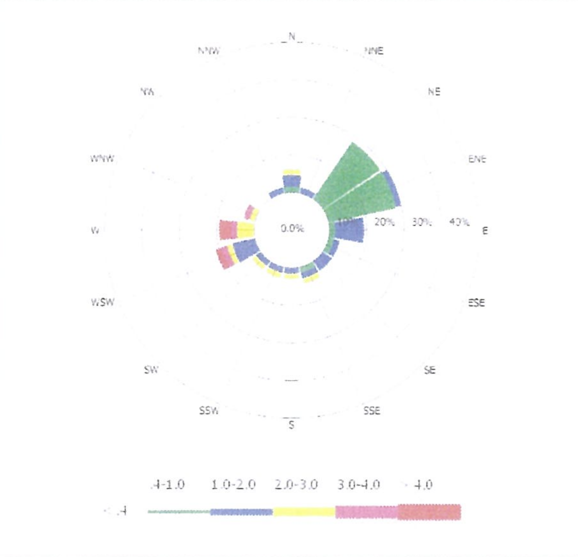
Station A2:

Wind Speed/Direction Measurement at Nga Pitat Village during January 21-24, 2015



Station A1:

Wind Speed/Direction Measurement at Mudu Village during October 7-10, 2015



Station A2:

Wind Speed/Direction Measurement at Nga Pitat Village during October 7-10, 2015

FIGURE 5.2-4 : WIND ROSE FROM WIND SPEED AND WIND DIRECTION MEASUREMENT OF THE PROJECT

Station A1 : Mudu Village	Station A2 : Nga Pitat Village

PHOTO 5.2-1: WIND SPEED AND WIND DIRECTION STATION

5.2.3 Geography/Topography

In general, the study area is relatively flat with an average level of about 1 m above mean sea level (+1 m MSL), whereas, the eastern part is varied with mountain ranges (with height ranges of 100 - 200 m above MSL, extends from the north to south direction). The western part of study area is surrounded by the Andaman Sea (see ***Figure 5.2-5***). The Na Bule Chaung Creek, is a major, naturally runs pass through, from the northern part to the center. Its topography can be mainly characterized into five categories (***Photo 5.2-2***), as follows.

A. Seawater Area

On the western part of study area, there is the Andaman Sea. The depth range of the sea is between 0- 12 km. Principally, from the shoreline, the water depth increases to about 7 m within 1 km. From thereon, the sea bed gently slope down to a depth of about 7-12 m at about 2-3 km from the shoreline.

B. Coastal Zone

On the western part of study area, there are beach sand dunes and back swamps, scattering along the coastline, approximately 10 km.

C. River

There is the Na Bule Chaung River, 26 km long; runs pass the study area (central area). The origin of up-stream water comes from the northern and eastern mountain ranges. An approximate width of the Na Bule Chaung River is 550 m. The width of the estuary is about 1.2 km. The depth range of the river is between 2-5 m.

D. Swamps and Flood Plains

Swamps: Due to characteristics of mineral soils with a poor drainage within the basin, by naturally creation, there are various back swamps scattering around basin area.

Flood Plains: According to the nature of location, the study area situates within the Na Bule Chaung Basin, where the river periodically overflows (semi-diurnal), as a result of flood plains around the Na Bule Chaung Basin. These plains are appropriate for agricultural activities, such as cashew nut and coconut plantations.

E. Mountain Range

There is the eastern mountain range, namely Taninthary Yoma, extends from the north to south direction. The range of its height is between 100-200 m above mean sea level. The highest peak is about 2,000 m about MSL.

Seawater Area	**Coastal Zone**
River	**Flood Plain**
Back Swamp	**Mountain Range**

PHOTO 5.2-2: LANDFORMS IN THE STUDY AREA

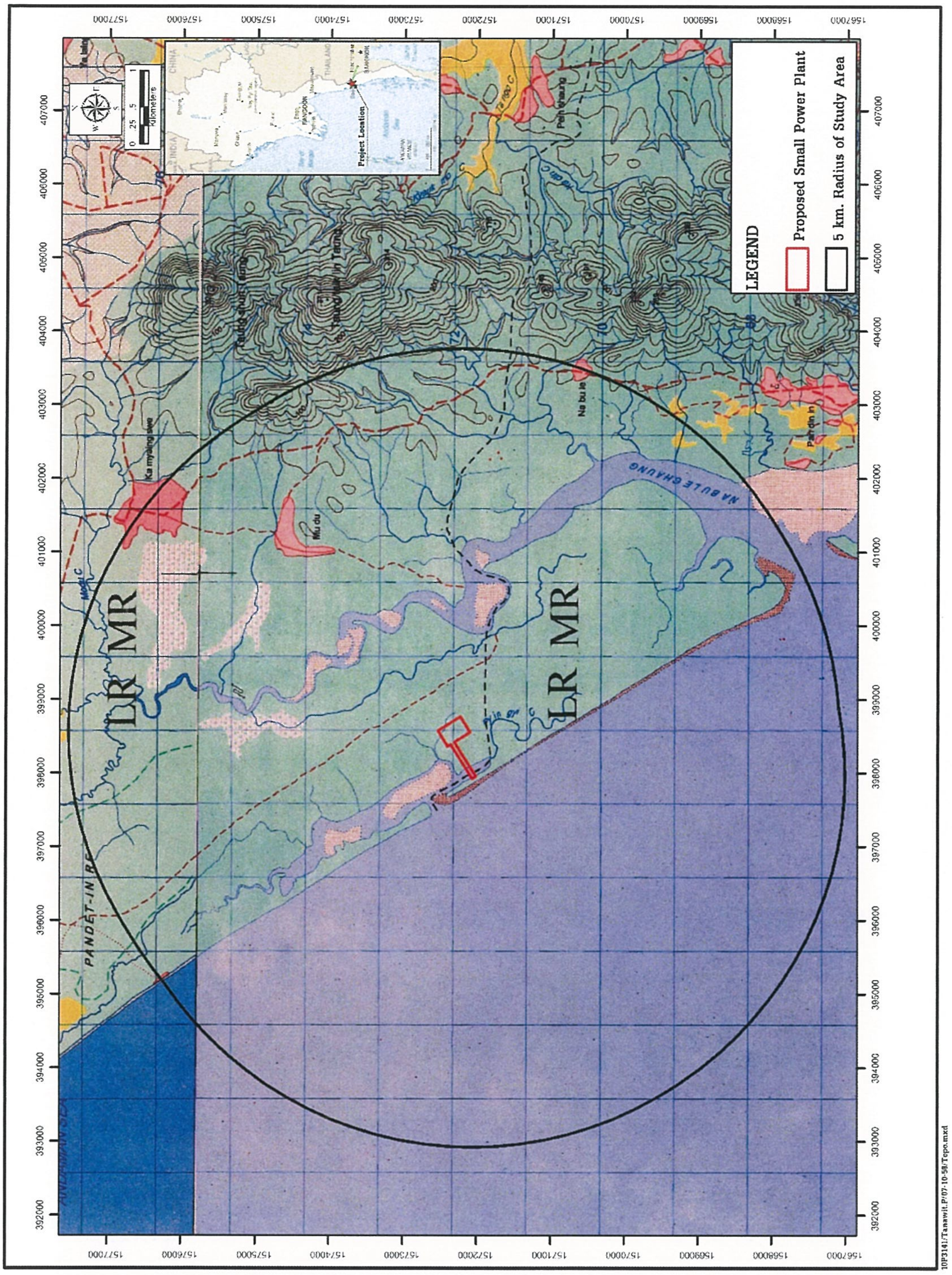


FIGURE 5.2-5: TOPOGRAPHIC CONDITION OF THE PROPOSED PROJECT SITE

5.2.4 Geology

The Tanintharyi region is in the southern part of the eastern most geotectonic belt of Myanmar, which refers to the Shan-Tanintharyi Massif or the Karen-Tanintharyi Unit in the Geological Map of Myanmar (scale 1:1,000,000 by National Stratigraphic Committee for IGCP, 1977) and map of Burma Rock Types (published in 1990 by Army Geospatial Center, US Army Corps of Engineers and US Geological Survey) (***Figure*** *5.2-6*). During the Carboniferous Period – Upper Paleozoic Era, it was formed as the basement, composing of thick sequence of folded argillite, greywacke and slate, with lesser amount of limestone, quartzite, agglomerate and conglomerate.

The name Mergui Series was given by T.Oldhem in 1856 to the unfossilliferous strata, composing of crushed shale, agglomerate, limestone and quartzite, which are found widely in the Region. The Mergui Series is pre-Carboniferous in age and underlies the Moulmein limestone. This Mergui series should be equivalent to Kaeng Krachan Group in Thailand and is interpreted to be a turbidite deposit on the continental shelf.

The predominant rock type of the Mergui Series in Dawei District is argillite, fine grained rock of blue gray to black color at fresh, with obscure bedding and only incipient cleavage. The Carboniferous argillite composes of small crystals and alusite and sillimanite, with finely divided graphite.

The next major rock type is dark grey or almost black "greywacke" which has weathered to an ashy brown color. This rock lacks bedding and is composed of sub angular fragments of fine-grained rock in matrix identical to the argillites.

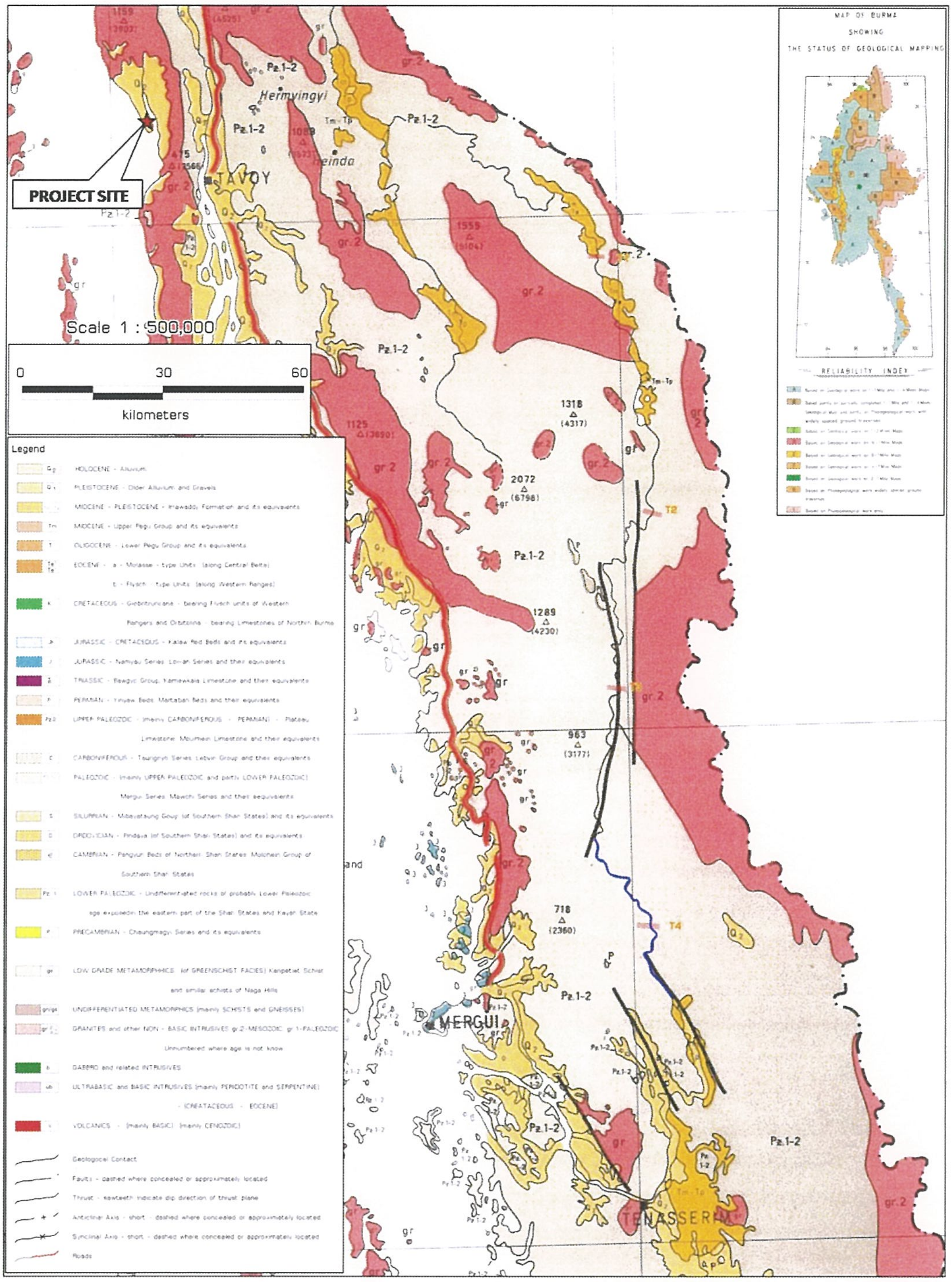
5.2.5 Seismology

The seismic zone map of Myanmar is presented in ***Figure 5.2-7***. The five seismic zones are demarcated and named (from low to high). A probable maximum range of ground acceleration in g values and equivalent Modified Mercalli Scale classes are given for each zone.

Tanintharyi Region is located in the lowest seismic hazard zone in Myanmar. No major earthquakes have been recorded in the study area. The Project site is located in the moderate zone II with a probable maximum range of ground acceleration from 0.1-0.15 g.

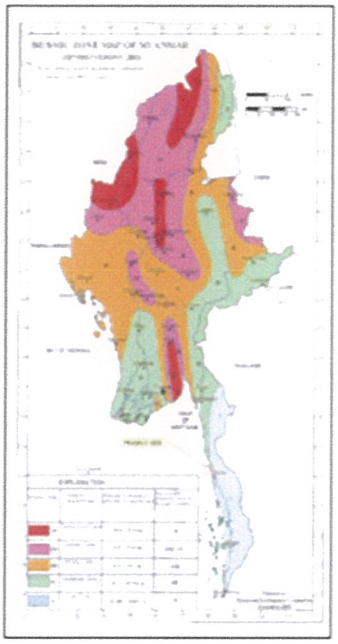
5.2.6 Soils

Figure 5.2-8 is a soil map of Myanmar showing 11 types of soils in the country. Acrisol is the dominant type of soil in a most all of the Region, including the study areas. Visually, sand top soil is evident in the Project site.



Source: Army Geospatial Center, US Army Corps of Engineers and US Geological Survey (1990)

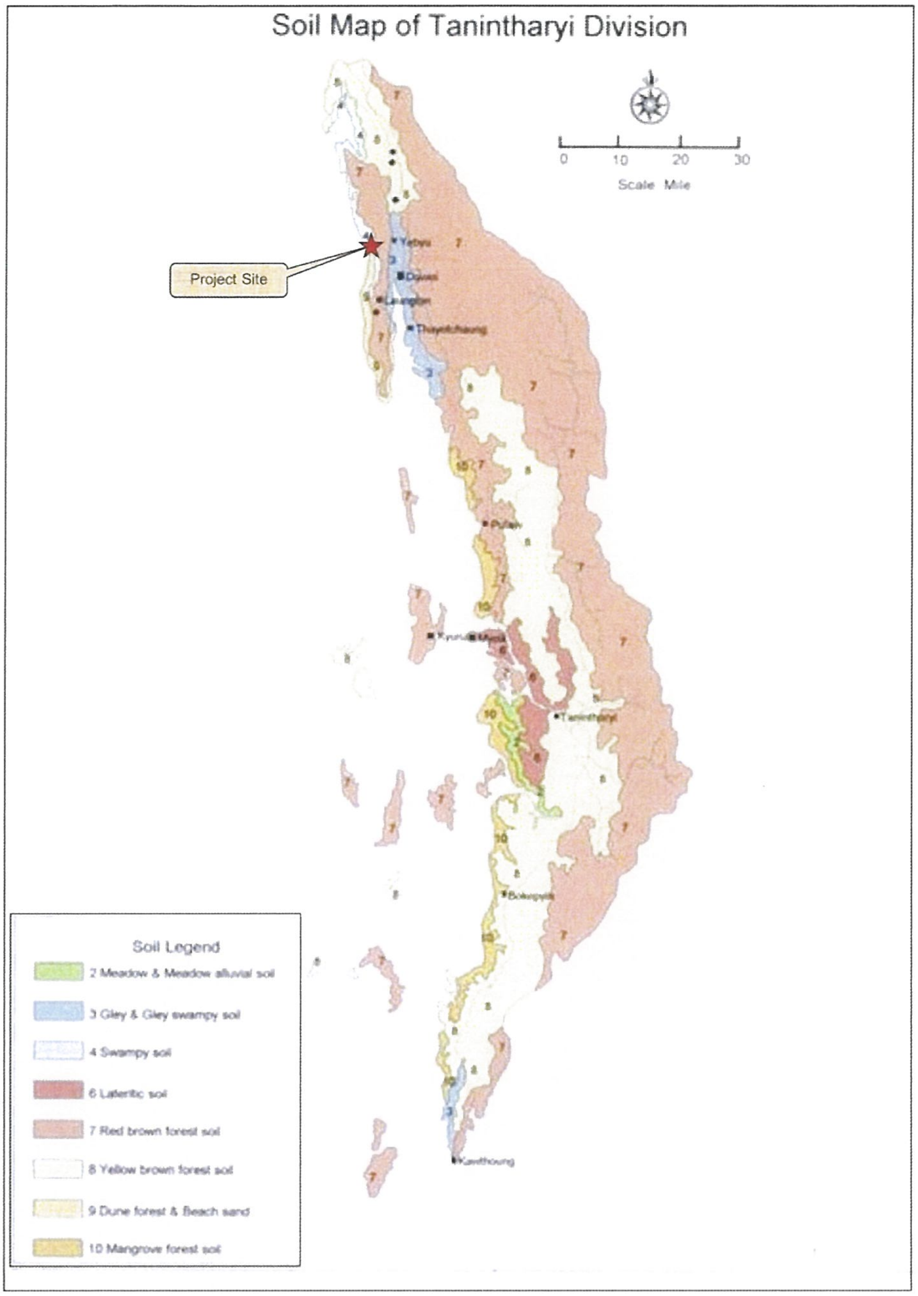
FIGURE 5.2-6 : GEOLOGICAL MAP OF TANINTHARYI REGION



EXPLANATION			
SEISMIC ZONE	GENERAL DESCRIPTION	PROBABLE RANGE OF GROUND ACCELERATION	EQUIVALENT MODIFIED MERCALLI SCALE CLASSES
V	Destructive Zone	0.4 - 0.5 g	IX
IV	Severe Zone	0.3 - 0.4 g	VIII - IX
III	Strong Zone	0.2 - 0.3 g	VIII
II	Moderate Zone	0.1 - 0.15 g	VII
I	Low Zone	0.05 - 0.07 g	VI

Source: Meteorological and Hydrological Department, Yangon, Myanmar.

FIGURE 5.2-7: SEISMIC HAZARD MAP OF TANINTHARYI REGION



Source: http://www.apipnm.org/swlwpnr/reports/y_ta/z_mm/mmmp222.htm#506

FIGURE 5.2-8: SOIL MAP IN TANINTHARYI REGION

To supplement the regional soil data, the Consultant conducted soil sampling on January 27, 2015 at 2 stations, one in the study area nearby the Project site and another in Mudu Villages. Soil sampling at each location was performed by digging a 30 cm. of depth in totally 3 stations at the study area nearby the Project site and Mudu Village. Begin collecting the sample and transfer the soil from each station to be composited homogenized with a stainless steel spoon prior to filling a sample bottles. The collected soil samples were preserved in a storage box and were sent to the assigned laboratory in Thailand for analysis of various quality parameters. The results of soil sampling within project study area are shown in ***Table 5.2-5*** and ***Figure 5.2-9***.

Information on soil quality in the study area has to be collected. Visually, the sand and clay loam top soil is evident the Project site. The Consultant also conducted soil sampling with 2 stations at the study area nearby the Project site and Mudu Village. The results of soil sampling within project study area are shown in ***Table 5.2-5*** and ***Appendix 5A***. The Laboratory Certification registered with the Department of Industrial Works is provided in ***Appendix 5G***.

TABLE 5.2-5

ANALYTICAL RESULT OF SOIL SAMPLING WITHIN PROJECT STUDY AREA

Parameter	Method	Unit	Result		Standard[1]
			Station 1	Station 2	
Physical Parameters					
Sand	Hydrometer	%	94.1	40.2	-
Silt	Hydrometer	%	4.0	21.9	-
Clay	Hydrometer	%	1.9	37.9	-
Chemical Parameters					
Chloride	ISE Application	mg/kg	305	32.4	-
Conductivity	APHA (2012), 2510B	micromhos/cm	248	20.5	-
Nitrate	APHA (2012), 4500-NO3 E	mg/kg	<1.0	6.1	-
pH	US EPA, Method 9040 B		5.2	5.2	-
Phosphate	APHA (2012), 4500-P	mg/kg	<1.0	<1.0	-
Salinity	APHA (2012), 5210 B	ppt	0.12	0.02	-
Sulfate	APHA (2012), 4110 B	mg/kg	101	11.0	-
Total Organic Carbon	US EPA, Method 9060	%	0.19	2.08	-
Metals					
Arsenic	US EPA, Method 3050B and 6010B	mg/kg	<0.05	1.04	<3.9
Cadmium	US EPA, Method 3050B and 6010B	mg/kg	<0.05	<0.05	<37

Note: Station 1 = The study area near by the Project Site (UTM 399518E, 1571408N)

Station 2 = Mudu Village (UTM 401429E, 1576778N)

Remark: [1]Soil Quality Standards for Habitat and Agriculture, Pollution Control Department (PCD), Ministry of Natural Resources and Environment, Thailand

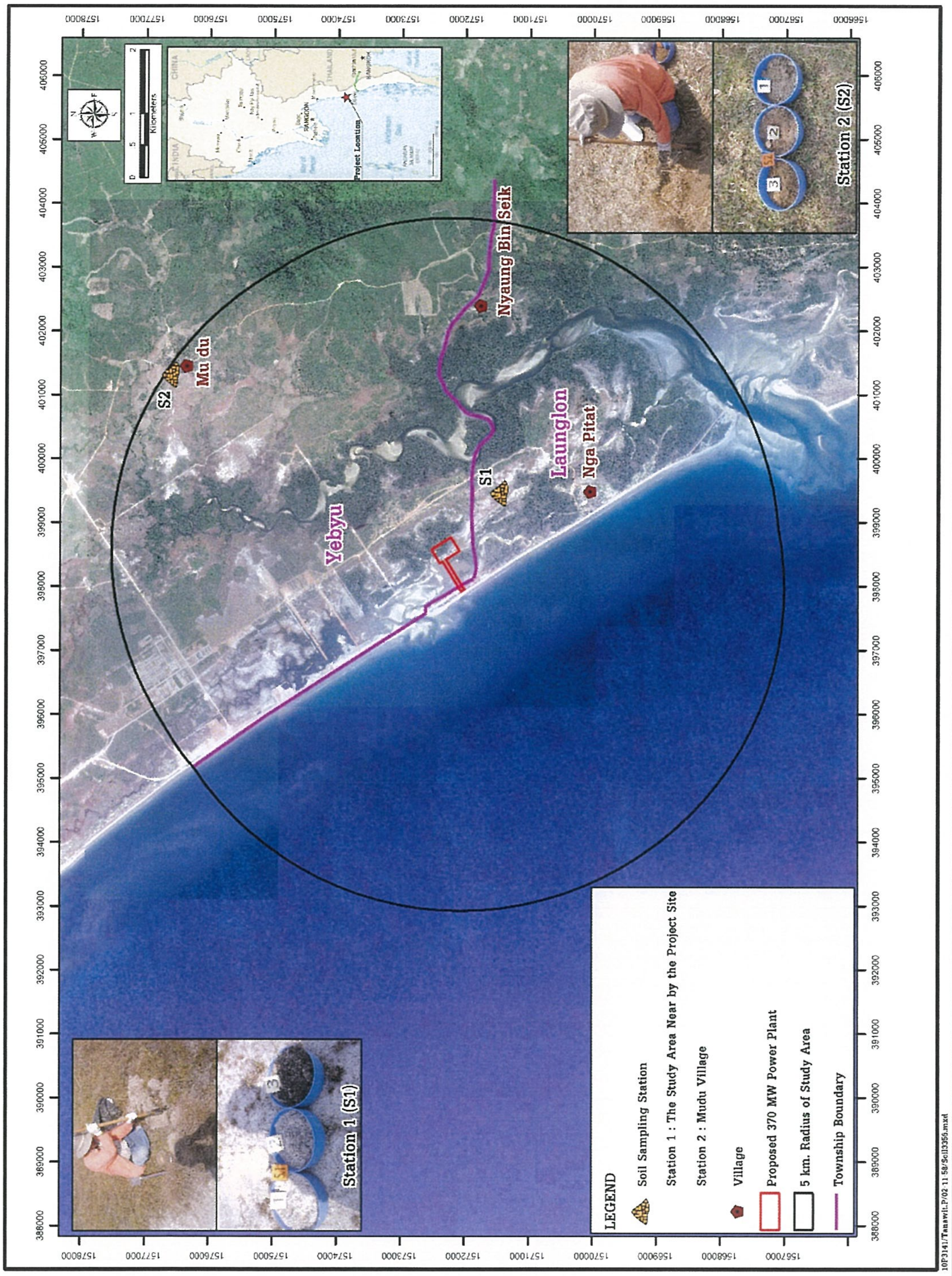


FIGURE 5.2-9: SOIL SAMPLING STATION FOR PROJECT STUDY

5.2.7 Hydrology

The study area is mainly coastal area characterized by low elevations and tidal rivers. The area is drained by Nabule River. Sections of the two rivers in the study area are estuarine, i.e. they are subjected to tidal translation in the Andaman Sea. The water is brackish most time of the year and the river mouths are wide with mud flat and mangrove.

Nabule River is main river in the study area. This river originates at about 3.2 km south of Htain Gyi Village and drains into the Andaman Sea south of Nga Pitat Village. Nabule River and the reach of Dawei River in the study area are mostly brackish, especially in sections close to the sea. The banks near the river mouths are inhabited by mangrove and mud flat emerges during low tides. These areas thus form an important link between the freshwater and marine ecosystems.

Dawei River is the other river in this area. From its origin at the foothills of Tanintharyi mountain ranges, Dawei River meanders in the north- south direction to discharge into the Andaman Sea at Tanintharyi Region coast. During its course to the sea, Dawei River is joined by several tributaries from its eastern and western sides. There are no flow records of Dawei River.

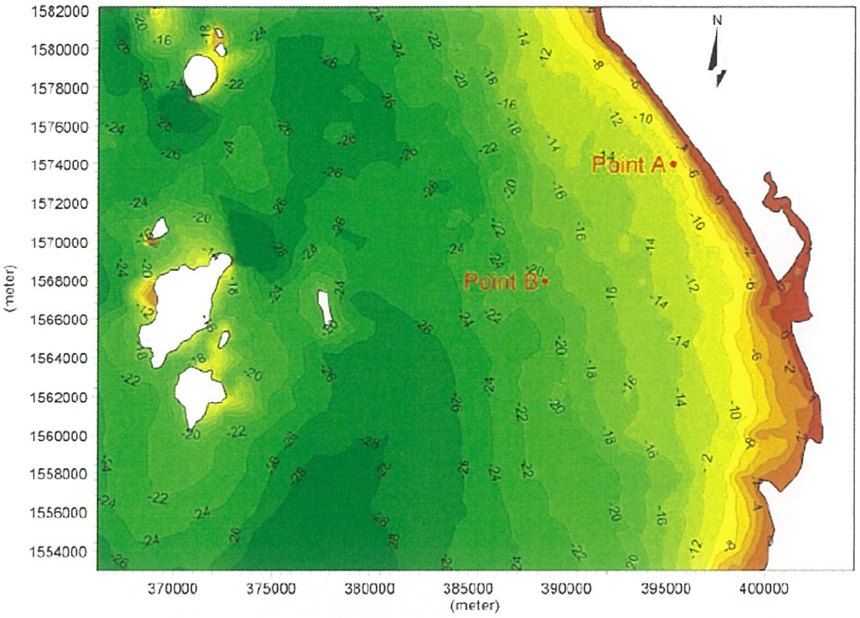
5.2.8 Oceanographic Condition

Information on this subject was taken from the oceanographic and coastal condition surveys conducted by Halcrow-Aurecon for ITD's Deep Sea Port Project (2012)[2] and secondary information collected from the U. S. National Oceanographic and Atmosphere Administration (NOAA) and Ocean Weather, Inc. (OWI).

Two tide gauges were deployed during the Metocean data acquisition campaign by Halcrow-Aurecon. ***Figure 5.2-10*** is a coastal map showing the locations of the two tide gauges consisting of one offshore gauge and one near shore gauge. The offshore tide gauge was deployed at Point B (E388873, N1567935) at a water depth of approximately -20 m LAT. The near shore gauge was deployed at Point A (E395296, N1573959) at a water depth of about -10 m LAT. Water level data from the first deployment (July 23 – August 09, 2011) and the second deployment (August 12 – September 02, 2011) were analyzed.

The following sections summarize general coastal conditions of the sea fronting the project site. Further information regarding the coastal conditions is available in the "Final Modeling and Downtime Analysis Report" (Halcrow-Aurecon, 2012), "Hydrographic Survey Report" (Halcrow-Aurecon 2011), and "Preliminary Design Report" (Halcrow-Aurecon, 2011).

[2] The EHIA of the Deep Sea Port Project was conducted by TEAM (February, 2013).



Source: Halcrow-Aurecon, 2011

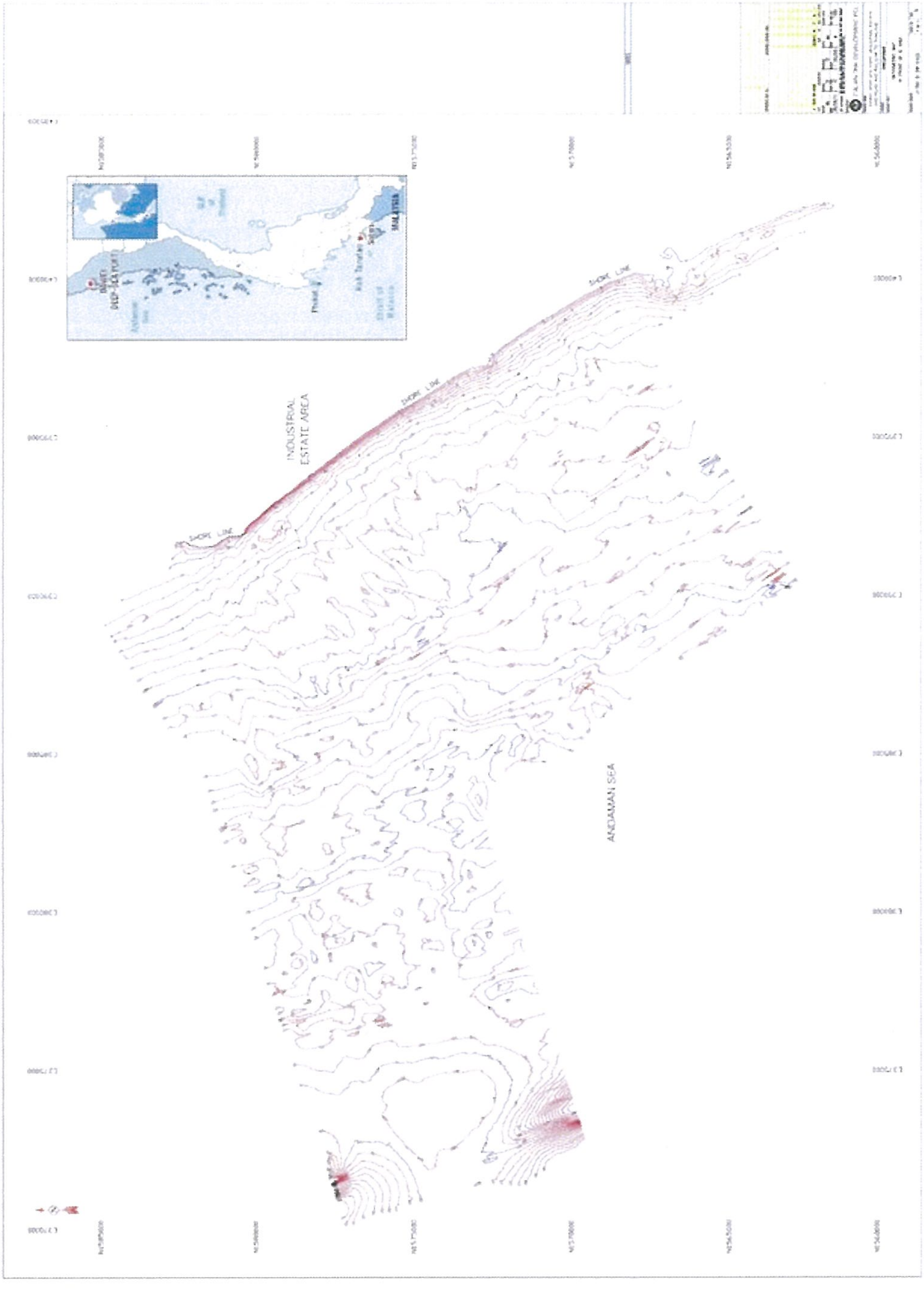
FIGURE 5.2-10: LOCATIONS OF DEPLOYED TIDE GAUGES

Bathymetry

From the shoreline, the water depth increases to about 18 m (10 fathoms) within 7 to 8 km from the shoreline. From there on, the seabed gently slopes down to a depth of about 27 m (15 fathoms) at about 15 km from the shoreline. Several clusters of rocky islands exist approximately 25 km from the coast. These consist of four islands on the west, three islands on the southwest, and several small islands on the northwest. The passages between the islands in general show water depths in excess of 25 m (***Figure 5.2-11***).

Tidal Levels

Measurements of tidal levels were carried out by ITD at the existing small port over a 20 months period from January 2013 until September 2014. The monthly data is given in ***Table 5.2-6***. The data indicate that the water levels did not vary significantly over the months. The tidal range varied between 3 to 4 m.



Source : Italian-Thai Development Public Co., Ltd. 2014

FIGURE 5.2-11: BATHYMETRY OF ANDAMAN SEA NEAR PROPOSED PROJECT SITE

TABLE 5.2-6

THE DATA OF MONTHLY WATER LEVEL IN SMALL PORT AREA IN YEAR 2013 AND 2014 (JANUARY-SEPTEMBER)

Month	Water Level (m.)					
	2013			2014		
	Average	Max	Min	Average	Max	Min
January	1.01	3.76	0.01	1.29	3.75	0.01
February	0.99	3.79	0.01	1.29	3.68	0.02
March	1.01	3.69	0.01	1.21	3.79	0.03
April	1.13	3.75	0.01	1.16	3.89	0.02
May	0.95	3.74	0.03	2.09	3.59	0.52
June	1.99	3.79	0.09	1.99	3.79	0.09
July	1.91	3.89	0.09	1.91	3.89	0.09
August	1.11	3.79	0.03	1.99	3.79	0.09
September	1.03	3.68	0.02	1.67	3.89	-0.22
October	1.06	3.67	0.02			
November	1.10	3.78	0.02			
December	1.01	4.01	0.02			

Source: Italian-Thai Development Public Co., Ltd., 2014.

5.2.9 Erosion and Sedimentation

Information on erosion in the study area and sedimentation in Dawei and Nabule Rivers are not available. This subject is relevant to hydropower projects not a thermal power project like this Project. The Consultant therefore made no attempt to collect information on the subject.

5.2.10 Air Quality

Air quality surveys were conducted during January 21-24, 2015 for the dry season and October 7-10, 2015 for the wet season at two stations (A1, A2) using two sets of air quality measurement equipment. The two stations are shown in ***Photo 5.2-3*** and ***Figure 5.2-12***.

The field measurements were carried out in parallel for 3 consecutive days at each station. The air quality parameters measured included Total Suspended Particle (TSP), Particulate Matter smaller than 10 microns (PM-10), Sulfur Dioxide (SO_2), and Nitrogen Oxides (NO_X). The sampling and analytical methods used are those recommended by the United States Environmental Protection Agency (U.S. EPA) as follows:

Pollutant	Sampling/ Analysis Method	Sampling Period
TSP (Average 24 Hours)	High-Volume Air Sampler/ Gravimetric method	72-hour
PM-10 (Average 24 Hours)	High-Volume Air Sampler (PM-10) / Gravimetric method	72-hour
SO_2 (Average 24 Hours)	Pararosaniline (ASTM D2914-78)	72-hour
NO_x (Average 24 Hours)	Sodium Arsenite (U.S. EPA EQN-1277-026)	72-hour
Wind Speed and Wind Direction	Cup Anemometer and Wind Vane	72-hour

Results of the air quality surveys during the dry season (January, 2015) and the wet season (October, 2015) are presented in ***Appendix 5B***. The Laboratory Certification registered with the Department of Industrial Works is provided in ***Appendix 5G***.

The following major conclusion may be drawn.

- **Dry season**

Station A1 (Mudu Village): The concentration of TSP (Avg. 24 hr.) ranged from 86.51-103.46 μg/m^3, PM-10 (Avg. 24 hr.) from 17.91-34.73 μg/m^3, NO_2 (Avg. 24 hr.) lower than 18 μg/m^3 and SO_2 (Avg. 24 hr.) lower than 50 μg/m^3. The values of all air quality parameters were much below the permissible maximum values prescribed in the Ambient Air Quality Standards of World Bank (1998 and 2007) (***Table 5.2-7***).

Station A2 (Naga Pitat Village): The concentration of TSP (Avg. 24 hr.) ranged from 93.55-110.81 μg/m^3, PM-10 (Avg. 24 hr.) from 33.94-40.82 μg/m^3, NO_2 (Avg. 24 hr.) lower than 18 μg/m^3 and SO_2 (Avg. 24 hr.) lower than 50 μg/m^3. The values of all air quality parameters were much below the permissible maximum values prescribed in the Ambient Air Quality Standards of World Bank (1998 and 2007) (***Table 5.2-7***).

- **Wet season**

Station A1 (Mudu Village): The concentration of TSP (Avg. 24 hr.) ranged from 13.71-23.97 μg/m^3, PM-10 (Avg. 24 hr.) from 4.32-9.38 μg/m^3, NO2 (Avg. 24 hr.) lower than 18 μg/m^3 and SO2 (Avg. 24 hr.) lower than 50 μg/m^3. The values of all air quality parameters were much below the permissible maximum values prescribed in the Ambient Air Quality Standards of World Bank (1998 and 2007) (***Table 5.2-8***).

Station A2 (Naga Pitat Village): The concentration of TSP (Avg. 24 hr.) ranged from 33.22-53.75 μg/m^3, PM-10 (Avg. 24 hr.) from 9.33-23.89 μg/m^3, NO_2 (Avg. 24 hr.) lower than 18 μg/m^3 and SO_2 (Avg. 24 hr.) lower than 50 μg/m^3. The values of all air quality parameters were much below the permissible maximum values prescribed in the Ambient Air Quality Standards of World Bank (1998 and 2007) (***Table 5.2-8***).

TABLE 5.2-7

RESULTS OF THE AIR QUALITY MEASUREMENTS (DRY SEASON)

Station	Sampling Date	Results of Measurement (μg/m³)			
		Average 24 Hour			
		TSP	PM-10	NO_2	SO_2
A1: Mudu Village, Yebyu Township, Dawei District, Tanintharyi Region	21-22 January 2015	86.51	17.91	<18	<50
	22-23 January 2015	94.86	34.73	<18	<50
	23-24 January 2015	103.46	29.46	<18	<50
	Min-Max	**86.51-103.46**	**17.91-34.73**	**<18**	**<50**
A2 : Nga Pitat Village, Launglon Township, Dawei District, Tanintharyi Region	21-22 January 2015	102.58	38.31	<18	<50
	22-23 January 2015	110.81	40.82	<18	<50
	23-24 January 2015	93.55	33.94	<18	<50
	Min-Max	**93.55-110.81**	**33.94-40.82**	**<18**	**<50**
Ambient Air Quality Standards of World Bank Group (1998)[1/]		**230**	**150**	**150**	**150**
Ambient Air Quality Standards of World Bank (2007)[2/]		**-**	**150**	**-**	**125**
Ambient Air Quality Standards of Myanmar (2015)[3/]		**-**	**50**	**-**	**20**

Remark: [1/] Refer to Ambient Air Quality in Power Plant "Thermal Power: Guidelines for New Plant", Pollution Prevention and Abatement Handbook WORLD BANK GROUP, Effective July 1998.
[2/] WHO Ambient Air Quality Guidelines stated on Environmental, Health, and Safety Guidelines: Environmental Air Emissions and Ambient Air Quality of International Finance Corporation (April 30, 2007).
[3/] National Environmental Quality (Emission) Guidelines, Myanmar, 29 December 2015.

Source: Field survey by TEAM Consulting Engineering and Management Co., Ltd., January 21-24, 2015

TABLE 5.2-8

RESULTS OF THE AIR QUALITY MEASUREMENTS (WET SEASON)

Station	Sampling Date	Results of Measurement (μg/m³)			
		Average 24 Hour			
		TSP	PM-10	NO_2	SO_2
A1 : Mudu Village, Yebyu Township, Dawei District, Tanintharyi Region	7-8 October 2015	23.97	9.38	<18	<50
	8-9 October 2015	13.71	4.32	<18	<50
	9-10 October 2015	15.64	5.46	<18	<50
	Min-Max	**13.71-23.97**	**4.32-9.38**	**<18**	**<50**
A2 : Nga Pitat Village, Launglon Township, Dawei District, Tanintharyi Region	7-8 October 2015	46.44	23.89	<18	<50
	8-9 October 2015	53.75	11.00	<18	<50
	9-10 October 2015	33.22	9.33	<18	<50
	Min-Max	**33.22-53.75**	**9.33-23.89**	**<18**	**<50**
Ambient Air Quality Standards of World Bank Group (1998)[1/]		**230**	**150**	**150**	**150**
Ambient Air Quality Standards of World Bank (2007)[2/]		**-**	**150**	**-**	**125**
Ambient Air Quality Standards of Myanmar (2015)[3/]		**-**	**50**	**-**	**20**

Remark: [1/] Refer to Ambient Air Quality in Power Plant "Thermal Power: Guidelines for New Plant", Pollution Prevention and Abatement Handbook WORLD BANK GROUP, Effective July 1998.
[2/] WHO Ambient Air Quality Guidelines stated on Environmental, Health, and Safety Guidelines: Environmental Air Emissions and Ambient Air Quality of International Finance Corporation (April 30, 2007).
[3/] National Environmental Quality (Emission) Guidelines, Myanmar, 29 December 2015.

Source: Field survey by TEAM Consulting Engineering and Management Co., Ltd., October 7-10, 2015

The results clearly show that the wet season has better air quality than the dry season as most of the air pollutants are removed by rain. However, clean air at the two air sampling stations would be expected considering low industrial and traffic activities in the study area. The data in ***Table 5.2-7*** and ***Table 5.2-8*** also indicate large gaps between the existing air quality and the permissible maximum concentration in all four key air quality parameters. For example, the TSP (Avg. 24 hr.) at Station A1 was 86.51 $\mu g/m^3$ compared with the permissible maximum value of 230 $\mu g/m^3$. This indicates that the airshed of the study area still has a large assimilative capacity.

A1 Sampling Station

N1 Sampling Station

Air Quality and Noise Measurement at Mudu Village, Yebyu Township, Dawei District, Tanintharyi Region (A1 & N1), 2015

A2 Sampling Station

N2 Sampling Station

Air Quality and Noise Measurement at Nga Pitat Village, Launglon Township, Dawei District, Tanintharyi Region (A2 & N2), 2015

PHOTO 5.2-3: AIR QUALITY AND NOISE MEASUREMENT STATION WITHIN 5 KM RADIUS OF POWER PLANT

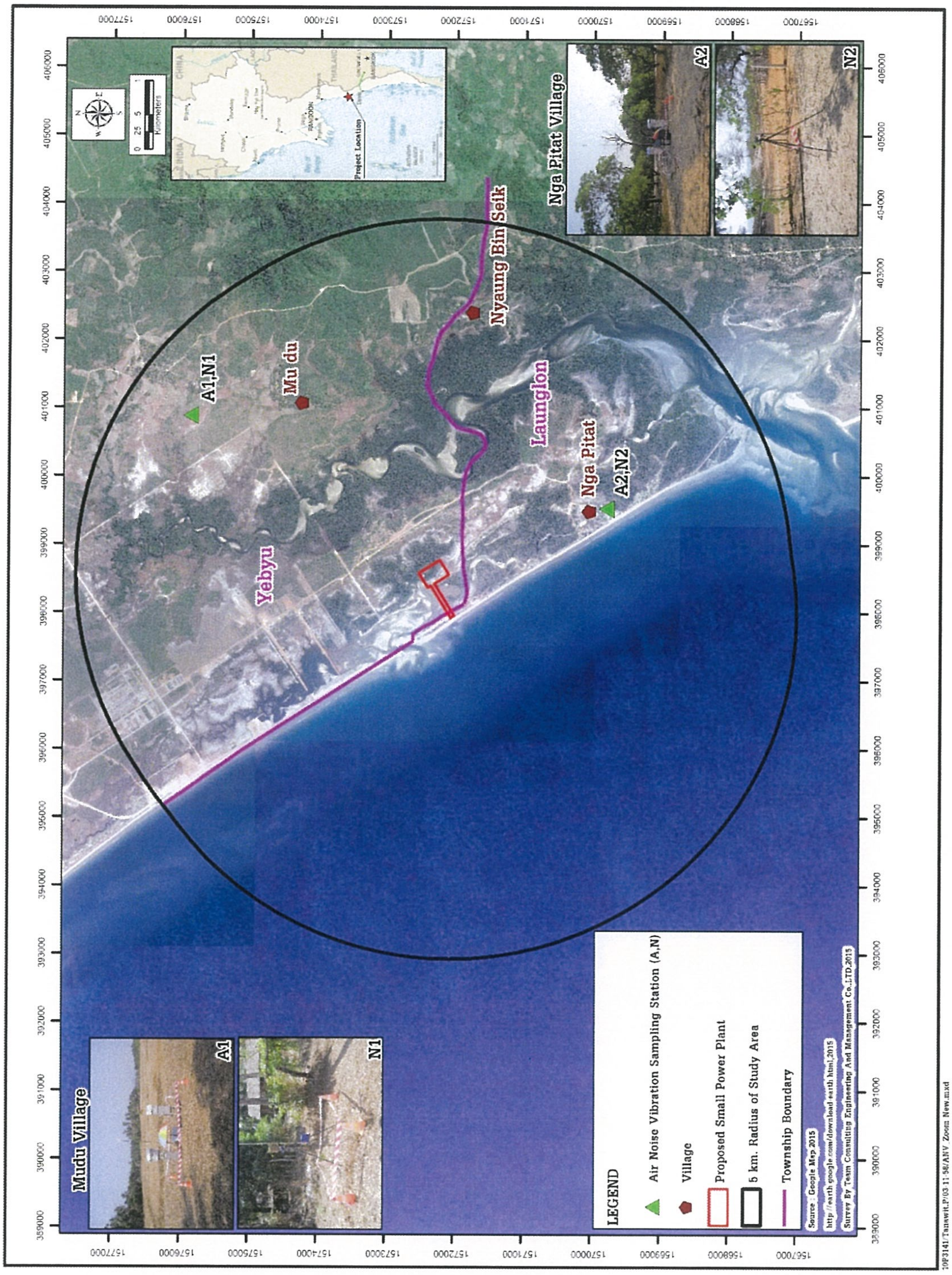


FIGURE 5.2-12: AIR QUALITY AND NOISE MEASUREMENT STATIONS FOR PROJECT STUDY

5.2.11 Noise and Vibration

(1) Noise

The Project construction will invariably create noise, which could disturb nearby sensitive receptors. As the Project area is sparsely populated and still largely undeveloped, existing levels of background noise are expected to be below the maximum permissible limits prescribed in the national noise standard. Nevertheless, it would be useful to establish the baseline data on background noise levels in the Project site.

The Consultant conducted noise measurements during January 21-24, 2015 for dry season and October 7-10, 2015 for wet season at Station N1 and Station N2. The two stations were set in the same location for air quality sampling as shown in ***Figure 5.2-12*** and ***Photo 5.2-3***. Information on the two stations is summarized below:

Particulars	Station N1: Mudu Village	Station N2: Nga Pitat Village
Reference Coordinates	UTM 402425E, 1576727N	UTM 399344E, 1569815N
District	Dawei	Dawei
Nearest village	Nyaung Bin Seik	Nyaung Bin Seik
Nearest noise sources	village activities	village activities
Distance from Project Site (km)	4.01	2.49

The noise level was measured and recorded continuously for 72 hours using a sound level meter. The results are summarized in ***Table 5.2-9*** and ***Table 5.2-10*** and details of the measurements are presented in ***Appendix 5C***. The Laboratory Certification registered with the Department of Industrial Works is provided in ***Appendix 5G***. IFC noise standards are also compared with the background noise levels in ***Table 5.2-9*** and ***Table 5.2-10***. Major finding are:

- The background noise level expressed in LAeq-1 hr. exceeded the limit set by the IFC Standard during both daytime and nighttime.
- The average background noise levels expressed in Leq (24 hr.) were significantly below the maximum limit set by US EPA noise standard.

(2) Vibration

Measurement of background vibration in the study area was not made. As the study area is still largely rural, existing vibration level would be insignificant considering light traffic and the lack of construction and industrial activities.

The Consultant would not collect baseline vibration level since vibration would be an issue only during piling activities in the foundation construction.

TABLE 5.2-9

NOISE LEVEL MEASUREMENT AT 2 SAMPLING STATIONS DURING JANUARY 21-24, 2015 (DRY SEASON)

Sampling Location	Sampling Date	Noise Level (dB(A))					
		LAeq 1 hr (Daytime)	LAeq 1 hr (Nighttime)	Leq 24 hr	Lmax	Ldn	L90
N1: Mudu Village, Yebyu Township, Dawei District, Tanintharyi Region	January 21-22, 2015	40.4-53.8	43.8-56.6	62.5	96.6	69.2	42.2
	January 22-23, 2015	41.0-54.0	44.4-60.3	51.4	91.3	54.8	47.7
	January 23-24, 2015	46.0-60.0	45.7-60.1	54.0	97.1	60.4	49.8
Min-Max		**40.4-60.0**	**43.8-60.3**	**51.4-62.5**	**91.3-97.1**	**54.8-69.2**	**42.2-49.8**
N2: Nga Pitat Village, Launglon Township, Dawei District, Tanintharyi Region	January 21-22, 2015	50.8-60.5	50.5-60.5	55.5	90.7	61.5	49.1
	January 22-23, 2015	51.8-60.9	50.5-58.0	55.7	87.6	60.9	49.5
	January 23-24, 2015	53.7-59.3	53.1-56.4	55.7	86.8	61.5	51.0
Min-Max		**50.8-60.9**	**50.5-60.5**	**55.5-55.7**	**86.8-90.7**	**60.9-61.5**	**49.1-51.0**
Standard		55* [1/,4/]	45** [1/,4/]	-	-	-	-
		-	-	70[2/,3/]	110[3/]	-	-

Remark:
- * for residential, institutional and educational area during daytime (7.00 a.m.-10.00 p.m.)
- ** for residential, institutional and educational area during nighttime (10.00 p.m. – 7.00 a.m.)
- 1/ Environmental, Health, and Safety (EHS) Guidelines, International Finance Corporation, April 2007
- 2/ Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, U.S. EPA (U.S. Environmental Protection Agency), 1974
- 3/ Notification of Guidelines for Community Noise, World Health Organization (WHO), 1999
- 4/ National Environmental Quality (Emission) Guidelines, Myanmar, 2015

Source: Field Survey by TEAM Consulting Engineering and Management Co., Ltd., January 21-24, 2015

TABLE 5.2-10

NOISE LEVEL MEASUREMENT AT 2 SAMPLING STATIONS DURING OCTOBER 7-10, 2015 (WET SEASON)

Sampling Location	Sampling Date	Noise Level (dB(A))					
		LAeq 1 hr (Daytime)	LAeq 1 hr (Nighttime)	Leq 24 hr	Lmax	Ldn	L90
N1:Mudu Village, Yebyu Township, Dawei District, Tanintharyi Region	7-8 October 2015	53.7-59.2	55.6-58.0	56.9	85.7	63.4	55.1
	8-9 October 2015	56.1-65.4	56.7-67.0	59.8	95.6	66.9	56.4
	9-10 October 2015	56.9-63.4	57.8-72.3	62.6	96.6	71.0	57.1
Min-Max		**53.7-65.4**	**55.6-72.3**	**56.9-62.6**	**85.7-96.6**	**63.4-71.0**	**55.1-57.1**
N2 : Nga Pitat Village, Launglon Township, Dawei District, Tanintharyi Region	7-8 October 2015	50.4-64.3	48.4-57.7	56.1	91.4	59.8	48.6
	8-9 October 2015	49.3-72.7	47.6-62.2	60.7	96.7	64.3	47.7
	9-10 October 2015	47.8-61.8	49.4-58.0	54.5	91.9	60.6	48.7
Min-Max		**47.8-72.7**	**47.6-62.2**	**54.5-60.7**	**91.4-96.7**	**59.8-64.3**	**47.7-48.7**
Standard		55* [1/,4/]	45** [1/,4/]	-	-	-	-
		-	-	70[2/, 3/]	110[3/]	-	-

Remark:
- * for residential, institutional and educational area during daytime (7.00 a.m.-10.00 p.m.)
- ** for residential, institutional and educational area during nighttime (10.00 p.m. – 7.00 a.m.)
- 1/ Environmental, Health, and Safety (EHS) Guidelines, International Finance Corporation, April 2007
- 2/ Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, U.S. EPA (U.S. Environmental Protection Agency), 1974
- 3/ Notification of Guidelines for Community Noise, World Health Organization (WHO), 1999
- 4/ National Environmental Quality (Emission) Guidelines, Myanmar, 2015

Source: Field Survey by TEAM Consulting Engineering and Management Co., Ltd., October 7-10, 2015.

5.2.12 Seawater Quality

The study of coastal water quality was conducted on January 21, 2015 for dry season and on October 7-8, 2015. Seawater samples were collected at four selected stations, all are within 5 km of the project site as indicated in a map in ***Figure 5.2-13***. These stations were selected considering their proximities to the intake and the disposal points of cooling water which could have impacts on seawater quality with consequence on the marine ecosystem.

At each station, water samples were collected from 1 meter below surface. In situ measurement was made for conductivity, dissolved oxygen (DO), pH, temperature, salinity and transparency (***Photo 5.2-4***). All collected water sample bottles were labeled and their information was recorded and kept for tracing. The collected water samples were preserved at 4°C in a storage box and were sent to the assigned laboratory in Thailand for analysis of various quality parameters. The water quality data was presented in ***Table 5.2-11*** and ***Table 5.2-12*** and compared with marine water quality criteria for the ASEAN REGION for Aquatic Life Protection. Details of the measurements are presented in ***Appendix 5D***. The Laboratory Certification registered with the Department of Industrial Works are provided in ***Appendix 5G***.

From the data, the following major conclusions may be drawn.

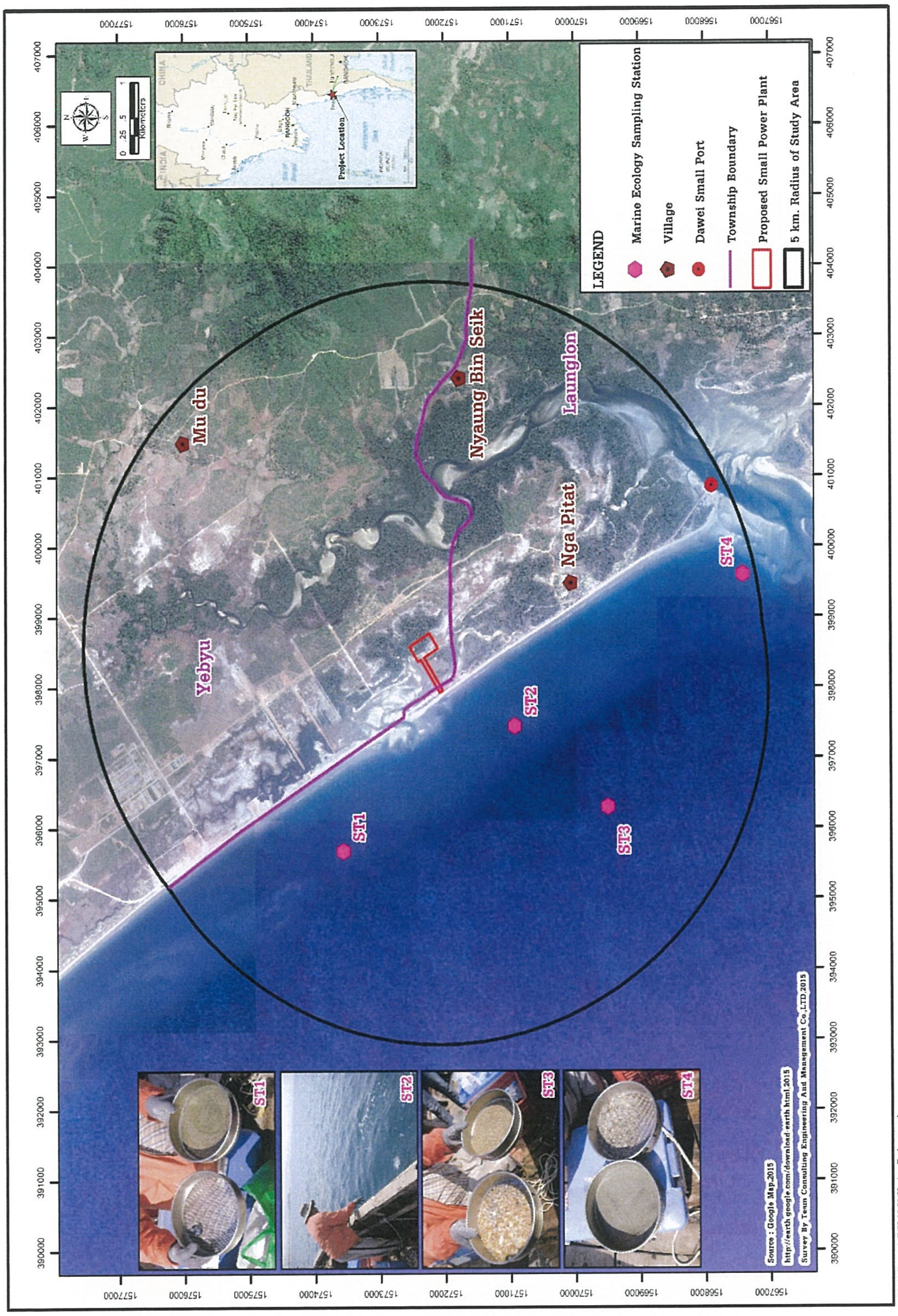
In general, seawater quality parameters at all stations were within the standards and did not vary significantly with the stations and the seasons. This would be expected as there are no significant pollution sources in the sea. However, salinity varied significantly within the season, around 30.5-30.9 ppt in the dry season and 22.2-22.7 ppt in the wet season indicating the dilution effect of rain. The seawater was slightly basic with pH value of 7.93 to 8.19.

The level of dissolved oxygen in both seasons was relatively high, 5.99-7.26 mg/l in the dry season and 7.02-7.65 mg/l in the wet season. Biochemical oxygen demand (BOD) in all samples were lower (less than 2.0 mg/l) than the maximum permissible limit in the standards, thus indicating low level of organic pollution. This would be expected considering small coastal communities and the locations of the sampling stations far from the coastal communities.

Total dissolved solids (TDS) in the dry season was in a range of 47,080.0-63,653.8 mg/l which higher than those of in wet season, 29,062.2-29,782.6 mg/l. Although the value of TDS is not prescribed in the standard, the range of variations of TDS concentration would not cause any adverse effect on marine organisms.

In both sampling periods, oil and grease in the samples were detected at low concentration (<5.0 mg/l) and no oil film were not visible during the water sampling.

The concentrations of heavy metals and chemical substances, including iron, lead, cyanide and arsenic, in all the samples were lower than the maximum limits prescribed in the Standard. This would be expected considering no industrial activities in the region. Data on background levels of heavy metal would benefit in the management of seawater to protect the marine ecosystem.



10P3141/Tanawit.P/29-10-58/Marine Ecology.mxd

FIGURE 5.2-13: LOCATION OF SEAWATER AND MARINE ECOLOGY SAMPLING

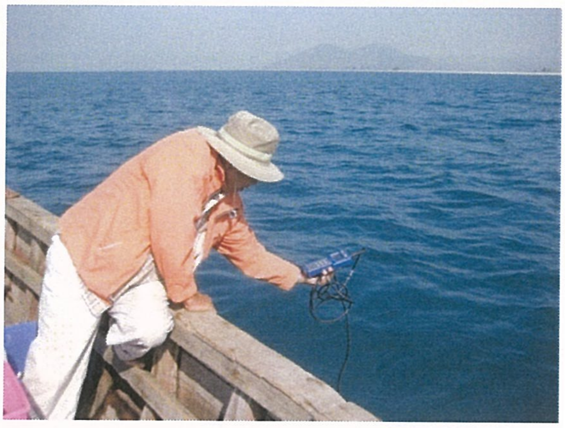


PHOTO 5.2-4: SEAWATER SAMPLING ACTIVITIES

TABLE 5.2-11

RESULTS OF SEAWATER QUALITY SAMPLING, 21 JANUARY 2015

Characteristic	Parameter	Unit	SW1	SW2	SW3	SW4	Standard*
1. Physical	Depth	m.	11.0	11.5	16.6	7.2	-
	Temperature	°C	26.5	27.0	27.4	27.1	Increase not more than 2°C above the maximum ambient temperature
	Transparency	m.	5.5	5.0	7.8	3.4	-
	Conductivity	mS/cm	48.11	42.92	49.48	49.02	-
2. Chemical	pH	-	8.16	8.19	8.18	8.16	-
	DO	mg/l	7.26	6.68	5.99	6.85	≥ 4.0
	Salinity	ppt	30.5	30.6	30.9	30.6	-
	Turbidity	NTU	1.2	1.1	1.1	1.0	-
	COD	mg/l	44	53	61	44	-
	BOD	mg/l	<2	<2	<2	<2	-
	Total Dissolved Solids	mg/l	63,653.8	54,587.8	56,317.5	47,080.0	-
	Suspended Solids	mg/l	<5.0	<5.0	<5.0	<5.0	-
	Oil & Grease	mg/l	<5.0	<5.0	<5.0	<5.0	0.14
	Iron	mg/l	0.21	0.16	0.08	0.15	-
	Lead	mg/l	Not detected	Not detected	Not detected	Not detected	0.0085
	Cyanide	mg/l	Not detected	Not detected	Not detected	Not detected	0.007
	Arsenic	mg/l	<0.005	<0.005	<0.005	<0.005	-

Remark: SW1 : UTM 395675E 1573545N Zone 47P

SW2 : UTM 397446E 1570914N Zone 47P

SW3 : UTM 396298E 1569482N Zone 47P

SW4 : UTM 399599E 1567402N Zone 47P

*ASEANMARINE WATER QUALITY Management Guidelines and Monitoring Manual, 2008

Source: TEAM Consulting Engineering and Management Co., Ltd., January 2015

TABLE 5.2-12

RESULTS OF SEAWATER QUALITY SAMPLING, 7-8 OCTOBER 2015

Characteristic	Parameter	Unit	SW1	SW2	SW3	SW4	Standard*
1. Physical	Depth	m.	12.5	11.2	14.2	5.6	-
	Temperature	°C	29.1	28.7	28.9	28.7	Increase not more than 2°C above the maximum ambient temperature
	Transparency	m.	5.0	5.0	4.5	3.5	-
	Conductivity	mS/cm	38.69	38.61	38.04	38.41	-
2. Chemical	pH	-	7.97	7.96	7.93	7.98	-
	DO	mg/l	7.65	7.53	7.02	7.35	≥ 4.0
	Salinity	ppt	22.6	22.7	22.2	22.5	-
	Turbidity	NTU	0.7	0.8	0.7	1.0	-
	COD	mg/l	92	86	83	80	-
	BOD	mg/l	0.6	<0.5	<0.5	<0.5	-
	Total Dissolved Solids	mg/l	29,213.0	29,782.6	29,293.3	29,062.2	-
	Suspended Solids	mg/l	<5.0	<5.0	<5.0	<5.0	-
	Oil & Grease	mg/l	<5.0	<5.0	<5.0	<5.0	0.14
	Iron	mg/l	<0.03	<0.03	<0.03	<0.03	-
	Lead	mg/l	0.00065	0.0073	0.00005	0.0046	0.0085
	Cyanide	mg/l	<0.003	<0.003	<0.003	<0.003	0.007
	Arsenic	mg/l	<0.0003	<0.0003	0.0003	0.0005	-

Remark: SW1 : UTM 395675E 1573545N Zone 47P

SW2 : UTM 397446E 1570914N Zone 47P

SW3 : UTM 396298E 1569482N Zone 47P

SW4 : UTM 399599E 1567402N Zone 47P

*ASEANMARINE WATER QUALITY Management Guidelines and Monitoring Manual, 2008

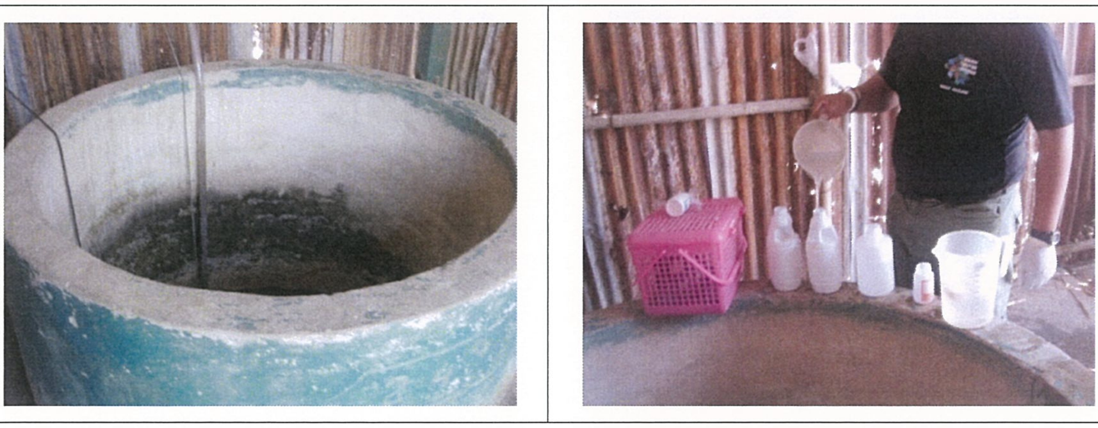
Source: TEAM Consulting Engineering and Management Co., Ltd., October 2015

5.2.13 Groundwater Quality

Groundwater bored wells are found in villages nearby the Project site. Two wells, one in Nga Pitat School (GW1) and another in Mudu School (GW2), were selected for groundwater quality surveys. Nga Pitat School is about 2. 22 km from the Project site while Mudu School is about 4. 12 km. The locations of the two villages are indicated on a map in ***Figure 5.2-14*** and ***Photo 5.2-5***.

Groundwater sampling was conducted in Mudu Village on January 23, 2015 and Nga Pitat Village on January 27, 2015. In each sampling, a grab sample of about 5 liters was collected at about 0.3 m from the surface for in-situ and laboratory analyses. ***Table 5.2-13*** shows the ground water quality data compared with WHO Guidelines for Drinking-water. The data on conductivity and salinity clearly indicate that the groundwater samples from both wells were freshwater. The groundwater quality was below the WHO standards for drinking purpose. Details of the measurements are presented in ***Appendix 5E***. The Laboratory Certification registered with the Department of Industrial Works are provided in ***Appendix 5G***.

GW1: Nga Pitat School



GW2: Mudu School

PHOTO 5.2-5: GROUNDWATER SAMPLING ACTIVITIES AT EACH STATION

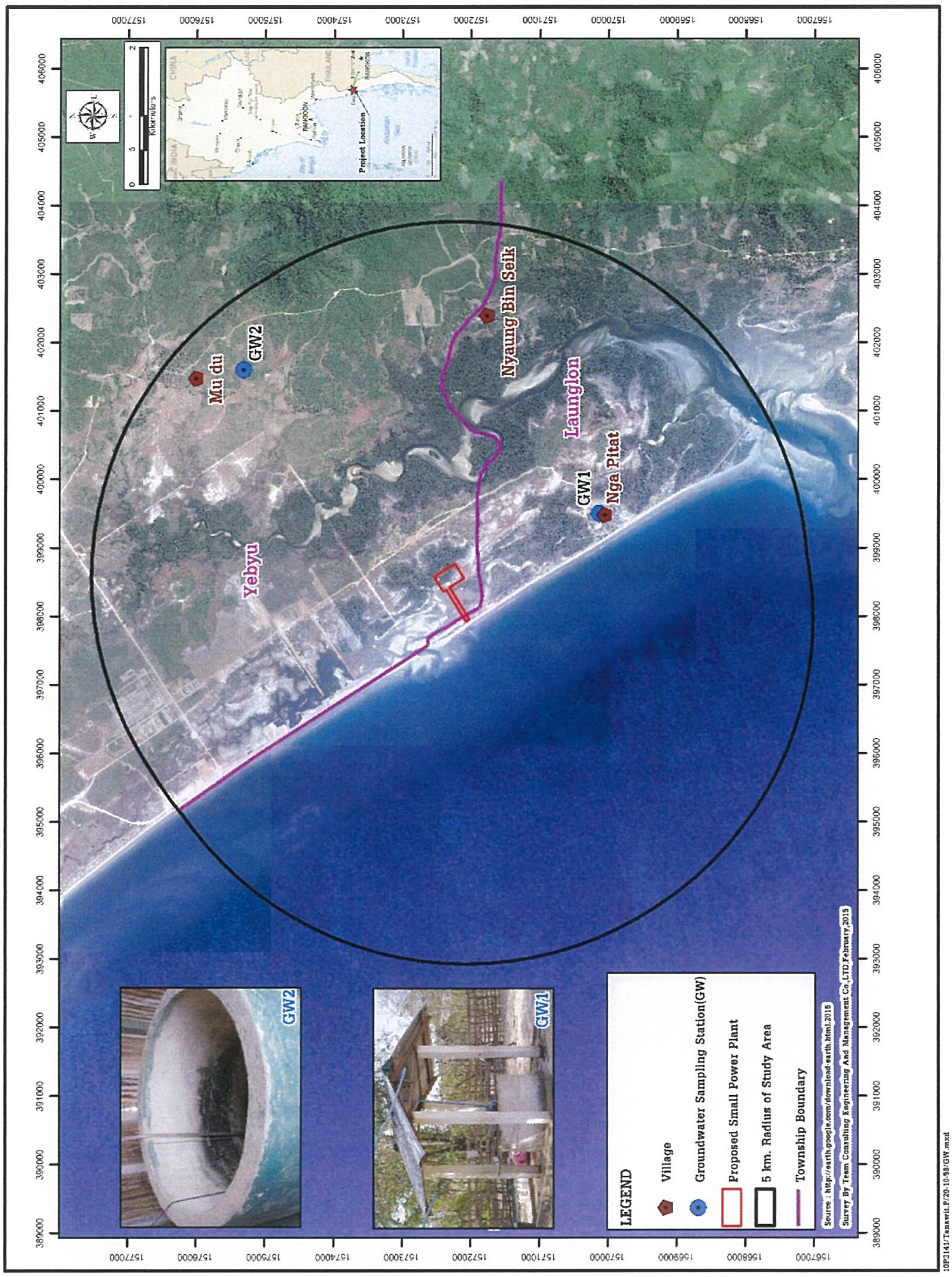


FIGURE 5.2-14: LOCATION OF GROUNDWATER SAMPLING

TABLE 5.2-13
RESULTS OF GROUND WATER QUALITY ANALYSIS AT EACH STATION

Characteristic	Parameter	Unit	GW1	GW2	WHO Drinking Water Standard[1]
Sampling Date			27/1/2015	23/1/2015	
1. Physical	Odour	-	None	None	-
	Water temperature	°C	26.6	25.7	-
	Conductivity	µs/cm	132.2	25.5	-
	Oil & Grease	mg/l	<5.0	<5.0	-
2. Chemical	pH	-	6.92	6.92	6.5 – 8.5
	Turbidity	NTU	0.10	0.10	<1
	DO	mg/l	4.69	5.33	-
	Salinity	ppt	0.10	0.10	-
	Total Dissolved Solids	mg/l	36.8	947.5	-
	Suspended Solids	mg/l	<5.0	<5.0	-
	Total Hardness	mg/l	45.10	109.8	-
	Chloride	mg/l	11.00	13.0	<250
	Arsenic	mg/l	Not detected	0.0006	<0.01
	Iron	mg/l	0.04	0.21	-
	Lead	mg/l	0.001	0.0004	<0.01
	Nitrite	mg/l	Not detected	Not detected	3
	Nitrate	mg/l	Not detected	2.2	50
	Cyanide	mg/l	Not detected	<0.005	0.17

Remark: GW1: Nga Pitat Village (UTM 399504E, 1570128N)

GW2: Mudu Village (UTM 401599E, 1575318N)

[1]WHO Guidelines for drinking water quality 4th Edition, 2011

Source: TEAM Consulting Engineering and Management Co., Ltd., January 2015

5.2.14 Sediment Quality

Collection of sedimentation samplers was also carried out in two occasions, the first collection on January 21, 2015 and the second collection on Ocotber 7-8, 2015 at the same station as seawater quality (***Figure 5.2-13***). Collection of sediment was carried out along with sampling of seawater, by using Ekman Grab as shown in ***Photo 5.2-6***. All collected sediments were kept in sample bottles and labeled. Related information on the samples was recorded in a chain of custody. The collected sediment samples were preserved in a storage box and were sent to the assigned laboratory in Thailand for analysis of various quality parameters.

The sediment quality data was presented and compared with NOAA standard in ***Table 5.2-14*** and ***Table 5.2-15***. The chemical parameters of sediment quality and metals in all samples are within NOAA standard. That mean the sediment is suitable for ecosystem. Details of the measurements are presented in ***Appendix 5F***. The Laboratory Certification registered with the Department of Industrial Works are provided in ***Appendix 5G***.

For the dry season, all collected sediment samples were mostly consisted of coarse sand (39.27-48.59%) and medium sand (16.75-34.20%). All parameters are under suitable allowance value.

For the wet season, all collected sediment samples were mostly consisted of fine sand (39.74-46.42%) and medium sand (25.09-36.25%). All parameters are under suitable allowance value.

PHOTO 5.2-6 : COLLECTION OF SEDIMENT IN THE STUDY AREA

TABLE 5.2-14

RESULTS OF SEDIMENT QUALITY ANALYSIS AT EACH STATION, 21 JANUARY 2015

Parameter	Unit	Station				NOAA*	
		SB1	SB2	SB3	SB4	ERL	ERM
Particle size							
- Silt or Clay	%	0.14	0.16	0.01	0.17	-	-
- Fine Sand	%	3.46	5.89	1.88	6.11	-	-
- Medium Sand	%	34.20	29.54	16.75	33.81	-	-
- Coarse Sand	%	39.75	40.04	48.59	39.27	-	-
- Fine Gravel	%	22.45	24.37	32.77	20.65	-	-
Chemical parameter							
Oil & Grease	mg/kg	296	475	506	987	-	-
Organic Matter	%	0.30	0.20	0.09	0.13		
Total Organic Carbon	%	0.31	0.17	1.77	0.11	-	-
Metals							
- Arsenic	mg/kg	4.96	1.92	4.56	1.94	8.2	70
- Cadmium	mg/kg	<0.5	<0.5	<0.5	<0.5	1.2	9.6
- Chromium	mg/kg	14.7	7.20	7.27	6.05	81	370
- Copper	mg/kg	5.88	3.98	5.10	1.88	34	270
- Iron	mg/kg	10,056	4,566	18,591	4,477	-	-
- Lead	mg/kg	4.87	2.95	4.96	2.33	46.7	218
- Zinc	mg/kg	46.5	44.6	15.2	17.9	150	410
- Mercury	mg/kg	<0.10	<0.10	<0.10	<0.10	0.15	0.71

Remark: * NOAA Screening Quick Reference Table, from "Sediment quality criteria in use around the world", *Limnology* (2002) 3: 65-75

ERL = the Effect Range Low is the concentration of chemicals in seabed sediments in the low levels which cause insignificant toxicity to sensitive organisms in the seabed sediments

ERM = the Effect Range Median is the concentration of chemicals in seabed sediments in the medium levels which cause insignificant toxicity to sensitive organisms in the seabed sediments

Source: TEAM Consulting Engineering and Management Co., Ltd., January, 2015

TABLE 5.2-15

RESULTS OF SEDIMENT QUALITY ANALYSIS AT EACH STATION, 7-8 OCTOBER 2015

Parameter	Unit	Station				NOAA*	
		SB1	SB2	SB3	SB4	ERL	ERM
Particle size							
- Silt or Clay	%	23.36	23.67	25.83	20.38	-	-
- Fine Sand	%	43.50	39.74	46.42	40.06	-	-
- Medium Sand	%	31.02	25.09	26.97	36.25	-	-
- Coarse Sand	%	2.08	11.46	0.74	3.29	-	-
- Fine Gravel	%	0.03	0.03	0.04	0.01	-	-
Chemical parameter							
Oil & Grease	mg/kg	<100	<100	<100	<100	-	-
Organic Matter	%	0.31	0.61	0.27	0.16		
Total Organic Carbon	%	0.21	0.52	0.57	<0.1	-	-
Metals							
- Arsenic	mg/kg	6.75	2.08	7.03	1.07	8.2	70
- Cadmium	mg/kg	<0.50	<0.50	<0.50	<0.50	1.2	9.6
- Chromium	mg/kg	11.4	7.30	14.2	2.95	81	370
- Copper	mg/kg	1.09	1.17	1.46	<1.00	34	270
- Iron	mg/kg	7,103	6,313	8,615	2,213	-	-
- Lead	mg/kg	4.70	4.08	4.79	1.48	46.7	218
- Zinc	mg/kg	8.03	10.5	9.14	4.34	150	410
- Mercury	mg/kg	<0.10	<0.10	<0.10	<0.10	0.15	0.71

Remark: * NOAA Screening Quick Reference Table, from "Sediment quality criteria in use around the world", *Limnology* (2002) 3: 65-75

ERL = the Effect Range Low is the concentration of chemicals in seabed sediments in the low levels which cause insignificant toxicity to sensitive organisms in the seabed sediments

ERM = the Effect Range Median is the concentration of chemicals in seabed sediments in the medium levels which cause insignificant toxicity to sensitive organisms in the seabed sediments

Source: TEAM Consulting Engineering and Management Co., Ltd., October, 2015

5.3 BIOLOGICAL COMPONENTS

5.3.1 Terrestrial Resource

The surveys of terrestrial resources covered the 19,415.07 acres study area focusing on the project site of 37.19 acres (about 0.15 km^2). However, only about 10,420 acres of the study area are land area while the remaining 8,994.32 acres are coastal water area.

The land part of the study area consists of idle land covered with natural vegetation and agricultural areas. The idle land accounts for about 21% of the total land area. It could be categorized as beach forest, mangrove forest, mixed forest, and deciduous forest. The agricultural land is rubber plantation, palm and cashew plantation, paddy field and orchard. The land use is discussed in ***Section 5.4.7***.

A. Forest Resource

The Consultant conducted forest resource surveys during October 5-9, 2015 to collect information on existing conditions of forest areas, vegetation types, and land use patterns. The suitable temporary sampling plots for the forest area within South-Eastern of Asia Region are Stratified Random Sampling. For forests in South East Asia, the most suitable sampling method for forest survey is the stratified random sampling.

Based on this sampling method, there were 13 sample plots within the power plant project area and additional 10 sample plots within 5 km radius of the power plant area (see ***Figure 5.3-1*** and ***Figure 5.3-2***). Three sizes of temporary sampling plots were used with the following purposes:

- The rectangular sampling plot of 10 x 10 m. (area of 100 m^2) was used for collecting data on tree diameters over 1.30 m (for terrestrial forest) and 20 cm. for mangrove forest or girth over 30 cm at breast height (Diameter at breast height (DBH) or Girth at breast height (GBH) respectively).

- The rectangular sampling plot of 4 x 4 m. (area of 16 m^2) covered within the sampling plot of 10 x 10 m was used for studying small trees higher than 1.30 m with GBH less than 30 cm. Species and number were recorded for sapling density and other natural generation.

- The rectangular sampling plot of 1 x 1 m. (area of 1 m^2) covered within the sampling plot of 4 x 4 m was used for studying the seedling comprising plants lower than 1.30 m in height and under the trees (annual, creeper, and climbing plants). They are used as an indicator of the natural regeneration of the ecosystem.

The survey identified four types of natural forest areas in the study area as shown in ***Photo 5.3-1***. The survey results are summarized below:

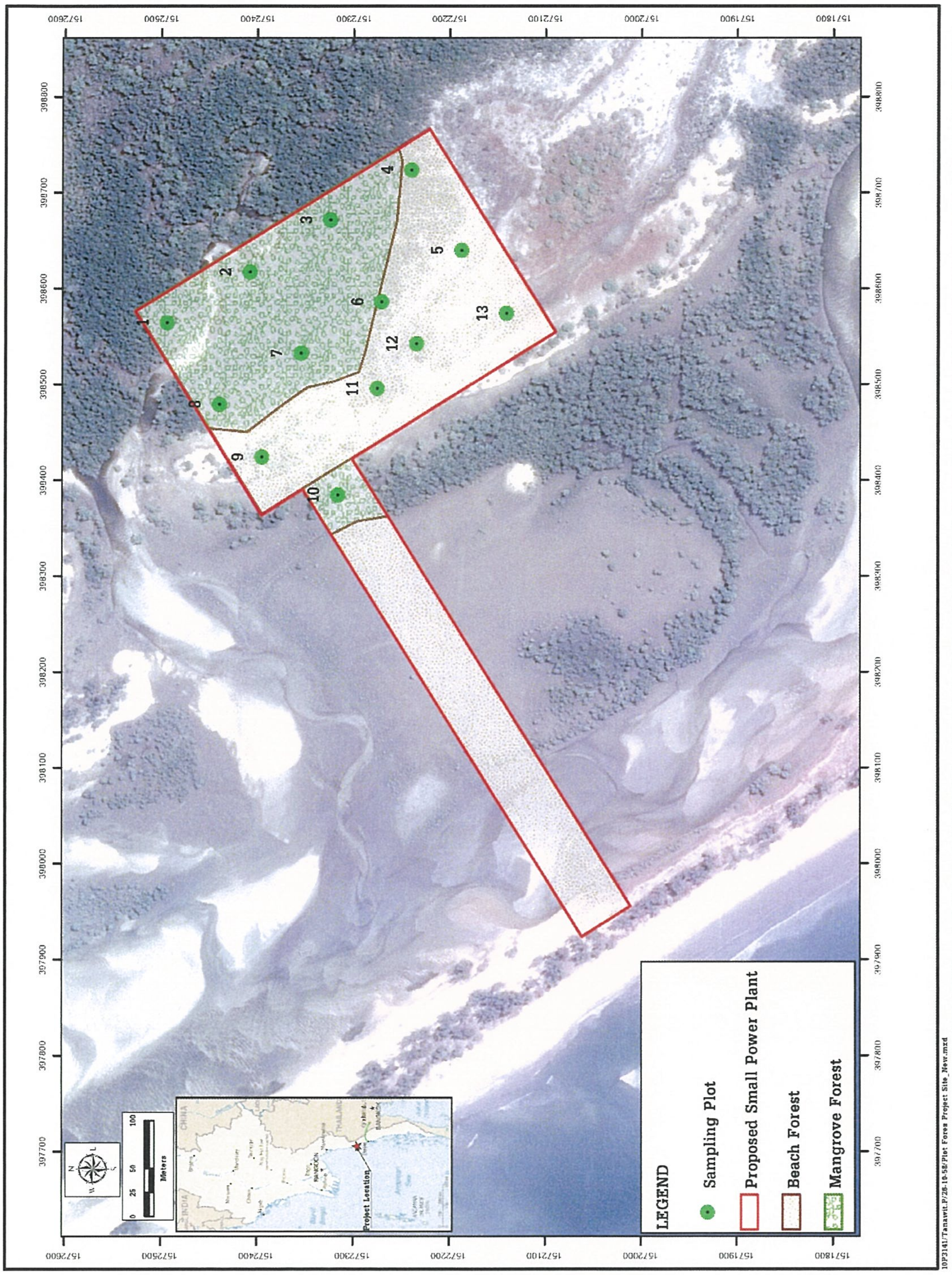


FIGURE 5.3-1: STUDY AREA AND SAMPLING PLOTS ON POWER PLANT PROJECT AREA

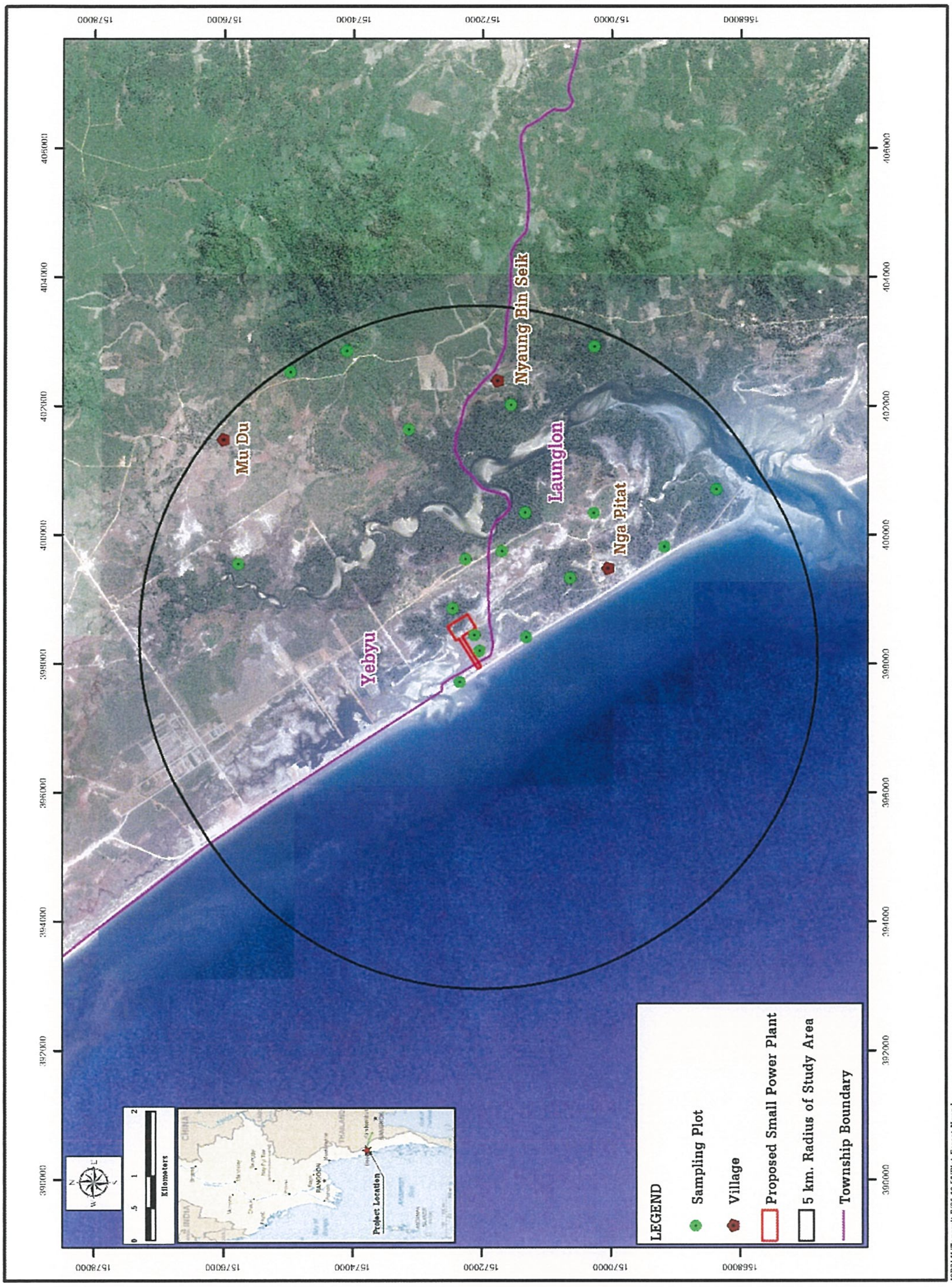


FIGURE 5.3-2: STUDY AREA AND SAMPLING PLOTS WITHIN 5 KM RADIUS OF POWER PLANT AREA

Fertile Mangrove Forest[1]

Deterioration Mangrove Forest[1]

Beach Forest[1]

Deciduous Forest about 300 meters from the East of Project Site[2]

Mangrove Forest about 650 meters from the north of Project Site[2]

Mixed Forest about 4.10 kilometers from the northeast of Project Site[2]

Remark: [1] Type of forest within the power plant site
[2] Type of forest within area 5 km radius of the power plant site

PHOTO 5.3-1: THE EXISTING FORESTRY WITHIN THE POWER PLANT SITE AND AREA 5 KM RADIUS OF POWER PLANT SITE

(1) The Power Plant Site

The power plant site has not yet been cleared and some vegetation still existing. However, the entire DSEZ, including the power plant site, has no forest areas designated as conservation forest by the MONREC. The field survey by 13 sampling plots, it can be identified at least 30 plant species in the power plant site. Plant species and forest types in and adjacent to the power plant site are as follows:

Mangrove Forests

Most mangrove areas exist in the northeastern edge and small patch in middle area of the power plant site consisting of about 10.58 acres of fertile mangrove forest and about 0.91 acres of deteriorated mangrove forest. There are 29 plant species were identified in the mangrove areas which *Rhizophora apiculata* Blume was the dominant plant species. Plant growth patterns can be classified as tree, shrub, climber, fern, palm and epiphytic orchid habits. Details of each plant habit as followed; 9 tree species were *Avicennia allba* Blume, *Rhizophora apiculata* Blume, *Rhizophora mucronata* Poir., *Lumnitzera littorea* (Jack) Voigt etc.; 7 shrub species include as *Acanthus ebracteatus* Vahl., *Clerodendrum inerme* (L.) Gaertn., *Premna obtusifolia* R.Br., *Aegialitis rotundifolia* Roxb. etc.; 5 climber species were *Acanthus volubilis* Wall., *Caesalpinia crista* L., *Dalbergia candenatensis* (Dennst.) Prain, ect.; 2 fern species as *Drynaria sparsisora* (Desv.) S. Moore and *Pyrrosia adnascens* (G. Forst.) Ching; 2 palm species were *Licuala spinosa* Thunb. and *Phoenix paludosa* Roxb.; 2 epiphytic orchid species were *Cleisostoma halophilum* (Ridl.) Garay and *Cymbidium finlaysonianum* Lindl. Some pictures of these species are shown in ***Photo 5.3-2***.

Beach Forest

Beach forests are found in the southwest side of the project site boundary adjacent to Andaman Sea. Beach forests are open area with scattering patches of vegetation and deteriorated forest. The total area of beach forest was estimated at about 18.90 acres. There were nine plant species were found and only one species habit of tree as *Pandanus odoratissimus* Jacq. Nom. Illeg., and the remaining habits followed; found five species of shrub as *Clerodendrum inerme* (L.) Gaertn., *Premna obtusifolia* R.Br., *Dendrolobium umbellatum* (L.) Benth., *Melastoma malabathricum* L. and *Dodonae viscosa* Jacq.; two climber species as *Caesalpinia crista* L. and *Cayratia trifolia* (L.) Domin; *Impomoea pes-caprae* (L.) R.Br. was only one species from creeping herb habit. Pictures of some dominant plant species are shown in ***Photo 5.3-2***.

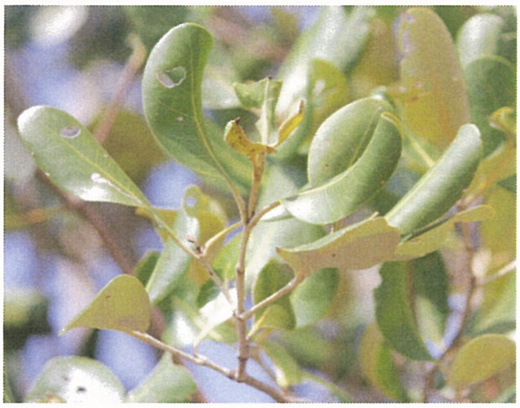
(a) *Rhizophora mucronata*	(b) *Diospyros ferrea*
	
(c) *Avicennia officinalis*	(d) Pandanus odoratissimus

PHOTO 5.3-2: PLANT SPECIES WITHIN POWER PLANT SITE

(2) Study Area within 5 km from the Power Plant Site

The area within 5 km distance from the power plant site has no forest areas designated as conservation forest by MONREC. Four types of forests were found in the area-mangrove forest, beach forest, mixed forest, and deciduous forest. At least 145 plant species were identified in the area.

Mangrove Forest

The existing small patches of mangrove forest are still densely covered with a mix of large, medium and small trees. Plant species representative are in family Avicenniaceae, Apocynaceae, Rhizophoraceae, Combretaceae, Malvaceae, Meliaceae, Euphobiaceae, Palmae, Plumbaginaceaeand Leguminosae-Caesalpinioideae. The dominant plant species are *Avicennia alba* Blume, *Avicennia officinalis* L., *Cerbera odollam* Gaertn., *Rhizophora apiculata* Blume, *Rhizophora mucronata* Poir, *Ceriope tagal* (Perr.) C.B. Rob., *Bruguiera cylindrica* (L.) Blume, *Lumnitzera littorea* (Jack) Voigt, *Hibiscus tiliaceus* L., *Heritiera littoralia* Dryand., *Xylocarpus granatum* Koenig, *Xylocarpus moluccensis* (Lam.) M. Roem., *Excoecaria agallocha* L., *Nypa fruticans*Wurmb, *Aegialiti srotundifolia* Roxb. and *Intsia bijuga* (Colebr.) Kuntze. Pictures of some dominant plant species are shown in ***Photo 5.3-3***.

Beach Forest

Dominant species found in the beach forest are listed in botanical names as follows: *Manilkara hexandra* (Roxb) Dubard, *Anacardiu moccidentale* L., *Casuarina equisetifolia* J.R. & G. Forst., *Syzygium cinereum* (Kurz) Chantar. & J. Parn., *Careya arborea* Roxb., *Eurycoma longifolia* Jack, *Phyllanthus emblica* L., *Diospyros ferrea* (Willd.) Bakh.var. ferrea, *Morinda coreia* Buch.-Ham. and *Lannea coromandelica* Merr. Pictures of some dominant plant species are shown in ***Photo 5.3-3***.

Mixed Forest

Dominant plant species found in the mixed forest are listed in botanical names as follows: *Suregada multiflorum* (A. Juss.) Baill., *Streblus asper* Lour., *Nephelium hypoleucum* Kurz, *Fernandoa adenophylla* (Wall. ex G. Don) Steenis, *Hopea odorata* Roxb., *Cratoxylum cochinchinense* (Lour.) Blume, *Garuga pinnata* Roxb., *Spondias pinnata* (L. f.) Kurz, *Dillenia obovata* (Blume) Hoogland, and *Microcos tomentosa* Sm. Pictures of some dominant plant species are shown in ***Photo 5.3-3***.

Deciduous Forest

Dominant plant species found in the deciduous forest are listed in botanical names as follows: *Dipterocarpus obtusifolius* Teijsm. ex Miq., *Aporusa villosa* (Wall. ex Lindl.) Baill, *Xylia xylocarpa* (Rxob.) Taub., *Ochna integerrima* (Lour.) Merr., and *Croton oblongifolius* Roxb.

(a) *Dipterocarpus obtusifolius* Teijsm. ex Miq.	(b) *Phyllanthus emblica* L.	(c) *Suregada multiflorum* (A.Juss.) Baill.
(d) *Dodonae vicosa* Jacq.	(e) *Rhizophora apiculata* Blume	(f) *Casuarina equisetifolia* J.R. & G. Forst.
(g) *Careya arborea* Roxb.	(h) *Lumnitzera racemosa*	(i) *Derris indica*
(j) *Spinifex littoreus*	(k) *Ipomoea aquatica* Forssk.	(l) *Abrus precatorius* L.

PHOTO 5.3-3: PLANT SPECIES WITHIN AREA 5 KM RADIUS OF POWER PLANT SITE

In addition to the identified perennial tree species, other vegetation found in the study area include small seasonal plants, climbers, epiphytes, grasses and reeds.

Common seasonal plants and climber plants in the area are listed in common botanical names as follows: *Mimosa pudica* L., *Macroptilium lathyroides* (L.) Urb., *Caesalpinia bonduc* (L.) Roxb., *Flagellaria indica* L., *Acanthus ilicifolius* L., *Tylophora flexuosa* R. Br., *Premna obtusifolia* R.Br., *Streptocaulon juventas* (Lour.) Merr., *Caesalpinia crista* L., *Aganosma marginata* (Roxb.) G. Don, *Gloriosa superb* L., *Abrus precatorius* (L.), *Clerodendrum inerme* (L.) Gaertn., *Pandanus odoratissimus* L.f., *Finlaysonia maritima* Backer ex K. Heyne and *Derris trifoliate* Lour.

Epiphytes are *Dendrobium secundum* (Blume) Lindl., *Aerides falcate* Lindl. and *Dendrobium draconis* Rchb. f.

Grass groups and other reeds are *Cynodon dactylon* (L.) Pers., *Spinifex littoreus* Merr. and *Schoenoplectus mucronatus* (L.) Palla. Pictures of some dominant plant species are shown in ***Photo 5.3-3***.

(3) Plant Status

Of the 30 plant species found in the power plant site and 145 plant species found in the area within 5 km from the power plant site, 5 species are listed as Threatened Species in the International Union for Conservation of Nature (IUCN) Red List (2013). The threatened species are:

The Power Plant Site

There are two species, *Acanthus volubilis* Wall., and *Acanthus ebracteatus* Vahl., as Least Concern (LC) status in the IUCN Red List of Threatened Species.

The Study Area within 5 km from the Power Plant Site

Vulnerable Species (VU) –two species were found, namely *Hopea odorata* Roxb., and *Intsia bijuga* (Colebr.) Kuntze.

Near Threatened Species (NT) –three species were found, namely *Aegialitis rotundifolia* Roxb., *Ceriops decandra* (Griff.) Ding Hou and *Sonneratia ovata* Backer. Pictures of some dominant plant species are shown in ***Photo 5.3-4***.

(A) *Acanthus ebracteatus*

(B) *Hopea odorata*

(B) *Intsia bijuga*

(B) *Aegialitis rotundifolia*

(B) *Ceriops decandra*

PHOTO 5.3-4: (A) LEAST CONCERN SPECIES WITHIN POWER PLANT SITE AND (B) VULNERABLE SPECIES IN 5 KM RADIUS OF POWER PLANT SITES (IUCN, 2013)

B. Wildlife Resources

The surveys of wildlife resources in the project site and the radius area were carried out simultaneously with the forest resource surveys during October 5-9, 2015.

Field surveys were conducted using two methods, direct searching method and indirect inquiry method. The direct searching method was used in the selected sample areas by line transects and point count. Binoculars were used to detect the diurnal squirrels and other day- active small mammals. More ground searches were conducted to detect tracks and other signs of existing wildlife resources such as track in soft soils and claw, marks, feeding signs, dropping and quills, etc. The indirect inquiry method was carried out by interviewing local people to obtain information on sighted wildlife and exact representative of each habitat.

As the terrestrial ecosystem in the study area has long been disturbed, most of the wildlife species found in the surveys were small animals which had adapted to thrive well in disturbed and poor habitats. A total of 89 wildlife species was recorded in the surveys consisting of 10 mammals, 49 birds, 20 reptiles and 7 amphibians.

Findings in the two surveyed areas are summarized below:

(1) The Power Plant Site

In total of 43 wildlife species were found in the power plant site, consisting of 4 mammal species, 28 bird species, 7 reptile species, and 4 amphibian species. Pictures of some of the species are shown in ***Photo 5.3-5***.

Details of species diversity and distribution of the 4 wildlife groups in the power plant site are as follows:

Mammals

Four mammal species observed in the power plant site are several kinds of rats, shrews, and squirrels, namely *Pipistrellus javanicus*, *Mus musculus*, *Rattus rattus* and *Callosciurus erythraeus*.

Remark: [1]Wildlife species within the power plant site

[2]Wildlife species within area 5 km radius of power plant site

PHOTO 5.3-5: WILDLIFE SPECIES WITHIN THE POWER PLANT SITE AND AREA 5 KM RADIUS OF POWER PLANT SITE

Birds

Birds can migrate rapidly searching for habitats and food sources. The distribution ranges of birds are very wide, especially for the arboreal birds. Some birds require specific habitats and ecological conditions, while many species can live and feed in diverse ecosystems.

In the power plant site, there are at least 28 species of birds sighted in open areas, mangrove forests and coastal areas, and sparse forest. Some observed species include: *Butorides striatus*, *Egretta garzetta*, *Ardeola bacchus*, *Vanellus indicus*, *Actitis hypoleucos*, *Coracias benghalensis*, *Todirhamphus chloris*, *Phalacrocorax niger*, *Streptopelia chinensis*, *Acridotheres tristis*, *Hirundo rustica*, *Centropus sinensis*, *Falco tinnunculus*, *Glaucidium cuculoides*, *Nectarinia jugularis*, *Phylloscopus inornatus*, *Orthotomus sutorius* and *Psittacula alexandri*.

Reptiles

Seven species of this wildlife group were found in the power plant site, all are species distributed widely in Myanmar. The reptiles found living in mangrove forests, sand beach, and sand dune are: *Ptyas korros*, *Cerberus rynchops*, *Boiga dendrophila*, *Python reticulatus*, *Trimeresurus purpureomaculatus*, *Varanus nebulosus* and *Leiolepis belliana*.

Amphibians

Four species of this group were found in the power plant site, including *Fejervarya cancrivora*, *Fejervarya limnocharis*, *Kaloula pulchra* and *Microhyla ornata*.

(2) The Area within 5 km from the Power Plant Site

In total, 86 wildlife species were found in this outer area, consisting of 10 mammal species, 49 bird species, 20 reptile species, and 7 amphibian species (***Photo 5.3-5***).

Details of species diversity and distribution of the 4 wildlife groups are as follows:

Mammals

There are 10 mammals species listed in this study area. Wild animals that could be found within the 5 km radius of the power plant site included *Macroglossus sobrinus*, *Pipistrellus javanicus*, *Scotophilus kuhlii*, *Callosciurus caniceps*, *Callosciurus erythraeus*, *Mus musculus*, *Rattus rattus*, *Bandicota indica*, *Paradoxurus hermaphroditus* and *Sus scrota*.

Birds

Birds can migrate rapidly searching for habitats and food source. The distribution ranges of birds are very wide, especially for the arboreal birds. Some birds require specific habitats and ecological conditions, while many species can live and feed in diverse ecosystems.

In the study area, there are 49 species of birds in the forest and food sources forest or in dense and diverse vegetation as well as in agricultural areas, open areas, scattered trees areas, abandoned areas and community areas such as *Butorides striatus*, *Egretta garzetta*, *Ardeola bacchus*, *Casmerodius albus*, *Vanellus indicus*, *Dicrurus macrocercus*, *Centropus bengalensis*, *Charadrius alexandrinus*, *Pluvialis fulva*, *Actitis hypoleucos*, *Numenius phaeopus*, *Pernis ptilorhyncus*, *Haliastur indus*, *Falco tinnunculus*, *Glaucidium cuculoides*, *Tringa totanus*, *Lanius cristatus*, *Phalacrocorax niger*, *Columba livia*, *Streptopelia chinensis*, *Passer montanus*, *Acridotheres tristis* and *Copsychus saularis*.

Reptiles

About 20 species of this wildlife group were found in the area. They are *Ptyas korros*, *Chrysopelea ornata*, *Ahaetulla prasina*, *Enhydris plumbea*, *Cerberus rynchops*, *Naja* sp., *Trimeresurus albolabris*, *Trimeresurus purpureomaculatus*, *Python reticulatus*, *Gekko gecko*, *Hemidactylus frenatus*, *Hemidactylus garnotii*, *Cosymbotus platyurus*, *Leiolepis belliana*, *Calotes mystaceus*, *Mabuya multifasciata* and *Varanus nebulosus*.

Amphibians

About 7 species of this wildlife group were found in the area. They are *Fejervarya limnocharis*, *Fejervarya cancrivora*, *Hoplobatrachus rugulosa*, *Duttaphrynus melanostictus*, *Microhyla ornata*, *Kaloula pulchra* and *Polypedates leucomystax*.

C. Wildlife Status

Species are classified by the IUCN Red List (2013) into nine groups based on such criteria as rate of decline, population size, area of geographic distribution, and degree of population and distribution fragmentation. The detail are as follows:

- Extinct (EX) – No known individuals remaining.
- Extinct in the wild (EW) – Known only to survive in captivity, or as a naturalized population outside its historic range.
- Critically endangered (CR) – Extremely high risk of extinction in the wild.
- Endangered (EN) – High risk of extinction in the wild.
- Vulnerable (VU) – High risk of endangerment in the wild.
- Near threatened (NT) – Likely to become endangered in the near future.
- Least concern (LC) – Lowest risk. Does not qualify for a more at risk category. Widespread and abundant taxa are included in this category.
- Data deficient (DD) – Not enough data to make an assessment of its risk of extinction.
- Not evaluated (NE) – Has not yet been evaluated against the criteria.

When discussing the IUCN Red List, the official term "threatened" is a grouping of three categories:

When discussing the IUCN Red List, the official term " threatened" is a grouping of three categories:

- Critically Endangered (Cr) This category includes species, which are facing an extremely high risk of extinction in the wild in the immediate future.
- Endangered (En) This category includes species, which are facing a very high risk of extinction in the wild in the near future.
- Vulnerable (Vu) This category includes species, which are facing a high risk of extinction in the wild in the medium-term future.

Furthermore, IUCN (2013) also evaluates species which do not satisfy the criteria for any of the categories as mentioned above, but which are close to qualifying for vulnerable. Species included in this subcategory are classified as near-threatened (Nt).

Summary of 2013 IUCN Red List categories.

Status for Conservation Concern: Based on IUCN (2013), results of field survey show that threatened species were not found within the power plant site. Most species were classified as Least Concern Species (LC).

5.3.2 Marine Ecology

The study of marine ecology was based on information obtained from: (i) past surveys and studies of marine ecology of Tanintharyi Region; (ii) field surveys in the seawaters near the project site; and (iii) interviewing villagers in Nga Pitat, Sakhanthit, Nyaung Bin Seik, Pan Din In and Muangmagan Villages regarding sea turtle nesting areas.

The secondary information reviewed included (i) published results of past surveys of cetacean and sea grass in the region; and (ii) results of coral reef site surveys conducted by ITD in July 2012.

Marine ecological surveys were conducted on dry season January 21, 2015 and wet season 7-8 October, 2015 at the four seawater quality sampling stations are shown in ***Figure 5.2-13*** and ***Photo 5.3-6***. The survey collected water samples for plankton and fish larvae analysis and sea bed samples for benthos analysis.

PHOTO 5.3-6: MARINE ECOLOGICAL SAMPLING ACTIVITIES

Plankton sampling at each station was performed by collecting 30 liters of water from 0.3 m depth and pouring the collected water sample through plankton net with 70 micron mesh size. The retained plankton was transferred into a storage bottle and was preserved with 5% neutral formalin solution. Species composition and abundance determinations were identified at Kasetsart University laboratory, Bangkok, Thailand.

Fish larvae samples were obtained by plankton net with 70 micron mesh size. A flow meter was attached to the mouth of net to determine the volume of seawater filtered during tow. The sampling period was about 10 minutes with oblique tow. Collected specimens were preserved in 5% neutral formalin solution. Fish larvae samples were standardized to numbers caught per 1,000 m^3 of seawater volume filtered. Species composition and abundance determinations were identified at Kasetsart University laboratory, Bangkok, Thailand.

Benthic samples were collected using Ekman dredge with a grabbing area of 0.25 ft^2. Three grab samplings (0.75 ft^2) were undertaken at each station. Each collected sample was observed to identify the texture and composition of sediments. The information was recorded accordingly. The sediments were washed through a series of wire sieves with mesh size of 1,000 and 500 µm. The retained fauna was kept in a plastic bottle and preserved in 5%formalin-seawater solution. All samples were sent to laboratory at Kasetsart University (Thailand) for identification.

Results of the marine ecology survey can be summarized as follows:

(1) Dry Season

- **Phytoplankton**

In total, 16 species of phytoplankton were identified. They belong to 4 classes, namely: Cyanophyceae (Blue-Green Algae), Bacillariophyceae (Diatom), Coscinodiscophyceae (Centric diatom), and Class Dinophyceae (Dinoflagellates). The phytoplankton densities were found to range from 19,600 to 30,550 cells/m^3. The dominant species was *Peridinium* sp. as it was most abundant at all sampling stations with densities ranging from 4,700 – 14,100 cells/m^3.

- **Zooplankton**

In total, 12 taxa of zooplankton were identified. They belong to 3 phylum, namely: Arthropoda, Chordata, and Protozoa. The zooplankton densities were found to range from 47,600 to 112,800 cells/m^3. The most abundant zooplankton was copepod nauplius with densities ranging from 14,000-51,700 cells/m^3.

The diversity index of plankton was lowest at 1.89 at Station SW1 while the highest value of 2.30 was found at Station SW4. The average diversity index of all four stations was 2.10.

The collected data on diversity index of phytoplankton and zooplankton indicate that the coastal water quality was moderately suitable for marine organisms and resources.

Results of plankton identification for this study were shown in ***Table 5.3-1***.

- **Fish Larvae**

Five families of fish larvae were identified. They belong to 5 families, namely: Engraulidae, Exocoetidae, Mullidae, Carangidae and Gobiidae. Yolk sac larvae were the most abundance. Three families could be found in SW1 and SW4 while two families and one family were observed in SW3 and SW2, respectively. Fish larvae densities were found to range from 141-900 larvae/ 1 ,000 m^3. The highest density of total fish larvae, 900 larvae/1,000 m^3, was also obtained in SW3 and the lowest density of total fish larvae, 141 larvae//1,000 m^3, was also obtained in SW2. Fish eggs densities were found to range from 1,020-10,700 eggs/1,000 m^3. The highest density of total fish eggs, 10,700 eggs/1,000 m^3, was also obtained in SW3 and the lowest density of total fish eggs, 1,020 eggs/1,000 m^3, was also obtained in SW2.

Results of fish larvae identification for this study were shown in ***Table 5.3-2***.

- **Benthos**

In total, 10 species of benthos could be identified in the benthic samples collected at all four sampling stations. They belong to 4 phylum, namely: Annelida, Arthropoda, Mollusca, and Echinodermata. Their densities ranged from 44 to 264 individuals/m^2. The population was most abundant at Stations SW1 and SW4 and least abundant at Station SW2. The largest benthos population found at SW1 and SW4 were polychaete in Family Capitellidae and Family Cossuridae, with densities of 220 individuals/m^2 and 198 individuals/m^2, respectively. The benthos data indicate that the marine ecosystems in the vicinities of SW1 and SW4 is more fertile than those in the vicinities of SW2 and SW3.

Results of benthos identification are shown in ***Table 5.3-3***.

TABLE 5.3-1
RESULTS OF PLANKTON SAMPLINGS AND ANALYSIS (JANUARY, 2015)

Phytoplankton/Zooplankton						Station				Total ($Cell/m^3$)
Division	**Class**	**Order**	**Suborder**	**Family**	**Genus**	**SW 1**	**SW 2**	**SW 3**	**SW 4**	
Division Cyanophyta										
	Class Cyanophyceae (Blue-Green Algae)									
		Order Nostocales								
				Family Oscillatoriaceae						
					Oscillatoria sp.		5,200	2,800	4,700	12,700
Division Chromophyta										
	Class Bacillariophyceae (Diatom)									
		Order Biddulphiales (Centric Diatom)								
			Suborder Coscinodiscineae							
				Family Coscinodiscaceae						
					Coscinodiscus sp.		2,600	5,600	2,350	10,550
				Family Heliopeltaceae						
					Arachnoidiscus sp.		2,600			2,600
	Class Coscinodiscophyceae									
		Order Melosirales								
				Family Hyalodiscaceae						
					Hyalodiscus stelliger	4,700				4,700
		Order Coscinodiscales								
			Suborder Rhizosoleniineae							
				Family Rhizosoleniaceae						
					Rhizosolenia calcar-avis	2,350				2,350
			Suborder Biddulphiineae							
				Family Eupodiscaceae						
					Triceratium favus	2,350			2,350	4,700
		Order Bacillariales (Pennate Diatom)								
			Suborder Bacillariineae							
				Family Bacillariaceae						
					Nitzschia sigma		2,600			2,600
				Family Naviculaceae						
					Pleurosigma sp.			2,800		2,800
				Family Eunotiacea						
					Eunotia flexuosa	2,350			2,350	4,700
	Class Dinophyceae (Dinoflagellates)									
		Order Gonyaulacales								
				Family Ceratiaceae						
					Ceratium breve				2,350	2,350
					C. deflexum	2,350				2,350
					C. extensum		2,600			2,600
					C. furca		2,600			2,600
					C. fusus		2,600			2,600
		Order Peridiniales								
				Family Peridiniaceae						
					Peridinium sp.	4,700	7,800	8,400	14,100	35,000
				Family Pyrophacaceae						
					Pyrophacus horologium	2,350			2,350	4,700

TABLE 5.3-1

RESULTS OF PLANKTON SAMPLINGS AND ANALYSIS (JANUARY, 2015) (CONT'D)

Phytoplankton/Zooplankton (Phylum / Class / Subclass / Order / Family / Genus)	Station SW 1	SW 2	SW 3	SW 4	Total (Cell/m³)
Phylum Arthropoda					
Class Crustacea					
Subclass Copepoda					
*Copepod larva (Nauplius)	51,700	31,200	14,000	35,250	132,150
Order Calanoida					
*Unidentified Calanoida	11,750	2,600	8,400	7,050	29,800
Order Cyclopoida					
*Unidentified Cyclopoida	32,900	13,000	2,800	14,100	62,800
Order Harpacticoida					
*Unidentified Harpacticoida	4,700			2,350	7,050
Phylum Chordata					
Class Larvacea					
Order Copelata					
Family Oikopleuridae					
Oikopleura fusiformis				2,350	2,350
Phylum Protozoa					
Class Ciliata					
Subclass Spirotricha					
Order Tintinnida					
Family Codonellidae					
Tintinnopsis radix	9,400	23,400	16,800	7,050	56,650
T. mortensenii	2,350		2,800		5,150
Codonelopsis ostenfeldi				2,350	2,350
Family Cyttarocylidae					
Favella campanula		2,600		2,350	4,950
Family Rhabdonellidae					
Rhabdonella cuspidata				2,350	2,350
Family Tintinnidae					
Leprotintinnus nordguisti		5,200	2,800		8,000
Class Sarcodina					
Subclass Rhizopoda					
Order Foraminiferida					
Family Codonellidae					
Globorotalia inflata				2,350	2,350
Total density					
Phytoplankton	21,150	28,600	19,600	30,550	99,900
Zooplankton	112,800	78,000	47,600	77,550	315,950
Total	133,950	106,600	67,200	108,100	415,850
Total diversity					
Phytoplankton	**7**	**8**	**4**	**7**	**16**
Zooplankton	**6**	**6**	**6**	**10**	**12**
Total	**13**	**14**	**10**	**17**	**28**
Ratio of Phytoplankton : Zooplankton	**0.19**	**0.37**	**0.41**	**0.39**	**Avg.=0.34**
Diversity index	**1.89**	**2.16**	**2.06**	**2.30**	**Avg.=2.10**

Remark: * = unidentified
SW1: UTM 395675E 1573545N Zone 47P
SW2: UTM 397446E 1570914N Zone 47P
SW3: UTM 396298E 1569482N Zone 47P
SW4: UTM 399599E 1567402N Zone 47P

Source: TEAM Consulting Engineering and Management Co., Ltd., January, 2015

TABLE 5.3-2
RESULTS OF FISH LARVAE SAMPLINGS AND ANALYSIS (JANUARY, 2015)

No.	Family	Station				Total (Larvae/1,000 m^3)
		SW1	SW2	SW3	SW4	
1	Engraulidae				18	**18**
2	Exocoetidae			16		**16**
3	Mullidae	179	21		224	**424**
4	Carangidae	103				**103**
5	Gobiidae	401		166	52	**619**
6	*Yolk sac larvae	143	120	718	455	**1,436**
	Total	**826**	**141**	**900**	**749**	**2,616**
	Eggs	**1,372**	**1,020**	**10,700**	**5,408**	**18,500**

Remark: * = unidentified

SW1: UTM 395675E 1573545N Zone 47P

SW2: UTM 397446E 1570914N Zone 47P

SW3: UTM 396298E 1569482N Zone 47P

SW4: UTM 399599E 1567402N Zone 47P

Source: TEAM Consulting Engineering and Management Co., Ltd., January, 2015

TABLE 5.3-3
RESULTS OF BENTHOS SAMPLINGS AND ANALYSIS (JANUARY, 2015)

Benthos	Station				Total (Individual/m²)
	SW1	SW2	SW3	SW4	
Phylum Annelida					
Class Polychaeta					
Subclass Scolecida					
Family Capitellidae	44	22	22	220	308
Family Cossuridae	198				198
Subclass Canalipalpata					
Order Terebellida					
Family Terebellidae				44	44
Subclass Aciculata					
Order Phyllodocida					
Family Glyceridae			22		22
Family Nereididae			44		44
OrderAmphinomidae					
Family Amphinomidae		22			22
Phylum Arthropoda					
Class Malacostraca					
Superorder Peracarida					
Order Amphipoda					
Suborder Gammaridea					
Family Ampithoidae	22		22		44
Order Isopoda					
Suborder Cymothoida					
Family Cirolanidae			22		22
Phylum Mollusca					
Class Bivalvia					
Subclass Heterodonta					
Order Veneroida					
FamilyArcidae					
Anadara sp.			22		22
Phylum Echinodermata					
Class Ophiuroidea					
Order Ophiurida					
Family Ophiotrichidae					
Ophiothrix sp.			22		22
Total density (individual/m²)	**264**	**44**	**176**	**264**	**748**
Total diversity (species)	**3**	**2**	**7**	**2**	**10**

Remark: SW1: UTM 395675E 1573545N Zone 47P
SW2: UTM 397446E 1570914N Zone 47P
SW3: UTM 396298E 1569482N Zone 47P
SW4: UTM 399599E 1567402N Zone 47P

Source: TEAM Consulting Engineering and Management Co., Ltd., January, 2015

(2) Wet Season

- **Phytoplankton**

In total, 13 species of phytoplankton were identified. They belong to 4 classes, namely: Cyanophyceae (Blue-Green Algae), Bacillariophyceae (Diatom), Coscinodiscophyceae (Centric diatom), and Class Dinophyceae (Dinoflagellates). The phytoplankton densities were found to range from 64,350 to 291,200 cells/m^3. The dominant species was *Oscillatoria* sp. as it was most abundant at all sampling stations with densities ranging from 14,850 – 204,750 cells/m^3.

- **Zooplankton**

In total, 10 taxa of zooplankton were identified. They belong to 4 phylum, namely: Arthropoda, Chordata, Protozoa and Mollusca.The zooplankton densities were found to range from 18,800 to 59,400 cells/m^3. The most abundant zooplankton was copepod nauplius with densities ranging from 4,550-32,400 cells/m^3.

The diversity index of plankton was lowest at 1.62 at Station SW1 while the highest value of 2.51 was found at Station SW4. The average diversity index of all four stations was 2.22.

The collected data on diversity index of phytoplankton and zooplankton indicate that the coastal water quality was moderately suitable for marine organisms and resources.

Results of plankton identification for this study were shown in ***Table 5.3-4***.

- **Fish Larvae**

Thirteen families of fish larvae were identified. They belong to 13 families, namely: Clupeidae, Engraulidae, Callionymidae, Ambassidae, Leiognathidae, Sillaginidae, Sciaenidae, Nemipteridae, Carangidae, Gobiidae, Bothidae, Cynoglossidae and Monacanthidae. Gobiidae was the most abundance. Seven families could be found in SW1, SW2 and SW3 while four families were observed in SW4. Fish larvae densities were found to range from 23-123 larvae/ 1,000 m^3. The highest density of total fish larvae, 123 larvae/1,000 m^3, was also obtained in SW1 and the lowest density of total fish larvae, 23 larvae//1,000 m^3, was also obtained in SW4. Fish eggs densities were found to range from 152-735 eggs/1,000 m^3. The highest density of total fish eggs, 735 eggs/1,000 m^3, was also obtained in SW2 and the lowest density of total fish eggs, 152 eggs/1,000 m^3, was also obtained in SW4.

Results of fish larvae identification for this study were shown in ***Table 5.3-5***.

TABLE 5.3-4
RESULTS OF PLANKTON SAMPLINGS AND ANALYSIS (OCTOBER, 2015)

Phytoplankton/Zooplankton	Station				Total (Cell/m^3)
Division / Class / Order / Suborder / Family / Genus	SW1	SW2	SW3	SW4	
Division Cyanophyta					
Class Cyanophyceae (Blue-Green Algae)					
Order Nostocales					
Family Oscillatoriaceae					
Oscillatoria sp.	204,750	54,000	42,300	14,850	315,900
Division Chromophyta					
Class Bacillariophyceae (Diatom)					
Order Biddulphiales (Centric Diatom)					
Suborder Coscinodiscineae					
Family Thalassiosiraceae					
Thalassiosira subtilis	9,100	10,800			19,900
Family Coscinodiscaceae					
Coscinodiscus sp.	18,200		4,700	9,900	32,800
Family Asterolampraceae					
Asterolampra marylandica		5,400			5,400
Class Coscinodiscophyceae					
Order Melosirales					
Family Hyalodiscaceae					
Hyalodiscus stelliger	4,550				4,550
Order Coscinodiscales					
Family Hemidiscaceae					
Hemidiscus cuneiformis			4,700	9,900	14,600
Suborder Rhizosoleniineae					
Family Rhizosoleniaceae					
Rhizosolenia alata	9,100	5,400	4,700		19,200
R. robusta	4,550				4,550
Suborder Biddulphiineae					
Family Eupodiscaceae					
Odontella mobiliensis	4,550				4,550
Triceratium favus			4,700		4,700
Order Bacillariales (Pennate Diatom)					
Suborder Bacillariineae					
Family Bacillariaceae					
Nitzschia longissima	9,100		9,400	4,950	23,450
Family Naviculaceae					
Navicula sp.			4,700		4,700
Pleurosigma sp.				4,950	4,950
Family Surirellaceae					
Campyrodiscus sp.				4,950	4,950

TABLE 5.3-4

RESULTS OF PLANKTON SAMPLINGS AND ANALYSIS (OCTOBER, 2015) (CONT'D)

Phytoplankton/Zooplankton (Division / Class / Order / Suborder / Family / Genus)	SW1	SW2	SW3	SW4	Total (Cell/m^3)
Class Dinophyceae (Dinoflagellates)					
Order Dinophysiales					
Family Amphisoleniaceae					
Amphisolenia bidentata		5,400			5,400
Family Dinophysiaceae					
Dinophysis miles			4,700		4,700
Ornithocercus thumii		5,400			5,400
Order Prorocentrales					
Family Prorocentraceae					
Prorocentrum micans		5,400	4,700		10,100
Order Gonyaulacales					
Family Ceratiaceae					
Ceratium breve			4,700		4,700
C. deflexum	4,550				4,550
C. extensum	4,550	5,400			9,950
C. fusus			4,700		4,700
C. trichoceros			4,700		4,700
Family Ceratocoryaceae					
Ceratocorys horrida				4,950	4,950
Family Gonyaulacaceae					
Gonyaulax sp.				4,950	4,950
Order Peridiniales					
Family Peridiniaceae					
Peridinium sp.	9,100	10,800	4,700		24,600
Family Protoperidiniaceae					
Proroperidinium sp.	4,550			4,950	9,500
Family Pyrophacaceae					
Pyrophacus horologium	4,550	10,800			15,350

TABLE 5.3-4

RESULTS OF PLANKTON SAMPLINGS AND ANALYSIS (OCTOBER, 2015) (CONT'D)

Phytoplankton/Zooplankton (Phylum / Class / Subclass / Order / Family / Genus)	Station				Total (Cell/m³)
	SW1	SW2	SW3	SW4	
Phylum Arthropoda					
Class Crustacea					
Subclass Copepoda					
*Copepod larva (Nauplius)	4,550	32,400		19,800	56,750
Order Calanoida					
*Unidentified Calanoida	4,550	5,400			9,950
Order Cyclopoida					
*Unidentified Cyclopoida		5,400		9,900	15,300
Phylum Chordata					
Class Larvacea					
Order Copelata					
Family Oikopleuridae					
Oikopleura fusiformis		5,400	4,700		10,100
Phylum Protozoa					
Class Ciliata					
Subclass Spirotricha					
Order Tintinnida					
Family Codonellidae					
Codonelopsis ostenfeldi	4,550		4,700		9,250
Family Cyttarocylidae					
Favella campanula				4,950	4,950
Family Tintinnidae					
Eutintinnus sp.	4,550		9,400	4,950	18,900
Class Sarcodina					
Subclass Rhizopoda					
Order Foraminiferida					
Family Codonellidae					
Globorotalia sp.	9,100			9,900	19,000
Phylum Mollusca					
Class Gastropoda					
Order Thecosomata					
Family Limacinidae					
Limacina sp.		5,400			5,400
Class Bivalvia					
Pelecypod laevae		5,400			5,400
Total density					
Phytoplankton	291,200	118,800	103,400	64,350	577,750
Zooplankton	27,300	59,400	18,800	49,500	155,000
Total	318,500	178,200	122,200	113,850	732,750
Total diversity					
Phytoplankton	13	10	13	9	28
Zooplankton	5	6	3	5	10
Total	18	16	16	14	38
Ratio of Phytoplankton:Zooplankton	**10.67**	**2.00**	**5.50**	**1.30**	**Avg.=4.87**
Diversity index	**1.62**	**2.35**	**2.39**	**2.51**	**Avg.=2.22**

Remark: * = unidentified
SW1: UTM 395675E 1573545N Zone 47P
SW2: UTM 397446E 1570914N Zone 47P
SW3: UTM 396298E 1569482N Zone 47P
SW4: UTM 399599E 1567402N Zone 47P

Source: TEAM Consulting Engineering and Management Co., Ltd., October, 2015

TABLE 5.3-5

RESULTS OF FISH LARVAE SAMPLINGS AND ANALYSIS (OCTOBER, 2015)

No.	Family	Station				Total (Larvae/1,000 m³)
		SW1	SW2	SW3	SW4	
1	Clupeidae	13	11	5		**29**
2	Engraulidae	13				**13**
3	Callionymidae				3	**3**
4	Ambassidae	13	5		3	**21**
5	Leiognathidae		3			**3**
6	Sillaginidae			2		**2**
7	Sciaenidae		6	2		**8**
8	Nemipteridae	20	8	5		**33**
9	Carangidae	10	8	3		**21**
10	Gobiidae	39	16	28	5	**88**
11	Bothidae	5				**5**
12	Cynoglosside				12	**12**
13	Monacanthidae			2		**2**
14	*Yolk sac larvae	13	13	2		**28**
	Total	**123**	**70**	**49**	**23**	**265**
	Eggs	**226**	**735**	**381**	**152**	**1,494**

Remark: * = unidentified

SW1: UTM 395675E 1573545N Zone 47P

SW2: UTM 397446E 1570914N Zone 47P

SW3: UTM 396298E 1569482N Zone 47P

SW4: UTM 399599E 1567402N Zone 47P

Source: TEAM Consulting Engineering and Management Co., Ltd., October, 2015

- **Benthos**

In total, 6 species of benthos could be identified in the benthic samples collected at all four sampling stations. They belong to 3 phylum, namely: Annelida, Arthropoda and Mollusca.Their densities ranged from 22 to 220 individuals/ m^2. The population was most abundant at Stations SW2 and least abundant at Station SW1 and SW3. The largest benthos population found at SW2 were polychaete in Family Capitellidae, with densities of 132 individuals/m^2. The benthos data indicate that the marine ecosystems in the vicinities of SW2 is more fertile than those in the vicinities of SW1, SW3 and SW4.

Results of benthos identification are shown in ***Table 5.3-6***.

TABLE 5.3-6

RESULTS OF BENTHOS SAMPLINGS AND ANALYSIS (OCTOBER, 2015)

Benthos	Station				Total (Individual/m²)
	SW1	SW2	SW3	SW4	
Phylum Annelida					
Class Polychaeta					
Subclass Scolecida					
Family Capitellidae		132		44	**176**
Subclass Aciculata					
Order Phyllodocida					
Family Glyceridae		22			**22**
Family Nereididae		22			**22**
Phylum Arthropoda					
Class Malacostraca					
Subclass Hoplocarida					
Superorder Eucarida					
Order Decapoda					
Family Sergestidae					
Acetes sp.	22				**22**
Phylum Mollusca					
Class Bivalvia					
Subclass Heterodonta					
Order Veneroida					
Family Tellinidae					
Tellina sp.		22	22	22	**66**
Family Donacidae					
Donax sp.		22		44	**66**
Total density (individual/m²)	**22**	**220**	**22**	**110**	**374**
Total diversity (species)	**1**	**5**	**1**	**3**	**6**

Remark: SW1: UTM 395675E 1573545N Zone 47P
SW2: UTM 397446E 1570914N Zone 47P
SW3: UTM 396298E 1569482N Zone 47P
SW4: UTM 399599E 1567402N Zone 47P

Source: TEAM Consulting Engineering and Management Co., Ltd., October, 2015

(4) Endangered Marine Species

Marine species of concern are turtles, coral reefs, dolphin, whales, and dugong and seagrass as these are vulnerable to anthropogenic impacts.

A. Coral Reefs

Coral reefs nearest to the project site are at four islands namely; Bashuhino, Heinze Bok, North, and Pasut Kyun Islands. These four islands have a combined coral reef area of about 790,000 m^2 (United Nations Environment Programme and World Conservation Monitoring Center (UNEP-WCMC), 2010).

However, these four islands are at quite a distance from the project site as shown in ***Table 5.3-7*** and a map in ***Figure 5.3-3***. They would be too distant to be affected by development activities under the Project.

Although the four islands are remote from DSEZ, ITD conducted surveys of coral reefs at these four islands on July 3, 2012. The surveys found fringing reefs around the islands. Tabulate coral, *Acropora* spp. were commonly found in the reef areas while soft corals, sea anemone *Heteractis magnifica* and orange cup coral *Tubastraea coccinea* were developed at the pinnacle where currents are strong.

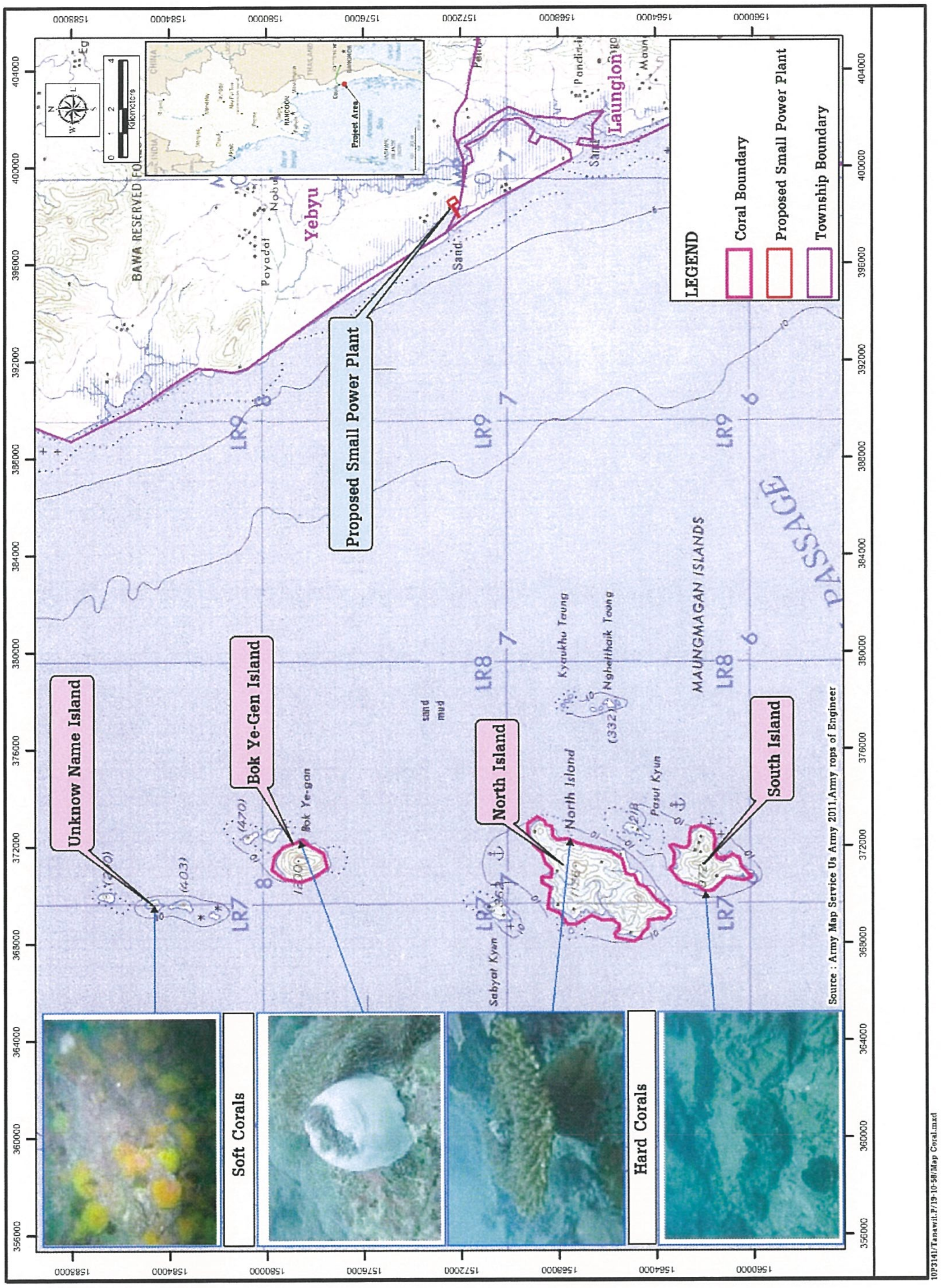
Observations made during the field surveys by the Consultant also found no coral reef areas in coastal waters near the project site.

TABLE 5.3-7

DISTRIBUTION OF CORAL REEF ON ISLANDS AROUND PROPOSED POWER PLANT PROJECT

Island name	Estimation distance from Proposed Project Site (km)
1. Bok Ye-Gen	26.49
2. South	26.94
3. North	24.95
4. Unknown name	30.92

Source: Coral reefs survey at these four islands on July 3, 2012 by ITD.



Source: TEAM Consulting Engineering and Management Co., Ltd., October 2014

FIGURE 5.3-3: LOCATIONS OF FOUR ISLANDS WITH CONFIRMED EXISTENCE OF CORAL REEFS

B. Sea Turtles

In the coastal area of DSEZ, it is highly likely that sea turtles have no longer used beaches in the area as their nesting sites. This conclusion was derived from the interviews of fishermen in the five coastal villages near the project site[3].

During the interview of two fishermen in Nga Pitat Village on 19 October 2014, the interviewed persons were shown photos of all known marine endangered species in the Bay of Bengal and Andaman Sea and asked about their sighting. If any species were reportedly sighted, the interviews would pursue more details on such species, including (i) location and frequency of sighting; (ii) number of each sighting; and (iii) behavior of each species. Information on nesting of sea turtle was asked as well.

The two interviewed fishermen in Nga Pitat Village informed that one nest of leatherback turtle was found at one spot on Nga Pitat beach in 2013. All eggs were illegally collected by locals for consumption and selling at Muangmagan at between 900-1,000 kyat per one egg. The interviewed fishermen also informed that leatherback turtle spawning season was between October to November. This information was again confirmed individual interviewed during the dry season visits to the villages in January 2015. The location of Nga Pitat beach is shown in ***Figure 5.3-4*** and general views of the beach is shown in ***Photo 5.3-7***.

However, some fishermen in Nga Pitat confirmed that leatherback turtle had not visited Nga Pitat beach for nesting over the past 3-4 years. This could be due to the impact of illegal fishing in the shoreline zone on the turtles as turtles could be trapped in the fishing nets. In addition, one unpopulated islet was declared by the Government as turtle conservation area. The turtles would then go to this islet for nesting as it is safer for them. This islet is about 20 km from the project site.

The interviewed fishermen in Sakhanthit, Nyaung Bin Seik, Pan Din In, and Muangmagan Villages also confirmed no turtle nesting areas on beaches in their villages.

C. Seagrass

During the field surveys in January 2015, no seagrass was found in the coastal waters in the vicinity of the proposed project site. The nearest seagrass area is about 41 km south of the proposed power plant site. The dominant type of seagrass species is *Halophila decipiens* which was found in seagrass beds in the coastal water at Maungmagun. ***Figure 5.3-5*** shows the locations of seagrass areas.

[3] Data derived from the field survey of TEAM Consulting Engineering and Management in this area in October 2014 and January 2015.

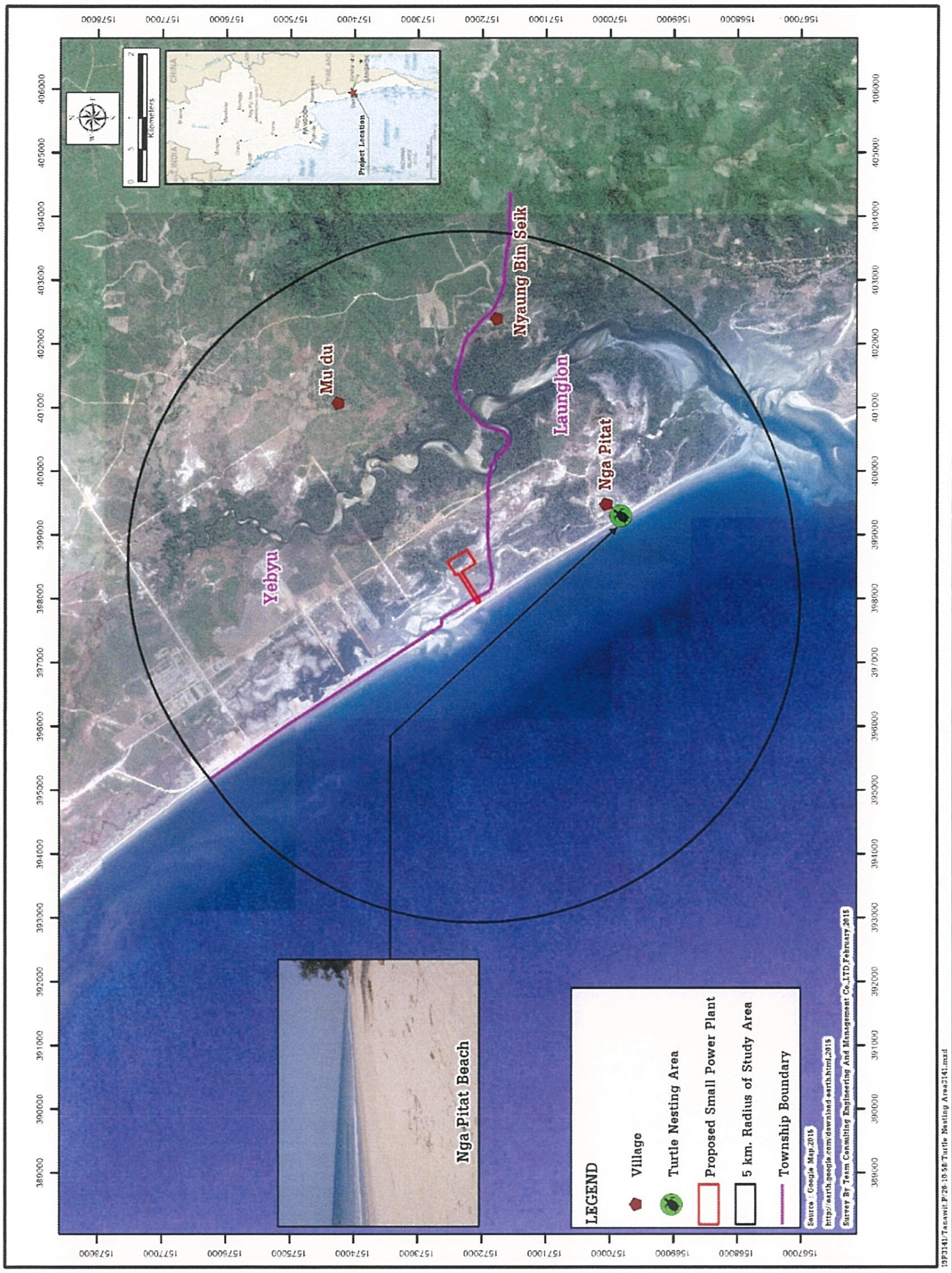


FIGURE 5.3-4: NESTING AREA OF LEATHERBACK TURTLE AT NGA PITAT BEACH

PHOTO 5.3-7: NGA PITAT BEACH (399300E 1569824N, WGS Zone 84)

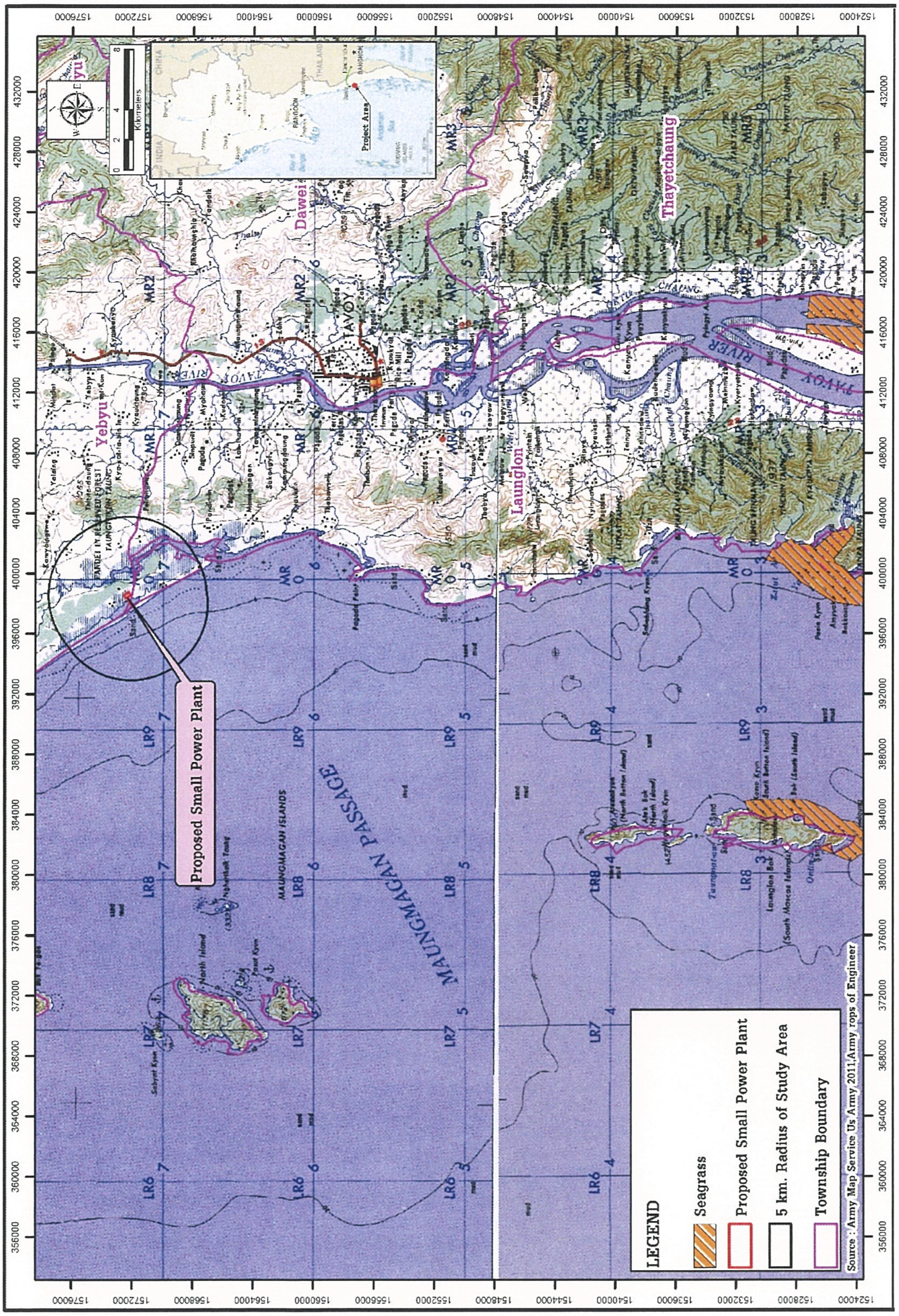


FIGURE 5.3-5: LOCATIONS OF SEAGRASS AREAS

Source : TEAM Consulting Engineering and Management Co., Ltd., October 2011

5.3.3 Fisheries

The fishery survey was conducted in January 2015 in the dry season. The results of survey could be used as the baseline information on fisheries for the Project.

The fishery survey involved interviewing local fishermen, observations of fish sold in the local fish market, and interviewing fish traders in Nga Pitat Village, Pan Din In Village, Sakhanthit Village and Muangmagan Village, Fishing activities and fish species were photographed during the survey. The interviews were intended to collect the following information: (i) fishermen-fishing activities and fishing gear, and main fishing grounds; and (ii) fish traders-quantities of main fish species landed per day, and destinations of the fishery products.

The results of fishery survey can be summarized as follows:

A. Fish Species

A total of 78 fish species were identified as listed in ***Table 5.3-8***. Species of economic importance are grouper (Family Serranidae), snapper (*Lutjanus* spp.), emperor (*Lethrinus* spp.), cat fish (*Arius* spp.), mackerel and tuna (Family Scombridae), and trevally (Family Carangidae).

In addition to fish, crabs and shrimps are other marine resources of economic importance such as mud crab (*Scylla serrata*), Blue swimming crab (*Portunus pelagicus*), banana prawn (*Penaeus merguiensis*), giant tiger prawn (*Penaeus monodon*), painted spiny lobster (*Panulirus versicolor*), mud spiny lobster, *Panulirus polyphagus* shown in ***Photo 5.3-9***.

B. Fishing Grounds

The main fishing grounds are waters around the South Island, North Island and Bok Ye-gen Island. These islands are about 30 km to the west of Nga Pitat Village shown in ***Figure 5.3-6***.

C. Fishing Gears

In Nga Pitat Village, seven fishermen were interviewed. Two types of fishing boats are used. The medium-sized boats are about 8-10 m long and equipped with 5-10 horse-power engines while small-sized boats are 4-6 m long with no engine. The small and medium sized boats need 1 to 2 persons and 2 to 4 persons, respectively. Most of the boat crews are family members of boat owners. They fish all year round using different types of fishing gears. Four major types of fishing gears are push net, hook and line, tangling net, and trap.

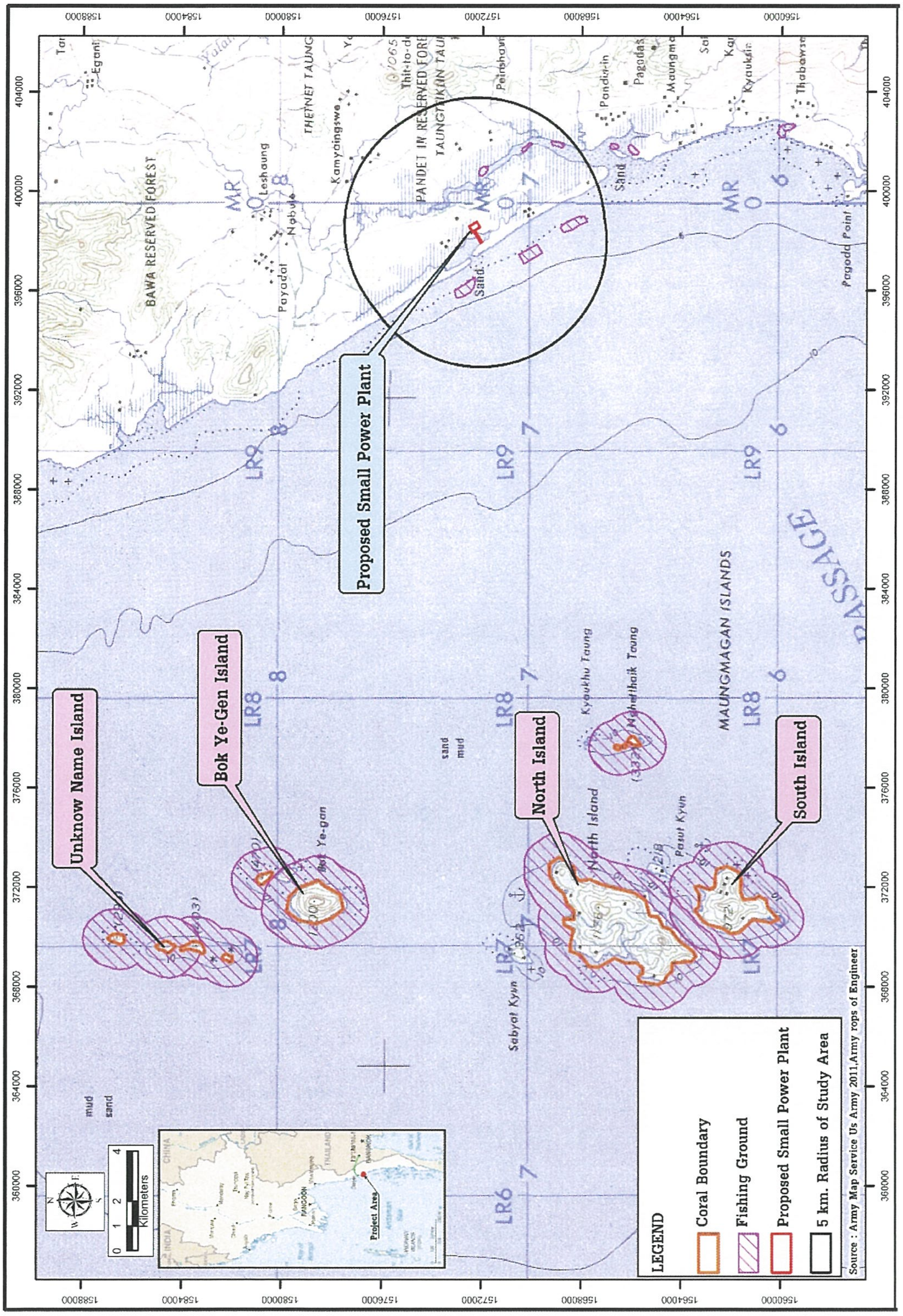


FIGURE 5.3-6: FISHING GROUND OF FISHERMEN FROM NGA PITAT, SAKHANTHIT AND PAN DIN IN VILLAGE

TABLE 5.3-8

LIST OF SPECIES OBSERVED IN THIS STUDY (JANUARY 2015)

No.	Family	Scientific Name	Common Name	Status of Conservation Species (IUCN, 2013)
Fish				
1	Orectolobidae	*Chiloscyllium griseum*	Grey bamboo shark	NT
2	Carcharhinidae	*Carcharhinus melanopterus*	Blacktip reef shark	NT
3	Dasyatidae	*Dasyatis kuhlii*	Bluespotted stingray	-
4	Elopidae	*Elops hawaiensis*	Tenpounder	-
5	Megalopidae	*Megalops cyprinoides*	Indo-Pacific tarpon	-
6	Clupeidae	*Anodontostoma chacunda*	Chacunda gizzard shad	-
7		*Sardinella* sp.	Sardine	-
8	Engraulididae	*Stolephorus* sp.	Anchovy	-
9	Pristigasteridae	*Opisthopterus tardoore*	Tardoore	-
10	Chirocentridae	*Chirocentrus dorab*	Dorab wolf herring	-
11	Synodontidae	*Saurida* sp.	Lizardfish	-
12	Ariidae	*Arius* sp.	Catfish	-
13		*Arius thalassinus*	Giant catfish	-
14	Plotosidae	*Plotosus lineatus*	Striped eel catfish	-
15	Muraenesocidae	*Muraenesox cinereus*	Dogtooth pike conger	-
16	Belonidae	*Ablennes hians*	Flat needlefish	-
17	Hemirhamphidae	*Hemirhamphus far*	Blackbarred halfbeak	-
18	Exocoetidae	*Cypselurus naresii*	Pharao flyingfish	-
19	Platycephalidae	*Thysanophrys arenicola*	Flathead	-
20	Serranidae	*Epinephelus areolatus*	Areolate grouper	LC
21		*Epinephelus coioides*	Orangespotted grouper	NT
22		*Epinephelus erythrurus*	Cloudy grouper	-
23		*Epinephelus sexfasciatus*	Sixbar grouper	-
24	Teraponidae	*Terapon jarbua*	Jarbua terapon	LC
25		*Terapon theraps*	Largescaled terapon	LC
26	Sillaginidae	*Sillago sihama*	Silver sillago	-
27	Rachycentridae	*Rachycentron canadum*	Cobia	-
28	Carangidae	*Alectis indicus*	Indian threadfish	-
29		*Alepes melanoptera*	Blackfin scad	-
30		*Atule mate*	Yellow scad	-
31		*Carangoides armatus*	Longfin trevally	-
32		*Caranx ignobilis*	Giant trevally	-
33		*Caranx tille*	Tille trevally	-
34		*Megalaspis cordyla*	Hardtail scad	-
35		*Scomberoides commersonianus*	Talang Queenfish	-
36		*Trachinotus blochii*	Snubnose dart	-
37	Leiognathidae	*Leiognathus* sp.	Ponyfish	-
38	Gerreidae	*Gerres abbreviatus*	Deepbody mojarra	-
39		*Gerres filamentosus*	Flagfin mojarra	LC

TABLE 5.3-8

LIST OF SPECIES OBSERVED IN THIS STUDY (JANUARY 2015) (CONT'D)

No.	Family	Scientific Name	Common Name	Status of Conservation Species (IUCN, 2013)
40	Lutjanidae	*Lutjanus decussatus*	Checkered snapper	LC
41		*Lutjanus fulviflamma*	Blackspot snapper	-
42		*Lutjanus leminiscatus*	Yellowstreaked snapper	-
43		*Lutjanus lutjanus*	Bigeye snapper	-
44		*Lutjanus vitta*	Brownstriped snapper	-
45	Caesionidae	*Caesio cunning*	Redbelly yellowtail fusilier	-
46	Lobotidae	*Lobotes surinamensis*	Tripletail	-
47	Haemulidae	*Diagramma pictus*	Painted sweetlips	-
48		*Plectorhinchus gibbosus*	Harry hotlip	LC
49		*Plectorhinchus lessoni*	Sweetlip	-
50		*Pomadasys maculatum*	Saddle grunt	LC
51	Nemipteridae	*Nemipterus* sp.	Threadfin bream	-
52		*Scolopsis monogramma*	Monocle bream	-
53	Lethrinidae	*Lethrinus lentjan*	Pinkear emperor	-
54		*Lethrinus olivaceus*	Longface emperor	-
55	Sciaenidae	*Argyrosomus amoyensis*	Amoy croaker	-
56		*Nibea* sp.	Croaker	-
57		*Pennahia* sp.	Croaker	-
58		*Protonebia* sp.	Croaker	-
59	Ephippidae	*Drepane longimana*	Banded sicklefish	-
60		*Drepane punctata*	Spotted sicklefish	-
61	Mugilidae	*Ellochelon vaigiensis*	Squaretail mullet	LC
62		*Moolgarda* sp.	Mullet	-
63	Polynemidae	*Eleutheronema tetradactylum*	Fourfinger threadfin	-
64	Siganidae	*Siganus javus*	Streaked spinefoot	-
65	Sphyraenidae	*Sphyraena jello*	Pickhandle barracuda	-
66		*Sphyraena obtusata*	Obtuse barracuda	-
67	Scombridae	*Euthynnus affinis*	Mackerel tuna	LC
68		*Gymnosarda unicolor*	Dogtooth tuna	-
69		*Thunnus tonggol*	Longtail tuna	-
70		*Rastrelliger brachysoma*	Indo-pacific mackerel	-
71		*Rastrelliger kanagurta*	Indian mackerel	-
72		*Scomberomorus commerson*	Narrowbarred Spanish mackerel	NT
73		*Scomberomorus guttatus*	Indo-pacific king mackerel	-
74	Istiophoridae	*Istiophorus platypterus*	Indo-pacific sailfish	LC
75	Bothidae	*Grammatobothus polyophthalmus*	Manyeyed flounder	-
76	Cynoglossidae	*Arelia bilineata*	Fourlined tonguesole	-
77	Balistidae	*Abalistes stellatus*	Starry triggerfish	-
78	Tetraodontidae	*Lagocephalus wheeli*	Toadfish	-
Mollusk				
1	Muricidae	*Chicoreus ramosus*	Rock shell	-
2	Volutidae	*Melo melo*	Indian volute	-
3	Veneridae	*Meretrix ovum*	Venus shell	-
4	Arcidae	*Anadara inaequivalvis*	Arc clam	-

TABLE 5.3-8

LIST OF SPECIES OBSERVED IN THIS STUDY (JANUARY 2015) (CONT'D)

No.	Family	Scientific Name	Common Name	Status of Conservation Species (IUCN, 2013)
4	Arcidae	*Anadara inaequivalvis*	Arc clam	-
5	Sepiidae	*Sepia pharaonis*	Pharaoh cuttlefish	-
Crustaceans				
1	Penaeidae	*Penaeus indicus*	Indian white prawn	-
2		*Penaeus merguiensis*	Banana shrimp	-
3		*Penaeus monodon*	Giant tiger prawn	-
4		*Penaeus semisulcatus*	Green tiger prawm	-
5	Portunidae	*Portunus pelagicus*	Blue swimming crab	-
6		*Portunus rubromaginatus*	Red portunid crab	-
7		*Portunus sanguinolentus*	Threespot swimming crab	-
8		*Scylla serata*	Serrated mud crab	-
9		*Charybdis feriatus*	Indo-pacific portunid crab	-

Source : Field survey by TEAM Consulting Engineering and Management Co., Ltd (January, 2015)

In Sakhanthit Village, five fishermen were interviewed. There are about 30 to 40 fishing boats in this village. Most are medium-sized boats with engines. Major types of fishing gears are the same as those used by fishermen in Nga Pitat Village. The exception is small boats that operate crab traps and hooks with lines in nearby mangroves areas. Crews of small boats are family members of boat owners while about 2 to 3 additional crews are hired for engine boats. A number of set nets are operated in the estuary near the village.

Photo 5.3-8 show fishing boats used by local fishermen in Nga Pitat and Sakhanthit Villages.

D. Quantities of Fish Catches

From interviewing fish traders in Pan Din In Village, an average quantity of caught fish landed here was in a range of 200-1,000 kg/day.

E. Markets

Most of fish catches are sold and the remaining are kept for home consumption. Fish catches are either directly sold in local market or to fish traders in Dawei and Thailand.

F. Conservation Status

Status for Conservation Concern: Based on IUCN (2013), results of field survey show that threatened species were not found. Most species were classified as Near Threatened Species (NT) and Least Concern Species (LC) shown in ***Table 5.3-8***.

Fishing boat at Nga Pitat Village

Fishing boat at Sakhanthit Village

Set net at estuary area near Sakhanthit Village

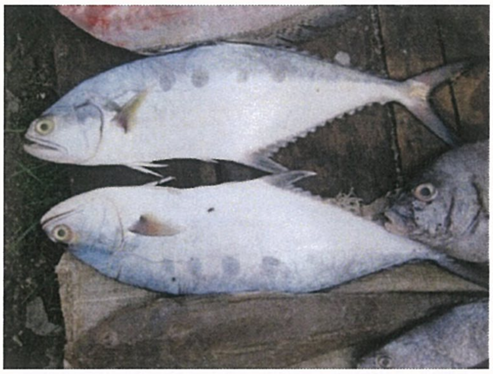
Push net operated near the beach

Selling fish in Sakhanthit Village

PHOTO 5.3-8: FISHERY RELATED ACTIVITIES

Giant catfish, *Arius thalassinus*

Orange spotted grouper, *Epinephelus coioides*



Talang queenfish, *Scomberoides commersonianus*

Brown striped snapper, *Lutjanus vitta*

Long face emperor, *Lethrinus olivaceus*

Dogtooth tuna, *Gymnosarda unicolor*

PHOTO 5.3-9: ECONOMIC SPECIES

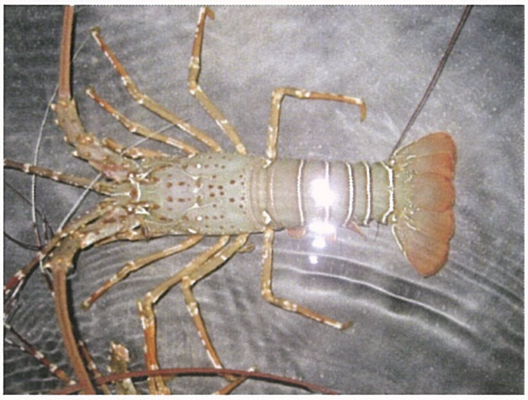
Indian volute, *Melo melo*	Rock shell, *Chicoreus ramosus*
Pharaoh cuttlefish, *Sepia pharaonis*	Blue swimming crab, *Portunus pelagicus*
	
Painted spiny lobster, *Panulirus versicolor*	Mud spiny lobster, *Panulirus polyphagus*

PHOTO 5.3-9: ECONOMIC SPECIES (CONT'D)

5.4 SOCIO-ECONOMIC COMPONENTS

5.4.1 Studied Villages

The collection of baseline information on social profile covered three existing villages and one community near the main construction area of the proposed power plant; namely (i) Nga Pitat; (ii) Nyaung Bin Seik; and (iii) Mudu (including Ka Myaing swea community). The first two villages are in Launglon Township while Mudu is in Yebyu Township, Tanintharyi Region. The project site is about 2.23 km from Nga Pitat Village. These three villages may be affected to some extent by environmental disturbances caused by construction and material transport activities, and by inaccessibility to the Britney Creek for navigation.

The locations of three villages and the community are indicated in a map in ***Figure 5.4-1***. Nga Pitat and Nyaung Bin Seik Villages are located on the coastal area while Mudu and Ka Myaing swea are inland. All these villages have been established as settlements over 100 years ago. They have the cluster pattern of settlement.

5.4.1.1 Information Collection

Information on social, economic, and health profiles of the three villages and one community was collected from secondary and primary sources. The secondary information was compiled from statistical records, maps, publications, and online database. The primary information was collected through interviewing sampled persons representing the village and household levels. Two sets of questionnaire were used to interview the key informants and villagers shown in ***Appendix 5H***.

At the village level, the interviewed persons were key-informants, including the village headmen and elders of the three villages. At the household level, the interviews covered 145 samples out of a total of 954 households. The sampling number and its distribution are shown in ***Table 5.4-1*** and were derived using the statistical-based sampling methodology recommended in the references listed below[4].

TABLE 5.4-1

DISTRIBUTION OF SAMPLE SIZE FOR THE SOCIO-ECONOMIC SURVEY IN 3 VILLAGES

Township	Villages	Population	No. of household	Sample size (household)
Launglon	Nga Pitat	911	180	40
	Nyaung Bin Seik	370	75	20
Yebyu	Mudu (including Ka Myaing swea)	2,738	699	85
2 Townships	**3 villages and 1 community**	**4,019**	**954**	**145**

Source: Key Informant Interview by TEAM Consulting Engineering and Management Co., Ltd, October 2015

[4] Israel, Glenn D. 1992.Sampling the Evidence of Extension Program Impact.Program Evaluation and Organizational Development, IFAS, University of Florida.PEOD-5. October.
Normann, D.W., F.D. Worman, J.D. Sietbert and E. Modiakgotla, 1995. *The Farming systems Approach to Development and Appropriate Technology Generation*, Food and Agriculture Organization (FAO) of the United Nations, Rome.
Farming Systems Research and Development: Guidelines for Developing Countries. Boulder, Colorado, USA: Westview Press: quoted by Normann et al., 1995.

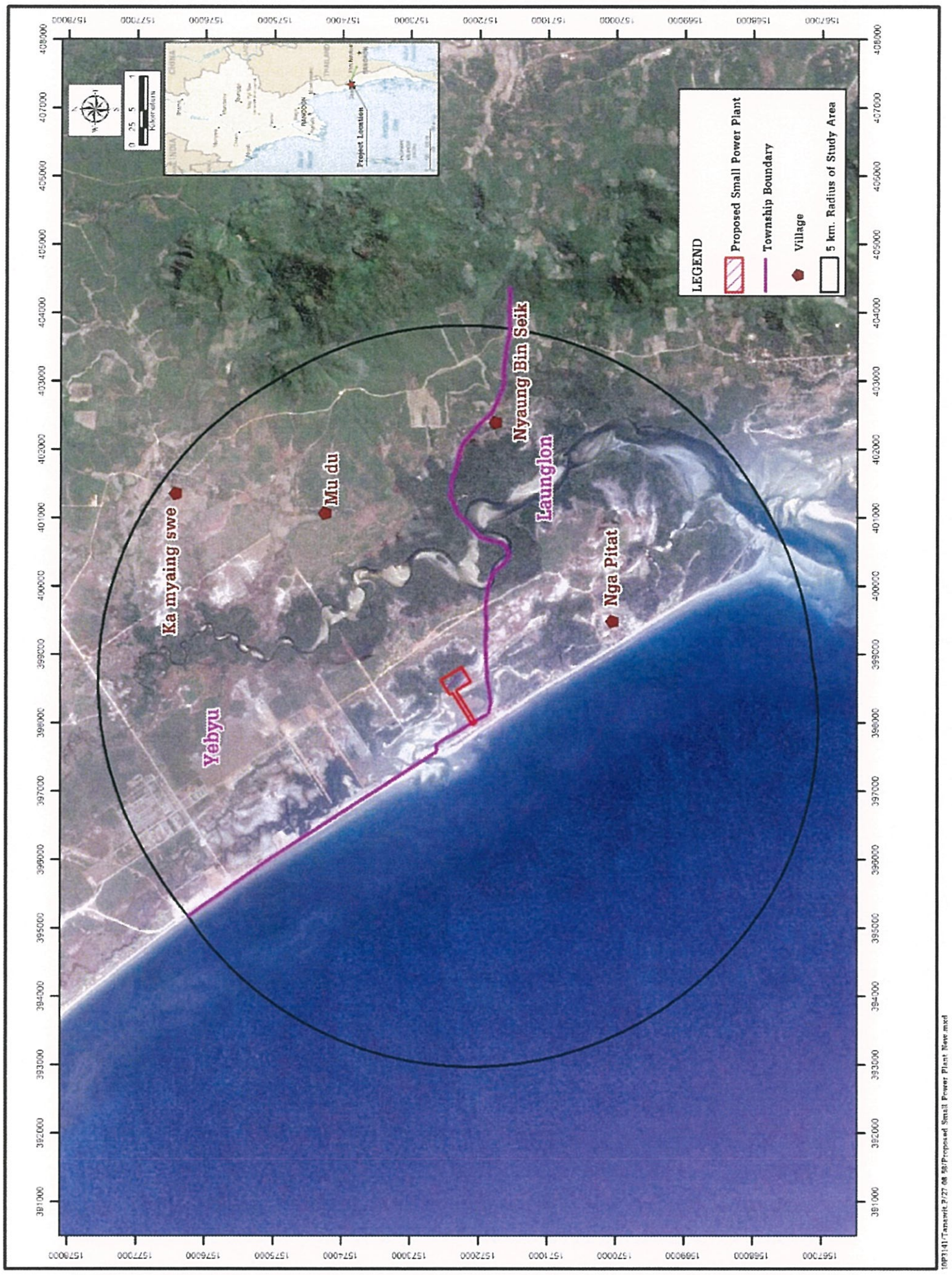


FIGURE 5.4-1: PROJECT LOCATION AND PROJECT AFFECTED VILLAGES

5.4.1.2 Demography

The three villages are inhabited by 4,019 people living in 954 households giving an average household size of about 4-5 persons. The population consists of 1,391 female and 1,347 male giving a female to male ratio of 1.02 to 1. This sex ratio is similar at the township level, 1.03 to 1 and 1.02 to 1 in Luanglon and Yebyu Townships, respectively.

Table 5.4-2 gives data at the village level. With 4,019 people, Mudu is the largest village. Its population is much larger than the other two villages.

TABLE 5.4-2

POPULATION IN THE PROJECT STUDY AREA

Name of Village	Population (October 2015)			No. of Household (October 2015)	Family Size (Person/household)
	Total	Male	Female		
Nga Pitat	911	477	434	180	5
Nyaung Bin Seik	370	157	213	75	5
Mudu (including Ka Myaing swea)	2,738	1,347	1,391	699	4
3 Villages	**4,019**	**1,981**	**2,038**	**954**	**5**

Source : Key Informant Interview by TEAM Consulting Engineering and Management Co., Ltd, October 2015

In terms of population change, the birth rate in this area is higher than the mortality rate. Only a small number of peoples have migrated into the villages while the emigration is nearly 20% of total population, mostly to seek employment in other countries, Thailand in particular.

5.4.1.3 Communities

The people in the study area are rural type people. They have close relationship and help each other in the same village.

5.4.1.4 Education

The majority of villagers in the three villages completed only primary education. Only few people have secondary and higher education. Some elders received only informal rudimentary education from monks in temples. ***Table 5.4-3*** gives information on education of the villagers in each village.

TABLE 5.4-3

EDUCATION LEVEL OF VILLAGERS IN THE PROJECT STUDY AREA

Education level (%)	Nga Pitat	Nyaung Bin Seik	Mudu (including Ka Myaing swea)	Average
Children before school	6	12	5	8
Pre-school	0	0	0	0
Primary School	79	73	77	76
Secondary and High school	2	1	6	3
University	1	0	1	1
Informal Rudimentary Education	11	14	10	12
Illiterate	1	0	1	1
Total	100	100	100	100

Source: Key Informant Interview by TEAM Consulting Engineering and Management Co., Ltd, October 2015

5.4.1.5 Vulnerable Groups

Vulnerable groups were identified in all three villages of the study area as shown in ***Table 5.4-4***. The number of vulnerable persons is small compared to the total population. The majority of them are household heads who are over sixty year old. According to key-informants, there is no special program or activity to support these vulnerable people in this area. By social structure, they are taken care of by relatives and neighbors and are living in the communities without difficulties.

TABLE 5.4-4

IDENTIFIED VULNERABLE GROUP IN THE PROJECT STUDY AREA

Vulnerable groups	Nga Pitat	Nyaung Bin Seik	Mudu (including Ka Myaing swea)	Total
Disabled in family	3	1	10	14
Head of household over 60 years	20	20	133	173
Head of household are women	13	3	50	66
Persons living alone	6	2	4	12

Source: Key Informant Interview by TEAM Consulting Engineering and Management Co., Ltd, October 2015

5.4.1.6 Minority Groups

The majority of people in the study area belongs to Dawei ethnic group of Bamar. A very small number of Mon and Rakhine people is living in the study area. The Dawei people practice Theravada Buddhism and speak the native language of Dawei. The Mon and Rakhine also practice Theravada Buddhism.

5.4.1.7 Gender Situation

In general, men and women are equal in Myanmar. Therefore, there are no gender issues within the study area. Roles, work division and decision making between men and women are determined by physical conditions, social structure and norms. Decision making on some aspects are on a joint or sharing basis by both male and female. Once a decision is made in a family by one party, it will always be respected by another party. For example, men and women are making decisions together on participation in activities in their community, property purchasing and religious activities. While men play a major role on fishing, farming and political interest, women dominate in cooking and children's education. Although women don't go fishing in the sea due to physical constraints, they do collect aquatic fauna such as shell, clams, and shrimp in mangroves forest to supplement the family fishing.

5.4.1.8 Religion

Buddhism is the only religion adopted by the villagers.

5.4.1.9 Political and Social Organizations

Based on the old cluster type of settlement and social structure, the local communities pay respect to their leaders, heads of villages, and the senior monks and abbots in particular. Normally, there are no formal social groups in the study area. Villagers gather to form a group when required for particular activities. For example, they gather to respond to local needs related to religious and funeral activities. Each group is composed of specified members who have the same interest and are normally led by the village elders. These groups are activated occasionally.

Youth groups are active at the community level. The number of members of each youth group varies from village to village. The group in Mudu has about 300 members. The youth groups help in community functions when required, such as in religious ceremonies, or when the communities ask for their assistance. A firefighting team is established in Mudu but not in the other villages of the study area.

The active community-based organization in the study area is Dawei Development Association-DDA, formed by young and active peoples from Dawei Region. The organization is a rights watchdog that monitors the lurching progression of DSEZ. Their foci are on green development, property rights, land rights, natural resource management for sustainable regional development and education.

5.4.2 Economic Profile

5.4.2.1 Employment

Table 5.4-5 shows data on household occupations in the three villages. Fishing and collecting aquatic fauna are main economic activities of most villagers in Nga Pitat and Nyaung Bin Seik Villages. Even these villages are fishing communities, agriculture also plays a role although to a less extent than fishing.

Mudu (including Ka Myaing swea) is different from the other two villagers in economic activities. The economy of the community is land based relying on growing perennial crops, mainly cashew nut, betel nut, rubber and fruits. Paddy and sugar cane are also cultivated in Mudu but in a smaller area than orchards. Cropping pattern in Nga Pitat and Nyaung Bin Seik are similar to Mudu, but cultivation area is smaller.

Besides major occupations of fishing and farming, some villagers are engaged in other occupations, mainly waged labours and employees. About 20% of the villagers work outside their villages. Some of them are working at the ITD site, in Dawei city; and, for the majority, in Thailand.

TABLE 5.4-5

HOUSEHOLD OCCUPATION BY VILLAGE IN THE PROJECT STUDY AREA

Occupation[1/] (%)	Village			
	Nga Pitat	Nyaung Bin Seik	Mudu (including Ka Myaing swea)	Average
Agriculture	0	7	65	24
Fisheries	75	92	5	58
Agriculture & Fisheries	7	0	0	2
Trade[2/]	9	0	3	4
Government officials	0	0	0	0
Wage labor / Employee	7	1	26	12
Unemployed person	2	0	0	1
Total	100	100	100	100

Remark: 1/ Some household have more than on occupation

2/ Grocery shop, Purchase of agricultural products etc.

Source: Key Informant Interview by TEAM Consulting Engineering and Management Co., Ltd, October 2015

In line with the occupations, most villagers are self-employed in their farms or small businesses. Most of casual workers in the villages are unskilled labors while skilled labors are few. Daily wages paid to casual workers are slightly difference between male and female adults, and between boys and girls (see ***Table 5.4-6***). Boys and girls get less wages than adults which could be considered normal.

TABLE 5.4-6

EMPLOYMENT RATE IN THE PROJECT STUDY AREA

Gender	Employment Rate
Boy	6,000
Girl	5,000
Male	7,500
Female	6,500

Remark: Rate of exchange 1,283 kyat = 1 USD

Source: Key Informant Interview by TEAM Consulting Engineering and Management Co., Ltd, October 2015

5.4.2.2 Traditional Production System

The villagers used conventional practice in agriculture. They use cows for ploughing. In non- agricultural production, weaving of baskets from bamboo and charcoal making are common practiced in many households of Mudu and Ka Myaing swea. The Consultant did not find any other traditional production systems apart from basketry and charcoal making.

5.4.2.3 Household Income and Expenditure

Table 5.4-7 presents average annual household income and expenditure of the three villages expressed in USD equivalent at the exchange rate of 1,283 kyat to 1 USD on 3 September 2015.The three villages are significantly different in average annual household incomes, varying from the lowest 624 USD equivalent for Nyaung Bin Seik to the highest 7,010 USD equivalent for Mudu. This reflects the poor condition of Nyaung Bin Seik which is the most difficult to access, especially in the rainy season. Their livelihoods are relying mainly on mangroves resources while Nga Pitat villagers earn more from fishing and Mudu earn the highest from land base agriculture and employment. This makes off-farm income of Mudu accounts nearly 40% of total income (***Table 5.4-8***).

TABLE 5.4-7

AVERAGE ANNUAL HOUSEHOLD INCOME AND EXPENDITURE IN YEAR 2014

Unit: USD/hh/year

Income and Expenditure	Nga Pitat	Nyaung Bin Seik	Mudu (including Ka Myaing swea)	Average
Household income				
Average income	3,712	857	7,010	3,860
Maximum	8,828	1,247	7,794	5,956
Minimum	1,403	624	2,343	1,456
Household expenditure				
Average expenditure	3,712	857	4,677	3,082
Maximum	8,828	1,247	7,794	5,956
Minimum	1,403	624	1,793	1,273
Sufficiency of the household income (% of household)				
Sufficient	10 %	30 %	14 %	15 %
Insufficient	90 %	70 %	86 %	85 %
Debt (% of household)	72 %	70 %	68 %	70 %
Saving (% of household	3 %	5 %	8 %	7 %

Remark: Rate of exchange 1,283 kyat = 1 USD

Source: Household Interview by TEAM Consulting Engineering and Management Co., Ltd, October 2015

TABLE 5.4-8
MAJOR SOURCES OF INCOME AND EXPENDITURE IN YEAR 2014

Unit: USD/hh/year

Sources of Income and Expenditure to total household income (%)	Nga Pitat	Nyaung Bin Seik	Mudu	Average
Sources of income				
Agriculture (Crop and Livestock)	5 %	15 %	58 %	22 %
Fishery	87 %	84 %	5 %	63 %
Off-farm income	8 %	1 %	37 %	15 %
Sources of expenditure				
Agriculture (Crop and Livestock)	5 %	6 %	18 %	12 %
Fishery	29 %	19 %	0.61%	14 %
Household expenses	66%	81 %	82%	77 %
- Food	23 %	40 %	38 %	34%
- House repair	11 %	8 %	5 %	7 %
- Medical care	3 %	10 %	7 %	6 %
- Education	5 %	5 %	5 %	5 %
- Transportation cost (e.g. fuel)	6 %	4 %	3 %	4 %
- Others	18 %	14 %	24 %	21 %

Remark: Rate of exchange 1,283 kyat = 1 USD

Source: Household Interview by TEAM Consulting Engineering and Management Co., Ltd, October 2015

The average annual household expenditure was similar to average annual household income in all three villages, varying from the lowest 624 USD equivalent for Nyaung Bin Seik to the highest 7,010 USD equivalent for Mudu. However, the overall average income of the three villages was slightly higher than the overall, average expenses (3,860 USD equivalent and 3,082 USD equivalent respectively). Therefore, most households in the villages would have no saving and households with debt would be common. The data shows about 70% of households were in debt while only 7% had some saving (***Table 5.4-7***).

The majority of expense was on food, accounted for about one-third of total household expense, followed by production expense such as fishery and agriculture. Cost of house repair, medical care, education and transportation cost (e.g. fuel) items, each is lower than 10%. The expense classified as others are a combination of miscellaneous expenses on clothes, religion/donation, social activities, communication and etc (***Table 5.4-8***).

There is no data to assess whether the cost of living in the three villages is comparable to other places in the country, which could be used as benchmarks. However, the high transportation cost due to poor access roads would significantly increase the costs of food items supplied from outside sources.

5.4.2.4 Land Ownership

Land in the three villages is used for farming and housing. Farm land accounts for about 80% of the total land area while residential area accounts for the remaining, except 50 acre of public pasture in Nga Pitat and 300 acres of idle land in Mudu. The average land holding per household is around 4.9 acres which is larger than the national average figure of 2.7 acres per household[5]. ***Table 5.4-9*** gives information on land use and average land holding as well as land ownership.

For land ownership, only few households in the three villages have no land. Land ownership documents could be Land Certificate or Tax Receipt for agricultural land.

TABLE 5.4-9

VILLAGE AREA AND LAND HOLDING

Area (acres)	Nga Pitat	Nyaung Bin Seik	Mudu	Total
Land resources				
Total village area	390	250	4,000	4,640
Residential area	70	35	600	705
Paddy field	0	0	500	500
Orchard land	270	215	2,900	3,385
Pasture area	50	N/A	N/A	50
Public area	0	N/A	N/A	0
Idle land	0	N/A	300	300
Forest resources	0	N/A	1,500	1,500
Mangrove resources	Public mangroves of about 3,500 acres			3,500

Source: Key Informant Interview by TEAM Consulting Engineering and Management Co., Ltd, October 2015

In addition, Land price can be categorized into 2 types: Agricultural land which consists of paddy or orchard, and residential area. Agricultural land is measured by acre while residential land is measured by square meter. The price of both categories varies greatly with location, and especially the road accessibility.

[5] Myanmar Agriculture in 2011: Old Problems and New Challenges, Ash Center for Democratic Governance and Innovation, Harvard Kennedy School, November 2011

A Strategic Agricultural Sector and Food Security Diagnostic for Myanmar prepared for USAID/Burma, Michigan State University (MSU) and the Myanmar Development Resource Institute's Center for Economic and Social Development (MDRI/CESD), July 2013

Case Study on Land in Burma, Giles Henley for the Overseas Development Institute (ODI), March 2014

5.4.2.5 Local Businesses

Local businesses are small grocery shops in the villages. Clients are people in the villages. Some households of three villagers purchase agricultural products from the villagers and collect for sale to merchants in Dawei.

5.4.2.6 Agriculture

Agricultural activities within the three villages vary depending on sizes and topography of land plots. The majority is orchard and paddy is cultivated in a smaller area in the low land during rainy season. Paddy is a subsistence crop while the major cash crops are cashew nut, betel nut, rubber and fruits.

Apart from crop cultivation, most of households in the three villages also engage in livestock raising such as pig, poultry and cattle. Nearly every household raises chicken from 5 to 50 heads mainly for household consumption. Some households raise pigs from 1 to 5 heads for sale. Cattle are raised for various purposes including use in farm activities, sale and household consumption (***Table 5.4-10***).

TABLE 5.4-10

LIVESTOCK RAISING

Type of livestock	Nga Pitat	Nyaung Bin Seik	Mudu	Total
Pig	5	30	100	135
Poultry	180	70	550	800
Cattle	20	20	220	260

Source: Key Informant Interview by TEAM Consulting Engineering and Management Co., Ltd., October 2015

5.4.2.7 Forestry

The forest area covers about 20% of the total study area. As shown in ***Table 5.4-9***, the majority is mangroves forest, accounted for about three times of total forest area. The inland forest is resources for food and energy of Mudu and Ka Myaing swea villagers. Apart from collecting woods for building and fuel, villagers also produce charcoal for sale.

In the coastal villages of Nga Pitat and Nyaung Bin Seik, the people rely mostly on mangroves resources for their livelihoods (***Photo 5.4-1***). They collect aquatic products from mangroves and creeks. Most of the products are sold for cash.

In addition to providing foods, mangrove forest also supplies woods for building and fuel. The mangrove forest is therefore a valuable natural resource as it serves as nursing ground of fish and other aquatic animals, protects the shoreline from erosion, and supports local livelihoods.

Nga Pitat Villagers utilize mangroves at Britney Creek as the shelter for their fishing boats when storming. Their boats enter at the river mouth which is about 3.5 km. northward of the village and use the creek bank as mooring area (***Photo 5.4-2***).

PHOTO 5.4-1 : MANGROVES RESOURCES IN THE STUDY AREA

PHOTO 5.4-2: MOORING AREA AND SHIPYARD IN MANGROVES FOREST

5.4.2.8 Fisheries/Aquaculture

Besides mangrove forest, villages of Nga Pitat and Nyaung Bin Seik also rely mostly on marine resources for their livelihoods. Fish and other marine products are the primary sources of protein and cash income for local people. Men go fishing in the sea. Most of fish catches are sold for cash. According to villagers, Thailand is the major market for local seafood products. With abundance of natural marine resources, there is no aquaculture in the area (see ***Photo 5.4-3***).

PHOTO 5.4-3: FISHING IN THE SEA AND ALONG SEA SHORE

5.4.2.9 Industries

No industries in the project area. The shipyard in Nga Pitat Village is based on traditional practice (***Photo 5.4-2***).

5.4.2.10 Mineral Development

No mining activities in the project area.

5.4.2.11 Tourism

The beach in the study area has two locations with tourism potential-Nebule and Maungmagan beaches. Nabule beach is about 32 km northwest of Dawei and 10.11 km north of the Project site. The beach is very long and empty stretch of brilliant white sand. At the north end of Nabule beach is a hillside pagoda with a small restaurant nearby. This location offers great views along the beach and out to the sea (***Photo 5.4-4***).

PHOTO 5.4-4: VIEWS AT NABULE BEACH

Maungmagan beach is about 12 km northwest of Dawei and 7.96 km south of the Project site. The beach is currently being developed and upgraded to be a tourism site. There are several simple restaurants serving fresh seafood (***Photo 5.4-5***).

PHOTO 5.4-5: VIEWS AT MUANGMAGAN BEACH

5.4.3 Health Profile

5.4.3.1 Access to Health Services

The three villages have no hospital and health care centers. Residents of Mudu Village have to travel about 17 km to hospital in Yebyu, or 10 km to nearest health care center in Lae Shaung Village. Their preference is the township hospital as it is better equipped than health care center with 25 beds, 2 physicians and 16 nurses. However, with poor road conditions to Yebyu, Lae Shaung health care center is the alternative for people in Mudu despite poorer facilities and inadequate personnel. It has only one nurse, compared to the hospital.

Villagers in Nga Pitat and Nyaung Bin Seik depend on medical service provided at Muangmagan station hospital, a travel distance from 4 to 10 km depending on the villages. This station hospital has 16 beds, 1 doctor and 16 nurses.

5.4.3.2 Access to Water Supply

The villagers have no access to public water supply. They rely on individual household sources and methods of supply. Groundwater (bored and shallow wells) and rainwater are the sources of supply. They are still in good quality.

5.4.3.3 Mortality and Morbidity

According to information derived from the interviews of village headmen and key informants, there were no serious health problems in the three villages in the study area. The mortality and morbidity rates were low.

Table 5.4-11 presents data on single leading causes of morbidity in Launglon and Yebyu Township in year 2012 and 2013. The data shows that Malaria, Annual Risk of Infection (ARI), Diarrhea, Dysentery and Tuberculosis (TB) are most common causes of

morbidity in these two townships. ARI, Diarrhea and TB are also cause of mortality in Launglone Township. This reflects the need for clean potable water, household sanitation and food hygiene, including clean external environment, particularly garbage and wastewater disposal.

TABLE 5.4-11

FIVE LEADING CAUSES OF MORBIDITY/MORTALITY IN LAUNGLON AND YEBYU TOWNSHIP

No	Launglon Township				Yepyu Township			
	2012		2013		2012		2013	
	Morbidity	Mortality	Morbidity	Mortality	Morbidity	Mortality	Morbidity	Mortality
1	Malaria	Food poisoning	ARI	Diarrhea	Malaria	N/A	Malaria	N/A
2	Diarrhea	ARI	Diarrhea	TB	ARI	N/A	Diarrhea	N/A
3	ARI	Malaria	Malaria	V.H.	Diarrhea	N/A	ARI	N/A
4	Dysentery	-	Dysentery	-	Dysentery	N/A	Dysentery	N/A
5	TB	-	TB	-	TB	N/A	TB	N/A

Source: Township Health Profile of Luanglone and Yebyu (2013)

5.4.3.4 Nutrition Levels

There are no data on nutrition levels specific to the three villages. The two year statistic (2012-2013) of nutrition has extracted from Public Health Profile of Launglon and Yebyu Townships. Some key items are presented in ***Table 5.4-12***. This presents low percentage of newborns with Low Birth Weight (LBW), under five children with severe underweight under five children with underweight. However, the people are high qualified consumption of adequately iodized salt in general.

TABLE 5.4-12

NUTRITION INFORMATION IN LAUNGLON AND YEBYU TOWNSHIP

Percent	Launglon Township		Yebyu Township	
	2012	2013	2012	2013
Percentage of newborns with LBW	1.49	0.5	0.20	0.6
Percentage of under five children with severe underweight	0.16	0.14	0.08	0.21
Percentage of under five children with underweight	4.06	2.9	3.04	5.2
Percentage of villages / wards with qualified consumption of adequately iodized salt	91.19	96.6	93.54	96.0

Source: Township Health Profile of Luanglone and Yebyu (2013)

5.4.3.5 Communicable Diseases

Communicable diseases in the three villages appear to be common cold, malaria, Tuberculosis (TB) and Human Immunodeficiency Virus (HIV) were recorded. These diseases, except HIV were also recorded as the five leading diseases of the townships. However, there were only few cases of them appeared.

5.4.4 Infrastructure Facilities

5.4.4.1 Water Use and Water Supply

The three villages have no piped water supply system. Groundwater and rainwater are two supply sources which adequately provide water of good quality for domestic consumption. Groundwater is accessed through bore wells or dug wells.

5.4.4.2 Hospital, Medical Clinic

Villages of Mudu and Ka Myaing swea rely on hospital in Yebyu and health care center in nearby village of Lae Shaung. Their locations are about 17 km and 10 km far respectively. Medical service for villagers in Nga Pitat and Nyaung Bin Seik is at Muangmagan station hospital. Its location is about 4 to 10 km far, depending on location of villages.

5.4.4.3 School and Religious Facilities

The number of existing schools and religious facilities in the project area are shown in ***Table 5.4-13***. All three villages have primary schools, monasteries and cemeteries. Secondary school however exists only in Mudu.

TABLE 5.4-13

NUMBER OF SCHOOLS AND RELIGIOUS FACILITIES

Social facilities	Nga Pitat	Nyaung Bin Seik	Mudu
Primary School	1	1	3
Secondary School	None	None	1
Temple	1	1	1
Cemetery	1	1	1

Source: Key Informant Interview by TEAM Consulting Engineering and Management Co., Ltd, October 2015

5.4.4.4 Road Transportation

Motorcycle is the most common mode of transportation, followed by bicycle. The roads linked between the project site these three villages and one community are laterite roads, established by the ITD.

(1) Road Condition

Roads within the three villages in the study area are unpaved laterite road about 4 m wide. The main road within the study area is the road along the coast. The main road is also unpaved laterite road, about 7 m wide with two traffic lanes, constructed by ITD which provides access to Dawei City. Most of the local roads can be used all year round. ***Figure 5.4-2*** is a map showing existing roads in the study area. Existing road conditions at several locations are shown in ***Photo 5.4-6***.

(2) Traffic Counting

To establish base line data on traffic conditions, traffic counting was carried out at two stations within the study area from 6.00 a.m. to 6.00 p.m. on 25 and 26 January, 2015, covering one working day and one holiday. The two traffic counting (TC1 and TC2) stations are at the junction of Nga Pitat Village and the small port coastal road at coordinates 399322E and 1569791N. TC1 was located on the small port coastal road and TC2 was located in front of Nga Pitat Village.

The location of one traffic counting station is indicated on a map in ***Figure 5.4-2*** and ***Photo 5.4-6***.

Traffic counting was done manually by one observer. The number and types of vehicles passing the station were recorded. The traffic counting data were used to calculate the V/C ratios.

Traffic condition is normally assessed in terms of road capacity relative to traffic volume, V/C ratio is commonly used for this purpose. This ratio is considered as a baseline traffic flow condition and will be further utilized to evaluate the consequences of the Project's impact on local traffic.

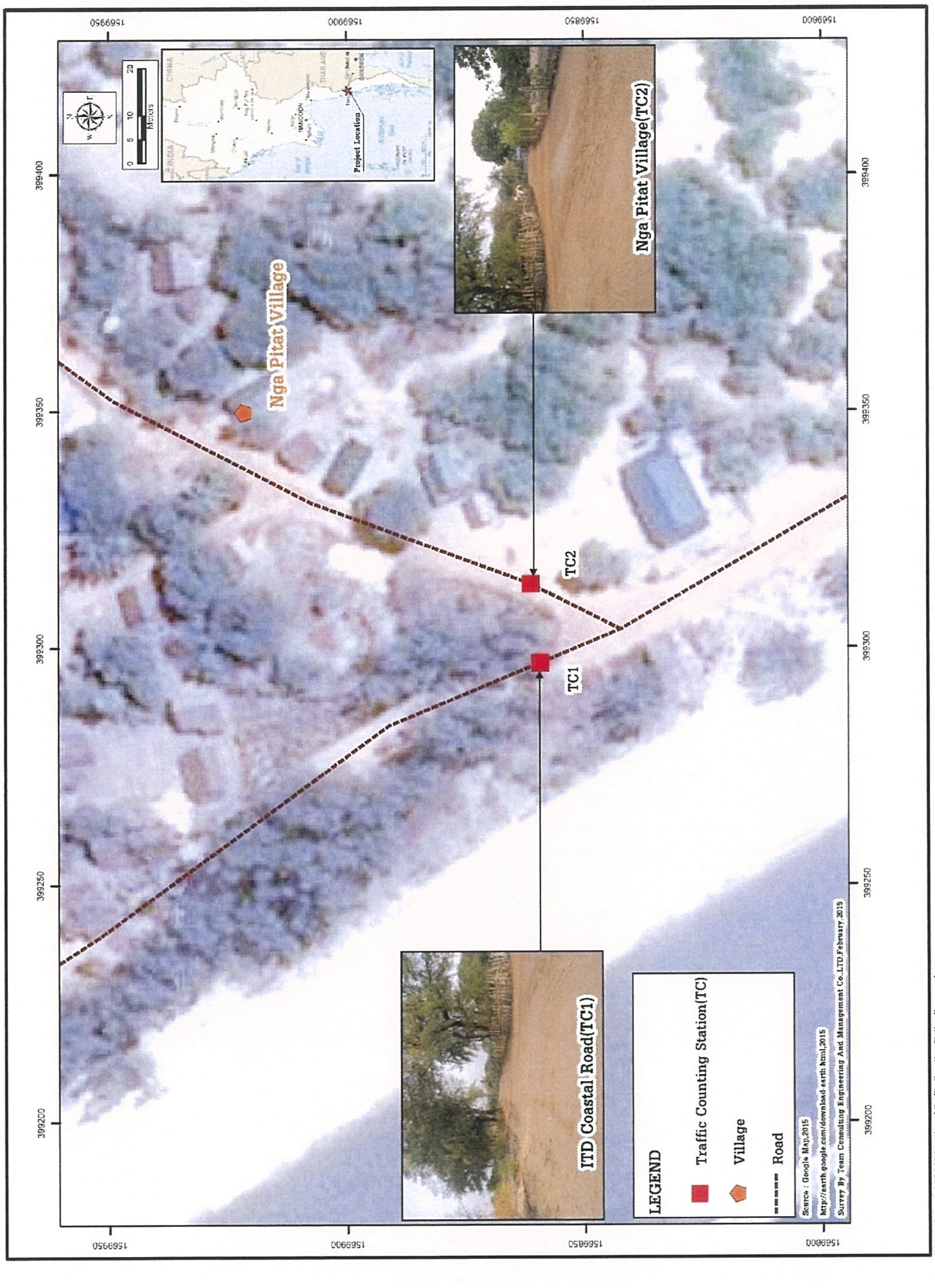


FIGURE 5.4-2: LOCATION OF TRAFFIC COUNTING STATION

Existing condition of road at Mudu Village

Existing condition of road at Nyaung Bin Seik Village

Existing condition of road at Ka Myaing swea

Existing condition of road at Nga Pitat Village

Traffic counting at the Small Port Coastal Road (TC1)

Traffic counting in front of Nga Pitat Village (TC2)

PHOTO 5.4-6: TRAFFIC COUNTING AND EXISTING CONDITION OF ROAD WITHIN PROJECT STUDY AREA

The calculation of V/C ratios follows the following steps:

1) Convert the number of vehicles from observation to Passenger Car Unit (PCU) by using Passenger Car Equivalents (PCE) factors specified for each type of vehicles as indicated in ***Table 5.4-14***. This is used as "Traffic Volume" or "V".

2) Select an applicable carrying capacity or "C" for the road (***Table 5.4-15***). The capacity can be estimated following the highway capacity manual (HCM, 2000).

3) Ratio of V/C can be calculated using the following formula

$$V/C\ \text{ratio} = \frac{\text{Traffic Volume}}{\text{Carrying Capacity of Respective Road}}$$

V/C ratio can be used to compare with the values defined by the Division of Traffic Engineering (Thailand) as shown in ***Table 5.4-16*** for indication of present traffic condition.

TABLE 5.4-14

PASSENGER CAR EQUIVALENT FACTOR OF EACH VEHICLE

Types of Vehicles	Passenger Car Equivalents Factor (PCE)
Passenger Car and Taxi	1.00
Light bus	1.50
Medium bus	1.50
Light truck	1.00
Crane and grader	2.10
Medium truck (6 wheeled truck)	2.10
Heavy truck (10 wheeled truck)	2.50
Heavy truck including trailer	2.50
Bicycle, Tricycle	0.33
Motorcycle	0.33

Source: Paopong, Highway Engineering. Thailand, 1997 and Department of Highway, Thailand, 2011.

TABLE 5.4-15

TRAFFIC CARRYING CAPACITY AND HIGHWAY TYPES

Highway Types	Carrying Capacity of Traffic Volume (PCU/hr.)
2 way road with more than 2 traffic lanes/multi-traffic lanes	2,000 (per 1 traffic lane)
2 way road with 2 traffic lanes	2,000 (for both directions)
2 way road with 3 traffic lanes	4,000 (for both directions)

Source: Paopong, Highway Engineering, Thailand 1997

TABLE 5.4-16

RANGE OF V/C RATIO FOR TRAFFIC CONDITION CLASSIFICATION

Range of V/C Ratio	Classification of Traffic Condition
0.88 – 1.00	Severe traffic congestion
0.67 – 0.88	Heavy traffic congestion
0.52 – 0.67	Satisfactorily traffic flow
0.36 – 0.52	Good traffic flow
0.20 – 0.36	Very good traffic flow

Source: Paopong, Highway Engineering, Thailand 1997

(c) Results of Traffic Counting

The results of traffic counting are presented in four tables in ***Appendix 5I***. The data show traffic volume of 10 categories of vehicles as follows: (i) passenger car; (ii) light bus; (iii) medium bus; (iv) crane and grader; (v) light truck: (vi) six-wheeled truck; (vii) ten-wheeled truck; (viii) heavy truck including trailer; (ix) bicycle and tricycle; and (x) motorcycle.

The traffic volume observed can be summarized as follows.

Station TC1

The number of vehicles passing coastal road on Sunday 25th and Monday 26th January 2015 was 88 and 89 units/day, respectively. The majority of vehicles were motorcycles. The hourly traffic volume was relatively consistent over the counting period. For holiday (Sunday) and working day (Monday) the traffic volume was highest during evening (during 3.00 p.m. – 6.00 p.m.) about 26 units/hour for holiday and 27 units/hour for working day, respectively.

Station TC2

The number of vehicles passing the coastal road on Sunday 25th and Monday 26th January 2015 was 73 and 102 units/day, respectively. The majority of vehicles were motorcycles. The hourly traffic volume was relatively consistent over the counting period. For the holiday (Sunday), the traffic volume was highest during the evening (during 3.00 p.m. – 6.00 p.m.), about 26 units/hour. For the working day (Monday), the traffic volume was highest during the morning (during 06.00 a.m. – 09.00 a.m.), about 32 units/hour.

(d) Traffic Conditions

Table 5.4-17 shows the highest V/C ratios calculated for the traffic condition during the field survey. The V/C ratio of the holiday and working day at Station TC1 were 0.0023 and 0.0038, respectively while V/C ratio of the holiday and working day at Station TC2 were 0.0018 and 0.0020, respectively. However, the ratios were much lower within the range of 0.20 – 0.36. These figures indicate light traffic condition on the main road and it could receive more traffic.

TABLE 5.4-17

EXISTING TRAFFIC CONDITION WITHIN PROJECT STUDY AREA

Description	TC1			TC2		
	Sun, 25th	Mon, 26th	Average*	Sun, 25th	Mon, 26th	Average*
Total Traffic volume (PCU/day)	55.880	92.110	73.995	43.750	47.250	45.500
Traffic volume per 12 hours*(PCU/hours)	4.657	7.676	6.166	3.646	3.938	3.792
Carrying capacity (C) (PCU/hours)	2,000	2,000	2,000	2,000	2,000	2,000
V/C ratio	0.0023	0.0038	0.0031	0.0018	0.0020	0.0019
Traffic Condition	Very good traffic flow			Very good traffic flow		

Remark: * Average of 25 and 26 January 2015 Values

** Traffic volume per 12 hours according to Traffic counting during field investigation on 25 and 26 January 2015

TC1: small port coastal road

TC2: In front of Nga Pitat Village

Source: Traffic survey by TEAM Consulting Engineering and Management Co., Ltd., January 2015

5.4.4.5 Navigation

There is no commercial navigation along the coastal area, only fishing boats are navigated along this area.

5.4.4.6 Airport

Dawei Airport is about 20 km away from the project area. It serves only domestic flight.

5.4.4.7 Transmission Lines

There is no transmission line in the project vicinity.

5.4.4.8 Electricity

The three villages in the study area have no public electricity supply. In each village, electricity is provided by a small privately owned diesel generator. The users pay the generator owner a monthly fee for the electricity consumption. The electricity supply is limited to only during the night.

5.4.4.9 Pipelines

No oil or gas pipelines exist in the project area.

5.4.4.10 Energy Sources

Firewood, oil, and solar energy are energy sources for the villagers.

5.4.4.11 Waste Management

There are no proper solid waste management and sanitation system in the study area. Domestic solid wastes are collected inside villages without proper containers, and are disposed by open burning within the village boundaries. Wastewater is directly discharged into the ground or natural canals nearby.

5.4.5 Unexploded Ordinance (UXO)

The project area has no history of wars. UXO cases have never been reported.

5.4.6 Land Use

Information on existing land use of the study area was established using the following sources of secondary information:

- Topographic map, scale 1 : 50000
- Satellite image of GOOGLE EARTH (http://earth.google.com).
- Geographical Information System (GIS) of Tanintharyi Region

The secondary information was verified and supplemented by ground truth surveys conducted from 21-24 January, 2015 and 6-8 October, 2015.

The study area covers 19,415.07 acres (78.57 km^2) of which about 8,994 acres (46.33%) are water bodies, mainly the coastal waters. The total land area is therefore about 10,420 acres. About 23.90% of the land area is village area and agricultural area. ***Photo 5.4-7*** shows typical scenes of the various types of land use in the study area. The land use types are summarized in ***Table 5.4-18*** and shown in a land use map in ***Figure 5.4-3***.

TABLE 5.4-18

LAND USE TYPES IN THE STUDY AREA

Name	Area (acre)	Area (km^2)	Percent (%)
Village/Built Up Area and Agricultural Area	4,640.30	18.78	23.90
Forest Area	4,008.20	16.22	20.64
Miscellaneous	1,772.25	7.17	9.13
Water Bodies	8,994.32	36.40	46.33
Total	**19,415.07**	**78.57**	**100.00**

Source: TEAM Consulting Engineering and Management Co., Ltd., January, 2015

The power plant site will cover 37.19 acres consisting of 18.90 acres of beach forest, 11.49 acres of mangrove forest, and 6.80 acres of water bodies.

(1) Village/Built Up Area and Agricultural Area

The village/built up area and agricultural area cover about 4,640.30 acres or 23.90% of the study area. This type of land use covers the three villages, four schools, four religious places (Mudu Monastery, Kyaung Thit Monastery, Yay Wine Monastery and Nyaung Bin Seik Monastery) , cement factory, paddy fields, mixed orchards and perennial trees, rubber growing area, eagle wood area, cashew area, and coconut area.

(2) Forest Area

Forest areas cover 4,008.20 acres or 20.64% of the study area. The forest areas consist of mixed deciduous forest, mangrove forest and beach forest as presented in ***Section 5.3.1***.

(3) Miscellaneous Areas

Miscellaneous areas cover about 1,772. 25 acres or 9. 13% of the study area. Most of this land use type are open land, idle land, sand beach/sand dune and road.

(4) Water Area

Water area covers 8,994. 32 acres or 46. 33 percent of the study area. Almost all of this area is the coastal water.

Village

Paddy field

Rubber area

Cashew area

Mangrove forest

Beach forest

PHOTO 5.4-7: TYPICAL SCENES OF LAND USE IN THE STUDY AREA

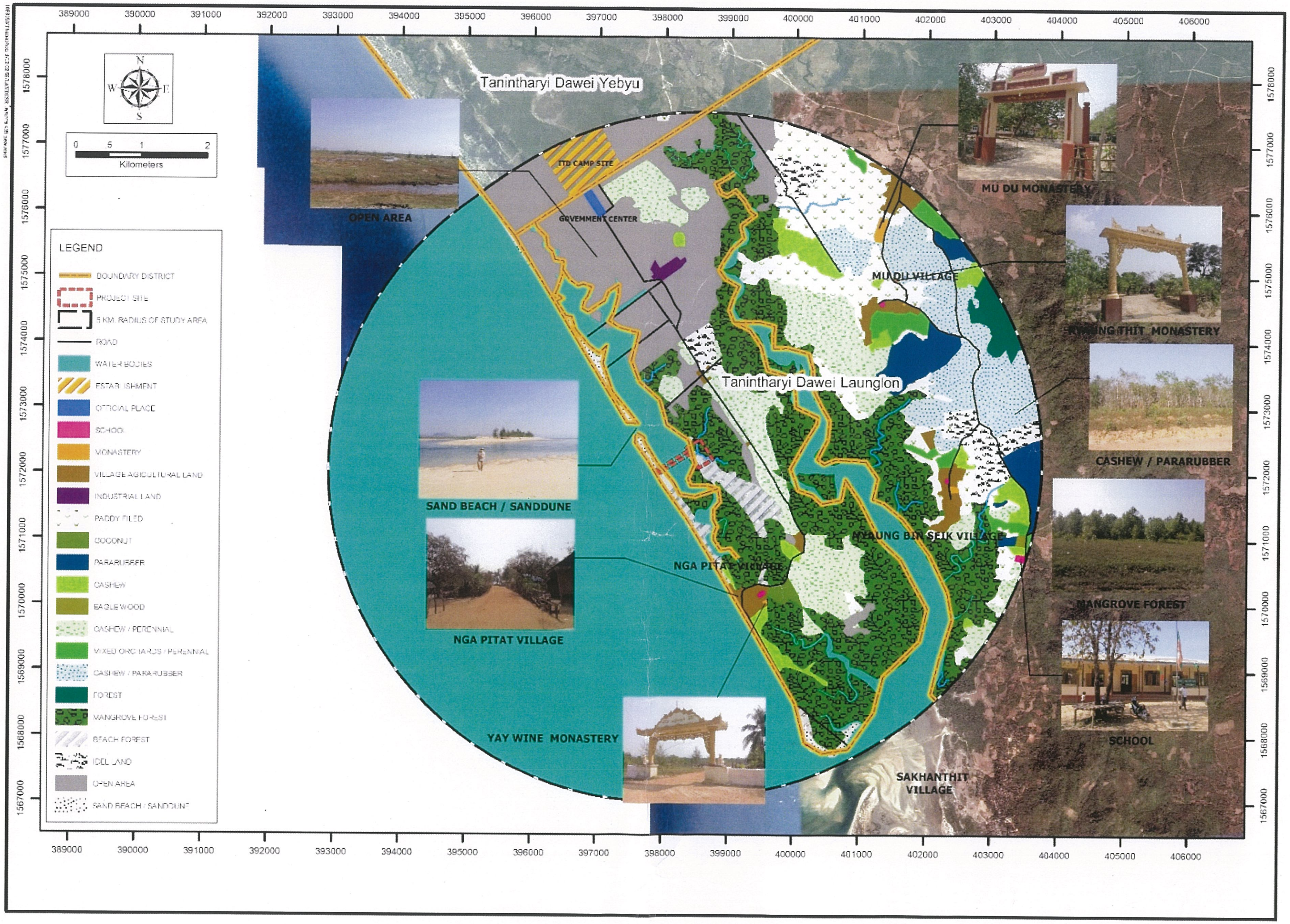


FIGURE 5.4-3 : EXISTING LAND USE WITHIN PROJECT STUDY AREA

5.5 CULTURAL COMPONENTS

The majority of people here are Dawei enthic group of Bamar, speaking the native language of Dawei and practicing Theravada Buddhism. It is common for them to go to their villages's monasteries for their religious purpose and other community social activities. Their leaders are village headman elected by villagers. Social norms and traditional practices are left to be dealt by village headman and abbots of Buddhist monasteries among the communities. This dual system "rule by law" and rule of the "social and traditional practices" exists nowadays.

Based on the field survey and interviewing key informants, there are no archaeological sites found in the study area.

5.6 VISUAL COMPONENTS

Major visual components of the project area consist of sea, beach, mangroves, beach forest, river and creek. Inland forest, agricultural land and idle land are in smaller size. ***Photo 5.6-1*** shows pictures of these visual components.

5.6.1 Aesthetic

At present, the main aesthetic value of the project area is related to the beach. However, the scenery is not strikingly beautiful. There is no special aesthetic.

PHOTO 5.6-1: OVERVIEW VISUAL COMPONENTS IN THE PROJECT AREA

5.6.2 Point of Interests

No points of interests in the project area that would attract visitors.

5.6.3 Landscape

All the natural visual components of the project area do not form a picturesque landscape. The current landscape quality is considered at a moderate level.

CHAPTER 6

IMPACT AND RISK ASSESSMENT AND MITIGATION MEASURES

CHAPTER 6

IMPACT AND RISK ASSESSMENT AND MITIGATION MEASURES

6.1 INTRODUCTION

This chapter presents results of impact and risk assessment and mitigation measures for the pre-construction phase, construction phase, operational phase and decommissioning phase of the power plant and its associated facilities. The impact assessment is focused on relevant environmental and social issues identified in the Scoping Report. These environmental and social issues will be included in environmental management of the Project.

The content and structure of this chapter follows the requirements prescribed in Article 41 to 73 of the EIA Guidelines as appropriate considering the context of this Project.

6.2 IMPACT ASSESSMENT METHODOLOGY AND APPROACH

6.2.1 Scope of Assessment

Environmental impact assessment (EIA) of a proposed development project is now recognized that it is essentially environmental management planning. Consequently, EIA reports are now required by national environmental agencies to include an environmental management plan (EMP) covering the project pre-construction, construction, operation and decommissioning phases. The EMP will be implemented to ensure that the project will have minimum and acceptable environmental impacts during its all phases.

It should be noted that the term "environmental impact" is now generally used to cover not only the natural environment but also social environment or social impacts as well as occupational health and safety. This scope of environmental impact is adopted in the EIA Procedure as shown below:

Environmental Impact means the probable effects or consequence on the natural environment and people of a proposed Project or businesses or activities or undertaking. Impacts can be direct or indirect, cumulative, and positive or adverse or both. For purposes of this Procedure, Environmental Impacts include occupational, social, socio-economical, community health, and safety issues.

6.2.2 The Conceptual Framework

A. Impact Analysis

The first major step in conducting an EIA is "Impact Analysis" as shown in a diagram in ***Figure 6.2-1***. The Impact Analysis is essentially a cause-effect analysis based on the following logics.

1) Project construction, operation and decommissioning involve various physical activities and require use of environmental resources as inputs. Examples:

- Pre-construction and construction activities-filling and compacting a 37.19 acre construction site
- Operational activity-combustion of natural gas for power generation
- Decommissioning activity-demolition and remediation structures

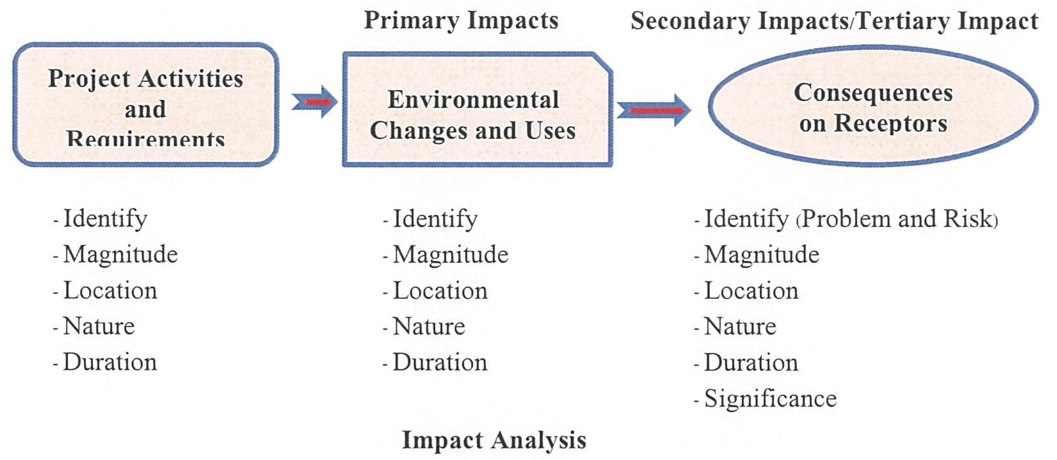


FIGURE 6.2-1 : IMPACT ANALYSIS LOGIC

2) Project activities and requirements consume and emit mass and energy to the environments. They are the sources or root causes of environmental impacts since they will, if not adequately controlled or managed, certainly cause ***significant changes*** or conflicting use of the environmental components. Examples:

- Changes during pre-construction and construction-change in ambient noise level caused by percussive piling activities (project activity)
- Changes during operation-change in ambient air quality caused by emissions of gaseous pollutants in stack gas of a thermal power plant (project activity)
- Changes during decommissioning-change in ambient air quality caused by demolition (project activity)

3) Direct impacts of project activities and requirements on the environment could be considered as ***primary impacts***. Ambient environmental standards are applied to the primary impacts while source or emission standards are applied to project activities.

4) The magnitude, nature, and duration of the environmental changes or primary impacts will be governed by the location, magnitude, nature, and duration of project activities or requirements. Most primary impacts caused by pre-construction, construction and decommissioning activities and requirements are transient and reversible. Few impacts are permanent and irreversible. Examples'

- Transient environmental changes- increased ambient noise levels and fugitive dust during pre-construction, construction and decommissioning.

- Irreversible and permanent environmental changes-conversion of forest area into a reservoir, and conversion of a mountain into a limestone quarry.

5) The primary impacts caused by project activities and requirements could have consequences on ***receptors*** which could be ecosystems, communities, or workers in geographical areas that the primary impacts occur. The consequences could be considered as ***secondary impacts***. In some cases, the secondary impacts could have consequences on other receptors. For example, degradation of the marine ecosystem (secondary impact) caused by coastal pollution (primary impact) could have impacts on livelihood of local fishermen. The consequences of the secondary impacts could be considered as ***tertiary impacts***.

6) Secondary and tertiary impacts are ***problems*** that need to be solved by reducing the primary impacts through measures applied to causative project activities or requirement. They are considered problems, since based on existing knowledge and experience, they will certainly occur. Example-coal combustion will certainly emit pollutants which will certainly pollute the ambient air. If primary or secondary impacts are uncertain, they are considered as ***risks***. Example-due to lack of established knowledge, it is not certain whether electromagnetic waves from transmission lines have impacts on human health.

7) A risk in environmental management could also be an undesirable event which may occur, and if it occurs will render an impact mitigation measure ineffective. An example of risk is fire and explosion in gas turbine enclosure due to gas leak.

8) The level of significance of a secondary impact is assessed from its extent and severity in terms of its magnitude and value of loss. The extent and severity of a secondary impact will depend on: (i) nature and magnitude of the primary impacts; and (ii) sensitivity of the receptors which depends on their nature and characteristics.

9) The environmental problems and risks will have to be evaluated to assess their significance. Measures and resources to be allocated to address the problems and manage the risks should follow their significance. However, impact sources and primary impacts need to be addressed regardless of the significance of secondary impacts due to the legal requirements for projects to comply with applicable source and ambient standards.

B. Formulation of Measures to Address the Problems

This step is to formulate measures to address the problems. Measures are to be directed at the causes of the problems, i.e. project activities and requirements. Measures could be:

- Engineering measures to be incorporated in the design for implementation by the contractors.

- Management measures to be implemented and managed during pre-construction, construction and decommissioning phases.

It is necessary to design effective implementation arrangements of the measures. Mitigation measures during the pre-construction and construction phases will have to be implemented by the contractors under supervision of construction supervision engineers engaged by the project proponent. The project proponent will oversee the implementation of mitigation measures through its project manager. Mitigation measures during the operation and decommissioning phases will be implemented as part of the operational management by the operational organization to be set up by the project proponent.

It should be noted that the measures will be applied to the project activities and requirements to reduce the primary impacts resulting in reduced secondary impacts. Some measures could be applied directly to the receptors to minimize the impacts on the receptors.

Figure 6.2-2 is a diagram showing the mitigation measure concept.

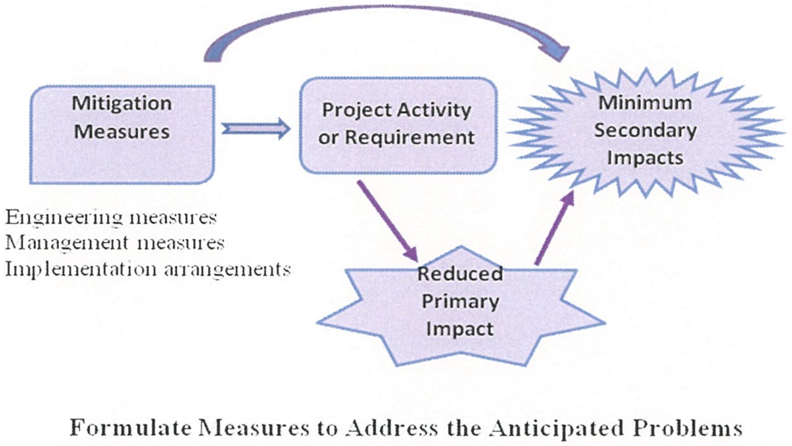


FIGURE 6.2-2 : MITIGATION MEASURE CONCEPT

C. Formulate Risk Management Measures

As pointed out, a secondary impact could create a risk. Measures will have to be formulated to manage the identified risks. ***Figure 6.2-3*** is a diagram showing the risk management logic. It involves an undesirable event which may or may not occur, and if it occurs will have adverse impacts on the receptor. In risk analysis, a risk event has to be identified and its likelihood of occurrence and severity of its impact (if it occurs) has to be assessed. Mitigation measures for risk management include measures to minimize the likelihood of occurrence or reduce the impacts. A contingency plan is required to handle the situations if the risk event occurs despite the implementation of risk mitigation measures. Finally, effective implementation arrangements for risk management will need to be designed.

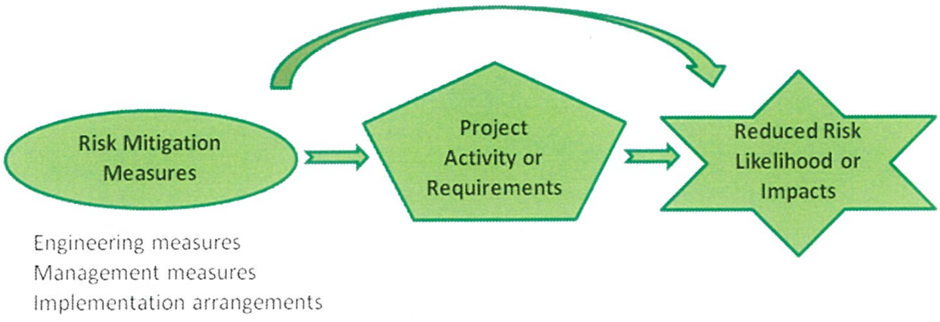


FIGURE 6.2-3: ENVIRONMENTAL RISK MANAGEMENT LOGIC

6.2.3 Methodology for the Impact Assessment of Each Environmental Issue

The Conceptual Framework

Compliance with Source Environmental Standards

The assessment of impacts of this Project is premised on a requirement that the design, construction, operation and decommissioning of Project facilities will adopt or implement best practicable measures to minimize the magnitude of resource consumption and wastes discharged into the natural environment. Examples are: (i) the Project will use the low NO_x burner technology to minimize the NO_x emission; (ii) the selected method of percussive piling will have lowest noise levels among the percussive piling alternatives; and (iii) water will be frequently sprayed on uncovered construction site to suppress dust. Therefore, the assessment will be on the severity of the residual impacts to determine the need for additional measures to further reduce the residual impacts. For example, if the residual dust levels will cause health risk and discomfort to people in the villages proximate to the construction site, additional measures will be needed to reduce the dust levels at the receptors.

The above principle indicates that all Project activities must comply with applicable source or emission standards or environmental guidelines. In the case of wastewaters, their treatment will be required to comply with the applicable effluent quality standards.

Impact on Ambient Environment

The assessment of impacts will cover (i) impacts on the ambient environment; and (ii) impacts on the receptors.

The impacts on the relevant ambient environment will be predicted, if possible, using an appropriate mathematical model. For example, ground level concentrations (GLC) of NO_x will be predicted at various distances from the stack of the power plant. The impacts on ambient air quality will be assessed based on the applicable ambient air quality standard. If the GLC of NO_x exceeds the maximum permissible limit prescribed in the ambient air quality standards, the impact of NO_x emission on the ambient air quality could be

considered critical or major. Treatment of the flue gas or increasing the stack height would be necessary to reduce the impact on ambient air quality.

Impacts on Receptors

Each environmental issue will have an impact area. Receptors in the impact area could be people, ecosystem, and properties depending on the nature of the issue. Impacts on the receptors are consequences of the impacts on ambient environment. For example, excessive dust concentration in the ambient air could adversely affect health and daily living of peoples living near the noise sources. The significance of the impact will be determined by severity and extent of the impacts which, in turn, will depend on the magnitude of the issue, and natural and socio-economic characteristics of the impact area. For example, the impact of fugitive dust during pre-construction, construction and decommissioning will depend on the amount of dust released into the air, wind speed and direction, and land use and population density of the impact area.

Normally, if the ambient air quality is complied with the impacts on receptors should be negligible.

The Methodology

Based on the above conceptual framework, the Consultant has developed a general impact assessment methodology for the impact assessment of each environmental issue. ***Figure 6.2-4*** shows a diagram of the methodology. The methodology is explained below:

1. Estimate Magnitude of the Environmental Issue

The first step is to estimate the magnitude of the environmental issue from information on the Project construction and operation presented in ***Chapter 4***. The measurement of the magnitude of an environmental issue depends on the nature of the issue.

Examples: (i) the magnitude of the construction waste disposal issue is the total amount of construction waste that will have to be disposed off; (ii) the magnitude of the NO_x emission issue is the total amount of NO_x in the flue gas to be discharged into the atmosphere; and (iii) the magnitude of the traffic issue is the number of truck loads to be generated during the pre-construction, construction and decommissioning phases.

2. Identify Best Practicable Measures to Minimize the Magnitude of the Issue

Regardless of the level of its impact, the magnitude of the environmental issue must be minimized through best practicable measures to be implemented through design, construction method, or good construction practices.

Examples: (i) the low NO_x burner technology will be used to minimize the amount of NO_x emission; (ii) a piling method with a low noise level will be used; and (iii) the construction site and demolition site will be frequently sprayed with water to suppress fugitive dust.

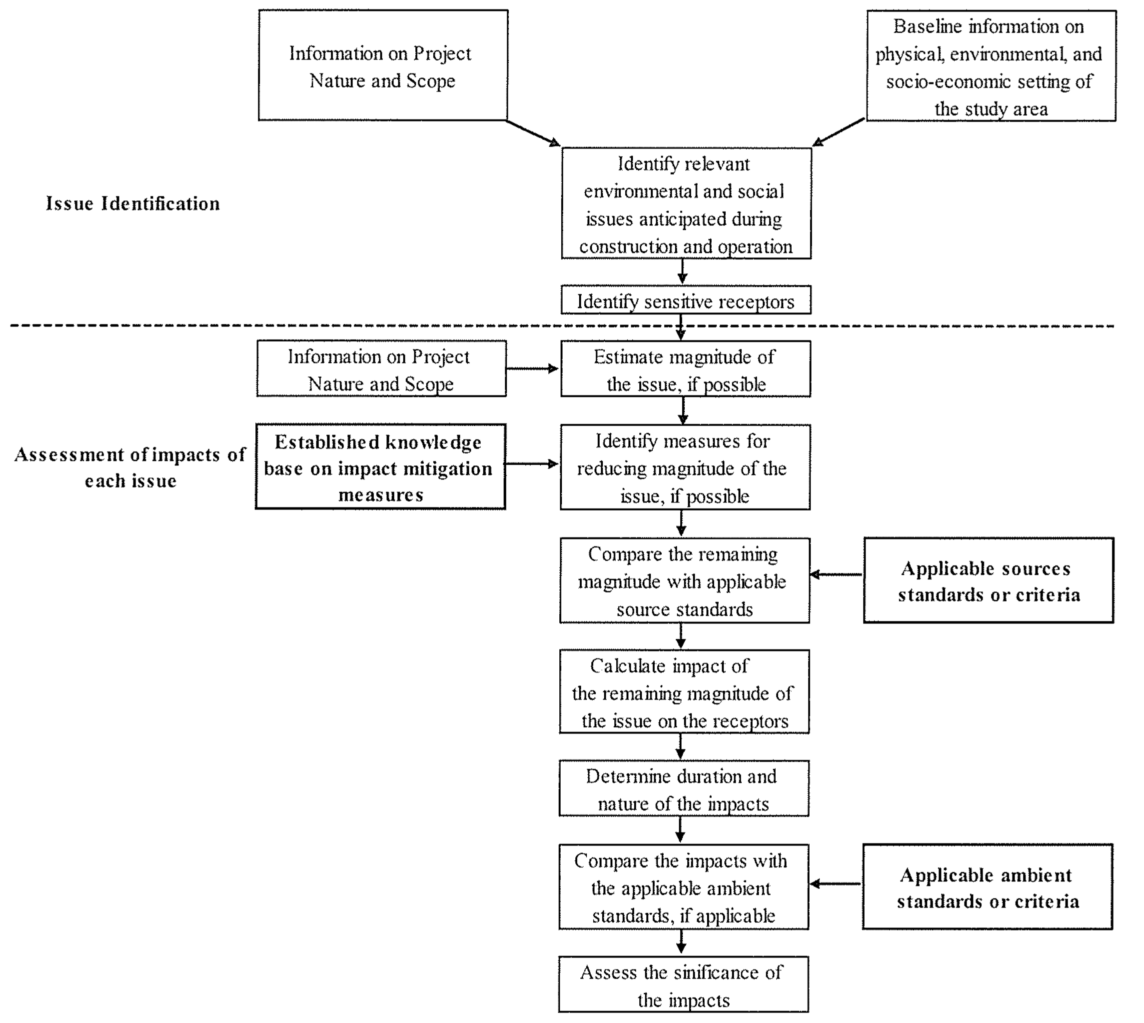


FIGURE 6.2-4 : METHODOLOGY FOR THE IMPACT ASSESSMENT OF EACH ENVIRONMENTAL ISSUE

3. Estimate the Remaining Magnitude of the Issue

The remaining magnitude of the issue can be estimated from the efficiency of the mitigation measures reported in various references.

Examples: (i) the amount of NO_x emission with the low NO_x burner technology can be calculated from the efficiency of this technology or from the supplier's guaranteed concentration of NO_x in the flue gas; and (ii) the remaining amount of fugitive dust after water spraying can be calculated from reported efficiency of water spraying in suppressing fugitive dust.

4. Compare the Remaining Magnitude of the Issue with Applicable Source Standards

Environmental issues related to pollution such as wastewater and NO_x emission issues can be referred to applicable source standards, such as effluent quality standard for the wastewater issue and emission standards for the air pollution issue.

If the remaining magnitude of the issue does not meet the applicable source standards, additional measures will be required to further reduce the remaining magnitude of the issue. For example, best practicable measures will be implemented to minimize the wastewater volume and the amount of pollutants. If the wastewater to be discharged from the power plant does not meet the effluent quality standard, the wastewater must be treated to produce the effluent that meets the effluent quality standard.

Some environmental issues, such as fugitive dust and construction wastes, have no source standards. In this case, the assessment can proceed to the next step.

5. Calculate or Estimate the Impact of the Remaining Magnitude of the Issue on Ambient Environmental Quality

A good example is the NO_x emission issue. This step will calculate the dispersion of the remaining amount of NO_x in the flue gas in the ambient air around the Project site. The results will be increases in NO_x in the ambient air at various locations around the Project site.

6. Determine the Significance of the Impact and the Priority of the Environmental Issue in Environmental Management

Level of Impacts

The impact of an environmental issue is divided into 5 levels based on six criteria or considerations as shown in ***Table 6.2-1***. The criteria will need to be modified to make them specific and relevant to each environmental issue.

TABLE 6.2-1

LEVELS OF IMPACT OF THE ISSUE IN ENVIRONMENT MANAGEMENT

Consideration	Level of Impact or Significance of the Issue in Environmental Management				
	Critical	Major	Moderate	Minor	Insignificant
Magnitude of the issue	Very large	Large	Medium	Small	Very small
Nature of the issue	Irreversible	Irreversible	Reversible	Reversible	Reversible
Duration of the issue	Permanent	Long	Relatively short	Short	Very short
After implementing best available measures					
-the remaining magnitude can meet the source standards	No	No	Yes	Yes	Yes
Impacts of the remaining magnitude on ambient env quality					
-resulting ambient env quality can meet the ambient standards	No	Yes	Yes	Yes	Yes
Sensitivity of the impacted area	Very High	High	Medium	Low	Relatively Low

The impact assessment will be made for the impact without control and the impact with control or residual impact. The five impact levels are:

- Level 5-Critical-the impact is irreversible with extensive and severe ecological damages or socio-economic damages. The issue cannot be resolved. The project plan will need to be changed, relocated or abandoned.
- Level 4-Major-the impact will be substantial but it can be effectively reduced using both engineering and management measures. The residual impact will be minor.
- Level 3-Moderate-the impact is moderate in terms of extent and severity and it can be effectively reduced using simple measures. The residual impact will be insignificant.
- Level 2-Minor-the impact is small in magnitude and confined to a small area. It can be easily managed through good construction practices. The residual impact will be negligible.
- Level 1-Insignifican-the impact is very small compared to Level 2 impact and can be easily mitigated through good construction practices. The residual impact will be negligible.

Definition of Elements of Impact Magnitude

Significance of the impact is evaluated in association with its category, duration, magnitude, extent and severity. Definition of these terms are described below:

Category: Category of impact is classified into 2 types of direct and indirect impacts. Direct impact refers to primary impact while indirect impact refers to secondary and tertiary impacts. Indirect impact is a consequence of direct impact. For example, degradation of the marine ecosystem (secondary impact) caused by coastal pollution (primary impact) could have impacts on livelihood of local fishermen. The consequences of the secondary impacts could be considered as tertiary impact. Lower income of villagers is tertiary impact in this case, as their major earnings are from coastal fishing.

Duration: refers to a timeframe of impact occurrence. It is specified in a period of time such as number of hour, day, month or year.

Magnitude: refers to scale of impacts, ranging from small, medium to large. It can be either positive or negative impacts.

Extent: refers to area of impact extension such as the Project site, construction area, community, township/city, regional level or national level.

Severity: refers to violent level of the impacts; ranging from low, medium and high.

6.3 PRE-CONSTRUCTION PHASE

6.3.1 Pre-construction Activities

The pre-construction phase will involve the following activities: (i) selection of the EPC contractor, Independent Engineer, and project management consultant; (ii) site surveys including topographical survey, soil boring, and soil testing; (iii) preparation of detailed engineering designs; (iv) selection of suppliers; (v) site preparation covering 37.19 acres; and (vi) surveys of the sea bed along two selected alignments, one for the marine outfall and another for the intake pipe. As the site is not inhabited, there will be no resettlement activities.

The pre-construction activities which may have environmental impacts are described below:

- **Site Surveys:** Geotechnical surveys of the construction site will be necessary to collect basic data for foundation engineering design. The surveys would involve soil borings at various locations in the site to collect soil samples for testing of their engineering properties. The soil boring will have no environmental impacts.

- **Sea Bed Surveys:** The sea bed surveys for the design of intake and outfall pipes would involve depth surveys and borings at various locations along the alignments of the two pipes. The surveys will have no environmental impacts.

- **Site Preparation:** Site preparation will be the major task in the pre-construction phase. Most projects consider site preparation as a construction task. The site preparation is to make the construction site ready for construction. In this Project, site preparation will consist of two major tasks: (i) site clearance; and (ii) site filling and compaction.

- **Site Clearance:** Existing vegetation on the construction site consists of beach forest and mangrove. All vegetation will have to be removed. This loss of natural vegetation would have negligible ecological impacts as the existing forest and mangrove are in degraded conditions in small patches with a total area of about 18.90 acres for the beach forest and 11.49 acres for mangrove. No flora and fauna of endangered species have been found.

- **Site Filling and Compaction:** At this stage, filling of the construction site has not yet been planned. Preferably, the site should be filled by dredged materials from the construction of the LNG terminal project. However, if this source of materials is not available, the site would need to be filled by materials from sources outside the DSEZ.

6.3.2 Relevant Environmental and Social Issues

Of the above listed activities in the pre-construction phase, only the site preparation will have environmental implications. Potential environmental and social issues related to the site preparation are identified in ***Table 6.3-1***. Impacts of these issues will be assessed and, if found significant, the issues will have to be addressed during the pre-construction phase of the Project.

TABLE 6.3-1

IDENTIFIED ENVIRONMENTAL AND SOCIAL ISSUES TO BE MANAGED DURING PRE-CONSTRUCTION WORK

Key Potential Issues	Activities / Sources
Environmental Issues	
Fugitive dust	- Site clearing including removal of vegetation and top soil - Excavation works, soil stripping and re-grading - Handling and transportation of excavated materials - Movement of heavy vehicles on unpaved roads and surfaces - Deposition of dust from haulage trucks onto local roads
Gaseous emissions	Operation of diesel-powered equipment, vehicles and generator sets in site clearing and compaction
Noise	Operation of diesel-powered equipment, vehicles and generator sets in site clearing and compaction
Site clearing wastes	- Biomass generated in site clearance - Spoils and excavated materials from earth works
Road traffic	Movement of heavy vehicles and trucks for transporting construction materials, plant equipment, and construction wastes.
Impacts on archaeological site	Site clearing and excavation works
Social Issues	
Loss of Britney Creek	Filling of sections of Britney Creek within the project site
Occupational health and safety of workers	Noise, dust, gaseous emissions, and movement of heavy equipment and vehicles could have implications on safety and health of workers involved in the site preparation works.

6.3.3 Environmental Issues

Impact assessment and mitigation measures of each environmental issue are presented in the subsequent sections.

6.3.3.1 Fugitive Dust

A. Sources

Fugitive dust generated during the pre-construction phase will mostly result from the following sources:

- Site clearing including removal of vegetation and top soil
- Transportation of fill materials
- Site filling and compaction
- Movement of heavy vehicles on unpaved roads and surfaces
- Deposition of dust from haulage trucks onto local roads

In addition to fugitive dust control at the construction sites, fugitive dust along the material transport routes should also be controlled focusing on areas where people live.

B. Sensitivity of Receptors

The closest receptor to the power plant construction site is Nga Pitat community which is located about 2.23 km south of the power plant site.

C. Magnitude of Fugitive Dust Emission at Sources

The amount of fugitive dust generated at the construction will depend primarily on the nature of construction works, soil characteristics, soil moisture content, types of construction equipment, and wind speeds.

In principle, the magnitude of fugitive dust emission could be calculated for each step of the construction process. However, considering the lack of detailed information on the construction steps, a global estimate has to be adopted using the Emission Factor in construction area established by the US EPA (AP-42, US EPA 2005). The emission factor is 1.2 tons per acre (about 2.693 metric tons/ha) of the construction area per month during the construction period.

Based on the above emission factor and the construction area of the power plant of about 15.05 hectares (37.19 acres), the total amount of fugitive dust is estimated at 40.53 metric tons. Assuming 8 working hours per day and 30 days per month, the emission rate will be 0.169 metric tons per hour or about 46.9 gram per sec (g/s).

D. Mitigation Measures to Reduce Fugitive Dust at Sources

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

- Spray water at and around the construction areas and access roads during site preparation and grading.
- Enforce a speed limit for vehicles and trucks in the construction sites not to exceed 40 km/h. Construction activities shall be kept as planned so that the disturbed areas will be minimized at any time.
- Restore, resurface, and rehabilitate the disturbed areas as soon as practicable after completion of construction or disturbance.
- Prohibit open burning of waste in the construction area.

These measures especially water spraying twice a day together with strict implementation of other dust suppression measures should be able to reduce fugitive dust emission as much as 75% (US.EPA (2006), AP 42, chapter 13.2.2).

It should be noted that the dust suppression efficiency of water spraying will depend on the volume of water use per unit area and the frequency of spraying. A 75% efficiency could be expected.

E. Fugitive Dust Control Targets

The fugitive dust control target will be based on the World Bank's ambient air quality standard. This standard prescribes the concentration of Total Suspended Particulates (TSP) not exceeding 230 $\mu g/m^3$ or 2.3 x 10^{-4} mg/l. The TSP level at the receptors will not exceed this limit.

F. Predicted TSP Levels at the Receptors

The dispersion of fugitive dust can be calculated using the Box Model recommended by Hanna, Briggs and Hosker (Handbook on Atmospheric Diffusion, 1987).

The Box Model is represented by the following formula:

$$C = \frac{Q}{d \times w \times m}$$

Where: C = concentration of dust (mg/m^3)

d = width of the project construction area perpendicular to wind direction (meteorological data period) = 250 m.

w = average wind speed = 2.1 m/s. (selected minimum average wind speed was used for worst case prediction (***Table 5.2-3*, Chapter 5**)

m = average Daytime Mixing Height = 1,500 m

Q = the quantity of dust dispersion into ambient air = 46,900 mg/s

The calculations were made in two cases-No Control Case and Control Case. The maximum background ambient TSP of 110.81 $\mu g/m^3$ was used in the calculations. This background TSP was 24-hr average TSP measured at Nga Pitat Village during the period from October 7-8, 2015 and January 21-24, 2015. The results of calculations are presented below:

Emission Rate (mg/s)		**TSP at Site ($\mu g/m^3$ or mg/l)**	**Total TSP ($\mu g/m^3$ or mg/l)**
No Control	46,900	59.56 or 5.956 x 10^{-5}	170.37 or 1.7037 x 10^{-4}
Control 75% suppression	11,725	14.89 or 1.489 x 10^{-5}	125.70 or 1.257 x 10^{-4}
Standard[1/]		230.00 or 2.3 x 10^{-4}	230.00 or 2.3 x 10^{-4}

Source: [1/] Thermal Power: Guidelines for new Plant, Pollution Prevent and Abatement Handbook WORLD BANK GROUP, 1998.

It can be seen that even without control the total ambient TSP level will be much lower than the control target of not exceeding 230 $\mu g/m^3$ or 2.3 x 10^{-4} mg/l.

As the nearest receptors in Nga Pitat Village is about 2,230 m away to the south-southeast (SSE) of the construction site, the impact of fugitive dust on the receptors will be smaller than the level at the perimeter of the construction site.

G. Recommended Mitigation Measures

No additional mitigation measures would be required at the construction site considering the small magnitude of the emission.

However, fugitive dust along the transport routes should be minimized. Measures to be implemented by the EPC contractor should include:

- Enforce speed limit for trucks not to exceed 40 km/h when passing the communities;
- Cover construction materials with canvas or equivalent during transportation, materials should be dampened, if necessary, before transportation;
- Establish a vehicle washing facilities to minimize the quantity of material deposition on public roads; and
- Establish a checkpoint at project gate to ensure the vehicles leaving the project site are following the measures prescribed to reduce dust emissions.

H. Evaluation of the Significance of Fugitive Dust Impact

The impact of fugitive dust impact on the nearby communities is evaluated as follows:

Impact category	Direct impact
Impact duration	Throughout the site preparation period of about 4 months
Impact extent	Local air pollution, mainly confined to within the construction site
Impact magnitude	Small magnitude even without control at sources
Impact severity	Minor, insignificant impact on the receptors
Control priority	Medium

The fugitive dust issue should receive medium control priority.

6.3.3.2 Gaseous Emissions

A. Sources

Diesel-powered heavy construction equipment, vehicles and generator sets are the major sources of gaseous emissions during the pre-construction phase.

B. Sensitivity of Receptors

The receptors will be construction personnel. As the nearest community is about 2.23 km away from the construction site, it is highly unlikely that this community will be affected by the gaseous emissions considering the distance and he small magnitude of the emissions.

C. Mitigation Measures for Emission Reduction at Sources

The EPC contractor will be required to adopt best practices to minimize gaseous emissions at sources through the following management measures:

- Adopt procedures to avoid vehicles from leaving the engines idle longer than 5 minutes if they have to queue to enter the construction site.
- Maintain all equipment and vehicles in proper working conditions according to the manufacturer's specifications. The engines of construction equipment fleet must be routinely maintained by qualified mechanics to ensure their proper conditions during operations.
- Perform on-site material hauling with trucks equipped with on-road engines (if determined to be less emissive than the off-road engines).
- Take measures to avoid congestion of trucks in areas near communities along the transport routes. A good traffic management plan will be required.

D. Evaluation of the Significance of Impacts

The significance of the impact of gaseous emissions was evaluated as shown below. The issue is considered low priority during the pre-construction period.

Impact category	Direct impact
Impact duration	Throughout the pre-construction period of about 4 months
Impact extent	Local confined to the construction site and inhabited areas along the transport routes
Impact magnitude	Small, short term
Impact severity	Low
Control priority	Low

The gaseous emission issue should receive low control priority.

6.3.3.3 Noise

A. Sources

Excessive noise will be generated by heavy construction equipment used in the site preparation works. The noise levels will affect workers and could also affect the nearby receptors.

B. Sensitivity of Receptors

The receptors of pre-construction noise will be the same receptors of fugitive dust. The most sensitive receptors will be Yay Wai Monastery and a school in Nga Pitat Village. However they are 2.23 km away from the power plant site.

C. Magnitude of Noise Levels at Sources

Noise during the site clearing, filling, and compaction would be due to operations of heavy equipment mainly bulldozers, compactors, graders, excavators, and trucks. The maximum noise level of these equipment is about 88 dB(A). As a standard, noise levels for construction equipment are referred to the levels measured at 15 m from the sources.

D. Mitigation Measures to Reduce Noise at Sources

Possibilities are limited for reduction of noise levels of these mobile construction equipment. The EPC contractor and the subcontractors may rent construction equipment from suppliers and would not be at liberty to improve them. It is difficult to design practicable noise retrofit kits to endure the environment of the construction sites. Therefore, the EPC contractor and his subcontractors should be required to use equipment that has best noise performance.

E. Noise Control Targets

The targets of construction noise control at the receptors are dictated by the adopted noise standards. For the Project, the construction noise control will be designed to achieve two conditions:

- The construction noise will not increase the ambient noise level at the designated receptors higher than 70 dB(A) Leq-24 hour (US.EPA Standard).
- The increase in the ambient noise level is not more than 3 dB(A) Leq-1 hour (IFC Standard, 2007).

F. Predicted Noise Levels at the Receptors

The noise level at the receptors due to the noise source can be calculated using the following equation:

$$Lp_2 = Lp_1 - 20 \log (r_2/r_1) \quad \text{.............................1)}$$

Where, Lp_1 = Sound Pressure Level at a distance r_1 from the source

Lp_2 = Sound Pressure Level at a distance r_2 from the source

r_1, r_2 = Distance between source and receiver Lp_1 and Lp_2

= 15 m and 2,230 m, respectively

The resulting ambient noise level will be the net effect of the noise level given by Equation (1) and the background noise level without the Project. The resulting ambient noise level can be calculated using the following equation:

$$\text{Total noise level} \quad Lp_{total} = 10 \log \left(\sum_{i=1}^{n} 10^{Lpi/10} \right) \quad \text{......................2)}$$

The ambient noise level measured during January 21-24 and October 7-10, 2015 was 54.5 - 60.7 dB(A) Leq-24 hr. The ambient noise level in Leq.-1hr varied from 47.6 to 72.7 dB(A). These ambient noise levels will be used in the assessment of noise impacts.

The calculations of the net effect of construction noise on the ambient noise levels were made in two cases-No Control Case and Control Case.

Table 6.3-2 presents the calculated noise levels in Leq-24 hour and Leq-1 hour at the receptors assuming simultaneous operations of three heavy equipment, each generating noise at 88 dB(A). The combined noise levels at the sources will be 92.8 dB(A).

The calculated ambient noise levels at the receptors clearly indicate that without control the net noise level would meet the control target of not exceeding 70 dB(A)-24 hour, but would be slightly below the noise control target of increase in ambient noise level not more than 3 dB(A)-1 hour. To achieve this noise control target, the construction noise at the site perimeter fronting the receptors will have to be reduced from 92.8 dB(A)-24 hour to 90 dB(A), or about 5%. The EPC contractor will prepare a design of sound barrier using appropriate materials, and construct the sound barrier as part of the construction contract. The sound barrier could be designed for permanent use as the perimeter walls of the power plant. This requirement will have to be prescribed in the contract. ***Table 6.3-2*** presents data on noise reduction effectiveness of various materials conventionally used in construction.

TABLE 6.3-2

CALCULATIONS OF AMBIENT NOISE LEVELS AT THE RECEPTOR

Receptor, r2	2,230	m
Noise source, r1	15	m
Log (r2/r1)	2.17221	
Noise level at r2, Lp1	Source-20 x Log (r2/r1)	
Ambient noise level, LP2	60.7	dB(A) Leq-24 hr
-Low	46.7	dB(A) Leq-1 hr
-High	72.7	dB(A) Leq-1 hr
Net noise level	10 x Log (10^(Lp2/10)+10^(Lp1/10))	
Noise level of source	88	dB(A) single equipment operate
	92.8	dB(A) 3 equipment simultaneously operate
Impact-Leq-24 hour		
Noise increase at source	49.4	
Net noise level including ambient noise	61.0	
Standard	70	
Impact-Leq-1 hour		
High combined noise level	72.7	
Increase from ambient level	0	
Low combined noise level	51.6	
Increase from ambient level	4.9	
Standard	3	

Remark: [a/] Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, U.S. EPA (U.S. Environmental Protection Agency). 1974.

[b/] Notification of Guidelines for Community Noise, World Health Organization (WHO), 1999.

[c/] Environmental, Health, and Safety Guidelines: General EHS GUIDELINES: ENVIRONMENTAL NOISE MANAGEMENT of International Finance Corporation, 2007.

G. Recommended Mitigation Measures

Physical Measures

- The noise reduction at the perimeter could be achieved using an acoustic wall or a sound barrier at least 3 m high with adequate length to block the noise emanating to the receptor.
- Provide ear plugs or ear muffs to workers operating in the excessive noise areas.

Management Measures

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

- Major construction activities which generate loud noise should be limited to only during the day time. Activities that are necessary to be carried out at night time will need approval of the site engineers, and will need to have adequate noise control equipment or measures.
- Speeds of vehicles in the construction site will not be more than 40 km/h.
- Noise performance requirements of construction equipment will need to be clearly stated in contract specifications.
- Temporary metal sheet fence to block the noise or shielding should be installed for non-mobile equipment.
- The EPC contractor will be required to regularly monitor ambient noise levels at the receptors, particularly during the noise generation period such as piling.
- The construction environmental management plan will need to include an efficient complaints redress procedure and an efficient corrective action procedure to address the noncompliance of noise performance.

H. Evaluation of the Significance of Noise Impact

The impact of construction noise on the nearby communities is evaluated as follows:

Impact category	Direct impact
Impact duration	Throughout the site preparation period of about 4 months
Impact extent	Highest in the construction site, and could slightly impact the receptor in Nga Pitat village, if no control
If no control - **Impact magnitude**	 Small, only exceeding Leq-1 hr standards
- **Severity**	Small
Control priority	Medium, to protect the workers

The construction noise issue deserves medium control priority.

6.3.3.4 Site Clearing Wastes

A. Sources

The site clearance will generate a large volume of vegetation wastes or biomass wastes. As the site will have to be filled, excavated materials would be small in volume.

The entire 37.19 acres of the Project site will have to be clear of vegetation, thus generating a sizeable quantity of biomass which will have to be disposed. The quantity of biomass from the land clearing is roughly estimated at about 1,962.05 tons using the unit mass of biomass/ha and the area of each category of land in ***Table 6.3-3***. ***Table 6.3-4*** presents the estimates.

TABLE 6.3-3

TYPES AND AREAS OF LAND USE IN PROJECT SITE

Type	Area	
	Acres	Hectares
Beach forest	18.90	7.65
Mangrove forest (fertile mangrove)	10.58	4.28
Deteriorated mangrove forest	0.91	0.37
Water bodies	6.80	2.75
Total	**37.19**	**15.05**

TABLE 6.3-4

ESTIMATES OF BIOMASS GENERATED BY LAND CLEARING

Type	Area		Biomass (tons/hectare)	Total (tons)
	Acres	Hectares[1/]		
Beach forest[2/]	18.90	7.65	70.00	535.50
Mangrove forest (fertile mangrove)[3/]	10.58	4.28	319.55	1,367.67
Deteriorated mangrove forest[3/]	0.91	0.37	159.13	58.88
Water bodies	6.80	2.75	-	-
Total	**37.19**	**15.05**	**-**	**1,962.05**

Remark: [1/] 1 hectare = 2.471 acres

[2/] Biomass rate for beach forest-use data for open forest, Cambodia, FAO, Biomass Density Estimates for Developing Countries Based on Existing Inventories

[3/] Biomass rates for deteriorated and fertile mangrove-the figure are combined above ground and below-ground biomass, Biodiversity and Biomass of a Natural and Degraded Mangrove Forest of Peninsular Malaysia

B. Sensitivity of Receptors

The receptors in this case will be soil and ground water at the disposal sites.

C. Mitigation Measure for Waste Disposal

- Arrangements should be made to enable local villagers to harvest woods for timber or charcoal making before the site clearing operation. Alternatively, the vegetation wastes should be separated into usable timber and woods, and small boughs, twigs, and leaves that will need to be disposed. The separated timbers and woods could be sold or given to villagers. The unusable wastes will be disposed off in a landfill site to be selected by the contractor with approval of the concerned authority.
- Alternatively, chipping and mulching of unusable vegetation wastes should be carried out. The mulched materials could be later used for landscaping purposes.
- Open burning will not be permitted.

D. Evaluation of the Significance of Impacts

The impacts of vegetative wastes on the natural environment are assessed in the table below. The issue is considered medium control priority.

Impact category	Direct impact on soil and water environment at the disposal site
Impact duration	Extend beyond the site preparation period of about 4 months
Impact extent	Local soil and ground water pollution, mainly confined to within the disposal sites
Impact magnitude	Medium magnitude considering the waste quantities
Impact severity	Minor, insignificant impact on the natural environment
Control priority	Medium

6.3.3.5 Road Traffic

A. Sources

During the site preparation period of about 4 months, transport of biomass wastes from site clearance and site fill materials will generate traffic loads on the existing local roads, particularly the small port coastal road and Nga Pitat road (see ***Photo 5.4-6*** in ***Chapter 5***). The increased traffic loads could congest the local roads and increase likelihood of traffic accidents.

B. Sensitivity of Receptors

The impact areas will be along the small port coastal road and at its junction with Nga Pitat road to the power plant site.

Small port coastal road-This road within the study area is the road along the coast linking the Project site to Nga Pitat Village and Dawei City. The traffic load on

this road is currently in the range of 88 to 89 vehicles per day. The majority of vehicles are motorcycles (see ***Section 5.4.4.4***). The traffic condition is consistent all day. The carrying capacity of this road is 2,000 PCU/hr while the highest average traffic volume is 7.676 PCU/hr (see ***Table 5.4-16***). There are houses and some industries along most parts of this road.

Nga Pitat road-This road is rural road in Nga Pitat Village. It is unpaved laterite road.

C. Estimates of Traffic Loads

A traffic load is expressed as the number of truck trips per hour. The traffic load during the land clearing and during the site filling have to be estimated.

Traffic Load Related to Transport of Biomass Wastes

It will depend on the total quantity of construction materials and process equipment that will need to be transported into the construction site and the construction wastes to be transported out of the construction site. Assuming the site clearance will be completed in 7 days, the average quantity of biomass waste per day will be about 280 tons/day. Assuming the truck capacity of 20 tons per truck trip and 8 working hours per day, the average traffic load will be 14 truck trip per day or about 2 truck trips per hour.

In addition, the number of truck trips has to be calculated in terms of inbound and outbound. Therefore, the number of truck trips will be about 4 truck trips per hour.

Traffic Load Related to Transport of Site Filling Material

The traffic load related to transport of site filling materials is estimated based on the following assumptions and data:

- The construction site will be filled up to about 2 m above the existing level.
- The filling period will be about 53 days.
- Trucks will transport fill materials to the site 8 hours per day.
- The entire area of 15.05 hectares (37.19 acres) of the power plant construction site will be filled.
- Sand will be used as fill material.
- Compacted volume of the fill material = 0.85 of loose volume.
- Capacity of a dump truck = 20 tons.
- Density of wet sand = 3,100 lb/cubic yard = 1.839 ton/m^3.

Based on the above data, the total number of truck trips for filling the power plant construction site will be about 32,561 trips (= $15.05 \times 10{,}000 \times 2\times 1.839)/(0.85\times 20)$.

The traffic load will be about 614 trips/day or 76.8 trips/hour.

In addition, the number of truck trips has to be calculated in terms of inbound and outbound. Therefore, the number of truck trips will be about 154 truck trips/hour.

As the traffic load related to the transport of site fill materials will be much higher than the traffic load related to the transport of biomass wastes, the traffic impacts will be assessed based on the traffic load related to the transport of site fill materials.

D. Traffic Management Targets

The traffic management targets for the pre-construction phase will be:

- There will be no traffic accidents on the two affected roads.
- Minimize traffic congestion on the two affected roads.

E. Predicted Impacts

The V/C ratio during the transport of site filling materials is calculated and the results are shown in ***Table 6.3-5***. The new V/C ratios of less than 0.2 indicate that the transport of site filling materials will have insignificant impacts on the existing roads.

TABLE 6.3-5

IMPACTS OF TRANSPORT OF CONSTRUCTION MATERIALS ON EXISTING TRAFFIC

PARTICULARS	TC1	TC2
Existing maximum average traffic, PCU/hr	7.676	3.938
Carrying capacity, PCU/hr	2,000	2,000
Existing V/C ratio	0.0038	0.0020
Existing traffic condition	Very good traffic flow	Very good traffic flow
During the site filling period		
Truck trips per hour based on 8 hrs	154	154
Truck traffic in PCU equivalent/hr (PCU for truck-2.5)	385	385
Total traffic during the site filling period, PCU	393	389
Carrying capacity, PCU/hr	2,000	2,000
New V/C ratio	0.1965	0.1945
Expected traffic condition	Very good traffic flow	Very good traffic flow

F. Management Guidelines and Impact Mitigation Measures

Although the transport of site filling materials would not have significant impacts on local traffic, the following traffic management guidelines and impact mitigation measures should be adopted in the pre-construction phase and throughout the construction phase.

Management Guidelines

- Take reasonable and practicable measures to avoid, or mitigate and manage the potential traffic impacts on communities near the worksites, including local parking.
- Minimize as far as reasonably practicable, potential traffic disruptions to the operation of the road network and the public transport network due to the transport of materials to and from the construction sites.
- Maintain safe access near all project work areas for road users, including pedestrians and cyclists. In particular, develop local access strategies in consultation with stakeholder groups to maintain safe, convenient and efficient access to community facilities such as schools, child care facilities, churches, health care, shops, and local markets, if any.
- Implement traffic management measures near worksites and other project works to avoid conflicts between construction traffic, and pedestrians and cyclists.
- Take reasonable and practicable measures to inform the local and broader communities about the timing and scale of changes to traffic conditions on roads in the vicinity of worksites and construction works.
- Monitor traffic flows near construction works and take corrective action in response to traffic impacts as a consequence of construction works.

Impact Mitigation Measures:

Truck routes and construction site access

- In consultation with the concerned authorities at the national, regional, and township levels, develop and implement a Construction Traffic Management Plan to address the following issues:
  - Use of established truck routes and arterial roads for the haulage of construction materials and spoil.
  - Where practicable, provide direct access from worksites to arterial roads to minimize truck traffic in local streets.
  - Avoid haulage tasks during peak traffic periods as far as practicable. Where haulage in peak periods is unavoidable, such activities are to be managed in accordance with specific traffic management sub-plans provided to the relevant agencies in advance.
  - Control heavy vehicle movements on small coastal road to avoid interference with major events, if any.
  - Investigate the capacity of intersections on haulage routes to minimize impact on intersection operations by heavy vehicles servicing the construction worksites.
  - Prepare and implement a comprehensive construction traffic management plan to control truck movements to avoid, or mitigate and manage the impacts of heavy vehicle traffic on the road network, except in exceptional circumstances, and after consultation with the local community.
  - Exceptional circumstances would arise when no suitable alternative routes are available for specific construction tasks.

- Measures to manage the operation of the construction truck fleet for incorporation into a Construction Vehicle management sub-plan to include:
  - Monitoring of truck position, speed, route and performance in relation of traffic conditions and schedule requirements.
  - Management of truck speed and position to avoid queuing on the approaches to the spoil handling and loading facilities.
  - Management of traffic signals on nominated spoil haulage routes in night-time hours to achieve optimum performance of the truck fleet and to minimize impacts on communities along the routes.
  - Maintain all vehicles transporting material to and from the construction sites to a high standard (ADR28/01) with regards noise emissions, exhaust emissions, traffic safety and operational safety.
  - Ensure all vehicles leaving a construction site pass over or through devices designed and maintained to remove soil and other materials.

Construction Traffic Hazards

- Heavy trailer trucks transporting heavy and large plant equipment will have to be directed by a traffic police car or by other vehicle specially designated to handle a guidance of this kind of transportation.
- Post warning signs along the right of way where the transmission line construction takes place.

Local Traffic

- Implement management measures to avoid, or minimize increase in traffic caused by the project works in local streets as practicable.
- Notify the local community about proposed changes to local traffic access arising from construction activities, and provide clear signage of changed traffic conditions and take other measures to ensure safe traffic movement.
- Prepare and implement an employee parking policy for the construction worksites to manage the impacts on car parking in the vicinity of worksites and help avoid project parking in local streets.

Traffic Management at the Intersection of Small Port Coastal Road and Nga Pitat Road

- Provide a traffic police or relevant officer to control traffic at the intersection during the transport period.

Pedestrians and Cyclists

- Maintain safe pedestrian and cycle access near construction works (particularly for elderly and children), including to community facilities, such as schools, monastery, open space, and particularly.
- Notify the local community, and in particular, local schools, about changes to pedestrian and cycle access during construction near construction works.

- Provide traffic controls designed for the safe movement of pedestrians and cyclists near the worksites.

G. Evaluation of the Significance of Impacts

The impact on traffic is evaluated as shown below. The traffic management deserves high priority during the pre-construction period and throughout the construction period.

Impact category	Direct impact
Impact duration	Throughout the pre-construction period of about 4 months
Impact extent	Mainly on small port coastal road and along the routes from the material sources to the power plant construction site
Impact magnitude	Small
Impact severity	Insignificant
Control priority	Medium for public safety

6.3.3.6 Impact on Archaeological Site

A. Sources

During the site clearing and excavation works, the Contractor may discover artifacts which potentially could have archaeological and cultural value.

B. Sensitivity of Receptors

The project site is not known to have archaeological sites. The possibility of discovering artifacts of value would be remote.

C. Magnitude of the Impacts

The magnitude of impacts cannot be assessed. The impacts would depend on archaeological value of the found artifacts. Without appropriate measures, the unearthed artifacts could be damaged or could have been disposed off as wastes.

D. Mitigation Measures

The Contractor shall prepare a detailed description of the Chance Find Procedure of the power plant. The Procedure shall clearly prescribed actions to be taken by the Contractor in the case of a chance find. Generally, the actions will include:

- Site supervisor/foreman shall order construction workers to stop immediately the construction activities in the area of the chance find.
- Inform concerned authority (Fine Arts Department), including head of village and township, for proper management if historic or archaeological is found.
- Delineate and mark clearly the discovered site or area and prohibit physical activities in the area without prior approval of the concerned authority.
- Install temporary site protection measures (warning tape and stakes, avoiding signs).

- Strictly enforce any no-go area needed to protect the site.
- Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be present until the responsible local authorities and the responsible Ministry take over.
- If it is necessary to relocate a cemetery and grave yard, cultural ceremony should be arranged prior to the relocation.

E. Evaluation of the Significance of Impact

The significance of the impact of archaeological site was evaluated as shown below.

Impact category	Direct impact, transient
Impact duration	Throughout the pre-construction period of about 4 months
Impact extent	Confined to within the project site
Impact magnitude	Small
Impact severity	Insignificant
Control priority	Medium

6.3.4 Social Issues

6.3.4.1 Loss of Britney Creek

A. Impact Assessment

The section of Britney Creek within the project site will be filled up. The creek will therefore be fragmented into three separated sections-the inlet or head section, the middle section, and the end or tail section. The inlet or head section of the project site will be cut off from seawater supply and would be filled up. The inlet section will remain but will be short. The middle section to the east and narrow tail section to the south of the LNG Terminal Project would be naturally filled up by sediment. Consequently, Britney Creek would disappear except the inlet section.

Morphologically, Britney Creek is a coastal marine lagoon. Coastal lagoons are bodies of water associated with the sea. They are usually separated from the sea by stretches of coast of islands of marine origin. They are usually parallel to the shore and, in some cases, associated with estuaries and bays. Marine lagoons are characterized by having free exchange with the sea, and a substantial portion of its volume is renewed by the tide. Usually, coastal lagoons support a high level of biodiversity. As coastal lagoons are shallow, light penetration could reach the bottom resulting in flourishing benthic zone. Coastal lagoons and their associated habitats-such as mangroves and sea grasses-provide safe refuges as nurseries and feeding grounds for several shellfish and fish species. Many fish species have adapted to spawn in marine coastal waters, while juveniles migrate into estuaries or lagoons to feed and grow in their shelter.

Based on general knowledge on ecological functions of coastal systems, the Consultant views that the loss of Britney Creek and its ecological functions is unavoidable in the land development for industrial sites within DSEZ. However, the loss would not have significant impacts on the coastal ecosystem as Britney Creek is only a very small part of the 900-km long Tanintharyi coast line.

Britney Creek is also used for navigation. Nga Pitat villagers are sailing the boat along this creek to the dockyard during spring tide (see ***Figure 6.3-1***). Filling up the Britney Creek will obstruct villagers' navigation to the dockyard. However the Project will find alternative dockyard with their acceptance.

B. Recommended Mitigation Measures

To keep Britney Creek would not be practical anyway. The area will be used for initial phase development of DSEZ[1]. After consultation with DSEZ MC and villagers in early 2013, the developer will develop alternative dockyard/boatyard which is also close to Nga Pitat village (see ***Figure 6.3-1***). So, villagers can sail along Chi Oo Creek which is deeper than Britney Creek to the new dockyard.

Myandawei Industrial Estate Company Limited (MIE) was agreed to develop alternative dockyard/boatyard at Chi Oo Creek area. The alternative dockyard/boatyard will be of similar kind or quality to the existing dockyard/boatyard at Britney Creek. MIE agreed to dredge Chi Oo Creek and upgrade the route to the alternative dockyard/boatyard.

MIE will organize public hearing and clarification for villagers and ship owners who are potentially affected.

C. Evaluation of the Significance of Lost of Britney Creek

The impacts of the loss of Britney Creek on ecosystems are evaluated as shown below. The issue deserves low priority during the pre-construction period as three are no mitigation measures to minimize the impacts.

Impact category	Direct impact
Impact duration	Permanent, irreversible impacts
Impact extent	Mostly confined to within the Project site
Impact magnitude	Small
Impact severity	High
Control priority	Low

[1] With reference to the Concession Agreement for Initial Phase Development, dated on 5 August 2015, the Republic of the Union of Myanmar has permitted the area in the DSEZ for development of the 3 Projects, comprising LNG Terminal, Boil-off Gas Power Plant and Initial Phase Power Plant.

FIGURE 6.3-1: ALTERNATIVE DOCKYARD

6.3.4.2 Occupational Health and Safety

A. Relevant OHS Issues

Fugitive dust, excessive noise, gaseous emissions, and work safety will be the relevant OHS issues during the pre-construction period. Considering the nature of site clearing works, these OHS issues are relatively easy for the contractor to address.

B. Mitigation and Management Measures

The contractor for the site clearing works will need to take appropriate protective measures to minimize workers' exposure to fugitive dust, excessive noise, and gaseous emissions and to reduce the levels of dust, noise and gaseous emissions at the construction site. The workers will have to be adequately briefed on safety aspects of the site clearing works.

C. Evaluation of the Significance of OHS Issues

The significance of OHS issues is evaluated as follows:

Impact category	Direct OHS issues
Impact duration	Throughout the pre-construction period of about 4 months
Impact extent	Confined to the construction site
Impact magnitude	Low significance level
Impact severity	Minor
Control priority	Low

6.4 CONSTRUCTION PHASE

6.4.1 Construction Activities

A. Construction Sites

The Project facilities will consist of onsite and offsite facilities. The onsite facilities include all process and non-process facilities to be constructed in the Project site. These are the power plant and its associated facilities such as a once-through cooling water system, a demineralization plant, support buildings, and others. The offsite facilities are seawater intake and outfall pipes to be constructed outside the Project site. Therefore, there will be three construction sites. The main construction site will be the Project site. As the two offsite facilities are linear structure, their construction sites will be narrow strips of land along their lengths. While the construction of the onsite facilities will be concentrated in various locations in the Project site, construction activities of the linear structures will take place over a short duration in one place, and will move along the alignment until the construction is completed. This nature of construction has implications on environmental and social impacts, and on monitoring and evaluation of the effectiveness of prescribed mitigation measures.

The construction of onsite and offsite facilities will involve civil works, mechanical works and electrical works. The nature and magnitude of these works will be different at each construction site.

B. Construction of Onsite Facilities

Construction activities of the onsite facilities will concentrate in the Project site. All three types of works will be largest in scope and magnitude in the construction of onsite facilities. Therefore, environmental impacts of the construction phase will mostly concentrate in the Project site.

The civil works will include: (i) construction of foundation works; (ii) erection of steel support structure and construction of concrete support structure for process and non-process buildings; (iii) installation of walls, roofs and other building components; and (iv) construction of internal roads, fence, drainage, water supply and wastewater management facilities.

The mechanical works will involve installation, including piping works, of process equipment of the gas turbines, gas engines, HRSG, gas regulating station, fire-fighting system, air-conditioning system, and in-plant once-through cooling water system.

The electrical works will involve installation, including cabling works, of electrical components and instruments for the operation and control of power plant, gas metering station, lighting system, and communication system including IT network.

In addition to these core construction works, there will also be landscaping works and minor civil works.

During the construction, the EPC contractor will erect temporary facilities such as worker camps, office buildings, fence, equipment shed, water supply, drainage, oil storage, canteen, toilets, etc.

The construction would require about 600 workers at peak time. Most or all workers would be local people living near the Project site. Details of the worker camps are not available at the time of preparing this Final EIA Report. However, the worker camps would be located near the construction site or within the project construction area, and will be served with temporary water and electricity supply systems. Water supply would come from Pa Yain Byu Reservoir. Drinking water would be procured from Dawei town or brought in from outside. Electricity would be obtained from diesel generators.

C. Construction of Intake and Outfall Pipes

Since sea water will be used in the once-through water cooling system, the intake and outfall pipes will be laid from the power plant to two designated offshore locations. At present, the cooling water system is being planned and designed. Tentatively, the intake pipe will be about 2.3 km long and 2.2 m in diameter. The outfall pipe will be about 1.7 km long and 2.2 m in diameter. The two pipes will be laid on the seabed for the offshore sections, trenched under the beach toward the coastal road, tunneled underneath the coastal road, and then laid underground toward the power plant area. The spent cooling water will be discharged through the outfall pipe with diffusors installed on its last 21.6 m section.

Excavation at the power plant site for the intake sump and the outfall chamber would take not more than three weeks.

6.4.2 Relevant Environmental and Social Issues

Based on the nature and magnitude of construction works, the Consultant identified in ***Table 6.4-1*** relevant environmental and social issues that will need to be managed during the construction phase.

TABLE 6.4-1

IDENTIFIED ENVIRONMENTAL AND SOCIAL ISSUES TO BE MANAGED DURING CONSTRUCTION PHASE

Key Potential Issues	Activities / Sources
Environmental Issues	
Fugitive dust	- Excavation works, soil stripping and re-grading - Handling and transportation of excavated materials - Movement of heavy vehicles on unpaved roads and surfaces - Deposition of dust from haulage trucks onto local roads
Gaseous emissions	Use of diesel-powered, vehicles and generator sets
Noise	Percussive piling by piling machines
Wastewaters	- Domestic sewage generated by daily living of workers - Wash waters, mainly from truck wheel washing and concrete wash waters - Surface runoff
Construction wastes	- Spoils and excavated materials from earth works - Construction material debris - Hazardous waste - Solid wastes from workers
Road traffic	Transportation of construction wastes, construction materials, and plant equipment
Impacts on archaeological site	Excavation works, soil stripping and re-grading
Social Issues	
Local economy (positive)	Contribution to the local economy through providing employment to about 600 workers at construction peak and spending of workers on local foods and services.
Livelihood (negative)	Construction of the intake and outfall pipes would cause inconveniences to local people in: - Daily commuting to the fishing boat mooring area - Taking the fishing boats in and out of the mooring area - Coastal fishery, especially small-scale fishery Construction activities may disturb mangrove resources around the construction site which are the main sources of income and protein.

TABLE 6.4-1

ENVIRONMENTAL AND SOCIAL ISSUES TO BE MANAGED DURING CONSTRUCTION (CONT'D)

Key Potential Issues	Activities / Sources
Infrastructure and services (negative)	The Project construction could compete with local communities in using limited local infrastructure and services, particularly roads and medical services. - Road: Increased traffic volume will affect the locals, especially Nga Pitat villagers. - Medical Services: The construction workers would need to use medical services provided by Yebyu hospital, Maungmagan station hospital, or Dawei hospital in more serious or emergency cases.
Social Issues	
Culture and tradition (negative)	Non-local construction personnel could have conflicts with locals due to differences in cultural and traditional practices and value.
Community health, safety and security (negative)	The construction may have some impacts on community health, safety and security. - Health Risk: The influx of construction workers could pose health risks to the communities such as sexually transmitted diseases, tuberculosis and hepatitis. - Security Risk: The influx of workers could also pose security risks to the communities in terms of crimes and drug abuses.
Stakeholders' negative attitude toward the Project (negative)	The stakeholders, especially local communities, may have negative attitude toward the Project.

6.4.3 Environmental Issues

Impact assessment and proposed mitigation measures of each potential environmental issue are presented in the subsequent sections.

6.4.3.1 Fugitive Dust

A. Sources

Fugitive dust during the construction phase will mostly result from various construction works. Potential sources of fugitive dust include:

- Excavation works, soil stripping and re-grading and foundation
- Handling and transportation of excavated materials
- Movement of heavy vehicles on unpaved roads and surfaces
- Deposition of dust from haulage trucks onto local roads

In addition to fugitive dust control at the construction sites, the control should also cover fugitive dust generated by construction trucks along the transport routes.

B. Sensitivity of Receptors

The closest receptor to the power plant construction site is Nga Pitat community which is located about 2.23 km south of the power plant site.

C. Magnitude of Fugitive Dust Emission at Sources

The amount of fugitive dust generated at the construction will depend primarily on the nature of construction works, soil characteristics, soil moisture content, types of construction equipment, and wind speeds.

In principle, the magnitude of fugitive dust emission could be calculated for each step of the construction process. However, considering the lack of detailed information on the construction steps, a global estimate has to be adopted using the Emission Factor in construction area established by the US.EPA (AP-42, US EPA 2005). The emission factor is 1.2 tons per acre (about 2.693 metric tons/ha) of the construction area per month during the construction period.

Based on the above emission factor and the construction area of the power plant of about 15.05 hectares (37.19 acres), the total amount of fugitive dust is estimated at 40.53 metric tons. Assuming 8 working hours per day and 30 days per month, the emission rate will be 0.169 metric tons per hour or about 46.9 gram per sec (g/s).

D. Mitigation Measures to Reduce Fugitive Dust at Sources

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

- Spray water at and around the construction areas and access roads.
- Enforce a speed limit for vehicles and trucks in the construction sites not to exceed 40 km/h. Construction activities shall be kept as planned so that the disturbed areas will be minimized at any time.
- Restore, resurface, and rehabilitate the disturbed areas as soon as practicable after completion of construction or disturbance.
- Prohibit open burning of waste in the construction area.

These measures especially water spraying twice a day together with strict implementation of other dust suppression measures should be able to reduce fugitive dust emission as much as 75% (US.EPA (2006), AP 42, chapter 13.2.2).

It should be noted that the dust suppression efficiency of water spraying will depend on the volume of water use per unit area and the frequency of spraying. A 75% efficiency could be expected.

E. Fugitive Dust Control Targets

The fugitive dust control target will be based on the World Bank's ambient air quality standard. This standard prescribes the concentration of Total Suspended Particulates (TSP) not exceeding 230 $\mu g/m^3$ or 2.3 x 10^{-4} mg/l. The TSP level at the receptors will not exceed this limit.

F. Predicted TSP Levels at the Receptors

The dispersion of fugitive dust can be calculated using the Box Model recommended by Hanna, Briggs and Hosker (Handbook on Atmospheric Diffusion, 1987).

The Box Model is represented by the following formula:

$$C = \frac{Q}{d \times w \times m}$$

Where: C = concentration of dust (mg/m^3)

d = width of the project construction area perpendicular to wind direction (meteorological data period) = 250 m.

w = average wind speed = 2.1 m/s. (selected minimum average wind speed was used for worst case prediction (***Table 5.2-3*, Chapter 5**)

m = average Daytime Mixing Height = 1,500 m

Q = the quantity of dust dispersion into ambient air = 46,900 mg/s

The calculations were made in two cases-No Control Case and Control Case. The maximum background ambient TSP of 110.81 $\mu g/m^3$ was used in the calculations. This background TSP was 24-hour average TSP measured at Nga Pitat Village during the period from October 7-8, 2015 and January 21-24, 2015. The results of calculations are presented below:

Emission Rate (mg/s)		**TSP at Site ($\mu g/m^3$ or mg/l)**	**Total TSP ($\mu g/m^3$ or mg/l)**
No Control	46,900	59.56 or 5.956×10^{-5}	170.37 or 1.7037×10^{-4}
Control 75% suppression	11,725	14.89 or 1.489×10^{-5}	125.70 or 1.257×10^{-4}
Standard[1/]		230.00 or 2.3×10^{-4}	230.00 or 2.3×10^{-4}

Source: [1/] Thermal Power: Guidelines for new Plant, Pollution Prevent and Abatement Handbook WORLD BANK GROUP, 1998.

It can be seen that even without control the total ambient TSP level will be much lower than the control target of not exceeding 230 $\mu g/m^3$ or 2.3×10^{-4} mg/l.

As the nearest receptors in Nga Pitat Village is about 2,230 m away to the south-southeast (SSE) of the construction site, the impact of fugitive dust on the receptors will be smaller than the level at the perimeter of the construction site.

G. Recommended Mitigation Measures

No additional mitigation measures would be required at the construction site considering the small magnitude of the emission.

However, fugitive dust along the transport routes should be minimized. Measures to be implemented by the EPC contractor should include:

- Enforce speed limit for trucks not to exceed 40 km/h when passing the communities.
- Cover construction materials with canvas or equivalent during transportation, materials should be dampened, if necessary, before transportation.
- Establish a vehicle washing facilities to minimize the quantity of material deposition on public roads.
- Establish a checkpoint at project gate to ensure the vehicles leaving the project site are following the measures prescribed to reduce dust emissions.

H. Evaluation of the Significance of Fugitive Dust Impact

The impact of fugitive dust impact on the nearby communities is evaluated as follows:

Impact category	Direct impact
Impact duration	Throughout the construction period of about 68 months More visible during the site preparation duration
Impact extent	Local air pollution, mainly confined to within the construction site
Impact magnitude	Small magnitude even without control at sources
Impact severity	Minor, insignificant impact on the receptors
Control priority	Medium

The fugitive dust issue should receive medium control priority.

6.4.3.2 Gaseous Emissions

A. Sources

Diesel-powered heavy construction equipment, vehicles and generator sets are the major sources of gaseous emissions during the construction. The emissions will include typical pollutants such as NO_x, SO_2, CO, and particulate in the exhaust gases discharged from the engines.

B. Sensitivity of Receptors

Gaseous emissions during the construction phase will create local air pollution confined within the construction sites. The receptors will be construction personnel.

As the nearest community is about 2.23 km away from the power plant construction site, it is unlikely that this community will be affected by the gaseous emissions during the construction considering the small magnitude of the emissions.

C. Estimates of Emission Loads

Emission loads of various pollutants could be estimated from information on the number and type of diesel-engine construction equipment and their hours of operation.

D. Mitigation Measures for Emission Reduction at Sources

The EPC contractor will be required to adopt best practices to minimize gaseous emissions at sources through the following management measures:

- Adopt procedures to avoid construction vehicles idling for excessive periods (e.g. more than 5 minutes) if required to queue to enter the construction sites.
- Maintain all construction equipment in proper working conditions according to the manufacturer's specifications. The engines of the construction equipment fleet must be routinely maintained by qualified mechanics to ensure their proper conditions during operations.
- Provide adequate training to the equipment operators in the proper use of equipment.
- Use the proper size of equipment for the job.
- Perform on-site material hauling with trucks equipped with on-road engines (if determined to be less emissive than the off-road engines).
- Encourage and provide carpools, shuttle vans, transit passes and/or secure bicycle parking for construction worker commutes.
- Take measures to avoid congestion of trucks in areas near communities along the transport routes. A good traffic management plan will be required.
- For stationary plant and equipment powered by diesel motors, take measures to avoid or mitigate and manage the potential impacts of exhaust emissions on adjacent residential or other sensitive activities. For example, ensure all construction vehicles and stationary plant and equipment powered by diesel motors are fitted with emission control measures, and are regularly maintained to manufacturers' specifications.

E. Emission Control Targets

Ambient air quality at the construction site should exactly follow ambient air quality standards of National Environmental Quality (Emission) Guidelines, Myanmar, 2015.

F. Predicted Impacts on Receptors

Considering the low emission loads, the impact of gaseous emission during the construction phase on the construction personnel is expected to be insignificant.

G. Impact Mitigation Measures

No additional mitigation measures apart from the source reduction measures would be necessary. However, heavy equipment operators could be provided with masks, if deemed necessary, to minimize the impact of particulates.

H. Evaluation of the Significance of Impacts

The significance of the impact of gaseous emissions was evaluated as shown below. The issue is considered low priority during the construction period.

Impact category	Direct impact
Impact duration	Throughout the construction period of about 68 months
Impact extent	Local, confined to within the construction site
Impact magnitude	Small, short term
Impact severity	Insignificant
Control priority	Low

Gaseous emissions during construction will not create significant air pollution problem. Nevertheless, best management practices must be adopted to minimize gaseous emissions during construction.

Overall the impact from gaseous emission during the construction phase is local in extent, short-term in duration and low in magnitude. The significance of impact from gaseous emissions during construction can be considered low, once mitigation measures are implemented.

6.4.3.3 Noise

A. Sources

Based on construction experience and the nature of construction of this Project, noise will be mostly generated in civil works construction by operations of heavy construction equipment and pile driving equipment. Construction activities that generate excessive noise include soil compaction by heavy graders and percussive piling by piling machines. The construction noise levels will affect construction workers and could also affect the nearby receptors.

Noise will be managed at the two construction sites. The power plant construction site will be where noisy construction activities are most intensive and concentrated. It is anticipated that percussive piling would be the main noise source at the construction site. A smaller extent of noise will be generated along the construction corridors of the intake and outfall pipeline. However, most of the pipelines will be laid offshore using floating cranes and excavators. Noise from offshore pipe-laying activities would not be significant.

B. Sensitivity of Receptors

The receptors of construction noise will be the same receptors of fugitive dust. The most noise sensitive receptor in the village is Yay Wai Monastery and Nga Pitat School.

C. Magnitude of Noise Levels at Sources

Table 6.4-2 compiles data on noise levels of various construction equipment relevant to the construction of this Project. As a standard, noise levels for construction equipment are referred to the levels measured at 15 m from the sources.

The data in ***Table 6.4-2*** clearly indicates that percussive piling machine generates the highest levels of noise at about 101 dB(A). Therefore, percussive piling will be the most significant source of noise at the power plant construction site during the durations of piling which may take about 2 months. Without noise from this source, noise from heavy construction equipment will be dominant noise sources at about 88 dB(A).

TABLE 6.4-2

NOISE LEVELS OF CONSTRUCTION EQUIPMENT RELATED TO THE PROJECT

Equipment	Noise level (dB(A))*
Air compressor	81
Backhoe	80
Compactor	82
Concrete mixer	85
Concrete pump	82
Concrete vibrator	76
Crane, Derrick	88
Crane, Mobile	83
Bull Dozer	85
Grader	85
Trucks	88
Excavator	81
Drilling machine	84
Wheel loader	79
Pile Driver (Impact)	101
Pile Driver (Sonic)	96
Pneumatic tool	85
Pump	76
Generator	81

Source: US EPA, "Noise from Construction Equipment and Operations, Building Equipment and Home Appliances", NTID300.1, December 31, 1971

D. Mitigation Measures to Reduce Noise at Sources

Possibilities are limited for reduction of noise levels of construction equipment. The EPC contractor and the subcontractors may rent construction equipment from suppliers and would not be at liberty to improve them. It is difficult to design practicable noise retrofit kits to endure the environment of the construction sites. Therefore, the EPC contractor and his subcontractors should be required to use equipment that has best noise performance.

For piling, even though the piling activity can create high noise, the activity is considered to be a short period. The noise levels depend on the methods of piling as shown in ***Figure 6.4-1***. To reduce the piling noise, bored piling should be used and the expected noise levels would be around 75 dB(A) (see ***Figure 6.4-1***).

E. Noise Control Targets

The targets of construction noise control at the receptors are dictated by the adopted noise standards. For the Project, the construction noise control will be designed to achieve two conditions:

- The construction noise will not increase the ambient noise level at the designated receptors higher than 70 dB(A) Leq-24 hour (US EPA Standard).
- The increase in the ambient noise level is not more than 3 dB(A) Leq-1 hour (IFC Standard, 2007).

F. Predicted Noise Levels at the Receptors

The noise level at the receptors due to the noise source can be calculated using the following equation:

$$Lp_2 = Lp_1 - 20 \log (r_2/r_1) \quad \text{.............................1)}$$

Where, Lp_1 = Sound Pressure Level at a distance r_1 from the source

Lp_2 = Sound Pressure Level at a distance r_2 from the source

r_1, r_2 = Distance between source and receiver Lp_1 and Lp_2

= 15 m and 2,230 m, respectively

The resulting ambient noise level will be the net effect of the noise level given by Equation (1) and the background noise level without the Project. The resulting ambient noise level can be calculated using the following equation:

$$\text{Total noise level } Lp_{total} = 10\log\left(\sum_{i=1}^{n} 10^{Lpi/10}\right) \quad \text{.......................2)}$$

The ambient noise level measured during January 21-24 and October 7-10, 2015 was 54.5 - 60.7 dB(A) Leq.-24 hr. The ambient noise level in Leq-1hr varied from 47.6 to 72.7 dB(A). These ambient noise levels will be used in the assessment of noise impacts.

The calculations of the net effect of construction noise on the ambient noise levels were made in two cases-No Control Case and Control Case.

No Control Case

Table 6.4-3 presents the calculated noise levels in Leq-24 hour and Leq-1 hour at the receptors under three possible scenarios: (a) simultaneous operations of three percussive piling machines, each generating noise at 101 dB(A); (b) simultaneous operations of three heavy equipment, each generating noise at 88 dB(A); and (c) simultaneous operations of three bored piling machines, each generating noise at 75 dB(A). The combined noise levels at the sources will be 105.77 dB(A) for Scenario (a), 92.8 dB(A) for Scenario (b); and 79.8 dB(A) for Scenario (c).

The calculated ambient noise levels at the receptors clearly indicate that without control. Scenario (a) would not meet the noise control target; Scenario (b) slightly below the target; and only Scenario (c) meeting the target. As Scenario (b), simultaneous operations of three heavy equipment, would be most prevalent throughout the construction period, the construction noise at the site perimeter fronting the receptors will have to be reduced.

Control Case

Table 6.4-3 also presents calculated ambient noise levels at three levels of source control-80, 85 and 90 dB(A). The figures clearly indicate that the noise levels at the site perimeter will have to be reduced to between 85-90 dB(A), or about 11%. The EPC contractor will prepare a design of sound barrier using appropriate materials, and construct the sound barrier as part of the construction contract. The sound barrier could be designed for permanent use as the perimeter walls of the power plant. This requirement will have to be prescribed in the contract. ***Table 6.4-3*** presents data on noise reduction effectiveness of various materials conventionally used in construction.

G. Recommended Mitigation Measures

Physical Measures

- The noise reduction at the perimeter could be achieved using an acoustic wall or a sound barrier at least 3 m high with adequate length to block the noise emanating to the receptor.
- Provide ear plugs or ear muffs to workers operating in the excessive noise areas.

Management Measures

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

- Major construction activities which generate loud noise should be limited to only during the day time. Activities that are necessary to be carried out at night time will need approval of the site engineers, and will need to have adequate noise control equipment or measures.
- Speeds of vehicles in the construction site will not be more than 40 km/h.
- Noise performance requirements of construction equipment will need to be clearly stated in contract specifications.
- Temporary metal sheet fence to block the noise or shielding should be installed for non-mobile equipment.
- The EPC contractor will be required to regularly monitor ambient noise levels at the receptors, particularly during the noise generation period such as piling.
- The construction environmental management plan will need to include an efficient complaints redress procedure and an efficient corrective action procedure to address the noncompliance of noise performance.

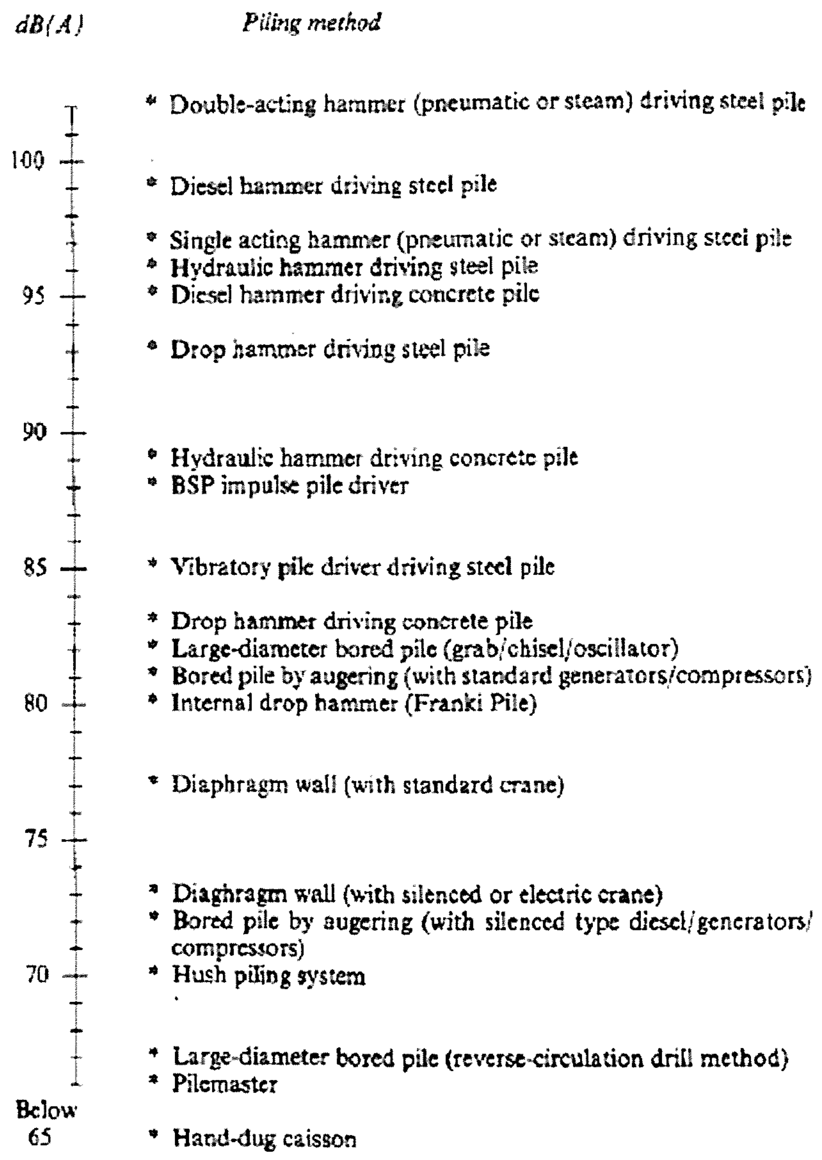


FIGURE 6.4-1: NOISE LEVELS OF VARIOUS PILING METHODS

TABLE 6.4-3

CALCULATIONS OF AMBIENT NOISE LEVELS AT THE RECEPTOR

Receptor, r2	2,230	m	
Noise source,r1	15	m	
Log (r2/r1)	2.17		
Noise level at r2, Lp1	Source-20x(Log(r2/r1)		
Ambient noise level,Lp2	60.7 dB(A) Leq-24 hr.		
-Low	47.6 dB(A) Leq-1 hr.		
-High	72.7 dB(A) Leq-1 hr.		
Net noise level	10xLog(10^(Lp2/10)+10^(LP1/10))		
Noise level of sources			
percussive piling	101	105.77	Assume 3 simultaneous operations
heavy equipment	88	92.77	
bored piling	75	79.77	

Unit: dB(A)

PARTICULARS	NO CONTROL			CONTROL LEVEL			STANDARD
Impact-Leq-24 hr.							
LP0-ambient	60.7	60.7	60.7	60.7	60.7	60.7	
LP1-Source	79.8	92.8	105.8	80.0	85.0	90.0	
LP2-Effect of Source	36.3	49.3	62.3	36.6	41.6	46.6	
LOG(LP0)	1.8	1.8	1.8	1.8	1.8	1.8	
LOG(LP2)	1.6	1.7	1.8	1.6	1.6	1.7	
Combined Noise Level	60.7	61.0	64.6	60.7	60.8	60.9	70.0 [a/,b/]
Impact-Leq-1 hr							
High Combined Noise Level	72.7	72.7	73.1	72.7	72.7	72.7	
Increase	0.0	0.0	0.4	0.0	0.0	0.0	3.0 [c/]
Low Combined Noise Level	47.9	51.6	62.5	47.9	48.6	50.1	
Increase	0.3	4.0	14.9	0.3	1.0	2.5	3.0 [c/]

Remark: [a/] Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, U.S. EPA (U.S. Environmental Protection Agency), 1974.

[b/] Notification of Guidelines for Community Noise, World Health Organization (WHO), 1999.

[c/] Environmental, Health, and Safety Guidelines: General EHS GUIDELINES: ENVIRONMENTAL NOISE MANAGEMENT of International Finance Corporation, 2007

H. Evaluation of the Significance of Noise Impact

The impact of construction noise on the nearby communities is evaluated as follows:

Impact category	Direct impact
Impact duration	Throughout the construction period of about 68 months More significant during the piling period if percussive piling is used.
Impact extent	Highest in the construction site, and could slightly impact the receptor in Nga Pitat Village, if no control
If no control - **Impact magnitude**	 Small, only exceeding Leq-1 hr standards
- **Severity**	Small
Control priority	Medium, to protect the workers

The construction noise issue deserves medium control priority.

6.4.3.4 Wastewaters

A. Sources

During the construction phase, the following wastewaters will be generated and need to be controlled:

- Domestic sewage generated by daily living activities of about 600 construction personnel at peak of the construction
- Wash waters in the construction site, mainly from truck wheel washing and concrete wash waters
- Contaminated surface runoff

These wastewaters will need proper management to minimize their environmental impacts when they are discharged from the construction site into the receiving waters.

B. Sensitivity of Receptors

The wastewaters will be treated and most of the treated effluent will be reused in the construction site. The remaining volume will need to be discharged into the sea, about 1 km from the front boundary of the power plant construction site. At the time of preparing this EIA report, sea-bed dredging is being carried out but the dredging boundary has not yet been clear. Hence, the location of effluent discharge will be defined when the dredging is completed.

The baseline survey found negligible levels of marine pollution. The seawater had high levels of dissolved oxygen (> 4 mg/l) and very low concentrations of heavy metals and organic contaminants (see ***Section 5.2.12***). Wastewater to be discharged from the power plant construction site may have some small local impacts on seawater quality and the marine ecosystem.

C. Estimates of Wastewater Volume

Domestic Sewage: The domestic wastewater was estimated at about 90 m^3/day based on a per capita volume of about 150 liters/day[2].

Wash Waters-Concrete Wash Waters: Concrete wash waters are generated in washing concrete mixers, delivery trucks, and related equipment (chutes, pump lines, drums, barrows, etc.). For a large construction site, typical volume of wash waters produced per week could be about 2,000 liters[3].

Wash Waters-Wheel Wash Water: For truck wheel washing, the volume of wash water to be disposed will depend on the method selected for wheel washing. For this Project, the EPC contractor would use the flooded basin for truck wheel washing. This method is simple and would be practical for this Project. The Consultant made a rough

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[2] Metcalf & Eddy, Inc. (1991) Wastewater engineering: Treatment, Disposal and Reuse, 3d ed., McGraw-Hill, New York.

[3] Environment Agency, U.K., Regulatory Position Statement, Managing concrete wash waters on construction sites: good practice and temporary discharges to ground or to surface waters, *https://www.gov.uk/government/.../RPS_107_Concrete_washwaters.pdf*

estimate of the volume of wheel wash water using the following assumptions: (i) 2 flooded basins; (ii) each flooded basin is 4 m wide, 10 m long and 0.5 m water depth; and (iii) the wash water will be daily replaced. Therefore, the daily volume of wheel wash water will be 40 m^3.

Surface Runoff: The volume of surface runoff will depend on the total daily amount of rainfall. For a daily maximum rainfall of 208 mm over the 15.05 ha (37.19 acres) construction site, the maximum volume of surface runoff from the construction site would be 28,174 m^3/day assuming saturated soil with a run-off coefficient of 0.9. The runoff during the initial period of rainfall could be contaminated. This volume of contaminated runoff will be much smaller than 28,174 m^3.

D. Wastewater Control Target

The wastewater control targets are to ensure that: (i) the quality of the treated effluent will comply with the applicable effluent quality standards; and (ii) there will be no public complaints related to effluent discharge.

E. Anticipated Impacts on Receptors

Considering the large assimilative capacity of the coastal waters, it is highly unlikely that the wastewater generated in the construction phase will cause perceptible change in the seawater quality and significant impacts on marine ecosystem. Nevertheless, the wastewater will be properly treated to meet the applicable effluent standards before discharging into the sea.

The domestic sewage if not treated will have a BOD load of about 30 kg/day based on a per capita BOD load of about 50 g/day. The domestic sewage will be treated to reduce the BOD to not exceeding 50 mg/l. The total BOD load discharged into the sea will be only about 1.5 kg/day.

The concrete wash water will have a high pH and contain high suspended solids. However, considering its small volume of about 2 m^3 per week or about 0.33 m^3/day, it will not have significant impacts on the seawater. However, it will be treated to remove suspended solids and adjust the pH as necessary.

Surface runoff will contain high suspended solids as it flows past the uncovered land surface. It may be contaminated by oil spills on some areas. It would be more practical to prevent contamination than to treat contaminated runoff. The surface runoff would not cause significant impact on sea water quality and the marine ecosystem.

F. Impact Mitigation Measures

The EPC Contractor will be required to prepare detailed design of a wastewater management system for the power plant construction site. The wastewater management system will consist of a collection system and a simple treatment system. The proposed design concept presented below is based on the principle of wastewater segregation, treatment and reuse as briefly described below:

Surface Runoff

- To prevent contamination of the surface runoff, potential contamination sources will be covered with roof. The surface runoff would contain only suspended solids washed out from the open area.
- Construct a temporary drainage system to collect the surfaced runoff from the construction area to avoid the discharge of surface runoff directly into the open sea.
- The collected storm water will be drained into a retention pond for removal of suspended solids before discharging into the sea or a nearby drainage channel, if exist. After the construction, the retention pond will be retained and used for wastewater management during the operational phase.

Domestic Wastewater

- Toilet wastes will be separated from grey water or sullage.
- Kitchen and canteen wastewater will be discharged into oil and grease trap tank before draining into the retention pond.
- Toilet wastes will be discharged into a septic tank (or more than one septic tank) with a hydraulic retention time of about 5 days. The volume of toilet wastes is estimated at about 20% of the total volume of domestic wastewater, or about 7.6 m^3/d. The septic tank effluent (seepage) will be discharged into the retention pond. Alternatively, toilet wastes and grey water could be treated in a package sewage treatment plant.
- Grey water will be discharged into the retention pond.

Wash Waters

- The concrete wash water and the wheel wash water will be discharged into a concrete settling basin. The effluent will be treated to adjust the pH, if necessary, and reused. The remaining effluent will be discharged into the retention pond.
- Water in the retention pond will be used for dust suppression on unpaved areas in the construction site, watering of the green area, concrete washing, and wheel washing.

G. Evaluation of the Significance of Impact

The impact of the treated effluent discharge on the sea water quality and marine ecosystem is evaluated as shown below. The wastewater management issue deserves medium priority during the construction period.

Impact category	Direct impact
Impact duration	Throughout the construction period. More significant during the concreting work period of about 6 months
Impact extent	Mainly on the sea around the effluent discharge point.
Impact magnitude	Small
Impact severity	Insignificant
Control priority	Medium

6.4.3.5 Construction Wastes

A. Sources

During the construction of Project facilities, the following waste materials will be generated:

- Spoils and excavated materials from earth works (rocks, soil)
- Construction material debris (concrete, wood, scrap metal)
- Hazardous waste (empty fuel drums, used oil filters, batteries, spent solvents, and oils)
- Domestic solid wastes from site workers (food waste, waste paper, and packaging)

For the purpose of waste management, wastes generated in the construction can be divided into three categories:

(1) ***Construction, demolition, and land-clearing (CDL) waste***: Includes all non-hazardous solid wastes resulting from excavation, concrete works, steel works, piping works, installation of equipment, and construction of buildings. CDL wastes for this Project will consist of excavated materials particularly top soil, construction debris, remnants of steel bars and beams, packaging materials, broken roofing materials and tiles, and remnants of pipes, glasses, and other inert building materials.

(2) ***Non-construction waste***: Includes wastes generated in worker camps, canteens and offices such as paper, food and beverage containers, food wastes, and other domestic items.

(3) ***Hazardous waste***: Includes such wastes as spent lubricating oil, paints, and chemicals used in the construction. Most of the hazardous wastes are in liquid form.

These waste materials will need to be adequately managed to minimize their environmental impacts.

B. Sensitivity of Receptors

The receptors in this case will be soil and ground water at the disposal sites.

C. Estimates of Waste Quantities

Construction Wastes

The amount of construction wastes can be estimated using the quantity of waste per unit area quoted in various documents as shown in ***Table 6.4-4*** below. The best rates of the three references are similar, i.e. about 1.9-1.963 tons/100 m^2. For conservative estimates, 2 tons per 100 m^2 was used in the estimation of construction waste quantity.

The Project will use 37.19 acres of land for the power plant block and associated facilities. Assuming that this area will be concrete floor, the total amount of construction wastes to be generated in the construction was estimated at 3,010 tons. For the construction period of about 68 months, the average daily amount of waste would be about 1.672 tons/day based on 25 construction days per month.

TABLE 6.4-4

AMOUNT OF CONSTRUCTION WASTES FOR NON-RESIDENTIAL BUILDINGS

Reference	Amount of Construction Wastes
Zender Environmental, www.zender-engr.net, 2016	3.89 lb/ft^2 (1.90 tons/100 m^2)
www.steelconstruction.info/Construction_and_demolition_waste	Ranging from 11.1 to 1.9 tons/100 m^2 gross internal areas depending on the level of management performance.
thegreenestbuilding.org	4.02 lb/ft^2 (1.963 tons/100 m^2)

Non-construction Wastes

Non-construction wastes will be generated in daily living of construction workers and project personnel. At the peak of construction activities, about 600 people will be working on the Project site. Assuming that all construction personnel will live on site, each will generate about 0.16 kg/day[4].

The total amount of non-construction wastes was estimated at about 96 kg/day at peak, which is much lower than the construction wastes.

Hazardous Wastes

A waste may be considered hazardous if it exhibits one or more of the following characteristics:

- Ignitability - a liquid with a flash point below 140 °F (solvents, mineral spirits, etc.)
- Corrosivity - a water-based liquid with a pH of less than or equal to 2.0 or a pH of greater than or equal to 12.5 (battery acid, alkaline cleaning solvents, etc.)
- Reactivity - an unstable substance that readily undergoes violent chemical reactions with water or other substances (hydrogen sulfide, bleach, etc.)
- Toxicity - a harmful substance due to the presence of metals or organic compounds (lead paint, adhesives, etc.)

Examples of hazardous wastes generated in construction include:

- Used oil, hydraulic fluid, or diesel fuel.
- Soil contaminated with toxic or hazardous pollutants.
- Waste paints, varnish solvents, sealers, thinners, resins, roofing cement, adhesives, machinery lubricants, and caulk.
- Cleanup materials (such as rags) contaminated with the items listed above.
- Drums and containers that once contained the items listed above.

[4] Agamuthu Pariatomby and Masaru Tunica, Municipal Solid Waste Management in Asia and the Pacific Islands: Challenges and Strategic Solutions, 2014.

- Mercury containing wastes such as fluorescent bulbs, broken mercury switches, batteries, or thermostats
- Other items that may have inseparable hazardous constituents.

The amount of hazardous wastes could be roughly estimated at 1% to 2% of the total amount of wastes. This figure is used for estimating the amount of hazardous wastes in the residential construction. However, it may be used to give a rough idea on the magnitude of the hazardous waste issue.

At 1% of the total amount of wastes, the total amount of hazardous waste was estimated at about 22 kg/day.

D. Mitigation Measures for Waste Reduction at Sources

Reduction of construction wastes at sources could be achieved through good design and best practices in construction management.

Design and Planning

There are five key principles that design teams can use during the design process to reduce waste. They are summarized below together with questions the design team should address to design out waste.

1) Design for reuse and recovery

Design for reuse of material components and/or entire buildings have considerable potential to reduce the environmental burdens from construction. Much of this is common sense as, with reuse, the effective life of the materials is extended and thus annualized burdens are spread over a greater number of years. Reuse, in the waste hierarchy is generally preferable to recycling, where additional processes are involved, some of which will have their own environmental burdens.

2) Design for off-site construction

The benefits of off-site factory production in the construction industry are well documented and include the potential to considerably reduce waste especially when factory manufactured elements and components are used extensively. Its application also has the potential to significantly change operations on site, reducing the amount of trades and site activities and changing the construction process into one of a rapid assembly of parts that can yield many benefits including:

Off-site construction is one of a group of approaches to more efficient construction sometimes called Modern Methods of Construction (MMC) that also include prefabrication and improved supply chain management. Technologies used for off-site manufacture and prefabrication include light gauge steel framing systems and modular and volumetric forms of construction which offer great potential for improvements to the efficiency and effectiveness of construction. To assess the suitability of off-site construction, design teams should consider the following questions:

- Can the design or any part of the design be manufactured off site?
- Can site activities become a process of assembly rather than construction?

3) Design for materials optimization

Good practice in this context means adopting a design approach that focuses on materials resource efficiency so that less material is used in the design, i.e. lean design, and/or less waste is produced in the construction process, without compromising the design concept.

Three main areas offer significant potential for waste reduction. They are:

- Minimization of excavation
- Simplification and standardization of materials and component choices
- Dimensional coordination

4) Design for waste efficient procurement

Designers have considerable influence on the construction process itself, both through specification as well as setting contractual targets, prior to the formal appointment of a contractor/constructor. Designers need to consider how work sequences affect the generation of construction waste and work with the contractor and other specialist subcontractors to understand and minimize these. Once work sequences that cause site waste are identified and understood, they can often be 'designed out'.

5) Design for deconstruction and flexibility

Designers need to consider how materials can be recovered effectively during the life of the building when maintenance and refurbishment is undertaken or when the building comes to the end of its life.

Best Practices in Construction Management

The construction will adopt the following practices to minimize waste quantities at sources: waste segregation, waste collection and storage, waste reuse and recycling, waste disposal, and on-site record keeping.

Waste Segregation

- The Contractor will design and implement a waste segregation system and procedure and communicate it to all construction personnel to strictly adhere to the segregation procedure;
- An appropriate number of containers with adequate volume and appropriate materials will be provided at strategic locations to support the segregation. Each waste category will be segregated into recycling, reuse and disposal sub-categories.

Waste Collection and Storage

- Daily collection and transport will be organized and carried out for each sub-category of segregated wastes;
- A roofed storage area with adequate space will be provided for storing the segregated wastes waiting for the on-site or off-site reuse or recycling;
- The storage area for hazardous waste will need to be specially designed to prevent spills or leaks onto the soil.

Waste Reuse and Recycling

- Reuse of excavated material as fill at approved fill sites;
- Topsoil free of weeds to be stockpiled and stored for re-use, if possible;
- Collection and return of packaging materials (e.g. pallets) to suppliers wherever practicable;
- Use of recycled materials to the limits of design in concrete, road base, asphalt and other construction materials;
- Remove any contamination inadvertently deposited in recyclable waste material containers. Provide cleanup of excessive contamination at recycling vendor locations when such contamination is not controlled at the project site;
- If applicable, collection and recycling of used oils by a licensed contractor;
- If applicable, collection by a licensed contractor of empty oil and fuel drums and other containers for return to recycling facilities.

E. Waste Control Targets

There are no quantitative standards for construction waste management on site. However, the control targets should be on soil and groundwater quality standards if the construction wastes are to be disposed in the Project area.

The performance of construction waste management will be evaluated by the following qualitative indicators:

- No wastes are haphazardly dumped inside or outside the construction site
- In case of any public complaints related to the management of construction wastes, the Project will response effectively.

F. Predicted Impacts on Receptors

It is not possible to predict the impacts of construction wastes on soil and ground water at the disposal sites. Considering the small quantities of wastes that could cause pollution, insignificant impacts are most likely.

G. Impact Mitigation Measures

The remaining wastes that cannot be reused or recycled will have to be properly disposed off properly to minimize environmental impacts. The following approach should be considered:

General Requirements

- An efficient construction waste management system should be established and implemented. Construction waste will need to be classified and sorted out at source for disposal. The disposal methods will depend on the types of wastes: direct reuse in the construction, sale and recycling of materials, land filling for inert materials and specific treatment method for each type of hazardous materials.

- Haphazard disposal of construction waste in or off the construction site will be prohibited.
- No burning of wastes will be allowed.

Construction and Land Clearing Wastes

- Construction wastes should be handled by the existing municipal solid waste collection and disposal services. If such service is not possible, the construction wastes would need to be disposed off in the Project site. They may be buried in areas designated for green areas.

Non-construction Wastes

- Provide adequate number of refuse bins or containers with tight covers, daily collection of disposal.

Hazardous Wastes Management

- Hazardous wastes will be handled by a licensed hazardous waste contractor. If this service is not available, the Contractor will need to find appropriate arrangements for incineration, safe permanent storage, or other appropriate methods of disposal.
- A Hazardous Waste Management System covering waste classification, separation, collection, storage, transfer and disposal should be set up and operated. The waste management system will comply with applicable regulation of the government, if any.

H. Evaluation of the Significance of Impacts

The impacts of construction wastes on the natural environment are assessed in the table below. The issue is considered medium control priority.

Impact category	Direct impact on soil and water environment
Impact duration	Throughout the construction period of about 68 months, excluding 4 months for site preparation.
Impact extent	Local soil and ground water pollution, mainly confined to within the disposal sites.
Impact magnitude	Small magnitude considering the waste quantities
Impact severity	Minor, insignificant impact on the natural environment
Control priority	Medium

6.4.3.6 Road Traffic

A. Sources

During the construction period of 68 months, the construction of power plant and facilities will necessitate the need for transportation of construction wastes out of the construction site and construction materials, and plant equipment. Consequently, traffic loads will be increased on existing roads within the study area, small coastal road and Nga Pitat road, the access road to the power plant construction site. It is expected that most construction personnel will stay in camps within the premise of the construction sites. Therefore, traffic related to personnel transport will not be considered. Traffic related impacts during the construction phase would be congestion of local roads and increased risk of accidents.

B. Sensitivity of Receptors

The impact areas will be small port coastal road, and the junction of Nga Pitat Village to the power plant site;

Small port coastal road-This road within the study area is the road along the coast linking the Project site to Nga Pitat Village and Dawei City. The traffic load on this road is currently in the range of 88 to 89 vehicles per day. The majority of vehicles are motorcycles (see ***Section 5.4.4.4).*** The traffic condition is similarly all days. The carrying capacity of this road is 2,000, while the highest average traffic volume is 7.676 PCU/hr (see ***Table 5.4-16***). Most land areas along this road are populated with houses and some industries.

Nga Pitat road-The access road is rural road in Nga Pitat Village. Existing condition of this road is unpaved laterite road.

C. Estimates of Traffic Loads

A traffic load is expressed as the number of truck trips per hour. It will depend on the total quantity of construction materials and process equipment that will need to be transported into the construction site and the construction wastes to be transported out of the construction site.

At this stage of project development, information on the quantities of construction materials has not yet been prepared. The Consultant therefore has to make a rough estimate of the quantities of cement, sand, and gravel (coarse aggregates) based on the following assumptions:

- Of the total area of 15.05 ha, about 8 ha would be concrete floor to support the power block and non-process areas (based on information on a combined cycle gas power plant of nearly equal capacity)
- Thickness of concrete= 8 inches
- Concrete mix= 1:2:4

The calculation results are given in ***Appendix 6A***. The key findings are:

Total weight of cement	6.794	tonnes
Total weight of sand	14,456	tonnes
Total weight of coarse aggregate	28,911	tonnes
Total weight of materials	50,161	tonnes

If the concrete works will take 3 months, the number of truck trips will be only about 3 trips/hour on average.

Including steel bars for concrete works and power plant building, the number of truck trips would be higher than 3 trips/hour. At this stage of project preparation, the exact number of truck trips is not available. However, the number will definitely be lower than the number of truck trips for land filling.

It is then clear that the traffic loads created by the land filling will be much greater than the traffic loads created by the concreting works which will be carried out after the land filling. Therefore, the traffic impacts will be more intense during the land filling period.

D. Mitigation Measures for Reduction of Traffic Loads

It would not be necessary to reduce the number of truck trips per hour.

E. Traffic Management Targets

The traffic management targets set for the pre-construction phase will be maintained throughout the construction phase. The targets will be:

- There will be no accidents related to construction traffic in the identified impact areas.
- Minimize traffic congestion on Nga Pitat road during the construction period.

F. Predicted Impacts

The traffic load during the construction period will be much less than that during the pre-construction period. Therefore, the impact on local traffic during the construction phase will be much less than the impact during the pre-construction phase. Very good traffic flow could be expected. The calculation results are shown in ***Table 6.4-5***.

TABLE 6.4-5

IMPACTS OF TRANSPORT OF CONSTRUTON MATERIALS ON EXISTING TRAFFIC

PARTICULARS	TC1	TC2
Existing maximum average traffic, PCU/hr	7.676	3.938
Carrying capacity, PCU/hr	2,000	2,000
Existing V/C ratio	0.0038	0.0020
Existing traffic condition	Very good traffic flow	Very good traffic flow
During the site filling period		
Truck trips per day	28	28
Truck trips per hour based on 8 hrs	4	4
Truck traffic in PCU equivalent/hr (PCU for truck-2.5)	10	10
Total traffic during the site filling period, PCU	17.7	14
Carrying capacity, PCU/hr	2,000	2,000
New V/C ratio	0.009	0.007
Expected traffic condition	Very good traffic flow	Very good traffic flow

G. Management Guidelines and Impact Mitigation Measures

Although the traffic load and its impacts during the construction phase will be much less than those during the pre-construction phase, the management guidelines and impact mitigation measures adopted in the pre-construction phase presented in ***Section 6.3.3.5*** should be continued.

H. Evaluation of the Significance of Impacts

The impact on traffic is evaluated as shown below. The traffic management during the construction phase deserves low priority.

Impact category	Direct impact
Impact duration	Throughout the construction period of about 68 months.
Impact extent	Mainly on small port coastal road and along the routes to the power plant site
Impact magnitude	Negligible
Impact severity	Insignificant
Control priority	Low

6.4.3.7 Impact on Archaeological Site

A. Sources

During the excavation works, the Contractor may discover artifacts which potentially could have archaeological and cultural value.

B. Sensitivity of Receptors

The project site is not known to have archaeological sites. The possibility of discovering artifacts of value would be remote.

F. Magnitude of the Impacts

The magnitude of impacts cannot be assessed. The impacts would depend on archaeological value of the found artifacts. Without appropriate measures, the unearthed artifacts could be damaged or could have been disposed off as wastes.

G. Mitigation Measures

The Contractor shall prepare a detailed description of the Chance Find Procedure of the power plant. The Procedure shall clearly prescribed actions to be taken by the Contractor in the case of a chance find. Generally, the actions will include:

- Site supervisor/foreman shall order construction workers to stop immediately the construction activities in the area of the chance find.
- Inform concerned authority (Fine Arts Department), including head of village and township, for proper management if historic or archaeological is found.
- Delineate and mark clearly the discovered site or area and prohibit physical activities in the area without prior approval of the concerned authority.
- Install temporary site protection measures (warning tape and stakes, avoiding signs).
- Strictly enforce any no-go area needed to protect the site.
- Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be present until the responsible local authorities and the responsible Ministry take over.
- If it is necessary to relocate a cemetery and grave yard, cultural ceremony should be arranged prior to the relocation.

H. Evaluation of the Significance of Impact

The significance of the impact of archaeological site was evaluated as shown below.

Impact category	Direct impact, transient
Impact duration	Throughout the construction period of about 68 months
Impact extent	Confined to within the project site
Impact magnitude	Small
Impact severity	Insignificant
Control priority	Medium

6.4.4 Social Issues

Most of the potential social issues listed in ***Table 6.4-1*** are related to the influx of 600 construction workers into the project area, and reduce some area of mangrove forest which is a main source of food and income of the locals. Each issue is discussed as follows:

6.4.4.1 Local Economy

A. Impacts

The Project construction will require about 600 workers at construction peak. These workers will require local services, particularly foods and sundries. Therefore, there will be a cash injection into the local economy, thereby boosting the local economy. Assuming a monthly wage of US$100[5] and 80% of income to be spent locally[6], the Project construction will generate a cash flow of about US$ 48,000 per month. Considering the multiplier effects, this cash injection will have positive impacts on the local economy.

If most of the construction workers are locals, the Project construction will generate direct employment opportunities in addition to the indirect employment opportunities related to the provision of services. The employment creation will create social benefit in addition to the economic benefit described above.

However, the likely positive social and economic impacts of the Project construction will be realized only over the construction period. Their magnitudes would be much less than the similar impacts that would be created by the Initial Phase Development of DSEZ in the near future.

B. Enhancement Measures

The following measures should be implemented to ensure benefits of the Project on the local economy and employment.

- The Project Proponent and the Contractor will contact the Labour Directorate and prepare training program for employees with reference to the laws and regulation of Labour Directorate before commencement of the Project construction.

[5] Calculation is based on findings from household survey in the study area, October 2015.
[6] Estimation is based on household survey in the study area in October 2015. Finding shows that income of the locals was mostly spent with no saving.

For the development of the employee's skill, the training program for staffs will be arranged following the requirement under **Employment and Skill Development Law (2013), Section 14,** is described in ***Appendix 6B***.

- Priority should be given to hiring local people, especially residents of the villages close to the construction site; e.g. Nga Pitat, Nyaung Bin Seik and Mudu (including Ka Myaing swea).
- The recruitment process should be fair and transparent and wage rates will need to be commensurate with experiences and qualifications.
- Employment terms and conditions will need to comply with the requirements in the national labor law, the social security law and standard wage rate, and other applicable laws and regulations.
- Skill training should be provided to local people to be employed in the project construction.

C. Evaluation of the Significance of Impacts

The impact on local economy during construction phase will be positive. Its significance is considered moderate, once the suggested measures are implemented. Enhancement measures should be considered high priority.

Impact category	Direct impact
Impact duration	Throughout the construction period of about 68 months More significant during the peak period when 600 workers are employed.
Impact extent	Mainly on communities close to the construction site; e.g. Nga Pitat, Nyaung Bin Seik and Mudu (including Ka Myaing swea), with extension to Maungmagan and Dawei
Impact magnitude	Positive impacts on both social and economic aspects in terms of boosting the local economy and improving livelihoods These will create good relationship between the locals and Project.
Impact severity	Significant
Control priority	High

6.4.4.2 Livelihood

A. Impacts

- Construction of the intake and outfall pipes of the water cooling system could cause inconveniences to local people in:
  - Daily commuting to the dockyard at the bank of Britney creek
  - Taking the fishing boats in and out of the dockyard
  - Coastal fishery, especially small-scale fishery

Although these impacts will be temporarily experienced within the period of pipe laying of about 7 months, the period will be long enough to cause significant impacts on the local fishermen and villagers.

B. Mitigation Measures

B.1 Reducing Impacts of Inconveniences in Fishing Activities

- Consult with Nga Pitat villagers about the mitigation procedure during construction.
- Clearly demarcate the alignments of the intake and outfall pipes and construction schedule. Provide the information to the affected public in due course before the construction.
- Use the construction methods that could minimize the inconveniences to the affected peoples.

B.2 Minimizing Impacts on Mangrove Resources

The Project Proponent will design and implement a mangrove resource management program (MGRMP) to ensure sustainable use of mangrove resources and minimizing coastal erosion. Details are:

1) Technology of Mangrove Resource Management

Integrated technology will be used for The MGRMP, comprising:

- **Participatory approach**: by involvement of expertise from Fisheries and Forestry Department including the local people in planning and implementing various activities;
- **Being ownership**: local participation will be on voluntary basis in order to encourage the locals to have program's ownership;
- **Indigenous knowledge**: of the local resources; and
- **Know-how**: fisheries and mangroves forestry by expert of Fisheries and Forestry Department.

2) Establishment of the Core Mangrove Management Group

The Project should support key persons who are interested in mangrove management to form the core group, comprising seven members of:

- Four villagers from Nga Pitat, composing of one village headman and the other three persons who are knowledgeable about mangrove area and resources;
- One official from Department of Fisheries of Launglon Township;
- One officials from Forest Department of Launglon Township; and
- One representative of the Project proponent.

3) Roles and Responsibilities of the Core Mangrove Management Group:

Particular roles and responsibilities of each party in the core team are:

- Officials of Department of Fisheries and Forestry will play supervision role on technical aspect to villagers in various activities mentioned above.
- Villagers in the core team will cooperate with officials and mobilize the other villagers to participate in implementation various activities.
- The Project proponent will facilitate implementation and financial support to the activities according to the budget indicated in ***Appendix 8A***.

Overall roles and responsibilities: The Core group will formulate action plan which comprises following activities:

- Define mangrove management area
- Mangrove Zoning
- Reforestation
- Local Mobilization
- Formulate regulations for sustainable utilization

4) Activities

Details of each activity are elaboration as follows:

Define Mangrove Management Area

The core group will cooperate to define the boundaries of the mangrove forest to be managed. At this stage, the proposed area is about 30 hectare size. It is about two times of the power plant site, located in Chi Oo Creek area, about 1.7 km. distant from Nga Pitat as shown in ***Figure 6.4-2***.

Mangrove Zoning

Officials from Department of Fisheries and Forestry together with knowledgeable villagers will survey the mangrove forest together. They will cooperate to define preservation and utilization zones. The former will be preserved with the aim of mangrove propagation of fauna and flora resources while the latter can be used under local regulations.

Reforestation

Based on the survey, Officials from Department of Fisheries and Forestry will identify damage areas including suitable area for reforestation. In practice, the reforestation areas should be the preservation areas and degraded areas where forest rehabilitation is required.

They should also define valuable local mangroves which could be used for the purpose of seed and stock selection for the use of reforestation.

FIGURE 6.4-2: THE PROPOSED AREA FOR MANGROVE REHABILITATION

Local Mobilization

After that, villagers in the core team will invite more villagers to collect those identified seeds and stocks. Officials from Department of Fisheries and Forestry will advise villagers to propagate collected seeds and stocks in the simple nursery to be constructed by local materials.

Announcement will be made in Nga Pitat village for more participation to plant mangroves at suitable time.

Formulate Regulations for Sustainable Utilization

The core group will discuss to issue local regulations for mangrove management. For example, types, size and volume of woods that the villagers can harvest, and type, size and quantities of aquatic flora and fauna that villagers can collect, etc.

Regulations will be announced for feedback and adjustment, aiming at effective management especially for local utilization.

The more participation of the locals, the more sustainable utilization and management would be.

5) Participatory Assessment Process

Based on the survey and before the project start, the Core Mangrove Management Group led by officials from Department of Fisheries and Forestry will identify mangrove situation especially the damage area to the communities. They will also assist the core group to set up the simple assessment process which the communities can participate and practice.

The mangrove situation and assessment process will be raised up for comments from the concerned government agencies, especially Department of Fisheries and Forestry including Launglon Township for agreement. Once it settles, the mangrove situation and assessment process will be disseminate and discuss with the communities for comments. Their comments be adjusted to the process.

C. Evaluation of the Significance of Impacts

The impact on livelihood is evaluated as shown below. The significance of the negative impacts is considered moderate. However, high control priority is required considering social aspects of the impacts.

Impact category	Direct impact
Impact duration	Throughout the period of laying out the intake and outfall pipes for 7 months
Impact extent	Mainly on the coastal villagers and small-scale fishermen, especially villagers in Nga Pitat, Maungmagan and Dawei
Impact magnitude	Significant at the local level over 7 months
Impact severity	Moderately significant to the affected people
Control priority	High

6.4.4.3 Infrastructure and Services

A. Impacts

The Project construction could compete with the local communities in using limited local infrastructure and services. This competing use could put an extra demand pressure on the already inadequate infrastructure and services. Two potential areas of concern will be roads and medical services. However, as the impacts of construction traffic on local traffic will be insignificant as discussed in ***Section 6.4.3.6***, the only area of concern will be medical services.

The Project personnel would need to use medical services provided by Yebyu hospital and Maungmagan station hospital for non-serious cases, and Dawei hospital for serious cases. However, these hospitals give priority to local residents and they have limited resources (see ***Section 5.4.4.2***). Therefore, the Project should try to minimize exerting demand on these hospitals.

B. Mitigation Measures

- The EPC Contractor should provide first-aid service and medical treatment for common illnesses.
- Arrangements should be made with a hospital in Dawei for admitting the project personnel with serious medical cases.

C. Evaluation of the Significance of Impacts

The Project impact on infrastructure and services to the locals is evaluated as shown below. Its impact on road traffic to the local will be insignificant while the impact on local medical services would be low if the recommended mitigation measures are implemented.

Impact category	Direct impact
Impact duration	Throughout the construction period of about 68 months More significant during the peak period when 600 workers are employed
Impact extent	Mainly on communities nearby the Project site, especially Nga Pitat with extension to Maungmagan and Dawei
Impact magnitude	Small
Impact severity	Low if mitigation measures are implemented.
Control priority	Medium

6.4.5 Culture and Tradition

A. Impacts

Construction personnel who come from other areas could have conflicts with local people due to differences in cultural and traditional practices and value.

B. Mitigation Measures

- Give priority to hiring local people.
- All project personnel should be made aware of local cultures, traditions and norms.
- A code of conduct should be put in place for workers to strictly observe when interacting with the locals, including restriction to movement outside of the campsite after designated time.
- The Project Proponent should establish good relationship with the locals and actively support and participate in traditional and cultural events.

C. Evaluation of the Significance of Impacts

The Project impact on culture and tradition would not be significant if the majority of construction personnel are local villagers.

Impact category	Direct impact
Impact duration	Throughout the construction period of about 68 months
Impact extent	The construction sites and nearby communities, e.g. Nga Pitat, Nyaung Bin Seik and Mudu (including Ka Myaing swea), with extension to Maungmagan
Impact magnitude	Small
Impact severity	Insignificant
Control priority	Low

6.4.6 Community Health, Safety and Security

The influx of construction workers may have some impacts on community health, safety and security. The construction workers could pose health risks to the communities such as sexually transmitted diseases, tuberculosis and hepatitis, and could also pose security risks to the communities in terms of crimes and drug abuses.

A. Impacts

The construction may have some impacts on community health, safety and security. The health and safety issues related to fugitive dust, gaseous emission, noise, and traffic during the construction phase are discussed in ***Sections 6.4.3.1, 6.4.3.2, 6.4.3.3*** and ***6.4.3.6***. This section will cover the remaining issues of health risk and security.

Health Risk: Without proper management, the influx of construction workers could pose health risks to the communities. Communicable diseases such as sexually transmitted diseases, tuberculosis and hepatitis are areas of concern. The EPC contractor will need to design and implement an effective program for control of communicable diseases among the workers.

Security Risk: The influx of workers could also pose security risks to the communities in terms of crimes and drug abuses.

However, as the workers will be mostly hired from the locals, the health and security risks would be small. Nevertheless, mitigation measures will need to be implemented to minimize the risks.

B. Mitigation Measures

Health Risks

- All recruited workers should receive health examinations for screening of major communicable diseases before employment. Subsequently, annual check-ups should be provided.
- Symptoms of major communicable diseases, if noted, should be immediately reported to the district medical officer for proper treatment.
- Provide health awareness training to workers on hygiene and sanitation, communicable and infectious diseases.

Security Risks

- All workers should be cleared with the local security authorities regarding criminal records before employment.
- The EPC contractor will be required to establish and implement a site security system and appropriate measures, including prevention of drug abuse.

C. Evaluation of the Significance of Impacts

The impact on community health risk and security is evaluated as shown below. As most of the workers would be local people, the health and security risks would be small.

Impact category	Direct impact
Impact duration	Throughout the construction period of about 68 months
Impact extent	Mainly on communities nearby the Project site, e.g. Nga Pitat, Nyaung Bin Seik and Mudu (including Ka Myaing swea), with extension to Maungmagan
Impact magnitude	Small
Impact severity	Moderately significant depending on the proportion of workers who are local people
Control priority	Medium

6.4.7 Stakeholders' Negative Attitudes toward the Project

The stakeholders, especially local communities, may have negative attitudes toward the Project.

A. Impacts

It is essential for the Project to ensure that its stakeholders have positive attitudes toward the Project. Their negative attitudes could lead to conflicts which could delay the project implementation and could lead to opposition to the Project.

B. Mitigations and Management Measures

To establish a good mutual understanding between the Project and stakeholders, particularly the local communities, the following measures are recommended:

1) Establishment of a Community Participatory Committee

Establishment

The Project Proponent should organize to establish the Community Participatory Committee (CPC), with completion before commencing the construction. Their functions are described as follows:

Structure

The committee of CPC will comprise 15 members. They are:

- Five representatives of government sectors, one from each agency, comprising MONREC/ ECD, Department of Electric Power (DOEP) of Tanintharyi Region, Dawei District, Yebyu Township and Launglon Township;
- Eight representatives of four communities of Nga Pitat, Nyaun Bin Seik, Mudu and Ka Myaing swea, 2 from each community; and
- Two representatives of the Project Proponent. They have authority to make a decision on behalf of the Project Proponent and power plant.

***Roles and Responsibilities*:**

Roles and responsibilities of the CPC are majority on cooperation with the Project Proponent in following activities:

- Public relations for the Project;
- Building understandings and good relationship between the Project and the surrounding communities;
- Participation in monitoring of the Project impacts and mitigation measures;
- Receiving and addressing complaints arisen from the project impacts;
- Resolving conflicts between the Project and the locals; and

- Coordinate among government sectors, the Project, communities and other stakeholders.

***Linkage between CPC, Government Sectors and Communities*:**

- Representatives of government sectors will inform about the progress/activities related to the project environmental management plan and people's complaints including problem solving to their agencies at the regional, district and township levels. In case of any feedbacks/comments from their agencies, they will bring the messages and inform the CPC.

- Representatives of four nearby communities will inform the people in their communities about the progress/activities related to the project environmental management plan. They will convey the complaints related to the Project impacts from villagers to CPC for joint consideration on problems' solving. They will also bring the results to inform the complainants and their communities.

2) Establishment of Channel for Public Relation and Information Disclosure

Public Relations and Information Disclosure will be developed and undertaken through several channels such as:

- Local media;
- Notice board at visible locations;
- Placement of leaflet at various places;
- Meeting;
- Participate local activities such as traditional festival;
- Visit the communities; and
- Open house of the Project

3) Involvement in Grievance Redress

A grievance redress process is illustrated in a diagram in ***Figure 6.8-1, Chapter 6 of EMP***. The CPC will assist the Project Proponent to manage the grievance redress process or to make appropriate response to complaints related to the Project impacts.

4) Establishment Good Relationship with Communities

The Project will establish good relationship with communities by supporting communities' activities through its annual CSR program. The following community development should be considered:

Education

The Project should provide scholarships to pupils and books and stationeries to local schools, particular those located within 5 km radius from the Project site, namely Nga Pitat, Nyaung Bin Seik, and Mudu including Ka Myaing swea villages.

Health Care and Sanitation

The Project should promote and support communities on environmental management, health care, sanitation system and provide periodical medical services in the villages.

Religions and Culture

The Project should cooperate with local authorities, community leaders, and villagers in the area in holding religious, traditional and cultural festivals as may be requested by the locals.

5) Support Socio-Economic Development

Supports should be in the form of:

Employment Opportunity

The Project should hire suitably qualified locals as many as possible during the construction phase. This aims to reduce the social conflicts and boost he local economy.

Occupation Promotion

The Project should support occupational trainings which are suitable to local circumstances. Examples are:

- Training on crop and livestock production should be organized for villagers in Mudu and Ka Myaing swea including Nyaung Bin Seik.
- Training on handicraft promotion focusing on product design and quality improvement of bamboo and rattan weaving products as they already exist in Mudu village.
- Training on fishery product development to increase value added of existing fishery products. Targets would be the fishing villages of Nga Pitat and Nyaung Bin Seik. The training should be on processing and preservation of fishery products.

Gender Development

The Project should support training to develop particular skills of women and girls in the area. Emphasis should be on food processing, food preservation and food preparation from local products of natural resources, agriculture and fishery. Food hygiene and sanitation should be included in the training. These trainings will not only assist them to improve nutritional value of local foods but also create income through increased sale of processed and preserved foods.

6) Regular Meeting with Communities

Regular visits to the communities will provide the Project Proponent opportunities to foresee problems that would arise from the Project implementation, and build up mutual understandings in the area.

7) Reporting on Results the Project Implementation, Mitigation Measures and Monitoring

The Project will report these results to concerned authorities and communities.

C. Evaluation of the Significance of Impacts

The impact of negative attitudes of the stakeholders toward the Project is evaluated as shown below. The control priority needs to be high in order to minimize impact magnitude and severity.

Impact category	Direct impact
Impact duration	Throughout the entire period of project implementation.
Impact extent	Mainly on communities nearby the Project site, e.g. Nga Pitat, Nyaung Bin Seik and Mudu (including Ka Myaing swea)
If control **- Impact magnitude** **- Impact severity**	Positive significant magnitude Positive significant impact on implementation of the Project
Control priority	High

6.5 OPERATIONAL PHASE

6.5.1 Nature of Project Operation

The operation of a natural gas-fired combined cycle power plant is cleaner and simpler than a coal-fired power plant. For this Project, the following features of power plant operation which have environmental implications are noted:

- Natural gas fuel will be supplied by pipeline.
- No gas storage tanks will be provided.
- No provision for diesel firing of the gas turbines. They will be operating on natural gas only.
- Gas turbines with low NO_x burners will be used.
- Once-through seawater cooling system will be used.

These design features will eliminate most environmental impacts associated with coal-fired power plant and other conventional natural gas-fired combined cycle power plant.

It should be noted that the natural gas fuel has virtually no sulfide content (see ***Table 4.1-2*** in ***Chapter 4***), therefore, sulfur dioxide will not be an issue.

6.5.2 Relevant Environmental and Social Issues

Based on information on the Project operation and Project area, and on established knowledge of environmental aspects of typical gas-fired combined cycle power plants, during the operational phase of this Project, the power plant management will have to manage the following issues:

1. Emissions of air pollutants generated by combustion of natural gas, including NO_X.
2. Excessive noise of turbine generators and water pump of cooling water system.
3. Wastewaters from power plant personnel, plant washing, boiler blow down, and back wash water or reject from the demineralization unit.
4. Occupational health and safety of power plant personnel, particularly excessive noise and heat in the working areas inside and outside the power plant.
5. Public safety of communities near the power plant.
6. Impacts on livelihood of communities living near the power plant.

These environmental and social issues have to be adequately managed to minimize their impacts and fulfill legal and social obligations. In addition the CSR and mangrove management program which has started to launch at the construction phase have to be continued in this phase, and throughout the entire period of project implementation.

Visual pollution caused by the power plant will not be an issue as the Project area is flat and has no places of natural beauties. The appearance of the Project's tall structures, particularly the power plant stack would not create an unsightly view of the Project area.

The Project area has no known sites of cultural or archaeological importance. The operation of power plant will also use only about 50 workers. Therefore, the Project operations will have no direct impacts on the local cultural and archaeological heritages

The Consultant identified in ***Table 6.5-1*** environmental and social issues related to operational works that will need to be managed during the operation phase.

TABLE 6.5-1

IDENTIFIED ENVIRONMENTAL AND SOCIAL ISSUES TO BE MANAGED DURING OPERATION PHASE

Key Potential Issues	Activities / Sources
Environmental Issues	
Gaseous emissions	Combustion of natural gas, including NO_x
Noise	Turbine generators and water pump of cooling water system
Wastewaters	- Power plant personnel, - Plant washing, - Boiler blow down, and - Back wash water or reject from the demineralization unit
Cooling water intake	Pumping a volume of seawater
Thermal discharge	Discharge cooling water
Social Issues	
Occupational Health and Safety	Excessive noise and heat may impact on power plant personnel, particularly in the working areas inside and outside the power plant.
Community health, safety and security	Communities living near the power plant may be impacted by operation of power plant.
Community development support and corporate social responsibility (CSR)	The stakeholders, especially local communities may not understand the Project implementation.
Mangroves management program	The mangrove resources around are the main sources of income and protein, including functioning on coast protection and mooring areas of coastal villages.

6.5.3 Environmental Issues

6.5.3.1 Gaseous Emissions (NO_x)

A. Sources

During the operational phase of the Project, the power plant will continuously emit air pollutants generated by combustion of natural gas in the gas turbine combustors and gas engines. For typical natural gas-fired combined cycle power plants, the main air pollutant in the flue gas is nitrogen oxides (NO_x). Sulfur dioxide (SO_2) is not significant due to the negligible content of sulfur in the natural gas. CO_2 is not an air pollutant but it receives attention due to its global warming effect.

NO_x formed in the combustion of natural gas will be thermal NO_x, i.e. NO_x naturally formed in high temperature combustion. Nitrogen gas in the natural gas will not contribute to the formation of thermal NO_x. In solid and liquid fuels, such as coal and oil, fuel-bound nitrogen in these fuels are chemically bound nitrogen in various chemical compounds. The fuel-bound nitrogen in these fuels will contribute significantly to the total NO_x emission.

B. Receptors

Gaseous emissions from the power plant will affect a wide area depending on climatological conditions and terrain of the air-shed, and stack height. In this study, the investigation of the impacts of gaseous emissions on ambient air quality covered a 10 km x 10 km square area with the power plant site at its center. Within this study area, about 4 receptors were identified, including the air quality sampling stations A1 at Mudu Village and A2 at Nga Pitat Village (***Table 6.5-2***).

TABLE 6.5-2

RECEPTORS WITHIN 10 KM x 10 KM SQUARE AREA WITH THE POWER PLANT SITE AT ITS CENTER

Receptors	Coordinate (UTM (WGS84))		Distance and Direction from Project site
	E (X)	N (Y)	
Mudu Village /A1	401316.67	1575767.64	4.03 km/ NE
Ka Myaing swea Community	401506.35	1576672.38	4.53 km/ NE
Nga Pitat Village /A2	399328.63	1570194.19	2.23 km/ SSE
Nyaung Bin Seik Village	402308.7	1571810.99	3.67 km/ E

C. Mitigation Measures for NO_x Reduction at Sources

The Project will adopt the low NO_x burner technology to minimize NO_x emission for gas turbines.

Low NO_x burners reduce NO_x by accomplishing the combustion process in stages. Staging partially delays the combustion process, resulting in a cooler flame which suppresses thermal NO_x formation. NO_x emission reductions of 40 to 85 percent have been observed with low NO_x burners.

D. Control Targets

The gaseous emission control will aim at complying with IFC's EHS Guidelines for Thermal Power Plants relevant to: (i) emission standards; and (ii) ambient air quality standards. The reasons for adopting the IFC's guidelines and the emission and ambient air quality standards are discussed in ***Section 3.6*** in ***Chapter 3***. The emission standards are presented again herein for ready reference (***Table 6.5-3***). It should be noted that the applicable emission standards do not include SO_2 and particulates as the natural gas has no sulfide and particulates.

The ambient air pollution control will adopt WHO's ambient air quality standard which are also adopted by IFC and World Bank Group. The standards are shown in ***Table 6.5-4***.

TABLE 6.5-3

EMISSION STANDARDS FOR NATURAL GAS FIRED COMBUSTION TURBINE

Combustion Technology	Parameter	Standard[1/]
Combustion Turbine	Nitrogen Oxides (NO_X)	51 mg/Nm^3 at 15% O_2
Reciprocating Engine	Nitrogen Oxides (NO_X)	200 mg/Nm^3 at 15% O_2

Note: [1/]IFC Environmental, Health, and Safety Guidelines Thermal Power Plants, 2008

Source: Dawei Power Company Limited, 2015

TABLE 6.5-4

AMBIENT AIR QUALITY STANDARD

Parameter	Averaging Period	Guideline Value ($\mu g/m^3$)
Nitrogen dioxide (NO_2)	1-year 1-hour 24-hour	40 (guideline)[1/,3/] 200 (guideline)[1/,3/] 150 (guideline)[2/]

Source: [1/] Environmental, Health, and Safety Guidelines: Environmental Air Emissions and Ambient Air Quality of International Finance Corporation (IFC), World Bank Group, 2007

[2/] Thermal Power: Guidelines for New Plants, Pollution Prevention and Abatement Handbook, World Bank Group, July 1998

[3/] National Environmental Quality (Emission) Guidelines, Myanmar, 2015

E. Prediction of Ground Level Concentrations of NOx

The ground level concentrations (GLCs) of NO_x within the study area related to the emission of NO_x from the power plant were predicted using the AERMOD model and the basic data in ***Table 6.5-5***. The predictions adopted the default values of NO_2/NO_x ratio of the AERMOD model. The 1-hour and annual NO_2/NO_x ratios are 0.8 and 0.75, respectively.

Air Quality Modeling Methodology

(a) Study Area

The study area covered an area of 10×10 km^2 as already discussed above in the receptor section.

(b) Mathematical Model

The mathematic model AERMOD was developed for prediction of air pollution distribution by U.S.EPA. It was selected for this study due to its capability to give real time estimates of air pollutant concentrations in the atmosphere using hourly meteorological data. For this study, the variable grid resolution was employed as follows:

- 100 m grid resolution for 1.5 km distance from fence line
- 250 m grid resolution for 1.5-3.0 km distance from fence line
- 500 m grid resolution for 3.0-5.0 km distance from fence line

(c) The Input Data Used for the AERMOD Model

Meteorological Data

In this study, meteorological data of the year 2014 from the nearest meteorological stations were collected and used as inputs for AERMOD. The data included:

Surface data: The surface data, including wind direction, wind speed, dry bulb temperature and relative humidity, were collected from the meteorological station of ITALIAN-THAI Development Public Company Limited (ITD) which located at 14°15' N latitude, 98°02'E longitude, about 4.4 km north of the project site. The cloud cover, ceiling height data were not available at this ITD station. Therefore, they were collected from Thong Phaphum meteorological station in Thailand which has similar climatic conditions to Dawei region. It was located at 14°44'32.0" N latitude, 98°38'11.0" E longitude, about 84.7 km northeast of the project site.

Upper meteorological data (UMD): The available nearest upper meteorological station at Bang Na Agromet., Bangkok in Thailand (Source: NOAA; http://esrl.noaa.gov/raobs/) was employed. This station was located at 13°39'59.0" N latitude, 100°36'22.0" E Longitude, about 281 km southeast of the project site. The UMD are measured at different standard pressures at heights from 100 m to 20 km. The data needed by AERMOD are at 3,000 m. The data need to be arranged as FSL Radiosonde Database including station location, pressure data, height, temperature, wind speed and direction.

Surface Characteristics Data The surface characteristics data, including the surface roughness length, Bowen ratio and albedo, were determined for the purpose of processing meteorological data for use with the AERMOD model. The calculation of the surface characteristics data followed the recommendations presented in U.S. EPA AERSURFACE User's Guide (Revised 01/16/2013). These recommendations are summarized below:

Surface roughness length based on an inverse distance weighted geometric mean for a default upwind distance of 1 kilometer from the center of the project site. Surface roughness length was varied by 8 sectors to account for variations in land cover near the project site.

Bowen ratio based on unweighted geometric mean for a representative domain with a default domain defined by a 10 km x 10 km region centered on the project site.

Albedo based on unweighted arithmetic mean for the same representative domain as defined for Bowen ratio, with a default domain defined by a 10 km x 10 km region centered on the project site.

Terrain Data The terrain data of the study area were used for determining base elevation of the emission sources as stacks and elevation of the study area. The terrain data used in this study were derived from the Digital Elevation Model (DEM) data of the latest version of Seamless Shuttle Radar Topography Mission (SRTM3) with a resolution of 90 x 90 m.

(d) Emission Source Data

The emission source data used as inputs for AERMOD were taken from the Feasibility Study Report and are presented in ***Tables 6.5-5*** and ***6.5-6***. The data included;

- Stack location
- Stack height, m
- Stack diameter, m
- Exit temperature of flue gas, K
- Exit velocity, m/s
- Emission rate of pollutants, g/s

(e) Studied Cases

1) Impacts from emission under normal operation condition

1.1) Impacts from emissions of Phase 1
- emissions from one gas engine stack (GEPP#1)

1.2) Impacts from emissions of Phase 2
- emissions from one gas engine and two gas turbine stacks (GEPP#1, HRSG1, HRSG2)

1.3) Impacts from emissions of Phase 3
- emissions from two gas engines and two gas turbine stacks (GEPP#1, HRSG1, HRSG2, GEPP#2)

1.4) Impacts from emissions of Phase 4
- emissions from two gas engines and four gas turbine stacks (GEPP#1, HRSG1, HRSG2, GEPP#2, HRSG3, HRSG4)

1.5) Impacts from emissions of Phase 5
- emissions from two gas engines and five gas turbine stacks (GEPP#1, HRSG1, HRSG2, GEPP#2, HRSG3, HRSG4, HRSG5)

2) Impacts from emission under emergency operation condition

2.1) Impacts from emissions of Phase 2
- emissions from one gas engine and two gas turbine bypass stacks (HRSG1-bypass, HRSG2-bypass)

2.2) Impacts from emissions of Phase 3
- emissions from two gas engines and two gas turbine bypass stacks (GEPP#1, HRSG1-bypass, HRSG2-bypass, GEPP#2)

2.3) Impacts from emissions of Phase 4
- emissions from two gas engines and four gas turbine bypass stacks (GEPP#1, HRSG1-bypass, HRSG2-bypass, GEPP#2, HRSG3-bypass, HRSG4-bypass)

2.4) Impacts from emissions of Phase 5
- emissions from two gas engines and five gas turbine bypass stacks (GEPP#1, HRSG1-bypass, HRSG2-bypass, GEPP#2, HRSG3-bypass, HRSG4-bypass, HRSG5- bypass)

TABLE 6.5-5

EMISSION DATA OF GAS ENGINES AND GAS TURBINE STACKS USED IN AIR QUALITY MODELING

Phase	Unit	1 (Stack GEPP#1)	2 (Stack GEPP#1, HRSG1, HRSG2)		3 (Stack GEPP#1, HRSG1, HRSG2, GEPP#2)	4 (Stack GEPP#1, HRSG1, HRSG2, GEPP#2, HRSG3, HRSG4)		5 (Stack GEPP#1, HRSG1, HRSG2, GEPP#2, HRSG3, HRSG4, HRSG5)
Stacks		**GEPP#1**	**CCGT#1 HRSG1**	**CCGT#1 HRSG2**	**GEPP#2**	**CCGT#2 HRSG3**	**CCGT#2 HRSG4**	**CCGT#3 HRSG5**
Coordinate of Stack (UTM (WGS84) Zone 47N)		1572324.49N, 398727.53E	1572443.34N, 398510.59E	1572421.97N, 398523.93E	1572271.51N, 398760.62E	1572314.29N, 398591.19E	1572292.93N, 398604.53E	1572262.39N, 398623.62E
Stack Height	m	30	35	35	30	35	35	35
Stack Diameter	m	2.5	3.5	3.5	2.5	3.5	3.5	3.5
End of Stack Velocity	m/s	20.78	13.86	13.86	15.58	13.86	13.86	13.35
End of Stack Temperature	deg C	367	104	104	367	104	104	90
Pressure Actual	Bar	1.01	1.01	1.01	1.01	1.01	1.01	1.01
%H_2O Actual	%	13.06	10.53	10.53	13.06	10.53	10.53	10.53
%O_2 Actual	%	9.7	12.53	12.53	9.7	12.53	12.53	12.53
Total Flue Gas Volume	Am^3/s	101.98	133.38	133.38	76.5	133.38	133.38	128.43
Concentration (at 15%O_2, dry)								
NO_x	mg/Nm^3	200.0	51.0	51.0	200.0	51.0	51.0	51.0
Actual Concentration								
NO_x	mg/Am^3	140.4	46.7	46.7	140.4	46.7	46.7	48.5
Emission Rate								
NO_x	g/s	14.32	6.23	6.23	10.74	6.23	6.23	6.23
NO_x control system		-	Dry Low NO_x Burner	Dry Low NO_x Burner	-	Dry Low NO_x Burner	Dry Low NO_x Burner	Dry Low NO_x Burner
IFC Standard of NO_X [1/]	mg/Nm^3	200	51	51	200	51	51	51

Source: DAWEI POWER COMPANY LIMITED, 2015

Remark: [1/] Environmental, Health, and Safety Guidelines for Thermal Power Plants, IFC, 2008 (calculated at dry gas, 0°C, 1 bar & 15% Excess O_2)

TABLE 6.5-6

EMISSION DATA OF GAS TURBINE BYPASS STACKS USED IN AIR QUALITY MODELING

Stacks	Unit	CCGT#1 HRSG1 Bypass	CCGT#1 HRSG2 Bypass	CCGT#2 HRSG3 Bypass	CCGT#2 HRSG4 Bypass	CCGT#3 HRSG5 Bypass
Coordinate of Stack (UTM (WGS84) Zone 47N)		1572458.84N, 398535.38E	1572437.47N, 398548.73E	1572329.79N, 398615.98E	1572308.43N, 398629.33E	1572277.88N, 398648.42E
Stack Height	m	30	30	30	30	30
Stack Diameter	m	3.5	3.5	3.5	3.5	3.5
End of Stack Velocity	m/s	30.91	30.91	30.91	30.91	30.91
End of Stack Temperature	deg C	567.7	567.7	567.7	567.7	567.7
Pressure Actual	Bar	1.01	1.01	1.01	1.01	1.01
%H2O Actual	%	10.53	10.53	10.53	10.53	10.53
%O2 Actual	%	12.53	12.53	12.53	12.53	12.53
Total Flue Gas Volume	Am^3/s	297.38	297.38	297.38	297.38	297.38
Concentration (at 15%O2, dry)						
NO_x	mg/Nm^3	51.0	51.0	51.0	51.0	51.0
Actual Concentration						
NO_x	mg/Am^3	21.0	21.0	21.0	21.0	21.0
Emission Rate						
NO_x	g/s	6.23	6.23	6.23	6.23	6.23
NO_x control system		Dry Low NO_x Burner	Dry Low NO_x Burner	Dry Low NO_x Burner	Dry Low NO_x Burner	Dry Low NO_x Burner
IFC Standard of NO_X[1/]	mg/Nm^3	51	51	51	51	51

Source: DAWEI POWER COMPANY LIMITED, 2015

Remark: [1/] Environmental, Health, and Safety Guidelines for Thermal Power Plants, IFC, 2008 (calculated at dry gas, 0°C, 1 bar & 15% Excess O_2)

(f) Calculation Results

There are two sets of calculation results.

- The first set is the predicted GLC of NO_2-1 hr, NO_2-24 hr and annual NO_2 caused by the emissions from the power plant in the dispersion study area. The results are also presented in contour lines.
- The second set is the predicted total GLC of the above taken into account the background GLC of the pollutants. The background GLC data used were the maximum concentrations of NO_2-24 hr of the air samples collected during October 7-8, 2015 and January 21-24, 2015.

The background level in NO_2-1 hr was estimated with a concentration-time relationship equation (Wark, K. and C. Warner, 1998. Air Pollution: Its Origin and Control, 3rd Edition, Harper Collins Publishers) as follows;

$$C2 = C1(t1/t2)^q$$

Where; C2 is the desired concentration of NO_2-1 hr,

C1 is the concentration of NO_2-24 hr (maximum concentration from sampling during October 7-8, 2015 and January 21-24, 2015 =18 $\mu g/m^3$)

t1 and t2 are the sampling time period (t1=24, t2=1)

q has a value between 0.17 and 0.20 (the value of 0.20 was selected for a conservative predicted results)

$$C_{(NO_2\text{-}1\ hr)} = 18\ (24/1)^{0.20}$$

$$= 34\ \mu g/m^3$$

The net GLC contours for each case study are shown in ***Figures 6.5-1*** to ***Figure 6.5-27***. The calculation results for each case study are summarized and also presented in ***Table 6.5-7*** and ***Table 6.5-8***. ***Table 6.5-9*** summarizes the overall results of predictions of maximum GLC of NO_2 for phases 1 to 5 of the project operations compared with the permissible maximum value in the ambient air quality standards (AQQS). The prediction was made at various distances and at the sensitive receptors under the normal and emergency operations of the power plant.

The data in ***Table 6.5-7*** to ***Table 6.5-9*** clearly show all the predicted values of NO_2 below the permissible maximum value in the AQQS. Therefore, it can be concluded that the emissions of NO_x from the power plant will have insignificant impacts on ambient air quality.

TABLE 6.5-7

SUMMARY OF AIR QUALITY MODELING RESULTS UNDER NORMAL OPERATION CONDITION

Results	Phase 1 (GEPP#1)			Phase 2 (GEPP#1, HRSG1, HRSG2)			Phase 3 (GEPP#1, HRSG1, HRSG2, GEPP#2)			Phase 4 (GEPP#1, HRSG1, HRSG2, GEPP#2, HRSG3, HRSG4)			Phase5 (GEPP#1, HRSG1, HRSG2, GEPP#2, HRSG3, HRSG4, HRSG5)		
	NO_2 (µg/m^3)			NO_2 (µg/m^3)			NO_2 (µg/m^3)			NO_2 (µg/m^3)			NO_2 (µg/m^3)		
	1-hr	24-hr	1-yr	1-hr	24-hr	1-yr	1-hr	24-hr	1-yr	1-hr	24-hr	1-yr	1-hr	24-hr	1-yr
In the entire study area															
-maximum incremental increase in concentration	24.07	6.58	0.79	35.30	10.10	1.76	48.26	12.61	2.43	66.14	19.87	3.46	75.20	23.64	4.04
-% of ambient air quality standard	12.04	4.39	1.98	17.65	6.73	4.40	24.13	8.41	6.08	33.07	13.25	8.65	37.60	15.76	10.10
-location of the maximum value	DSEZ Area	DSEZ Area	DSEZ Area	DSEZ Area	DSEZ Area	DSEZ Area	DSEZ Area	DSEZ Area	DSEZ Area	DSEZ Area	DSEZ Area	DSEZ Area	DSEZ Area	DSEZ Area	DSEZ Area
-Coordinate (UTM(WGS84))	398407E, 1572224N	398307E, 1572124N	399207E, 1572324N	398307E, 1572624N	397907E, 1572024N	399107E, 1572424N	398307E, 1572624N	397907E, 1572024N	399207E, 1572424N	398307E, 1572624N	398007E, 1572024N	399207E, 1572324N	398307E, 1572624N	398107E, 1572024N	399107E, 1572324N
-Distance (meter) / direction from project site	238/ S	379/ S	654/ E	332/ N	756/ W	549/ E	332/ N	756/ W	649/ E	332/ N	672/ W	654/ E	332/ N	593/ W	555/ E
-maximum concentration of background level	34	18	NA	34	18	NA	34	18	NA	34	18	NA	34	18	NA
-net maximum concentration including background level	58.07	24.58	0.79	69.30	28.10	1.76	82.26	30.61	2.43	100.14	37.87	3.46	109.20	41.64	4.04
-% of ambient air quality standard	29.04	16.39	1.98	34.65	18.73	4.40	41.13	20.41	6.08	50.07	25.25	8.65	54.60	27.76	10.10
In only sensitive areas															
-ranges of concentrations	5.22-8.54	0.25-0.71	0.02-0.12	10.16-16.98	0.5-1.62	0.05-0.23	15.17-24.15	0.74-2.34	0.07-0.32	20.57-33.4	1-3.34	0.09-0.44	23.63-38.75	1.15-3.91	0.11-0.5
-% of ambient air quality standard	2.61-4.27	0.17-0.47	0.05-0.3	5.08-8.49	0.33-1.08	0.13-0.58	7.59-12.08	0.49-1.56	0.18-0.8	10.29-16.7	0.67-2.23	0.23-1.1	11.82-19.38	0.77-2.61	0.28-1.25
-location of the maximum value	Ka Myaing swea Community	Ka Myaing swea Community	Nyaung Bin Seik Village	Mudu Village	Ka Myaing swea Community	Nyaung Bin Seik Village	Ka Myaing swea Community	Ka Myaing swea Community	Nyaung Bin Seik Village	Mudu Village	Ka Myaing swea Community	Nyaung Bin Seik Village	Mudu Village	Ka Myaing swea Community	Nyaung Bin Seik Village
-maximum concentration of background level	34	18	NA	34	18	NA	34	18	NA	34	18	NA	34	18	NA
-net maximum concentration including background level	39.22-42.54	18.25-18.71	0.02-0.12	44.16-50.98	18.5-19.62	0.05-0.23	49.17-58.15	18.74-20.34	0.07-0.32	54.57-67.40	19.00-21.34	0.09-0.44	57.63-72.75	19.15-21.91	0.11-0.50
-% of ambient air quality standard	19.61-21.27	12.17-12.47	0.05-0.30	22.08-25.49	12.33-13.08	0.13-0.58	24.59-29.08	12.49-13.56	0.18-0.80	27.29-33.70	12.67-14.23	0.23-1.10	28.82-36.38	12.77-14.61	0.28-1.25
Standard	**200**[1/,3/]	**150**[2/]	**40**[1/,3/]	**200**[1/,3/]	**150**[2/]	**40**[1/,3/]	**200**[1/,3/]	**150**[2/]	**40**[1/,3/]	**200**[1/,3/]	**150**[2/]	**40**[1/,3/]	**200**[1/,3/]	**150**[2/]	**40**[1/,3/]

Remark: [1/] Environmental, Health, and Safety Guidelines: Environmental Air Emissions and Ambient Air Quality of International Finance Corporation (IFC), World Bank Group, 2007
[2/] Thermal Power: Guidelines for New Plants, Pollution Prevention and Abatement Handbook, World Bank Group, July 1998
[3/] National Environmental Quality (Emission) Guidelines, Myanmar, 2015

TABLE 6.5-8

SUMMARY OF AIR QUALITY MODELING RESULTS UNDER EMERGENCY OPERATION CONDITION

Results	Phase 2 (GEPP#1, HRSG1_BYPASS, HRSG2_BYPASS)			Phase 3 (GEPP#1, HRSG1_BYPASS, HRSG2_BYPASS, GEPP#2)			Phase 4 (GEPP#1, HRSG1_BYPASS, HRSG2_BYPASS, GEPP#2, HRSG3_BYPASS, HRSG4_BYPASS)			Phase5 (GEPP#1, HRSG1_BYPASS, HRSG2_BYPASS, GEPP#2, HRSG3_BYPASS, HRSG4_BYPASS, HRSG5_BYPASS)		
	NO_2 (µg/m^3)			NO_2 (µg/m^3)			NO_2 (µg/m^3)			NO_2 (µg/m^3)		
	1-hr	24-hr	1-yr	1-hr	24-hr	1-yr	1-hr	24-hr	1-yr	1-hr	24-hr	1-yr
In the entire study area												
-maximum incremental increase in concentration	24.13	6.62	1.00	38.08	12.07	1.74	45.71	13.56	1.97	51.61	14.54	2.09
-% of ambient air quality standard	12.07	4.41	2.50	19.04	8.05	4.35	22.86	9.04	4.93	25.81	9.69	5.23
-location of the maximum value	DSEZ Area	DSEZ Area	DSEZ Area	DSEZ Area	DSEZ Area	DSEZ Area	DSEZ Area	DSEZ Area	DSEZ Area	DSEZ Area	DSEZ Area	DSEZ Area
-Coordinate (UTM(WGS84))	398407E, 1572224N	398307E, 1572124N	399207E, 1572424N	398307E, 1572124N	398207E, 1572024N	399207E, 1572324N	398407E, 1572224N	398207E, 1572024N	399207E, 1572324N	398407E, 1572224N	398207E, 1572024N	399207E, 1572324N
-Distance (meter) /direction from project site	238/ W	379/ W	649/ E	379/ W	521/ W	654/ E	238/ W	521/ W	654/ E	238/ W	521/ W	654/ E
-maximum concentration of background level	34	18	NA	34	18	NA	34	18	NA	34	18	NA
-net maximum concentration including background level	58.13	24.62	1.00	72.08	30.07	1.74	79.71	31.56	1.97	85.61	32.54	2.09
-% of ambient air quality standard	29.07	16.41	2.50	36.04	20.05	4.35	39.86	21.04	4.93	42.81	21.69	5.23
In only sensitive areas												
-ranges of concentrations	5.73-11.74	0.28-0.96	0.03-0.17	10.75-19.03	0.52-1.51	0.05-0.27	11.23-22.45	0.55-1.81	0.06-0.32	11.46-24.19	0.56-1.96	0.06-0.35
-% of ambient air quality standard	2.87-5.87	0.19-0.64	0.08-0.43	5.38-9.52	0.35-1.01	0.13-0.68	5.62-11.23	0.37-1.21	0.15-0.8	5.73-12.1	0.37-1.31	0.15-0.88
-location of the maximum value	Ka Myaing swea Community	Nyaung Bin Seik Village	Nyaung Bin Seik Village	Ka Myaing swea Community	Ka Myaing swea Community	Nyaung Bin Seik Village	Ka Myaing swea Community	Nyaung Bin Seik Village	Nyaung Bin Seik Village	Ka Myaing swea Community	Nyaung Bin Seik Village	Nyaung Bin Seik Village
-maximum concentration of background level	34	18	NA	34	18	NA	34	18	NA	34	18	NA
-net maximum concentration including background level	39.73-45.74	18.28-18.96	0.03-0.17	44.75-53.03	18.52-19.51	0.05-0.27	45.23-56.45	18.55-19.81	0.06-0.32	45.46-58.19	18.56-19.96	0.06-0.35
-% of ambient air quality standard	19.87-22.87	12.19-12.64	0.08-0.43	22.38-26.52	12.35-13.01	0.13-0.68	22.62-28.23	12.37-13.21	0.15-0.80	22.73-29.10	12.37-13.31	0.15-0.88
Standard	**200**[1/,3/]	**150**[2/]	**40**[1/,3/]	**200**[1/,3/]	**150**[2/]	**40**[1/,3/]	**200**[1/,3/]	**150**[2/]	**40**[1/,3/]	**200**[1/,3/]	**150**[2/]	**40**[1/,3/]

Remark: [1/] Environmental, Health, and Safety Guidelines: Environmental Air Emissions and Ambient Air Quality of International Finance Corporation (IFC), World Bank Group, 2007

[2/] Thermal Power: Guidelines for New Plants, Pollution Prevention and Abatement Handbook, World Bank Group, July 1998

[3/] National Environmental Quality (Emission) Guidelines, Myanmar, 2015

TABLE 6.5-9
OVERALL SUMMARY OF NO_2 PREDICTIONS-PHASES 1 TO 5

Operating Condition	NO_2-1 hr GLC in µg/m³ and % of AQQS		
	km. from Source	**Sensitive Receptors**	**Permissible Max.**
Normal			
238-332 m. from Source	58.07-109.20	39.22-72.75	200
	29.04-54.60%	19.61-36.38%	
379-756 m. from Source	24.58-41.64	18.25-21.91	150
	16.39-27.76%	12.17-14.61%	
549-654 m. from Source	0.79-4.04	0.02-0.50	40
	1.98-10.10%	0.05-1.25%	
Emergency			
238-379 m. from Source	58.13-85.61	39.73-58.19	200
	29.07-42.81%	19.87-29.10%	
379-521 m. from Source	24.62-32.54	18.28-19.96	150
	16.4121.69%	12.19-13.31%	
649-654 m. from Source	1.00-2.09	0.03-0.35	40
	2.50-5.23%	0.08-0.88%	

Predicted GHG Emission

The majority of greenhouse gases (GHGs) emissions generated during the power plant operation will consist of Carbon Dioxide (CO_2), Nitrous Oxide (N_2O) and Methane (CH_4). They are generated from combustion of natural gas in gas turbine combustors and gas engines. GHG Emission can be calculated based on an emission factor approach.

To calculate GHG Emission, following factors will be used:

Emission Rate = Emission Factor x Activity Data

GHG Emissions = Fuel consumption x Fuel Heating Value x Emission Factor x Global
(Tonne CO_2e) Warming Potential Value

GHG emitted from the initial phase power plant operation can be easily calculated and the results are shown in ***Table 6.5-10***. The total quantity of the GHG is estimated at 1.69 Mt of CO_2e. This quantity is a very small contribution as it accounts for less than 1.71% of the total GHG emissions of Myanmar in 2012 (98.93 Mt of CO_2e total GHG emissions excluding land use change and forestry[7]).

[7] http://cait.wri.org/profile/Myanmar, CAIT Climate Data Explorer, World Resources Institute.

TABLE 6.5-10
ESTIMATION OF GREENHOUSE GAS EMISSION DURING OPERATION

HHV of Natural Gas (Btu/scf)[1/]	Natural Gas Consumption			CO_2			CH_4			N_2O			Mt CO_2e/yr
	MMSCF/yr	MMBtu/yr	TJ/yr	EF (kg/TJ)[3/]	Global Warming Potential[2/]	tonne/yr	EF (kg/TJ)[3/]	Global Warming Potential[2/]	tonne/yr	EF (kg/TJ)[3/]	Global Warming Potential[2/]	tonne/yr	
1,200	23,725.00	28,470,000.00	30,060.62	56,100.00	1	1,686,400.72	1	25	751.52	0.1	298	895.810	1.69

Source: [1/] Properties requirement of natural gas from the Project
[2/] Global Warming Potential (GWP), the Fourth Assessment Report (AR4) in 2007, IPCC, 2007
[3/] Table 2.2 default emission factors for stationary combustion in the energy industries, 2006 IPCC guideline for national greenhouse gas inventories

Despite insignificant effect from GHG by the power plant, the Project will support on mangrove restoration program which is one of the proposed measures of the Project. The proposed program details shall be discussed with the related officials in the project area.

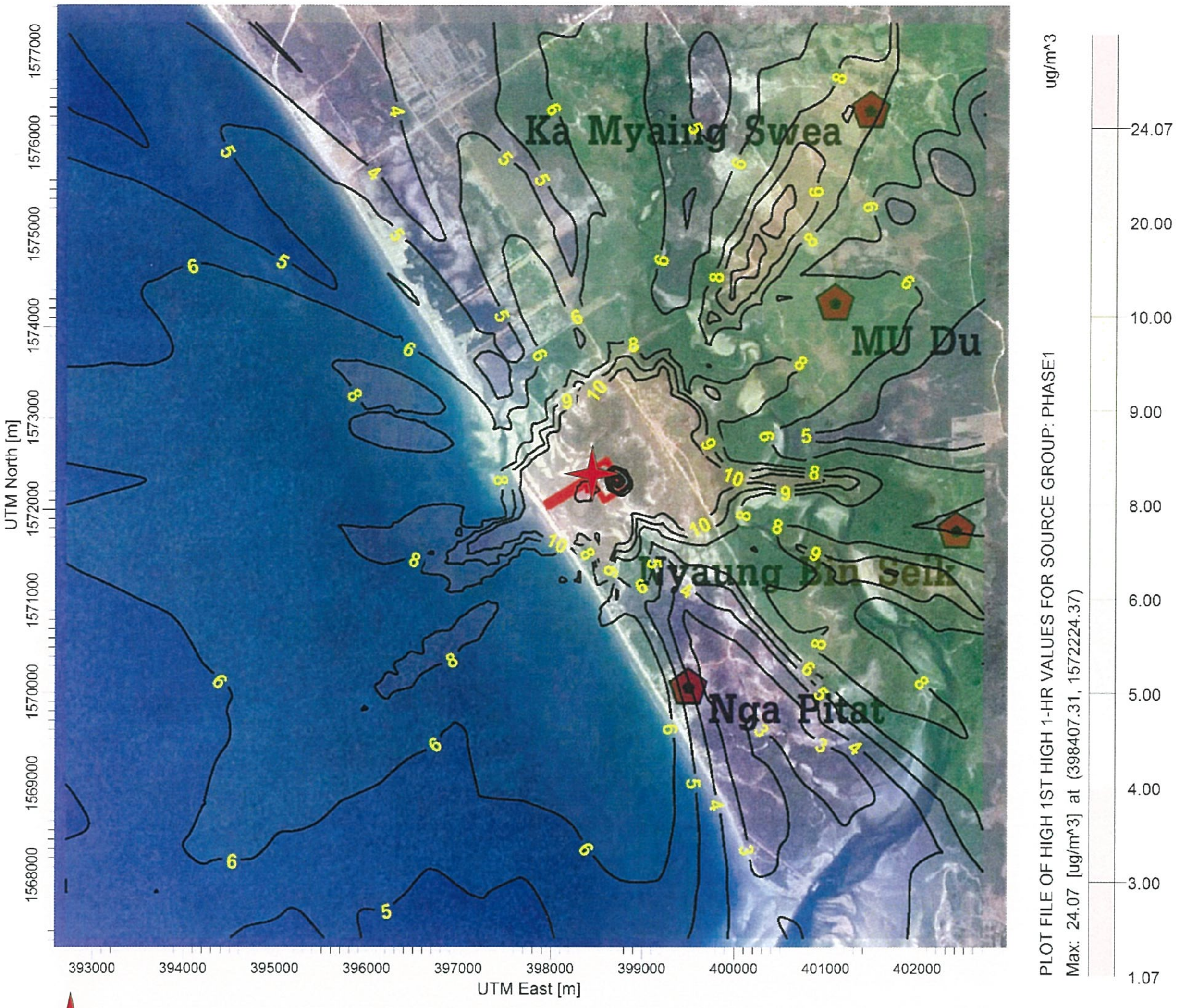
G. Impact Mitigation Measures

The reduction of NO_2 at source using the Low NO_2 burner will be adopted to meet the emission standard. There will be no need for further reduction of NO_2 in stack gas using such technology as SCR.

H. Evaluation of the Significance of Impacts

The impact of NO_x emission of the power plant on ambient air quality was evaluated as shown below. Although the impact would not be significant, the issue deserves high priority in the design and operation of the power plant considering the public attention.

Impact category	Direct Impact
Impact duration	Throughout the operation life of power plant
Impact extent	Mainly on the receptors about 4.53 km from the power plant site
Impact magnitude	Insignificant
Impact severity	Insignificant
Control priority	High



Maximum Conc. of 1-Hour Average NO_2

FIGURE 6.5-1: ISOPLETE OF 1-HOUR AVERAGE CONCENTRATION OF NO_2 (PHASE 1 (GEPP#1))

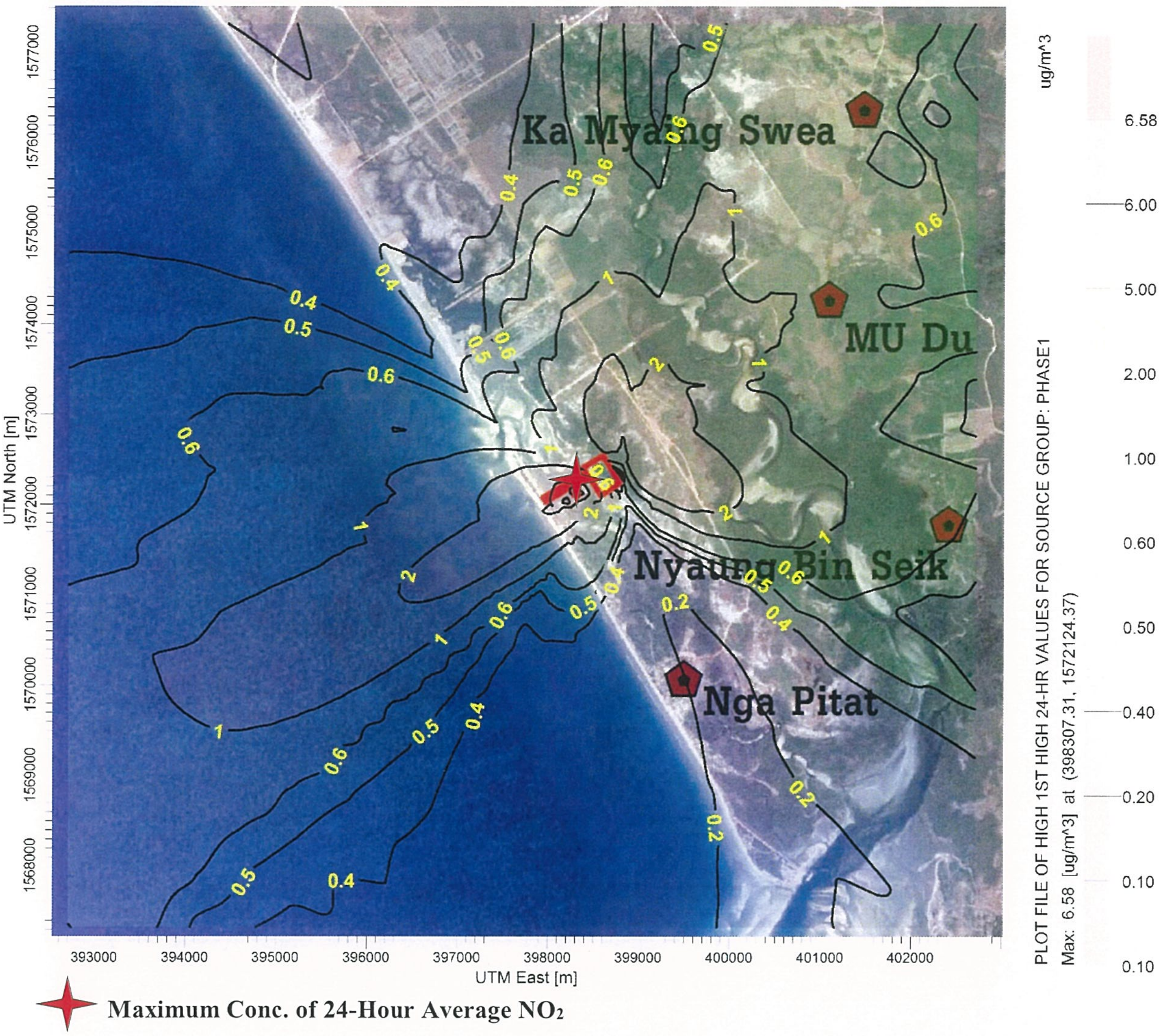


FIGURE 6.5-2: ISOPLETE OF 24-HOUR AVERAGE CONCENTRATION OF NO_2 (PHASE 1 (GEPP#1))

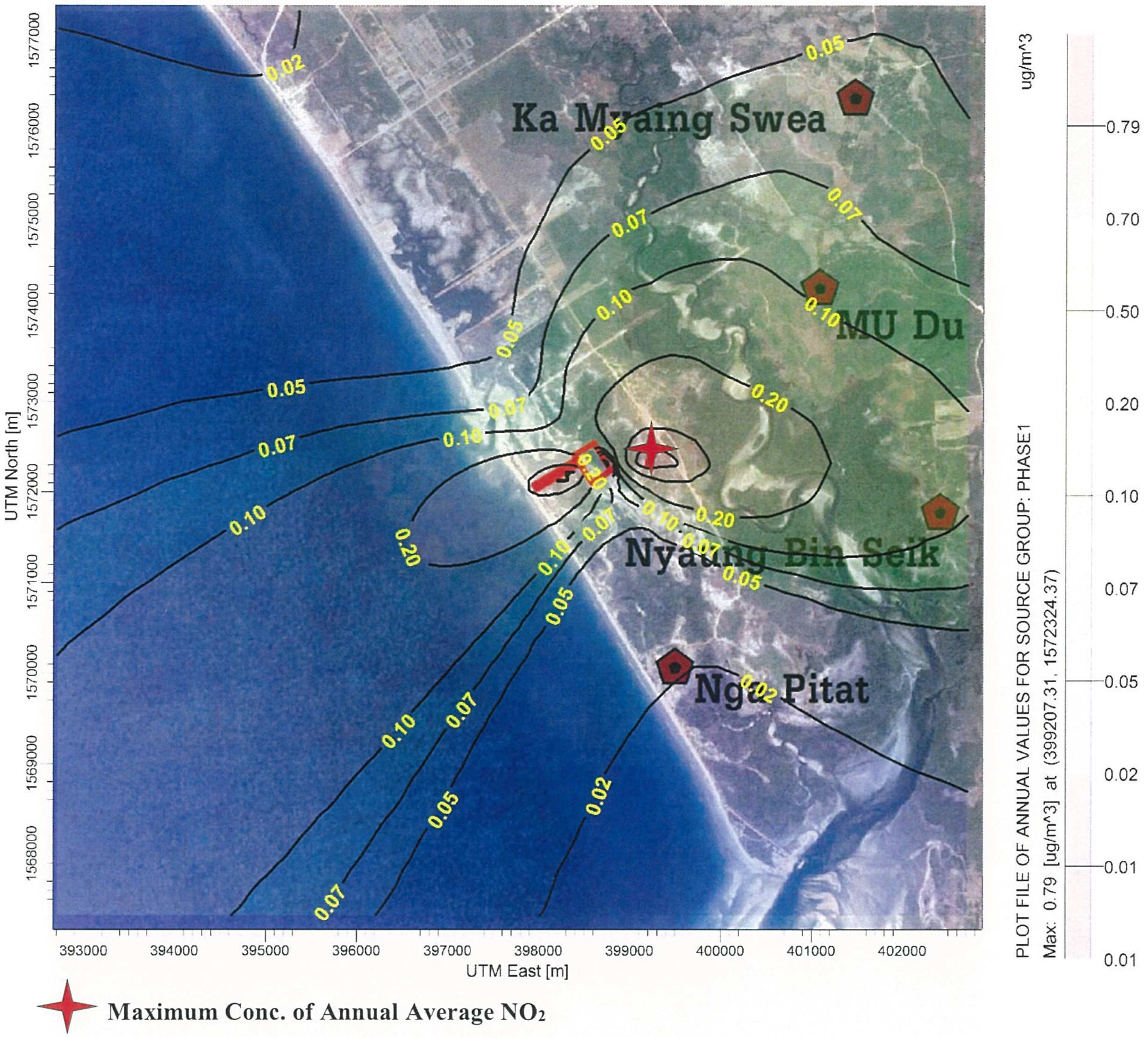
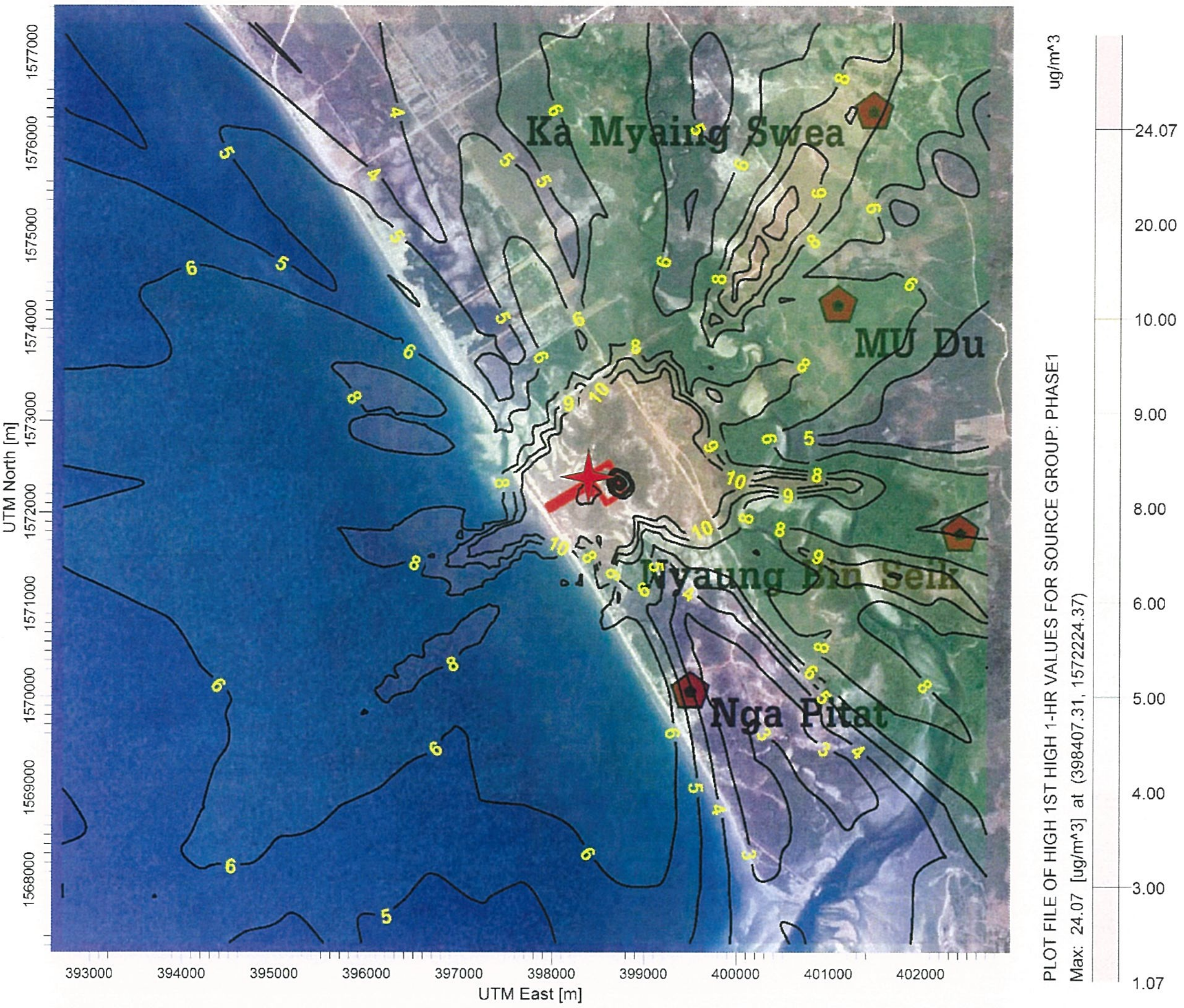
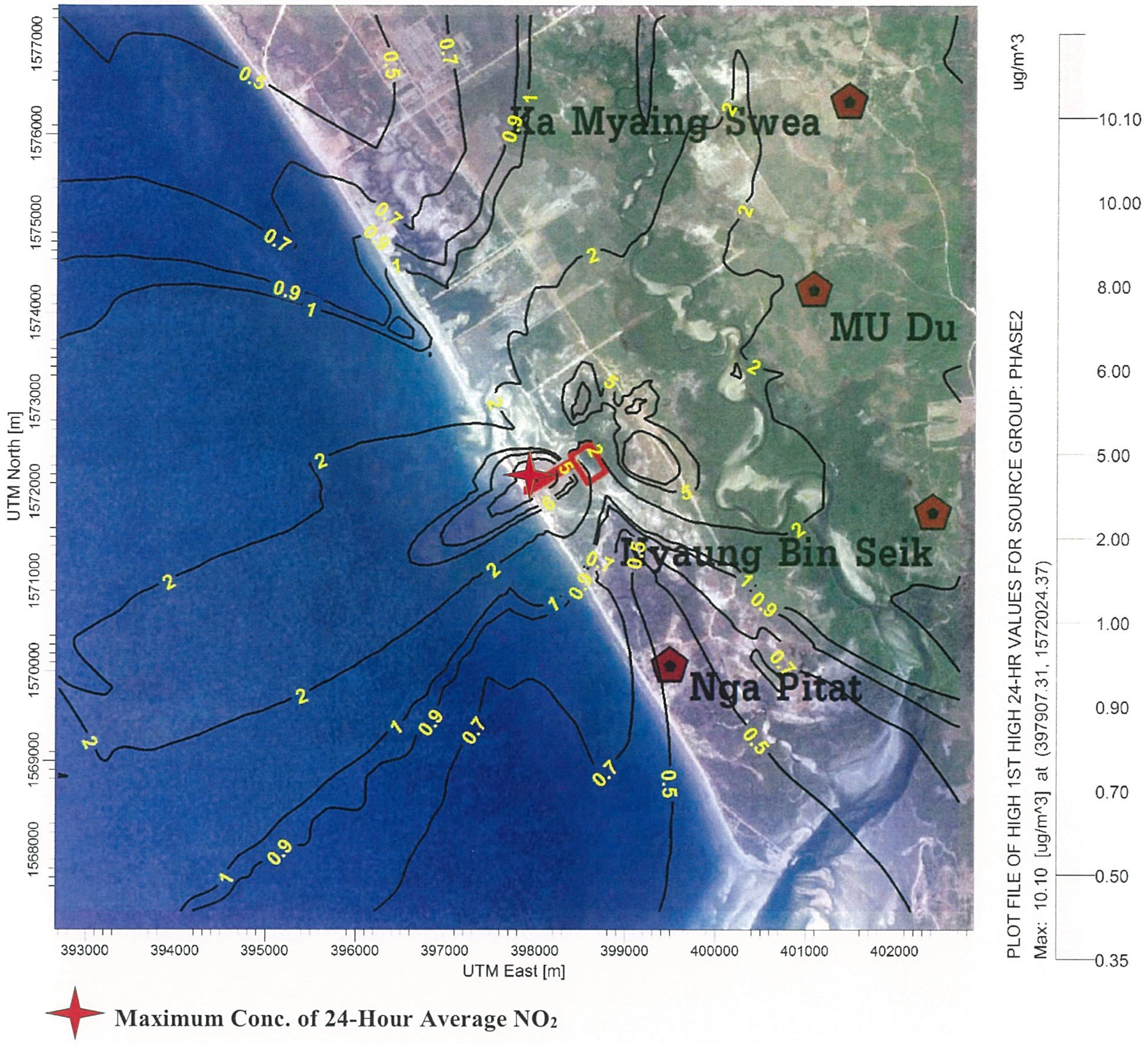


FIGURE 6.5-3: ISOPLETE OF ANNUAL AVERAGE CONCENTRATION OF NO_2 (PHASE 1 (GEPP#1))



Maximum Conc. of 1-Hour Average NO_2

FIGURE 6.5-4: ISOPLETE OF 1-HOUR AVERAGE CONCENTRATION OF NO_2 (PHASE 2 (GEPP#1, HRSG1, HRSG2))



Maximum Conc. of 24-Hour Average NO_2

FIGURE 6.5-5: ISOPLETE OF 24-HOUR AVERAGE CONCENTRATION OF NO_2 (PHASE 2 (GEPP#1, HRSG1, HRSG2))

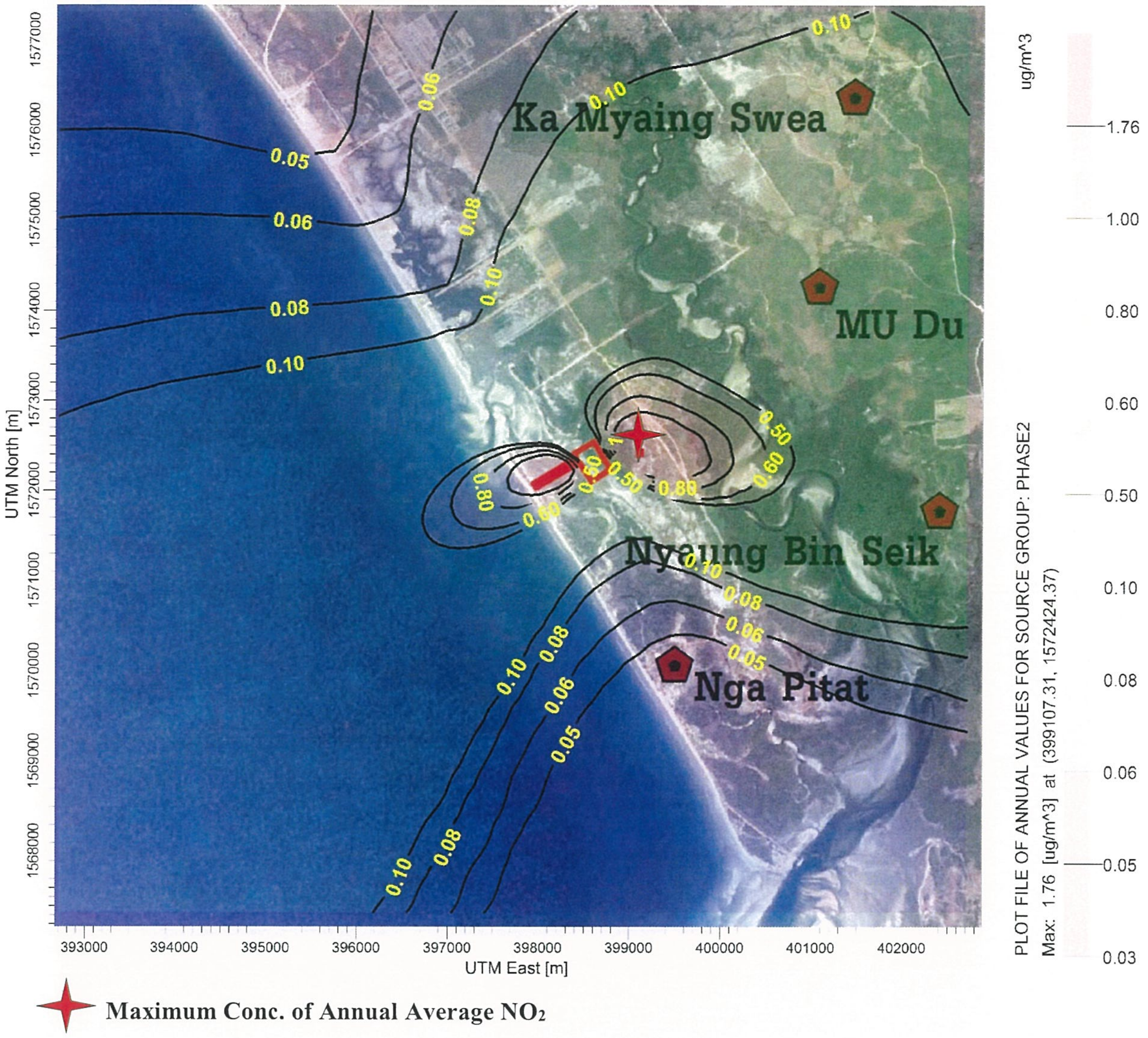


FIGURE 6.5-6: ISOPLETE OF ANNUAL AVERAGE CONCENTRATION OF NO_2 (PHASE 2 (GEPP#1, HRSG1, HRSG2))

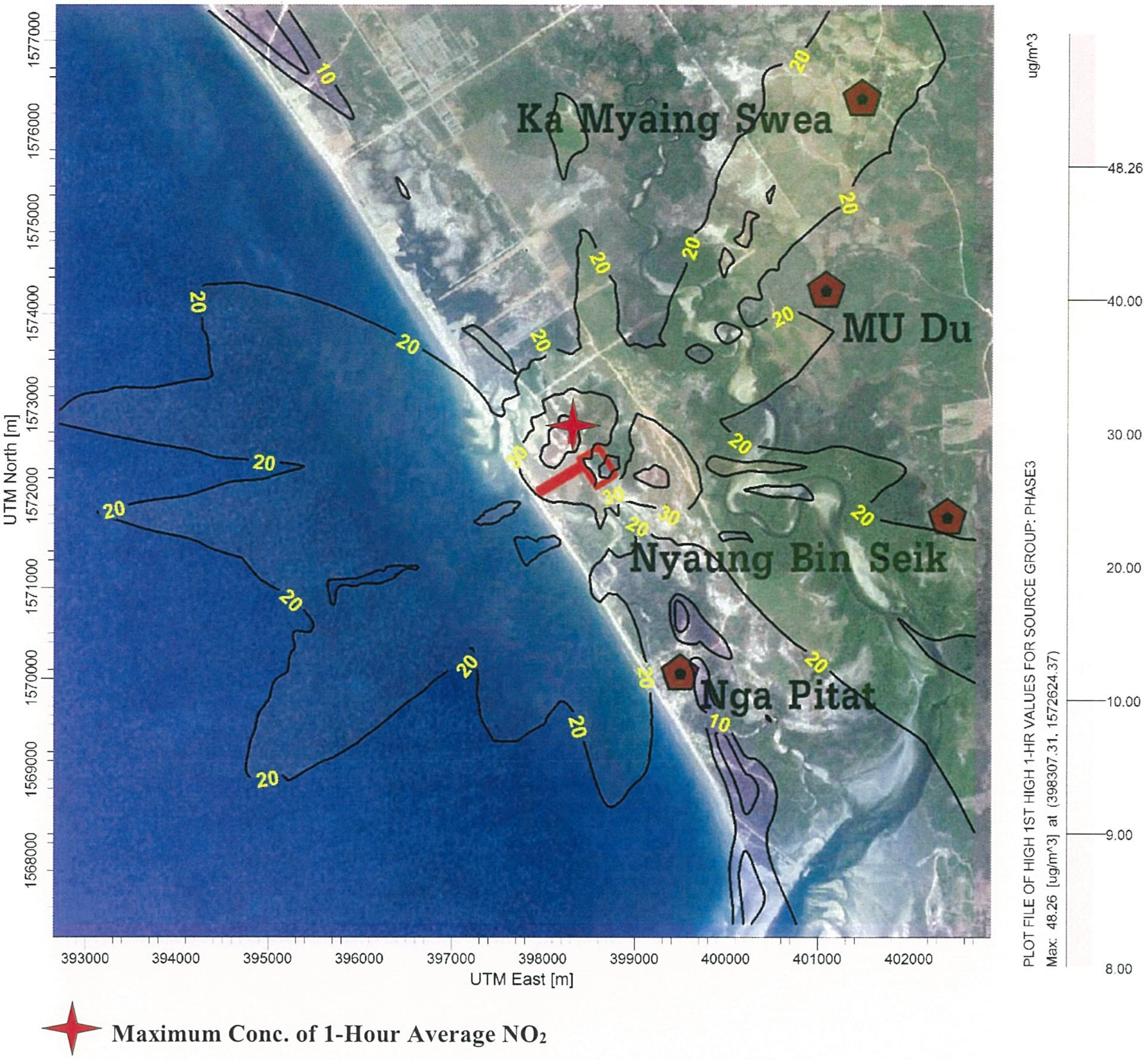


FIGURE 6.5-7: ISOPLETE OF 1-HOUR AVERAGE CONCENTRATION OF NO_2 (PHASE 3 (GEPP#1, HRSG1, HRSG2, GEPP#2))

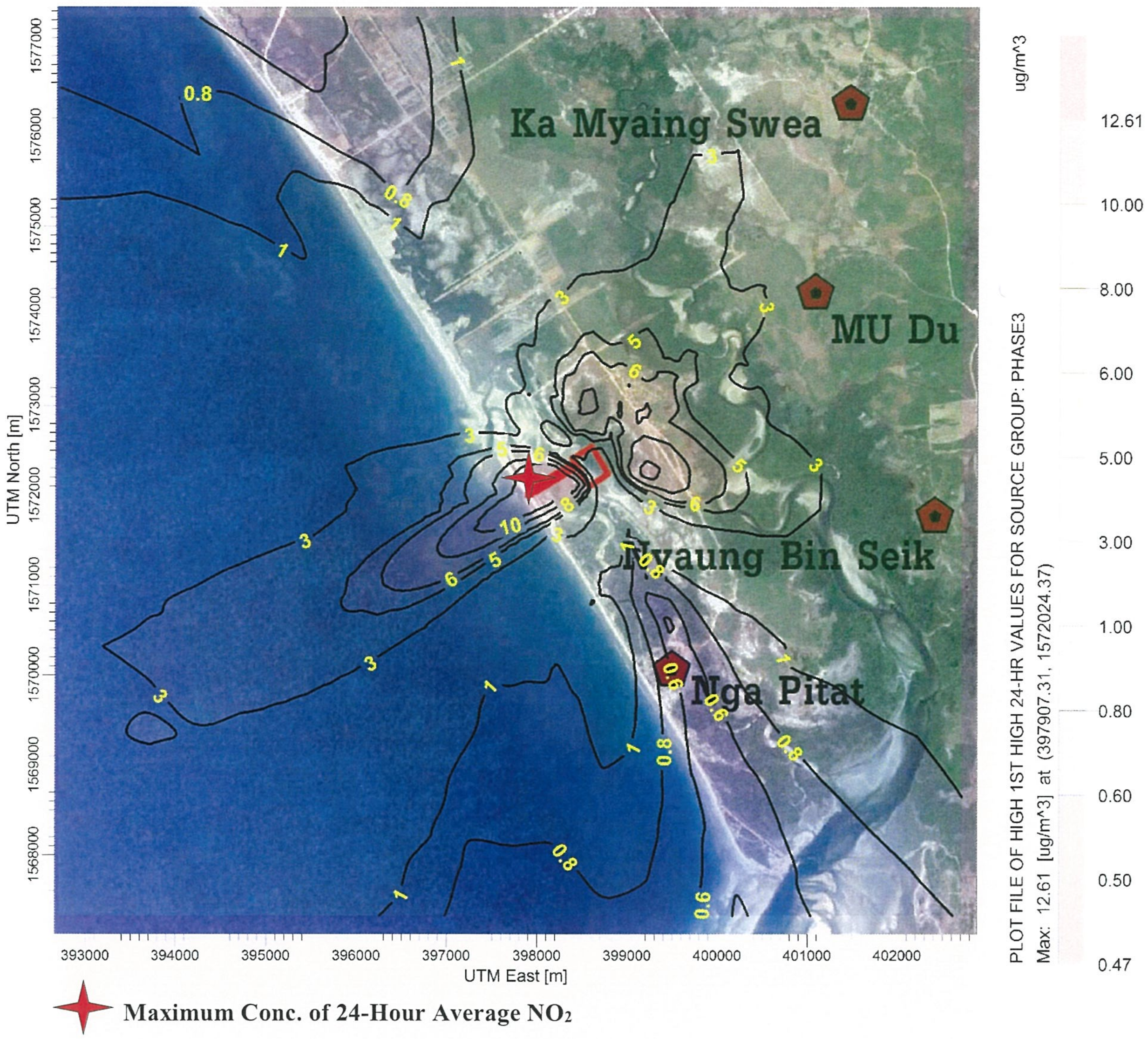
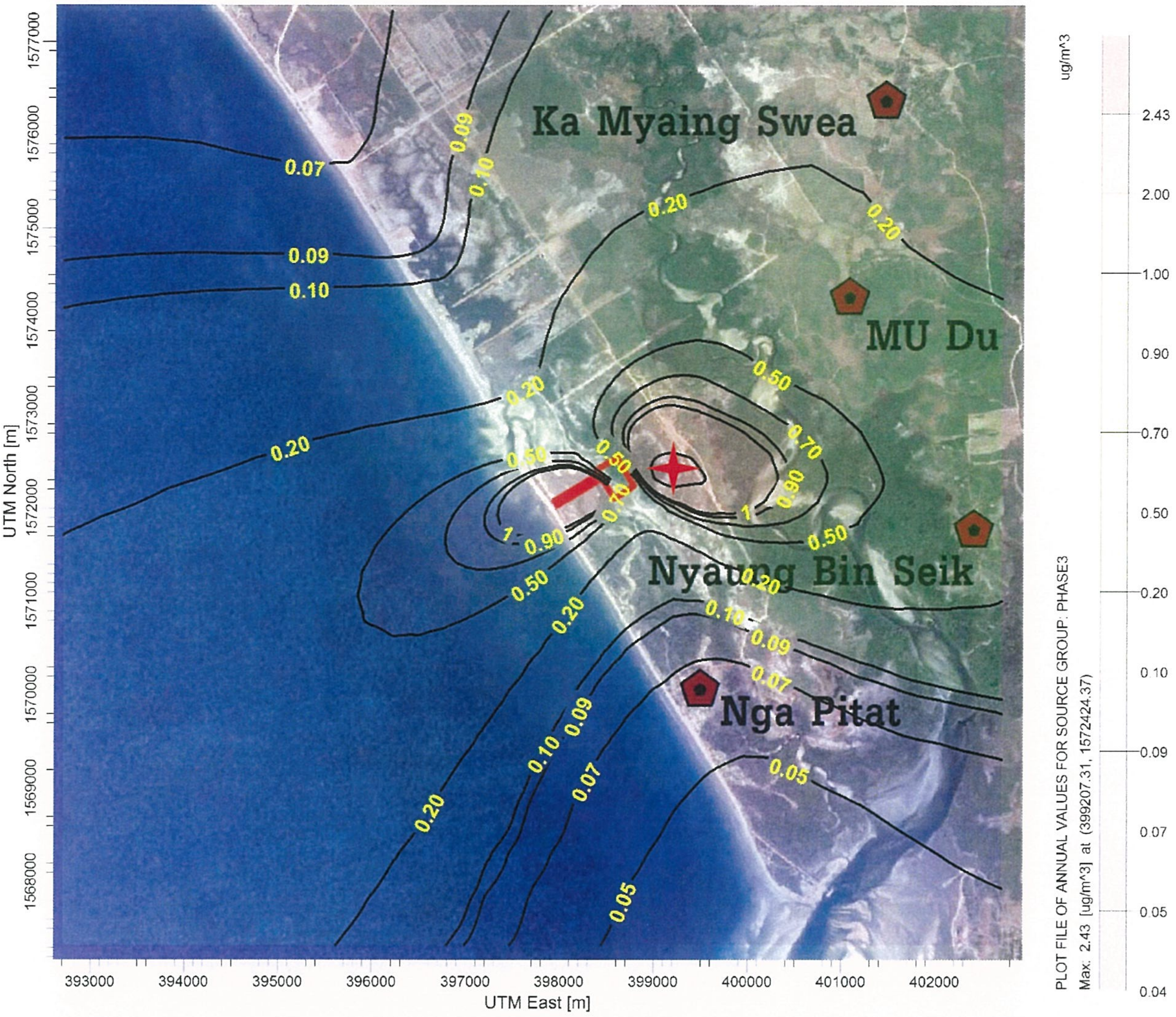


FIGURE 6.5-8: ISOPLETE OF 24-HOUR AVERAGE CONCENTRATION OF NO_2 (PHASE 3 (GEPP#1, HRSG1, HRSG2, GEPP#2))



Maximum Conc. of Annual Average NO_2

FIGURE 6.5-9: ISOPLETE OF ANNUAL AVERAGE CONCENTRATION OF NO_2 (PHASE 3 (GEPP#1, HRSG1, HRSG2, GEPP#2))

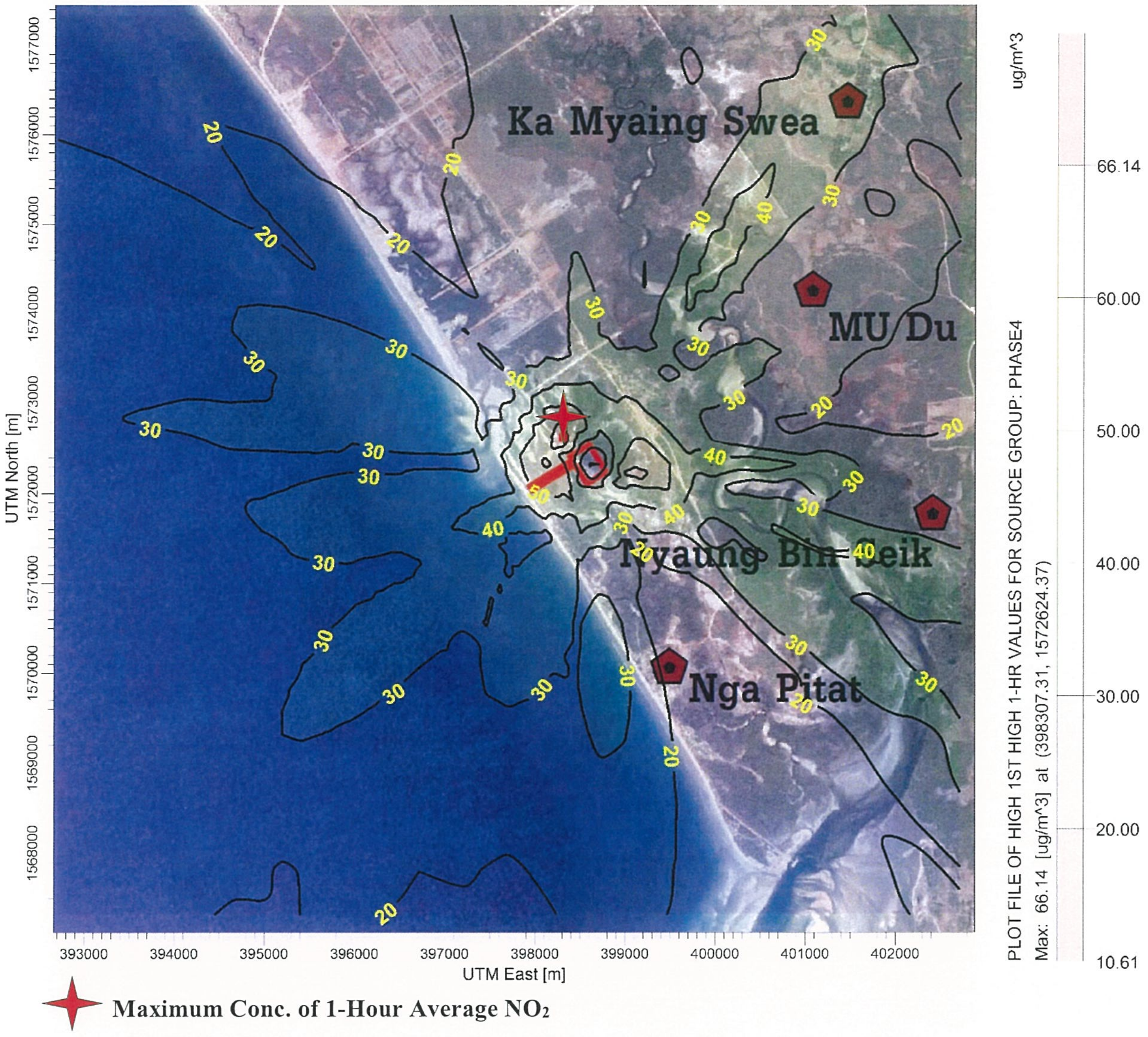


FIGURE 6.5-10: ISOPLETE OF 1-HOUR AVERAGE CONCENTRATION OF NO_2 (PHASE 4 (GEPP#1, HRSG1, HRSG2, GEPP#2, HRSG3, HRSG4))

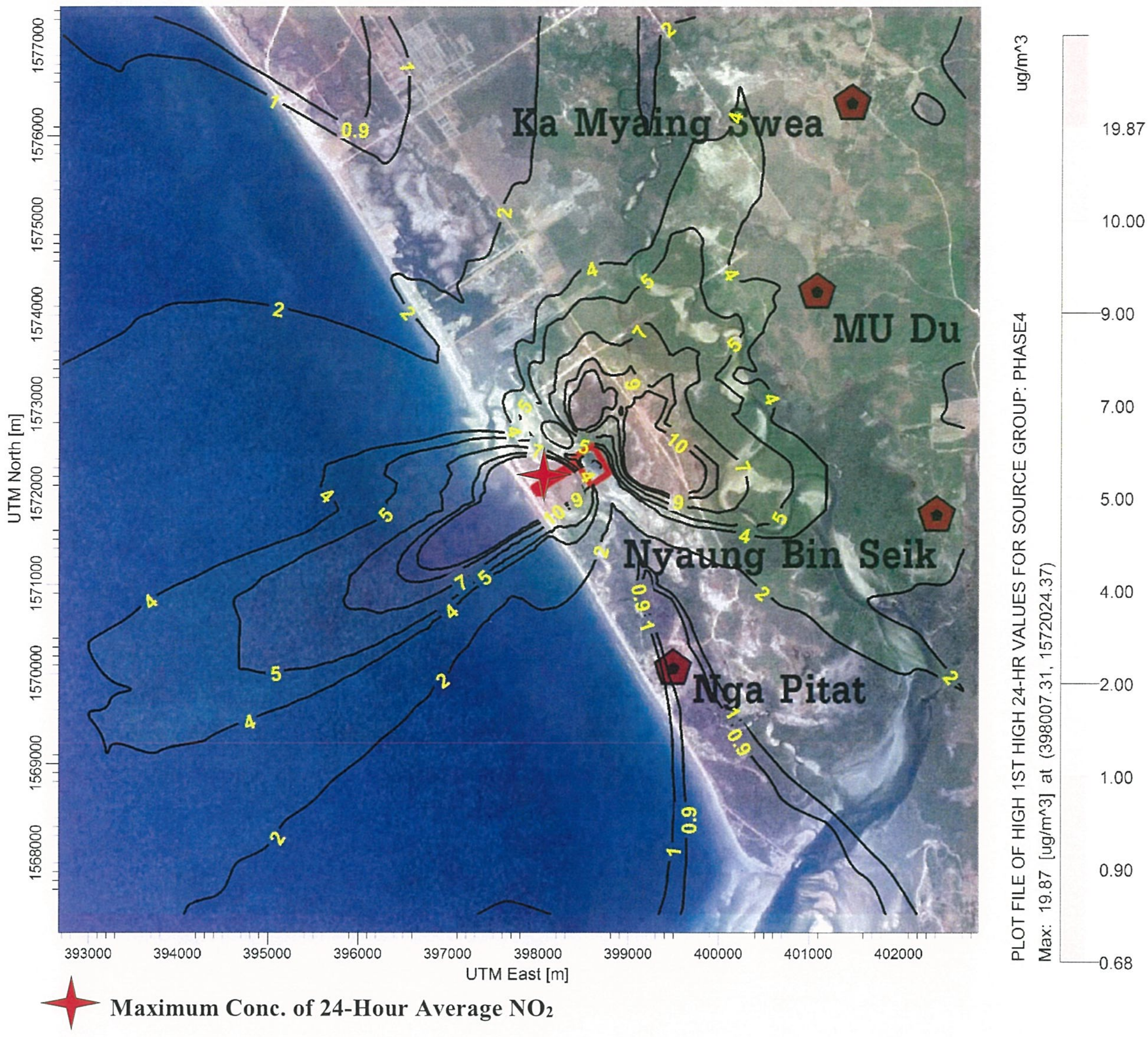


FIGURE 6.5-11: ISOPLETE OF 24-HOUR AVERAGE CONCENTRATION OF NO_2 (PHASE 4 (GEPP#1, HRSG1, HRSG2, GEPP#2, HRSG3, HRSG4))

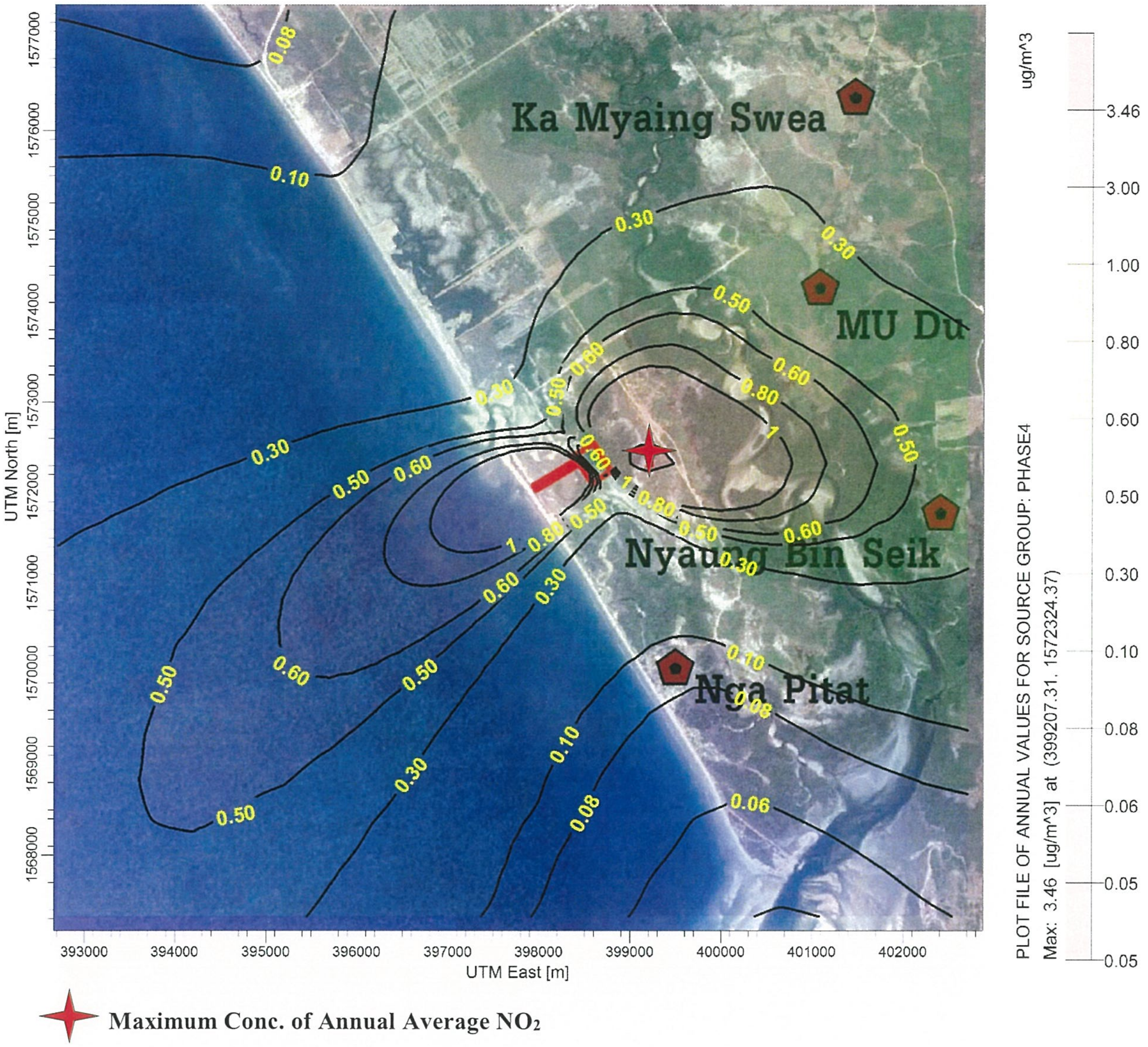


FIGURE 6.5-12: ISOPLETE OF ANNUAL AVERAGE CONCENTRATION OF NO_2 (PHASE 4 (GEPP#1, HRSG1, HRSG2, GEPP#2, HRSG3, HRSG4))

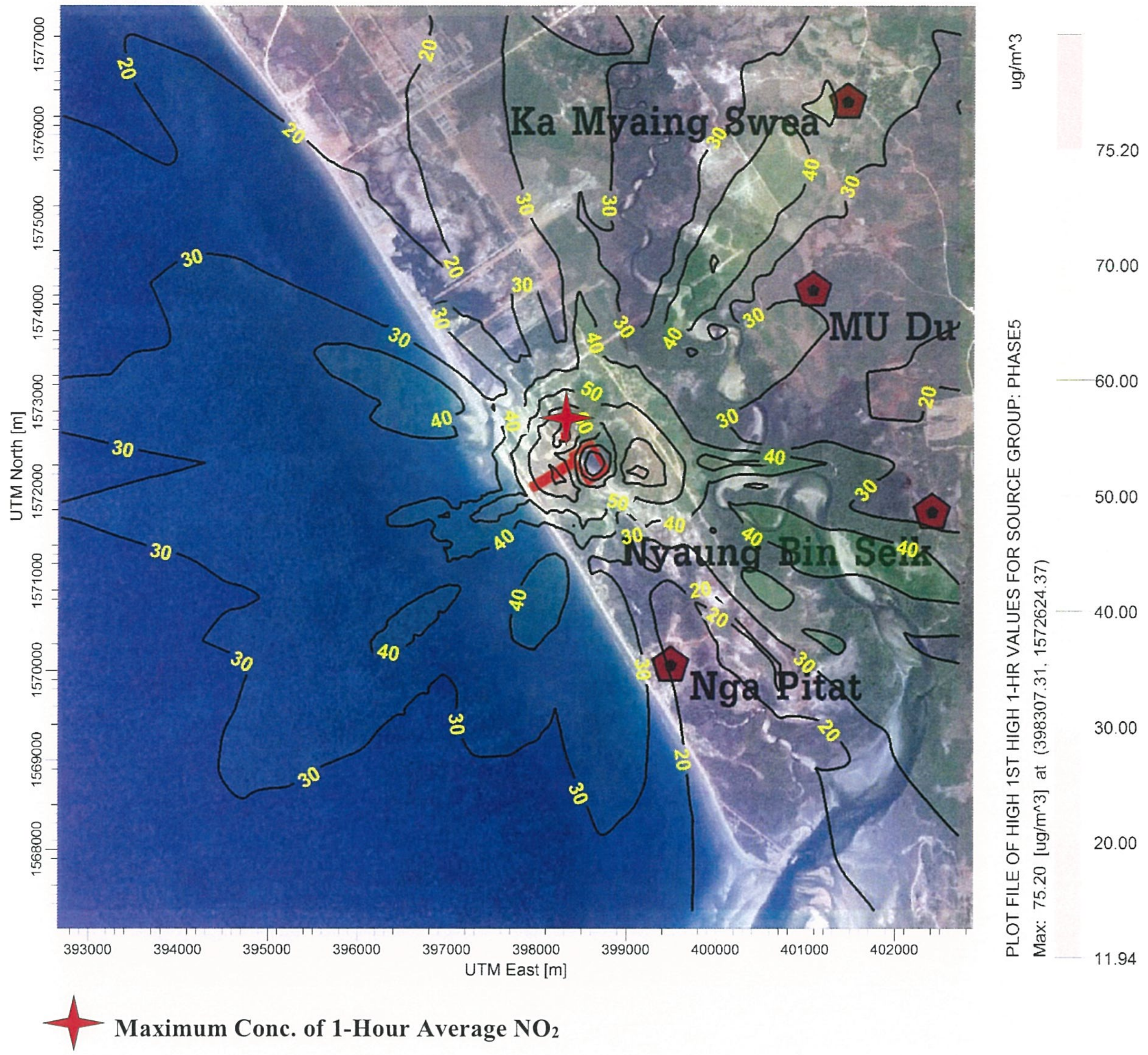


FIGURE 6.5-13: ISOPLETE OF 1-HOUR AVERAGE CONCENTRATION OF NO_2 (PHASE 5 (GEPP#1, HRSG1, HRSG2, GEPP#2, HRSG3, HRSG4, HRSG5))

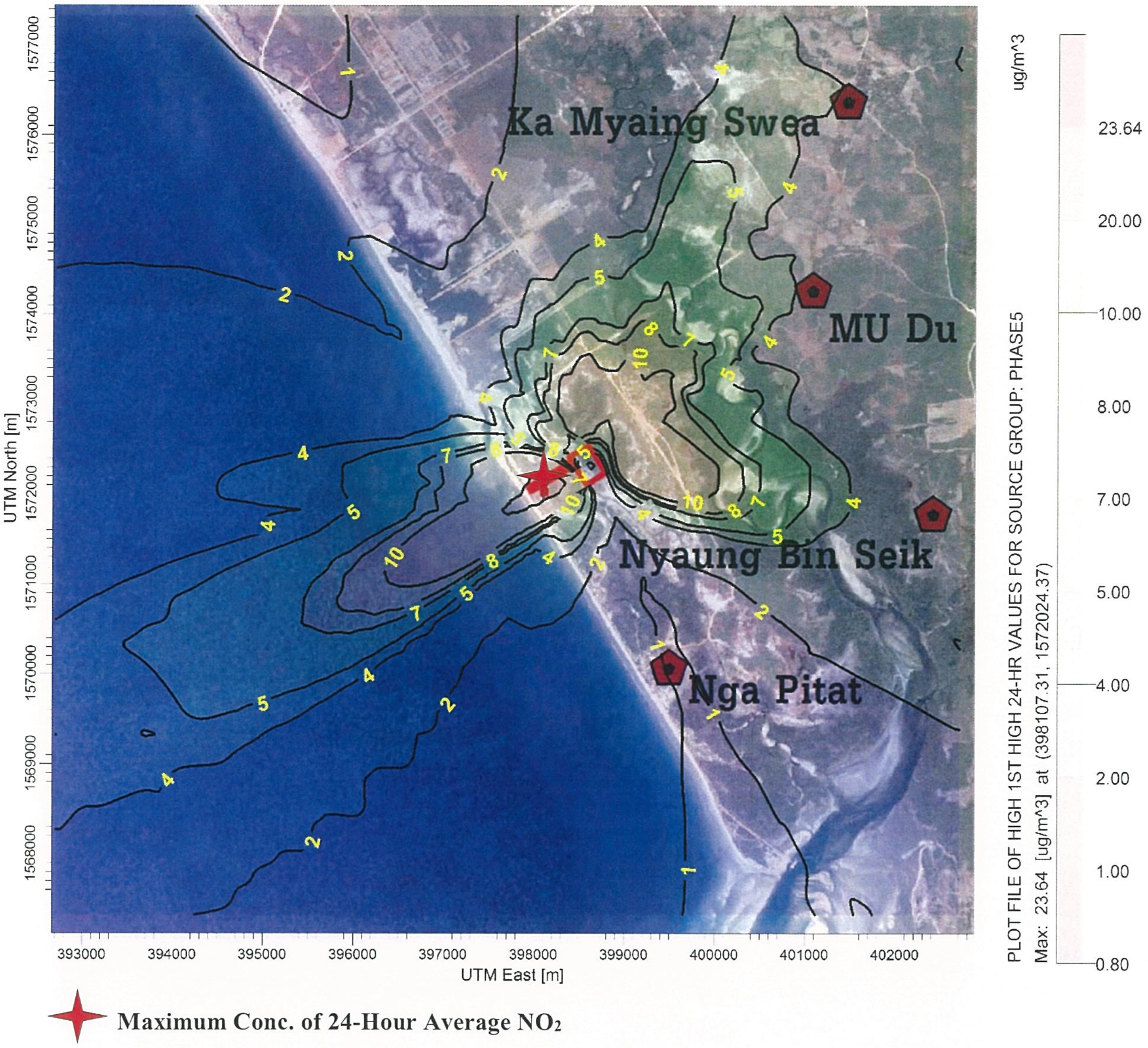


FIGURE 6.5-14: ISOPLETE OF 24-HOUR AVERAGE CONCENTRATION OF NO_2 (PHASE 5 (GEPP#1, HRSG1, HRSG2, GEPP#2, HRSG3, HRSG4, HRSG5))

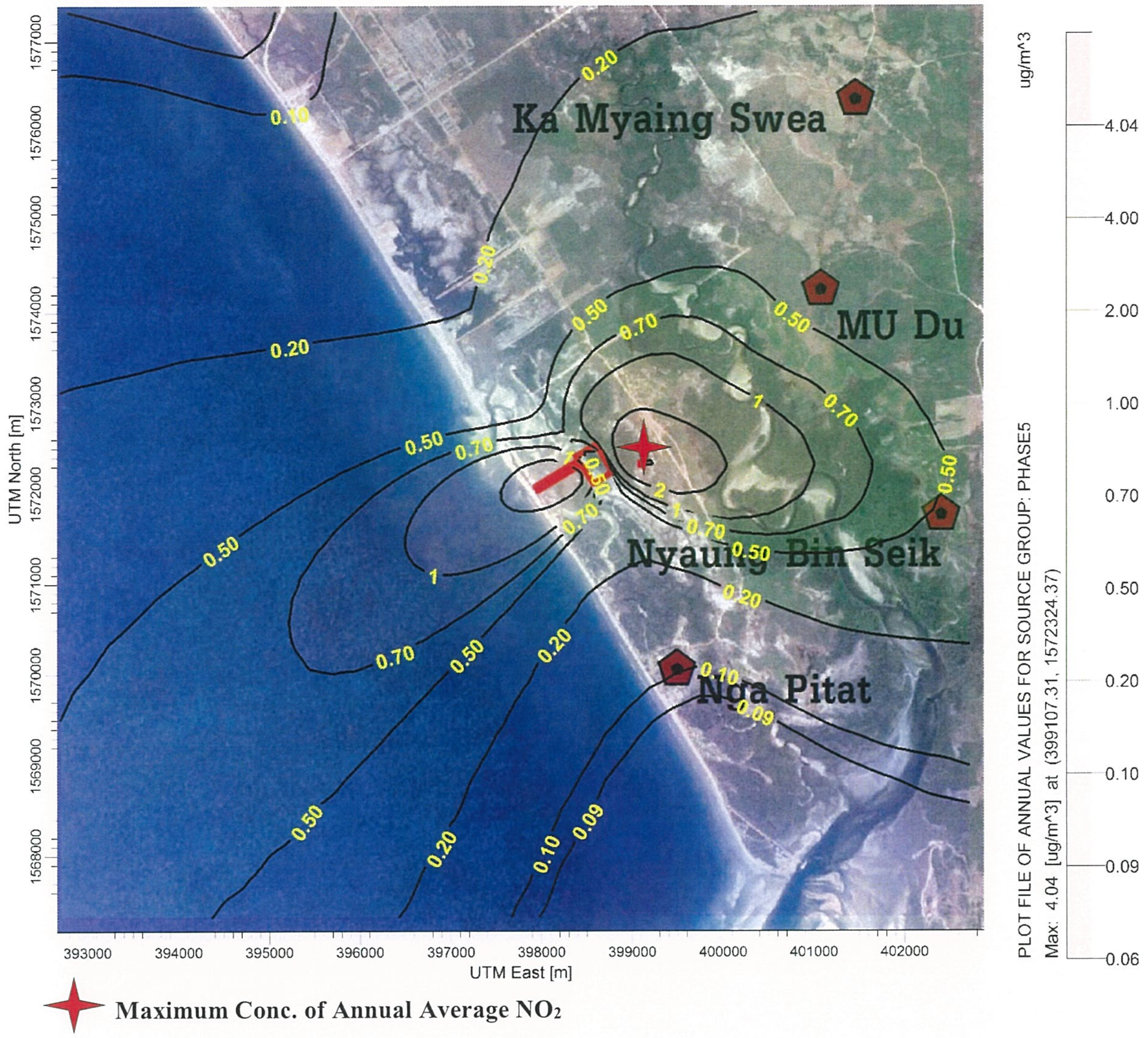


FIGURE 6.5-15: ISOPLETE OF ANNUAL AVERAGE CONCENTRATION OF NO_2 (PHASE 5 (GEPP#1, HRSG1, HRSG2, GEPP#2, HRSG3, HRSG4, HRSG5))

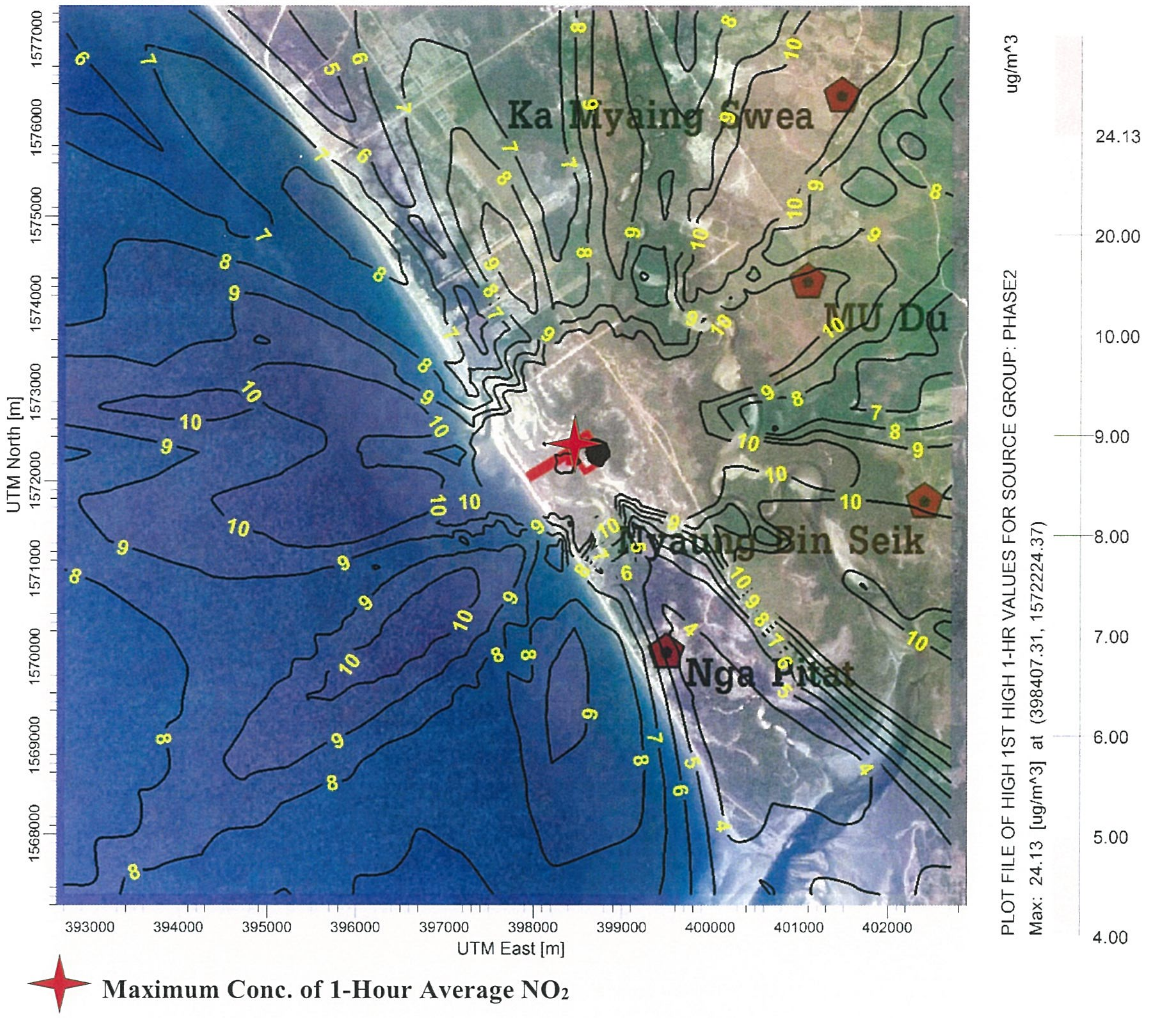


FIGURE 6.5-16: ISOPLETE OF 1-HOUR AVERAGE CONCENTRATION OF NO_2 (PHASE 2 (GEPP#1, HRSG1_BYPASS, HRSG2_BYPASS))

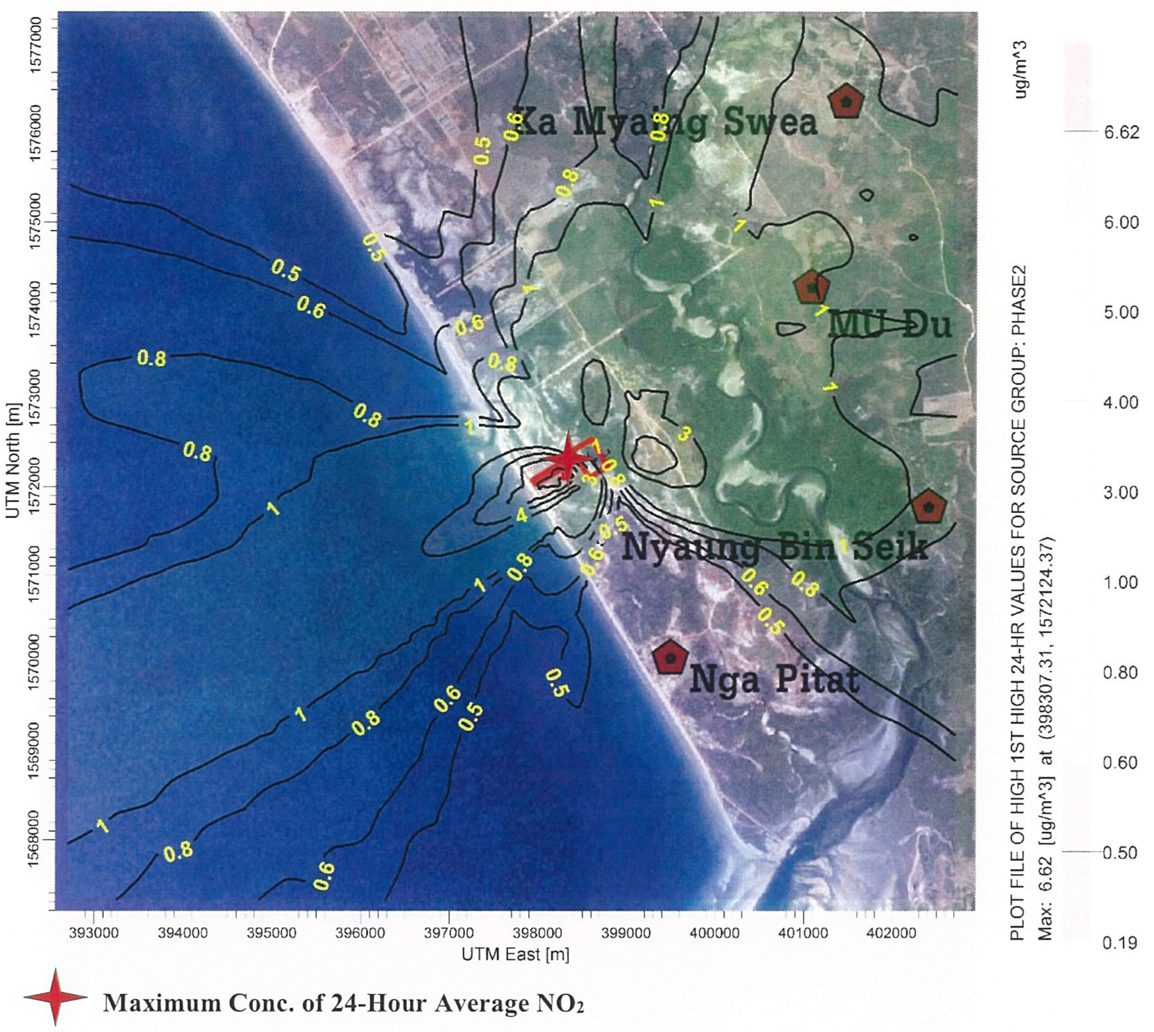


FIGURE 6.5-17: ISOPLETE OF 24-HOUR AVERAGE CONCENTRATION OF NO_2 (PHASE 2 (GEPP#1, HRSG1_BYPASS, HRSG2_BYPASS))

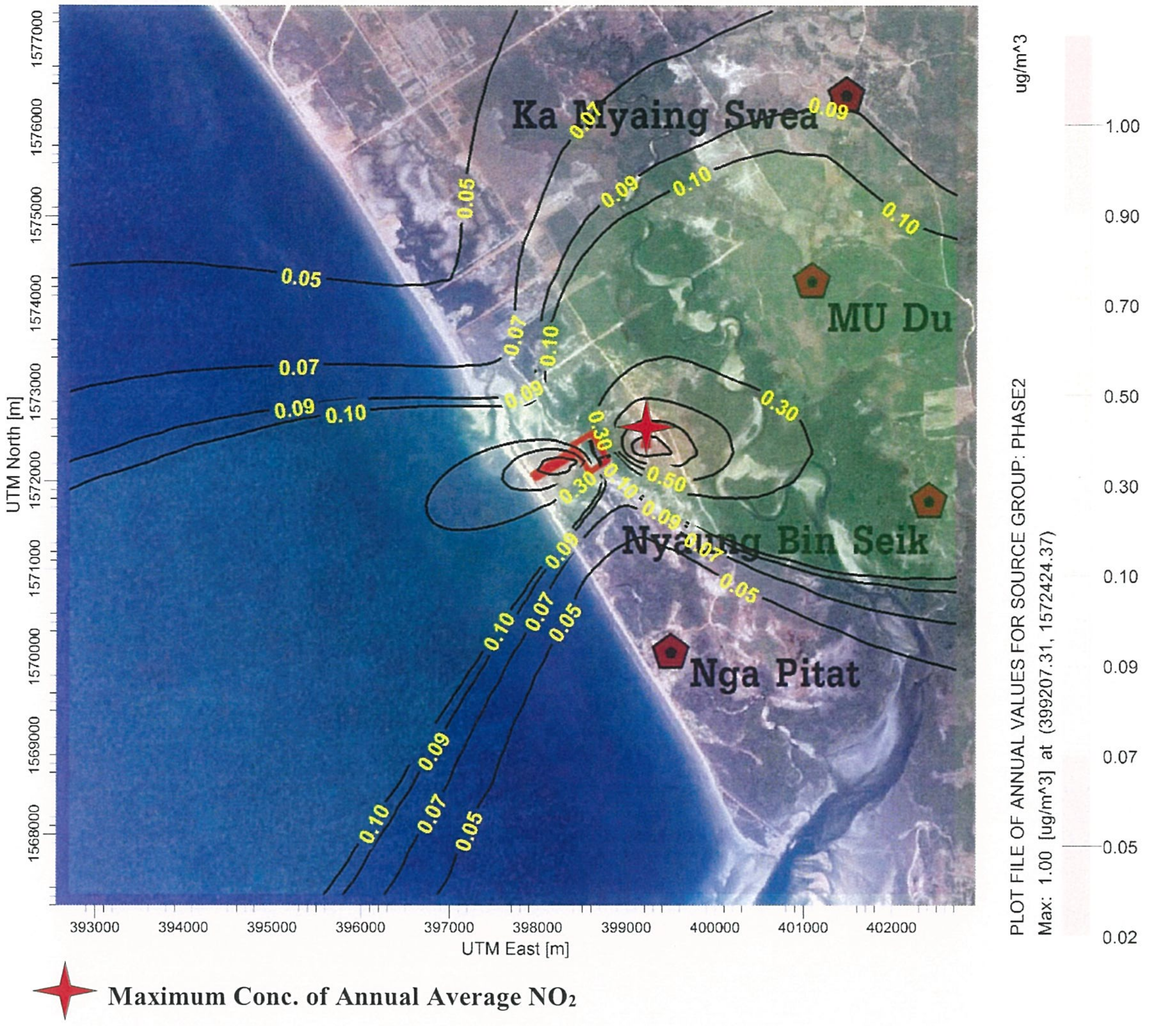
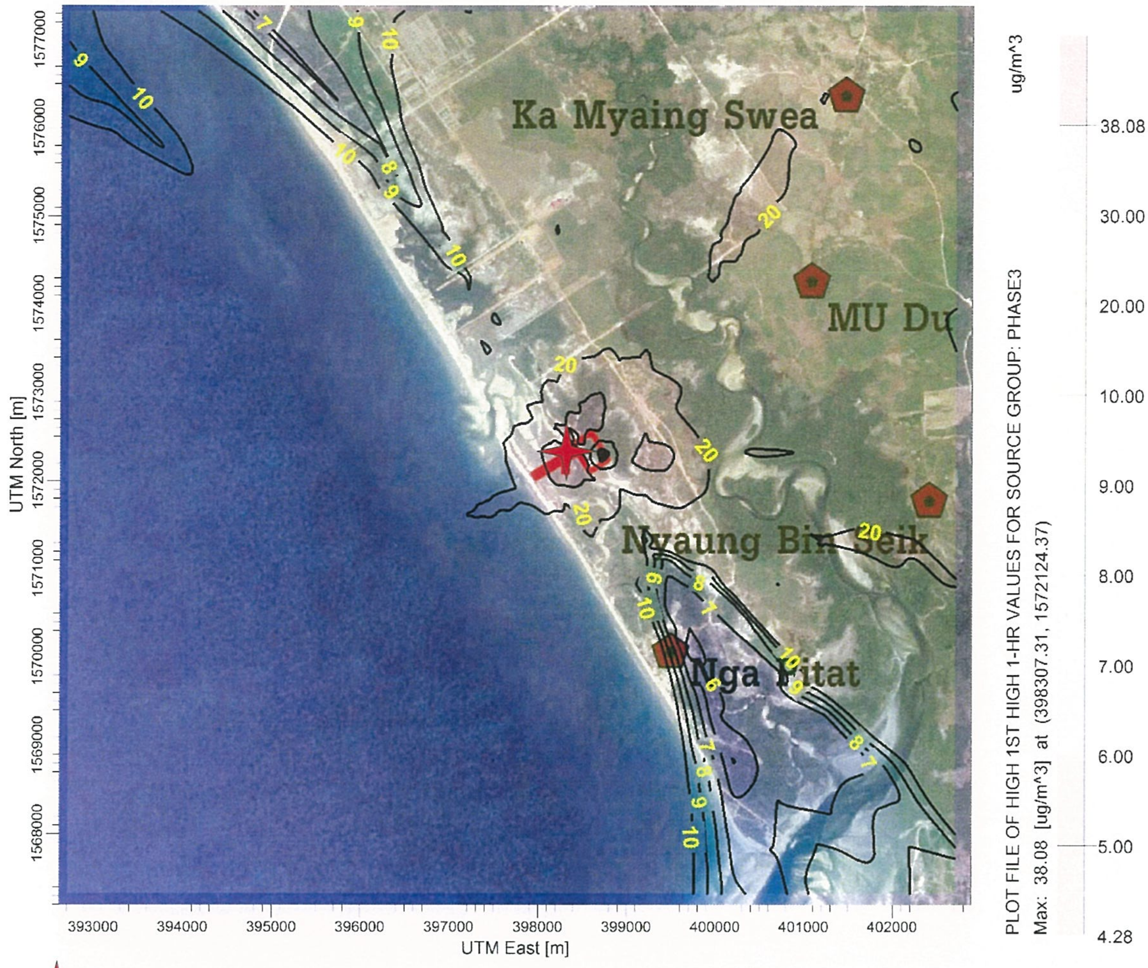


FIGURE 6.5-18: ISOPLETE OF ANNUAL AVERAGE CONCENTRATION OF NO_2 (PHASE 2 (GEPP#1, HRSG1_BYPASS, HRSG2_BYPASS))



Maximum Conc. of 1-Hour Average NO_2

FIGURE 6.5-19: ISOPLETE OF 1-HOUR AVERAGE CONCENTRATION OF NO_2 (PHASE 3 (GEPP#1, HRSG1_BYPASS, HRSG2_BYPASS, GEPP#2))

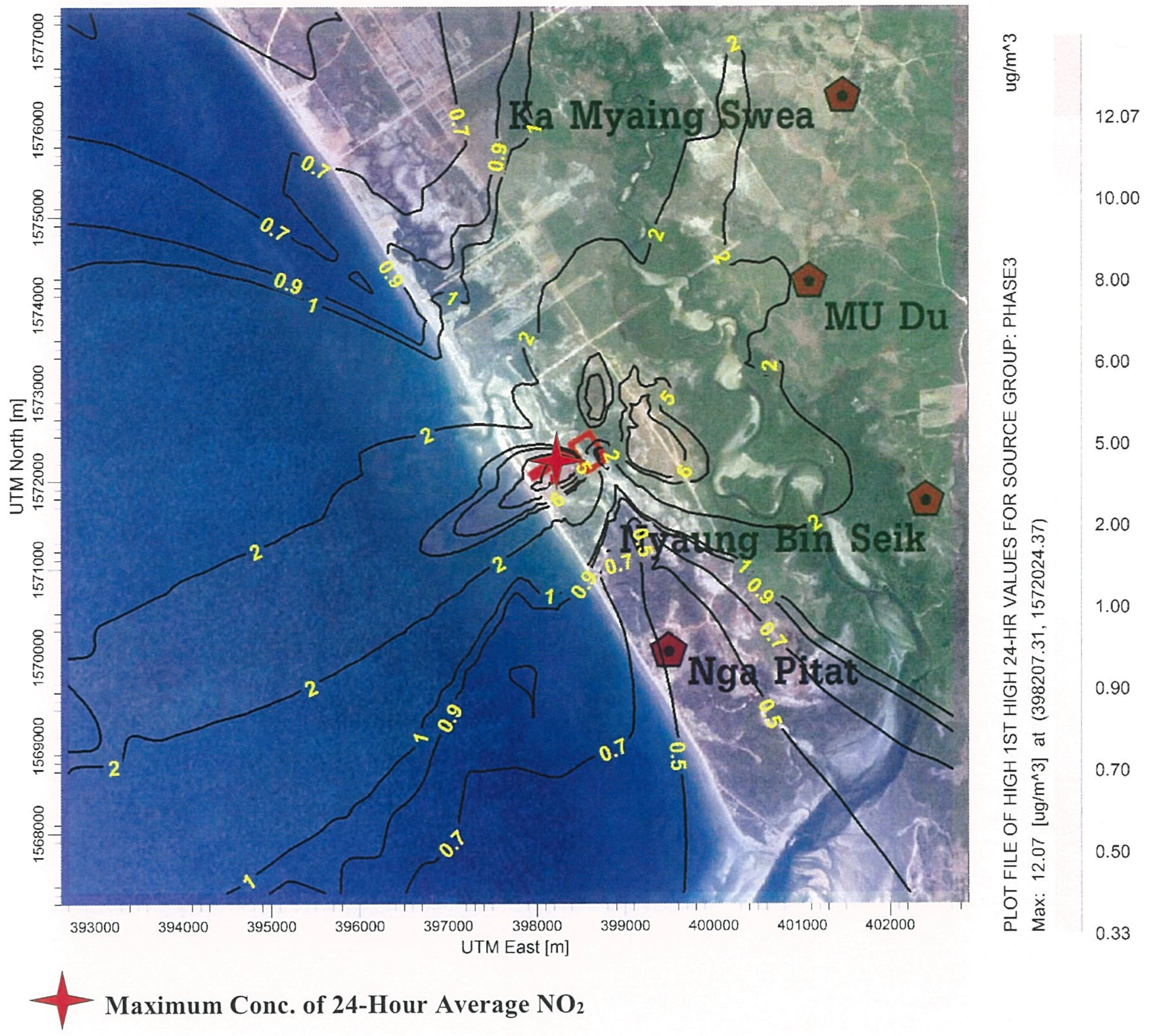
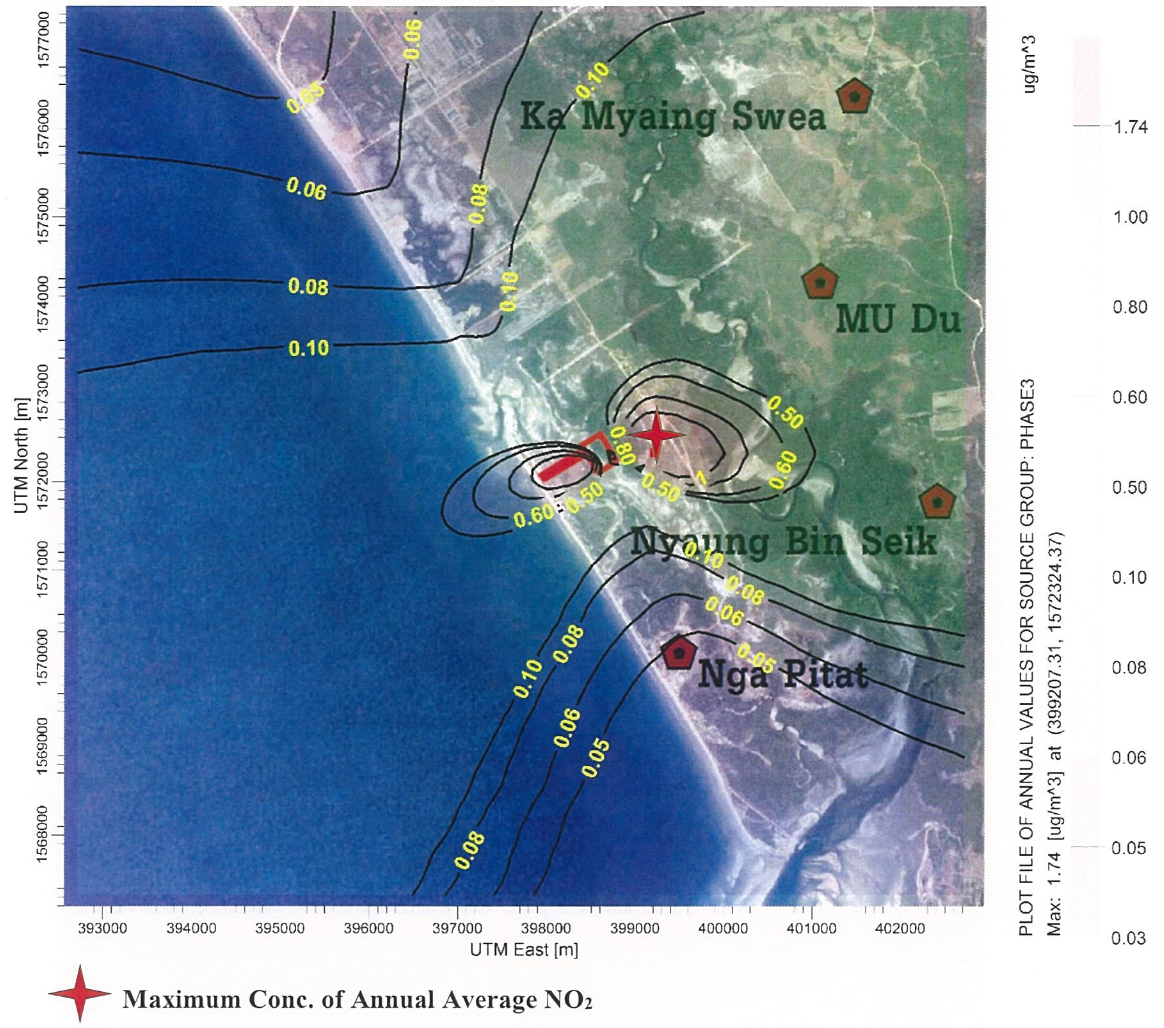


FIGURE 6.5-20: ISOPLETE OF 24-HOUR AVERAGE CONCENTRATION OF NO_2 (PHASE 3 (GEPP#1, HRSG1_BYPASS, HRSG2_BYPASS, GEPP#2))



IGURE 6.5-21: ISOPLETE OF ANNUAL AVERAGE CONCENTRATION OF NO_2 (PHASE 3 (GEPP#1, HRSG1_BYPASS, HRSG2_BYPASS, GEPP#2))

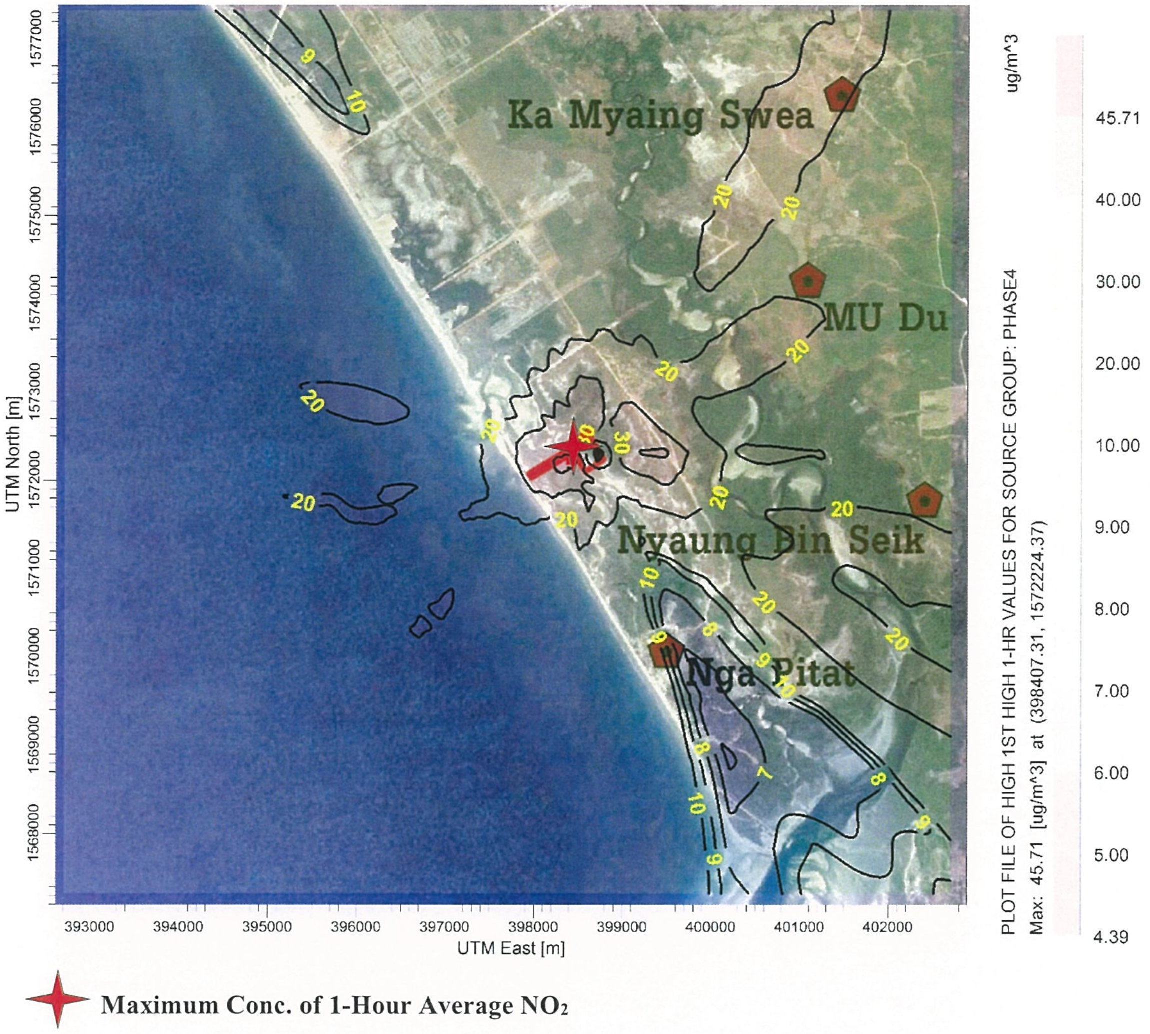


FIGURE 6.5-22: ISOPLETE OF 1-HOUR AVERAGE CONCENTRATION OF NO_2 (PHASE 4 (GEPP#1, HRSG1_BYPASS, HRSG2_BYPASS, GEPP#2, HRSG3_BYPASS, HRSG4_BYPASS))

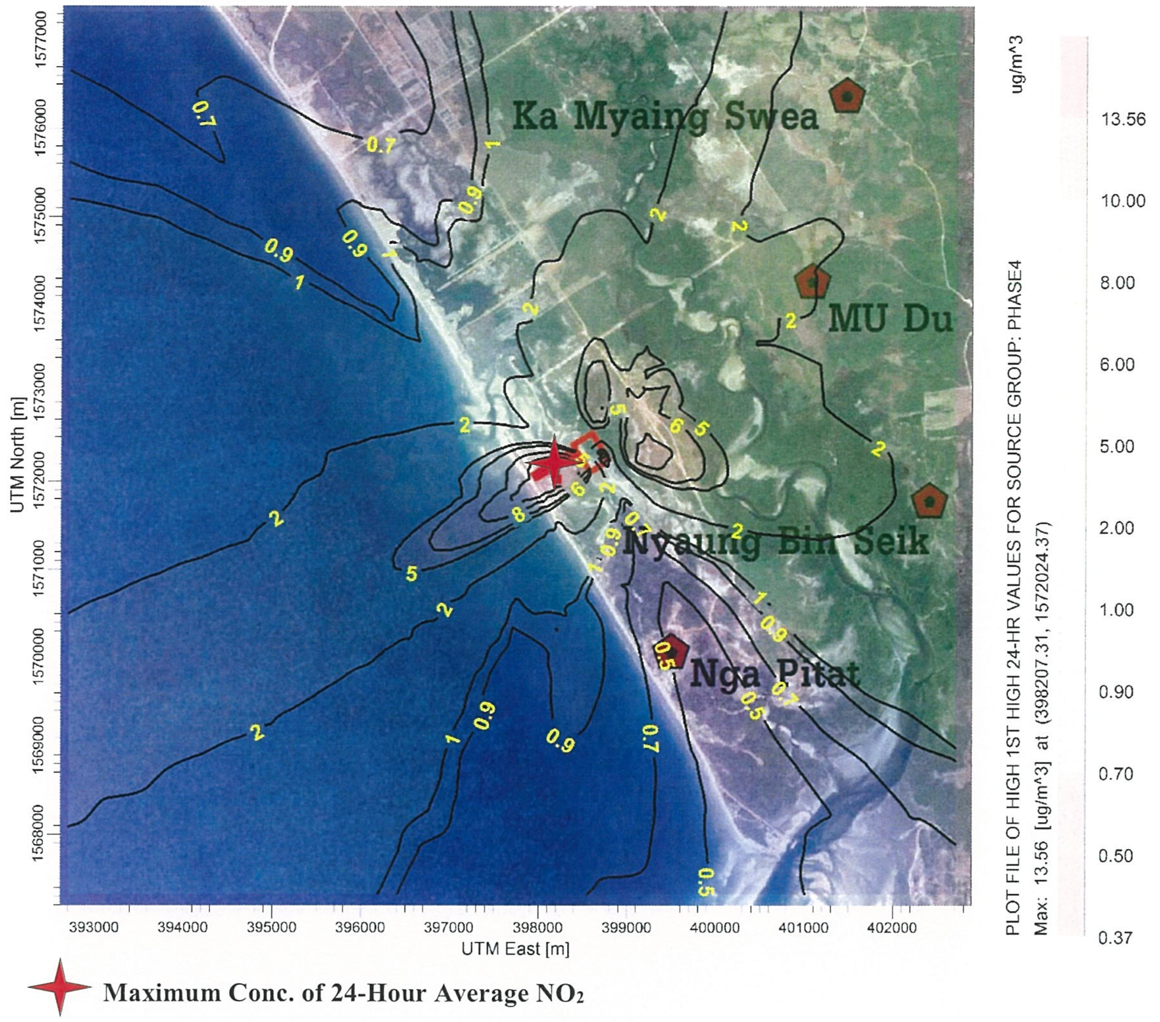


FIGURE 6.5-23: ISOPLETE OF 24-HOUR AVERAGE CONCENTRATION OF NO_2 (PHASE 4 (GEPP#1, HRSG1_BYPASS, HRSG2_BYPASS, GEPP#2, HRSG3_BYPASS, HRSG4_BYPASS))

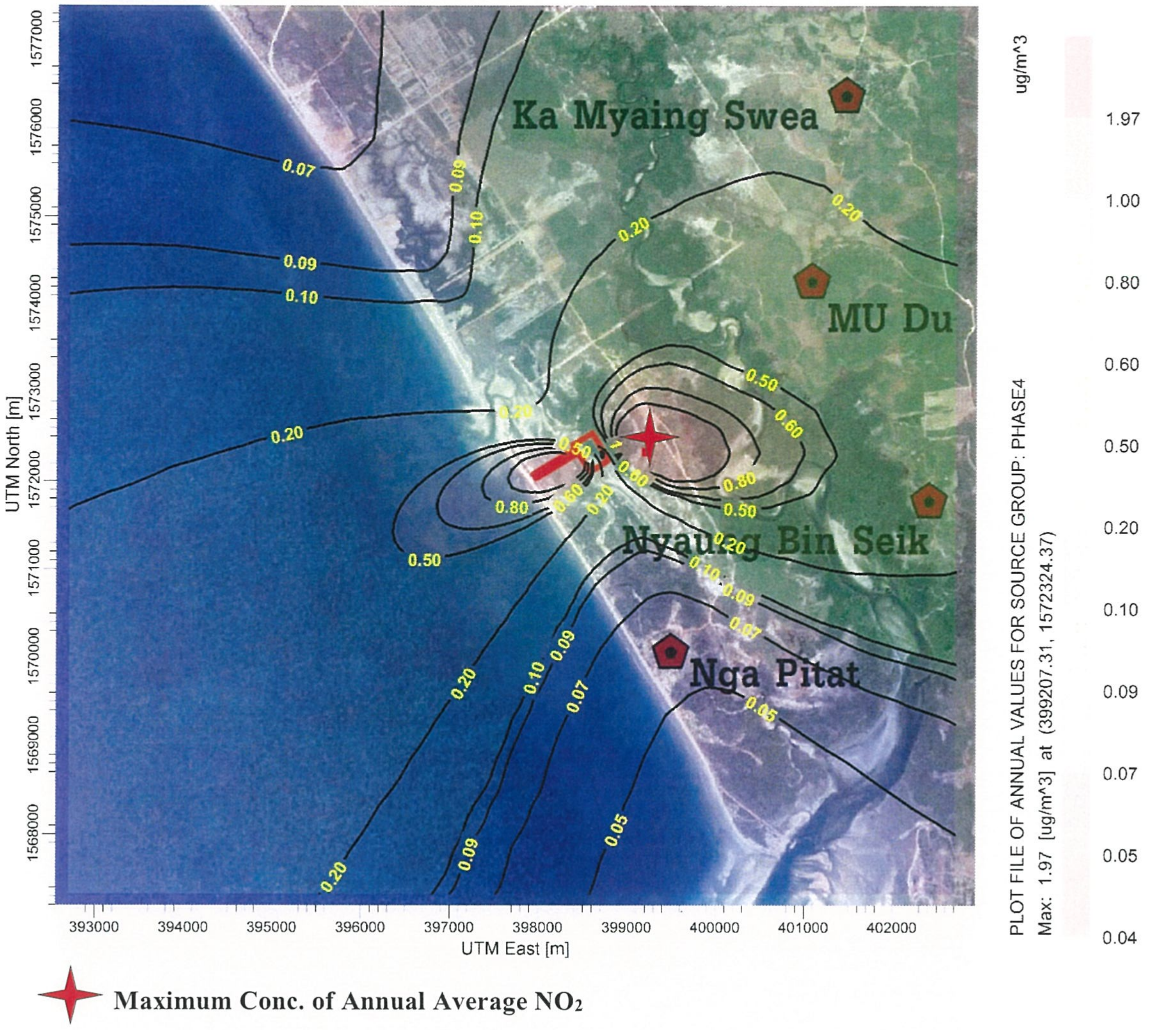


FIGURE 6.5-24: ISOPLETE OF ANNUAL AVERAGE CONCENTRATION OF NO_2 (PHASE 4 (GEPP#1, HRSG1_BYPASS, HRSG2_BYPASS, GEPP#2, HRSG3_BYPASS, HRSG4_BYPASS))

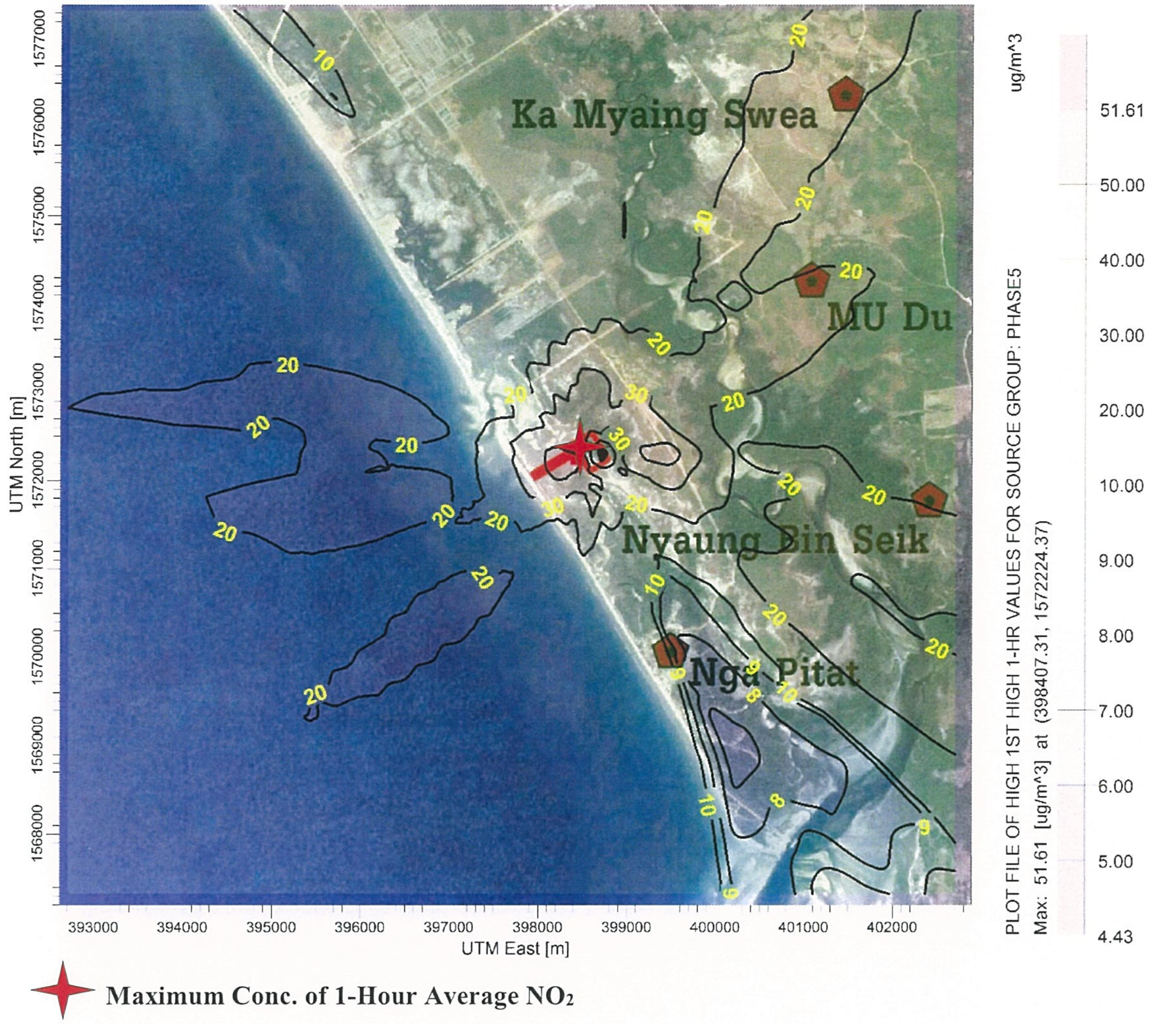


FIGURE 6.5-25: ISOPLETE OF 1-HOUR AVERAGE CONCENTRATION OF NO_2 PHASE 5 (GEPP#1, HRSG1_BYPASS, HRSG2_BYPASS, GEPP#2, HRSG3_BYPASS, HRSG4_BYPASS, HRSG5_BYPASS))

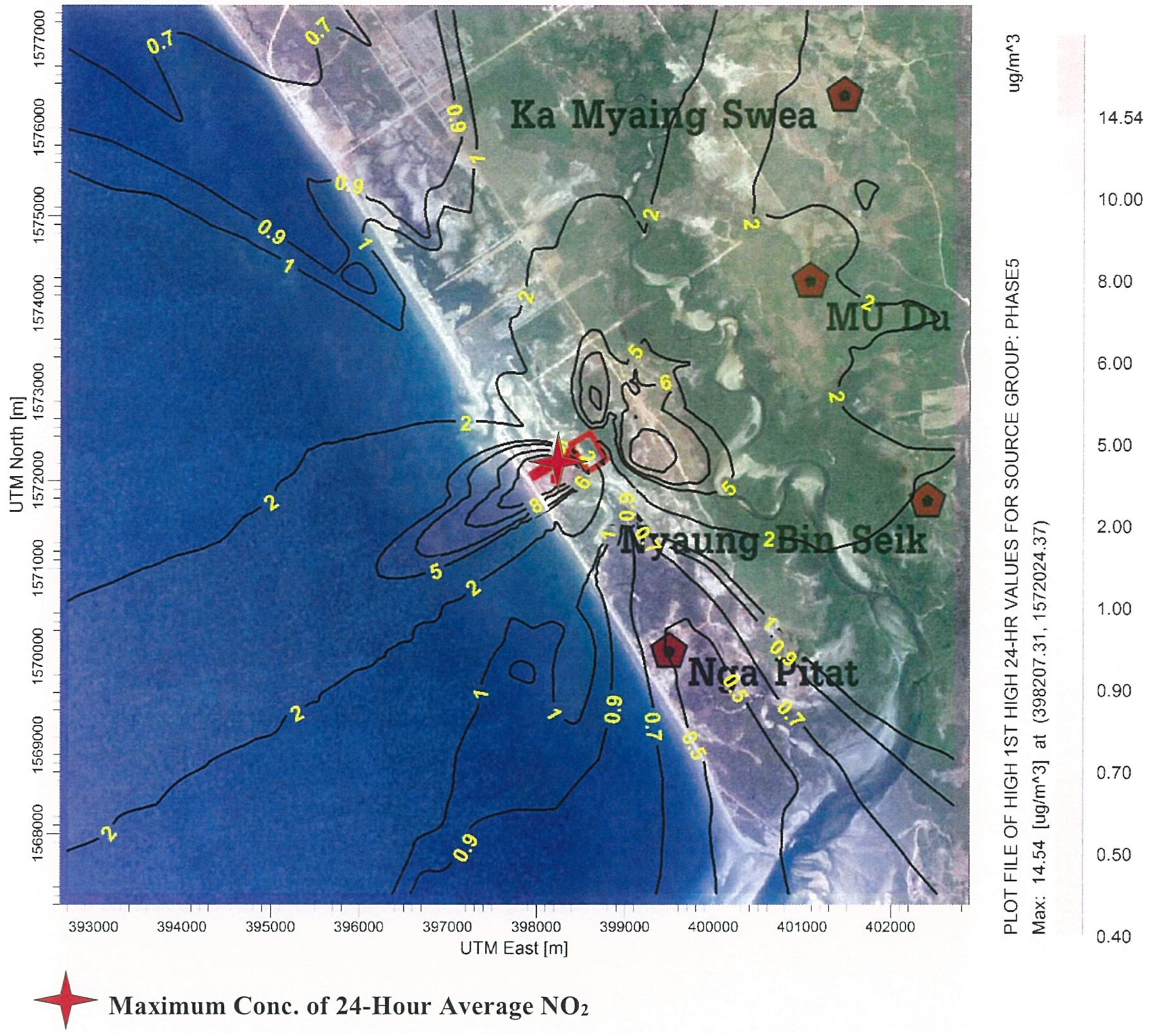


FIGURE 6.5-26: ISOPLETE OF 24-HOUR AVERAGE CONCENTRATION OF NO_2 PHASE 5 (GEPP#1, HRSG1_BYPASS, HRSG2_BYPASS, GEPP#2, HRSG3_BYPASS, HRSG4_BYPASS, HRSG5_BYPASS))

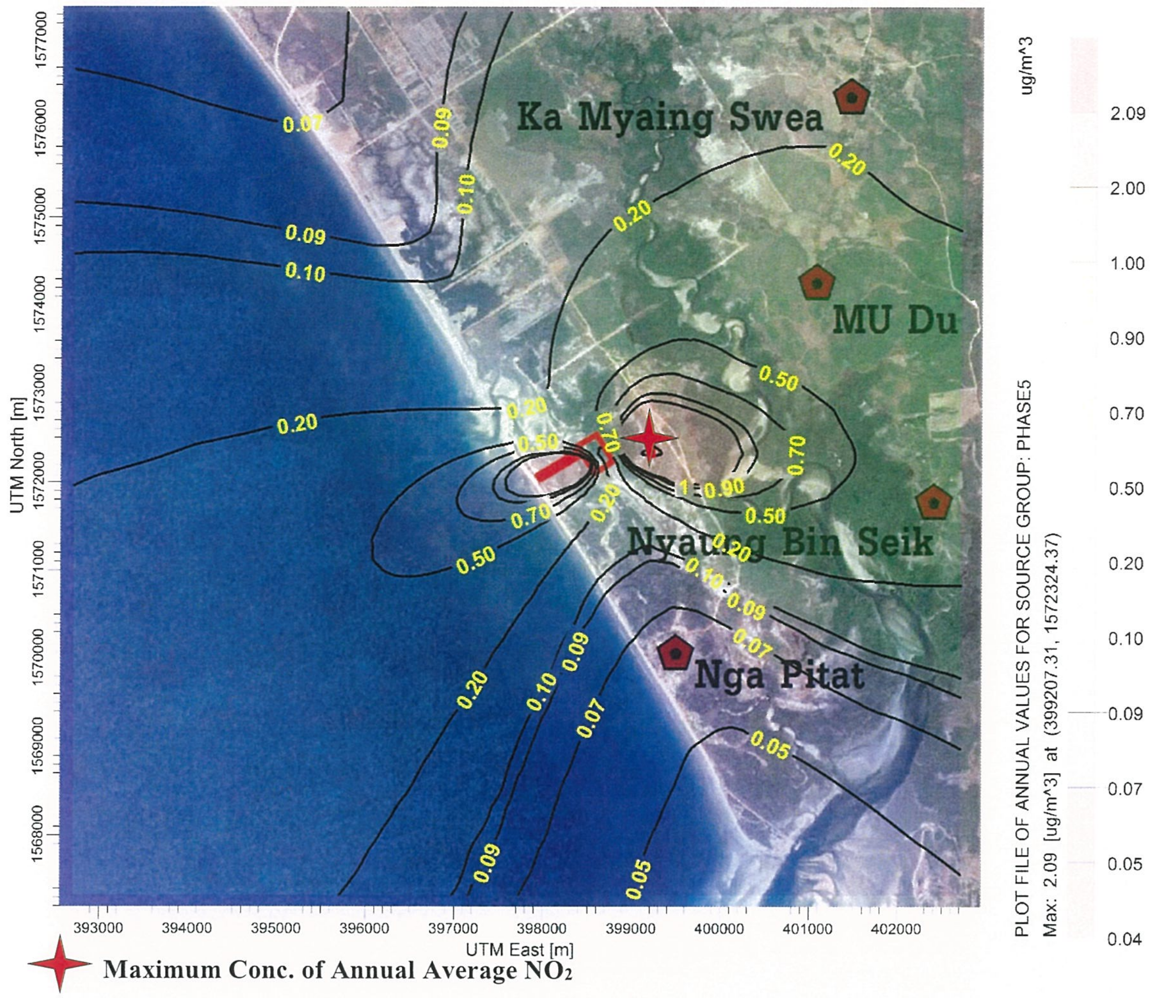


FIGURE 6.5-27: ISOPLETE OF ANNUAL AVERAGE CONCENTRATION OF NO_2 PHASE 5 (GEPP#1, HRSG1_BYPASS, HRSG2_BYPASS, GEPP#2, HRSG3_BYPASS, HRSG4_BYPASS, HRSG5_BYPASS))

6.5.3.2 Noise

A. Sources

During the operation phase of the power plant, the major noise sources will be:

- Gas engine generators
- Gas turbine generators
- Heat recovery steam generation equipment (HRSG)
- Steam turbine generators

Other minor noise sources will also require noise mitigation to ensure that the nighttime noise limit at the property boundary will be met. These minor sources will include boiler feed pumps (BFPs), the generator step-up transformer (GSUT), and various pumps, blowers, valves, and vents.

B. Sensitivity of Receptors

The closest receptor to the power plant site and intake and outfall pipeline installation are Nga Pitat community. This village is located about 2.23 km from the south of the power plant site. This village has about 180 households. The most noise sensitive receptor in the village is Yay Wai Monastery and Nga Pitat School.

C. Magnitude of Noise Levels at Sources

Table 6.5-11 compiles data on noise levels of major process equipment and facilities similar to those of this Project.

D. Noise Control Targets

The noise control targets will follow the guidelines in Table 1.7-1 and Table 2.3-1 of IFC's General EHS Guidelines, April 30, 2007.

Based on the guidelines, the noise control targets are:

1) Noise emission from the power plant will not cause the following impacts at the nearest receptor location off-site:

- Not exceeding 70 dB(A) both during day time (07.00-22.00) and nighttime (22.00-07.00); or
- An increase in the background noise level not greater than of 3 dB(A)

2) Ambient noise level outside the power plant building not exceeding 85 dB(A) on a condition that no plant personnel will be exposed to this maximum noise level more than 8 hours per day without hearing protection.

TABLE 6.5-11

NOISE LEVELS OF EQUIPMENT AND FACILITIES OF POWER PLANTS

Component	L_{WA} [dB(A)]	Measures
ALL	122	
Air Intake Opening	106	Sound power level per unit, Standard with silencer and filter, taken into account an anti icing with compressor air
Air Intake duct	99	Sound power level per unit, standard duct, no special insulation, silencer located partly inside the building
Turbine building	114	Standard cladding, no special requirements, this noise source was calculated with worst case conditions, steam turbine bypass operation during start up or shut down of the plant, during normal operation the sound power level will be significantly lower
Turbine building ventilation intake	110	Standard weather hoods, about 70 m^2 open surface, no special requirements, this noise source was calculated with worst case conditions, steam turbine bypass operation during start up or shut down of the plant, during normal operation the sound power level will be significant lower
Turbine building ventilation outlet roof fans	106	Standard fans
Generator	99	Sound power level per unit (GT Generators outdoor only ST Generator inside turbine building), the Generators are equipped with a standard enclosure with integrated ventilation
Exhaust Diffuser	103	Sound power level per unit, standard duct with thermal / acoustical insulation
HRSG, including transition duct stack body and pipe work	107	Sound power level per unit, Standard outdoor HRSG with thermal insulation for the gas path and the steam piping
Stack Mouth	105	Sound power level per unit, short silencer in the exhaust system
Feed water pump set	112	Standard equipment
Main Transformer	104.3	Sound power level per unit (three main transformers) Standard equipment
Aux. Transformer	90	Sound power level per unit
Atmospheric drain vessel, start up ejector	105	Operation during start up only, plant on part load during the main operation of the blow out. Standard single stage silencer required
Gas receiving and metering station	99	Standard equipment
ACC	114	Standard ACC
Combustion turbine, generator re-cooler	111	Both units together, worst case scenario, summer operation day time, during night time the re-cooler will have a significant lower sound power level, since the fans run usually temperature controlled

Source: Denizli Power Station, Acoustical study far field noise, U. Scholz, January 2010

E. Mitigation Measures to Reduce Noise at Sources

The EPC contractor will be required to achieve the noise level outside the power plant building not exceeding 85 dB(A) as indicated in the above stated control targets. This could be achieved though: (i) plant layout and siting of process equipment with consideration of distances from the receptors; and (ii) incorporating the most noise control techniques in the designs such as using acoustic machine enclosures; selecting structures according to their noise isolation effect to envelop the building; using mufflers or silencers in intake and exhaust channels; using sound absorptive materials in walls and ceilings; using vibration isolators and flexible connections (e.g., helical steel springs and rubber elements); applying a carefully detailed design to prevent possible noise leakage through openings or to minimize pressure variations in piping. Some examples of noise control at sources are given below:

Heat Recovery Steam Generation Equipment

Reduction of the noise emission of the HRSG unit could be accomplished by choosing locations where the noise contribution at the property boundary would be minimal. In addition, some noisier components should be placed indoors when possible. For example, the HRSG blow down tank, often a significant source of noise during plant startup, could be erected inside the STG building as opposed to its more typical outdoor location directly beside the HRSGs. It is technically feasible to achieve a sound level of 48 dB(A) at a distance of 1 meter from the sides of the enclosure.

Steam Turbine Generator

The steam turbine generator actually consists of multiple noise sources- the steam turbine, generator, condenser, and condensate pumps. The steam turbine and generator usually come from the manufacturer with a weather enclosure, though it is not necessarily acoustic.

Since the STG will be located indoors, no special noise mitigation measures would be required. Noise emissions from the STG would be controlled within the building using the acoustic building walls and roof. The required level of noise reduction would depend on the distance between the STG and the boundary.

The ventilation system of the STG building would consist of building wall fan openings to provide inlet air and exhaust louvers. The building wall fans may have a sound level of up to 99 dB(A). In this case, additional equipment for noise reduction will be installed to maintain noise level at written in the standard.

Steam Piping

In combined cycle facilities where startup or shutdown operation is included in the noise regulation, the high-pressure steam piping and condenser fans are major noise sources. High-pressure steam moving along pipes, elbows, valves, and vents causes high levels of mid-to-high-frequency noise. In these situations, the proper noise reduction equipment will be installed to bring reduce the noise level to acceptable level according to standard.

F. Predicted Impacts on the Receptors

The noise levels at the nearest receptor, Nga Pitat community, were calculated using the same method as that used in the study of noise impacts during the construction phase presented in ***Section 6.4.3.3***. The calculations were based on the following plausible assumptions:

- The EPC contractor will design and install effective noise control facilities at sources to achieve the ambient noise level in the power plant site not exceeding 85 dB(A).
- The ambient noise level in the power plant site at 3 m from the boundary walls will not exceed 80 dB(A).

The calculation results for various noise levels at the boundary are presented in ***Table 6.5-12***. The results give the following conclusions:

- At the control level of 85 dB(A) at the boundary, the power plant would increase the noise level at the receptor by about 27.6 dB(A). With the background noise level of 60.7 dB(A), the impact of the power plant would result in the total noise level of 60.7 dB(A) compared with the control target of 70 dB(A) for 24 hours noise exposure.
- At the control level of 85 dB(A), the power plant would increase the background hourly noise level at the receptors by not more than 0.04 dB(A), thus meeting the noise control target of less than 3 dB(A).

G. Mitigation Measures

No additional measures would be required. However, it would be prudent to grow trees along the boundary facing the receptors to further reduce the power plant noise.

H. Evaluation of the Significance of Impacts

The impact of the power plant noise was evaluated as shown below. The noise control deserves high priority in the design and operation of the power plant.

Impact category	Direct impact
Impact duration	Throughout the operation period.
Impact extent	Local, confined to areas around the project sites
If no control **-Impact magnitude** **-Impact severity**	 Resulting ambient noise levels much above the applicable standards High, cause annoyance and may have health effects
If control **-Impact magnitude** **-Impact severity**	 Resulting ambient noise levels fully met the applicable standards Negligible
Control priority	High

TABLE 6.5-12

CALCULATIONS OF NOISE LEVELS AT THE RECEPTOR

Receptor, r2	2,230	m
Noise source,r1	3	m
Log (r2/r1)	2.87	
Noise level at r2, Lp1	Source-20x(Log(r2/r1)	
Ambient noise level,Lp2	60.7 dB(A) Leq-24 hr.	
- Low	47.6 dB(A) Leq-1 hr.	
-High	72.7 dB(A) Leq-1 hr.	
Net noise level	10xLog(10^(Lp2/10)+10^(LP1/10))	

Noise level of sources at 3 m from the boundary

Control level	1	85.0
Control level	2	80.0
Control level	3	75.0
Control level	4	70.0

Unit: dB(A)

PARTICULARS	NOISE LEVEL AT BOUNDARY				STANDARD
Impact-Leq-24 hr.					
LP0-ambient	60.7	60.7	***60.7***	60.7	
LP1-Source	85.0	80.0	***75.0***	70.0	
LP2-Effect of Source	27.6	22.6	17.6	12.6	
LOG(LP0)	1.8	1.8	***1.8***	1.8	
LOG(LP2)	1.4	1.4	***1.2***	1.1	
Combined Noise Level	60.7	60.7	***60.7***	60.7	70.0 [a/,b/]
Impact-Leq-1 hr					
High Combined Noise Level	72.7	72.7	***72.7***	72.7	
Increase	0.00	0.00	***0.00***	0.00	3.0 [c/]
Low Combined Noise Level	47.6	47.6	***47.6***	47.6	
Increase	0.04	0.01	***0.00***	0.00	3.0 [c/]

Remark: [a/] Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, U.S. EPA (U.S. Environmental Protection Agency). 1974.

[b/] Notification of Guidelines for Community Noise, World Health Organization (WHO), 1999.

[c/] Environmental, Health, and Safety Guidelines: General EHS GUIDELINES: ENVIRONMENTAL NOISE MANAGEMENT of International Finance Corporation, 2007

6.5.3.3 Wastewaters

A. Sources

The power plant is designed to use the once-through seawater cooling system. Therefore, the power plant will not have cooling towers, thus no wastewater from cooling tower bleed-off or blow-down.

Wastewaters will come from the following sources:

- HRSG blow down and quench water
- Domestic sewage
- Plant wash water
- Wastewater from the demineralization unit

B. Sensitivity of Receptors

The wastewaters will be treated and most of the treated effluent will be reused at the power plant site. The remaining volume will need to be discharged into the sea, about 800 m from the front boundary of the power plant construction site.

The coastal water near the Project site is currently unpolluted as inferred from its high levels of dissolved oxygen and very low concentrations of heavy metals and organic contaminants (see ***Section 5.2.12***). Discharging the treated effluent from the power plant into the coastal water would have insignificant impacts on seawater quality and the marine ecosystem.

C. Estimated Wastewater Volume and BOD Load

Based on the water balance diagram in ***Figure 6.5-28,*** the volume of each wastewater was estimated as shown in ***Table 6.5-13***.

TABLE 6.5-13

ESTIMATES OF WASTEWATER VOLUME

Wastewater Category	Volume, m^3/d
HRSG blow down and quenching water	186.96
Domestic sewage[1/]	2.8
Plant wash water and others	707.04
Wastewater from the demineralization unit	82.56
Total	**979.36**

Note: [1/] Assume sewage volume is about 80% of water consumption.

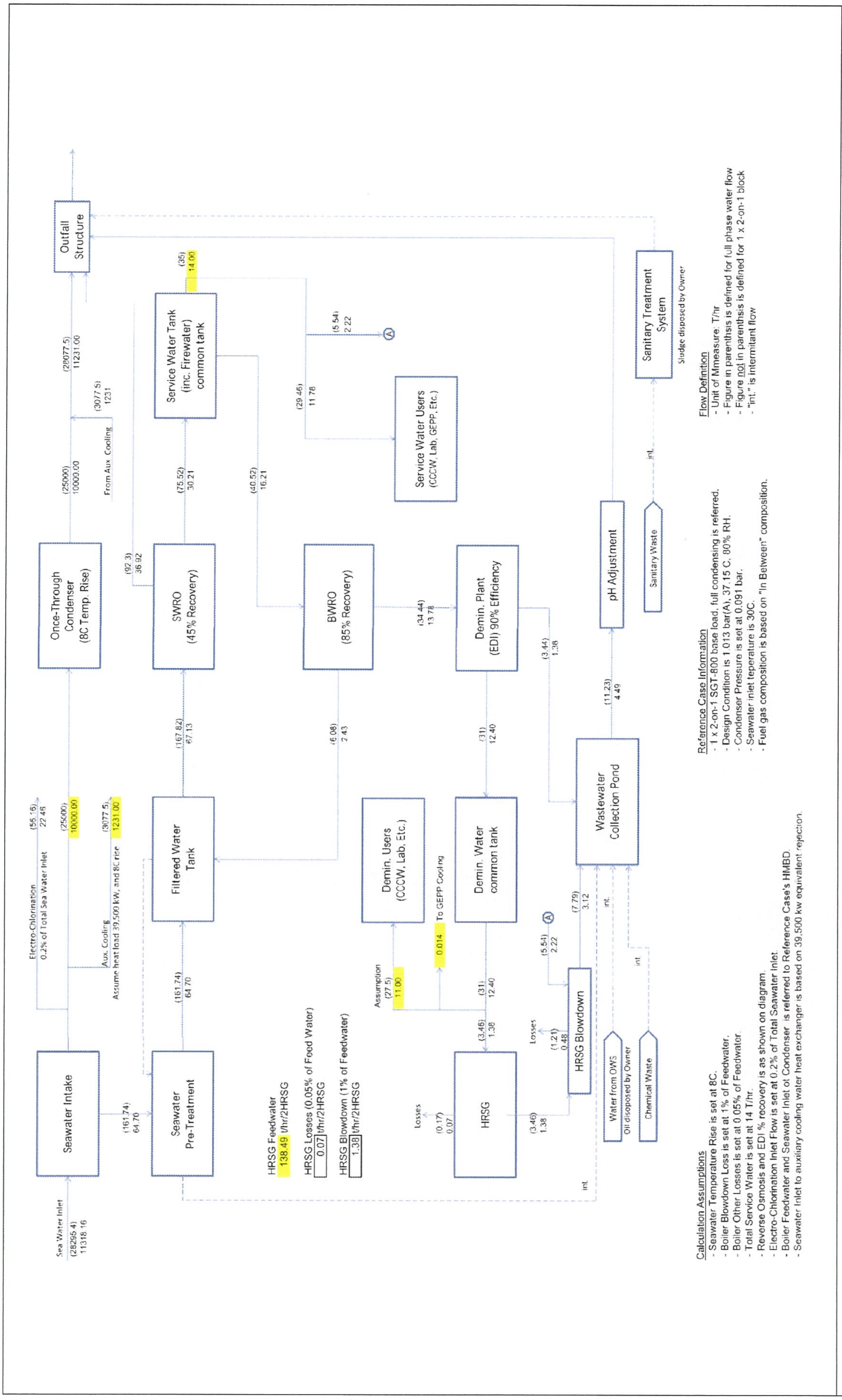


FIGURE 6.5-28 : PRELIMINARY WATER BALANCE DIAGRAM OF THE PROJECT

Only the domestic sewage has organic pollutants measured as BOD. The other wastewaters contain chemicals in the forms of various inorganic compounds which are non-toxic. Based on a BOD load of 50 gm/capita/day, the total BOD load of the domestic sewage from 50 persons would be only about 3.25 kg/day. The contribution of the domestic sewage from 50 power plant staff will be very small compared to the total BOD load received by the sea.

D. Mitigation Measures for Wastewater Reduction at Sources

The figures represent the possible minimum volume. It is not technically feasible to reduce the volume of these wastewaters at sources.

E. Control Target

The treated effluent will meet the following standard limits at least 95% of the times the effluent quality is tested over six consecutive months.

• pH, Standard unit	6-9
• Temperature increase, °C[1/]	<3
• TSS, mg/l	<50
• Oil and grease, mg/l	<10
• Total residual chlorine, mg/l	<0.2
• BOD5*, mg/l	<50
• COD, mg/l	<250

Remark: [1/] Temperature increase due to discharge of once-through cooling water
* The amount of dissolved oxygen consumed in five days by biological processes breaking down organic matter.

The above standards are prescribed in the National Environmental Quality (Emission) Guidelines, 29 December 2015 adopted from Pollution Prevention and Abatement Handbook, 1998.

F. Predicted Impacts on the Receptors

Only the domestic sewage from the power plant will contain organic pollutants measured as BOD which could deplete dissolved oxygen level of the seawater. However, the domestic sewage from the power plant will have negligible impact on the dissolved oxygen level of the sea as the treatment process will remove the BOD load by not less than 80%, thus reducing the BOD load to 0.65 kg/day. This pollution load is very small compared to the dilution volume of the coastal waters. Therefore, it will not have any impacts on the sea water quality.

The remaining two categories of wastewaters are inorganic in nature containing various inorganic compounds naturally present in water. Considering their total volume of about 310 m^3/day, even without pH adjustment, they will have negligible impact on the pH level of the seawater considering the high dilution volume of the seawater.

Therefore, the inorganic wastewaters will not have any impacts on the seawater quality and the marine ecosystem. The inorganic wastewaters from the power plant will also not have any impact on the beach forest and mangrove patches existing at about 800 m away from the power plant.

G. Wastewater Management Measures

The EPC contractor will prepare detailed design of wastewater treatment facilities based on the following design concept:

(A) The wash water contaminated with oil will be segregated for oil removal in an oil separator. The oil-free wash water will then be combined with other wastewater streams for further treatment.

(B) Wastewater from the demineralization unit and the boiler blow down mixed with quenching water will be combined and neutralized in a neutralization basin before combining with other wastewater streams for further treatment.

(C) Domestic sewage will be treated in a small treatment plant. The treated effluent will be combined with the effluents from (a) and (b).

(D) The combined effluent will be discharged into a pond before disposal through a sewer pipe into the Andaman Sea, about 800 m away. Water in the pond will be used for landscaping.

(E) A drainage system will be provided to collect surface runoff and discharged into the retention pond or directly into the sea through the effluent outfall. Surface runoff from open areas contaminated by oil will be separately drained into an oil separator before discharging into the main drainage system.

F. Evaluation of the Significance of Impacts

The impact of the treated effluent discharge on the seawater quality and marine ecosystem was evaluated as shown below. The wastewater management issue deserves medium priority during the operational phase.

Impact category	Direct impact
Impact duration	Throughout the operational life of the power plant
Impact extent	Mainly on the sea of effluent discharge point.
Impact magnitude	Very small
Impact severity	Insignificant
Control priority	Medium

6.5.3.4 Cooling Water Intake

A. Source

At full load, the power plant will abstract 675,210 m^3/day (28,134 m^3/h) of seawater for cooling purposes. The seawater intake pipe will be laid on the sea bed and the intake point will be 1,940 m offshore. Seawater will flow through the intake pipe to the pumping station which will discharge the seawater through the condenser system.

B. Nature of Impacts

Pumping a large volume of seawater could cause impingement and entrainment of marine lives. Impingement occurs when marine organisms are trapped against intake screens by the velocity and force of water flowing through them. Entrainment occurs when smaller organisms pass through an intake screen and into the condenser system.

Mortality of impinged organisms will depend on intake designs, especially the screening systems at the pumping station, and among marine life species, age, and water conditions. Some hardy species may be able to survive impingement and be returned to the sea, but the 24-hour survival rate of less robust species and/or juvenile fish may be less than 15%[8]. Organisms entrained into process equipment are generally considered to have a mortality rate of 100%. The number of affected organisms will vary considerably with the volume of the seawater, flow velocity in the intake system, and the use of mitigation measures developed to minimize their impact. If intake velocities are sufficiently low, fish may be able to swim away to avoid impingement or entrainment. The swimming performance for different species of fish can predict the types and ages most vulnerable, however, even large fish are frequently caught on intake screens, indicating that swimming ability is not the only factor in impingement.

Table 6.5-14 presents data on the densities of phytoplankton, zooplankton, fish eggs and fish larvae collected near the intake point during the dry and wet seasons (Station SW1). Based on the intake volume of 679,100 m^3/day, the quantities of marine organisms in the cooling water will be 1.06×10^{11} cells for phytoplankton, 8.59×10^{10} cells for zooplankton, 1.01×10^{9} eggs for fish eggs, and 6.03×10^{8} individuals for fish larvae, if no mitigation measures are implemented.

As the seawater will be abstracted from about 1 m above the sea bed, the quantities of planktons in the seawater will be less than the above figures. The reason is the densities of phytoplankton and zooplankton are highest at surface due to high light intensity. In addition, planktons have short life cycles and can reproduce very quickly. Therefore, the impact of seawater intake on planktons is considered low.

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8 An Overview of Seawater Intake Facilities for Seawater Desalination, Tom Pankratz, texaswater.tamu.edu/readings/desal/seawaterdesal.pdf

TABLE 6.5-14

DENSITY OF MARINE ORGANISMS IN STATION SW1

Organism	Dry season (January, 2015)	Wet season (October, 2015)
Phytoplankton (cell/m^3)	21,150	291,200
Zooplankton (cell/m^3)	112,800	27,300
Fish eggs (egg/m^3)	1,372	226
Fish larvae (individual/m^3)	826	123

The abstraction of seawater above the seabed will also have no impact on benthos which live on the seabed.

C. Mitigation Measures

The design of the seawater intake and pumping system will consider minimizing the impacts on marine organisms. The design will consider the following mitigation measures:

Velocity Cap – The cover placed over the vertical terminal of an offshore intake pipe is called a "velocity cap". The cover converts vertical flow into horizontal flow at the intake entrance to reduce fish entrainment. It has been noted that fish will avoid rapid changes in horizontal flow and velocity cap intakes have been shown to provide 80-90% reduction in fish impingement at two California power stations, and a 50-62% impingement reduction versus a conventional intake at two New England power stations (EPA Efficacy of Cooling Water Intake Structures)[9].

Screens at the Pumping Station – The pumping station will be equipped with screens with 10 cm spacing to block the passage of large marine lives, and travelling screens with 10 mm mesh size to prevent entrainment of small marine organisms. The travelling screens would be effective for preventing entrainment of fish larvae but not fish eggs.

D. Residual Impacts

The losses of planktons, fish larvae and fish eggs in the intake seawater will be unavoidable despite adoption of the above mitigation measures in the design. However, the volume of intake of 679,000 m^3/day is a negligible portion of the entire volume of coastal water in Dawei. Therefore, the losses of small marine organisms would not have significant impacts on the marine ecosystem.

E. Evaluation of the Significance of Impacts

The impact of cooling water intake was evaluated as shown below. The control is of low priority in the operation of the power plant. However, a routine marine ecological monitoring program should be carried out.

[9] An Overview of Seawater Intake Facilities for Seawater Desalination, Tom Pankratz, texaswater.tamu.edu/readings/desal/seawaterdesal.pdf

Impact category	Direct impact
Impact duration	Throughout the operation period.
Impact extent	Local, confined to areas around the project sites
If no control **-Impact magnitude** **-Impact severity**	 Low Negligible
If control **-Impact magnitude** **-Impact severity**	 Low Negligible
Control priority	Low

6.5.3.5 Thermal Discharge

A. Source

The cooling water system is designed to allow temperature of the cooling water to increase from about 30° C to about 38° C after passing through the condensers. The warm spent cooling water will be returned to the sea through the outfall pipe and diffusers at about 1,240 m offshore. The warm water will rise up and form a thermal plume which will vary in boundaries with tidal conditions.

B. Thermal Plume Modeling

When the warm spent cooling water is discharged into a cooler coastal waters, a thermal plume will be formed over a distance before the warm spent cooling water is completely mixed with the ambient water. ***Figure 6.5-29*** shows a typical thermal plume which consists of near-field and far-field regions.

Conditions in the near-field zone are strongly dependent on the thermal emission rate, temperature of the spent cooling water, and the outfall design, i.e. depth of discharge, velocity of discharge, and the distribution of the discharge, i.e. jet or diffuser discharge. Conditions in the far-field zone are governed by the thermal emission rate, the receiving water characteristics such as turbulence and stratification, and surface cooling. The boundaries of the thermal plume will vary with tidal conditions.

In general, the outfall system for thermal discharge should be designed to ensure that the increase of ambient water temperature at the edge of mixing zone will not exceed the permissible regulatory standard. For this Project, the National Environmental Quality (Emission) Guidelines, 29 December 2015 sets the temperature increase due to discharge of once-through cooling water at not exceeding 3° C. However, the distance from the discharge point at which this 3° C is applicable is not prescribed in the Guidelines.

Temperature distribution in the thermal plume in this Project was investigated in a cooling water inlet/outlet study by a consultant, International Marine and Dredging Consultants (IMDC) engaged by the Project Proponent. The investigation employed TELEMAC 3-D model. **TELEMAC** is short for the open TELEMAC-MASCARET system, or a suite of finite element computer program owned by the Laboratoire National d'Hydraulique

et Environnement (LNHE), part of the R&D group of Électricité de France. The model is widely used in modeling coastal process.

Background data used in the modeling are:

- Discharge rate = 40,000 m^3/h or 11 m^3/s
- Temperature of the spent cooling water = 38° C
- Ambient water temperature = 30° C
- Current = north/south
- Tidal range = 5.71 m
- Tidal amplitude
  - Spring = 4.46 m
  - Neap = 0.89 m
  - Mean = 2.86 m

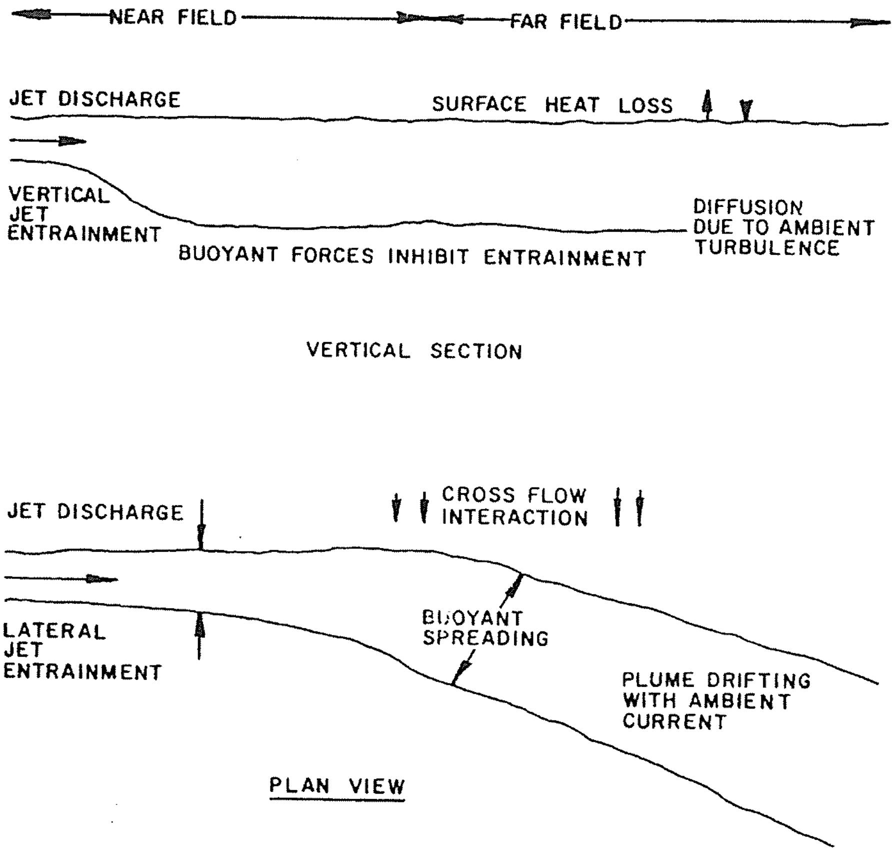


FIGURE 6.5-29 : SCHEMATIC CATEGARIZATION OF PLUME GEOMETRY ACCORDING TO PHYSICAL PROCESSES

The calculations were made under three tidal conditions-spring, neap and mean tides. The results of calculations are summarized in ***Figures 6.5-30*** to ***Figures 6.5-32***. The major findings are:

- The impacts of thermal discharge will be largest in spring tide due to its highest tidal amplitude. The thermal plume boundaries will be largest. The plume's length will extend about 2.92 km north of the discharge point and about 2.49 km south of the discharge point. The maximum plume width will be about 1.21 km. The plume will extend nearest to the shore.
- The temperature increase will be not exceeding 3°C at about 1 00 m from the discharge point.

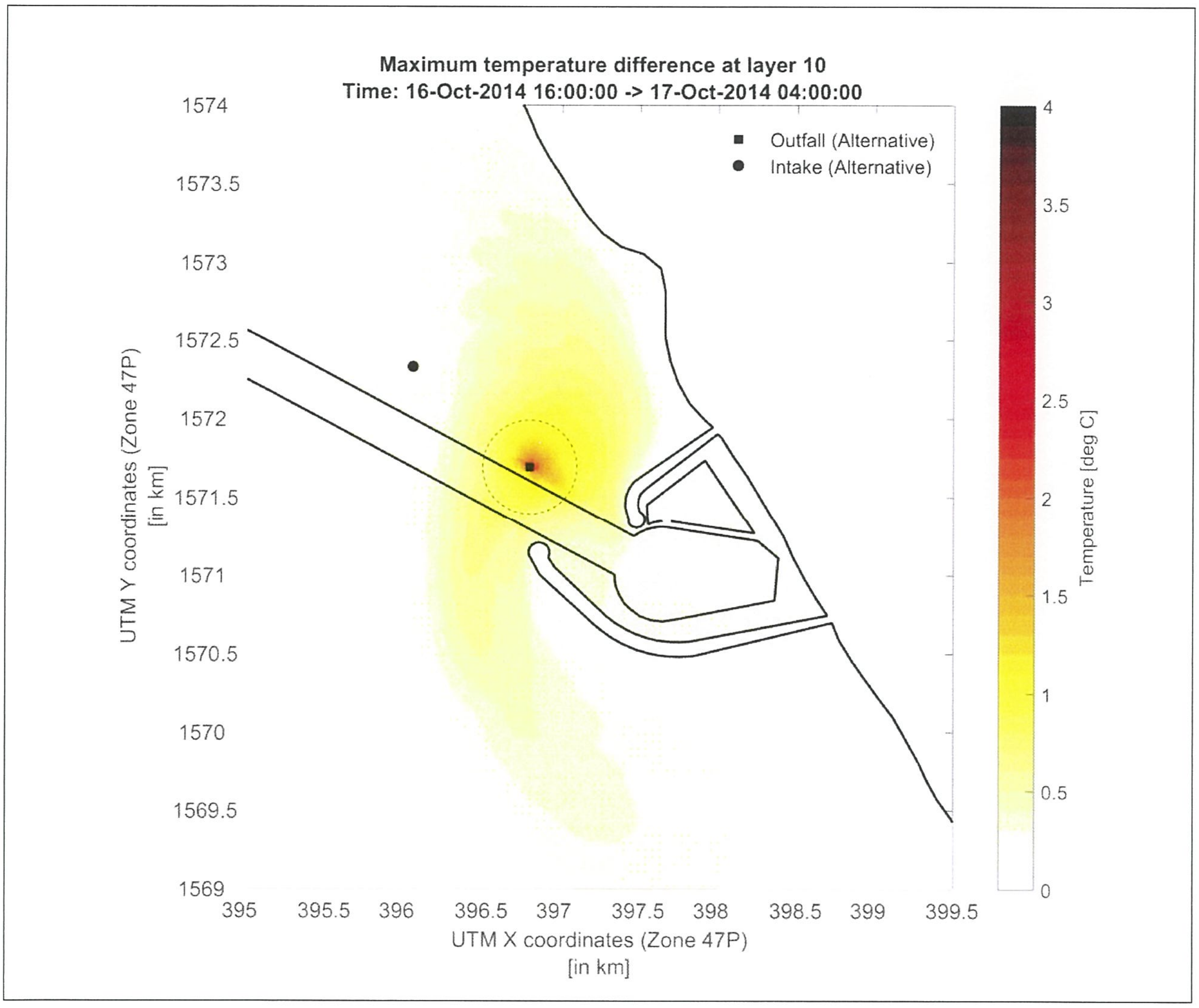


FIGURE 6.5-30 : THERMAL PLUME AT SPRING TIDE

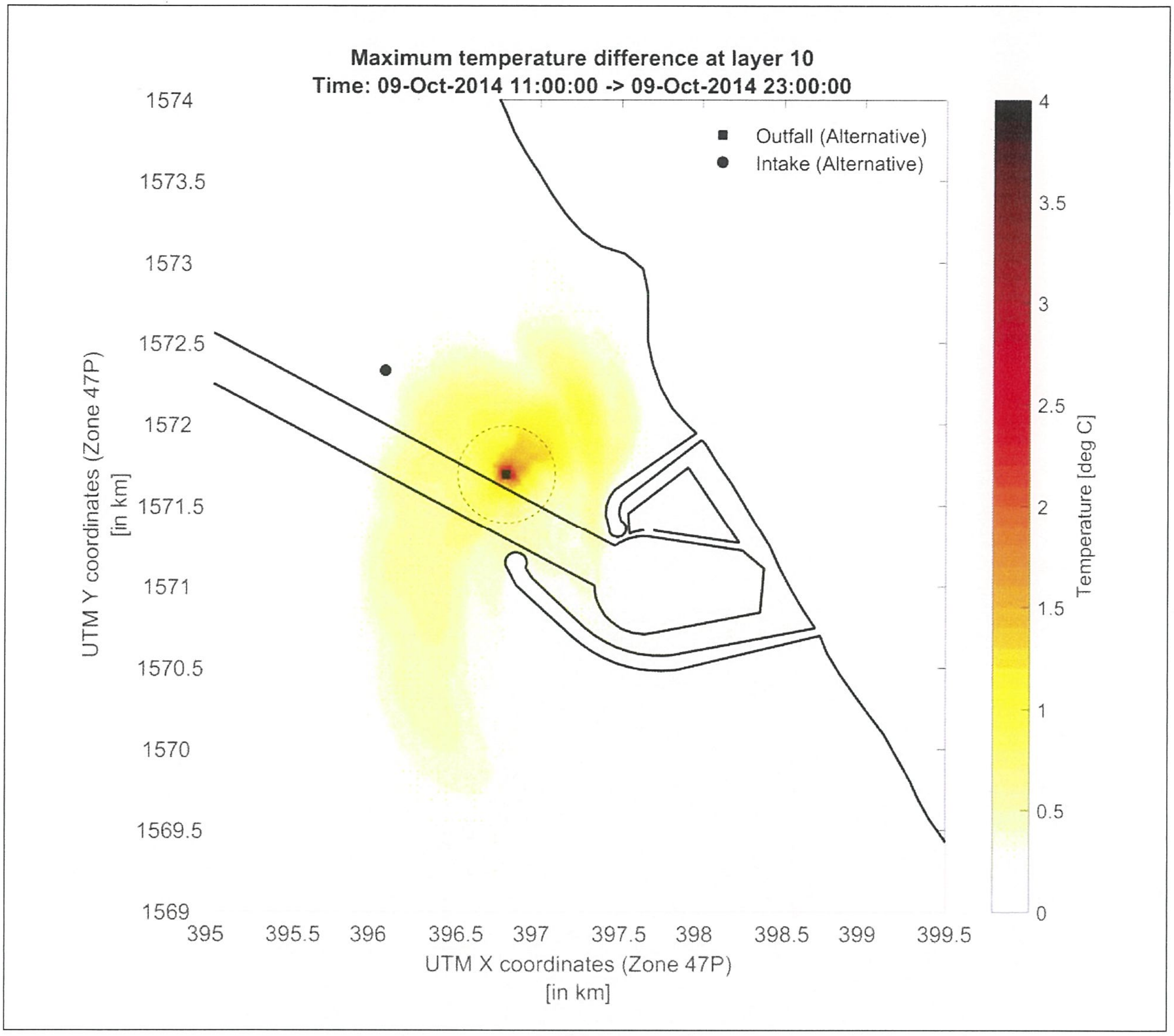


FIGURE 6.5-31: THERMAL PLUME AT NEAP TIDE

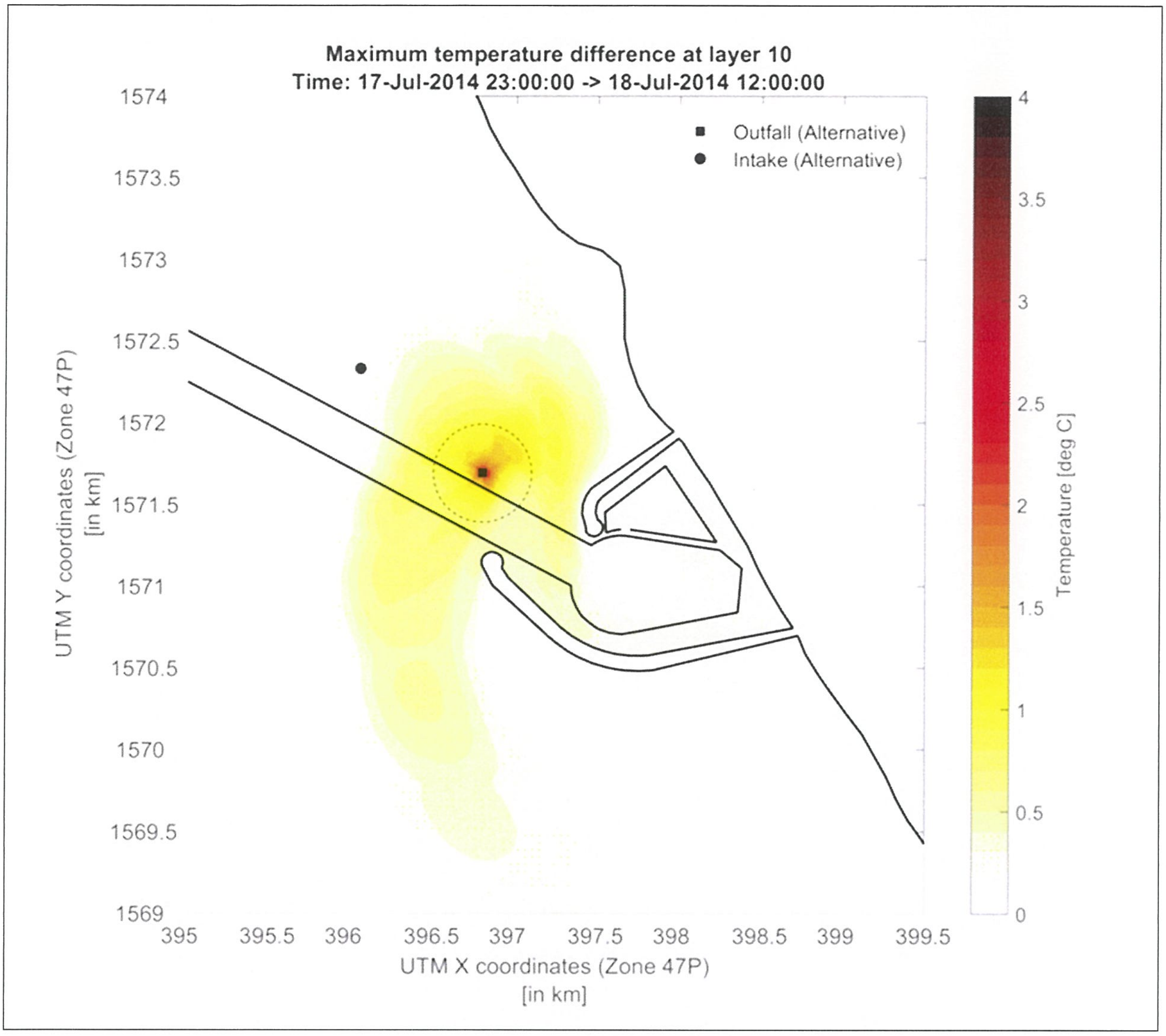


FIGURE 6.5-32: THERMAL PLUME AT MEAN TIDE

C. Impacts on Marine Ecology

The maximum temperature of seawater at the discharge point will be about 38 °C. The modelling results show that the increase in temperature of seawater in excess of 3 °C will be confined within less than 100 m around the discharge point. This magnitude of temperature increase and size of the affected area will have insignificant impacts on the abundance and species composition of pelagic marine organisms such as phytoplankton, zooplankton, and fish larvae. These organisms in general are adapted to environments with stable temperatures and small changes in temperature can affect survival. In addition, juvenile and adult fishes have the ability to swim away from the temperature affected areas. Therefore, the impacts of thermal discharge on aquatic resources would also be insignificant.

D. Mitigation Measures

The outfall design already adopts best practices for minimizing impacts of thermal discharge on ambient water. The discharge from the sea bed through approximately 517 diffusers will enhance vertical mixing, thus eliminating thermal stratification.

E. Evaluation of the Significance of Impacts

The impact of thermal discharge was evaluated as shown below. The control is of medium priority in the operation of the power plant. However, a routine temperature monitoring covering the plume boundaries should be carried out over an initial period of power plant operation to verify the predicted temperature.

Impact category	Indirect impact on marine ecology
Impact duration	Throughout the operation period
Impact extent	Local, confined to areas around the discharge point
If no control **- Impact magnitude** **- Impact severity**	 Medium Low
If control **- Impact magnitude** **- Impact severity**	 Low Low near the coast line
Control priority	Medium

6.5.4 Social Issues

6.5.4.1 Occupational Health and Safety

A. Areas of Concern

OHS issues during the operational phase of Project are relevant to health and safety of operational personnel. They are issues of concern common to operational personnel in all types of industries but their natures depend on types of industries. They are not issues for the impact assessment but the issues that must be managed in compliance with applicable laws and regulations of the government.

The OHS management system and procedures to be established will need to cover the following issues:

- Non-ionizing radiation
- Heat
- Noise
- Confined spaces
- Electrical hazards
- Chemical hazards

B. Mitigation and Management Measures

OHS management measure to be adopted should follow applicable guidelines in IFC's General EHS Guidelines: Occupational Health and Safety, April 30, 2007, and IFC's EHS Guidelines: Thermal Power Plants, Section 1.2-Occupational Health and Safety, December 19, 2008. Based on these two documents, the Consultant recommends the Project Proponent to take the following actions:

Plant Design and Equipment Selection

(1) Incorporate in the EPC contract, all OHS requirements that the EPC contractor will in the design of the power plant and associated facilities, including equipment selection; give due consideration to, but not limited to, the following OHS requirements: (i) integrity of workplace structures; (ii) standard operating procedures for process shutdown, including evacuation plan; (iii) work space and exit; (iv) fire precautions; (v) toilets and showers; (vi) potable water supply; (vii) clean eating area; (viii) lighting; (ix) safe access; (x) first aid; (xi) air supply and ventilation; (xii) work environment temperature; (xiii) noise and vibration; (xiv) electrical safety; (xv) fire and explosions; and (xvi) confined working space.

(2) The EPC contractor will be required to prepare for consideration of the Project Proponent an OHS management plan and implementation procedures specific to the power plant of this Project and in line with the Owner's OHS policy and procedures. The OHS management plan and implementation procedures will be submitted before commissioning of the power plant and associated facilities.

(3) The OHS management plan and implementation procedures will cover but not limited to the following subjects:

- Organization and responsibilities of OHS management
- Training plan
- Communication plan
- Contractor responsibilities
- Safety measures for the power plant's O&M, including-safety in turbine operations, fire, explosion, and chemical hazards
- Emergency response procedures
- Reporting system
- Documentation system

During Plant Commissioning

During plant commissioning, the EPC contractor will be required to conduct necessary orientation and training to the Owner's power plant operational team to ensure that the operational team clearly understands the OHS plan and implementation procedures.

During Operations

The Plant Manager will implement the OHS plan and procedures as part of his operational control and management.

The EHS Manager will monitor the implementation of OHS procedures to comply with relevant requirements.

E. Evaluation of the Significance of Impacts

The impact of power plant operation evaluated as shown below. The control is required to be medium priority during the entire period of commissioning and operation of the power plant in order to minimize the impact.

Impact category	Direct impact on the Project staff and employee
Impact duration	Throughout the commissioning and operation period
Impact extent	Local, within the Project site
If no control **- Impact magnitude** **- Impact severity**	 Medium Medium
If control **-Impact magnitude** **-Impact severity**	 Low Low
Control priority	Medium

6.5.4.2 Community Health, Safety and Security

A. Issue

The IFC's document on Performance Standards on Environmental and Social Sustainability, January 1, 2012, prescribes *Performance Standard 4-Community Health, Safety and Security* for its clients to follow. The document requires its client to identify and evaluate the risks and impacts to the health and safety of the affected communities during the project life-cycle and propose mitigation measures that are commensurate with their nature and magnitude. These measures will favor the avoidance of risks and impacts over minimization.

For community health and safety, Performance Standard 4 identifies the following five areas that could be related to community health and safety.

(1) Infrastructure and Equipment Design and Safety

(2) Hazardous Materials Management and Safety

(3) Ecosystem Services

(4) Community Exposure to Disease

(5) Emergency Preparedness and Response

These five areas will be investigated to identify and evaluate risks or impacts relevant to the operation of the power plant.

For community security, Performance Standard 4 emphasizes risks to the communities posed by the security arrangements made by the project proponent. Records and conducts of security personnel are two risk areas.

B. Impact Assessment

Infrastructure and Equipment Design and Safety

This area of concern is most relevant to the operations of the power plant. The major concern is fire and explosion risks related to the gas supply system and gas turbine operations. Fire and explosion incidents have occurred in a number of gas-fired power plants. This subject is studied and presented in ***Section 6.7*** on Risk Assessment.

Hazardous Materials Management and Safety

Hazardous materials for the power plant of this Project would be chemicals used in water treatment and cleaning, natural gas, and oils. As the natural gas will be supplied by pipeline, the Project will have no gas storage tanks. Considering the nature of their use, chemicals and oils would not be stored in large quantities. The possibility of the communities being exposed to these hazardous materials will be very low. This subject is also discussed in the section on risk management.

Ecosystem Services

In the context of this Project, this issue is relevant to only the impact of the power plant operation on the marine ecosystem. As the impact on seawater quality will be negligible, the ecosystem services will not be an issue.

Community Exposure to Diseases

The power plant operation will need only 50 staff. This small number of staff will not pose any health risks to the local communities.

Emergency Preparedness and Response

This area of concern is relevant only to accidental fires and explosions in the power plant already pointed out. An emergency preparedness and response system will need to be established and ready for operation when the emergency situation arises. This is one of the main risk management or mitigation measures in the risk management system of the power plant. The subject is elaborated in the section on risk management.

It can be concluded that fire and gas explosion are major risk events of the power plant operations and that emergency preparedness and response will be one of the major risk management measures that will need to be established and ready to operate when the need arises. The subject is included in the risk management.

C. Mitigation Measures

As described above, it can be concluded that mitigation measures for community health, safety and security have been already formulated and integration under the subject of risk management which is elaborated in ***Section 6.7*** of Risk Assessment.

D. Evaluation of the Significance of Impacts

The Project impact during operation phase may impact on community health, safety and security in various areas, as evaluated below. The impact magnitude and its severity will be high in case there is no risk management. Therefore the requirement of control is at high priority.

Impact category	Direct impact
Impact duration	Throughout the project operation phase.
Impact extent	Mainly on communities nearby the Project site, especially Nga Pitat
If no control **- Impact magnitude** **- Impact severity**	 High High
If control **- Impact magnitude** **- Impact severity**	 Low Low
Control priority	High

6.5.4.3 Community Development Supports and Corporate Social Responsibility (CSR)

A. Impacts

During the operational phase, the impacts of the power plant both positive and negative on the nearby communities will be much less than those during the construction. The main reasons are: (i) only 50 persons will work in the power plant in the operation compared with 600 persons in the construction; and (ii) transport of materials into and out of the power plant will be very small compared to the construction related transport.

B. Support and Management Measures

The positive impacts of the Project during the operational phase will have to come from the provision of community development supports under a corporate social responsibility (CSR) program of the Project Proponent. Therefore it is recommend that the Project Proponent should continue implementation of the CSR program which has been started at the construction phase (details as shown in ***Section 6.4.4.2***).

C. Evaluation of the Significance of Impacts

The Project impact on stakeholders, especially local communities was evaluated as shown below. The control priority needs to be high in order to minimize impact magnitude and severity.

Impact category	Direct impact
Impact duration	Throughout the entire period of project implementation
Impact extent	Mainly on communities nearby the Project site, e.g. Nga Pitat, Nyaung Bin Seik and Mudu (including Ka Myaing swea)
If control - **Impact magnitude** - **Impact severity**	 Positive significant magnitude Positive significant impact on sustainability implementation of the Project
Control priority	High

6.5.4.4 Mangroves Management Program

A. Impact

Although the project activities during this phase is not disturbing surrounded mangroves. The Project should maintain the sustainability of mangrove resources which will support livelihood improvement.

B. Mitigations and Management Measures

Participatory mangrove management will continue. Implementation will be the same as implementation in the construction phase (details as shown in ***Section 6.4.4.2***). Core mangrove management group can be rotated among the members in the communities.

C. Evaluation of the Significance of Impacts

It is necessary to maintain good relationships and support locals' livelihood including coastal eco-system. Hence requirement for its control priority is high.

Impact category	Indirect impact
Impact duration	Throughout the entire period of project implementation
Impact extent	Mainly on coastal communities and coastal eco-system nearby the Project site, comprising Nga Pitat and Nyaung Bin Seik
If control **- Impact magnitude** **- Impact severity**	Positive significant magnitude to local livelihoods and coastal ecosystem Positive significant impact on local livelihoods and coastal ecosystem
Control priority	High

6.6 DECOMMISSIONING PHASE

For this Project, the time for decommissioning of the power plant would come in the distant future when a decision is made by the Power Company to cease permanently the operations of power plant systems. As the decommissioning is the event in distant future, the demolition EIA would need to considerably update the Decommissioning Environmental Management Plan (DEMP) to prepare a new DEMP. The new DEMP will reflect conditions related to technologies, laws and regulations, and land use around refinery area which would be much different from the present conditions.

6.6.1 Decommissioning Activities

There will be only a small number of activities during this phase. The majority activities will be demolition and removal structures including remediation. As decommissioning activities will concentrate in the Project site, environmental impacts during this phase will mostly concentrate in the Project site.

In addition, there will also be landscaping works and minor civil works.

6.6.2 Relevant Environmental and Social Issues

Based on the nature of work, the Consultant identified in ***Table 6.6-1*** environmental and social issues, and related works that will need to be managed during this phase.

TABLE 6.6-1

IDENTIFIED ENVIRONMENTAL AND SOCIAL ISSUES TO BE MANAGED DURING DECOMMISSIONING PHASE

Key Potential Issues	Activities / Sources
Environmental Issues	
Fugitive dust	- Structure demolished and removal - Excavation works, soil stripping and re-grading - Handling and transportation of excavated materials - Movement of heavy vehicles on unpaved roads and surfaces - Deposition of dust from haulage trucks onto local roads
Gaseous emissions	Use of diesel-powered and vehicles
Noise	Demolition activities
Decommissioning waste	- Spoils and excavated materials from earth works - Material debris - Hazardous waste - Domestic wastes from site workers
Road traffic	Transportation of material debris, some structures and equipment
Social Issues	
Occupational Health and Safety	The decommissioning works may have some impacts on safety and health of the operational staff and workers.

6.6.3 Environmental Issues

Impact assessment and mitigation measures of each environmental issues are presented in the subsequent sections.

6.6.3.1 Fugitive Dust

A. Sources

Fugitive dust will mostly result from the demolition and remediation works. Potential sources of fugitive dust include:

- Destruction and removal of some structures
- Excavation works, soil stripping and re-grading
- Handling and transportation of material debris
- Movement of heavy vehicles on unpaved roads and surfaces
- Deposition of dust from haulage trucks onto local roads

B. Sensitivity of Receptors

The closest receptor to the Project site are Nga Pitat community. This village is located about 2.23 km south of the power plant site.

C. Magnitude of Fugitive Dust Emission at Sources

The amount of fugitive dust generated in the Project site will depend primarily on the nature of decommissioning works, soil characteristics, soil moisture content, types of equipment, and wind speeds. However, there are small number of structures located in the Project site.

D. Mitigation Measures to Reduce Fugitive Dust at Sources

At the Project site, measures should be implemented to reduce fugitive dust emission. The most common measures are:

- Spray water at and around the working areas and access roads during works.
- Enforce a speed limit for vehicles and trucks in the Project site not to exceed 40 km/h. Decommissioning activities shall be kept as planned so that the disturbed areas will be minimized at any time.
- Restore, resurface, and rehabilitate the disturbed areas as soon as practicable after completion of demolition.
- Prohibit the open burning of waste in the Project area.
- Dust masks should be provided (where applicable) to all workers.

These measures especially water spraying twice a day together with strict implementation of other dust suppression measures should be able to reduce fugitive dust emission as much as 75% (US.EPA (2006), AP 42, chapter 13.2.2).

It should be noted that the dust suppression efficiency of water spraying will depend on the volume of water use per unit area and the frequency of spraying. A 75% efficiency could be expected.

E. Fugitive Dust Control Targets

The fugitive dust control target will be based on the World Bank's ambient air quality standard. This standard prescribes the concentration of Total Suspended Particulates (TSP) not exceeding 230 $\mu g/m^3$ or 2.3 x 10^{-4} mg/l. The TSP level at the receptors will not exceed this limit.

F. Predicted TSP Levels at the Receptors

As the activities related to decommissioning will generate less fugitive dust than the construction works, the total ambient TSP level will be much lower than the control target of not exceeding 230 $\mu g/m^3$ or 2.3 x 10^{-4} mg/l.

As the nearest receptors in Nga Pitat Village is about 2.23 km away to the South- southeast (SSE) of the Project site, the impact of fugitive dust on the receptors will be smaller than the level at the perimeter of the Project site.

G. Recommended Mitigation Measures

No additional mitigation measures would be required at the Project site considering the small magnitude of the emission.

However, fugitive dust along the transport routes should be minimized. Measures to be implemented should include:

- Enforce speed limit for trucks not to exceed 40 km/h when passing the communities.
- Cover material debris and removal structures with canvas or equivalent during transportation. Some materials should be dampened, if necessary, before transportation.
- Establish a vehicle washing facilities to minimize the quantity of material deposition on public roads.
- Establish a checkpoint at project gate to ensure the vehicles leaving the project site are following the measures prescribed to reduce dust emissions.

H. Evaluation of the Significance of Fugitive Dust Impact

The impact of fugitive dust impact on the nearby communities is evaluated as follows:

Impact category	Direct impact
Impact duration	Throughout the decommissioning period.
Impact extent	Local air pollution, mainly confined to within the decommissioning area
Impact magnitude	Small magnitude even without control at sources
Impact severity	Minor, cause annoyance, insignificant impact on the receptors
Control priority	Medium

The fugitive dust issue should receive medium control priority.

6.6.3.2 Gaseous Emissions

A. Sources

Diesel-powered heavy equipment and vehicles are the major sources of gaseous emissions during the decommissioning. The emissions will include typical pollutants such as NO_x, SO_2, CO, and particulate in the exhaust gases discharged from the engines.

B. Sensitivity of Receptors

Gaseous emissions during the decommissioning phase will create local air pollution confined within the Project site. The receptors will be workers.

As the nearest community is about 2.23 km away from the Project site, it is unlikely that this community will be affected by the gaseous emissions during the decommissioning considering the small magnitude of the emissions.

C. Estimates of Emission Loads

Emission loads of various pollutants could be estimated from information on the number and type of diesel-engine equipment and their hours of operation.

D. Mitigation Measures for Emission Reduction at Sources

The best practices will be required to adopt in order to minimize gaseous emissions at sources through the following management measures:

- Adopt procedures to avoid decommissioning vehicles idling for excessive periods (e.g. more than 5 minutes) if required to queue to enter the Project site.
- Maintain all equipment in proper working conditions according to the manufacturer's specifications. The engines of the equipment fleet must be routinely maintained by qualified mechanics to ensure their proper conditions during operations.
- Provide adequate training to the equipment operators in the proper use of equipment.
- Use the proper size of equipment for the job.
- Perform on-site material hauling with trucks equipped with on-road engines (if determined to be less emissive than the off-road engines).

E. Emission Control Targets

Ambient air quality at the construction site will comply with the applicable ambient air quality standards.

F. Predicted Impacts on Receptors

Considering the low emission loads, the impact of gaseous emission during the decommissioning phase on the workers is expected to be insignificant.

Overall the impact from gaseous emission during the decommissioning phase is local in extent, short-term in duration and low in magnitude. The significance of impact from gaseous emissions during decommissioning can be considered low, once mitigation measures are implemented.

G. Impact Mitigation Measures

No additional mitigation measures apart from the source reduction measures would be necessary. However, heavy equipment operators could be provided with masks, if deemed necessary, to minimize the impact of particulates.

H. Evaluation of the Significance of Impacts

The significance of the impact of gaseous emissions was evaluated as shown below. The issue is considered low priority during the decommissioning phase.

Impact category	Direct impact
Impact duration	Throughout the decommissioning phase
Impact extent	Local, confined to within the Project site.
Impact magnitude	Small, short term
Impact severity	Insignificant
Control priority	Low

6.6.3.3 Noise

A. Sources

Based on the nature of decommissioning of this Project, noise will be mostly generated while destruction and operations of heavy equipment including soil compaction by heavy graders. The decommissioning noise levels will affect workers and could also affect the nearby receptors.

B. Sensitivity of Receptors

The receptors of decommissioning noise will be the same receptors of fugitive dust. The most noise sensitive receptor in the village is Yay Wai Monastery and Nga Pitat School.

C. Mitigation Measures to Reduce Noise at Sources

As the contractor may rent equipment from suppliers and would not be at liberty to improve them, it is difficult to design practicable noise retrofit kits to endure the environment of the Project sites. Therefore, the contractor should be required to use equipment that has best noise performance.

D. Noise Control Targets

The targets of noise control at the receptors are dictated by the adopted noise standards. For the Project, the construction noise control will be designed to achieve two conditions:

- The decommissioning noise will not increase the ambient noise level at the designated receptors higher than 70 dB(A) Leq-24 hour (US.EPA Standard).
- The increase in the ambient noise level is not more than 3 dB(A) Leq-1 hour (IFC Standard, 2007).

E. Predicted Noise Levels at the Receptors

Considering the small activities involved and not generated load noise as construction works, noise impact during the decommissioning phase on the workers is expected to be negligible when preventive and mitigation measures implied.

F. Recommended Mitigation Measures

- Provide ear plugs or ear muffs to workers operating in the excessive noise areas.
- Major decommissioning activities which generate loud noise should be limited to only during the day time. Activities that are necessary to be carried out at night time will need approval of the site engineers, and will need to have adequate noise control equipment or measures.
- Speeds of vehicles in the construction site will not be more than 40 km/h.
- The contractor will be required to regularly monitor ambient noise levels at the receptors.

H. Evaluation of the Significance of Noise Impact

The impact of decommissioning noise on the nearby communities is evaluated as follows:

Impact category	Direct impact
Impact duration	Throughout the decommissioning period
Impact extent	Local confined to areas around the Project sites
Impact severity	Negligible
Control priority	Medium

The decommissioning noise issue deserves medium control priority.

6.6.3.4 Decommissioning Wastes

A. Sources

During the decommissioning phase, the following waste materials will be generated:

- Spoils and excavated materials (rocks, soil)
- Material debris (concrete, wood, scrap metal)
- Hazardous waste (empty fuel drums, used oil filters, batteries, spent solvents, oils)
- Domestic wastes from site workers (food waste, waste paper, packaging)

For the purpose of waste management, wastes generated in the Project site can be divided into three categories:

(1) ***Deconstruction, demolition, and land-clearing waste***: Includes all non-hazardous solid wastes resulting from land clearing, excavation and deconstruction of buildings. The wastes for this Project will consist of excavated materials particularly top soil, material debris, remnants of steel bars and beams, broken roofing materials and tiles, and remnants of pipes, glasses, and other inert building materials.

(2) ***Non-demolition waste***: Includes wastes generated from workers such as paper, food and beverage containers, food wastes, and other domestic items.

(3) ***Hazardous waste***: Includes such wastes as spent lubricating oil, paints, and chemicals used in the decommissioning. Most of the hazardous wastes are in liquid form.

These waste materials will need to be adequately managed to minimize their environmental impacts.

B. Sensitivity of Receptors

The receptors in this case will be soil and ground water at the disposal sites.

C. Mitigation Measures for Waste Reduction at Sources

Reduction of decommissioning wastes at sources could be achieved through best practices in decommissioning management.

The decommissioning will adopt the following practices to minimize waste quantities at sources: waste segregation, waste collection and storage, waste reuse and recycling, waste disposal, and on-site record keeping.

Waste Segregation

- The Contractor will design and implement a waste segregation system and procedure and communicate it to all workers to strictly adhere to the segregation procedure.
- An appropriate number of containers with adequate volume and appropriate materials will be provided at strategic locations to support the segregation. Each waste category will be segregated into recycling, reuse and disposal sub-categories.

Waste Collection and Storage

- Daily collection and transport will be organized and carried out for each sub-category of segregated wastes.
- A roofed storage area with adequate space will be provided for storing the segregated wastes waiting for the on-site or off-site reuse or recycling.
- The storage area for hazardous waste will need to be specially designed to prevent spills or leaks onto the soil.

Waste Reuse and Recycling

- Reuse of excavated material as fill at approved fill sites.
- Remove any contamination inadvertently deposited in recyclable waste material containers. Provide cleanup of excessive contamination at recycling vendor locations when such contamination is not controlled at the project site.
- If applicable, collection and recycling of used oils by a licensed contractor.
- If applicable, collection by a licensed contractor of empty oil and fuel drums and other containers for return to recycling facilities.

D. Waste Control Targets

There are no quantitative standards for decommissioning waste management on site. However, the control targets should be on soil and groundwater quality standards if the decommissioning wastes are to be disposed in the Project area.

The performance of decommissioning waste management will be evaluated by the following qualitative indicators:

- No wastes are haphazardly dumped inside or outside the Project site.
- No public complaints related to the management of decommissioning wastes.

E. Predicted Impacts on Receptors

It is not possible to predict the impacts of decommissioning wastes on soil and ground water at the disposal sites. Considering the small quantities of wastes that could cause pollution, insignificant impacts are most likely.

F. Impact Mitigation Measures

The remaining wastes that cannot be reused or recycled will have to be disposed off properly to minimize environmental impacts. The following approach should be considered:

General Requirements

- An efficient decommissioning waste management system should be established and implemented. Decommissioning waste will need to be classified and sorted out at source for disposal. The disposal methods will depend on the types of wastes: direct reuse as desire, sale and recycling of materials, land filling for inert materials and specific treatment method for each type of hazardous materials.
- Haphazard disposal of decommissioning waste in or off the Project site will be prohibited.
- No burning of wastes will be allowed.

Land Clearing Wastes

- Decommissioning wastes should be handled by the existing municipal solid waste collection and disposal services. If such service is not possible, the decommissioning wastes would need to be disposed off in the Project site. They may be buried in areas designated for green areas.

Non-decommissioning Wastes

- Non-decommissioning wastes will be disposed off with the decommissioning wastes.

- Provide adequate number of refuse bins or containers with tight covers, daily collection of disposal.

Hazardous Wastes Management

- Hazardous wastes will be handled by a licensed hazardous waste contractor. If this service is not available, the subcontractor will need to find appropriate arrangements for incineration, safe permanent storage, or other appropriate methods of disposal.

- A Hazardous Waste Management System covering waste classification, separation, collection, storage, transfer and disposal should be set up and operated. The waste management system will comply with applicable regulation of the government.

H. Evaluation of the Significance of Impacts

The impacts of construction wastes on the natural environment are assessed in the table below. The issue is considered medium control priority.

Impact category	Direct impact on soil and water environment
Impact duration	Throughout the decommissioning period
Impact extent	Local soil and ground water pollution, mainly confined to within the disposal sites of the Municipality
Impact magnitude	Small magnitude
Impact severity	Minor, insignificant impact on the natural environment
Control priority	Medium

6.6.3.5 Road Traffic

A. Sources

During this phase, the decommissioning of power plant and facilities will necessitate the need for transportation of decommissioning wastes, material debris, and plant equipment. Consequently, traffic loads will be increased on existing roads within the study area, small port coastal road and Nga Pitat road, the access road to the power plant site. Traffic related impacts during the decommissioning phase would be increased on local roads and increased risk of accidents.

B. Sensitivity of Receptors

The impact areas will be small port coastal road, and the junction of Nga Pitat Village to the power plant site.

Small port coastal road-This road within the study area is the road along the coast linking the Project site to Nga Pitat Village and Dawei City.

Nga Pitat road-The access road is rural road in Nga Pitat Village. Existing condition of this road is unpaved laterite road.

C. Estimates of Traffic Loads

It is difficult to estimate the traffic load during decommission phase which is 30 year ahead. Its load is expected to be smaller than construction activities.

D. Traffic Management Targets

The traffic management should aim at the following targets:

- There will be no accidents related to decommissioning traffic in the identified impact areas.
- Minimize traffic congestion on Nga Pitat Road during the decommissioning period.

G. Impact Mitigation Measures

Impact mitigation measures shall be applied as follows:

Truck routes and decommissioning site access

- In consultation with the concerned authorities at the national, regional, and township levels, develop and implement a Decommissioning Management Plan to address the following issues:
  - Use of established truck routes and arterial roads for the haulage of material debris and spoil.
  - Where practicable, provide direct access from worksites to arterial roads to minimize truck traffic on local roads.
  - Avoid haulage tasks during peak traffic periods as far as practicable. Where haulage in peak periods is unavoidable, such activities are to be managed in accordance with specific traffic management sub-plans provided to the relevant agencies in advance.
  - Control heavy vehicle movements on small port coastal road to avoid interference with major events, if any.
  - Investigate the capacity of intersections on haulage routes to minimize impact on intersection operations by heavy vehicles servicing the decommissioning worksites.
  - Prepare and implement a comprehensive decommissioning traffic management plan to control truck movements to avoid, or mitigate and manage the impacts

of heavy vehicle traffic on the road network, except in exceptional circumstances, and after consultation with the local communities.

- Measures to manage the operation of the truck fleet for incorporation into a Decommissioning Vehicle Management Plan to include:
  - Monitoring of truck position, speed, route and performance in relation of traffic conditions and schedule requirements.
  - Management of truck speed and position to avoid queuing on the approaches to the spoil handling and loading facilities.
  - Management of traffic signals on nominated spoil haulage routes in night-time hours to achieve optimum performance of the truck fleet and to minimize impacts on communities along the routes.
  - Maintain all vehicles transporting material to and from the Project site to a high standard (ADR28/01) with regards noise emissions, exhaust emissions, traffic safety and operational safety.
  - Ensure all vehicles leaving a working site pass over or through devices designed and maintained to remove soil and other materials.

Traffic Hazards

- Heavy trailer trucks transporting heavy and large equipment will have to be directed by a traffic police car or by other vehicle specially designated to handle a guidance of this kind of transportation.

Local Traffic

- Implement management measures to avoid, or minimize increase in traffic caused by the project works in local streets as practicable.
- Notify the local community about proposed changes to local traffic access arising from decommissioning activities, and provide clear signage of changed traffic conditions and take other measures to ensure safe traffic movement.

Traffic Management at the Intersection of Small Port Coastal Road and Nga Pitat Road

Provide a traffic police or relevant officer to control traffic at the intersection during the transport period.

Pedestrians and Cyclists

- Maintain safe pedestrian and cycle access near decommissioning works (particularly for elderly and children), including to community facilities, such as schools, monastery, open space, and particularly.
- Notify the local communities, and in particular, local schools, about changes to pedestrian and cycle access during decommissioning near decommissioning works.
- Provide traffic controls designed for the safe movement of pedestrians and cyclists near the worksite.

H. Evaluation of the Significance of Impacts

The impact on traffic was evaluated as shown below. The traffic management deserves medium priority during the decommissioning period.

Impact category	Direct impact
Impact duration	Throughout the decommissioning period
Impact extent	Mainly on small port coastal road
Impact magnitude	Increase traffic congestion on small port coastal road and intersection to Nga Pitat Village
Impact severity	Low
Control priority	Medium

6.6.4 Social Issue

The concern on social issue during this phase is only Occupational Health and Safety, as elaborated below:

6.6.4.1 Occupational Health and Safety

A. Impacts

Activities related to decommissioning works may effect on health and safety of operational workers.

B. Mitigation and Management Measures

In order to mitigate the decommissioning impacts on health and safety of workers, the design and equipment selection for decommissioning activities should emphasis on: (i) accident precautions; (ii) fire precautions; (iii) potable water supply; (iv) safe access; and (v) first aid.

The EHS manager will be required to prepare for consideration of the Project Proponent an OHS management plan and implementation procedures specific to the decommissioning work of this Project and in line with the Owner's OHS policy and procedures. The OHS management plan and implementation procedures will be submitted at least three months before commencement of decommissioning. The emphasis will be on safety measures during decommissioning, including-safety in fire, explosion, and chemical hazards.

C. Evaluation of the Significance of Impacts

The impact on traffic was evaluated as shown below. The Occupational Health and Safety deserves medium priority during the decommissioning period.

Impact category	Direct impact
Impact duration	Throughout the decommissioning period
Impact extent	Health and safety of decommissioning workers at the Project site
Impact magnitude	Low
Impact severity	Low
Control priority	Medium

6.7 RISK ASSESSMENT

6.7.1 Conceptual Framework

A. Concept and Definition of Environmental Risk

In most documents on environmental risk assessment, environmental risk is narrowly defined to focus on a hazard from an environmental event which could affect receptors through an environmental pathway. For example:

- Environmental event: disposal of toxic and hazardous wastes on land causing soil contamination which could pollute groundwater
- Environmental pathway: groundwater
- Consequences on receptors: health impacts on communities nearby the disposal site that rely on groundwater for domestic use and consumption

In these environmental risk assessment documents, impacts are easily confused with risks if the risk context is not clearly established. In the above example, if toxic and hazardous wastes are not properly disposed off in the site, soil will be contaminated and pollutants could reach the aquifer. If the disposal site is on the aquifer used by the communities, it is certain that the groundwater will be polluted causing adverse consequences on the communities. In this respect, groundwater pollution is certain and the issue needs to be investigated in the context of EIA not environmental risk assessment. On the contrary, if the wastes are properly disposed in engineered landfill, there still is a concern that the liner may possibly leak. This concern is a risk that should be investigated in the context of environmental risk management and will have to be managed to minimize the possibility of leak.

The Consultant considers environmental risk within the context and framework of project risk management as environmental risk is one of several categories of project risks, such as technical risk, financial risk, legal risk, and market risk. Environmental risk will need to be managed as part of project risk management, which is an integral part of project management, during the construction phase and the operational phase of a project in parallel with other categories of project risks.

A project risk is variously defined in risk management documents but all definitions share three key words: event, likelihood of occurrence of the event, and consequence of the event, if occurred, on the project. The Consultant defines a project risk in general as:

"A project risk is an undesirable event which may or may not occur, but if it occurs it will have negative consequences on the achievement of project objectives."

In investigating environmental risk of this Project, the Consultant, based on the above definition of a project risk, treats an environmental risk as:

"an event which may or may not occur, but if it occurs it will have negative consequences on the achievement of the Project's environmental management objectives, i.e. compliance with environmental performance requirements prescribed by MONREC and other authorities, and as agreed or committed with the stakeholders, particularly the surrounding communities."

B. Objectives of Environmental Risk Assessment

In line with the objectives of EIA, the objectives of environmental risk assessment (ERA) are to: (i) identify and assess environmental risks during the construction and operational phases of the Project; and (ii) prepare an environmental risk management plan (ERMP) for the Project covering the construction phase (CERMP) and the operational phase (OERMP). The ERMP will be part of the project risk management plan (PRMP) to be implemented as part of project management.

C. Environmental Risk Management Planning Process

The ERM planning process is similar in principle to the project risk management planning process, and the planning process for the construction phase is similar to that for the operational phase. The project risk management planning is different from the environmental risk management planning in scope and risk management context.

The ERM planning process adopted for this Project, in general, consists of the following steps:

(1) Establish the Environmental Risk Management Context

The establishment of environmental risk management context is to gain a clear understanding of the following subjects: (i) project management arrangements, especially project risk management; (ii) arrangements for environmental management of the Project during the construction phase; (iii) responsibilities of contractors, project owner, project management team, and supervision consultants; and (iv) linkage between environmental risk management and project risk management, and between environmental risk management and environmental management.

Information on the Project implementation and its environmental impacts will be the basis for forming judgmental views on the potential uncertain events which constitute risks, likelihood of occurrence of the events, and their impacts on the environmental management objectives of the Project.

(2) Risk Identification

Risk identification is to identify various concerns related to possible events that, if occur, could result in the Project being unable to comply with environmental requirements prescribed by MONREC and other authorities and as agreed or committed with the key stakeholders. Such events would consist of external events and internal events.

(3) Risk Analysis

In this step, each identified event will be analyzed to come up with a rational conclusion on its likelihood of occurrence (high medium, low), its impacts on the achievement of the Project's environmental management objectives and direct and indirect on-site and off-site costs, and causative factors related to the occurrence of the event.

(4) Risk Classification

The results of risk analysis are used to prepare a risk classification matrix based on the likelihood of occurrence and the magnitude of impact. ***Figure 6.7-1*** shows an example of a simple risk classification matrix[10]. In this example, risks are classified into minor, moderate and major risks.

- Minor risks are characterized by low impact and low likelihood of occurrence. Minor risks can be accepted or ignored.
- Moderate risks are characterized by high impact and low likelihood of occurrence or by low impact and high likelihood of occurrence. Moderate risks will need treatment.
- Major risks are characterized by high impact and high likelihood of occurrence. Major risks will need close attention of the management and significant levels of treatment.

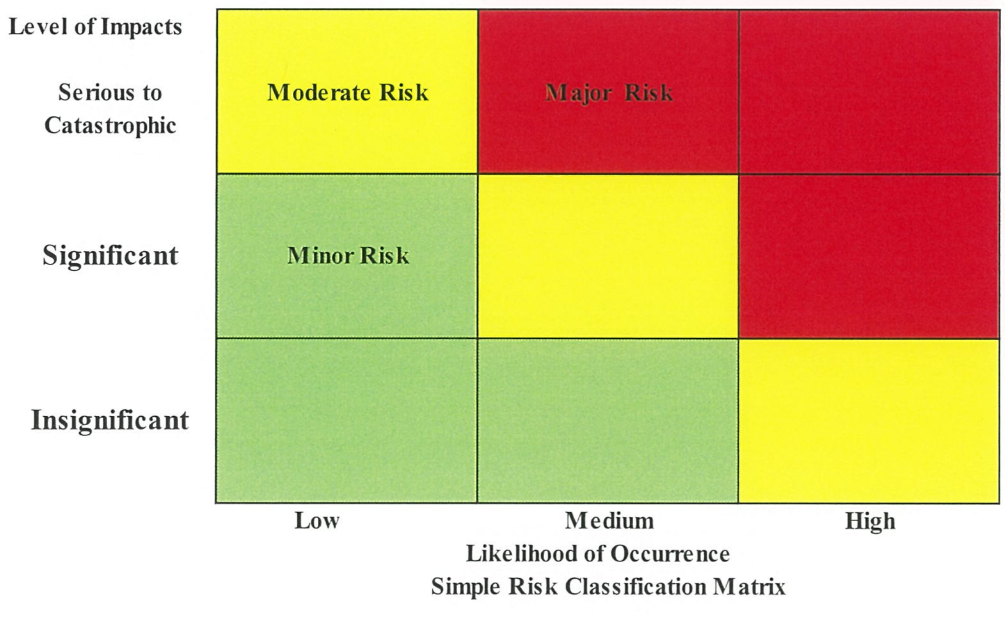


FIGURE 6.7-1: SIMPLE RISK MATRIX

[10] Modified from the matrix in NASA Risk Management Presentation - Imsworld.org www.imsworld.org/.../NASA%20risk%20managemnt%20power%20poin.

A risk profile should be prepared for each risk to be managed. The risk profile should include:

- A description of the risk
- Potential cause of the risk
- Likelihood of the risk occurring
- Potential effect or consequences of the risk
- Ranking or severity of the risk
- The evaluation of the acceptability of the risk

(5) Formulation of Cost Effective Risk Treatment or Mitigation Measures

For a risk related to uncontrollable external event, such as flooding, risk mitigation measures will either aim at protection or minimizing the impacts or both. For example, a risk mitigation for flooding in this Project is to fill the power plant site to raise its elevation by about 1-2 m above the existing level.

For a risk related to internal event, the risk mitigation measure to be adopted could be designed to reduce the likelihood of occurrence; reduce consequences if the event occurs; avoid the event by not taking actions that have risks; and transfer the risk. A minor risk would be accepted if the mitigation measure is not financially justified. Designing a cost effective mitigation measure needs to consider the root cause of the event constituting the risk.

(6) Arrangements for Implementing and Managing the Risk Mitigation Measures

This step will propose arrangements for implementing the proposed risk mitigation measures, including: (i) responsible person for each risk; (ii) organization for environmental risk management; (iii) risk monitoring and evaluation; and (iv) reporting and corrective actions.

The environmental risk management plan will need to be linked with the environmental management plan as well as the project risk management plan to ensure that any dependencies or potential resource conflicts between project and environmental management tasks and environmental risk mitigation are identified and resolved. Managing environmental risk is essentially an element of project risk management. For example, the individual environmental risks will need to be included in the project risk registration process.

Where appropriate, the environmental risk management plan should also be linked to other business plans within the power plant management entity such as the corporate risk management plan.

6.7.2 Environmental Risk Management-Construction Phase

A. Environmental Risk Management Context

For this Project, the EPC contractor would be contractually responsible for: (i) preparation of detailed designs and specifications of all equipment and facilities; (ii) procurement and construction; and (iii) testing and commissioning the power plant and associated facilities before handling over to the Project Proponent. The environmental performance requirements of the Project construction and operation will need to be adequately incorporated in the designs, specifications, and construction. All environmental mitigation measures recommended in this Final EIA Report and accepted by the Project Proponent and MONREC will be implemented by the EPC contractor and his subcontractors under the supervision of construction supervision consultants of the Project Proponent. Monitoring of the environmental performance of the EPC contractor will be carried out by the project management team of the Project Proponent.

The environmental risk management will be carried out by the project management team as part of the overall project risk management. The environmental risk mitigation measures will be implemented by the project management team within the scope of and procedures for project risk management.

B. Risk Identification

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

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

These two uncertain events could have the following consequences on the Project:

- The authorities may order the Project to suspend the construction or in the worst case they may revoke the construction permit.
- Public complaints could be filed against the Project and could lead to litigations.
- Bad publicity to the Project.
- Physical damages or body damages on-site or off-site with cost to be incurred by the Project.

C. Risk Analysis

The two identified risk events could be caused by the following:

Risk 1-Failure to comply with the environmental requirements

Potential causes:

- The EPC contractor and subcontractor unintentionally omit the environmental requirements due to ambiguity of the environmental requirements in the contract.
- Inadequate supervision and monitoring of environmental mitigation activities of the EPC contractor and subcontractors.
- Changes in designs or construction methods without revising the originally proposed mitigation measures.
- Changes in the environmental requirements during the construction without the revision of the originally proposed mitigation measures.

Risk 2-Public opposition to the Project

Potential causes:

- Misunderstanding or misinformed of the nature, severity and extent of impacts of the Project.
- Rough relationship between the Project and the surrounding communities.

D. Risk Classification

Figure 6.7-2 shows a risk matrix for the construction phase.

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

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

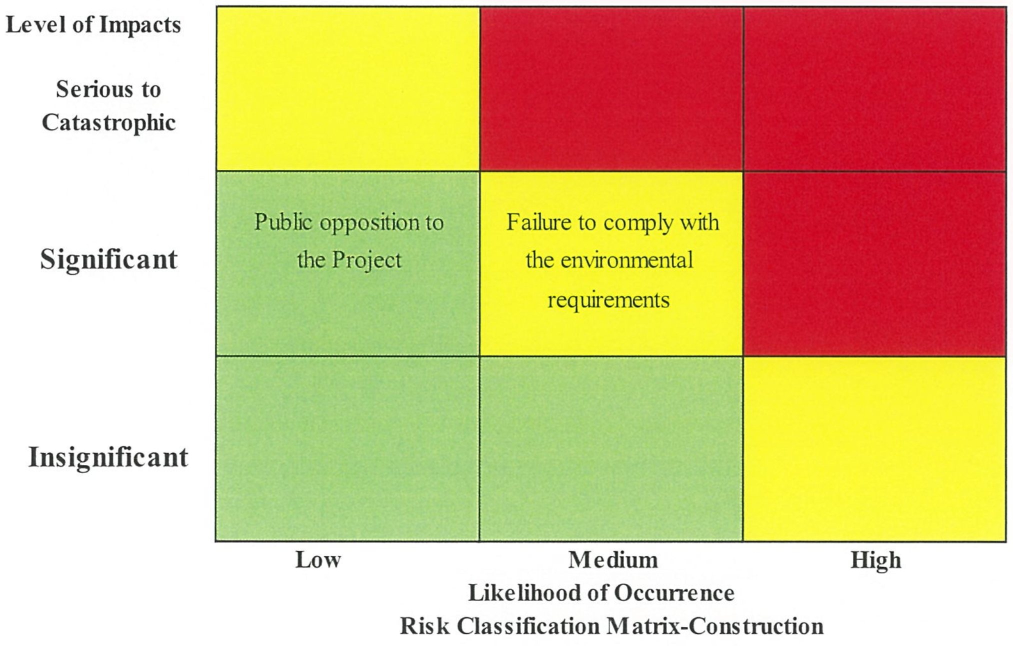


FIGURE 6.7-2: RISK MATRIX FOR THE CONSTRUCTION PHASE

E. Risk Mitigation Measures

Risk mitigation measures need to address the identified causes of the risk. Mitigation measures for the two identified risks correspond to the identified causes are presented in ***Table 6.7-1***. The measures will be implemented through contractual arrangements and stakeholder engagement.

TABLE 6.7-1

MITIGATION MEASURES FOR ENVIRONMENTAL RISK MANAGEMENT DURING CONSTRUCTION PHASE

Cause	Mitigation Measures
EPC contractor and subcontractor have inadequate understanding of the environmental performance requirements of the Project	1. Require the EPC contractor to: - Prepare a CEMP based on the EIA report and the associated CEMP, detailed design and construction plan and schedule. The CEMP must clearly define: - The project's environmental requirements and obligations - Physical measures that are needed to comply with the requirements and obligations - Construction measures that are needed to comply with the requirements and obligations - Assignment of responsibilities to each subcontractors 2. Require the EPC contractor to clearly incorporate environment requirements and mitigation measures in the Project Understanding, the Statement of Criteria, and the Basis of Designs-these three documents would be required by the Project Proponent as part of the design risk management.
Ambiguity of environmental requirements in the EPC contract	1. TOR for procurement of the EPC contract must clearly state the Project's environmental requirements during the construction phase that the EPC contractor must ensure that the Project construction will meet the requirements. 2. The EPC contract must clearly prescribes environmental management responsibility of the EPC contractor
Inadequate supervision and monitoring of environmental mitigation activities of the EPC contractor and subcontractors.	1. The supervision consultant will be required to submit a supervision and monitoring plan that clearly indicates the environmental tasks to be supervised and monitored. This supervision and monitoring plan for the implementation of the environmental mitigation measures would be part of an overall project supervision and monitoring plan. 2. Weekly and monthly reviews of the EPC contractor environmental performance. 3. Close supervision of truck operations especially during the site filling period.
Changes in designs or construction methods without revising the originally proposed mitigation measures accordingly	Changes in designs or construction methods may be initiated by the EPC contractor or the Project Proponent. The request for changes must be subject to the change procedure in project management. The request for changes must be accommodated by an analysis of environmental implications and revised mitigation measures.

TABLE 6.7-1

MITIGATION MEASURES FOR ENVIRONMENTAL RISK MANAGEMENT DURING CONSTRUCTION PHASE (CONT'D)

Cause	Mitigation Measures
Change in the environmental requirements during the construction without revising the originally proposed mitigation measures.	Change in the environmental requirements may be initiated by MONREC or the Project Proponent with approval of MONREC. The changes must be subject to the change procedure in project management. The EPC contractor will analyze environmental implications of the changes and revise the originally proposed mitigation measures accordingly.
Misunderstanding or misinformed of the nature, severity and extent of impacts of the Project	1. Pay attention to the clarity and adequacy of the information on impacts of the Project using non-technical language that could be easily understood by villagers. Information in audio visual forms should also be prepared. 2. Design an effective public information program to ensure the intended information reaches the target groups. 3. Ensure that the CPC proposed in the CEMP has a clear understanding of the Project's impacts. 4. Organize a study tour to other similar power plants in Myanmar or some neighboring.
Rough relationship between the Project and the surrounding communities	1. CSR activities should be initiated as soon as possible in the construction phase. 2. The Project management team should visit as often as possible the villages located within the area of influence of the Project.

F. Implementation Arrangements

(1) Responsible Persons and Organization

Environmental risk management needs to be an integral element of environmental management of the Project. Therefore, the organization for environmental management proposed in the CEMP will also implement the environmental risk mitigation measures in cooperation with the construction supervision manager.

(2) Risk Monitoring and Evaluation

Risk monitoring involves periodic monitoring of risk triggers. A risk trigger is an event which could lead to the occurrence of the risk event. For example, a risk trigger for a flood risk is the intensity and frequency of rain falls in the catchment area. The rainfall data will be analyzed to evaluate the likelihood of occurrence of the flood.

Risk monitoring and evaluation in environmental risk management will be carried out as part of the environmental monitoring program for environmental management. Some data could serve both risk monitoring and environmental monitoring.

Risk 1-Failure to comply with the environmental requirements

The monitoring and evaluation should cover the following risk triggers:

- Inadequacies of the CEMP prepared by the EPC contractor and the timeliness in correcting deficiencies in the CEMP found by the project management team.
- Trend of the EPC contractor and subcontractors not conform with the construction requirements related to the CEMP.
- Response of the EPC contractor to the instructions of the supervision engineers and the EHS manager regarding the implementation of environmental impact mitigation measures and monitoring of the environmental management performance.

Risk 2-Public opposition to the Project

The monitoring and evaluation should cover the following risk triggers:

- Trend of public complaints-the increasing trend would suggest the increasing likelihood of occurrence of the risk event.
- Periodically surveys of public views and opinions on the Project-the frequency of surveys would be reduced if the public opinions are positive.

(3) Reporting and Corrective Actions

The process for reporting and corrective actions in environmental management will also be applied to the environmental risk management.

6.7.3 Environmental Risk Management-Operational Phase

A. Environmental Risk Management Context

During the operational phase, the power plant operational team will routinely implement, as part of the power plant operations, all environmental mitigation measures recommended in this Final EIA Report and accepted by the Project Proponent and MONREC. It is essential that the environmental performance requirements of the operational phase will need to be adequately incorporated in the designs, specifications, and construction. Monitoring of the environmental performance of the power plant operation will be carried out by the power plant team as discussed in the OEMP section in ***Chapter 8***.

The environmental risk management during the operational phase will be carried out by the EHS unit as part of the overall power plant risk management. The environmental risk mitigation measures will be implemented by the power plant management team within the scope of and procedures for the power plant risk management.

B. Risk Identification

(1) Operational Risks

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

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

Past Incidents

Two catastrophic accidents of natural gas-fired power plants are briefly described below[11]:

- ***Kleen Energy's Combined Cycle Natural Gas Fired Power Plant:*** A serious explosion occurred in a combined cycle power plant in Connecticut on 7 February 2010. The accident occurred during the planned cleaning of fuel gas piping that was part of the commissioning and start-up phase of the power plant that resulted in six fatalities, 50 reported injuries and significant damage to the $1bn project. The accident was preventable if an inert gas had been used for cleaning and purging (US CSB, 2010).

- ***Calpine Wolfskill Power Plant, Fairfield California:*** This incident occurred on 26 January 2003 during pre-commissioning of the Wolfskill Energy Center natural gas power plant in Fairfield, California. High-pressure natural gas at approximately 630 psig was used to flush out the gas lines of debris and vented through four-inch open-ended pipe directly to the atmosphere. Seven people were at the site, either directing the operations or observing as in the case of the local fire department. Non-essential personnel were cleared from the area. Fortunately no one was injured when the explosion occurred, which shattered windows a quarter of a mile away and was heard up to ten miles from the site. The debris was projected over the heads of the people at the site and did not hit anyone. The ignition source was not determined, but Calpine's investigation concluded that the explosion was most likely ignited by static electricity. Calpine concluded that the use of natural gas to purge piping while convenient has risks. Calpine facilities now do not allow the use of natural gas to clean piping and instead use compressed air.

[11] Taken from: More on Vapor Cloud Explosions and Fires - AristaTek, www.aristatek.com/Newsletter/NOV10/NOV10ts.pdf

Nature of Key Operational Risks

Gas Leakage

Gas leakage in natural gas-fired power plants is a category of the *loss of containment* which is defined as "an unplanned or uncontrolled release of any material from primary containment, including non-toxic and non-flammable materials". The gas leakage often occurs as a result of:

- Mechanical failures such as defective materials, defective welding.
- Errors in operation and maintenance.
- External events such as heavy objects dropping on a gas pipe.
- Natural events such as earth quake, lightening strikes.
- Explosion or fire from other parts of the power plant.

The gas leaked could cause fire and/or explosion. Types of natural gas explosions are described in ***Appendix 6C*** for information.

The risk area will be the gas metering station. Gas leakage within the power plant will be included in the internal explosion.

Internal Explosion

Internal explosion is a recognized risk event for thermal power plants. For a natural gas-fired combined cycle power plant like the Project, the sources of internal explosion could be as follows:

- Internal explosions within flare systems due to ingress of air and subsequent ignition (e.g. due to contraction of the unburnt gas in the stack following flaring or system leakage).
- Internal explosion in combustor of gas turbine due to incorrect start-up procedures (e.g. due to a fuel leak and failure to purge before attempting ignition).
- Explosions in the hydrogen system used for generator cooling.
- internal explosion in other parts of the plant due to ingress of air (e.g. following maintenance) and subsequent ignition.
- Explosion within acoustic enclosure of gas turbine due to fuel leak.

Failure of Rotating Machinery

This incident has been found with failure of a steam turbine blade. Gas turbines contain many more blades than steam turbines and have been known to suffer from blade and rotor vibration problems due to poor design or maintenance. A combined cycle plant has both gas and steam turbines.

The failure of turbine blades could result in parts of the blades going through the building walls causing damage to properties and lives.

External Explosion

Appendix 6D presents the estimates of accidental fires in the LNG storage tanks from LNG Terminal Project. The impact of LNG-BLEVE on the initial power plant's assets and personnel will not be catastrophic as they will be located about 960 m

from the LNG storage tank and would be exposed to a thermal level of 30 kW/m^2. Extensive damage to the power plant and death of all personnel would not significantly affected by the BLEVE.

(2) Pollution Control Risks

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

C. Risk Analysis

(1) Operational Risks

Consequences

If a serious accident occurs, the damages would be contained within the power plant site as the nearest community is about 2.23 km away.

Underlying Causes

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

Likelihood of Occurrence

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

(2) Gaseous Emission Control Risks

Consequences

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

Underlying Causes

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

- The CEMS may malfunction, thus being unable to collect emission data to meet the monitoring requirement.
- The actual efficiency of the installed low NO_x burner is lower than the 30% level used in the calculation of emission standard.

Likelihood of Occurrence

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

(3) Wastewater Control Risk

Consequences

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

Underlying Causes

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

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

Likelihood of Occurrence

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

D. Risk Classification

(1) Operational Risks

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

(2) Pollution Control Risks

Gaseous Emission Control

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

Wastewater Control

The risk events related to the wastewater control requirements could also be rated as minor risk. A simple risk matrix for the operational phase is shown in ***Figure 6.7-3***.

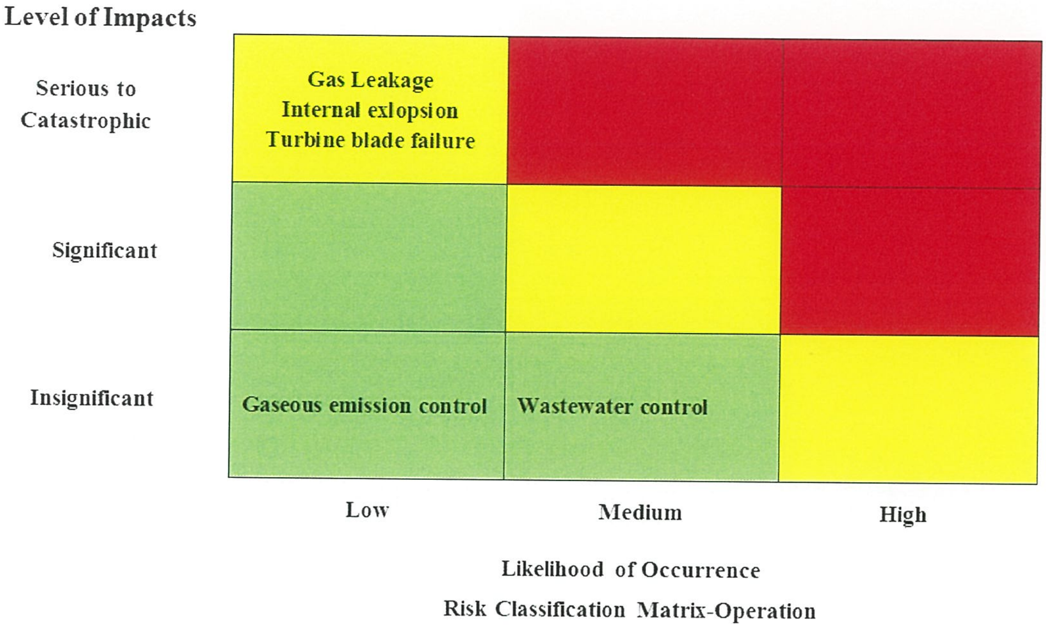


FIGURE 6.7-3: RISK CLASSIFICATION MATRIX-OPERATION PHASE

E. Risk Mitigation Measures

(1) Operational Risks

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

Measures for Addressing Faulty Design and Defects in the Equipment, Equipment Installation, and Construction

- The EPC contractor should be required to adopt the RAMS process in the design and construction of the power plant and its associated facilities.
- The EPC contractor will ensure that the design, selection of equipment, installation and construction will follow the health and safety guidelines, as well as applicable supplementary guidelines or standards of other recognized technical organizations such as the American Society of Mechanical Engineers (ASME), the

American Gas Association (AGA), the US National Fire Protection Association (NFPA), and the American Society of Testing Materials (ASTM).[12]

- The design will include installation of gas leakage detection system as advised in HSE's Guidance Note PM 84.

- The EPC contractor will be required to clearly incorporate operational risk management requirements and proposed designs of mitigation measures in the Project Understanding, the Statement of Criteria, and the Basis of Designs-these three documents would be required by the Project Proponent as part of the design risk management.

- A safety review of the design, proposed equipment, methods of installation and construction should be conducted by the project management team of the Project Proponent.

- The EPC contractor will be required to submit a detailed quality control system for the design, equipment installation and construction focusing on such key operational risk areas as the gas metering station, gas turbine enclosure, flare system, and hydrogen system for generator cooling. The quality control system will need to clearly show the interaction between the EPC contractor and the design consultant and the subcontractors.

- Conduct a detailed hazard and operability study (HAZOP) after the detailed design and specifications are completed. Results of the HAZOP study would support the safety review suggested above.

Measures for Addressing Inadequacies in the Operation and Maintenance Procedures, and Human Error in the Operations and Maintenance

The Project Proponent will, as part of the contract, require the EPC contractor to carry out the following tasks:

- Submit a detailed plan for testing and commissioning of the power plant. Purging of the gas piping system must strictly observe guidelines in NFPA 56 (PS), Fire and Explosion Prevention during Cleaning and Purging of Flammable Gas Piping System. This provisions prohibit the use of flammable gas during cleaning procedures while safeguarding a range of activities related to cleaning and repairing piping systems. The EPC contractor must prepare a gas-blow procedure for review by the Project Proponent and conduct a training of personnel to ensure correct implementation of the procedure.
- Submit detailed working procedures for the operation and maintenance of various units or facilities of the power plant, including the gas metering station, the gas turbines and generators, the HSRG and boilers and the demineralization unit, etc. The procedures will include safety aspect of high risk areas of operations such as flare system, gas turbine combustors, generator cooling, boilers, and steam generator. The working procedures must be certified by qualified engineers with extensive experience in

[12] The HSE's Guidance Note PM 84) is primarily aimed at manufacturers, suppliers and operators of gas turbines (GTs) used for generating electrical power, but is also applicable to their use in oil and gas pumping and compression plant and similar applications. The new edition has been extensively revised since its original publication in 2000, providing much additional information, including; the design of enclosure ventilation; further guidance on selecting equipment for use in potentially explosive atmospheres; and risks from the use of liquid fuels. The guidance will help in drawing attention to hazards associated with gas turbines and describes ways in which the associated risks can be eliminated or reduced to an acceptable level.

natural gas-fired combined cycle plants. The work procedures will be included in the safety review of the Project Proponent.

- Organize and conduct training of the power plant operational team to be nominated by the Project Proponent in the operation and maintenance and risk management of the Project power plant. The training will use the work procedures prepared by the EPC contractor. The EPC contractor will submit a detailed training program and implement the training not later than two weeks before commencing the testing and commissioning of the power plant. After the training, the EPC contractor will conduct a rigorous test of the trainees to evaluate their technical competencies required for efficient and safe operation and maintenance of the power plant.

In addition, the Project Proponent would also adopt a risk transfer measure through taking an insurance against the cost of damages to properties, injuries and fatalities, and loss of revenue should the operational risk events occur.

In addition to the insurance, the Project Proponent should require the EPC contractor to prepare an emergency response plan to enable the power plant operational team to promptly cope with the consequences if the operational risk events occur. The content of such plan should include, but be limited to the following:

- Background and Purpose of the Emergency Response Plan
- Types, Nature and Locations of Emergencies (on-site and off-site)
- Emergency Response Organization
- Emergency Response Process and Work Procedures
- Notification Procedures and Communication Systems
- Damage Assessment Process
- Process and Procedures for Returning to Normal Operations
- Emergency Equipment and Facilities Available
- Training, Simulation and Mock-Drills
- Regular Tests of Emergency Organization and Procedures
- Review of Plans and Updates
- Detailed Operating Manuals

(2) Pollution Control Risks

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

F. Implementation Arrangements

(1) Responsible Persons and Organization

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

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

The power plant management organization should have a risk management committee to be chaired by the power plant manager and participated by the operational manager and the EHS manager. Other members of the safety management committee would be head of various units of sections of the power plant. These unit heads will be responsible for the operation and maintenance of the units in strict adherence to the applicable work procedures. The risk committee will be involved in operational and environmental risks, including safety aspect. The risk committee will consistently review and evaluate the operational risks of the power plant, and recommend necessary improvements of the work procedures to ensure the risks are minimized or avoided.

(2) Risk Monitoring and Evaluation

Operational Risks

For the operational risks, the following risk triggers should be considered for routine monitoring and evaluation:

- Number of reported incidents of gas leakage and its trend.
- Response time to address the reported leakage and its trend.
- Number of reported incidents of non-conformance with the work procedures and its trend.

The incidents should be decreasing and the response to the reported leakage should be prompt and effective. The opposite trend suggests increasing of the likelihood of occurrence of operational risk events.

The monitoring and evaluation of the risk triggers should be the responsibility of the EHS unit.

Pollution Control Risks

The monitoring and evaluation should cover the following risk triggers:

- Number of CEMS malfunction incidents and the period of down time.
- Number of non-compliance of the effluent standards and the compliance trend.
- Number of non-compliance with the effluent quality standards of the treated effluent and the compliance trend.

(3) Reporting and Corrective Actions

The process for reporting and corrective actions in environmental management will also be applied to the environmental risk management. The monitoring and evaluation results will be reviewed by the risk management committee for taking corrective actions.

6.7.4 Environmental Risk during Decommissioning Phase

During the decommissioning phase, risk might be occurred in terms of the Project may not be able to comply with environmental requirements prescribed by MONREC or other concerned authorities. However a number of activities in this phase are much smaller and simpler than the other two phases implemented earlier. Furthermore, the Project would have long experience on coping with the risk during construction and operational phases before. From this point of view, the potential risk will be manageable.

CHAPTER 7

CUMULATIVE IMPACT ASSESSMENT

CHAPTER 7

CUMULATIVE IMPACT ASSESSMENT

7.1 INTRODUCTION

The Administrative Instruction of Environmental Impact Assessment Procedure (2015) prescribes Cumulative Impact Assessment (CIA) as one chapter in the Final EIA Report. However, it does not provide guidelines on the required content of the CIA chapter.

Numerous definitions of cumulative impacts or effects exist with slight differences in meaning. In general, cumulative impacts are defined as:

"The changes to the environment caused by a proposed project in combination with other past, present, and reasonably foreseeable projects or human activities".

It should be noted that baseline environmental quality, such as baseline ambient air quality, in an area is the results of current economic activities and projects already in operations. Therefore, the predicted ambient air quality presented in ***Chapter 6*** is cumulative impact of the Project and other existing activities in the area. In this regard, the CIA for this Project should consider only potential or approved future projects and anticipated future developments in the influence area. At present, information on future projects and development activities in the Project area is not available. The CIA in the context of this Project will not give practical or meaningful results if it is based on very broad scenarios of future development of DSEZ.

As DSEZ has no access to supply from the national power grid, the power generation capacity for DSEZ will have to be increased after the power plant of this Project operates at full capacity. Therefore, to make the CIA of this Project more meaningful, the CIA should be conducted for a plausible scenario of new power plant projects in the DSEZ.

This chapter presents results of the CIA based on the above premise.

7.2 METHODOLOGY AND APPROACH

7.2.1 Scope of the CIA

The CIA will be confined only to the air quality issue as cumulative impacts of power development in DSEZ will be mainly on ambient air quality. It is assumed that new power projects will be combined-cycle gas-fired power plants as the LNG terminal being developed could be expanded. The CIA will focus only on NO_2 concentrations in ambient air as NO_2 is the only major pollutant for natural gas-fired power plants.

A latest master plan for DSEZ development was prepared for Thailand's Neighboring Countries Economic Development Cooperation Agency (NEDA) by a consultant "Roland Berger". The document entitled "Revised Final Report-Integrated

Master Plan on Dawei SEZ Project Development" was completed in October 2015 and it is referred to in this report as the RB Plan as its findings and recommendations are views of RB not NEDA. Based on targeted industries in the latest master plan for DSEZ, TEAM estimated future power demand as shown in ***Table 7.2-1***.

TABLE 7.2-1

REQUIRED POWER SUPPLY CAPACITY FOR DSEZ

Particulars	Year 2025	Year 2035	Year 2045
Cumulative power demand, MW	630	5,234	5,864
Cumulative power supply, MW	430	630	5,234
New installed capacity after this Project, MW	200	4,600	630

Remark: Prepared by TEAM as part of a study for JICA on infrastructure requirements for DSEZ. The study report is being finalized.

Therefore, the CIA of power development on air quality will cover the impacts of 5,864 MW, the maximum generation capacity. The following assumptions are made for the CIA study:

- All future power plants will use the natural gas fired combined cycle technology.
- The number of power plants in operation will increase from one power plant under this Project to two power plants in 2025, 12 in 2035 and 14 in 2045. The capacity of each new power plant will be 430 MW equal to the existing power plant. In practice, the capacity of each new power plant will need to be determined based on the predicted annual demand to match the supply with the demand.
- All new power plants will be located next to the existing plant.

7.2.2 Air Quality Impact Assessment

The assessment of cumulative impacts on air quality uses the same methodology for air quality impact assessment used for the Project and the same basic data on terrain and climatological factors used in ***Chapter 6*, *Section 6.5.3.1***.

7.3 CUMULATIVE IMPACTS ON AIR QUALITY

The cumulative impacts on NO_2 concentrations in the ambient air in 2045 are investigated for the 5,864 MW generation. The investigation is made in two cases: (i) all new power plants will adopt the stack height of 35 m as in the Project's power plant; and (ii) all new power plants will adopt the stack height of 70 m which is recommended as Good Engineering Practice Stack Height Regulation of the EPA of State of Tennessee, approved on October 19, 1988.

7.3.1 Case 1-35 m Stack Height for All New Power Plants

The predicted maximum concentrations of NO_2 and its locations in the study area for year 2045 for Case 1 are given in ***Table 7.3-1*** and ***Figure 7.3-1*** to *7.3-3*.

TABLE 7.3-1

PREDICTED CUMULATIVE MAXIMUM NO_2 CONCENTRATION IN AMBIENT AIR FOR POWER DEMAND IN YEAR 2045-CASE 1

Results	Cumulative Power Demand In Year 2045 NO_2 ($\mu g/m^3$)		
	1-hr	**24-hr**	**1-yr**
In the entire study area			
- Maximum incremental increase in concentration	193.13	43.17	10.56
- % of ambient air quality standard	96.57	28.78	26.40
- Location of the maximum value	Andaman Sea	Britney Creek	DSEZ Area
- Coordinate (UTM(WGS84))	393707E, 1577324N	397007E, 1573724N	400207E, 1575324N
- Distance (meter) /direction from project site	6,750/NW	1,920/NW	630/NE
- Maximum concentration of background level	34	18	NA
- Net maximum concentration including background level	227.13	61.17	10.56
- % of ambient air quality standard	113.57	40.78	26.40
In only sensitive areas			
- Ranges of concentrations	130.32-150.24	9.52-12.47	2.22-2.71
- % of ambient air quality standard	65.16-75.12	6.35-8.31	5.55-6.78
- Location of the maximum value	Nga Pitat	Nyaung Bin Seik	Nyaung Bin Seik
- Maximum concentration of background level	34	18	NA
- Net maximum concentration including background level	164.32-184.24	27.52-30.47	2.22-2.71
- % of ambient air quality standard	82.16-92.12	18.35-20.31	5.55-6.78
Standard	**200[1/]**	**150[2/]**	**40[1/]**

Source: 1/ Environmental, Health, and Safety Guidelines: Environmental Air Emissions and Ambient Air Quality of International Finance Corporation (IFC), World Bank Group, 2007

2/ Thermal Power: Guidelines for New Plants, Pollution Prevention and Abatement Handbook, World Bank Group, July 1998

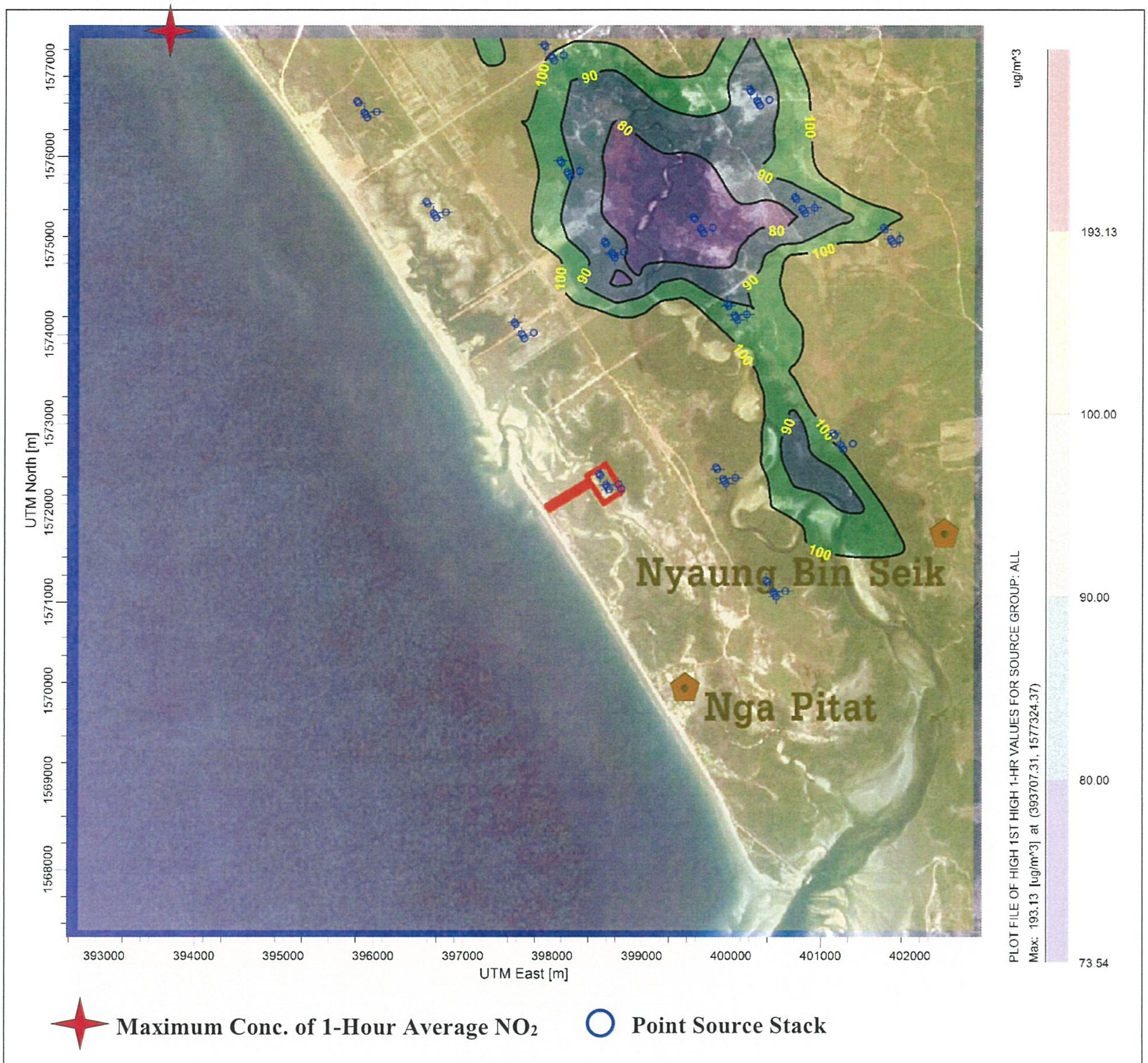


FIGURE 7.3-1 : ISOPLETE OF 1-HOUR AVERAGE CONCENTRATION OF NO_2 FOR CASE I: CUMULATIVE POWER DEMAND IN YEAR 2045

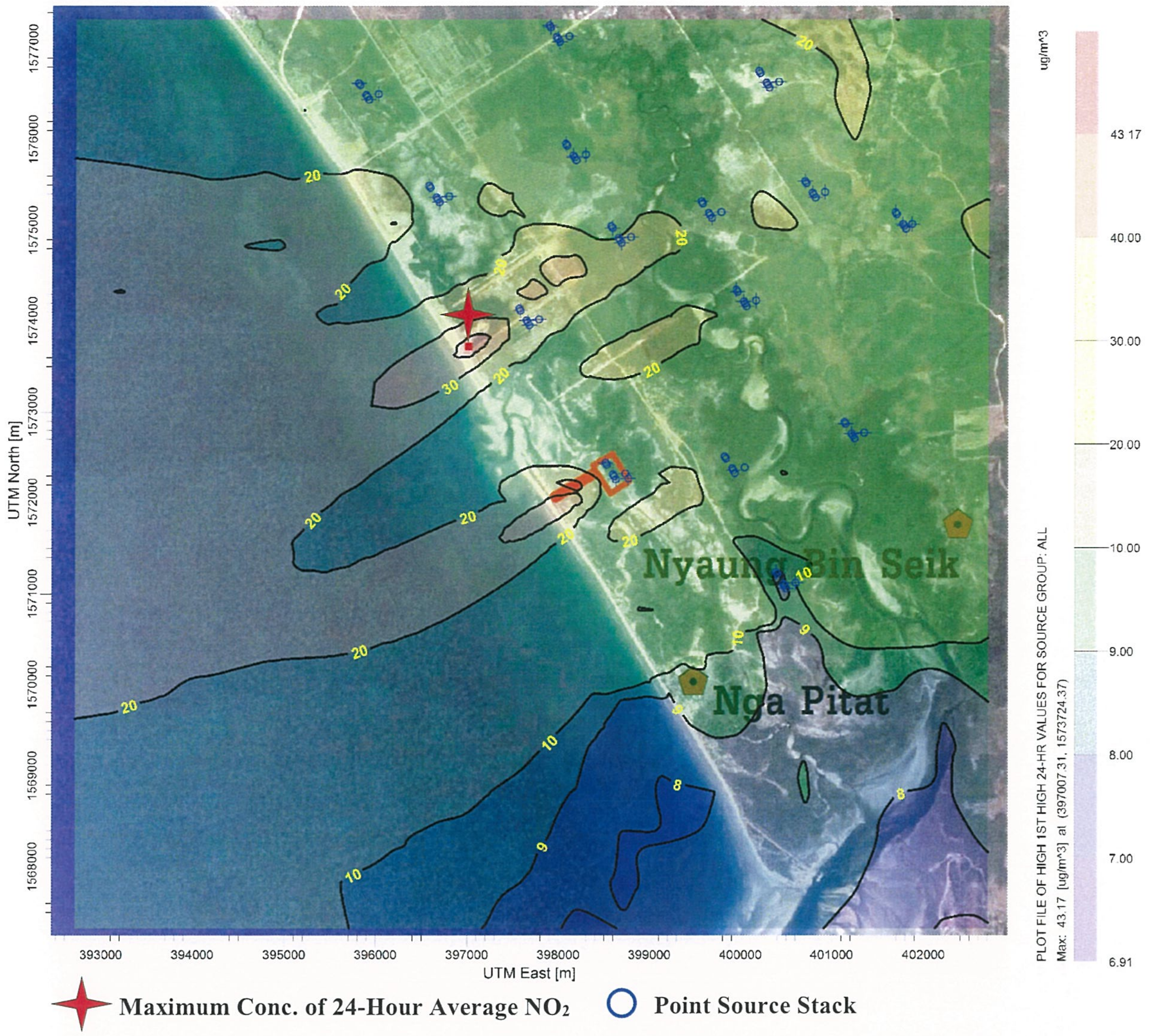


FIGURE 7.3-2 : ISOPLETE OF 24-HOUR AVERAGE CONCENTRATION OF NO_2 FOR CASE I: CUMULATIVE POWER DEMAND IN YEAR 2045

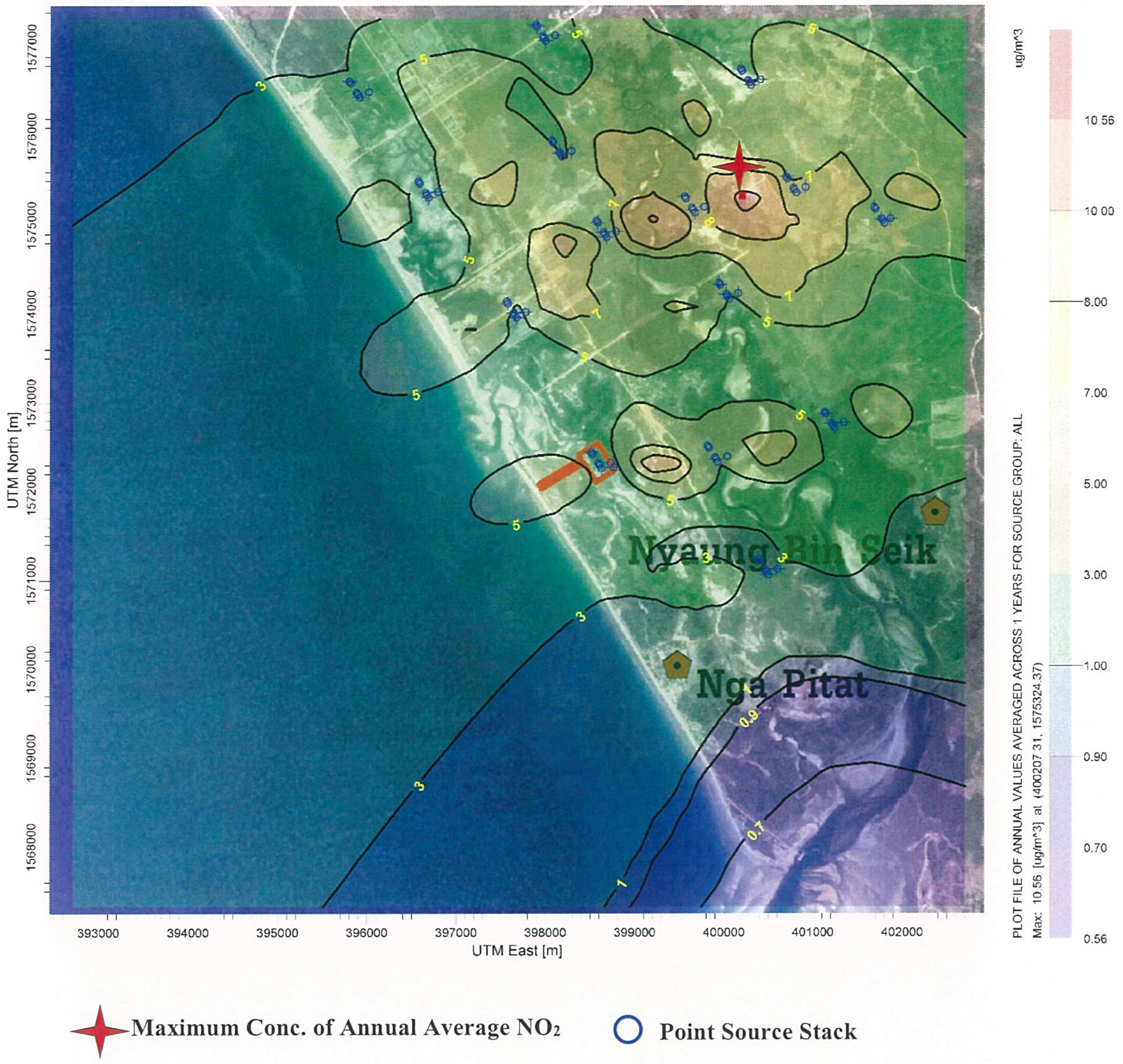


FIGURE 7.3-3: ISOPLETE OF ANNUAL AVERAGE CONCENTRATION OF NO_2 FOR CASE I: CUMULATIVE POWER DEMAND IN YEAR 2045

A. NO_2-1 hr

The maximum ambient concentration of NO_2-1 hr including background level concentration, is predicted to be 227.13 µg/m^3 (113.57% of AAQS) at Andaman Sea (393707E, 1577324N), located 6.75 km northwestward of the project site. The maximum concentrations of NO_2-1 hr at the sensitive receptors would be between 164.32-184.24 µg/m^3 (82.16-92.12% of AAQS) at Nga Pitat village (339328E, 1570194N), located 2.23 km south-southeastward of the project site. All these maximum concentrations are over the permissible maximum of 200 µg/m^3.

B. NO_2-24 hr

The maximum ambient concentration of NO_2-24 hr including background level concentration is predicted to be 61.17 µg/m^3 (40.78% of AAQS) at Britney Creek (393707E, 1573724N), located 1.92 km northwestward of the project site. The maximum concentrations of NO_2-24 hr at the sensitive receptors would be between 27.52-30.47 µg/m^3 (18.35-20.31% of AAQS) at Nyaung Bin Seik village (4023087E, 1571810N), located 3.67 km eastward of the project site. All these values are below the permissible maximum of 150 µg/m^3.

C. Annual NO_2

The maximum ambient concentration of annual NO_2 from stack emission (not including the background level concentration due to the unavailability of data) is predicted to be 10.56 µg/m^3 (26.40% of AAQS) at DSEZ Area (400207E, 1575324N), located 630 m northeastward of the project site. The maximum concentrations of annual NO_2 at the sensitive receptors (not including the background level) would be between 2.22-2.71 µg/m^3 (5.55-6.78% of AAQS) at Nyaung Bin Seik village (4023087E, 1571810N), located 3.67 km eastward of the project site. These values are below the permissible maximum of 40 µg/m^3. The gaps between the permissible maximum concentration and the predicted maximum concentrations are 29.44 µg/m^3. Although the data on background concentration of annual NO_2 is not available, the value will definitely be less than the background concentration of NO_2-24 hr of 18 µg/m^3. Therefore, the cumulative concentration of NO_2-24 hr will not be exceeded.

The air quality prediction results clearly indicate that the study area would not be able to accommodate a total 5,864 MW power production in 2045 if all new power plants will use a stack height of 35 m. The new power plants will have to raise the stack heights to increase the dispersion of NO_x.

7.3.2 Case 2-70 m Stack Height for All New Power Plants

The predicted maximum concentrations of NO_2 and its locations in the study area for year 2045 are given in ***Table 7.3-2*** and ***Figure 7.3-4*** to *7.3-6*.

TABLE 7.3-2

PREDICTED CUMULATIVE MAXIMUM NO_2 CONCENTRATION IN AMBIENT AIR FOR POWER DEMAND IN YEAR 2045-CASE 2

Results	Cumulative Power Demand In Year 2045		
	NO_2 ($\mu g/m^3$)		
	1-hr	24-hr	1-yr
In the entire study area			
- Maximum incremental increase in concentration	162.18	30.08	7.50
- % of ambient air quality standard	81.09	20.05	18.75
- Location of the maximum value	Andaman Sea	Britney Creek	DSEZ Area
- Coordinate (UTM(WGS84))	393707E, 1577324N	398007E, 1571924N	400207E, 1575324N
- Distance (meter) /direction from project site	6,750/NW	100/SW	630/NE
- Maximum concentration of background level	34	18	NA
- Net maximum concentration including background level	196.18	48.08	7.50
- % of ambient air quality standard	98.09	32.05	18.75
In only sensitive areas			
- Ranges of concentrations	119.44-131.46	8.24-11.63	1.96-2.53
- % of ambient air quality standard	59.72-65.73	5.49-7.75	4.90-6.33
- Location of the maximum value	Nga Pitat	Nyaung Bin Seik	Nyaung Bin Seik
- Maximum concentration of background level	34	18	NA
- Net maximum concentration including background level	153.44-165.46	26.24-29.63	1.96-2.53
- % of ambient air quality standard	76.72-82.73	17.49-19.75	4.90-6.33
Standard	**200[1/]**	**150[2/]**	**40[1/]**

Source: 1/ Environmental, Health, and Safety Guidelines: Environmental Air Emissions and Ambient Air Quality of International Finance Corporation (IFC), World Bank Group, 2007

2/ Thermal Power: Guidelines for New Plants, Pollution Prevention and Abatement Handbook, World Bank Group, July 1998

D. NO_2-1 hr

The maximum ambient concentration of NO_2-1 hr including background level concentration, is predicted to be 196.18 $\mu g/m^3$ (98.09% of AAQS) at Andaman Sea (393707E, 1577324N), located 6.75 km northwestward of the project site. The maximum concentrations of NO_2-1 hr at the sensitive receptors would be between 153.44-165.46 $\mu g/m^3$ (76.72-82.73% of AAQS) at Nga Pitat village (399328E, 1570194N), located 2.23 km south-southeastward of the project site. All these maximum concentrations are below the permissible maximum of 200 $\mu g/m^3$.

E. NO_2-24 hr

The maximum ambient concentration of NO_2-24 hr including background level concentration is predicted to be 48.08 μg/m^3 (32.05% of AAQS) at Britney Creek (398007E, 1571924N), located 100 m southwestward of the project site. The maximum concentrations of NO_2-24 hr at the sensitive receptors would be between 26.24-29.63 μg/m^3 (17.49-19.75% of AAQS) at Nyaung Bin Seik (4023087E, 1571810N), located 3.67 km eastward of the project site. All these values are below the permissible maximum of 150 μg/m^3.

F. Annual NO_2

The maximum ambient concentration of annual NO_2 from stack emission (not including the background level concentration due to the unavailability of data) is predicted to be 7.50 μg/m^3 (18.75% of AAQS) at DSEZ area (400207E, 1575324N), located 630 m northeastward of the project site. The maximum concentrations of annual NO_2 at the sensitive receptors (not including the background level) would be between 1.96-2.53 μg/m^3 (4.90-6.33% of AAQS) at Nyaung Bin Seik (4023087E, 1571810N), located 3.67 km eastward of the project site. These values are below the permissible maximum of 40 μg/m^3. The gaps between the permissible maximum concentration and the predicted maximum concentrations are 32.5 μg/m^3. Although the data on background concentration of annual NO_2 is not available, the value will definitely be less than the background concentration of NO_2-24 hr of 18 μg/m^3. Therefore, the cumulative concentration of NO_2-24 hr will not be exceeded.

The air quality prediction results clearly indicate that the study area could accommodate a total 5,864 MW power production in 2045 provided that all new power plants will use the natural gas- fired combined cycle process and a stack height of 70 m. If the stack height is less than 70 m, the air quality standards will not be met unless NO_x is to be further reduced.

Based on the existing background level of NO_2, about 30% of the absorptive capacity of the air-shed would still be available for industrial activities which could generate NO_2.

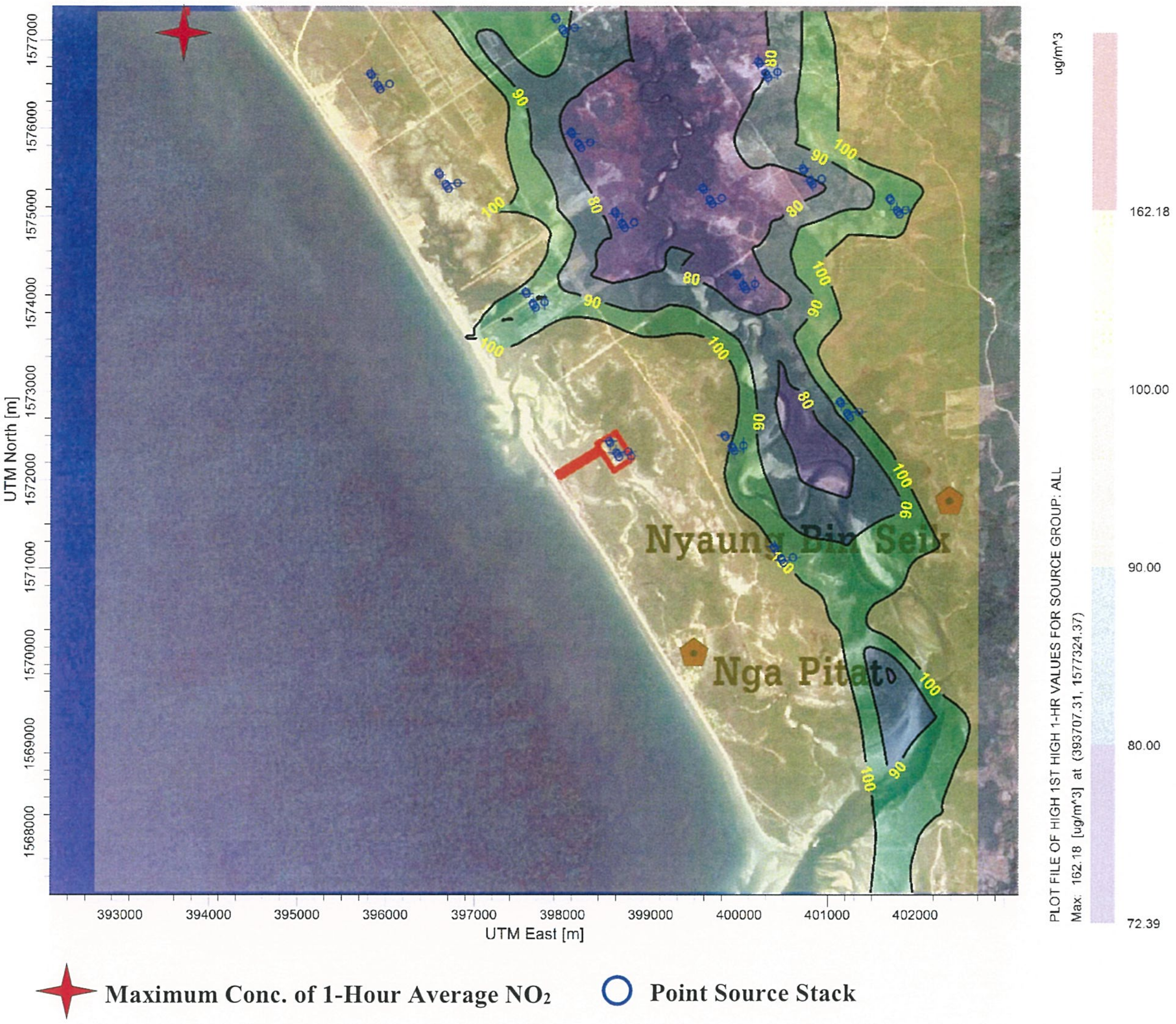


FIGURE 7.3-4 : ISOPLETE OF 1-HOUR AVERAGE CONCENTRATION OF NO_2 FOR CASE II: CUMULATIVE POWER DEMAND IN YEAR 2045

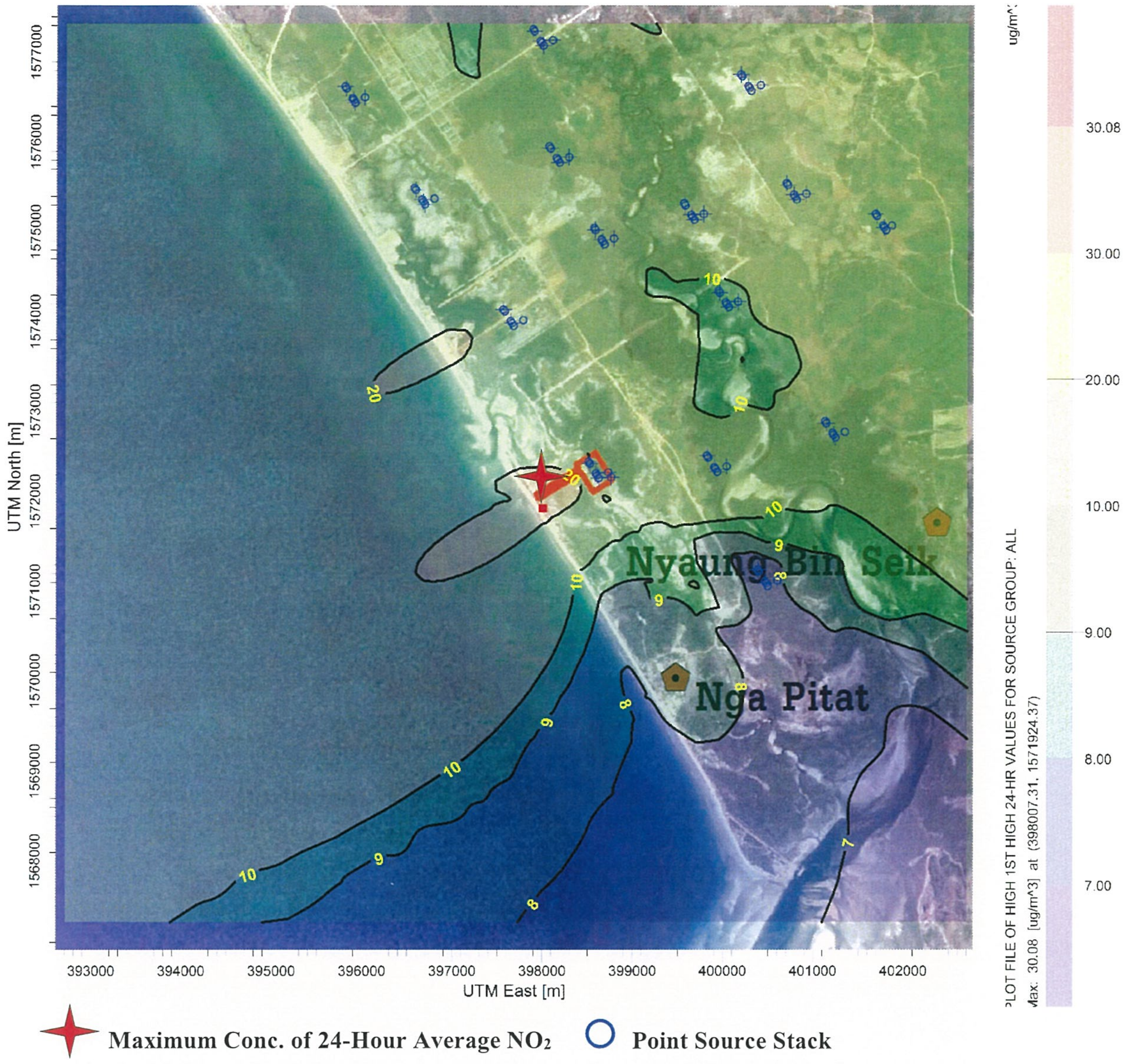


FIGURE 7.3-5 : ISOPLETE OF 24-HOUR AVERAGE CONCENTRATION OF NO_2 FOR CASE II: CUMULATIVE POWER DEMAND IN YEAR 2045

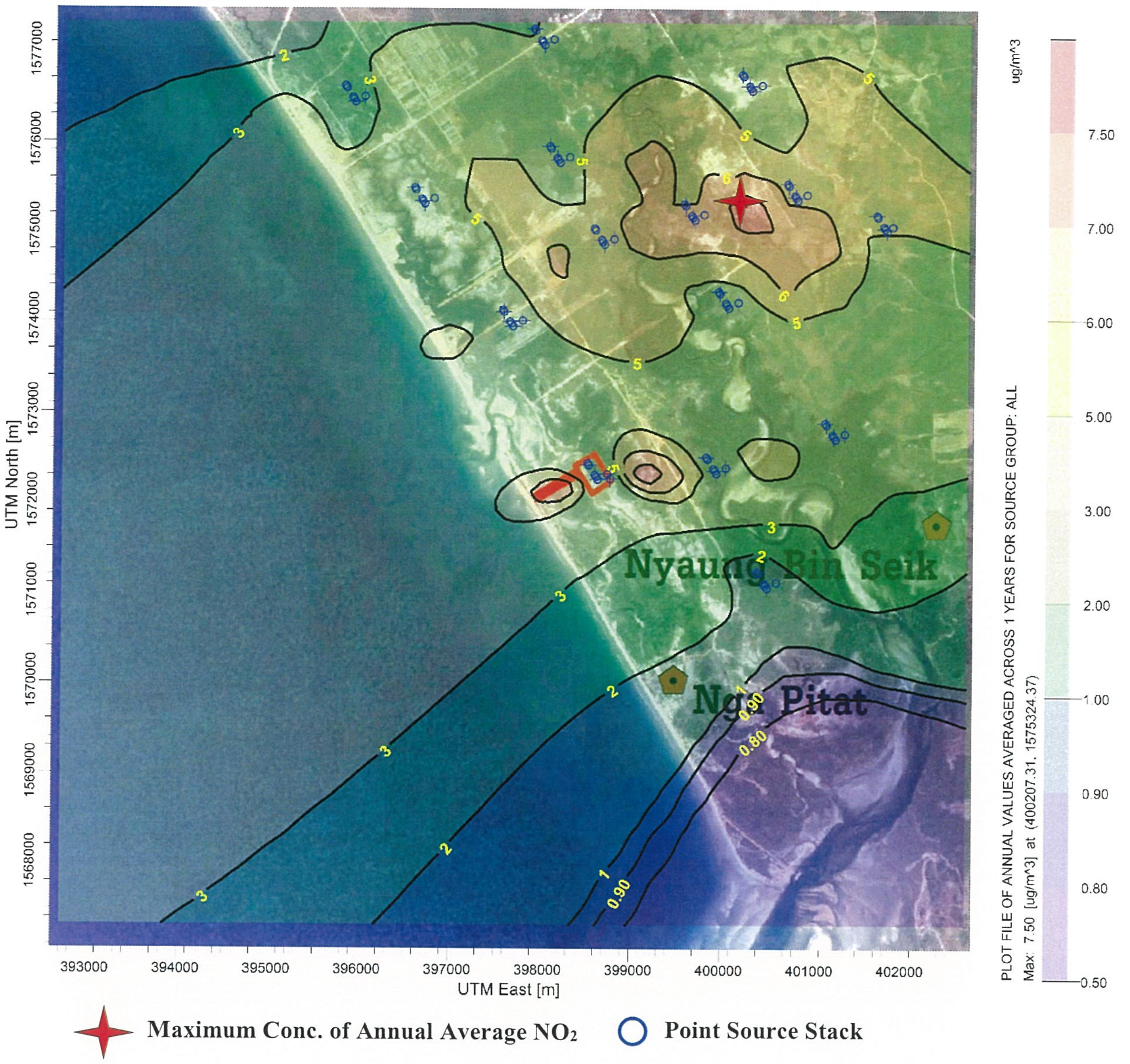


FIGURE 7.3-6: ISOPLETE OF ANNUAL AVERAGE CONCENTRATION OF NO_2 FOR CASE II: CUMULATIVE POWER DEMAND IN YEAR 2045

CHAPTER 8

ENVIRONMENTAL MANAGEMENT PLANS

CHAPTER 8

ENVIRONMENTAL MANAGEMENT PLANS

For convenience in the use of EMPs during Project implementation and as prescribed in the Environmental Impact Assessment Procedure 2015, the construction phase EMP and the operational phase EMP including decommissioning EMP are presented in Volume II of this Final ESIA Report. This Chapter presents the conceptual framework of EMPs and a summary of each EMP.

8.1 THE CONCEPTUAL FRAMEWORK

8.1.1 Scope of Environmental Management Plans

The results of EIA investigation will not lead to any results if they are not translated into two implementable Environmental Management Plans (EMPs): one EMP for implementing in the construction phase of the Project and another EMP for implementing in the operational phase of the Project. Recognizing this fact, the EIA Procedure requires the Final EIA Report to include two environmental management plans-a Construction Environmental Management Plan (CEMP) and an Operation Environmental Management Plan (OEMP). It should be noted that the CEMP also covers pre-construction phase and Decommissioning Environmental Management Plan (DEMP) has been prepared in addition.

The two EMPs are defined in the EIA Procedure as follows:

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

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

The above definitions make clear that the two EMPs required by MONREC will need to be comprehensive and have more details than very brief EMPs presented in EIA reports of the past. This requirement of MONREC is in line with current EIA practices in developed countries.

It should be noted that the two EMPs prepared as part of this EIA study are invariably framework plans as they are based on outline designs of the Project. They are therefore intended to provide framework and prescribe requirements for the preparation of detailed CEMP and OEMP by the appointed EPC contractor (Contractor). Consequently, they could be considered and referred to as the Project Proponent's or Owner's EMPs to distinguish them from the Contractor's EMP after the EIA during project implementation.

The DEMP is prepared in additional, to be in line with the comments of the EIA review committees which request the Consultant to elaborate more details at decommissioning phase of the Project.

8.1.2 Application of the Owner-EMPs

The Project Proponent will require in the EPC contract (Contract) to prepare a detailed CEMP in due course before commencing the construction. The Contractor will use the Owner-CEMP as the basis for preparing a detailed Contractor-CEMP. The Contractor-CEMP will be based on the Contractor's final designs, construction methods, and construction schedule. The scope and content of the Contractor-CEMP will not be less than the scope and content of the Owner-CEMP. The Contractor-CEMP shall be contractually binding. During the construction, the Contractor will implement the Contractor-CEMP under the supervision of a Project Manager to be appointed by the Project Proponent.

As the Contractor will also be responsible for the design, supply, installation, testing, and commissioning of the gas-fired power system and its associated facilities, the Project Proponent will require the Contractor to prepare a detailed Contractor-OEMP in due course before the commissioning. The Contractor will use the Owner-OEMP as the basis for preparing the Contractor-OEMP based on the actual construction and final operational procedures to be prepared by the Contractor. The Contractor-OEMP may need to be refined based on results of the commissioning. The Owner's Power Plant Operation Team will review and revise the Contractor-OEMP as appropriate to prepare the Final OEMP for implementation in the operational phase.

For decommissioning, the Project Proponent will require in the Contractor to prepare a detailed Contractor-DEMP in due course before the decommissioning. The Owner's Power Plant Operation Team will review and revise the Contractor-DEMP as appropriate to prepare the Final DEMP for implementation in the decommissioning phase.

For clarity, the application of the Owner-EMPs as above described is shown as a diagram in ***Figure 8.1-1***.

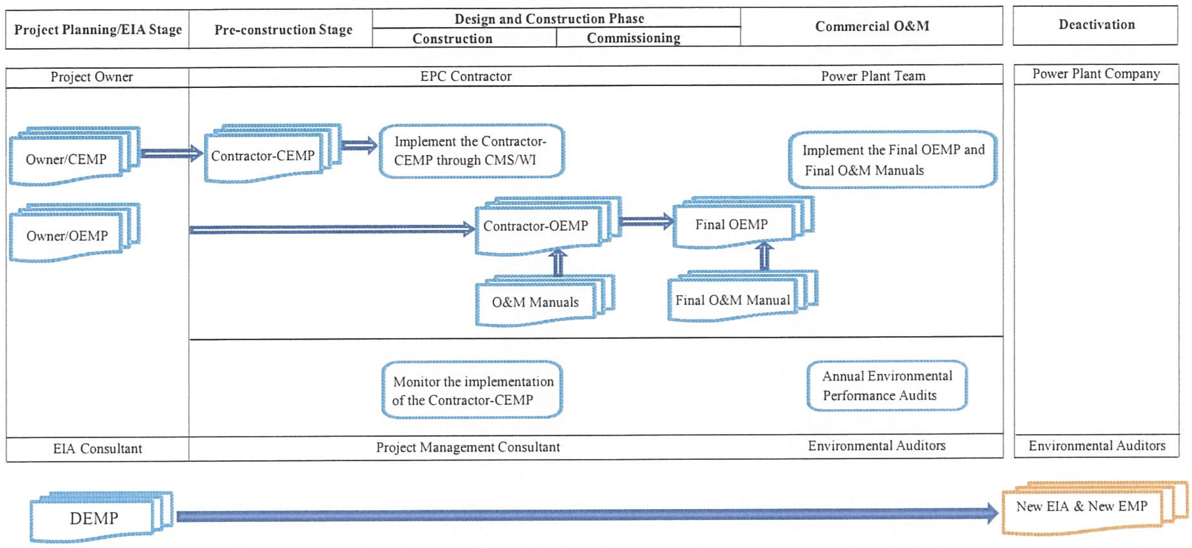


FIGURE 8.1-1 : APPLICATION OF THE EIA-EMP

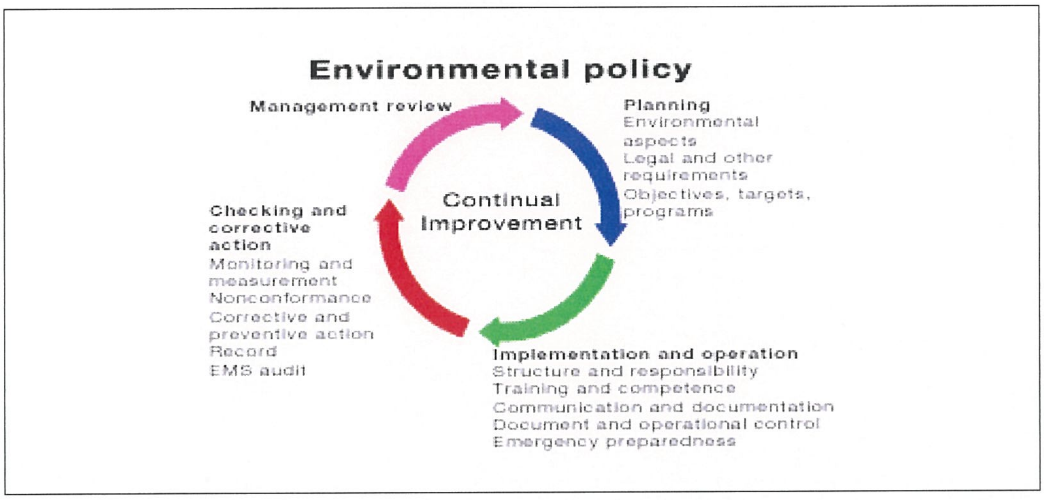


FIGURE 8.1-2 : PDCA CYCLE FOR ENVIRONMENTAL MANAGEMENT

8.1.3 Scope of Project Environmental Management

Environmental management during the construction, operational and decommissioning phases of the Project is based on the same basic principle of management in each project phase thus consists of four related tasks (see ***Figure 8.1-2***):

(i) Plan (P)	–	what need to be done to minimize the anticipated impacts;
(ii) Do (D)	–	implement the plan;
(iii) Check (C)	–	monitor and evaluate the results of implementation
(iv) Act (A)	–	taking corrective actions to improve the results, if found inadequate

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

8.2 PROJECT'S EHS POLICY AND COMMITMENTS, AND LEGAL REQUIREMENTS

The Owner's EHS policy and commitments and legal requirements will set the levels and targets of environmental performance of the Project during pre-construction and construction, operation and decommissioning.

8.2.1 Owner's Policy

The Project Proponent is committed to the sustainable development principle. In this regard, the Project Proponent will manage environmental aspects of the Project in accordance with the ISO 14001 environmental management system and OHASS 18001 Occupational Health and Safety Management System. Consequently, the Project Proponent will establish an environmental management system (EMS) for the project and will operate the EMS to meet the requirements of ISO 14001 and OHASS 18001 guidelines.

As the first step towards meeting the requirements of ISO 14001, the Project Proponent will formulate an environmental and social management policy to guide its environmental and social management during the construction phase and the operation phase and the decommissioning phase of the Project. Such a policy will support the following activities:

- Develop a comprehensive Environmental, Health, and Safety (EHS) Management System for implementing the Environmental Management Plan (EMP) to be prepared as part of the EIA of the Project;

- Implement the EMP and as part of project and operational management with due diligence audit to be conducted at appropriate interval during the construction, operational and decommissioning phases of the Project;
- In implementing the EMP during the project construction, the nominated EPC contractors will be required to prepare and implement contract specific EHS measures for the construction of the Initial Phase Power Plant Project;
- During the operational and decommissioning phases, EHS management will be an integral part of the operational management of the Initial Phase Power Plant Project;
- Establish adequate environmental and social safeguards capabilities;
- Encourage public participation in the EHS management as related to the surrounding communities; and
- Maintain information generated in the EHS management and prepare EHS performance reports as required by the corporate management and the concerned authorities of the Government.

The Project Proponent will establish and activate the EHS Management System starting from the commencement of construction.

During Pre-construction and Construction: The Project will endeavour to minimize environmental impacts and meet all EHS requirements during the construction. This will be achieved through adopting designs, construction methods, construction management practices, and impact mitigation measures. The Project EHS performance will be measured and evaluated against applicable national or international standards and guidelines prescribed by MONREC or proposed in the CEMP. In addition, the Project will establish an Environmental Management System (EMS) for the Project construction. In addition, the Project Proponent will submit the "Engineer Certificate" of the contractor which is certified by Myanmar Engineer Council before construction commencement.

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

During Decommissioning: the Project will endeavor to minimize environmental impacts and meet all EHS requirements of the power plant's operation and maintenance (O&M). This will be achieved through adopting: (i) best available technologies in the power plant design and operation; and (ii) effective impact mitigation measures proposed in the EIA. The Project EHS performance will be measured and evaluated against applicable national or international standards and guidelines prescribed by MONREC or proposed in the DEMP.

8.2.2 Legal Requirements

Environmental management of the Project will comply with legal requirements pertinent to the EMP prescribed in the Electricity Law 2014, the Environmental Conservation Rule 2014, EIA Procedure 2015 (29/ 12/ 2015) and Myanmar National Environmental Quality (Emission) Guidelines 29/12/2015.

A. Electricity Law 2014

The Electricity Law 2014 aims at the development of the power sector in harmony with environmental conservation and development (Article 3 (a) and (b)). To realize this, the Electricity Law 2014 authorizes the relevant ministry to conduct EIA, implement the activities with minimal environment impact, compensate for the negative impacts and provide funds for environmental conservation in accordance with the Environmental Conservation Law (Article 10 (b)). It requires the permit holders of the electricity businesses to abide by the current rules, regulations, orders and directives of the relevant ministry in implementing the electricity works (Article 20). Therefore, the draft Electricity Law supports the Environmental Conservation Law, its rule and the related EIA Procedure.

B. Environmental Conservation Rules 2014

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

C. EIA Procedure 2015

Articles in the EIA Procedure relevant to the preparation and implementation of the EMPs are summarized in ***Table 8.2-1***. Preparation and implementation of the two EMPs will need to comply with relevant articles in the table.

According to **Article 102 (a)**, the Project Proponent shall bear full legal and financial responsibility all of the Project Proponent's actions and omissions and those of its contractors, subcontractors, officers, employees, agents, representatives, and consultants employed, hired, or authorized by the Project acting for or on behalf of the Project, in carrying out work on the Project.

Article 103 states that the Project Proponent shall fully implement the EMP, all Project commitments, and conditions, and is liable to ensure that all contractors and subcontractors of the Project comply fully with all applicable Laws, the Rules, this Procedure, the EMP, Project commitments and conditions when providing services to the Project.

TABLE 8.2-1

CONTENT OF THE EIA PROCEDURE RELEVANT TO THE EMPS

Subject	Relevant Articles
Content of the EMPs	63
Project Approval Requirements	
- Issuance of an ECC[1]	70
- Conditions of the ECC[1]	87, 89, 90, 91, 92, 93, 94, 96, 97, 98
- Submission of an CEMP and OEMP	91, 94
Revision and updating the EMPs	94, 97, 98, 99
Implementing the EMPs	102, 103, 104
Monitoring and Reporting	
- Responsibility for Monitoring	106, 107
- Submission of Monitoring Report	108
- Content of Monitoring Report	109
- Disclosure of Monitoring Report	110
- Inspection by MONREC	111-122

Note: 1/ Environmental Compliance Certificate

D. Myanmar National Environmental Quality (Emission) Guidelines

Myanmar National Environmental Quality (Emission) Guidelines dated on 29 December 2015 will be adopted as the base guidelines and standards for environmental management during the entire period of Project implementation. The international guidelines and standards will be adopted only when the national guidelines and standards do not exist.

Based on nature of the gas-fired power plant development of the project, the national emission standards will be adopted for stack gas emissions and effluents to be discharged into the coastal waters. Combination of international and national ambient environmental quality standards for other parameters will be adopted as appropriate.

8.3 SUMMARY OF CEMP

As discussed in ***Chapter 6***, the Project is not expected to have major environmental impacts during construction apart from environmental disturbances normally experienced in power plant construction. Nevertheless, the Project Proponent will ensue that the Contractor will make best efforts to minimize the impacts during the construction phase despite their insignificant levels. In this regard, the Project Proponent will ensure that the Contractor-CEMP will incorporate all mitigation measures as prescribed in the Owner-CEMP in preparing detailed designs of the power plant and its associated facilities, construction methods, and specifications.

The content of the Owner-CEMP presented in ***Volume II*** follows the basic elements of environmental management as discussed in ***Section 8.1.3***. Major aspects of the Owner-CEMP are summarized as follows:

The following issues will be managed during the construction phase: (i) general construction; (ii) biomass waste; (iii) mangrove management; (iv) air quality; (v) noise; (vi) wastewater management; (vii) waste management; (viii) traffic management; (ix) OHS management; (x) resource management; (xi) corporate social responsibility; and (xii) emergency management. A sub-management plan for each of the identified issues is prepared and the twelve sub-plans are presented in ***Appendices of Volume II***. The Contractor will update the sub-plans and include in the Contractor-CEMP. Each sub-plan will be a working document and as such it will be reviewed and amended or updated as deemed necessary to reflect changes in construction schedule and management review changes.

8.3.1 Arrangements for the Implementation of Mitigation Measures

The Contractor will elaborate and update the Owner-CEMP to prepare a Contractor-CEMP for approval by the Owner's Project Manager. The Contractor will then implement the Contractor-CEMP under supervision of the Owner's Project Manager through the Construction Supervision Consultant. The Contractor will field an EHS manager to be in charge of all aspects of the implementation of the Contractor-CEMP.

8.3.2 Monitoring, Evaluating and Reporting

Monitoring, evaluating, and reporting (MER) of the environmental performance of the Contractor will include scheduled monitoring of the indicators related to each impact issue as indicated in each sub-plan in ***Appendices of Volume II***. In addition, the Contractor's and the Owner's EHS managers will conduct daily, weekly, and monthly site inspection programs to observe environmental performance of the construction. The Contractor will submit monitoring reports every 6 months, one for internal use and another for reporting to MONREC. These two types of reports are discussed in details in the CEMP.

In addition to the scheduled MER, environmental incidents, if occurred, will be recorded, registered and reported.

TABLE 8.3-1
ANTICIPATED IMPACTS AT VARIOUS MONTHS OF THE CONSTRUCTION

Activities	Duration (Months)	Impacts
Phase 1: Installation of Multiple Gas Engines	12	Fugitive dust, Noise, Wastewater, Construction waste, Road traffic, Impacts on archaeological site, Loss of Britney Creek Occupational health and safety, Livelihood, Infrastructure and services, Culture and tradition, Community health, safety and security, Community development support and corporate social responsibility, Risk management
Phase 2: 2 on 1 Combined cycle	24	Ambient air, Noise, Wastewater, Seawater and marine ecology, Construction waste, Road traffic, Infrastructure and services, Culture and tradition, Occupational health and safety, Community health, safety and security, Community development support and corporate social responsibility, Risk management
Phase 3: Installation of Multiple Gas Engines	12	Fugitive dust, Noise, Wastewater, Construction waste, Road traffic, Impacts on archaeological site, Occupational health and safety, Livelihood, Infrastructure and services, Culture and tradition, Community health, safety and security, Community development support and corporate social responsibility, Risk management
Phase 4: 2 on 1 Combined cycle	24	Ambient air, Noise, Wastewater, Construction waste, Road traffic, Infrastructure and services, Culture and tradition, Occupational health and safety, Community health, safety and security, Community development support and corporate social responsibility, Risk management
Phase 5: 1 on 1 Combined cycle	24	Ambient air, Noise, Wastewater, Construction waste, Road traffic, Infrastructure and services, Culture and tradition, Occupational health and safety, Community health, safety and security, Community development support and corporate social responsibility, Risk management

Note: Duration of activities based on tentative project implementation schedule in ***Figure 4.1-6***, ***Chapter 4***

8.3.3 Corrective Actions

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

The Contractor is required to establish own procedure for corrective actions related to EHS non-compliances. The CEMP proposes several categories of non-compliance, levels of non-compliance, and responsibilities and process for taking corrective actions based on the level of non-compliance. The Contractor will be required to conduct an investigation of the non-compliance to determine its root causes and formulate effective actions to correct the root causes. The Contractor will report to the Project Manager the results of taking corrective actions. The Contractor will also be required to prepare an emergency response plan and establish adequate capacity for implementing the emergency response plan.

8.3.4 Organization

Environmental management at this stage will cover both of pre-construction and construction phases as activities during these two phases are closely linked to each other. The management will be involved by the Project Proponent, the Contractor, and MONREC through ECD, and other government agencies at the regional, township and community levels.

As environmental management will be carried out as part of the Project management, it will be a functional unit in the project management organization. ***Figure 8.3-1*** shows a tentative organizational structure for Project construction which cover pre-construction. This consists of an organizational structure of the Project Proponent and an organizational structure of the Contractor. The two organizational structures will need to be revised as appropriate as the Project moves from the planning stage to the design stage.

8.3.5 Public Consultation and Disclosure

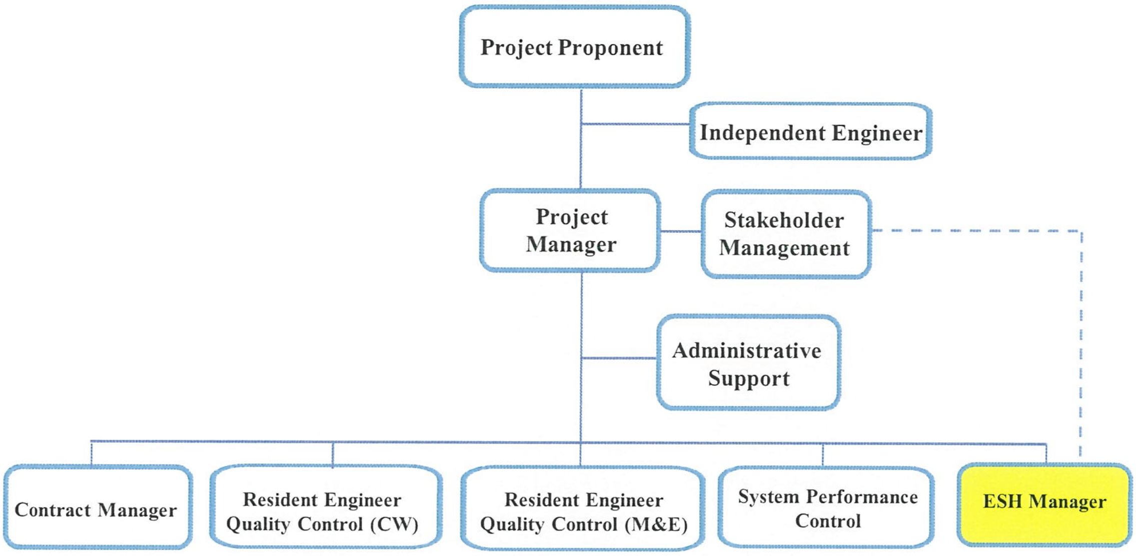
Establishment of Grievance Redress Mechanism

The Project proposes to establish grievance redress process as the main mechanism for public consultation and disclosure to ensure that public complaints and concerns related to the construction will be effectively addressed as soon as possible.

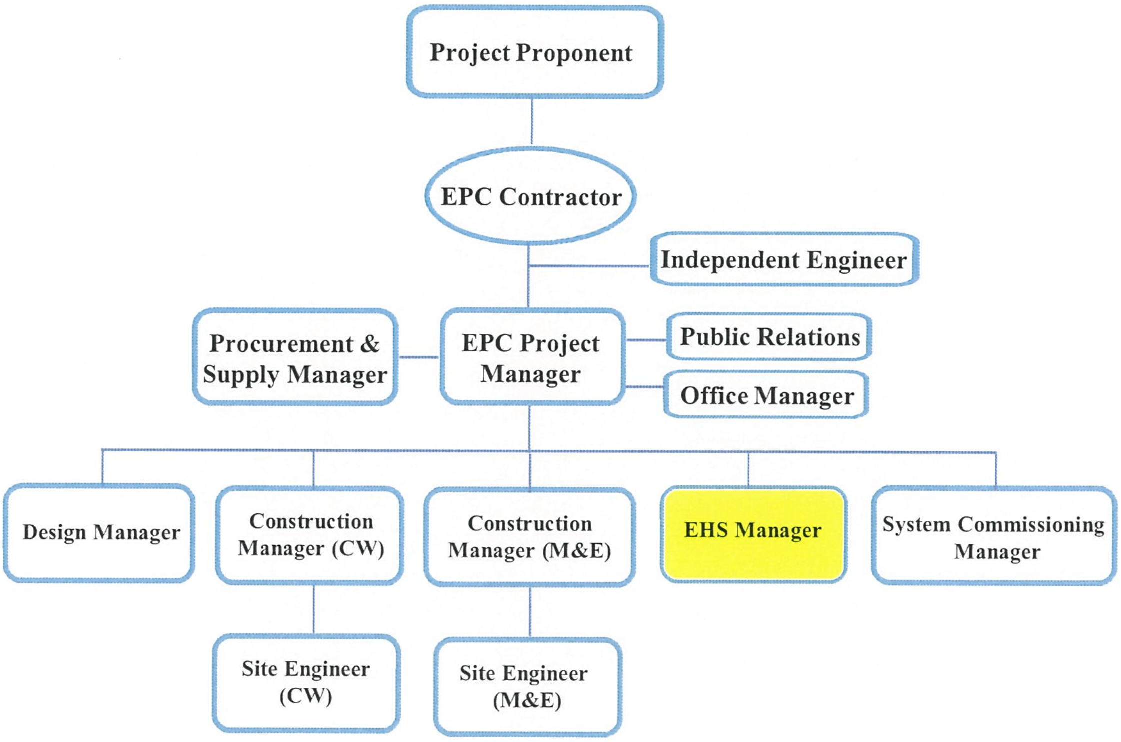
Structure

The key persons to mechanize grievance redress will be the same group as the Community Participatory Committee (CPC), comprising 15 members of:

- Five Representatives of government sectors, one from each agency, comprising MONREC/ ECD, Department of Electric Power (DOEP) of Tanintharyi Region, Dawei District, Yebyu Township and Launglon Township;
- Eight representatives of four communities of Nga Pitat, Nyaun Bin Seik, Mudu and Ka Myaing swea, 2 from each community; and
- Two representatives of the Project Proponent. They have authority to make a decision on behalf of the Project Proponent and power plant.



Project Management Structure



EPC Contractor's Project Management Structure

FIGURE 8.3-1: ORGANIZATION FOR PROJECT CONSTRUCTION

***Roles and Responsibilities*:**

Roles and responsibilities of the CPC [1] has been defined as majority on cooperation with the Project Proponent in following activities:

- Public relations for the Project;
- Building understandings and good relationship between the Project and the surrounding communities;
- Participation in monitoring of the Project impacts and mitigation measures;
- Receiving and addressing complaints arisen from the project impacts;
- Resolving conflicts between the Project and the locals; and
- Coordinate among government sectors, the Project, communities and other stakeholders.

Specific responsibility for cooperation in receiving and addressing complaints arisen from the project impacts, and resolving conflicts between the Project and the locals are described as shown in Grievance redress process diagram ***Figure 8.3-2***.

***Linkage between CPC, Government Sectors and Communities*:**

Linkage between CPC, government sectors and communities in the specific context of cooperation in receiving complaints and resolving conflicts will be:

- Representatives of government sectors will inform about the complaints received from stakeholders and their resolutions to their agencies at the regional, district and township levels. In case of any feedbacks/comments from their agencies, they will bring the messages and inform the CPC.
- Representatives of four nearby communities will convey the complaints related to the Project impacts from villagers to the CPC for joint consideration on problems' solving. They will also bring the results to inform the complainers and their communities.

[1] Refers to Establishment of a Community Participatory Committee in Section 6.4.7 Stakeholders' Negative Attitudes toward the Project of Chapter 6.

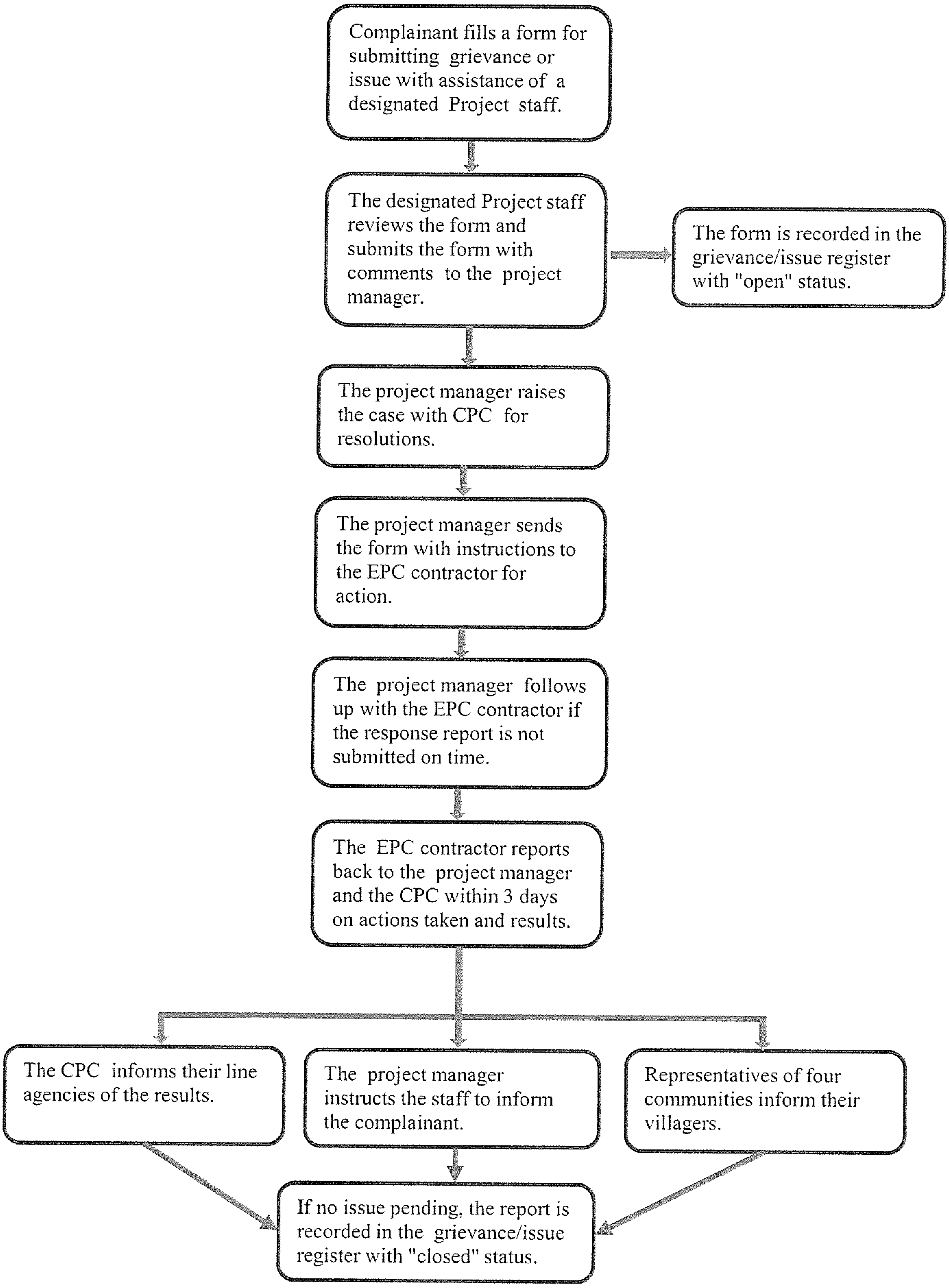


FIGURE 8.3-2: GRIEVANCE MANAGEMENT PROCESS

8.3.6 Audit

An audit is proposed at the end of the first year of construction and another audit at project completion.

8.3.7 Responsible Agencies for Environmental Management Plan

Environmental Management Team during Pre-construction and Construction Phases

Structure

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

There will be nine persons of two key groups responsibility for environmental management of the Project during these two phases:

- Five representatives of the Project Proponent or Project Owner who manages the Project through the Project manager and his/her functional units of (i) construction quality control (civil works) ; (ii) head and core environmental scientist of environmental, health and safety management; and (iii) stakeholder management.
- Four representatives of the Project Contractor as the party undertaking the construction; including the Contractor Project Manager and three functional units of (i) construction management (CW); (ii) construction management (M&E); and (iii) Contract EHS management.

Responsibilities

Responsibilities of each party in environmental management are as follows:

Project Proponent

- Response to MONREC and other line organizations who are responsible for specific environmental issues for environmental performance of the Project as prescribed as conditions in the ECC and other permits.
- Supervise closely the Contractor in implementing the Contractor CEMP as an integral part of its project implementation management and construction supervision.
- Conducting periodic audit of environmental and social performances of the Contractor.

Contractor

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

Specifically, the Contractor will have the following responsibilities:

- Prepare a detailed Contractor CEMP for review and approval by the Project Proponent.
- Implement the mitigation measures during the construction through construction method statements and work instructions in strict conformance with environmental conducts prescribed in the Contract.
- Ensure that all process and environmental control equipment meet all technical specifications related to their environmental performance.
- Ensure that its sub-contractors shall comply with the Contractor CEMP.
- Consistently update the Contractor CEMP and submit the updated version to the Project Proponent for approval.

Budget

The proposed measures for mitigation of environmental impacts during the pre-construction and construction phases will be included in the contract cost as they are carried out mainly by the contractor, and will be specified in the contract. Its cost will be too small to be presented as separate cost items. Examples are: (i) limit speed for vehicles and trucks not to exceed 40 km/hr; (ii) the contract will specify the contractor and his sub-contractors to use construction equipment that generate low level of noise; and (iii) toilet wastes will be discharged into a septic tanks with hydraulic retention time of about 5 days, etc. However, the proposed cost of mitigation measures during these phases will be on social environmental management plan, mangrove management plan, emergency response plan, and external audit. Total cost of mitigation measures during these two phases is provisionally estimated, as shown in ***Table 8.3-2***.

TABLE 8.3-2

BUDGET ESTIMATE FOR MITIGATION MEASURES DURING SIX YEARS OF CONSTRUCTION PHASE

No.	COST ITEMS	Monitoring Activities	Unit Cost		Annual Budget (US$)	Total Budget for 6 Years (US$)
			US$	Units		
1	Social Environmental Management Plan including CSR	- Disclosure th project information to the public - To be communication channel, including receiving complaints and settling the solutions - Community activities; e.g. education, health, religious, culture, occupation promotion and gender development	10,000	Lumpsum	10,000	60,000
2	Mangrove Management Plan	Implementation Mangrove Resource Management Program (MRMG) in 30 ha area, Implemetaiton will be on participatory approach: - Nga Pitat villagers will be the main actor - Officials of Department of Fishery and Forest Department will be supervisors - The Project Proponet will support the implementation	6,000	Lumpsum	6,000	36,000
3	Enmergency Response Plan	- Monitoring emergency situations such as accident, fire, flood, storm, tsunami etc. - Plan to restrain and recovery the situations as indicated in Emergency Response Plan	15,000	Lumpsum	15,000	90,000
4	External Audit	To verify the environmental management practices against established standards and check the compliance with rules and regulations to environmental management	1,500	Lumpsum	1,500	9,000
	Total of Implementation of Mitigation Measures				**32,500**	**195,000**

8.3.8 Responsible Agencies for Environmental Monitoring Program

Establishment of Environmental Monitoring Program

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

Two types of monitoring will be arranged for the Project. Internal monitoring will be carried out by staff of the Project or Contractor who are involving those particular subjects while external monitoring will be sourced out to a third party.

Internal monitoring will be organized by two teams, one for construction phase and another one for operation phase in accordance with different nature of work. As a short time operation of pre-construction and decommissioning phases, responsibilities of the former is integrated into construction phase while the latter is in operation phase.

Environmental Monitoring Responsible Agency during Pre-construction and Construction Phases

Structure of Internal Monitoring Responsible Agency

There will be four persons of two key groups responsibility for internal environmental monitoring during these two phases:

- Two representatives of the Project Proponent or Project Owner comprise: (i) Project Manager; and (ii) Owner's EHS Manager.
- Two representatives of the Project Contractor comprise: (i) the Contractor Project Manager; and (ii) the Contract's EHS management.

Responsibilities

Responsibilities of each party in environmental monitoring are as follows:

Project Proponent

- Monitoring and reviewing environmental compliance at the Project level as part of the Project management.
- Monitoring will also cover environmental incidents.
- Instructing the Contractor Manager to take corrective actions for any identified non-compliance.
- Preparing a project environmental monitoring report every six months for submission to MONREC.
- Notwithstanding the periodic monitoring reports to be submitted to MONREC, keep MONREC and other concerned authorities informed of any serious environmental events and responses to the events.

Contractor

- Implementing the monitoring plans, and arranging training and specialist consultants for the monitoring as required.
- Conducting monitoring by using the approved methods stated in the Contract.
- Conducting periodic monitoring and reporting of its compliance with the environmental and social performance prescribed in the Contract.
- Environmental results not meeting the required standards will be managed as per the corrective action process and issued with a non-compliance report.
- The Contractor's EHS Manager will advise the Contractor Project Manager of any non-compliance from monitoring and will report these to the Owner's EHS Manager as required.
- Preparing monthly environmental performance reports for submission to the Owner's Project Manager.

Budget

Budget is allocated for monitoring carried out by a third party only, but not for internal monitoring as it will be undertaken by monitoring team as mentioned above.

Monitoring by the third party will be officially carried out for air quality, noise, wastewater, marine resources and traffic twice a year over the construction period. Total cost of monitoring and evaluation of the Project's environmental and performance is provisionally estimated, as shown in ***Table 8.3-3***. The actual amount of budget will have to be determined each year in line with the actual annual monitoring program to be implemented in that year.

TABLE 8.3-3

BUDGET ESTIMATE FOR ENVRIONMENTAL MONITORING DURING SIX YEARS OF CONSTRUCTION PHASE

No.	COST ITEMS	Monitoring Activities	Unit Cost		Annual Budget (US$)	Total Budget for 6 Years (US$)
			US$	Units		
1	Air quality (3 stations)	Ambient air quality will be carried out twice a year at construction site and 2 stations at the sensitive area in Mudu and Nga Pitat, to check TSP and PM10.	800	Station	4,800	28,800
2	Noise measurement (3 stations)	Monitoring will be carried out twice a year at construction site and 2 identified sensitive receptor to check Leq 1 hr, Leq 24 hr and Lmax	700	Station	4,200	25,200
3	Vibration measurement (2 stations)	Monitoring will be carried out twice a year at the construction site and identified sensitive receptor to check particle velocity	600	Station	2,400	14,400
4	Wastewater measurement (2 stations)	Twice a year collection of two grab water samples, at inlet and the outlet of retention pond, to analyzed magnitudes of various quality parameters prescribed in effluent standards.	600	Station	2,400	14,400
5	Marine resources measurement (2 stations)	Twice a year collection at pipe laying and outlet of retention pond to analyzed for phytoplankton, zooplankton, benthos and larvae	1,000	Station	4,000	24,000
6	Traffic flows measurement (2 stations)	Conduct traffic survey twice a year at potential impact areas of ITD Coastal and Nga Pitat Roads, and analyse the traffic flow.	500	Station	2,000	12,000
	TOTAL BUDGET FOR CONSTRUCTION PHASE				**19,800**	**118,800**

8.4 SUMMARY OF OEMP

As discussed in ***Chapter 6***, the operation of the power plant will not create any significant environmental and social impacts. Therefore, the OEMP will require much less activities and a much simpler EMS compared to those of the CEMP. A summary of the Owner-OEMP is presented below:

8.4.1 Mitigation Measures and Plans

No environmental impact mitigation measures will be required apart from routine inspection and maintenance of power plant. The power plant management organization will implement sub-plans of air quality, noise, wastewater, OHS management, social environmental management, mangrove rehabilitation management, and emergency management, as presented in ***Appendices of Volume II***.

8.4.2 Environmental Management System (EMS)

The power plant management organization will set up a simple EMS for its O&M activities. This EMS will focus more on occupational health and safety of power plant workers which are less than 50 persons, and on monitoring of changes in air, water quality, noise levels and marine ecology at the area related to intake and discharge point of the seawater.

8.4.3 Monitoring, Evaluating and Reporting

The MER will include scheduled monitoring of air quality, noise, water quality. Air monitoring at each of the exhaust stacks will be fitted with in-stack monitoring equipment linked to the Continuous Emissions Monitoring System (CEMS). Ambient air quality monitoring will be conducted in sensitive receptor areas, once every six months in the first year of commercial operation. Each monitoring will collect air samples continuously for 24 hours. The collected combined samples will be analyzed for NO_X. Subject to the ambient air quality, the ambient air quality monitoring could be every six months or more frequent as necessary. Water quality could be daily routine scheduled monitoring of the discharge of spent cooling water and wastewater treatment facilities. Seawater quality surveys will be carried out monthly during the first six months of operations. The sampling and analysis requirements will be similar to those of the surveys conducted before the commissioning. Environmental reports will be prepared for submission to MONREC and other concerned authorities every 6 months.

8.4.4 Corrective Actions

Corrective actions are described as part of the management of the implementation of the community support. The process is discussed in the sub-plans.

8.4.5 Organization

As environmental management will be carried out as part of the power plant management, it is a functional unit in the power plant management organization. ***Figure 8.4-1*** shows a tentative organizational structure for power plant management, including the EHS unit. The organizational structure will be revised as appropriate in due course by the Project Proponent before the commissioning.

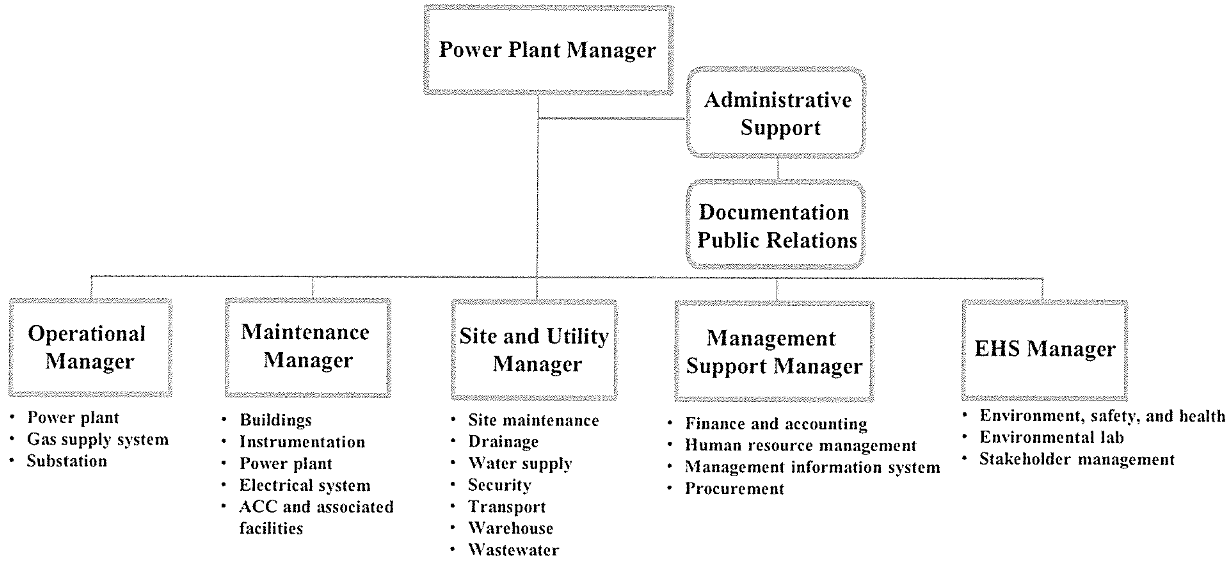


FIGURE 8.4-1: TENTATIVE ORGANIZATION FOR POWER PLANT O&M AND ENVIRONMENTAL MANAGEMENT

8.4.6 Public Consultation and Disclosure

Establishment of Grievance Redress Mechanism

The Project proposes to establish grievance redress process as the main mechanism for public consultation and disclosure to ensure that public complaints and concerns related to the construction will be effectively addressed as soon as possible.

Structure

The key persons to mechanize grievance redress will be the Community Participatory Committee (CPC), comprising 15 members of:

- Five representatives of government sectors, one from each agency, comprising MONREC/ ECD, Department of Electric Power (DOEP) of Tanintharyi Region, Dawei District, Yebyu Township and Launglon Township.
- Eight representatives of four communities of Nga Pitat, Nyaun Bin Seik, Mudu and Ka Myaing swea, 2 from each community.

- Two representatives of the Project Proponent. They have authority to make a decision on behalf of the Project Proponent and power plant.

***Roles and Responsibilities*:**

Roles and responsibilities of the CPC[2] has been defined as majority on cooperation with the Project Proponent in following activities:

- Public relations for the Project
- Building understandings and good relationship between the Project and the surrounding communities
- Participation in monitoring of the Project impacts and mitigation measures
- Receiving and addressing complaints arisen from the project impacts
- Resolving conflicts between the Project and the locals
- Coordinate among government sectors, the Project, communities and other stakeholders

Specific responsibility for cooperation in receiving and addressing complaints arisen from the project impacts, and resolving conflicts between the Project and the locals are described as shown in Grievance redress process diagram ***Figure 8.4-2***.

8.4.7 Audit

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

[2] Refers to Establishment of a Community Participatory Committee in Section 6.4.7 Stakeholders' Negative Attitudes toward the Project of Chapter 6.

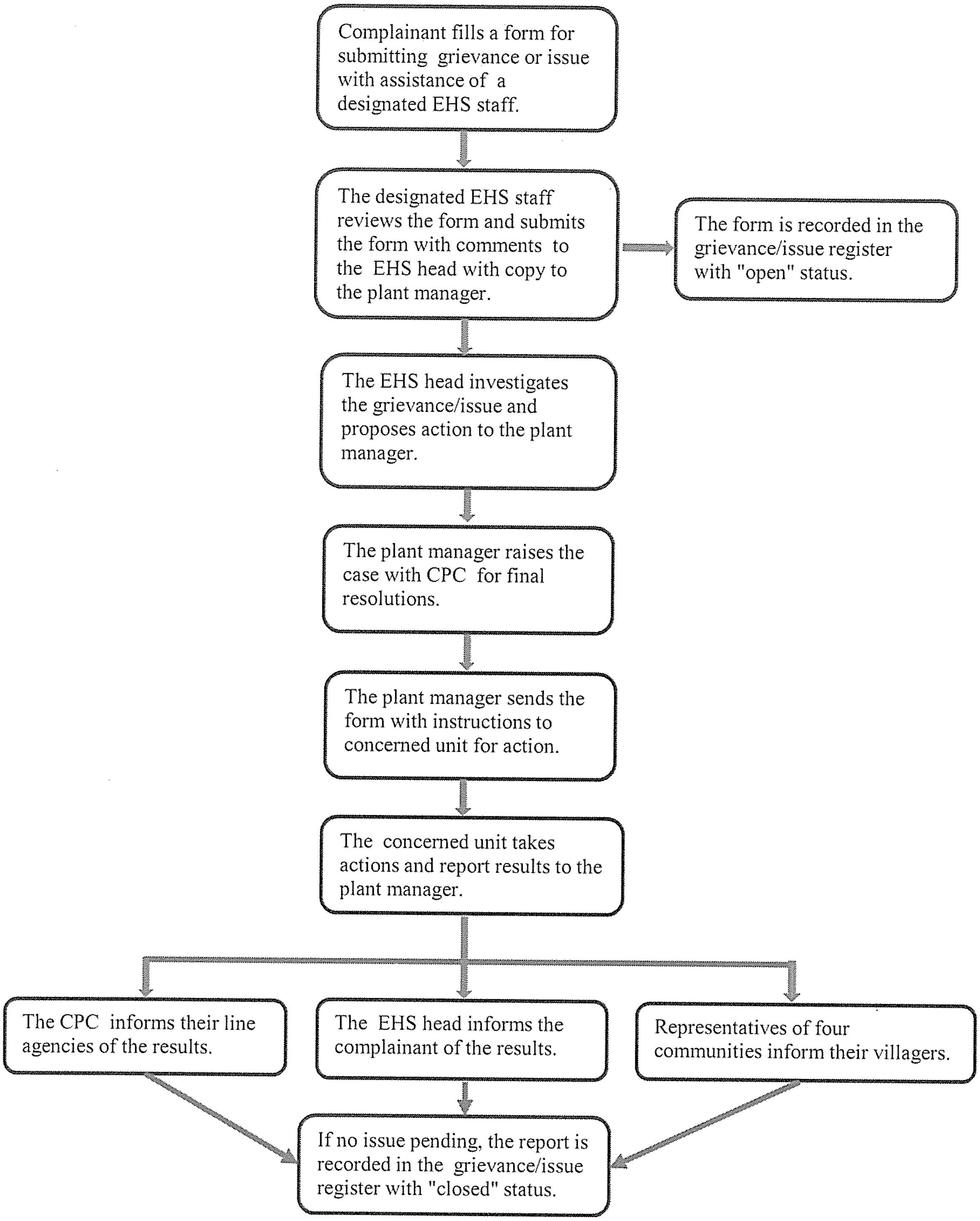


FIGURE 8.4-2: GRIEVANCE REDRESS PROCESS

8.4.8 Responsible Agencies for Environmental Management Plan

Environmental Management Team during Operation Phase

Structure

Environmental management during this phase will be part of the power plant management. Environmental management measures will be implemented by the plant operation team, consisting four representatives of the Project Proponent or Project Owner who manages the Project through the Power Plant Manager and his/her five functional units of (i) operational management; (ii) maintenance management; and (iii) environmental, health and safety management.

Responsibilities

- The Operation Manager will be primarily responsible for operation of environmental management facilities and implementing mitigation measures. He will therefore be responsible for EHS performance of the power plant.
- The Project Manager will supervise the Operation Manager and the EHS Manager in environmental management of the power plant operation.
- The EHS management function will involve the following activities:
    - Prepare the operation manuals for the wastewater treatment system, continuous emission management system (CEMS), and all scheduled environmental monitoring
    - Operate the CEMS and analyze the data generated by the CEMS for emission monitoring
    - Collaborate with the Operation Manager to ensure efficient operation of environmental management facilities and implementation of impact mitigation measures
    - Prepare periodic EHS performance reports for submitting to the Plant Manager
    - Coordinate with the Plant Manager and the Construction Manager to facilitate site inspection or visits of officials from MONREC/ECD, other government agencies, and representatives of communities in the vicinities
    - Cooperate with the Operation Manager in investigations related to public complaints
    - In consultation with the Operation Manager, prepare recommendations to the Plant Manager on corrective actions related to environmental performance
    - Supervising environmental management during the commissioning period

Budget

Impact mitigation measures to be implemented during the operation phase will be installed a part of the power plant process. These comprise gas engine and major equipment for power plant, once-through cooling water system, water demineralization facilities, water treatment plant, and emission control equipment. Their costs will be included in the power plant structure. At this stage of the Project design, there is no

information about the capital costs and their annual operation and maintenance expenses of these mitigation measures. However, the budget of this phase will be allocated for social environmental management plan, mangrove management plan, emergency response plan, and external audit. The total cost is estimated, as shown in ***Table 8.4-1***.

8.4.9 Responsible Agencies for Environmental Monitoring Program

Structure

Environmental monitoring during this phase will be part of the power plant management, mainly by the Power Plant Manager and his/her functional units of (i) operational management; (ii) environmental, health and safety management; and (iii) documentation public relations. So, there will be four person involved in monitoring.

Responsibilities

- The EHS Manager will be responsible for monitoring, evaluating, and reporting EHS performance of the power plant. He will work closely with the Operation Manager in formulating corrective actions to resolve non-compliance issues.
- The EHS management function will involve the following activities:
  - Carry out scheduled monitoring as prescribed in the monitoring plan
  - Prepare periodic EHS performance reports for submitting to the Plant Manager
  - Prepare monthly monitoring reports for internal use as feedback to the EMS
  - Prepare bi-annual monitoring reports for submitting to MONREC
  - Supervising environmental management during the commissioning period

Budget

Budget for monitoring will be allocated for a third party only, but not for internal monitoring as it will be undertaken by monitoring team as mentioned above.

Monitoring by the third party will be officially carried out for air quality, noise, wastewater and marine resources management. It will be undertaken within 2 separated periods. The first period will be for the first five year after commissioning and the second period will be from the 6th year onwards throughout the project life. Total cost of monitoring and evaluation of the Project's environmental and performance is provisionally estimated, as shown in ***Table 8.4-2***.

TABLE 8.4-1

BUDGET ESTIMATE FOR MITIGATION MEASURES DURING 30 YEARS OF OPERATION PHASE

No.	COST ITEMS	Monitoring Activities	Unit Cost		Annual Budget During Operation Phase		Total Budget of 30 year operation
			US$	Units	Year 1 to year 5 of operaiton	Year 6 to year 30 of operaiton	
1	Social Environmental Management Plan	- Disclosure th project information to the public - To be communication channel, including receiving complaints and settling the solutions - Community activities; e.g. education, health, religious, culture, occupation promotion and gender development	10,000	Lumpsum	10,000	10,000	300,000
2	Mangrove Management Plan	Continuation of Mangrove Resource Management Program (MRMG) in 30 ha area, with participatory approach: - Nga Pitat villagers will be the main actor - Officials of Department of Fishery and Forest Department will be supervisors - The Project Proponet will support the implementation	5,500	Lumpsum	5,500	5,500	165,000
3	Enmergency Response Plan	- Monitoring emergency situations such as accident, fire, flood, storm, tsunami etc. - Plan to restrain and recovery the situations as indicated in Emergency Response Plan	15,000	Lumpsum	15,000	15,000	450,000
4	External Audit	To verify the environmental management practices against established standards and check the compliance with rules and regulations to environmental management	1,500	Lumpsum	1,500	1,500	45,000
	Total of Implementation of Mitigation Measures				**32,000**	**32,000**	**960,000**

TABLE 8.4-2

BUDGET ESTIMATE FOR ENVIRONMENTAL MONITORING DURING 30 YEARS OF OPERATION PHASE

No.	COST ITEMS	Monitoring Activities	Unit Cost		Annual Budget During Operation Phase		Total Budget of 30 year operation
			US$	Units	Year 1 to year 5 of operaiton	Year 6 to year 30 of operaiton	
1	Air quality (3 stations)	Sampling ambient air quality at the sensitive area at project site and 2 stations of sensitive receptor in Mudu and Nga Pitat Villages to analyse NOx. Monitoring will be twice a year during five year after commissioning, and once a year from year 6 to year 30.	800	Station	4,800	2,400	84,000
2	Noise measurement (3 stations)	Noise monitoring will be carried out every six months during the first five year after commissioning, and once a year from year 6 to year 30, at project site and two sensitive receptors of Yay Wai Monastery and Nga Pitat School in Nga Pitat Village.	700	Station	4,200	2,100	73,500
3	Wastewater measurement (2 stations)	Water quality survey will be at 2 stations of discharged point and vicinities. Survey will be carried out every six months during the first five year after commissioning, and once a year from year 6 to year 30. The analysis will be on concentrations of various pollutants in the treated effluent compared with the effluent standards.	600	Station	2,400	1,200	42,000
4	Marine resouce measurement (2 stations)	Seawater quality surveys will be carried out every six months during the first five year after commissioning, and once a year from year 6 to year 30, at the 2 stations of discharged points. The analysis will be on various pollutants and temperature.	1,000	Station	4,000	2,000	70,000
	TOTAL BUDGET FOR OPERATION PHASE				**15,400**	**7,700**	**269,500**

8.5 SUMMARY OF DEMP

As discussed in ***Chapter 6***, the decommissioning of the power plant will not create any significant environmental and social impacts. Therefore, the DEMP will require much less activities and a much simpler EMS compared to those of the CEMP. A summary of the Owner-DEMP is presented below:

8.5.1 Mitigation Measures and Plans

No environmental impact mitigation measures will be required apart from routine inspection of decommissioning activities. The Project will implement sub-plans of air quality, noise, waste, traffic, OHS management, and social environmental management plan, as presented in ***Appendices of Volume II***.

8.5.2 Monitoring, Evaluating and Reporting

The MER will include scheduled monitoring of air quality, noise, waste, traffic, OHS management, and social environmental management as indicated in each sub-plan in ***Appendices of Volume II***. In addition, the Contractor's and the Owner's EHS managers will conduct regular inspection programs to observe environmental performance of the decommissioning. The Contractor will submit monitoring reports-one for internal use and another for reporting to MONREC. The monitoring report will be simple and straight forward to the results. Report to MONREC will be submitted when completion of decommissioning operation.

8.5.3 Corrective Actions and Organization

Corrective actions and environmental management will be carried out within the same process as those in the operation phase.

8.5.4 Public Consultation and Disclosure

Role and responsibilities of the core CPC will be the same as the operation phase. A grievance redress process will be continued.

8.5.5 Responsible Agencies for Mitigation and Monitoring during Decommissioning Phase

Structure

Environmental management during this phase will be part of the power plant management. Due to the short duration of decommissioning phase, environmental management, and monitoring will be implemented in parallel by the same team. The team will consist of three persons: (i) the Demolition Contractor; (ii) the EHS Manager; and (iii) Demolition Manager of the Power Plant Company.

Responsibilities

The Demolition Contractor will be responsible for implementing the prescribed mitigation measures and undertaking monitoring under the supervision of the EHS Manager and the Demolition Manager of the Power Plant Company.

The Demolition Contractor will establish an environmental management system (EMS) for the demolition works. The EMS will be supported by a documentation system to support decision making for corrective action. The Demolition Contractor will organize his demolition team which will include an EHS Manager.

The Power Plant will implement the demolition works as a project and will establish a Demolition Project Manager Office. The Demolition Project Manager and the Demolition EHS Manager will be responsible for environmental management of the demolition works.

Budget

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

8.6 EMERGENCY RESPONSE PLAN

The Project Proponent and the Contractor will prepare Disaster Preparedness Plan & Emergency Response Plan for pre-construction, construction, operation and decommissioning phases of the Project. The plan will be submitted to Natural Disaster Management Committee of Division/State Government and for approval.

The Contractor will be required to prepare an emergency response plan to efficiently and effectively cope with accidents and emergencies which may occur during the pre-construction, construction, operation and decommissioning phases. Emergency situations could occur such as fast spreading fires, explosions, bursting of gas or steam pipes, gas leakage, including natural disaster of storm, flood or even tsunami. Considering the nature and magnitude during these four phases, the emergency response plan would deal with work accidents and accidental fires. Natural emergency events such as earthquakes and floods would be very unlikely.

These emergency situations could seriously affect the power plant's construction and operation, and could result in damages to properties and injuries of plant personnel.

The emergency situations therefore need prompt and effective response to return the power plant to normal construction and operation as early as possible and minimize injuries and loss of lives, damage to properties, and construction delay.

The emergency response plan will be a part of the OHS system. Facilities to be provided on site will contain at minimum the following: fully equipped first aid station, fire-fighting equipment, arranged access to emergency services of the local hospital, and direct communication link with local fire brigades and other relevant government authorities and the local police station.

8.6.1 Emergency Procedures

The project will be responsible for providing emergency plan for unexpected case. The main objective of the plan is to mitigate impact on person in charge within the area of the project and damage to equipment and machinery. The emergency plan consists of:

- Map and diagram of each building's exit
- Safety zone, evacuation route, and a mustering point
- Diagram showing locations of fire extinguisher devices for example fire hose cabinet, chemical extinguisher, etc. of each building
- Practice various emergency cases, for example, fire, electric leakage, storm, flood, demonstration, etc.
- Evacuation plan
- First aid methods
- Training on proper use of fire extinguishing devices

The project manager will also be the emergency plan director. He/she will be responsible for controlling and instructing to evacuate all of workers and employees to safety place when emergency incident occurs. This director must well understand the emergency plan and be able to assess the situation. In addition, the director must determine degree of the situation whether it has necessity to evacuate either all people or some. He will also assess the necessity to divide zones for the situation control. The director will instruct workers and employees back to work after the situation is resolved and turned into normal stage. Thereafter, the director will take responsibility to prepare report, explaining in details which includes specific day, time, occurrence point, causes, severity level, damage to people and equipment, lost working hour, instruction program, employee's mentality recovery plan and machinery repairing plan. Furthermore, he will estimate working hour for repairing, number of employee concerns, cost of repairing equipment and spare part purchase, etc.

The project will conduct annual emergency practice and organize training for the power plant staff to have skill and specialization to mitigate impact from emergency situation at least once a year. Additionally, the project will be also responsible to examine equipment on weekly basis.

Emergency situation may causes by:

(1) Fire around the Power Plant

Fire may be expanded if strong wind is blown in period of dry climate, near to flammable substance and flammable origin. In addition, control of fire incident will be more difficult if fire occurs from flammable and explosive materials such as oil. However, trained employee's skill and quick response to fire is important factor to control fire. In addition, readiness of fire extinguisher devices, their positions, sufficiency of water pressure, readiness of fire pump with weekly examination and ready use condition are also important. These preparations, examination and emergency plan verification must be done regularly.

(2) Electric Leakage

In case electric leakage occurs, an assigned staff must be able to inform everyone to understand rescue practice to correctly save life of electric shock victim to safety.

(3) Accident

Accident such as falling from height, heavy weight falling during lifting, lost consciousness in confined space and traffic accident in particular have to be considered. Repeating accidents will cause substantial lost of working times and, consequently, solving the situation would become more difficult.

(4) Tsunami / Storm / Flood

An assigned staff must listen to news and climate forecast announcement from the Department of Meteorology for possible storm occurrence. Then, he will determine and instruct the staff to prepare readiness in advance such as fixing equipment for protection, lifting up stuffs to high and safe place, warn workers or employees to stop working outdoor around the building, etc.

On duty staff to watch change of the sea. Whenever there is a sign of tsunami, he/she must report to the project manager and instruct workers/employees to evacuate to the high/safe place.

However by the design, the height of coastal road which located between the sea and the Project site will be at +6.9 m Chart Datum (CD), and the Project site will raise its elevation to +7.0 m CD. These will minimize flood risks from extreme sea levels, tidal action including tsunami.

(5) Emergency Control

During working hour, a power plant manager will be responsible for controlling safety of workers and handling other emergencies.

During period of off-hour, periodic chief will be responsible for controlling emergency until the emergency is resolved or the power plant manager arrives at accident area and assumes the responsibility in place of the periodic chief.

8.6.2 Fire Fighting Plan

Fire is an emergency situation severely destroys life and property. Precise firefighting plan including regular practice of fire escape will be necessary and helpful to control and resolve the situation back to normal. These include:

(1) Practice during Working Hours

The power plant manager will determine the level of emergency whether it is level 1 or level 2. The manager will instruct to control the situation and protect equipment, machinery including evacuate people to safety zone. Official instructions which are frequently used include contacting fire brigade station, prepare to transport injured persons to the hospital, operation firefighting team, evacuation people from accident to assembly point, closing of traffic, closing entrance-exit of the power plant, etc. In addition, trained employees of each team will work together as follows:

- **Standby Employee**

Employee working during working hours will be responsible for maintaining fire extinguishing devices and preparing firefighting fire when instruction announce.

- **Fire Fighting Chief**

Firefighting chief will be responsible for controlling and instructing firefighting team to practice effectively. Therefore, the chief must report fire situation to an emergency director to request for support and coordinate with standby employees. However, an assigned staff must inform an emergency director to request manpower support or announce when situation becomes at violence.

- **Fire Fighting Team**

Firefighting Team consists of employees who are well trained on using fire hydrant and chemical fire extinguishing tank. The team will be responsible for squirting water or chemicals after receiving an instruction from an assigned staff. The team will take function to support firefighting officer in the area where fire arises severely.

- **Fire Fighting Device Team**

Firefighting device team consists of employees who are trained on using fire extinguisher devices such as opening fire hose cabinet, releasing fire hose, connecting fire hose with fire hydrant, preparing chemical extinguisher and firefighting materials such as helmet, shirt, gloves, shoes and communicating devices. Therefore, this team will be responsible for examining fire extinguishing device to be ready for use during working hours.

- **Water Fire Extinguishing Team**

Water fire extinguisher team consists of employees who are trained on using fire pump such as pump controller, electric motor fire pump and engine fire pump.

- **Survey and Evacuation Team**

Evacuation team consists of employees responsible for counting number of employees, taking them to safety zone (an assembly point), surveying injuries and taking the injuries to first aid team.

- **First Aid Team**

First aid team consists of employees responsible for first aid treatment, first aid device preparation, spinal board preparation, preparing to transport injured persons to the hospital, contact the hospital, moving patient by using spinal board, conducting temporary splint first aid treatment for patient before taking to hospital.

- **Security Team**

The security team during fire will control traffic within the power plant site by setting barriers, managing route for fire trucks approaching accidental place by clearing obstructing vehicles, preventing property of the power plant; prohibiting unauthorized people to enter into accidental area and managing obstructing vehicles.

(2) Practice during Off-Hour

Workers or employees facing an accident must determine whether he himself can resolve the accident or not. If not, the workers or employees must inform a central controlling building and emergency director to request for support immediately. A periodic chief will be an emergency director determining the accident when low number of employee works during off-hour. In case an accident is determined at emergency level 2, the director must immediately inform fire brigade station. Then, the director will also inform employees who are working, firefighting team and first aid team. He will instruct to perform the same as practicing. If there are injuries, the director must inform the hospital and transport them there. In addition, the director will cut off electricity around water squirting areas. Then, the director will report the situation of accident to a power plant manager and employees concerned as follows:

- **Standby Employee**

An employee working in irregular hours will be responsible for maintaining fire extinguishing devices and preparing for firefighting when a periodic chief gives instruction to him.

- **Fire Fighting Chief**

Firefighting chief will be responsible for receiving instruction from emergency director and collaborating with firefighting team. In addition, the chief will report fire situation to the emergency director for requesting support and coordinating with standby employee. In case fire is expanded and unable control, an assigned staff will inform the emergency director for requesting manpower support or announcing the situation become emergency level 2.

- **Fire Fighting Team**

Firefighting team consists of employees who are well trained on using fire pump, chemical fire extinguishing tank. The team will receive instruction from an assigned person and assume a function to support firefighting officer in the area.

- **Security Team**

Normally, the mission of security team is controlling entrance-exit door, preventing violators, protecting property of the power plant. In case fire occurs at night time, security team will prepare fire extinguishing devices such as opening fire hose cabinet, releasing fire hose, connecting fire hose to fire hydrant, preparing gloves, communicative devices and supporting fire extinguishing activities of the local fire extinguishing officer.

- **Emergency Supporting Team**

Emergency supporting team consists of employees who are trained on controlling fire at night time. They will coordinate with firefighting team and security team after both teams arrive at the accidental area. Therefore, the emergency supporting team must have telephone numbers of all employees, officers and agency concerned in hand.

- **Communication**

When emergency takes place in the power plant, the manager has to control a situation. In case it is beyond the ability, the manager has to call for assistance from other agencies. These will include, but not limit to

- Local authority of Launglon Township
- Police station in Launglon
- Maungmagan station hospital and Dawei hospital to prepare and support for injuries

8.6.3 Contingency Plan

Contingency plans and emergency procedures are being developed to cover events due to operational failures, natural causes and acts of third parties. The plans and procedures will cover, as a minimum, the following:

- Fire
- Explosion
- Bomb alerts
- Leaks and spill of hazardous materials
- Structure or equipment failures
- Injuries and illnesses
- Risk from nature disasters (Wind, storm, and earthquake)

8.6.4 Accidental Plan

As part of the preparation of emergency plans for accident response arrangements, the Project Proponent will carry out the following:

- Review industry-specific and Myanmar and applicable International standards and regulations
- Establish general guidelines on potential safety and accident risks
- Prepare job-specific operating instructions where appropriate
- Establish safety and security notices for hazardous materials
- Prepare specific emergency operating instructions
- Provide protective equipment (including clothing, air and ear protection etc.) as required
- Evaluate information and feedback from employees, record and investigate all accidents, injuries and incidents

An Emergency Response Team (ERT) will be setup. The role of ERT is to handle any emergency incident during construction and operations of the project site. The ERT is responsible for all incidents including hazardous material handling, rescue and fire control. Members of this team, or other nominated employees may be requested by the construction contractor and/or operation management to give advice or assistance in any incident in which is related to the plant. The ERT may be requested by construction contractor and/or operation management to assist any other company in the event of mutual aid. The ERT may consist of shift operators and relevantly trained day staff volunteers. This team will be lead by the Incident Controller, based in the construction offices (Construction) or control room (Operation). A site chief will be assigned and control the incident from the field. A coordinator will be assigned to control all services requested from the site chief, these will include all outside services, such as fire, ambulance and other public services.

The project will conduct annual emergency practice and organize training for the power plant staff to have skill and specialization to mitigate impact from emergency situation at least once a year. Additionally, the project will be also responsible to examine equipment on weekly basis.

8.6.5 Evacuation Plan

The project will take a responsibility to designate a assemble point and evacuation route. The best route for safety will be decided to evacuate the people from accident area.

The emergency evacuation plan will include:

- Floor plan of the workplace
- Exit route for all employees
- Employee assembly points
- Employee training requirements (drills/exercises)
- Assigning and defining responsibilities
- Contacting the emergency response units
- Accounting for workers (head count)
- Greeting the emergency response units
- Authorizing workplace re-entry

8.6.6 Recovery Plan

After any accident, recovery plan will be revised, improved and reported in all issues from real situation. The plan will place high priority on fire protecting plan, firefighting practicing plan, mitigation plan (must be immediately implemented after fire extinguishing complete) and provide relief for all employees who become disabled from the accident.

CHAPTER 9

PUBLIC CONSULTATION AND DISCLOSURE

CHAPTER 9

PUBLIC CONSULTATION AND DISCLOSURE

This chapter presents results of public consultation and disclosure conducted in the EIA investigation, including results of initial public consultation and disclosure reported in the Scoping Report. The chapter is structured as prescribed in ***Annex 2 of the Environmental Impact Assessment (EIA) Procedure (29 December, 2015).***

9.1 PURPOSES OF THE CONSULTATION DURING THE PREPARATION OF EIA REPORT

Public consultation conducted as part of the EIA investigation of this Project has three purposes:

(i) informing the stakeholders about the Project, environmental and social issues related to Project construction and operation, and mitigation measures to minimize environmental and social impacts;

(ii) Seeking views of the stakeholders on the Project and mitigation measures; and

(iii) Participation and partnership where issues and needs are jointly discussed and assessed.

Results of the public consultation are useful to the formulation and implementation of environmental and social management plans for the Project.

9.2 METHODOLOGY AND APPROACH

Public Consultation during preparation of EIA report was conducted in two periods, following the Environmental Impact Assessment Procedure. The two periods of consultation were held between 6 to 8 October, 2015 and 1 to 3 December, 2015 respectively. The methodology and approach of public consultation is presented below:

9.2.1 Identification of Stakeholders and Group Affected by the Project

Considering the Project scope and the legal and institutional framework for environmental and social impact management applicable to the Project, the Project stakeholders could be identified and classified into three categories:

(1) Government Authorities Involved in EIA Administration

The Project's stakeholders in this category are key officials or representatives of the national, state/regional, district and local authorities who have direct responsibilities for

the administration of the EIA process for environmental and social clearance and issuing operation permits for proposed development projects, particularly power projects.

For this Project, relevant key offices at the national level are Dawei Special Economic Zone (DSEZ) Management Committee and Ministry of Environmental Conservation and Forestry and Environmental Conservation Department (ECD).

Relevant key offices at the regional level are: (i) Tanintharyi Region Government; (ii) Tanintharyi Region Office of the Environmental Conservation Department; (iii) Tanintharyi Region Office of the Ministry of Electricity and Industry; (iv) Tanintharyi Region Office of Fisheries; and (v) Dawei District Government.

The DSEZ Management Committee (DSEZMC) and the Supporting Working Body (SWB) - Support Working Group of DSEZ - are two key organizations responsible for facilitating resolving issues between the Government, the Central Body and developers/ investors in DSEZ. Their responsibilities are wide-ranging including, but not limited to, supervising and inspecting matters regarding implementation of proposed investment and establishment plans, land-use, environmental conservation, waste control, health, education, finance and taxation, development, communication, security, infrastructure and coordination among the relevant governmental departments.

SWB involves in development activities in the project area. It comprises 14 representatives of relevant government agencies and organizations from various ministries.

Relevant key offices at the local level are: (i) Yebyu Township Administration; and (ii) Launglon Township Administration.

(2) Other Interested Parties

The Project's stakeholders in this category are various government departments responsible for development of various sectors, and community based organizations as listed below:

- Department of Health
- Planning Department
- Forestry Department
- Agriculture Department
- Fishery Department
- Electric Power Department
- Land Record Department
- Tavoyan Women's Union

(3) General Public

The Project's stakeholders in this category are village committees and individual villagers in the three villages and one community in the study area (5 kilometers radius) in Launglon and Yebyu Townships; namely: Nga Pitat, Nyaung Bin Seik, Mudu which includes Ka Myaing swea (see ***Table 9.2-1*** and ***Figure 9.2-1***). Residents in these villages would have concerns on various potential impacts of the Project during construction and operations such as noise, fugitive dust, stack emissions, wastewater, traffic safety, and degradation of natural resources, especially marine and mangroves resources in two coastal villages of Nga Pitat and Nyaung Bin Seik.

TABLE 9.2-1

VILLAGES AND COMMUNITY IN THE STUDY AREA

Township	Village	Approx. km from the Project Site
Launglon	Nga Pitat	2.23 km.
	Nyaung Bin Seik	3.67 km.
Yebyu	Mudu	4.03 km.
	Ka Myaing swea (community in Mudu)	4.53 km.
Total of 2 townships	**3 villages and 1 community**	2.23 - 4.53 km.

9.2.2 Methods of Consultations

The main method used in consultation was public meetings. This method is generally used in EIA. It is most effective in achieving the informing purpose, followed by the seeking views purpose, and the participation and partnership purpose.

The public meeting method was complemented by disclosure of project information through presentation in the meetings. This served the informing purpose.

In addition, the public meeting method was also complemented by the household surveys and one-on-one interviews used in collecting socio-economic information on communities in the study area. These two methods served the informing and seeking views purposes of the public consultation. However, this chapter reports only results of the public meetings, including the meetings with Non-government Organizations (NGOs) and key officials of government offices involved in environmental and social management of development projects.

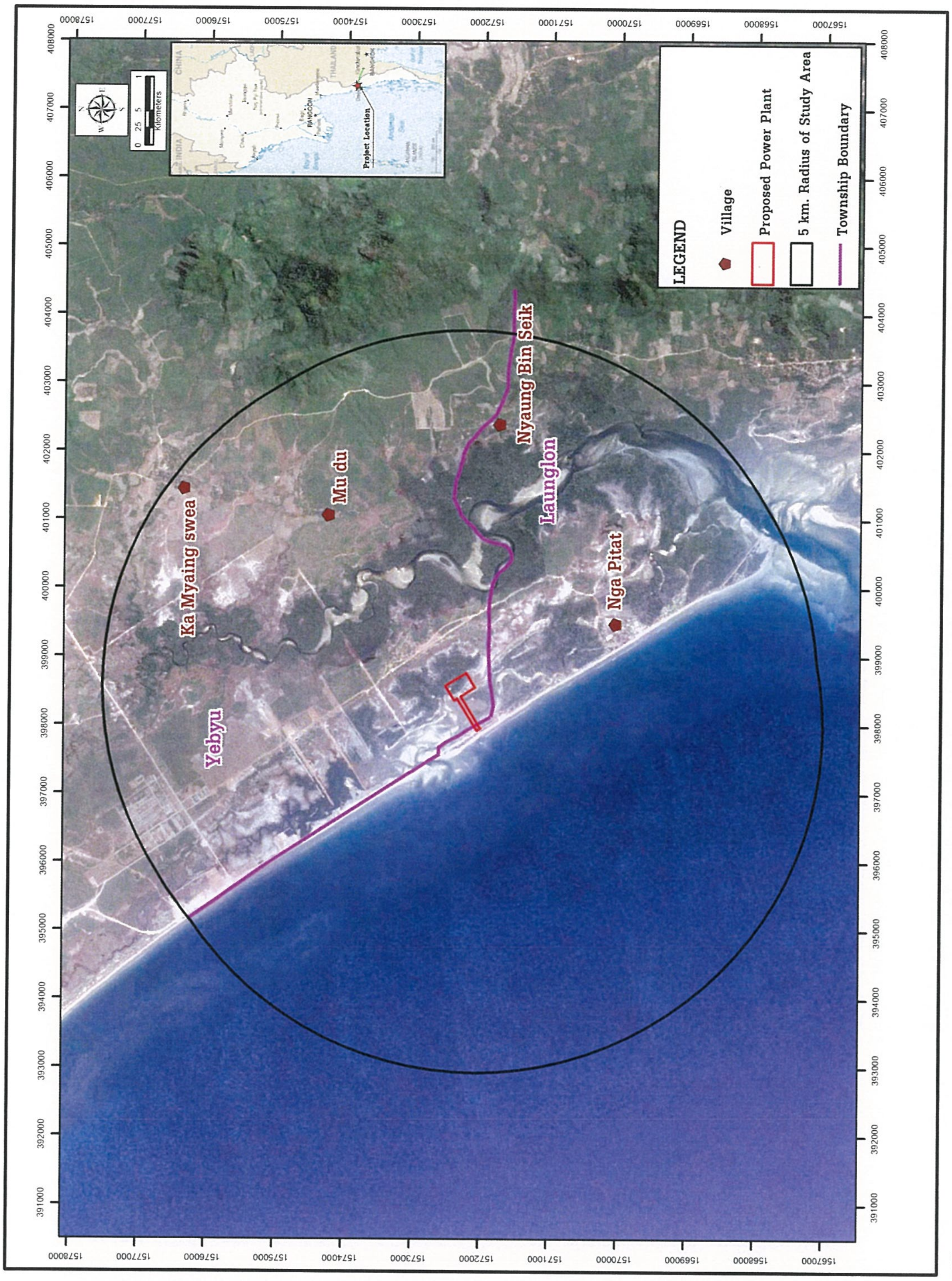


FIGURE 9.2-1: VILLAGES AND COMMUNITY IN THE STUDY AREA

9.2.3 Approach to the Public Meetings

The following approach to the public meetings was adopted:

- Each meeting at the community level was organized with assistance of Yebyu and Launglon Township Administration and village headmen. Headman of each village had identified participants to be invited, and in making arrangements for the meeting venue and issuing invitations.

- Representatives of the Project Proponent and the Consultant were jointly conducting the meeting. The Consultant was responsible for providing information on brief Project information including Project development plan, the EIA study including clarifications on issues related to impacts of the Project. Both of the Project Proponent's representatives and the Consultant were responsible for answering questions from the meeting or clarifying points raised in the meeting regarding the Project development plan. The two parties had worked as a Project team.

- For the second period of meeting, major impacts and mitigation measures to minimize the impacts were presented in addition.

- The meeting began by informing the participants of the objectives of the meeting and expected outcome. After that the Project team gave information about the Project and the EIA.

- The meeting then provided an open forum for discussions. The participants expressed their concerns, offer their views and suggestions, and raise questions or points that they need response from the Project team. The Project team responded to their concerns, views and suggestions as appropriate. The meeting was intended in interactive mode. The Project team and the participants engaged in constructive and relevant discussions.

9.3 SUMMARY OF CONSULTATION ACTIVITIES UNDERTAKEN

Public consultations with relevant government authorities, NGO and local communities were held in the two periods of 6-8 October 2015 and 1-3 December 2015. The meeting dates, names of persons met, the agencies they represented, and venues are given in ***Table 9.3-1*** and ***Table 9.3-2***. Names of villagers in the three villages and one community who attended the consultation meetings in two periods are listed for the record in ***Appendix 9A.***

Photo 9.3-1 and ***Photo 9.3-2*** show some pictures of the meetings.

TABLE 9.3-1

THE FIRST PERIOD OF CONSULTATION MEETINGS WITH THE PROJECT'S STAKEHOLDERS

Meeting Dates/time	Name	Position and Organization	Venue
6 October 2015	**SWB-Support Working Group (total of 6 persons)**		
9.00-10.30 hrs.	1. Mr. Aung Kyaw Nyien	Secretary/Myanmar Port Authority	SWB Office
	2. Mr. Aung Hone Than	Officer, Administration Department	
	3. Mr. U Thet Oo	Officer, Labour Department	
	4. Mr. Khin Htun	Officer, Immigration Department	
	5. Mr. Kyaw Min Oo	Chief Officer, Myanmar Police Force	
	6. Mr. Wai Linn Zaw	Officer, Administration Department	
6 October 2015	**Government Authorities at Regional and Local Levels**		
11.30-12.00 hrs.	1. Mr. Daw Let Let Htwe	Head of Yebyu Township Administration (1 person)	Yebyu Township Office
14.00-15.00 hrs.	2. Mr. U Tin Thein	Secretary of Tanintharyi Regional Government Office (1 person)	Tanintharyi Regional Government Office
16.30-17.30 hrs.	3. Mr. U Aung Khine Soe	Deputy Director of Environmental Conservation Department for Tanintharyi Region (1 person)	ECD Office, Dawei
7 October 2015	**The General Public : Local Community Groups**		
9.30-11.00 hrs.	1. Mudu and Ka Myaing swea Villagers	• Village headman, village committee, community leaders and villagers (total of 73 persons) • U Aung Khine Soe, Deputy Director of Environmental Conservation Department in Dawei (1 person)	At the house of Mudu Village Headman
8 October 2015	**The General Public : Local Community Groups**		
9.30-11.00 hrs.	1. Nyaung Bin Seik Villagers	Village headman, village committee, community leaders and villagers (total of 40 persons)	The temple of Nyaung Bin Seik Village
14.00-15.30 hrs.	2. Nga Pitat Villagers	Village headman, village committee, community leaders and villagers (total of 67 persons)	Community hall of Nga Pitat Village

TABLE 9.3-2

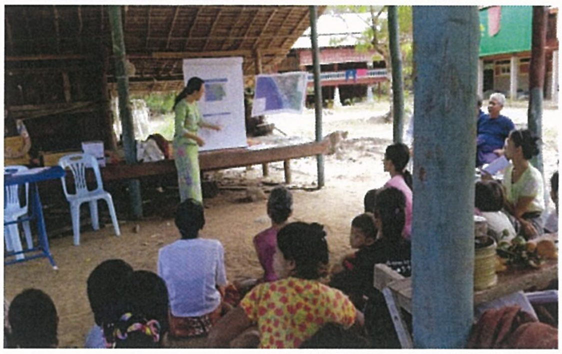
THE SECOND PERIOD OF CONSULTATION MEETINGS WITH THE PROJECT'S STAKEHOLDERS

Meeting Dates/time	Name	Position and Organization	Venue
2 December 2015	**Government Authorities at Regional and Local Levels (total of 20 persons)**		
9.00-11.00 hrs.	1. Mr. U Khin Maung Cho	Directory of General Administration Department of Dawei District (7 persons)	ITD Meeting Hall
	2. Mr. U Htun Wai Oo	Electric Power Corporation of Dawei District (1 person)	
	3. Mr. U Aung Hom Than	SWB: General Administration Department (1 person)	
	4. Mr. U Thet Oo	SWB: Department of Labor (2 persons)	
	5. Mr. U Khin Maung Win	SWB: Myanmar Port Authority (1 person)	
	6. Mr. U Kyaw Maw Htun	SWB: Immigration (2 persons)	
	7. Mr. U Aung Khine Soe	Deputy Director of Environmental Conservation Department for Tanintharyi Region (3 persons)	
	8. Mr. U Htun Win Myint	Director of Regional Fishery Officer (2 persons)	
	9. Mr. U Kyaw Naing	General Administration Department of Yebyu Township (2 persons)	
2 December 2015	**The General Public : Local Community Groups**		
13.30-15.00 hrs.	1. Nga Pitat Villagers	Village headman, village committee, community leaders and villagers (total of 82 persons)	Community hall of Nga Pitat Village
3 December 2015	**The General Public : Local Community Groups**		
9.00-11.00 hrs.	2. Mudu and Ka Myaing swea Villagers	Village headman, village committee, community leaders and villagers (total of 89 persons)	At the public playground of Mudu Village
13.00-15.00 hrs.	3. Nyaung Bin Seik Villagers	Village headman, village committee, community leaders and villagers (total of 66 persons)	The temple of Nyaung Bin Seik Village
4 December 2015	**NGO**		
13.00 – 14.30 hrs.	Tavoyan Women's Union	Ms. Ma Marlar (total of 9 persons)	702, Shwe Taung Sar Road, North Village, Dawei

Meeting with SWB of DSEZ

Materials Presented to Villagers (in Myanmar Language)

Consultation Meeting at Mudu Village



Consultation Meeting at Nyaung Bin Seik Village

Consultation Meeting at Nga Pitat Village

PHOTO 9.3-1: THE FIRST CONSULTATION MEETINGS WITH CONCERNED AGENCIES AND THE LOCALS

Meeting with SWB and Regional Government Officials at ITD Hall

Materials Presented to Villagers (in Myanmar Language)

Consultation Meeting at Mudu Village

Consultation Meeting at Nyaung Bin Seik Village

Consultation Meeting at Nga Pitat Village

Consultation Meeting with Tavoyan Women's Union

PHOTO 9.3-2: THE SECOND CONSULTATION MEETINGS WITH CONCERNED AGENCIES, THE LOCALS AND NGO

9.4 SUMMARY OF MAIN COMMENTS RECEIVED FROM STAKEHOLDERS

During the two periods of consultation meetings, there were comments and feedbacks from each group of stakeholders. The Project's Proponent and Consultant had responded and clarified those comments, as attached in Minutes of Meeting ***(Appendix 9B)***. Major issues can be summarized as follows:

9.4.1 The First Period of Consultation Meeting

(1) Government Authorities

Major concerns and comments from the Secretary of Tanintharyi Regional Government Office, Deputy Director of ECD Regional Office, Support Working Body of DSEZ and Head of Yebyu Township Administration, were:

1) Secretary of Tanintharyi Regional Government Office

The Secretary of Tanintharyi Regional Government had suggested the Consultant to organize the village meetings to be in line with the official procedure. He also notified that questions raised by the communities might be influenced by the Non Governmental Organizations (NGOs).

2) Deputy Director of ECD Regional Office

The ECD Deputy Director informed about negative views of civil organizations on the proposed development in Dawei area. He suggested the Consultant to answer all questions raised by communities.

3) Support Working Body of DSEZ - SWB

The SWB Committee had questioned on types of activities carried out between 5 - 11 October 2015. He asked about the method to protect mangrove forest, and suggested not to be exploited by the project development. They recommended the Consultant to inform the village headmen and ECD officials concerned before the conduct of public consultations and household surveys.

4) Head of Yebyu Township Administration

Head of Yebyu Township Administration had short comment on implementation of the Project activities which must follow official bureaucracy.

(2) Local Communities Groups

Consultation meetings at the village level were conducted between 7-8 October 2015, at three villages of Mudu (including Ka Myaing swea), Nyaung Bin Seik and Nga Pitat.

Issues identified by the participating villagers are as follows:

1) Mudu and Ka Myaing swea Villages

Seventy three (73) villagers from Mudu and Ka Myaing swea participated in the meeting. The ECD Deputy Director also joined as observer. The villagers' main concerns were on emission and other negative impacts from the power plant, effectiveness of the monitoring system, and poor conditions of the road link to the monastery nearby.

2) Nyaung Bin Seik Village

Forty villagers (40) participated in the meeting. Most of them were women as men went out for fishing in the sea. Their main concerns were on emission from the power plant, accessibility to mangroves resources and electricity generated by the project including poor conditions of the road.

3) Nga Pitat Village

Seventy three (73) villagers participated in the meeting. Their main concerns were on emission from the power plant and accessibility to mangroves resources.

9.4.2 The Second Period of Consultation Meeting

(1) Government Authorities

Consultation meeting with the Government Officials at regional and local levels was conducted on December 1, 2015. Twenty officials participated the meeting. There are from 9 concerned agencies such as Dawei District, SWB, Electricity Power Corporation, Environmental Conservation Department and Fishery Department of Tanintharyi Region, etc.

Their major concerns and comments were:

- Impact of Thermal Plume on the marine resources
- Water pollution from the power plant operation
- Impact of water discharged from the cooling system on aquatic animals
- Suggest to provide electricity to nearby community, at the lower rate

(2) Local Communities Groups

Consultation meetings at the village level were conducted between 2-3 December 2015, at three villages of Nga Pitat, Mudu (including Ka Myaing swea) and Nyaung Bin Seik.

Issues identified by the participating villagers are as follows:

1) Nga Pitat Village

Eighty two (82) villagers participated in the meeting. Their major concerns were:

- Negative impact from laying pipeline on the seabed which might make marine resources declined and limitation of fishing area.
- Employment opportunity with the Project in relation to age limitation and unskilled labour of villagers.
- Request to provide electricity to their village, as Nga Pitat is the nearest village to the Project site.

2) Mudu and Ka Myaing swea Villages

Eighty nine (89) villagers from Mudu and Ka Myaing swea participated in the meeting. Their major issues were:

- Asking about current status of the EIA study and its entire procedure.
- Asking about organization to monitor the project impacts.
- Suggestion to monitor on short and long term impacts from the project implementation.

3) Nyaung Bin Seik Village

Sixty six (66) villagers participated in the meeting. Their concern was only on the project impacts during construction and operation periods.

(3) NGOs

The meeting with Tavoyan Women's Union was held on December 4, 2015. Their concerns were on the misunderstandings between the Project developer and villagers regarding land compensation in the past. On this occasion, the developer had explained about compensation procedure which was jointly undertaken by representatives of the 3 parties of the developer, local authorities and affected villagers. The developer then invited the NGO to visit the office where compensation document of each case was kept.

The NGO had satisfied with explanation and accepted the invitation. They proposed to participate the public consultation meeting at the village level in the future. This was agreeable by all parties and hope for mutual understanding.

9.4.3 Significant Impacts in the View of Stakeholders to be addressed in the Mitigation Measures

Significant impacts in the view of stakeholders from 2 rounds of consultation were summarized. The consultant had prepared preventive and mitigation measures including monitoring accordingly. Those are in ***Chapter 6 of ESIA Report*** and ***Chapter 5*** to ***Chapter 8 of EMP***. Its summary is shown in ***Table 9.4-1***.

TABLE 9.4-1

SIGNIFICANT IMPACTS IN THE VIEW OF STAKEHOLDERS AND MITIGATION MEASURES

Significant Impacts in the View of Stakeholders	Response/Addressed in Measures
Government Authorities	
Different views of NGO concerning project impact on local communities should be complied.	- The consultants and developer had consultation with NGO - Tavoyan Women's Union. - NGOs were invited to visit the developer office at site, to discuss and study concerned matters.
Concerned on the method to protect mangrove forest, and requested not to exploit the forest.	- The project site is located on a small area of 37.19 acres. The site is vacant and sparsely covered with some sand dune vegetation commonly found in the region. The project development would not cause adverse impact on mangrove.
Recommended to inform the village headmen and ECD officials concerned before the conduct of public consultations and household surveys.	- Before the consultation activities, the consultant had informed all village headmen in the study area and ECD officials in advance.
Concerned on impact of Thermal Plume on the marine resources.	- By the outfall design, the discharge from the sea bed will be through approximately 517 diffusers which will enhance vertical mixing, thus eliminating thermal stratification. Thus, the temperature increase will be less than 3° C at about 300 m from the discharge point.
Concerned on impact of water pollution from the power plant operation.	- Wash water contaminated with oil will be segregated. Then oil-free wash water will be combined with other wastewater streams for further treatment. - Wastewater from demineralization unit and boiler blow down mixed with quenching water will be combined and neutralized in a neutralization basin before combining with other wastewater streams for further treatment. - Domestic sewage will be treated in a treatment plant. The treated effluent will be combined with the effluents from oil-free wash water and other wastewater. - Combined effluent will be discharged into a pond before disposal through a sewer pipe into the Andaman Sea, about 800 m away. - A drainage system will collect surface runoff and discharge into the retention pond or directly into the river through the effluent outfall. Surface runoff from open areas contaminated by oil will be separately drained into an oil separator before discharging into the main drainage system.

TABLE 9.4-1

SIGNIFICANT IMPACTS IN THE VIEW OF STAKEHOLDERS AND MITIGATION MEASURES (CONT'D)

Significant Impacts in the View of Stakeholders	Response/Addressed in Measures
Concerned on impact of water discharged from the cooling system on aquatic animals	As an increase of temperature of water discharged will not excess 3° C within 300 m around the discharge point, its magnitude and size of the affected area will have insignificant impacts on the abundance and species composition of pelagic marine organisms such as phytoplankton, zooplankton, and fish larvae. These organisms in general are adapted to environments with stable temperatures and small changes in temperature can affect survival. In addition, juvenile and adult fishes have the ability to swim away from the temperature affected areas. Therefore, the impacts of thermal discharge on aquatic resources would also be insignificant.
Local Communities Group	
Concerned on air emission and other negative impacts from the power plant	- Dry Low NO_x Combustor will be used to minimize thermal NO_x emission. - Each of the exhaust stacks will be fitted with in-stack monitoring equipment linked to the Continuous Emission Monitoring System (CEMS) in order to measure NO_x, O_2, flow rate and heat temperature of emission gas. - All potential impacts of the project have been thoroughly identified and studied. Preventive and mitigation measures were formulated in accordance with applicable Myanmar standards.
Effectiveness of the monitoring system	Monitoring system is designed to be implemented in all phases throughout the project life. All performance indicators are referred to Myanmar standards.
Concerned on inaccessibility to mangrove resources	By design, the Project site is located on a small area of 37.19 acres. The site is vacant and sparsely covered with some sand dune vegetation commonly found in the region. There would not be disturbance on mangrove.
Concerned on negative impact from laying pipeline on the seabed which might make marine resources declined and limitation of fishing area.	- By design, laying pipeline on the seabed will take place in a very small area due to only 2.2 m diameter size of intake and outfall pipes while its length in the sea will be about 2.3 km and 1.7 km respectively. - Demarcate the area for laying intake and outfall pipelines, and notify the construction period to the public. - Install pipelines within a short period of 4 months.
Concerned on employment opportunities of the locals with the Project	- The project would hire construction workers from local sources as many as possible.
Suggestion to monitor on short and long term impacts from the project implementation	Monitoring system is designed to be implemented in all phases throughout the project life.
NGO: Tavoyan Women's Union	
Proposed to participate in the public consultation meeting at the village level in the future	The project proponent will contact the NGO to attend public consultation meeting during project implementation.

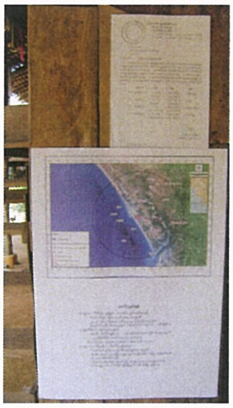
9.5 HOW THESE COMMENTS WERE TAKEN INTO ACCOUNT

All comments/ issues obtained from the consultations are the basis for planning and arranging subsequent consultation meetings during the project implementation. Results of all the public consultation meetings will be utilized for implementation of environmental and social management plans of the Project as well as community support development programs to be implemented by the Project Proponent in the Corporate Social Responsibility (CSR) context.

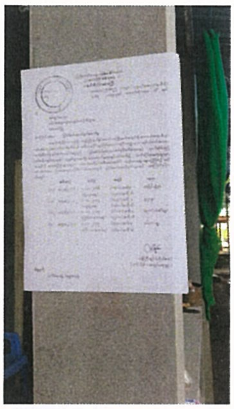
9.6 PROJECT INFORMATION DISCLOSURE

Public consultation and information disclosure for the first and second consultation periods were in form of public meetings together with posting information at the well-known visible places in the communities such as at the tea shop and grocery shop in the village center. In addition, the Project Information will be posted on the website (***Appendix 9C***).

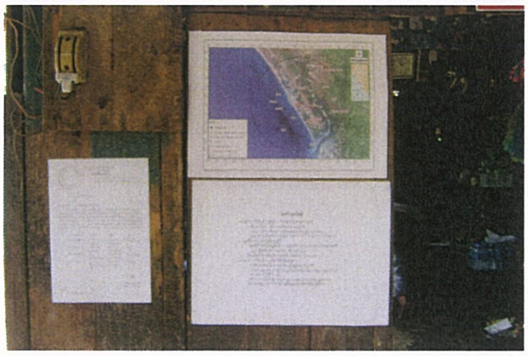
Photo 9.6-1 and ***Photo 9.6-2*** show information posting in Nyaung Bin Seik, Mudu and Nga Pitat Villages.



Information Disclosure at Nyaung Bin Seik Village



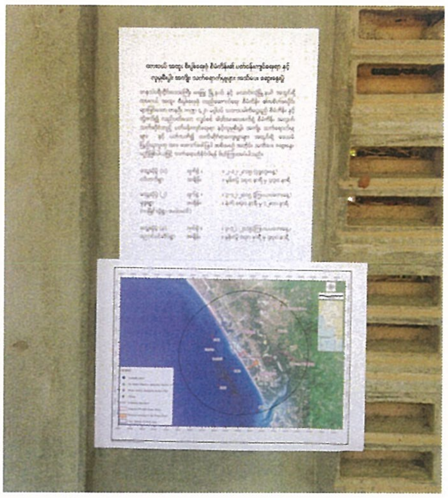
Information Disclosure at Mudu Village



Information Disclosure at Nga Pitat Village

PHOTO 9.6-1: DISCLOSURE OF THE PROJECT INFORMATION AND INVITATION TO THE FIRST MEETING IN THREE VILLAGES

Information Disclosure at Nyaung Bin Seik Village



Information Disclosure at Mudu Village

Information Disclosure at Nga Pitat Village

PHOTO 9.6-2: DISCLOSURE OF THE PROJECT INFORMATION AND INVITATION TO THE SECOND MEETING IN THREE VILLAGES

Details of Public consultation and information disclosure at each period are presented as follows:

In each public consultation meeting, objectives of EIA and the Project information was disclosed to the officials and villagers through handouts in Myanmar language. For the second meeting, results of environmental survey in the wet season and the first public consultation, including major impacts from the project and their mitigation measures to minimize the impacts were presented in addition. Participants were invited for discussion after presentation.

Appendix 9D provides the slides and the handouts of the two periods of meeting.

The information disclosed in the first and second meetings included:

- Objectives of EIA
- Project location
- Project layout
- Generation capacity
- Main project components including:
  - Total generation capacity of 420 MW in combined cycle operation
  - Gas pipeline connecting to the LNG Regasification Station in order to get the gas supply
  - Route of overhead transmission line
  - The once-through cooling water system using sea water, consisting of intake pipes, pumping station, and outfall pipes
  - Demineralization plant with demineralized water storage tanks
  - Wastewater treatment facility to treat the waste water following official guidelines
  - Firefighting system for the entire plant
  - Continuous emission monitoring system
  - Distribution control system
  - Other related facilities
- Field activities related to environmental survey, including:
  - Air quality/noise
  - Seawater Quality
  - Marine Ecology
  - Fisheries
  - Groundwater Quality
  - Sediment Quality
  - Terrestrial Resources
  - Wildlife Resource and
  - Land Use

- Field activities related to social survey, comprising:
    - Public consultation and
    - Socio-economic survey
- Tentative schedule of the study
- Contact persons
- Open discussion

The additional information disclosed in the second meetings included:

- Results of environmental survey in the wet season
- Results of socio-economic survey
- Issues raised by the stakeholders during the first meeting
- Major impacts and their mitigation measures

9.7 THE THIRD PUBLIC CONSULTATION MEETING

The third public consultation meeting with relevant government authorities, local media, NGO and local communities was held on 29 March 2018 in Dawei Special Economic Zone, Auditorium Hall. The summary of attendant is given in ***Table 9.7-1***. Name of relevant government authorities, local media, NGO and local communities are listed for the record in ***Appendix 9E***. ***Photo 9.7-1*** shows some pictures of the meetings.

TABLE 9.7-1

THE THIRD PUBLIC CONSULTATION MEETING WITH THE PROJECT'S STAKEHOLDERS

Meeting Date/Time	Attendants	Number
29 March 2018 10.30-12.00 hrs.	Relevant government and local media	26
	Villagers	76
	NGOs	-

During the consultation meeting, there were comments and feedbacks from stakeholders. The Project's Proponent and Consultant responded and clarified those comments, as shown in Minute of Meeting both Consultant and DSEZMC in ***Appendix 9F*** and ***Appendix 9G***. Questions and answers are shown in ***Table 9.7-2***.

TABLE 9.7-2

QUESTIONS AND ANSWERS FROM THE THIRD CONSULTATION MEETING

Question	Response
Local Communities Group	
Villager of Mudu - Need power plant provide electricity to villagers.	**Vice Chairman-2 of DSEZ Committee** - Power plant project will distribute electricity only for DSEZ. - Government has plan to get electricity from Kan Bouk within 2 to 3 years for villages in DSEZ area. - Villages outside of DSEZ, regional government will responsible to get electricity for these villages.
Villager of Ya Laing - Warning Signs (traffic sign) need to be installed in every village road to reduce accident.	**TEAM** - Project developer will install prior to start construction.
Villager of Htain Gyi - Nabule village was not got electricity until now while other villages as Pan Din In, Nyaung Bin Seik, and Yebyu already got electricity. - Recently, there is a lot of fugitive dust from road traffic with high speed. - Accidents are also took place along the road due to the fugitive dust reduce visibility. - The structure of bridges are not proper so there are motor-cycle accident at the bridge. - Villagers want to learn new skills. - Villagers want to work as not only temporary staff but also permanent staffs. - They want to become skillful workers.	**TEAM** - When the project starts, dust control measures will be employed for example speed of car will be controlled (not more than 40 km/hr). - All of the road and bridge will be maintained when the project starts. - Training and development process will be proposed for employees.
Villager of Pagow Zoon - Villagers want job opportunities in not only construction phase but also operation phase. - Project developer should keep in touch with all villages to know about their difficulties. - When will the compensation be paid?	**DPC/MIE** - The resettlement and compensation steps including Compensation and Resettlement Committee will be explained.

PHOTO 9.7-1: THE THIRD PUBLIC CONSULTATION MEETING WITH CONCERNED AGENCIES, THE LOCALS AND NGO

PHOTO 9.7-1: THE THIRD PUBLIC CONSULTATION MEETING WITH CONCERNED AGENCIES, THE LOCALS AND NGO (CONT'D)

9.8 RECOMMENDATIONS FOR FUTURE CONSULTATIONS

Public consultation will be carried out during the pre-construction, construction, operational and decommissioning phases as part of environmental management of the two project phases. Public consultation during the pre-construction and construction would mainly concern with measures to minimize various environmental disturbances which some communities may experience. The issues discussed would vary with the progress of construction and change in the nature of construction works. Public consultation during the operational and decommissioning phases would be less intense as environmental and social management become predictable and routine. Community development support would be a major issue for public consultation.

In ***Chapter** 8*, the Consultant proposes that the Community Participatory Committee (CPC) will be set up to serve as venue for public consultation. Details of the CPC for the construction phase and the operational phase are given in Construction Environmental Management Plan (CEMP) and Operation Environmental Management Plan (OEMP) in ***Sections 8.3*** and ***8.4***.

In addition, the Project Proponent has already posted the current status of ESIA Report of the Initial Phase Power Plant Project at the website link below:

http://www.daweiindustrialestate.com/download.php?cid=110&cname=EIA%20Report

The ESIA report will be disclosed at the website of the Project Proponent after MONREC's acceptance of the Final ESIA Report of Initial Phase Power Plant and the website link shall then be promptly stated in the report.

CHAPTER 10

CONCLUSIONS AND RECOMMENDATIONS

CHAPTER 10

CONCLUSIONS AND RECOMMENDATIONS

10.1 CONCLUSIONS

The EIA investigation was based on project information, surveys of environmental and socio-economic settings of the Project area, rounds of consultations with stakeholders in the government sector and communities in the vicinity of the Project site, and experience of the Consultant in technical and environmental aspects of power projects. From the EIA investigation results, the following major conclusions may be drawn:

1) By its design, the Project will have minimum environmental impacts through (i) use of low NO_x burners in the gas turbine generators; (ii) use of seawater for cooling system; and (iii) no provision for back-up fuel (distillate oil) as only natural gas will be used.

2) The surrounding areas are largely rural and have no environmentally or ecologically sensitive areas. The nearest village is 2.23 km away.

3) During Project pre-construction and construction, all environmental issues are normally experienced in construction projects. All environmental issues could be readily addressed using conventional measures and good environmental practices in the design and construction.

4) During Project operation, NO_x emission loads will be very small and the use of low NO_x burner. The impacts on ambient air quality will be insignificant for stack heights 35 m. The majority of noise sources will be from nine units of gas engines and five units of Heat Recovery Steam Generation (HRSG). However, an application of proposed mitigation measures and more than 2 km a distance far from the closet village of Nga Pitat, its impact will be insignificant to the locals. Its sources will be from total volume of wastewaters from all sources would be about 979.36 m^3/day. The wastewater will be treated in the power plant site while the remaining will be discharged in the sea, at about 1 km away. With good quality with high level of dissolved oxygen in Andaman Sea, the discharged water will have no impact on seawater quality and the marine ecosystem.

5) During short period of Project decommissioning, all environmental issues could be readily addressed using conventional measures and good environmental practices in the design and demolition.

6) The identified environmental risks of the Project in the construction phase will need to be managed through contractual arrangements and close supervision of the EPC contractor in implementing the prescribed environmental impact mitigation measures. The major risks during the power plant operations will be fires and explosions. The likelihood of occurrence of these risks will be minimized through incorporating risk management objectives in the designs, selection of equipment, quality construction, and

operation and maintenance. To cope with the consequences of the risks, if occur, an emergency response plan and operational procedures will have to be in place for commissioning and commercial operation.

7) The proposed CEMP and OEMP are adequate at this stage of project planning for the EPC contractor to prepare the contract specific CEMP and OEMP based on the designs, specifications, construction plan, operation plan and methods to be developed by the EPC contractor.

8) The national and regional agencies concerned have high expectations of environmental and social management of the Project. Their concerns are on marine pollution, coastal resources deterioration and accessible to the electricity.

9) The three villages and one community that public consultation meetings were held did not oppose to the Project. They have concerns on air and water pollution, participatory monitoring system, and protection of marine and coastal resources which are significant resources of their livelihoods.

10) Tripartite committee as the main mechanism for public consultation and information disclosure.

10.2 RECOMMENDATIONS

To implement the results of this EIA investigation, the Consultant recommends that:

1) Proposed environmental mitigation measures and environmental management requirements be clearly stated and incorporated in the TOR for the procurement of EPC contract and construction supervision contract, and in the EPC contract and construction supervision contract.

2) Filling of the Project site be carried out in phases, if possible, and started as soon as possible to minimize the traffic load.

3) The proposed CPC be set up as soon as possible to serve as a means for continuing public consultation and disclosure.

4) The Project should develop ISO 14001 and OHSAS 18001 for better compliance with environmental protection and conservation for sustainable environment and occupational health and safety management.

5) The Project should send the collected samples related to environmental monitoring program during construction and operation phases to analyze at the assigned qualified laboratory under Myanmar government or qualified private laboratory.

APPENDICES

APPENDIX 2A

BRIEF INFORMATION ON THE INITIAL PHASE DEVELOPMENT OF DSEZ

APPENDIX 2A

OVERALL PLAN FOR THE DAWEI SEZ INITIAL PHASE DEVELOPMENT

Italian-Thai Development Public Company Limited ("ITD"), ROJANA Industrial Park Public Company Limited ("ROJANA"), Electricity Generating Public Company Limited ("EGCO"), and LNG Plus International Company Limited ("LNG Plus") altogether referred to as (the "Applicant"), hereby submits the bid Application for the Initial Phase Development of the Dawei Special Economic Zone ("Dawei SEZ") in relation to the Terms of Reference to Apply for the Dawei SEZ Initial Phase Development ("TOR") as issued on the 15th of August 2014 by the Dawei Special Economic Zone Management Committee ("DSEZ Authority") and Dawei SEZ Development Company Limited ("SPV"). In compliance with the Government of the Republic of the Union of Myanmar ("Union Government") and the SPV to re-start the development of the DSEZ Project, create local employment in the immediate future, and stimulate the Myanmar economy, as well as show other benefits of the Dawei SEZ Project; the Applicant hereby submits the bid application which will cover the development plan for the Initial Phase of the Dawei SEZ Project covering the seven (7) Initial Projects as set forth in the TOR.

In order to integrate our development plan to develop a successful model to realize the Initial Phase of the Dawei SEZ, we, the Applicant, are proposing to develop the initial projects which will comprise of the following:

1. A Two-lane Road, connecting Dawei SEZ with the Thai border;
2. A Small Port. The following projects are proposed in the small port area:
   - 2.1 A Small Port
   - 2.2 LNG Terminal
3. An Initial Industrial Estate consisting of Land Development and Waste Water, Water Distribution and Power Distribution;
4. A Small Power Plant consisting of:
   - 4.1 Temporary Power Plant and Boil-off Gas Power Plant
   - 4.2 Small Power Plant GT/CCGT 420 MW
5. An Initial Township / Residential Area;
6. A small water reservoir; and
7. A Telecommunications Landline.

Due to the fact that the consortium for the various initial projects and its components comprise of various consortium members, we are proposing that the Concession Agreement be separated for each of the components of the initial projects as mentioned above. Therefore, we are proposing altogether 9 different concessions; we propose the (1) LNG terminal and (2) Temporary Power Plant and Boil-off Gas Power Plant to be two additional separate concessions for the Initial Phase of the Dawei SEZ Development as described above. The separation of the Concession Agreements will

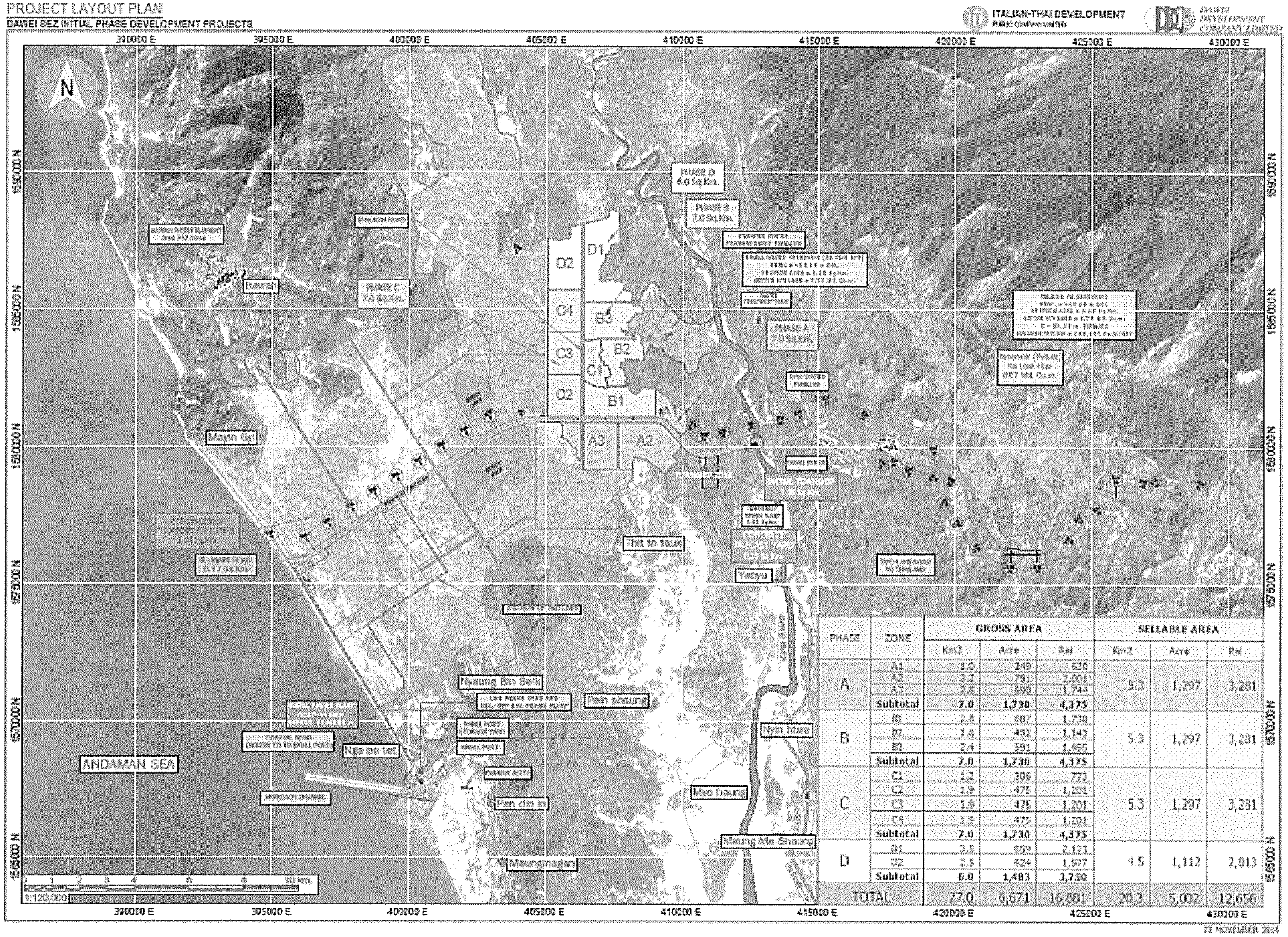
ensure that the liability for each of the concessions only falls to the respective consortium members of that particular initial project. This separation of Concession Agreements will also fulfill the requirements from our prospective lenders. More discussion can be made during the Negotiation Phase between the Applicant and the DSEZ Authority.

It is critical to note that all of the initial projects and its components as aforementioned are integrated to the overall successful development of the Initial Phase Development of the Dawei SEZ, therefore, the full support from the DSEZ Authority in granting the relevant permits and licenses and other supportive issues to be later described in this Application for each of the projects is highly essential not only for us to meet the tentative schedule to be later described but also to attain the necessary financing from our prospective lenders. Besides the Two-lane road from the DSEZ to the Thai border, the other initial projects development plan is subject to the phasing of the initial industrial estate development.

The development and operation plan is to develop an industrial estate area initially totaling 7 sq.km. including its related facilities adjacent to the Main Road as indicated in the map below as Phase A, to be leased to the various labor intensive and medium industries wishing to establish their factories in the Dawei SEZ on an environmentally friendly basis; wherein additional land will be granted in phases subjected to the performance monitoring terms and conditions as agreed upon with the DSEZ Authority. Altogether the industrial estate area for sale will total 27 sq.km as specified in the TOR. To develop this total land area of 27 sq. km., we estimate the time for development and sales to cover a period of 8 years (2016-2023) by dividing the sales plan into 4 phases, namely: Phase A (Y2016-2017), Phase B (Y2018-2019), Phase C (Y2020-2021) and Phase D (Y2022-2023) as shown in the ***Figure 1***.

In conjunction with the initial industrial estate to be developed as mentioned above, the other Initial Projects or supporting infrastructure will also be developed to support the demand and functionality of the investors/customers in order to operate their businesses and factories sufficiently in the Dawei SEZ.

Lastly, as for the compensation and relocation plan, we propose the facilitation of the DSEZ Authority to utilize the existing Bawah Resettlement site with its existing facilities to accommodate the affected villagers in the Initial Phase Development estimated at 78 households (except for those affected along the two-lane road). Those along the Two-lane road is propose to relocated to the current Gad Tra Khee Resettlement Site at KM 145 north of the Two-lane road which will accommodate the Gad Tra Khee and Hti Khee Village.



PHASE	ZONE	GROSS AREA			SELLABLE AREA		
		Km2	Acre	Rai	Km2	Acre	Rai
A	A1	1.0	249	620	5.3	1,297	3,281
	A2	3.2	791	2,001			
	A3	2.8	690	1,744			
	Subtotal	7.0	1,730	4,375			
B	B1	2.8	687	1,738	5.3	1,297	3,281
	B2	1.8	452	1,143			
	B3	2.4	591	1,495			
	Subtotal	7.0	1,730	4,375			
C	C1	1.2	305	773	5.3	1,297	3,281
	C2	1.9	475	1,201			
	C3	1.9	475	1,201			
	C4	1.9	475	1,201			
	Subtotal	7.0	1,730	4,375			
D	D1	3.5	859	2,173	4.5	1,112	2,813
	D2	2.5	624	1,577			
	Subtotal	6.0	1,483	3,750			
TOTAL		27.0	6,671	16,881	20.3	5,002	12,656

FIGURE 1: OVERALL LAYOUT AND INDUSTRIAL ESTATE ZONING PLAN

Technical Plan for the Dawei SEZ Initial Phase Development

1. Small Port

The Small Port is located on the north bank of the Pan Din In river mouth at approximately 3 kilometers southward from the Dawei SEZ area. The existing jetty at the Pan Din In river mouth will be utilized as the first berth of the Small Port (to serve the initial demand as well as during the construction period of the Initial Phase. The Small Port consists of an approach channel, basin, breakwaters, shore protection, reinforced concrete jetty structure (i.e. platform, dolphin and trestle), storage yard and other facilities, machinery, equipment related to its operation, as well as a coastal road for the transport of cargo to and from the port and linking it with the Main Road within the Dawei SEZ. The access channel has been designed to accommodate large LNG carriers in accordance with PIANC standards and is more than adequate to facilitate the cargo vessels at the small port. Protection from adverse sea states is afforded by the provision of breakwaters on both the north and south sides of the harbor entry. Navigation aids will be available for ship maneuvering.

The future demand of the Dawei SEZ initial phase industrial estate has been forecasted and plans to increase the capacity of the Small port by constructing a 2nd berth are being developed. The 1st berth of the small port will be sufficient for the expected cargo demand up until the completion of the 2nd berth at the beginning of 2019. The Small Port with 2 berths could be used at full capacity to accommodate the expected throughput increase from the initial industrial estate.

2. LNG Terminal

Rapid development of the Dawei SEZ Initial Phase Development cannot be contemplated without access to reasonably priced natural gas for power generation and industries. Present forecasts indicate that demand for natural gas for early stage of development will materialize from mid to 2016 onward albeit in small quantity and increasing rapidly as more industries start to be built and operated. The Dawei LNG Terminal will be located in a 277 acres plot at the Dawei Small Port.

The LNG Terminal will provide Throughput Services to the Dawei SEZ. Throughput Services will include the following services:

i) Berthing of LNG carriers at the LNG terminal;

ii) Receipt of LNG through unloading of LNG carriers at the LNG terminal;

iii) Temporary storage of the LNG;

iv) Pumping and vaporization of the LNG; and,

v) Send-out of the vaporized LNG into the downstream pipeline networks supplying gas to power plant and other industrial customers.

3. Boil-Off Gas Power Plant

The Boil-off Gas Power Plant will consist of 7 units (6 operating and 1 standby) of 2.5 MW containerized gas generator which will allow flexibility to handle the varying volume of boil-off gas from Dawei LNG Terminal which will be higher in the day and lower in the night as well as the seasonal high and low throughout the year. The boil-off gas volume is forecasted to be between 3 and 4 MMSCFD (Million Standard Cubic Feet per Day) which will be able to generate between 12 and 16 MW. The Boil-off Gas Power Plant will be operational at the same time as the Dawei LNG Terminal which is projected to be operational in January 2017.

4. Two-Lane Road

For land transport, the already existing Two-lane Road from the Thai border to the Dawei SEZ will be upgraded to asphalt specification based on the Class 4 of the Highway Design Standards of the Department of Highways (DOH), Thailand covering a distance of 138 km with two directions of 3.5 m width (7 m. of carriage roadway width) with 1 m pave shoulder (7 on 9 m road type) with the right-of-way ("R.O.W.") of 40 m. starting from the DSEZ at Sta. 18+500 to Sta.156+500 at the Thai-Myanmar border, while maintaining the Two-Lane Road's alignment on the existing access road as much as possible. This road will be a toll road and will collect fee for the passing vehicles at four toll booths along the road with related facilities such Service center and Vista point.

APPENDIX 2B

BRIEF INFORMATION ON EGCO AND ITD

APPENDIX 2B

BRIEF INFORMATION ON EGCO AND ITD

Brief Information on EGCO

EGCO is the first independent power producer in Thailand. It was incorporated in May 1993 by the Electricity Generating Authority of Thailand (EGAT) in response to the government's privatization initiatives in the power sector. EGCO was transformed into a public company in March 1994 and was listed on the Stock Exchange of Thailand in January 1996. EGCO is a holding company with investment in power generation and supply. As of August 2014, it holds the generation capacity of 7,839 MW as gross, or 4,977MW as equity stake basis, both in Thailand and overseas. Its power generation includes gas and coal fired, hydro, wind, and solar power plants. Over the past twenty years, EGCO has accumulated ample experience and knowhow in the development, operation, and management of power projects. EGCO has strong track records of compliance with environmental regulations and maintenance of good relation with local communities.

Brief Information on ITD

ITD is one of the largest construction and engineering company in Thailand and Southeast Asia. The company was established in 1958 and was listed as a public company in the Stock Exchange of Thailand in 1994. As of the end of 2014, ITD had a registered capital of 5,279.84 million Baht (about 173,601.14 MM USD). Its total revenue in 2014 was about 49,186.64 million Baht (about 1,617,256.72 MM USD.)

ITD, together with its subsidiaries, is engaged in the civil and infrastructure construction and development business in Thailand and internationally. The company focuses on various projects consisting of buildings; industrial plants; pipelines and utility works, such as oil, gas, and water transmission pipelines, conduit and manhole systems, and storage tanks; highways, railways, high speed rails, viaducts, track works, Mass Rapid Transit (MRT) systems, bridges, and expressways; airports, ports, and marine works; dams, tunnels, and power plants; steel structures; telecommunications; and mining projects.

ITD is also involved in ship charter; coal digestion services; manufacture and distribution of cement; production and distribution of electricity; rock quarrying, processing, and distribution; and manufacture, distribution, and installation of concrete panels and concrete products for real estate, as well as provides foundation and piling work services. In addition, the company produces and sells vessels and equipment; manufactures and distributes steel pipes for civil construction; leases/sells sheet piles and beams; and constructs airport terminals, multi-purpose ports, underground electrical train stations, and water drainage tunnels, as well as involved in real estate and mining business. Further, it operates as a service agent; and contractor for track doubling, and overburden and lignite removal services.

APPENDIX 2C

NAMES OF MEMBERS OF THE EIA STUDY TEAM

APPENDIX 2C

NAMES OF MEMBERS OF THE EIA STUDY TEAM

Position	Name	Qualification
1. Team Leader / Environmental Expert	Dr. Sirinimit Boonyuen	B.Sc., M.Sc., Ph.D.
2. EIA Expert	Dr. Sermpol Rattasuk	Ph.D., M. Eng., B.Sc. (Hons.)
3. Project Manager / Socio-Economic / Public Consultation Specialist	Dr. Siriluck Sirisup	B.Sc., M.Sc., Ph.D.
4. Socio-Economic / Public Consultation Specialist	Ms. Thet Htar Myint	B.Sc., M.Sc.
5. Land Use / Agricultural Specialist	Mr. Plian Maneeya	B.Sc., M.Sc., Ph.D.
6. Project Coordinator / Marine Ecologist	Dr. Supichaya Wongchinawit	B.Sc., M.Sc.
7. Environmental Scientist	Mr. Natt Dumkum	B.Sc., M.Sc.
8. Air Quality / Noise Specialist	Ms. Narachan Pimsuca	B.Sc., M.Sc.
9. Water Quality / Aquatic Ecological Specialist	Mr. Nipat Somkleep	B.S., M.S.
10. Terrestrial Ecological Specialist	Mr. Apichai Horcharoensap	B.Sc.
11. Senior Water Resource Engineer	Mr. Prasit Akkakraisee	B.Eng., M.Eng.
12. Thermal Plume Model Specialist	Mr. Kittipong Thanasiriyakul	B.Eng., M.Eng.
13. Public Health Specialist	Mr. Khunakorn Toomjeen	B.S., M.S.
14. Cultural Heritage / Aesthetic Specialist	Mrs. Budsaba Israngkura Na Ayudhaya	B.A., M.P.

APPENDIX 2D

TOTAL BUSINESS SOLUTION COMPANY CERTIFICATION

MINISTRY OF NATIONAL PLANNING AND ECONOMIC DEVELOPMENT
COMPANIES REGISTRATION OFFICE

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ

အမျိုးသားစီမံကိန်းနှင့် စီးပွားရေးဖွံ့ဖြိုးတိုးတက်မှုဝန်ကြီးဌာန

ကုမ္ပဏီမှတ်ပုံတင်လက်မှတ်

အမှတ် ၁၀၀ အက်ဖ်စီ / ၂၀၁၂-၂၀၁၃

မြန်မာနိုင်ငံ ကုမ္ပဏီများ အက်ဥပဒေအရ ......တိုတယ်(လ်) ဘစ်စနက်(စ်) ဆလူးရှင်း....

ကုမ္ပဏီ လီမိတက်......................အား ပေးရန်တာဝန် ကန့်သတ်ထားသော လီမိတက်

ကုမ္ပဏီအဖြစ် ၂၀၁၂.. နှစ်၊စက်တင်ဘာ . လ၊ ၁၁ . ရက်နေ့တွင် မှတ်ပုံတင်ခွင့်ပြုလိုက်သည်။

ညွှန်ကြားရေးမှူးချုပ်(ကိုယ်စား)

(နန်းရီရီသန်း၊ညွှန်ကြားရေးမှူး)

ရင်းနှီးမြှုပ်နှံမှုနှင့်ကုမ္ပဏီများညွှန်ကြားမှုဦးစီးဌာန

THE GOVERNMENT OF THE REPUBLIC OF THE UNION OF MYANMAR
MINISTRY OF NATIONAL PLANNING AND ECONOMIC DEVELOPMENT

CERTIFICATE OF INCORPORATION

NO. ....100 FC............ of 2012-2013

I hereby certify that ....TOTAL BUSINESS SOLUTION............ COMPANY LIMITED. ....is this day incorporated under the Myanmar Companies Act and that the company is Limited.

Given under my hand at Nay Pyi Taw this ....ELEVENTH ....day of SEPTEMBER,....TWO THOUSAND AND TWELVE......................................

FOR DIRECTOR GENERAL

(Nang Yi Yi Than, Director)

Directorate of Investment and Company Administration

ဤကုမ္ပဏီမှတ်ပုံတင် လက်မှတ်သည် (၁၁-၉-၁၂) မှ (၁၀-၉-၁၇) ရက်နေ့ အထိ (၅)နှစ် သက်တမ်းအတွက်သာ ဖြစ်သည်။ သက်တမ်း မကုန်ဆုံးမီ (၃)လအလိုတွင် သက်တမ်းတိုးရန် ရင်းနှီးမြှုပ်နှံမှုနှင့် ကုမ္ပဏီများညွှန်ကြားမှု ဦးစီးဌာနသို့ လျှောက်ထားရမည်။

ညွှန်ကြားရေးမှူးချုပ်(ကိုယ်စား)
(သီတာအောင် ၊ဒုတိယညွှန်ကြားရေးမှူး)

ISSUDE DATE 19 DEC

APPENDIX 3A

CORPORATE ENVIRONMENTAL AND SOCIAL POLICIES OF ITD AND EGCO

APPENDIX 3A

CORPORATE ENVIRONMENTAL AND SOCIAL POLICIES OF ITD AND EGCO

1. ITD

ITD's corporate policy on Occupational Safety, Health, and Working Environment are as follows:

The Company recognizes the importance of occupational safety, health, and working environment which affect our employees. The Company, therefore, has established the policy on the said issue as follows:

1. Occupational safety and good working environment maintenance are responsibilities of all employees to cooperate and perform in order to afford safety to themselves, company, and related person.
2. The Company shall encourage all employees to understand and recognize occupational safety and health concern in their operation.
3. The Company recognizes the importance of operational accident prevention.
4. The Company shall support and promote the improvement of working environment and working with safety and healthy.
5. The management shall supervise occupational safety, health, and working environment of the subordinates according to related Company's regulation.
6. The Company shall support and promote safety campaign for maximum effectiveness of an application of the policy in practice.
7. The Company shall monitor and evaluate an application of the policy on occupational safety, health, and working environment for efficient and effectiveness according to legal requirements

Environmental concerns are explicitly stated as one element, item 6, of ITD's policy on Corporate Social Responsibility as follows:

The Company has a guideline for the Corporate Social Responsibility as follows:

1. The Corporate Governance: The management system of the Company shall have efficiency, transparency, and accountability for the confidence of shareholders, investors, stakeholders and related parties and lead to the sustainable growth of the Company.
2. The Business Ethics: The Company believed that moral in business operation can benefit the Company in the long-term. The Company will avoid engaging the activities which are against morality.
3. The Respect to Human Right and Labor Equity: Human resource is the effective factor to drive the business and add value for the corporate. The Company, therefore, shall improve their working environment and provide them a chance to training for skill enhancement.

4. The Responsibility to the Consumer: The construction business is high competition. The success of previous project and the satisfaction of the customer can benefit to the Company competitive advantage. The Company, therefore, shall maintain its standard of goods and services and can be the part of society to mitigate the social problems.

5. The Community Development: The community's sustainability is one of the significant factors which can support the Company's business. The Company will establish the activities which can strengthen the community for example the education support, human resource development, employment creation, and other development project.

6. The Environmental Concern: The people nowadays concern for the environment. The operation with suitable environmental impact protection system can help the Company timely complete the project. The Company, therefore, shall set the environmental impact protection system comply with laws and regulation and participate in environmental activities with other part of society.

7. CSR Report: The Company will disclose the information related to CSR activities of the Company in the annual report.

2. EGCO

Safety Health and Environment Management (SHE Management)

Since we, Electricity Generating Public Company Limited or EGCO, operate in the industry that uses natural resources for power generation, we are well aware of the environment impacts from our operation. Consequently, we commit to use natural resources in the most efficient and environmentally responsible manner to minimize the impact on the environment. To strengthen our capacity to achieve our mission, we educate the workforce to understand that each and everyone's work affects the environment and that it is their responsibility to discharge the assigned duty with environment concern.

Environmental Policy

EGCO Group has an intention to operate the business with the commitment to environmental responsibility:

1. We will comply with relevant environmental laws and regulations.

2. We will manage our business with the goal to alleviate the adverse effects on the environment, undertake appropriate reviews and evaluations of our performance to measure and to ensure compliance with this environmental policy,

3. We will encourage employees to have strong concern and be responsible for the clean environment, and

4. We will educate the employees on the environment including exchanging the knowledge with other agencies in order to continuously and regularly maintain good environment and to improve the working practice appropriate to the environment.

Safety and Health Policy

EGCO Group believes that the safety and health of our employees are fundamental responsibilities and that the continued success of our operation depends upon the protection of our employees. We therefore set the policy to enable our employees and contractors to work safely and comply with the relevant laws.

1. We will strive to prevent accident, injury and occupational illnesses through the active participation of every employee. We are committed to continuous efforts to identify and eliminate or manage safety risks associated with our activities.

2. We will strictly comply with all applicable laws and regulations. In case that no enforceable body of law exists, we will apply reliable standards of our own.

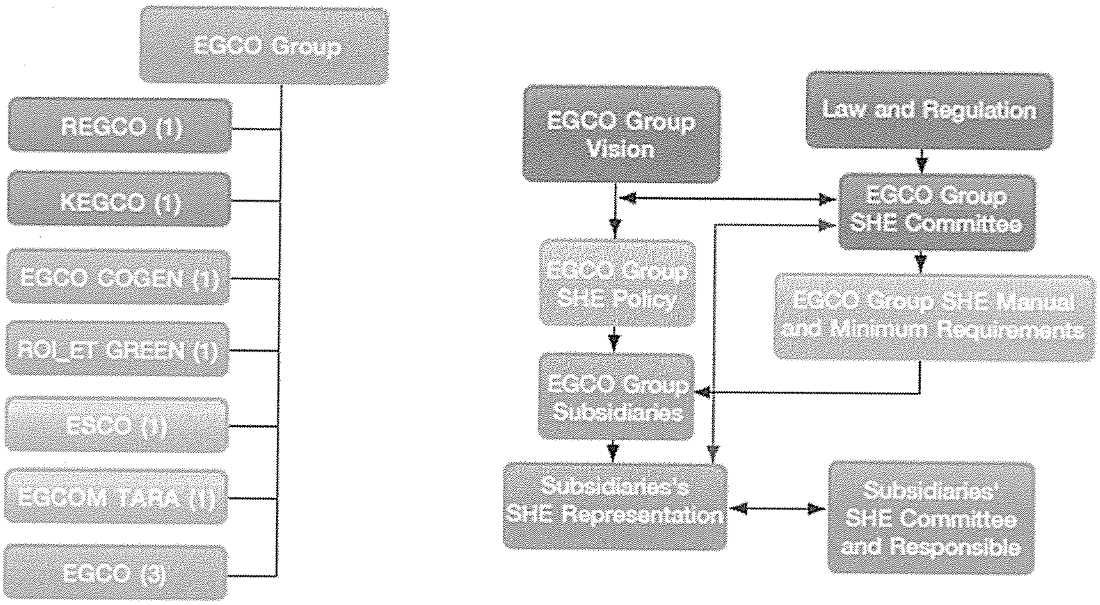
3. We will arrange for the proper design of tool and equipment, regulations, training and the control tools in a manner that safeguards workers, property and the communities in which we operate from machine, working procedures and occupational illnesses.

4. Employees who report to work with illegal drugs in their system or report with level of alcohol or other chemical substances that could impair performance are subject to disciplinary action.

To align our efforts in the same direction and to extend our scope of responsibility to cover future power plants, we have included the projects on safety, health and environment in our strategic plan and budget. With respect to this, the Safety, Health and Environment (SHE) Committee, has been shored up since 2005 comprising representatives from Group companies. The responsibilities of the SHE Committee are to prepare the action plan on SHE implementation in alignment with the corporate policy and goals as well as the strategic plan and to monitor and appraise the quality of SHE program. At present, the Executive Vice President-Project Management from Asset Management and Planning Group is the Chairman of the Committee.

EGCO Group's SHE management in based on experience and knowledge sharing among Group companies with Rayong and Khanom power plants as SHE champions to showcase their best practices to their peers in order to enhance the SHE management of the whole Group. This would not only help develop the knowledge on SHE management, but also lead to improvement in EGCO Group's working standard.

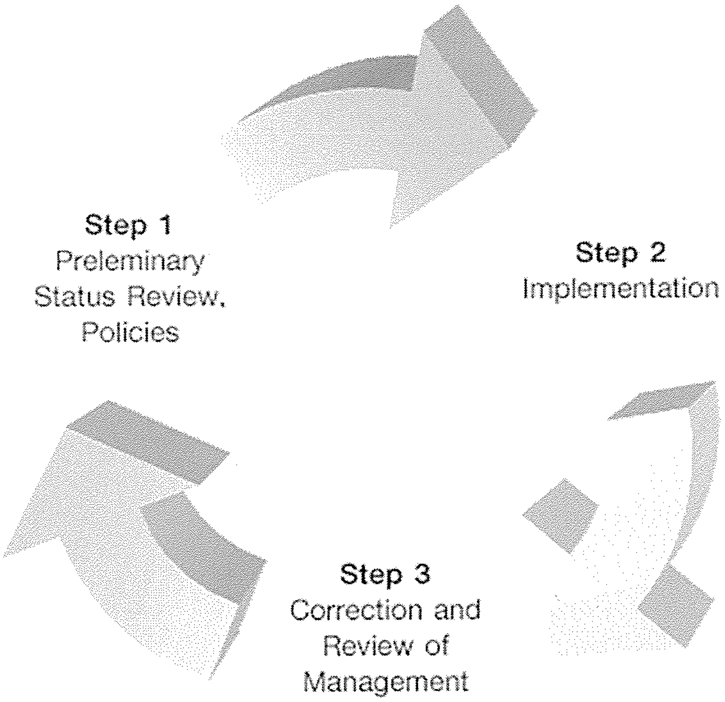
Structure and Management Framework
EGCO Group Safety, Health and Environment Committee



The SHE Committee has issued the standard requirements on "EGCO Group Safety, Health and Environment Management" to reduce and control hazardous working environment, to increase the working efficiency and to show our commitment for social and environment responsibilities. These standard requirements do not only prepare the Group companies for SHE audit either by internal and external partner, but also help identify areas for future improvement. Apart from the standard requirements, the SHE Committee also prepared the "EGCO Group Manual for Implementing SHE system" as a guideline to ensure that SHE system and management would be applied based on the same standard. This manual has been officially launched by the President on September 1, 2006.

EGCO Group's SHE System

EGCO Group's SHE system comprises of three significant steps as shown below.



APPENDIX 5A

RESULTS OF SOIL QUALITY

Analysis / Test Report

Report to :	TEAM Consulting Engineering and Management Co., Ltd. 151, Nuan Chan Road, Nuan Chan, Bueng Kum, Bangkok Thailand 10230	**Project Name :**	ESIA for Dawei SEZ initial phase(435 MW :main facility and 97 MW:back up facility)
Attn :	Patravut Tadsuan	**Location :**	Myanmar
Phone :	0-2509-9000	**P/O :**	
Fax :	0-2509-9047	**Receipt No :**	
Email :	patravut_ta@team.co.th	**CC Email. :**	
Cc.Email :	sarawoot_s@team.co.th		

Lot ID: 156542
Date Received : Feb 06, 2015
Date Reported : Mar 25, 2015
Report Number : 546776-1

Reference Number	156542-1
Sampling Date	Jan 21, 2015
Sample Description	Soil at Project Site (UTM 399518E, 1571408N)
Location	Myanmar
Condition of Sample	packed in two glass bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Date of Analysis	Feb 07, 2015

Analyte		**Unit**	**LOD**	**Result**	**Method**
Chemical Testing					
Chloride		mg/kg	-	305	ISE Application
Conductivity	aqueous phase 20% (w/v)	micromhos/cm	-	248	Based on APHA (2012), 2510 B
Nitrate		mg/kg	-	<1.0	Based on APHA (2012), 4500-NO3 E
Oil & Grease		mg/kg	-	649	Based on US EPA, 9071 B
Organic matter		%	-	0.63	Dichromate Titration
pH	aqueous phase 20% (w/v)		-	5.2	Based on US EPA, Method 9040 B
Phosphate		mg/kg	-	<1.0	Based on APHA (2012), 4500-P
Salinity		ppt	-	0.12	Based on APHA (2012), 5210 B
Sulfate		mg/kg	-	101	Based on APHA (2012), 4110 B
Total Organic Carbon		%	-	0.19	Based on US EPA, Method 9060
Metals Testing					
Arsenic		mg/kg	-	<0.50	Based on US EPA, Method 3050B and 6010B
Cadmium		mg/kg	-	<0.50	Based on US EPA, Method 3050B and 6010B
Chromium		mg/kg	-	<1.00	Based on US EPA, Method 3050B and 6010B
Copper		mg/kg	-	<1.00	Based on US EPA, Method 3050B and 6010B
Iron		mg/kg	-	88.9	Based on US EPA, Method 3050B and 6010B
Lead		mg/kg	-	<1.00	Based on US EPA, Method 3050B and 6010B

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any from without written consent from the Laboratory. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

Approved by

Narin Saiseng
Supervisor

Analysis / Test Report

Report to :	TEAM Consulting Engineering and Management Co., Ltd. 151, Nuan Chan Road, Nuan Chan, Bueng Kum, Bangkok Thailand 10230	**Project Name :**	ESIA for Dawei SEZ initial phase(435 MW :main facility and 97 MW:back up facility)
Attn :	Patravut Tadsuan	**Location :**	Myanmar
Phone :	0-2509-9000	**P/O :**	
Fax :	0-2509-9047	**Receipt No :**	
Email :	patravut_ta@team.co.th	**CC Email. :**	
Cc.Email :	sarawoot_s@team.co.th		

Lot ID: 156542
Date Received : Feb 06, 2015
Date Reported : Mar 25, 2015
Report Number : 546776-1

Reference Number	156542-1
Sampling Date	Jan 21, 2015
Sample Description	Soil at Project Site (UTM 399518E, 1571408N)
Location	Myanmar
Condition of Sample	packed in two glass bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Date of Analysis	Feb 07, 2015

Analyte	Unit	LOD	Result	Method
Metals Testing				
Zinc	mg/kg	-	3.26	Based on US EPA, Method 3050B and 6010B
Mercury	mg/kg	-	<0.10	Based on US EPA, Method 7471B
PHYSICAL PARAMETERS				
Soil Texture		-	Sand	Hydrometer
Sand	%	-	94.1	Hydrometer
Silt		-	4.0	Hydrometer
Clay	%	-	1.9	Hydrometer

Note:
This Analysis test report is reissued to supersede report No. 531338-1 Rev. No.1 Date Reported : Mar 13, 2015

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Approved by

Narin Saiseng
Supervisor

Analysis / Test Report

Report to :	TEAM Consulting Engineering and Management Co., Ltd. 151, Nuan Chan Road, Nuan Chan, Bueng Kum, Bangkok Thailand 10230	**Project Name :**	ESIA for Dawei SEZ initial phase(435 MW :main facility and 97 MW:back up facility)
Attn :	Patravut Tadsuan	**Location :**	Myanmar
Phone :	0-2509-9000	**P/O :**	
Fax :	0-2509-9047	**Receipt No :**	
Email :	patravut_ta@team.co.th	**CC Email. :**	
Cc.Email :	sarawoot_s@team.co.th		

Lot ID: 156542
Date Received : Feb 06, 2015
Date Reported : Mar 25, 2015
Report Number : 546776-1

Reference Number	156542-2
Sampling Date	Jan 21, 2015
Sample Description	Soil at Mudu Village (UTM 401429E, 1576778N)
Location	Myanmar
Condition of Sample	packed in two glass bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Date of Analysis	Feb 07, 2015

Analyte		**Unit**	**LOD**	**Result**	**Method**
Chemical Testing					
Chloride		mg/kg	-	32.4	ISE Application
Conductivity	aqueous phase 20% (w/v)	micromhos/cm	-	20.5	Based on APHA (2012), 2510 B
Nitrate		mg/kg	-	6.1	Based on APHA (2012), 4500-NO3 E
Oil & Grease		mg/kg	-	470	Based on US EPA, 9071 B
Organic matter		%	-	3.58	Dichromate Titration
pH	aqueous phase 20% (w/v)		-	5.2	Based on US EPA, Method 9040 B
Phosphate		mg/kg	-	<1.0	Based on APHA (2012), 4500-P
Salinity		ppt	-	0.02	Based on APHA (2012), 5210 B
Sulfate		mg/kg	-	11.0	Based on APHA (2012), 4110 B
Total Organic Carbon		%	-	2.08	Based on US EPA, Method 9060
Metals Testing					
Arsenic		mg/kg	-	1.04	Based on US EPA, Method 3050B and 6010B
Cadmium		mg/kg	-	<0.50	Based on US EPA, Method 3050B and 6010B
Chromium		mg/kg	-	14.8	Based on US EPA, Method 3050B and 6010B
Copper		mg/kg	-	<1.00	Based on US EPA, Method 3050B and 6010B
Iron		mg/kg	-	12262	Based on US EPA, Method 3050B and 6010B
Lead		mg/kg	-	22.3	Based on US EPA, Method 3050B and 6010B

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Approved by

Narin Saiseng
Supervisor

Analysis / Test Report

Report to :	TEAM Consulting Engineering and Management Co., Ltd. 151, Nuan Chan Road, Nuan Chan, Bueng Kum, Bangkok Thailand 10230	**Project Name :**	ESIA for Dawei SEZ initial phase(435 MW :main facility and 97 MW:back up facility)	**Lot ID: 156542**
				Date Received : Feb 06, 2015
		Location :	Myanmar	Date Reported : Mar 25, 2015
Attn :	Patravut Tadsuan	**P/O :**		Report Number : 546776-1
Phone :	0-2509-9000	**Receipt No :**		
Fax :	0-2509-9047			
Email :	patravut_ta@team.co.th	**CC Email. :**		
Cc.Email :	sarawoot_s@team.co.th			

Reference Number	156542-2
Sampling Date	Jan 21, 2015
Sample Description	Soil at Mudu Village (UTM 401429E, 1576778N)
Location	Myanmar
Condition of Sample	packed in two glass bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Date of Analysis	Feb 07, 2015

Analyte	Unit	LOD	Result	Method
Metals Testing				
Zinc	mg/kg	-	28.0	Based on US EPA, Method 3050B and 6010B
Mercury	mg/kg	-	<0.10	Based on US EPA, Method 7471B
PHYSICAL PARAMETERS				
Soil Texture		-	Clay Loan	Hydrometer
Sand	%	-	40.2	Hydrometer
Silt		-	21.9	Hydrometer
Clay	%	-	37.9	Hydrometer

Note:

This Analysis test report is reissued to supersede report No. 531338-1 Rev. No.1 Date Reported : Mar 13, 2015

Remark :

1. LOD : Limit of Detection
2. "<" : Lower than LOQ (Limit of Quantitation)

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any from without written consent from the Laboratory. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

Approved by

Narin Saiseng
Supervisor

APPENDIX 5B

RESULTS OF AIR QUALITY

AMBIENT AIR ANALYSIS REPORT

CLIENT NAME : TEAM Consulting Engineering and Management Co.,Ltd.

PROJECT NAME : ESIA for Dawei SEZ initial phase (435 MW :main facility and 97 MW:back up facility)

MEASURED BY : Mr.Pornchai Chu-en and Mr.Patravut Tadsuan

CONTRACTED BY : Dr. Supichaya Wongchinawit

REPORT DATE : 16/02/2015

MEASURED DATE : 21-24/01/2015

MEASURED POINT : Myanmar

PROJECT NO : P3141

ANALYSIS NO. : A58001/1-2

SAMPLING LOCATION	SAMPLING DATE	PARAMETERS	
		TOTAL SUSPENDED PARTICULATES (TSP), 24 HRS. (µg/m^3)	PARTICULATE MATTER LESS THAN 10 mm (PM-10), 24 HRS. (µg/m^3)
Nga Pitat Village (UTM 399344E 1569815N)	21-22/01/2015	102.58	38.31
	22-23/01/2015	110.81	40.82
	23-24/01/2015	93.55	33.94
Mudu Village (UTM 402425E 1576727N)	21-22/01/2015	86.51	17.91
	22-23/01/2015	94.86	34.73
	23-24/01/2015	103.46	29.46
STANDARD		330	120
ANALYSIS METHOD@		GRAVIMETRIC METHOD	GRAVIMETRIC METHOD

REF:@ 1. METHOD OF AIR SAMPLING AND ANALYSIS 2ND ED., 1872

2. METHOD OF AIR SAMPLING AND ANALYSIS 3RD ED., 1989

REPORTED RESULTS REFER TO SUBMITTED SAMPLES ONLY

DO NOT COPY PARTIAL OF THIS ANALYSIS REPORT WITHOUT OFFICAL APPROVAL

(MR.SARAWOOT SINGPROMMA)
ANALYST SIGNATURE
16/02/2015

(MR.PATRAVUT TADSUAN)
AUTHORIZED SIGNATURE
16/02/2015

GFE The Geotechnical Expert
GEOTECHNICAL & FOUNDATION ENGINEERING CO., LTD.
151 Nuan Chan Road, Nuan Chan, Bueng Kum, Bangkok 10230 THAILAND
Tel: +66 2 363 7723 Fax: +66 2 363 7724 www.gfe.co.th

ISO 9001:2008 CERTIFIED

AMBIENT AIR ANALYSIS REPORT

CLIENT NAME : TEAM Consulting Engineering and Management Co.,Ltd.
PROJECT NAME : ESIA for Dawei SEZ initial phase(435 MW :main and 97 MW:back up facility)
MEASURED POINT : Mudu Village, Myanmar.
CONTRACTED BY : Dr. Supichaya Wongchinawit

REPORT DATE : 13/02/2015
MEASURED DATE : 21-24/01/2015
PROJECT NO. : P3141
ANALYSIS NO. : SO2NO258001/1-2
MEASURED BY : Mr.Patravut Tadsuan

SAMPLING LOCATION	SAMPLING DATE	PARAMETERS	
		SULFUR DIOXIDE (SO_2) 24 HRS. (ppm)	NITROGEN DIOXIDE (NO_2) 24 HRS. (ppm)
Nga Pitat Village (UTM 399344E 1569815N)	21-22/01/2015	<0.02*	<0.01**
	22-23/01/2015	<0.02*	<0.01**
	23-24/01/2015	<0.02*	<0.01**
Mudu Village (UTM 402425E 1576727N)	21-22/01/2015	<0.02*	<0.01**
	22-23/01/2015	<0.02*	<0.01**
	23-24/01/2015	<0.02*	<0.01**
STANDARD		**0.12**	-
ANALYSIS METHOD@		PARAROSANILINE METHOD(1)	SODIUM ARSENITE METHOD(2)

REF: *(1) METHOD OF ASTM D2914-78 (2) US.EPA EQN-1277-026*

REMARK : * Less than 50 $\mu g/m^3$ ** Less than 18 $\mu g/m^3$

REPORTED RESULTS REFER TO SUBMITTED SAMPLES ONLY

DO NOT COPY PARTIAL OF THIS ANALYSIS REPORT WITHOUT OFFICAL APPROVAL

(MR.SARAWOOT SINGPROMMA)
ANALYST SIGNATURE
13/02/2015

(MR.PATRAVUT TADSUAN)
AUTHORIZED SIGNATURE
13/02/2015

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Tel: +66 2 363 7723 Fax: +66 2 363 7724 www.gfe.co.th

ISO 9001:2008 CERTIFIED

ANALYSIS REPORT

CLIENT NAME	:	TEAM Consulting Engineering and Management Co., Ltd.
PROJECT NAME	:	ESIA for Dawei SEZ initial phase(435 MW :main facility and 97 MW:back up facility
PROJECT NO.	:	10P3141
MEASURED POINT	:	Mudu Village (UTM 402425E 1576727N)
MEASURED DATE	:	21-24/01/2015
MEASURED BY	:	Mr.Pornchai Chu-en and Mr.Patravut Tadsuan
ANALYSIS NO.	:	WS-WD58001/2

TIME \ DATE	21-22 January 2015		22-23 January 2015		23-24 January 2015	
	WS	WD	WS	WD	WS	WD
06.00-07.00 PM	1.3	WNW	2.2	NW	0.4	WNW
07.00-08.00 PM	0.4	W	0.4	WNW	0.0	Calm
08.00-09.00 PM	0.0	Calm	0.0	Calm	0.0	Calm
09.00-10.00 PM	0.0	Calm	0.0	Calm	0.0	Calm
10.00-11.00 PM	0.0	Calm	0.0	Calm	0.0	Calm
11.00-12.00 PM	0.0	Calm	0.0	Calm	0.0	Calm
12.00 PM-01.00 AM	0.0	Calm	0.0	Calm	0.0	Calm
01.00-02.00 AM	0.0	Calm	0.0	Calm	0.0	Calm
02.00-03.00 AM	0.0	Calm	0.0	Calm	0.0	Calm
03.00-04.00 AM	0.0	Calm	0.0	Calm	0.0	Calm
04.00-05.00 AM	0.0	Calm	0.4	E	0.0	Calm
05.00-06.00 AM	0.0	Calm	0.0	Calm	0.0	Calm
06.00-07.00 AM	0.0	Calm	0.4	ENE	0.0	Calm
07.00-08.00 AM	0.0	Calm	0.4	NE	0.0	Calm
08.00-09.00 AM	0.4	ESE	0.4	E	0.0	Calm
09.00-10.00 AM	0.4	E	0.4	E	0.0	Calm
10.00-11.00 AM	0.4	ENE	0.4	NE	0.4	NE
11.00-12.00 AM	0.9	NE	0.4	NE	0.9	NE
12.00 AM-01.00 PM	0.4	NE	0.4	NE	0.4	NE
01.00-02.00 PM	0.4	ENE	0.4	NW	0.4	NW
02.00-03.00 PM	0.4	NE	1.3	WNW	0.4	WNW
03.00-04.00 PM	0.4	WNW	0.9	WNW	0.8	WNW
04.00-05.00 PM	1.3	WNW	0.9	W	1.1	WNW
05.00-06.00 PM	2.2	NW	1.8	WNW	1.7	WNW

Remark : WS = Wind Speed (m/s) WD = Wind Direction Calm = <0.4 m/s

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ANALYST SIGNATURE
13/02/2015

(MR. PATRAVUT TADSUAN)
AUTHORIZED SIGNATURE
13/02/2015

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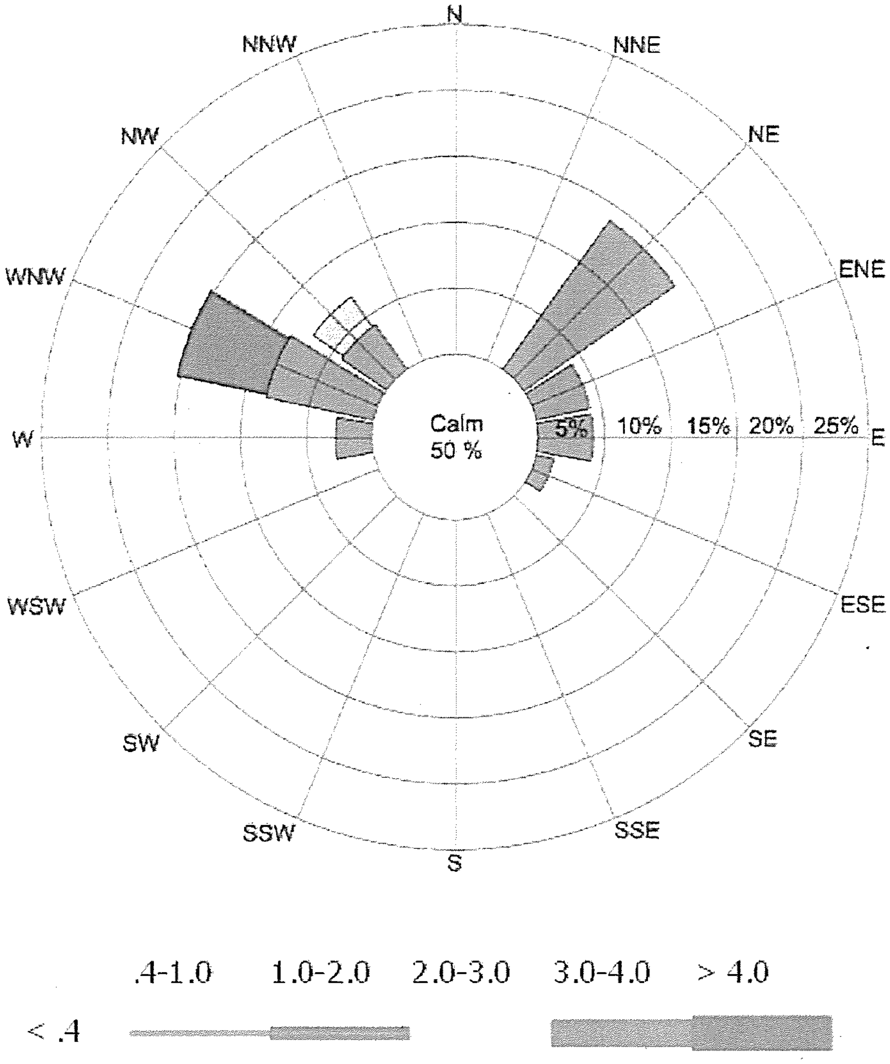
ANALYSIS REPORT

CLIENT NAME	:	TEAM Consulting Engineering and Management Co., Ltd.
PROJECT NAME	:	ESIA for Dawei SEZ initial phase(435 MW :main facility and 97 MW:back up facility
PROJECT NO.	:	10P3141
MEASURED POINT	:	Mudu Village (UTM 402425E 1576727N)
MEASURED DATE	:	21-24/01/2015
MEASURED BY	:	Mr.Pornchai Chu-en and Mr.Patravut Tadsuan
ANALYSIS NO.	:	WS-WD58001/2

WIND ROSE PLOT



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ANALYSIS REPORT

CLIENT NAME : TEAM Consulting Engineering and Management Co., Ltd.

PROJECT NAME : ESIA for Dawei SEZ initial phase(435 MW :main facility and 97 MW:back up facility

PROJECT NO. : 10P3141

MEASURED POINT : Nga Pitat Village (UTM 399344E, 1569815N)

MEASURED DATE : 21-24/01/2015

MEASURED BY : Mr.Pornchai Chu-en and Mr.Patravut Tadsuan

ANALYSIS NO. : WS-WD58001/1

DATE / TIME	21-22 January 2015		22-23 January 2015		23-24 January 2015	
	WS	WD	WS	WD	WS	WD
01.00-02.00 PM	3.8	W	3.4	WNW	3.9	W
02.00-03.00 PM	3.7	WNW	2.7	WNW	3.9	W
03.00-04.00 PM	2.5	WNW	2.5	WNW	3.4	WNW
04.00-05.00 PM	2.9	WNW	2.7	NW	2.4	WNW
05.00-06.00 PM	2.3	WNW	1.8	NW	1.9	NW
06.00-07.00 PM	0.9	NNE	0.9	N	1.2	NNW
07.00-08.00 PM	0.8	ESE	1.4	ENE	0.8	NNE
08.00-09.00 PM	1.1	ENE	1.0	NE	1.2	NE
09.00-10.00 PM	1.0	NE	0.9	NNE	0.8	NE
10.00-11.00 PM	0.9	NNE	0.9	NNE	1.0	NE
11.00-12.00 PM	1.0	NE	0.9	NNE	0.9	NE
12.00 PM-01.00 AM	1.0	NE	0.9	NNE	0.9	NNE
01.00-02.00 AM	1.0	NE	1.4	NE	0.8	NNE
02.00-03.00 AM	1.3	NE	1.8	NE	1.0	NE
03.00-04.00 AM	1.3	NNE	1.8	NE	1.0	NE
04.00-05.00 AM	1.1	NE	1.6	NE	1.1	NE
05.00-06.00 AM	1.0	NE	1.6	NE	1.0	NE
06.00-07.00 AM	0.9	NE	1.5	NE	1.1	NE
07.00-08.00 AM	1.8	ENE	1.7	NE	1.9	NE
08.00-09.00 AM	2.0	ENE	2.0	NE	2.2	NE
09.00-10.00 AM	1.9	ENE	1.9	NE	1.9	ENE
10.00-11.00 AM	1.5	ENE	1.9	W	1.6	NE
11.00-12.00 AM	2.0	WSW	3.4	W	2.7	WSW
12.00 AM-01.00 PM	4.0	W	4.2	W	4.5	W

Remark : WS = Wind Speed (m/s) WD = Wind Direction Calm = <0.4 m/s

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ANALYST SIGNATURE
13/02/2015

(MR. PATRAVUT TADSUAN)
AUTHORIZED SIGNATURE
13/02/2015

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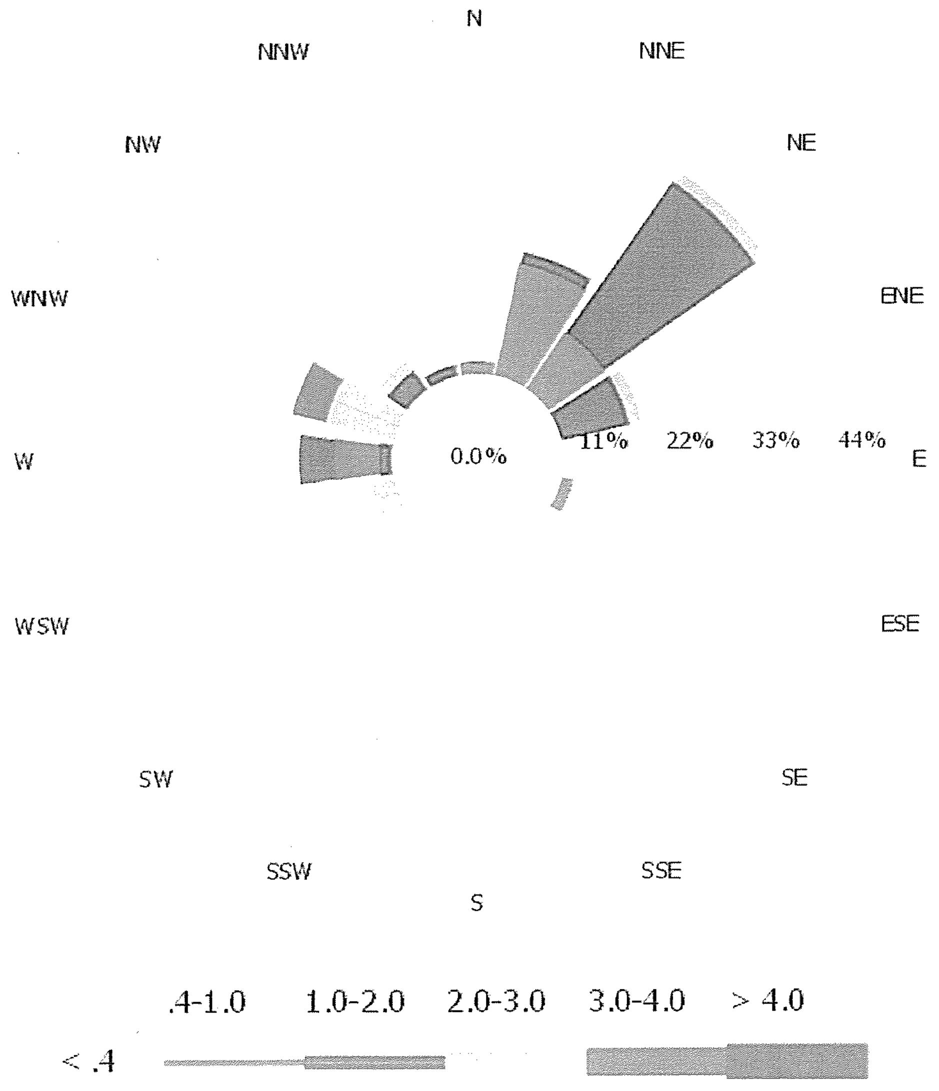
ANALYSIS REPORT

CLIENT NAME	:	TEAM Consulting Engineering and Management Co., Ltd.
PROJECT NAME	:	ESIA for Dawei SEZ initial phase(435 MW :main facility and 97 MW:back up facility
PROJECT NO.	:	10P3141
MEASURED POINT	:	Nga Pitat Village (UTM 399344E, 1569815N)
MEASURED DATE	:	21-24/01/2015
MEASURED BY	:	Mr.Pornchai Chu-en and Mr.Patravut Tadsuan
ANALYSIS NO.	:	WS-WD58001/1

WIND ROSE PLOT



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AMBIENT AIR ANALYSIS REPORT

CLIENT NAME : TEAM Consulting Engineering and Management Co.,Ltd.

PROJECT NAME : ESIA for Dawei SEZ Initial Phase Development
370 MW Combined Cycle Power Plant Project

MEASURED BY : Mr.Pornchai Chu-en and Mr.Patravut Tadsuan

CONTRACTED BY : Dr. Supichaya Wongchinawit

REPORT DATE : 21/10/2015

MEASURED DATE : 7-10/10/2015

MEASURED POINT : Myanmar

PROJECT NO : 10P3356

ANALYSIS NO. : A58007/1-2

SAMPLING LOCATION	SAMPLING DATE	PARAMETERS	
		TOTAL SUSPENDED PARTICULATES (TSP), 24 HRS. (µg/m^3)	PARTICULATE MATTER LESS THAN 10 mm (PM-10), 24 HRS. (µg/m^3)
Nga Pitat Village (UTM 399344E 1569815N)	7-8/10/2015	46.44	23.89
	8-9/10/2015	53.75	11.00
	9-10/10/2015	33.22	9.33
Mudu Village (UTM 401450E 1576760N)	7-8/10/2015	23.97	9.38
	8-9/10/2015	13.71	4.32
	9-10/10/2015	15.64	5.46
STANDARD		330	120
ANALYSIS METHOD@		GRAVIMETRIC METHOD	GRAVIMETRIC METHOD

REF:@ 1. METHOD OF AIR SAMPLING AND ANALYSIS 2ND ED., 1872

2. METHOD OF AIR SAMPLING AND ANALYSIS 3RD ED., 1989

REPORTED RESULTS REFER TO SUBMITTED SAMPLES ONLY

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21/10/2015

(MR.PATRAVUT TADSUAN)
AUTHORIZED SIGNATURE
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AMBIENT AIR ANALYSIS REPORT

CLIENT NAME : TEAM Consulting Engineering and Management Co.,Ltd.
PROJECT NAME : ESIA for Dawei SEZ Initial Phase Development
370 MW Combined Cycle Power Plant Project
MEASURED POINT : Nga Pitat Village and Mudu Village, Myanmar.
CONTRACTED BY : Dr. Supichaya Wongchinawit

REPORT DATE : 21/10/2015
MEASURED DATE : 7-10/10/2015
PROJECT NO. : 10P3356
ANALYSIS NO. : SO2NO258005/1-2
MEASURED BY : Mr.Patravut Tadsuan

SAMPLING LOCATION	SAMPLING DATE	PARAMETERS	
		SULFUR DIOXIDE (SO_2) 24 HRS. (ppm)	NITROGEN DIOXIDE (NO_2) 24 HRS. (ppm)
Nga Pitat Village (UTM 399344E 1569815N)	7-8/10/2015	<0.02*	<0.01**
	8-9/10/2015	<0.02*	<0.01**
	9-10/10/2015	<0.02*	<0.01**
Mudu Village (UTM 401450E 1576760N)	7-8/10/2015	<0.02*	<0.01**
	8-9/10/2015	<0.02*	<0.01**
	9-10/10/2015	<0.02*	<0.01**
STANDARD		**0.12**	-
ANALYSIS METHOD@		PARAROSANILINE METHOD(1)	SODIUM ARSENITE METHOD(2)

REF: (1) METHOD OF ASTM D2914-78 (2) US.EPA EQN-1277-026

REMARK : * Less than 50 μg/m^3 ** Less than 18 μg/m^3

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ANALYSIS REPORT

CLIENT NAME	:	TEAM Consulting Engineering and Management Co., Ltd.
PROJECT NAME	:	ESIA for Dawei SEZ Initial Phase Development 370 MW Combined Cycle Power Plant Project
PROJECT NO.	:	10P3356
MEASURED POINT	:	Nga Pitat Village (UTM 399344E, 1569815N)
MEASURED DATE	:	7-10/10/2015
MEASURED BY	:	Mr.Pornchai Chu-en and Mr.Patravut Tadsuan
ANALYSIS NO.	:	WS-WD58007/1

DATE / TIME	7-8 October 2015		8-9 October 2015		9-10 October 2015	
	WS	WD	WS	WD	WS	WD
07.30-08.30 PM	0.4	NE	3.4	W	0.4	NE
08.30-09.30 PM	0.5	NE	4.1	WSW	0.5	ENE
09.30-10.30 PM	1.0	ENE	3.7	WSW	0.4	NE
10.30-11.30 PM	0.5	ENE	2.7	W	0.6	ENE
11.30-12.30 PM	0.6	ENE	0.9	N	0.5	ENE
12.30 PM-01.30 AM	0.4	ENE	0.9	N	1.1	ENE
01.30-02.30 AM	0.5	NE	1.6	NNW	0.7	ENE
02.30-03.30 AM	0.6	NE	0.8	NE	1.5	N
03.30-04.30 AM	0.8	NE	0.5	NE	2.2	N
04.30-05.30 AM	0.9	NE	0.9	ENE	1.4	NNE
05.30-06.30 AM	0.8	NE	1.5	E	0.8	E
06.30-07.30 AM	0.9	NE	1.5	ENE	0.7	ESE
07.30-08.30 AM	0.8	NE	1.8	E	0.7	ENE
08.30-09.30 AM	0.9	NE	1.6	E	0.8	ENE
09.30-10.30 AM	1.1	N	1.5	E	0.9	ENE
10.30-11.30 AM	1.3	WSW	0.8	SSE	1.3	SE
11.30-12.30 AM	1.4	WSW	1.8	SSE	1.3	SE
12.30 AM-01.30 PM	2.6	W	1.5	SSW	1.4	ESE
01.30-02.30 PM	2.5	WNW	1.8	SW	1.8	WSW
02.30-03.30 PM	4.5	W	6.4	W	2.5	SW
03.30-04.30 PM	3.7	WNW	2.3	S	2.7	SSW
04.30-05.30 PM	2.7	W	2.3	SSE	1.8	S
05.30-06.30 PM	2.7	W	2.2	SSE	1.8	S
06.30-07.30 PM	2.8	WSW	1.0	WSW	1.7	S

Remark : WS = Wind Speed (m/s) WD = Wind Direction Calm = <0.4 m/s

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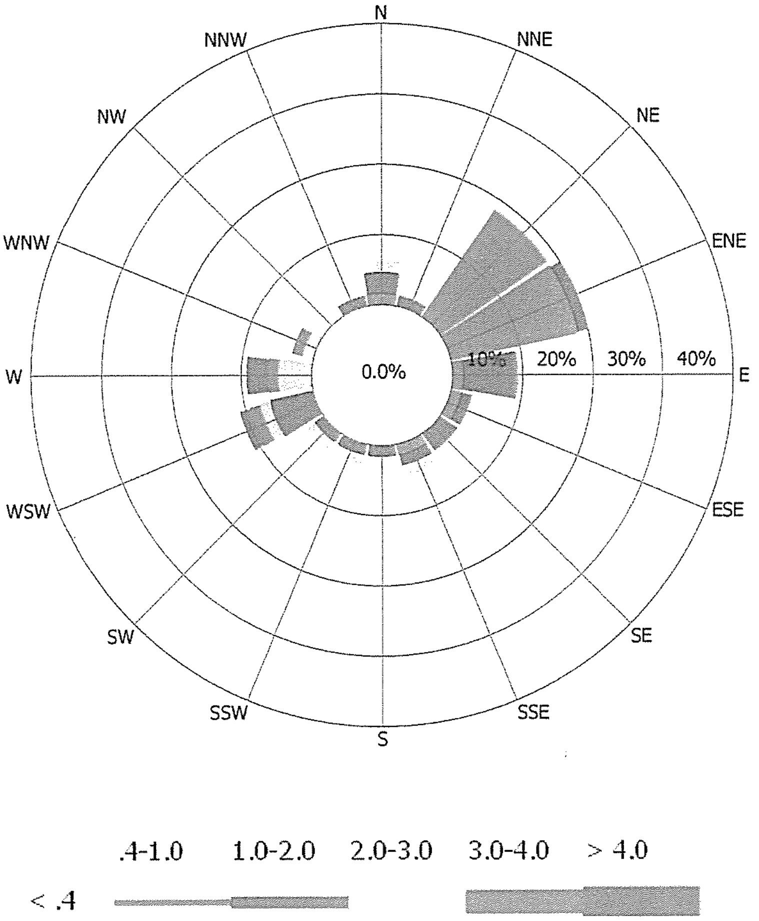
ANALYSIS REPORT

CLIENT NAME	:	TEAM Consulting Engineering and Management Co., Ltd.
PROJECT NAME	:	ESIA for Dawei SEZ Initial Phase Development 370 MW Combined Cycle Power Plant Project
PROJECT NO.	:	10P3356
MEASURED POINT	:	Nga Pitat Village (UTM 399344E, 1569815N)
MEASURED DATE	:	7-10/10/2015
MEASURED BY	:	Mr.Pornchai Chu-en and Mr.Patravut Tadsuan
ANALYSIS NO.	:	WS-WD58007/1

WIND ROSE PLOT



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ANALYSIS REPORT

CLIENT NAME : TEAM Consulting Engineering and Management Co., Ltd.

PROJECT NAME : ESIA for Dawei SEZ Initial Phase Development 370 MW Combined Cycle Power Plant Project

PROJECT NO. : 10P3356

MEASURED POINT : Mudu Village (UTM 401450E 1576760N)

MEASURED DATE : 7-10/10/2015

MEASURED BY : Mr.Pornchai Chu-en and Mr.Patravut Tadsuan

ANALYSIS NO. : WS-WD58007/2

DATE / TIME	7-8 October 2015		8-9 October 2015		9-10 October 2015	
	WS	WD	WS	WD	WS	WD
11.30-12.30 AM	1.8	WSW	2.7	WNW	0.4	SW
12.30 AM-01.30 PM	1.8	W	0.9	N	0.4	NW
01.30-02.30 PM	1.3	WSW	1.8	WSW	0.4	SSW
02.30-03.30 PM	1.3	WSW	1.3	W	0.0	Calm
03.30-04.30 PM	2.7	W	0.9	W	0.0	Calm
04.30-05.30 PM	1.8	W	0.4	WSW	0.4	WSW
05.30-06.30 PM	0.0	Calm	0.0	Calm	0.0	Calm
06.30-07.30 PM	0.0	Calm	0.0	Calm	0.0	Calm
07.30-08.30 PM	0.0	Calm	0.0	Calm	0.0	Calm
08.30-09.30 PM	0.0	Calm	0.0	Calm	0.0	Calm
09.30-10.30 PM	0.0	Calm	0.0	Calm	0.0	Calm
10.30-11.30 PM	0.0	Calm	0.0	Calm	0.0	Calm
11.30-12.30 PM	0.0	Calm	0.0	Calm	0.0	Calm
12.30 PM-01.30 AM	0.0	Calm	0.0	Calm	0.0	Calm
01.30-02.30 AM	0.0	Calm	0.0	Calm	2.2	NW
02.30-03.30 AM	0.0	Calm	0.0	Calm	0.4	NW
03.30-04.30 AM	0.0	Calm	0.0	Calm	0.0	Calm
04.30-05.30 AM	0.0	Calm	0.4	WNW	0.0	Calm
05.30-06.30 AM	0.0	Calm	0.0	Calm	0.0	Calm
06.30-07.30 AM	0.0	Calm	0.0	Calm	0.0	Calm
07.30-08.30 AM	0.0	Calm	0.0	Calm	0.0	Calm
08.30-09.30 AM	0.0	Calm	0.0	Calm	0.0	Calm
09.30-10.30 AM	0.4	W	0.0	Calm	0.0	Calm
10.30-11.30 AM	1.8	W	0.4	SSW	0.4	NNE

Remark : WS = Wind Speed (m/s) WD = Wind Direction Calm = <0.4 m/s

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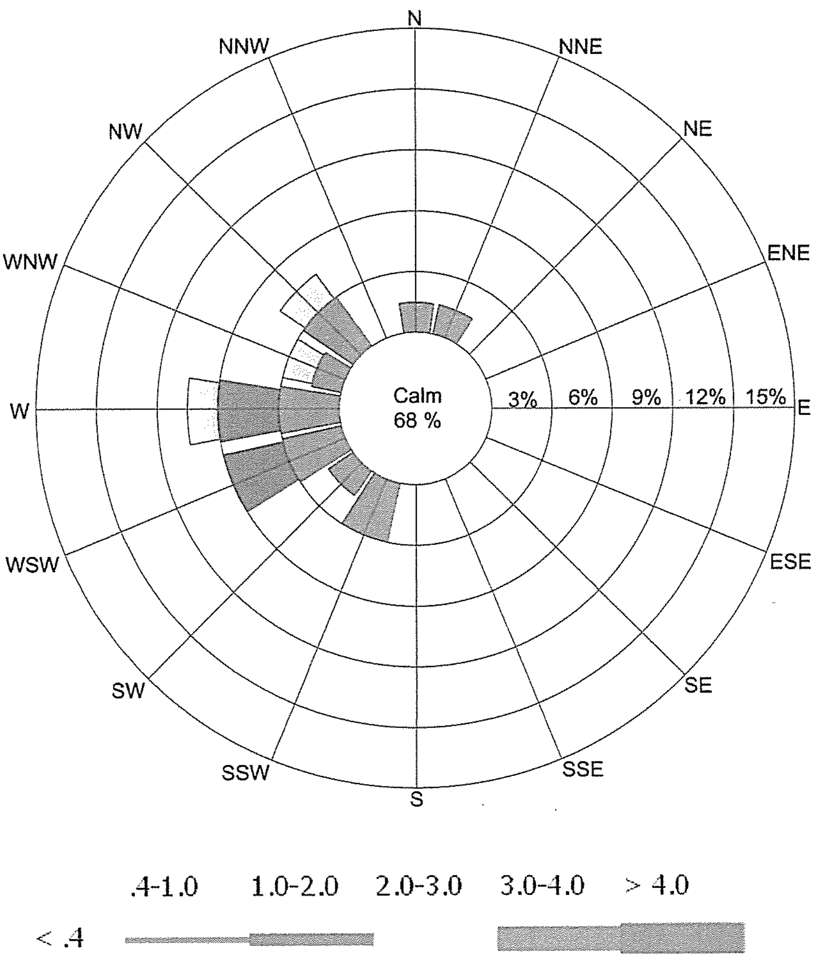
CLIENT NAME	:	TEAM Consulting Engineering and Management Co., Ltd.
PROJECT NAME	:	ESIA for Dawei SEZ Initial Phase Development 370 MW Combined Cycle Power Plant Project
PROJECT NO.	:	10P3356
MEASURED POINT	:	Mudu Village (UTM 401450E 1576760N)
MEASURED DATE	:	7-10/10/2015
MEASURED BY	:	Mr.Pornchai Chu-en and Mr.Patravut Tadsuan
ANALYSIS NO.	:	WS-WD58007/2

WIND ROSE PLOT



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APPENDIX 5C

RESULTS OF NOISE MEASUREMENTS

AMBIENT NOISE

CLIENT NAME : TEAM Consulting Engineering and Management Co.,Ltd.
PROJECT NAME : ESIA for Dawei SEZ initial phase (435 MW :main facility and 97 MW:back up facility)
MEASURED POINT : Mudu Village, Myanmar.
CONTRACTED BY : Dr. Supichaya Wongchinawit

REPORT DATE : 12/02/2015
MEASURED DATE : 21-24/01/2015
PROJECT NO. : P3141
ANALYSIS NO. : N58002/2
MEASURED BY : Mr.Pornchai Chu-en

SAMPLING LOCATION	SAMPLING DATE	SAMPLING TIME	LAeq	LAmax	L90
Mudu Village (UTM 402425E 1576727N)	21-22/01/2015	10.00 PM-11.00 PM	52.0	88.1	40.0
		11.00 PM-12.00 PM	43.8	66.0	38.7
		12.00 PM-01.00 AM	47.2	73.6	38.6
		01.00 AM-02.00 AM	46.6	75.3	39.3
		02.00 AM-03.00 AM	48.3	76.9	40.3
		03.00 AM-04.00 AM	56.6	96.6	41.5
		04.00 AM-05.00 AM	53.1	86.1	41.5
		05.00 AM-06.00 AM	49.2	78.8	43.1
		06.00 AM-07.00 AM	43.9	65.6	41.3
		07.00 AM-08.00 AM	48.4	70.8	38.4
		08.00 AM-09.00 AM	49.7	73.2	36.1
		09.00 AM-10.00 AM	51.7	67.3	49.6
		10.00 AM-11.00 AM	51.3	60.1	48.1
		11.00 AM-12.00 AM	50.9	64.0	45.5
		12.00 AM-01.00 PM	46.6	55.9	30.9
		01.00 PM-02.00 PM	33.5	53.2	30.6
		02.00 PM-03.00 PM	35.9	63.5	29.7
		03.00 PM-04.00 PM	40.4	59.3	27.9
		04.00 PM-05.00 PM	44.9	65.0	41.8
		05.00 PM-06.00 PM	53.4	85.6	40.0
		06.00 PM-07.00 PM	49.9	75.7	41.6
		07.00 PM-08.00 PM	53.8	77.6	41.4
		08.00 PM-09.00 PM	52.9	83.7	43.4
		09.00 PM-10.00 PM	50.2	88.9	41.8
		24 Hours Measured	**62.5**	**96.6**	**42.2**
		Ldn	**69.2**		

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AMBIENT NOISE

CLIENT NAME : TEAM Consulting Engineering and Management Co.,Ltd.
PROJECT NAME : ESIA for Dawei SEZ initial phase (435 MW :main facility and 97 MW:back up facility)
MEASURED POINT : Mudu Village, Myanmar.
CONTRACTED BY : Dr. Supichaya Wongchinawit

REPORT DATE : 12/02/2015
MEASURED DATE : 21-24/01/2015
PROJECT NO. : P3141
ANALYSIS NO. : N58002/2
MEASURED BY : Mr.Pornchai Chu-en

SAMPLING LOCATION	SAMPLING DATE	SAMPLING TIME	LAeq	LAmax	L90
	22-23/01/2015	10.00 PM-11.00 PM	52.2	90.3	39.6
		11.00 PM-12.00 PM	47.1	72.3	39.0
		12.00 PM-01.00 AM	44.4	64.0	39.0
		01.00 AM-02.00 AM	47.9	69.8	43.2
		02.00 AM-03.00 AM	57.9	71.1	44.3
		03.00 AM-04.00 AM	60.3	72.7	59.5
		04.00 AM-05.00 AM	54.8	74.3	50.8
		05.00 AM-06.00 AM	52.9	71.8	51.0
		06.00 AM-07.00 AM	47.9	64.1	42.7
		07.00 AM-08.00 AM	43.5	59.1	42.5
		08.00 AM-09.00 AM	43.1	64.9	41.1
		09.00 AM-10.00 AM	42.0	74.0	40.4
		10.00 AM-11.00 AM	41.7	53.9	40.7
		11.00 AM-12.00 AM	41.9	59.5	40.8
		12.00 AM-01.00 PM	41.0	53.9	40.2
		01.00 PM-02.00 PM	41.6	54.7	40.5
		02.00 PM-03.00 PM	41.6	61.7	40.2
		03.00 PM-04.00 PM	42.2	59.9	40.5
		04.00 PM-05.00 PM	44.9	62.6	38.8
		05.00 PM-06.00 PM	54.0	86.0	40.2
		06.00 PM-07.00 PM	47.8	76.8	39.8
		07.00 PM-08.00 PM	49.9	77.8	40.7
		08.00 PM-09.00 PM	50.7	72.9	42.3
		09.00 PM-10.00 PM	49.5	84.7	43.5
		24 Hours Measured	**51.4**	**90.3**	**47.7**
		Ldn	**54.8**		

A Member of TEAM GROUP
12-02-2015

AMBIENT NOISE

CLIENT NAME : TEAM Consulting Engineering and Management Co.,Ltd.
REPORT DATE : 12/02/2015
PROJECT NAME : ESIA for Dawei SEZ initial phase (435 MW :main facility and 97 MW:back up facility)
MEASURED DATE : 21-24/01/2015
PROJECT NO. : P3141
MEASURED POINT : Mudu Village, Myanmar.
ANALYSIS NO. : N58002/2
CONTRACTED BY : Dr. Supichaya Wongchinawit
MEASURED BY : Mr.Pornchai Chu-en

SAMPLING LOCATION	SAMPLING DATE	SAMPLING TIME	LAeq	LAmax	L90
	23-24/01/2015	10.00 PM-11.00 PM	51.4	85.6	43.2
		11.00 PM-12.00 PM	45.7	69.1	38.5
		12.00 PM-01.00 AM	46.3	71.4	38.4
		01.00 AM-02.00 AM	55.7	69.6	43.6
		02.00 AM-03.00 AM	60.1	72.7	59.2
		03.00 AM-04.00 AM	56.6	78.7	43.4
		04.00 AM-05.00 AM	53.1	73.4	50.4
		05.00 AM-06.00 AM	52.9	70.7	50.8
		06.00 AM-07.00 AM	53.4	65.9	51.0
		07.00 AM-08.00 AM	52.5	69.3	51.4
		08.00 AM-09.00 AM	52.7	61.0	51.3
		09.00 AM-10.00 AM	52.4	67.0	51.2
		10.00 AM-11.00 AM	52.2	57.1	51.0
		11.00 AM-12.00 AM	51.2	59.7	50.2
		12.00 AM-01.00 PM	51.5	55.0	50.3
		01.00 PM-02.00 PM	51.3	54.9	49.8
		02.00 PM-03.00 PM	51.7	64.1	50.0
		03.00 PM-04.00 PM	51.1	67.4	40.8
		04.00 PM-05.00 PM	46.0	67.4	40.5
		05.00 PM-06.00 PM	60.0	97.1	39.5
		06.00 PM-07.00 PM	55.9	89.0	41.7
		07.00 PM-08.00 PM	50.0	72.0	40.9
		08.00 PM-09.00 PM	53.8	82.5	44.4
		09.00 PM-10.00 PM	52.6	85.6	41.3
		24 Hours Measured	**54.0**	**97.1**	**49.8**
		Ldn	**60.4**		

(MR.SARAWOOT SINGPROMMA)
ANALYST SIGNATURE
12/2/2015

(MR. PATRAVUT TADSUAN)
AUTHORIZED SIGNATURE
12/2/2015

AMBIENT NOISE

CLIENT NAME : TEAM Consulting Engineering and Management Co.,Ltd.
PROJECT NAME : ESIA for Dawei SEZ initial phase(435 MW :main facility and 97 MW:back up facility)
MEASURED POINT : Nga Pitat Village, Myanmar.
CONTRACTED BY : Dr. Supichaya Wongchinawit

REPORT DATE : 12/02/2015
MEASURED DATE : 21-24/01/2015
PROJECT NO. : P3141
ANALYSIS NO. : N58002/1
MEASURED BY : Mr.Pornchai Chu-en

SAMPLING LOCATION	SAMPLING DATE	SAMPLING TIME	LAeq	LAmax	L90
Nga Pitat Village (UTM 399344E 1569815N)	21-22/01/2015	02.00 PM-03.00 PM	58.0	88.3	48.5
		03.00 PM-04.00 PM	60.5	89.4	48.7
		04.00 PM-05.00 PM	54.9	81.1	49.4
		05.00 PM-06.00 PM	53.8	83.6	50.1
		06.00 PM-07.00 PM	55.5	78.2	52.9
		07.00 PM-08.00 PM	55.6	69.7	52.3
		08.00 PM-09.00 PM	52.7	61.9	50.0
		09.00 PM-10.00 PM	51.1	67.3	49.8
		10.00 PM-11.00 PM	50.5	67.0	49.5
		11.00 PM-12.00 PM	51.4	67.1	50.4
		12.00 PM-01.00 AM	51.6	63.4	50.1
		01.00 AM-02.00 AM	52.0	58.5	50.1
		02.00 AM-03.00 AM	51.6	56.1	50.0
		03.00 AM-04.00 AM	51.4	71.1	49.7
		04.00 AM-05.00 AM	53.3	73.0	46.8
		05.00 AM-06.00 AM	57.9	85.3	44.3
		06.00 AM-07.00 AM	60.5	90.7	44.7
		07.00 AM-08.00 AM	54.2	78.3	49.6
		08.00 AM-09.00 AM	54.7	83.0	48.5
		09.00 AM-10.00 AM	53.6	75.4	46.5
		10.00 AM-11.00 AM	50.8	73.7	45.1
		11.00 AM-12.00 AM	57.3	84.3	45.3
		12.00 AM-01.00 PM	56.6	80.5	46.0
		01.00 PM-02.00 PM	57.0	81.9	46.9
		24 Hours Measured	**55.5**	**90.7**	**49.1**
		Ldn	**61.5**		

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Tel: +66 2 363 7723 Fax: +66 2 363 7724 www.gfe.co.th

ISO 9001:2008 CERTIFIED

AMBIENT NOISE

CLIENT NAME : TEAM Consulting Engineering and Management Co.,Ltd.
PROJECT NAME : ESIA for Dawei SEZ initial phase(435 MW :main facility and 97 MW:back up facility)
MEASURED POINT : Nga Pitat Village, Myanmar.
CONTRACTED BY : Dr. Supichaya Wongchinawit

REPORT DATE : 12/02/2015
MEASURED DATE : 21-24/01/2015
PROJECT NO. : P3141
ANALYSIS NO. : N58002/1
MEASURED BY : Mr.Pornchai Chu-en

SAMPLING LOCATION	SAMPLING DATE	SAMPLING TIME	LAeq	LAmax	L90
	22-23/01/2015	02.00 PM-03.00 PM	54.8	85.5	47.7
		03.00 PM-04.00 PM	54.7	85.7	48.0
		04.00 PM-05.00 PM	54.4	82.5	49.2
		05.00 PM-06.00 PM	56.9	84.3	50.7
		06.00 PM-07.00 PM	56.1	85.0	52.3
		07.00 PM-08.00 PM	55.1	74.9	52.9
		08.00 PM-09.00 PM	55.0	67.1	51.4
		09.00 PM-10.00 PM	51.8	65.1	49.6
		10.00 PM-11.00 PM	50.7	70.8	49.7
		11.00 PM-12.00 PM	50.5	66.4	49.5
		12.00 PM-01.00 AM	50.8	62.1	49.4
		01.00 AM-02.00 AM	52.5	61.5	50.4
		02.00 AM-03.00 AM	52.5	66.7	51.0
		03.00 AM-04.00 AM	52.3	71.1	50.9
		04.00 AM-05.00 AM	53.9	72.6	47.1
		05.00 AM-06.00 AM	57.2	85.0	42.7
		06.00 AM-07.00 AM	58.0	86.6	43.1
		07.00 AM-08.00 AM	56.8	87.6	49.1
		08.00 AM-09.00 AM	54.0	85.7	49.2
		09.00 AM-10.00 AM	53.4	75.3	47.7
		10.00 AM-11.00 AM	55.5	81.2	46.3
		11.00 AM-12.00 AM	59.7	76.3	49.3
		12.00 AM-01.00 PM	60.9	86.7	49.1
		01.00 PM-02.00 PM	57.9	80.8	47.9
		24 Hours Measured	**55.7**	**87.6**	**49.5**
		Ldn	**60.9**		

A Member of TEAM GROUP

12-02-2015

AMBIENT NOISE

CLIENT NAME : TEAM Consulting Engineering and Management Co.,Ltd.
REPORT DATE : 12/02/2015

PROJECT NAME : ESIA for Dawei SEZ initial phase(435 MW :main facility and 97 MW:back up facility)
MEASURED DATE : 21-24/01/2015

PROJECT NO. : P3141

MEASURED POINT : Nga Pitat Village, Myanmar.
ANALYSIS NO. : N58002/1

CONTRACTED BY : Dr. Supichaya Wongchinawit
MEASURED BY : Mr.Pornchai Chu-en

SAMPLING LOCATION	SAMPLING DATE	SAMPLING TIME	LAeq	LAmax	L90
	23-24/01/2015	02.00 PM-03.00 PM	56.3	86.8	49.4
		03.00 PM-04.00 PM	54.6	77.9	49.4
		04.00 PM-05.00 PM	56.0	83.2	49.8
		05.00 PM-06.00 PM	53.8	74.4	51.4
		06.00 PM-07.00 PM	53.9	74.8	52.6
		07.00 PM-08.00 PM	56.9	82.6	52.5
		08.00 PM-09.00 PM	54.8	59.7	53.2
		09.00 PM-10.00 PM	55.5	60.6	53.3
		10.00 PM-11.00 PM	53.3	65.8	51.6
		11.00 PM-12.00 PM	53.1	66.3	51.7
		12.00 PM-01.00 AM	53.2	67.1	51.7
		01.00 AM-02.00 AM	54.1	68.1	52.2
		02.00 AM-03.00 AM	54.0	67.5	52.2
		03.00 AM-04.00 AM	55.2	73.4	53.4
		04.00 AM-05.00 AM	56.2	74.1	53.0
		05.00 AM-06.00 AM	56.4	81.2	45.8
		06.00 AM-07.00 AM	56.3	79.8	45.9
		07.00 AM-08.00 AM	57.5	84.4	49.6
		08.00 AM-09.00 AM	57.3	85.5	50.1
		09.00 AM-10.00 AM	55.8	77.4	50.0
		10.00 AM-11.00 AM	53.7	75.3	47.5
		11.00 AM-12.00 AM	59.3	81.7	46.6
		12.00 AM-01.00 PM	55.8	81.7	49.6
		01.00 PM-02.00 PM	57.2	84.8	48.3
		24 Hours Measured	**55.7**	**86.8**	**51.0**
		Ldn	**61.5**		

(MR.SARAWOOT SINGPROMMA)
ANALYST SIGNATURE
12/2/2015

(MR. PATRAVUT TADSUAN)
AUTHORIZED SIGNATURE
12/2/2015

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ISO 9001:2008 CERTIFIED

AMBIENT NOISE

CLIENT NAME : TEAM Consulting Engineering and Management Co.,Ltd.
PROJECT NAME : ESIA for Dawei SEZ Initial Phase Development 370 MW Combined Cycle Power Plant Project
MEASURED POINT : Mudu Village, Myanmar.
CONTRACTED BY : Dr. Supichaya Wongchinawit

REPORT DATE : 19/10/2015
MEASURED DATE : 7-10/10/2015
PROJECT NO. : 10P3356
ANALYSIS NO. : N58010/2
MEASURED BY : Mr.Pornchai Chu-en

SAMPLING LOCATION	SAMPLING DATE	SAMPLING TIME	LAeq	LAmax	L90
Mudu Village (UTM 401475E 1576757N)	7-8/10/2015	10.00 AM-11.00 AM	57.6	85.7	52.9
		11.00 AM-12.00 AM	54.6	71.7	53.0
		12.00 AM-01.00 PM	54.5	75.3	52.8
		01.00 PM-02.00 PM	54.0	76.7	52.3
		02.00 PM-03.00 PM	53.7	71.6	52.0
		03.00 PM-04.00 PM	55.6	75.3	53.3
		04.00 PM-05.00 PM	57.0	78.3	53.3
		05.00 PM-06.00 PM	56.3	84.2	53.4
		06.00 PM-07.00 PM	59.1	85.6	56.8
		07.00 PM-08.00 PM	59.2	67.3	58.2
		08.00 PM-09.00 PM	58.6	74.5	57.2
		09.00 PM-10.00 PM	58.6	74.1	57.5
		10.00 PM-11.00 PM	58.0	72.9	56.9
		11.00 PM-12.00 PM	57.9	82.1	56.3
		12.00 PM-01.00 AM	56.6	73.0	54.8
		01.00 AM-02.00 AM	55.6	60.5	54.3
		02.00 AM-03.00 AM	56.1	67.4	54.5
		03.00 AM-04.00 AM	56.3	62.5	54.7
		04.00 AM-05.00 AM	57.2	72.8	55.8
		05.00 AM-06.00 AM	58.0	82.6	55.9
		06.00 AM-07.00 AM	57.2	74.4	55.1
		07.00 AM-08.00 AM	56.4	76.1	54.3
		08.00 AM-09.00 AM	56.5	78.3	54.8
		09.00 AM-10.00 AM	55.7	80.8	54.3
		24 Hours Measured	**56.9**	**85.7**	**55.1**
		Ldn	**63.4**		

A Member of TEAM GROUP

19-10-2015

AMBIENT NOISE

CLIENT NAME : TEAM Consulting Engineering and Management Co.,Ltd.
REPORT DATE : 19/10/2015
PROJECT NAME : ESIA for Dawei SEZ Initial Phase Development 370 MW Combined Cycle Power Plant Project
MEASURED DATE : 7-10/10/2015
PROJECT NO. : 10P3356
MEASURED POINT : Mudu Village, Myanmar.
ANALYSIS NO. : N58010/2
CONTRACTED BY : Dr. Supichaya Wongchinawit
MEASURED BY : Mr.Pornchai Chu-en

SAMPLING LOCATION	SAMPLING DATE	SAMPLING TIME	LAeq	LAmax	L90
	8-9/10/2015	10.00 AM-11.00 AM	58.1	80.1	55.1
		11.00 AM-12.00 AM	65.4	90.1	55.4
		12.00 AM-01.00 PM	56.1	75.9	53.7
		01.00 PM-02.00 PM	57.7	79.1	55.3
		02.00 PM-03.00 PM	57.3	78.6	55.5
		03.00 PM-04.00 PM	56.7	75.2	55.0
		04.00 PM-05.00 PM	56.4	73.6	55.3
		05.00 PM-06.00 PM	56.5	78.8	55.0
		06.00 PM-07.00 PM	58.1	72.8	57.1
		07.00 PM-08.00 PM	58.6	77.2	57.7
		08.00 PM-09.00 PM	59.1	83.4	57.6
		09.00 PM-10.00 PM	57.9	65.4	57.0
		10.00 PM-11.00 PM	56.9	61.1	56.2
		11.00 PM-12.00 PM	57.3	60.2	55.9
		12.00 PM-01.00 AM	56.9	60.8	55.7
		01.00 AM-02.00 AM	56.7	61.0	56.1
		02.00 AM-03.00 AM	57.0	70.9	56.3
		03.00 AM-04.00 AM	57.3	66.0	56.5
		04.00 AM-05.00 AM	67.0	83.9	56.5
		05.00 AM-06.00 AM	59.5	76.0	57.6
		06.00 AM-07.00 AM	61.8	78.5	58.2
		07.00 AM-08.00 AM	59.7	79.3	58.4
		08.00 AM-09.00 AM	61.2	95.6	56.0
		09.00 AM-10.00 AM	58.4	81.4	57.0
		24 Hours Measured	**59.8**	**95.6**	**56.4**
		Ldn	**66.9**		

AMBIENT NOISE

CLIENT NAME : TEAM Consulting Engineering and Management Co.,Ltd.
PROJECT NAME : ESIA for Dawei SEZ Initial Phase Development 370 MW Combined Cycle Power Plant Project
MEASURED POINT : Mudu Village, Myanmar.
CONTRACTED BY : Dr. Supichaya Wongchinawit

REPORT DATE : 19/10/2015
MEASURED DATE : 7-10/10/2015
PROJECT NO. : 10P3356
ANALYSIS NO. : N58010/2
MEASURED BY : Mr.Pornchai Chu-en

SAMPLING LOCATION	SAMPLING DATE	SAMPLING TIME	LAeq	LAmax	L90
	9-10/10/2015	10.00 AM-11.00 AM	57.6	74.4	56.7
		11.00 AM-12.00 AM	58.2	88.4	56.4
		12.00 AM-01.00 PM	63.2	91.3	57.6
		01.00 PM-02.00 PM	58.7	84.2	57.3
		02.00 PM-03.00 PM	57.6	73.7	56.0
		03.00 PM-04.00 PM	62.4	88.6	57.0
		04.00 PM-05.00 PM	58.3	73.1	57.2
		05.00 PM-06.00 PM	57.9	76.0	56.7
		06.00 PM-07.00 PM	63.4	92.3	57.3
		07.00 PM-08.00 PM	63.4	75.6	56.6
		08.00 PM-09.00 PM	56.9	67.4	56.4
		09.00 PM-10.00 PM	57.0	62.8	56.5
		10.00 PM-11.00 PM	58.2	65.3	57.1
		11.00 PM-12.00 PM	58.2	61.9	57.3
		12.00 PM-01.00 AM	57.8	65.7	56.9
		01.00 AM-02.00 AM	72.3	96.6	57.0
		02.00 AM-03.00 AM	66.9	81.2	58.8
		03.00 AM-04.00 AM	63.4	78.6	57.5
		04.00 AM-05.00 AM	60.0	77.0	58.2
		05.00 AM-06.00 AM	60.3	81.7	58.2
		06.00 AM-07.00 AM	58.8	78.4	57.5
		07.00 AM-08.00 AM	58.4	74.2	57.0
		08.00 AM-09.00 AM	57.8	78.2	56.5
		09.00 AM-10.00 AM	59.5	96.0	56.2
		24 Hours Measured	**62.6**	**96.6**	**57.1**
		Ldn	**71.0**		

(MR.SARAWOOT SINGPROMMA)
ANALYST SIGNATURE
19/10/2015

(MR. PATRAVUT TADSUAN)
AUTHORIZED SIGNATURE
19/10/2015

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Tel: +66 2 363 7723 Fax: +66 2 363 7724 www.gfe.co.th

ISO 9001:2008 CERTIFIED

AMBIENT NOISE

CLIENT NAME : TEAM Consulting Engineering and Management Co.,Ltd.
PROJECT NAME : ESIA for Dawei SEZ Initial Phase Development 370 MW Combined Cycle Power Plant Project
MEASURED POINT : Nga Pitat Village, Myanmar.
CONTRACTED BY : Dr. Supichaya Wongchinawit

REPORT DATE : 19/10/2015
MEASURED DATE : 7-10/10/2015
PROJECT NO. : 10P3356
ANALYSIS NO. : N58010/1
MEASURED BY : Mr.Pornchai Chu-en

SAMPLING LOCATION	SAMPLING DATE	SAMPLING TIME	LAeq	LAmax	L90
Nga Pitat Village (UTM 399344E 1569815N)	7-8/10/2015	03.00 PM-04.00 PM	64.3	91.4	48.6
		04.00 PM-05.00 PM	58.1	80.9	48.5
		05.00 PM-06.00 PM	50.4	66.9	47.5
		06.00 PM-07.00 PM	58.0	63.6	50.6
		07.00 PM-08.00 PM	56.8	81.2	50.8
		08.00 PM-09.00 PM	53.2	66.9	49.3
		09.00 PM-10.00 PM	52.6	61.8	49.1
		10.00 PM-11.00 PM	50.4	57.3	48.8
		11.00 PM-12.00 PM	49.7	55.7	48.9
		12.00 PM-01.00 AM	49.5	57.5	48.7
		01.00 AM-02.00 AM	48.4	54.6	47.7
		02.00 AM-03.00 AM	48.5	59.2	47.7
		03.00 AM-04.00 AM	48.9	60.3	47.9
		04.00 AM-05.00 AM	49.7	72.1	47.5
		05.00 AM-06.00 AM	53.8	76.2	47.0
		06.00 AM-07.00 AM	57.7	80.7	45.3
		07.00 AM-08.00 AM	61.3	81.1	55.5
		08.00 AM-09.00 AM	54.3	86.6	45.5
		09.00 AM-10.00 AM	53.7	81.9	44.3
		10.00 AM-11.00 AM	54.1	78.9	44.6
		11.00 AM-12.00 AM	56.0	82.8	45.4
		12.00 AM-01.00 PM	55.9	82.5	45.2
		01.00 PM-02.00 PM	56.1	85.1	45.7
		02.00 PM-03.00 PM	52.0	83.7	45.1
		24 Hours Measured	**56.1**	**91.4**	**48.6**
		Ldn	**59.8**		

A Member of TEAM GROUP

19-10-2015

AMBIENT NOISE

CLIENT NAME : TEAM Consulting Engineering and Management Co.,Ltd.
REPORT DATE : 19/10/2015
PROJECT NAME : ESIA for Dawei SEZ Initial Phase Development 370 MW Combined Cycle Power Plant Project
MEASURED DATE : 7-10/10/2015
PROJECT NO. : 10P3356
MEASURED POINT : Nga Pitat Village, Myanmar.
ANALYSIS NO. : N58010/1
CONTRACTED BY : Dr. Supichaya Wongchinawit
MEASURED BY : Mr.Pornchai Chu-en

SAMPLING LOCATION	SAMPLING DATE	SAMPLING TIME	LAeq	LAmax	L90
	8-9/10/2015	03.00 PM-04.00 PM	51.9	81.6	45.4
		04.00 PM-05.00 PM	53.6	82.9	43.6
		05.00 PM-06.00 PM	50.7	77.0	47.2
		06.00 PM-07.00 PM	55.1	70.5	51.2
		07.00 PM-08.00 PM	50.2	71.7	47.4
		08.00 PM-09.00 PM	49.3	60.0	47.1
		09.00 PM-10.00 PM	49.6	61.5	47.6
		10.00 PM-11.00 PM	49.2	60.6	47.6
		11.00 PM-12.00 PM	49.1	55.4	47.6
		12.00 PM-01.00 AM	48.3	62.1	47.4
		01.00 AM-02.00 AM	47.6	57.4	46.8
		02.00 AM-03.00 AM	48.5	71.6	47.0
		03.00 AM-04.00 AM	58.6	78.6	46.9
		04.00 AM-05.00 AM	62.2	80.8	48.7
		05.00 AM-06.00 AM	57.9	81.4	47.3
		06.00 AM-07.00 AM	57.7	85.4	49.5
		07.00 AM-08.00 AM	61.3	96.0	46.9
		08.00 AM-09.00 AM	55.1	90.9	45.7
		09.00 AM-10.00 AM	53.1	87.7	44.6
		10.00 AM-11.00 AM	50.2	76.4	44.8
		11.00 AM-12.00 AM	50.4	71.4	46.7
		12.00 AM-01.00 PM	64.0	96.7	48.2
		01.00 PM-02.00 PM	72.7	95.2	52.3
		02.00 PM-03.00 PM	50.4	67.3	47.6
		24 Hours Measured	**60.7**	**96.7**	**47.7**
		Ldn	**64.3**		

AMBIENT NOISE

CLIENT NAME : TEAM Consulting Engineering and Management Co.,Ltd.
PROJECT NAME : ESIA for Dawei SEZ Initial Phase Development 370 MW Combined Cycle Power Plant Project
MEASURED POINT : Nga Pitat Village, Myanmar.
CONTRACTED BY : Dr. Supichaya Wongchinawit

REPORT DATE : 19/10/2015
MEASURED DATE : 7-10/10/2015
PROJECT NO. : 10P3356
ANALYSIS NO. : N58010/1
MEASURED BY : Mr.Pornchai Chu-en

SAMPLING LOCATION	SAMPLING DATE	SAMPLING TIME	LAeq	LAmax	L90
	9-10/10/2015	03.00 PM-04.00 PM	50.2	79.0	46.8
		04.00 PM-05.00 PM	50.2	84.0	45.0
		05.00 PM-06.00 PM	49.4	66.4	47.3
		06.00 PM-07.00 PM	55.5	71.1	53.6
		07.00 PM-08.00 PM	51.8	58.2	49.3
		08.00 PM-09.00 PM	49.6	56.5	48.5
		09.00 PM-10.00 PM	49.7	54.9	48.6
		10.00 PM-11.00 PM	49.4	55.7	48.1
		11.00 PM-12.00 PM	49.7	53.4	48.8
		12.00 PM-01.00 AM	49.4	52.5	48.8
		01.00 AM-02.00 AM	58.0	88.9	48.8
		02.00 AM-03.00 AM	56.6	82.1	50.7
		03.00 AM-04.00 AM	55.4	77.8	50.0
		04.00 AM-05.00 AM	51.7	73.4	50.1
		05.00 AM-06.00 AM	53.9	75.4	50.3
		06.00 AM-07.00 AM	53.1	75.6	49.2
		07.00 AM-08.00 AM	57.2	89.9	46.3
		08.00 AM-09.00 AM	57.2	91.9	45.4
		09.00 AM-10.00 AM	51.7	85.7	45.3
		10.00 AM-11.00 AM	47.8	67.2	45.2
		11.00 AM-12.00 AM	50.8	80.9	45.8
		12.00 AM-01.00 PM	57.0	83.4	46.6
		01.00 PM-02.00 PM	61.8	79.6	48.9
		02.00 PM-03.00 PM	51.0	82.6	48.5
		24 Hours Measured	**54.5**	**91.9**	**48.7**
		Ldn	**60.6**		

(MR.SARAWOOT SINGPROMMA)
ANALYST SIGNATURE
19/10/2015

(MR. PATRAVUT TADSUAN)
AUTHORIZED SIGNATURE
19/10/2015

APPENDIX 5D

RESULTS OF SEAWATER QUALITY

GFE The Geotechnical Expert
GEOTECHNICAL & FOUNDATION ENGINEERING CO., LTD.
151 Nuan Chan Road, Nuan Chan, Bueng Kum, Bangkok 10230 THAILAND
Tel: +66 2 363 7723 Fax: +66 2 363 7724 www.gfe.co.th

ISO 9001:2008 CERTIFIED

WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME : TEAM Consulting Engineering and Management Co.,Ltd.

REPORT DATE : 18/02/2015

PROJECT NAME : ESIA for Dawei SEZ initial phase(435 MW main facility and 97 MW back up facility)

RECEIVED DATE : 27/01/2015

SAMPLING SOURCE : Coastal water

ANALYTICAL DATE : 28/01-13/02/2015

SAMPLING BY : Mr.Nipat Somkleeb and Mr.Suttiphot Gampetch

PROJECT NO. : P3141

SAMPLING METHOD : GRAB

ANALYSIS NO. : W58001/1-6

CONTRACTED BY : Dr. Supichaya Wongchinawit

PARAMETERS/ITEM	UNITS	ANALYSIS METHOD@	SW1	SW2	SW3	SW4
ANALYSIS NO.			W58001/1	W58001/2	W58001/3	W58001/4
SAMPLING DATE			21/1/2015	21/1/2015	21/1/2015	21/1/2015
SAMPLING TIME			10:30 AM	12:00 AM	01:07 PM	02:20 PM
SAMPLING LOCATION			Station 1	Station 2	Station 3	Station 4
DEPTH	m	-	11.0	11.5	16.6	7.2
pH	-	4500-H$^+$(B)	8.16	8.19	8.18	8.16
TRANSPARENCY	m	-	5.50	5.00	7.80	3.40
WATER TEMPERATURE	°C	2550(B)	26.5	27.0	27.4	27.1
CONDUCTIVITY	mS/cm	2510(B)	48.11	42.92	49.48	49.02
DISSOLVED OXYGEN	mg/L	4500-O(G)	7.26	6.68	5.99	6.85
SALINITY	ppt	2520(B)	30.5	30.6	30.9	30.6
TURBIDITY	NTU	2130(B)	1.2	1.1	1.1	1.0
SUSPENDED SOLIDS	mg/L	2540(D)	<5.0	<5.0	<5.0	<5.0
TOTAL DISSOLVED SOLIDS	mg/L	2540(C)	63653.8	54587.8	56317.5	47080.0
OIL & GREASE	mg/L	5520(D)	<5.0	<5.0	<5.0	<5.0

REF:@ STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER 22nd ED.,2012.(APHA-AWWA-WEF)

Remark : SW1 - Andaman Sea, Dawei, Myanmar (UTM 395675E, 1573545N) , Lightly

SW2 - Andaman Sea, Dawei, Myanmar (UTM 397446E, 1570914N) , Lightly

SW3 - Andaman Sea, Dawei, Myanmar (UTM 396298E, 1569482N) , Lightly

SW4 - Andaman Sea, Dawei, Myanmar (UTM 399529E, 1567402N) , Lightly

REPORTED RESULTS REFER TO SUBMITTED SAMPLES ONLY

DO NOT COPY PARTIAL OF THIS ANALYSIS REPORT WITHOUT OFFICAL APPROVAL

(MR.SARAWOOT SINGPROMMA)
ANALYST SIGNATURE
18/02/2015

(MR. PATRAVUT TADSUAN)
AUTHORIZED SIGNATURE
18/02/2015

Analysis / Test Report

Report to :	TEAM Consulting Engineering and Management Co., Ltd. 151, Nuan Chan Road, Nuan Chan, Bueng Kum, Bangkok Thailand 10230	**Project Name :**	ESIA for Dawei SEZ initial phase(435 MW :main facility and 97 MW:back up facility)
Attn :	Patravut Tadsuan	**Location :**	Myanmar
Phone :	0-2509-9000	**P/O :**	
Fax :	0-2509-9047	**Receipt No :**	
Email :	patravut_ta@team.co.th	**CC Email. :**	
Cc.Email :	sarawoot_s@team.co.th		

Lot ID: 152298
Date Received : Jan 27, 2015
Date Reported : Mar 13, 2015
Report Number : 533147-1 Rev. No.1

Reference Number 152298-7
Sampling Date Jan 21, 2015
Sample Description SW1 - Andaman Sea, Dawei, Myanmar. (UTM 395675E, 1573545N)
Condition of Sample contained in four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Date of Analysis Jan 29, 2015

Analyte		Unit	LOD	Result	Method
Metals Testing					
Arsenic		mg/L	0.002	<0.005	Based on APHA (2012), 3125
Iron		mg/L	0.001	0.21	Based on APHA (2012), 3125
Lead		mg/L	0.001	Not Detected	Based on APHA (2012), 3125
Water Testing					
BOD (5 days at 20 degree C)		mg/L	-	<2	Based on APHA (2012), 5210 B
COD		mg/L	1.5	44	Based on APHA (2012), 5220 D
Cyanide	as CN	mg/L	0.002	Not Detected	Based on APHA (2012), 4500-CN (C),(E)

Note:
This Analysis test report is reissued to supersede report No. 533147-1, Date Reported : Feb 11, 2015

Remark :
1. LOD : Limit of Detection
2. "<" : Lower than LOQ (Limit of Quantitation)

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any from without written consent from the Laboratory. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

Approved by Sawitree N.
Sawitree Noisangiam
Section Head

Analysis / Test Report

Report to : TEAM Consulting Engineering and Management Co., Ltd.
151, Nuan Chan Road, Nuan Chan, Bueng Kum, Bangkok Thailand 10230
Attn : Patravut Tadsuan
Phone : 0-2509-9000
Fax : 0-2509-9047
Email : patravut_ta@team.co.th
Cc.Email : sarawoot_s@team.co.th

Project Name : ESIA for Dawei SEZ initial phase(435 MW :main facility and 97 MW:back up facility)
Location : Myanmar
P/O :
Receipt No :
CC Email. :

Lot ID: 152298
Date Received : Jan 27, 2015
Date Reported : Mar 13, 2015
Report Number : 533148-1 Rev. No.1

Reference Number	152298-8
Sampling Date	Jan 21, 2015
Sample Description	SW2- Andaman Sea, Dawei, Myanmar. (UTM 397446E, 1570914N)
Condition of Sample	contained in four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Date of Analysis	Jan 29, 2015

Analyte		**Unit**	**LOD**	**Result**	**Method**
Metals Testing					
Arsenic		mg/L	0.002	<0.005	Based on APHA (2012), 3125
Iron		mg/L	0.001	0.16	Based on APHA (2012), 3125
Lead		mg/L	0.001	Not Detected	Based on APHA (2012), 3125
Water Testing					
BOD (5 days at 20 degree C)		mg/L	-	<2	Based on APHA (2012), 5210 B
COD		mg/L	1.5	53	Based on APHA (2012), 5220 D
Cyanide	as CN	mg/L	0.002	Not Detected	Based on APHA (2012), 4500-CN (C),(E)

Note:
This Analysis test report is reissued to supersede report No. 533148-1, Date Reported : Feb 11, 2015

Remark :
1. LOD : Limit of Detection
2. "<" : Lower than LOQ (Limit of Quantitation)

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Approved by Sawitree N.
Sawitree Noisangiam
Section Head

Analysis / Test Report

Report to :	TEAM Consulting Engineering and Management Co., Ltd. 151, Nuan Chan Road, Nuan Chan, Bueng Kum, Bangkok Thailand 10230	**Project Name :**	ESIA for Dawei SEZ initial phase(435 MW :main facility and 97 MW:back up facility)
Attn :	Patravut Tadsuan	**Location :**	Myanmar
Phone :	0-2509-9000	**P/O :**	
Fax :	0-2509-9047	**Receipt No :**	
Email :	patravut_ta@team.co.th	**CC Email. :**	
Cc.Email :	sarawoot_s@team.co.th		

Lot ID: 152298

Date Received : Jan 27, 2015
Date Reported : Mar 13, 2015
Report Number : 533149-1 Rev. No.1

Reference Number	152298-9
Sampling Date	Jan 21, 2015
Sample Description	SW3- Andaman Sea, Dawei, Myanmar. (UTM 396298E, 1569482N)
Condition of Sample	contained in four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Date of Analysis	Jan 29, 2015

Analyte		**Unit**	**LOD**	**Result**	**Method**
Metals Testing					
Arsenic		mg/L	0.002	<0.005	Based on APHA (2012), 3125
Iron		mg/L	0.001	0.08	Based on APHA (2012), 3125
Lead		mg/L	0.001	Not Detected	Based on APHA (2012), 3125
Water Testing					
BOD (5 days at 20 degree C)		mg/L	-	<2	Based on APHA (2012), 5210 B
COD		mg/L	1.5	61	Based on APHA (2012), 5220 D
Cyanide	as CN	mg/L	0.002	Not Detected	Based on APHA (2012), 4500-CN (C),(E)

Note:
This Analysis test report is reissued to supersede report No. 533149-1, Date Reported : Feb 11, 2015

Remark :
1. LOD : Limit of Detection
2. "<" : Lower than LOQ (Limit of Quantitation)

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Approved by Sawitree N.

Sawitree Noisangiam
Section Head

Analysis / Test Report

Report to : TEAM Consulting Engineering and Management Co., Ltd.
151, Nuan Chan Road, Nuan Chan, Bueng Kum, Bangkok Thailand 10230
Attn : Patravut Tadsuan
Phone : 0-2509-9000
Fax : 0-2509-9047
Email : patravut_ta@team.co.th
Cc.Email : sarawoot_s@team.co.th

Project Name : ESIA for Dawei SEZ initial phase(435 MW :main facility and 97 MW:back up facility)
Location : Myanmar
P/O :
Receipt No :
CC Email. :

Lot ID: 152298
Date Received : Jan 27, 2015
Date Reported : Mar 13, 2015
Report Number : 533150-1 Rev. No.1

Reference Number	152298-10
Sampling Date	Jan 21, 2015
Sample Description	SW4- Andaman Sea, Dawei, Myanmar. (UTM 399529E, 1567402N)
Condition of Sample	contained in four plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Date of Analysis	Jan 29, 2015

Analyte		Unit	LOD	Result	Method
Metals Testing					
Arsenic		mg/L	0.002	<0.005	Based on APHA (2012), 3125
Iron		mg/L	0.001	0.15	Based on APHA (2012), 3125
Lead		mg/L	0.001	Not Detected	Based on APHA (2012), 3125
Water Testing					
BOD (5 days at 20 degree C)		mg/L	-	<2	Based on APHA (2012), 5210 B
COD		mg/L	1.5	44	Based on APHA (2012), 5220 D
Cyanide	as CN	mg/L	0.002	Not Detected	Based on APHA (2012), 4500-CN (C),(E)

Note:
This Analysis test report is reissued to supersede report No. 533150-1, Date Reported : Feb 11, 2015

Remark :
1. LOD : Limit of Detection
2. "<" : Lower than LOQ (Limit of Quantitation)

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Approved by Sawitree N.
Sawitree Noisangiam
Section Head

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Tel: +66 2 363 7723 Fax: +66 2 363 7724 www.gfe.co.th

ISO 9001:2008 CERTIFIED

WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME : TEAM Consulting Engineering and Management Co.,Ltd.

REPORT DATE : 22/10/2015

PROJECT NAME : ESIA for Dawei SEZ Initial Phase Development 370 MW Combined Cycle Power Plant Project

RECEIVED DATE : 9/10/2015

ANALYTICAL DATE : 12-19/10/2015

SAMPLING SOURCE : Coastal water

PROJECT NO. : 10P3356

SAMPLING BY : Mr.Nipat Somkleeb and Dr. Supichaya Wongchinawit

ANALYSIS NO. : W58032/1-4

SAMPLING METHOD : GRAB

CONTRACTED BY : Dr Supichaya Wongchinawit

PARAMETERS/ITEM	UNITS	ANALYSIS METHOD@	SW1	SW2	SW3	SW4
ANALYSIS NO.			W58032/1	W58032/2	W58032/3	W58032/4
SAMPLING DATE			8/10/2015	8/10/2015	7/10/2015	7/10/2015
SAMPLING TIME			09.00 AM	07.55 AM	10.30 AM	02.20 PM
SAMPLING LOCATION			Station 1	Station 2	Station 3	Station 4
DEPTH	m	-	12.5	11.2	14.2	5.6
pH	-	$4500-H^{+}$(B)	7.97	7.96	7.93	7.98
TRANSPARENCY	m	-	5.00	5.00	4.50	3.50
WATER TEMPERATURE	°C	2550(B)	29.1	28.7	28.9	28.7
CONDUCTIVITY	mS/cm	2510(B)	38.69	38.61	38.04	38.41
DISSOLVED OXYGEN	mg/L	4500-O(G)	7.65	7.53	7.02	7.35
SALINITY	ppt	2520(B)	22.6	22.7	22.2	22.5
TURBIDITY	NTU	2130(B)	0.7	0.8	0.7	1.0
SUSPENDED SOLIDS	mg/L	2540(D)	<5.0	<5.0	<5.0	<5.0
TOTAL DISSOLVED SOLIDS	mg/L	2540(C)	29213.0	29782.6	29293.3	29062.2
OIL & GREASE	mg/L	5520(D)	<5.0	<5.0	<5.0	<5.0

REF:@ STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER 22nd ED.,2012.(APHA-AWWA-WEF)

Remark : SW1 - Andaman Sea, Dawei, Myanmar (UTM 395675E, 1573545N) , Lightly

SW2 - Andaman Sea, Dawei, Myanmar (UTM 397446E, 1570914N) , Lightly

SW3 - Andaman Sea, Dawei, Myanmar (UTM 396298E, 1569482N) , Lightly

SW4 - Andaman Sea, Dawei, Myanmar (UTM 399529E, 1567402N) , Lightly

REPORTED RESULTS REFER TO SUBMITTED SAMPLES ONLY

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(MR SARAWOOT SINGPROMMA)
ANALYST SIGNATURE
22/10/2015

(MR PATRAVUT TADSUAN)
AUTHORIZED SIGNATURE
22/10/2015

A Member of TEAM GROUP

บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด
S.P.S. CONSULTING SERVICE CO., LTD.
7 ซอยพหลโยธิน 24 ถนนพหลโยธิน แขวงจอมพล เขตจตุจักร กรุงเทพฯ 10900
7 Soi Phaholyothin 24, Phaholyothin Rd., Jompol, Chatuchak, Bangkok 10900
Tel: (662) 939-4370 (Automatic 5 Lines) Fax: (662) 513-4221 E-mail: sale@spscon.com

Ref. No. W704-W707/10/15

Report No. 001_a

Sea Water Quality Analysis Report

Project	:	ESIA for Dawei SEZ Initial Phase Development 370 MW Combined Cycle Power Plant Project	Sampling Date	:	7-8 October 2015
Address	:	Myanmar	Received Date	:	9 October 2015
Client name	:	Team Consulting Engineering and Management Co.,Ltd.	Analytical Date	:	9-22 October 2015
Sampling Method	:	Grab	Report Date	:	22 October 2015
Sampling by	:	Team Consulting Engineering and Management Co.,Ltd.			

พารามิเตอร์	วิธีวิเคราะห์	สถานี				LOQ
		SW 1	SW 2	SW 3	SW 4	
BOD_5 (mg/L)	5 Day BOD Test (5210 B.)	0.6	<0.5	<0.5	<0.5	<0.5
COD (mg/L)	Closed Reflux, Titrimetric Method (5220 C.)	92	86	83	80	<10
Cyanide (µg/L)	Distillation, Colorimetric Method (4500-CN^- E.)	<3	<3	<3	<3	<3
Lead (µg/L)	Electrothermal Atomic Absorption Spectrometric Method (3113 B.)	0.65	7.3	<0.05	4.6	<0.05
Arsenic (µg/L)	Hydride Generation/Atomic Absorption Spectrometric Method (3114 C.)	<0.3	<0.3	0.3	0.5	<0.3
Total Iron (µg/L)	Inductively Coupled Plasma (ICP) Method (3120 B.)	<30	<30	<30	<30	<30

Remark:

Sample Characteristic ;

1. SW1 - Andaman Sea, Dawei, Myanmar. (UTM 395675E, 1573545N); Slightly Precipitate
2. SW2 - Andaman Sea, Dawei, Myanmar. (UTM 397446E, 1570914N); Slightly Precipitate
3. SW3 - Andaman Sea, Dawei, Myanmar. (UTM 396298E, 1569482N); Slightly Precipitate
4. SW4 - Andaman Sea, Dawei, Myanmar. (UTM 399529E, 1567402N); Slightly Precipitate

****

Reported Results Refer to Submitted Samples Only.

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(Suparat Sutthisomboon)
Analyst
22/10/2015

(Bang-on Siriphokhar)
Laboratory Manager
22/10/2015

APPENDIX 5E

RESULTS OF GROUNDWATER QUALITY

WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME : TEAM Consulting Engineering and Management Co.,Ltd. **REPORT DATE :** 18/02/2015

PROJECT NAME : ESIA for Dawei SEZ initial phase(435 MW main fac **RECEIVED DATE :** 27/01/2015

SAMPLING SOURCE : Ground water **ANALYTICAL DATE :** 28/01-13/02/2015

SAMPLING BY : Mr Nipat Somkleeb and Mr Sutiphot Gampetch **PROJECT NO. :** P3141

SAMPLING METHOD : GRAB **ANALYSIS NO. :** W58001/1-7

CONTRACTED BY : Dr Supichaya Wongchinawit

PARAMETERS/ITEM	UNITS	ANALYSIS METHOD@	GW1	GW2
ANALYSIS NO.			W58001/5	W58001/6
SAMPLING DATE			27/1/2015	23/1/2015
SAMPLING TIME			01 40 PM	03 10 PM
SAMPLING LOCATION			Station 1	Station 2
DEPTH	m	-	4 50	4 50
pH	-	4500-H^+(B)	6 92	5 01
WATER TEMPERATURE	°C	2550(B)	26 6	25 70
CONDUCTIVITY	uS/cm	2510(B)	132 2	25 50
SALINITY	ppt	2520(B)	0 10	<0 10
TURBIDITY	NTU	2130(B)	0 10	0 10
CHLORIDE	mg/L	4500-Cl(B)	11 00	13 0
TOTAL HARDNESS	mg/L	2340 (C)	45 10	109 8
SUSPENDED SOLIDS	mg/L	2540(D)	<5 0	<5 0
TOTAL DISSOLVED SOLIDS	mg/L	2540(C)	36 8	947 5
OIL & GREASE	mg/L	5520(D)	<5 0	<5 0

REF:@ STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER 22nd ED.,2012.(APHA-AWWA-WEF)

Remark : GW1 - Well of Nga Pitat School, Dawei, Myanmar (UTM 399504E, 1570128N) , Lightly

GW2 - Well of Mu Du School, Dawei, Myanmar (UTM 401599E, 1575318N) , Lightly

REPORTED RESULTS REFER TO SUBMITTED SAMPLES ONLY

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(MR SARAWOOT SINGPROMMA)	(MR. PATRAVUT TADSUAN)
ANALYST SIGNATURE	AUTHORIZED SIGNATURE
18/02/2015	18/02/2015

ALS

LABORATORY ACCREDITATION BLA-DSS

TESTING No.0009

Analysis / Test Report

Report to : TEAM Consulting Engineering and Management Co., Ltd.
151, Nuan Chan Road, Nuan Chan, Bueng Kum, Bangkok Thailand 10230
Attn : Patravut Tadsuan
Phone : 0-2509-9000
Fax : 0-2509-9047
Email : patravut_ta@team.co.th
Cc.Email : sarawoot_s@team.co.th

Project Name : ESIA for Dawei SEZ initial phase(435 MW :main facility and 97 MW:back up facility)
Location : Myanmar
P/O :
Receipt No :

Lot ID: 156199
Date Received : Feb 04, 2015
Date Reported : Mar 13, 2015
Report Number : 530601-1 Rev. No.1

Reference Number	156199-1
Sampling Date	Jan 27, 2015
Sample Description	GW-1-Well of Nga Pitat School,Dawei,Myanmar.(UTM 399504E,1570128N)
Condition of Sample	contained in three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Date of Analysis	Feb 05, 2015

Analyte		**Unit**	**LOD**	**Result**	**Method**
Metals Testing					
Arsenic		mg/L	0.00005	0.0006	Based on APHA (2012), 3125
Iron		mg/L	0.0001	0.21	Based on APHA (2012), 3125
Lead		mg/L	0.00005	0.0004	Based on APHA (2012), 3125
Water Testing					
Nitrate	as N	mg/L	0.06	2.2	Based on APHA (2012), 4110 B
Nitrite *	as N	mg/L	0.03	Not Detected	Based on APHA (2012), 4110 B
Cyanide	as CN	mg/L	0.002	<0.005	Based on APHA (2012), 4500-CN (C),(E)

Note:
This Analysis test report is reissued to supersede report No. 530601-1, Date Reported : Feb 12, 2015

Remark :
1. LOD : Limit of Detection
2. "<" : Lower than LOQ (Limit of Quantitation)
3. Analyte(s) marked * is/are not included in scope of Accreditation.

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Approved by

Narin Saiseng
Supervisor

Analysis / Test Report

TESTING
No.0009

LABORATORY ACCREDITATION
BLA-DSS

Report to : TEAM Consulting Engineering and Management Co., Ltd.
151, Nuan Chan Road, Nuan Chan, Bueng Kum, Bangkok Thailand 10230
Attn : Patravut Tadsuan
Phone : 0-2509-9000
Fax : 0-2509-9047
Email : patravut_ta@team.co.th
Cc.Email : sarawoot_s@team.co.th

Project Name : ESIA for Dawei SEZ initial phase(435 MW :main facility and 97 MW:back up facility)
Location : Myanmar
P/O :
Receipt No :

Lot ID: 152298
Date Received : Jan 27, 2015
Date Reported : Mar 13, 2015
Report Number : 533151-1 Rev. No.1

Reference Number 152298-11
Sampling Date Jan 23, 2015
Sample Description GW2- Well of Mu Du School, Dawei, Myanmar. (UTM 401599E, 1575318N)
Condition of Sample contained in three plastic bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Date of Analysis Jan 29, 2015

Analyte		Unit	LOD	Result	Method
Metals Testing					
Arsenic *		mg/L	0.00005	Not Detected	Based on APHA (2012), 3125
Iron		mg/L	0.0001	0.04	Based on APHA (2012), 3125
Lead		mg/L	0.00005	0.001	Based on APHA (2012), 3125
Water Testing					
Nitrate	as N	mg/L	0.06	Not Detected	Based on APHA (2012), 4110 B
Nitrite *	as N	mg/L	0.03	Not Detected	Based on APHA (2012), 4110 B
Cyanide	as CN	mg/L	0.002	Not Detected	Based on APHA (2012), 4500-CN (C),(E)

Note:
This Analysis test report is reissued to supersede report No. 533151-1, Date Reported : Feb 11, 2015

Remark :
1. LOD : Limit of Detection
2. "<" : Lower than LOQ (Limit of Quantitation)
3. Analyte(s) marked * is/are not included in scope of Accreditation.

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Approved by Sawitree N.
Sawitree Noisangiam
Section Head

APPENDIX 5F

RESULTS OF SEDIMENT QUALITY

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REF. NO. S009/02/15
B-Quo-0265/2015
BM0442/02/58

REPORT NO. 2026/2015
FILE : SEDIMENT1501

SEDIMENT QUALITY ANALYSIS REPORT

PROJECT	:	ESIA FOR DAWEI SEZ INITIAL PHASE (435 MW: MAIN FACILITY AND 97 MW:BACK UP FACILITY)	SAMPLING DATE	:	21/01/2015
ADDRESS	:	MYANMAR	RECEIVED DATE	:	06/02/2015
CLIENT NAME	:	TEAM CONSULTING ENGINEERING AND MANAGEMENT CO.,LTD	ANALYTICAL DATE	:	06-20/02/2015
SAMPLING METHOD	:	GRAB	REPORT DATE	:	20/02/2015
SAMPLING BY	:	TEAM CONSULTING ENGINEERING AND MANAGEMENT CO.,LTD			

SEDIMENT 1- ANDAMAN SEA, DAWEI, MYANMAR. (UTM 395675E, 1573545N)						NAME OF SOIL SEPARATE*
SIEVE NO.	SIEVE OPENING (mm.)	WEIGHT OF SOIL RETAINED (g dry weight)	RETAINED (% dry weight)	CUMULATIVE RETAINED (% dry weight)	PERCENT FINER	
#4	4.76	20.55	10.27	10.27	89.73	FINE GRAVEL
#8	2.36	18.83	9.41	19.68	80.32	COARSE SAND
#10	2.00	3.60	1.80	21.48	78.52	COARSE SAND
#20	0.85	15.51	7.75	29.23	70.77	MEDIUM SAND
#40	0.42	9.70	4.85	34.08	65.92	MEDIUM SAND
#80	0.18	116.62	58.29	92.37	7.63	FINE SAND
#100	0.15	4.90	2.45	94.82	5.18	FINE SAND
#200	0.075	8.37	4.18	99.00	1.00	FINE SAND
PAN	PAN	0.91	0.45	99.45	0.55	SILT OR CLAY

* = SOIL SEPARATE IN UNIFIED SOIL TEXTURAL CLASSIFICATION SYSTEM.

****

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(SUPARAT SUTTHISOMBOON)
ANALYST
20/02/2015

บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด

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LABORATORY MANAGER
20/02/2015

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REF. NO. S010/02/15
B-Quo-0265/2015
BM0442/02/58

REPORT NO. 2027/2015
FILE : SEDIMENT1501

SEDIMENT QUALITY ANALYSIS REPORT

PROJECT : ESIA FOR DAWEI SEZ INITIAL PHASE (435 MW: MAIN FACILITY AND 97 MW:BACK UP FACILITY)
ADDRESS : MYANMAR
CLIENT NAME : TEAM CONSULTING ENGINEERING AND MANAGEMENT CO.,LTD
SAMPLING METHOD : GRAB
SAMPLING BY : TEAM CONSULTING ENGINEERING AND MANAGEMENT CO.,LTD

SAMPLING DATE : 21/01/2015
RECEIVED DATE : 06/02/2015
ANALYTICAL DATE : 06-20/02/2015
REPORT DATE : 20/02/2015

SEDIMENT 2-ANDAMAN SEA, DAWEI, MYANMAR. (UTM 397446E, 1570914N)						
SIEVE NO.	SIEVE OPENING (mm.)	WEIGHT OF SOIL RETAINED (g dry weight)	RETAINED (% dry weight)	CUMULATIVE RETAINED (% dry weight)	PERCENT FINER	NAME OF SOIL SEPARATE*
#4	4.76	12.42	6.06	6.06	93.94	FINE GRAVEL
#8	2.36	33.88	16.53	22.59	77.41	COARSE SAND
#10	2.00	0.96	0.47	23.06	76.94	COARSE SAND
#20	0.85	15.04	7.34	30.40	69.60	MEDIUM SAND
#40	0.42	51.94	25.34	55.74	44.26	MEDIUM SAND
#80	0.18	67.72	33.04	88.78	11.22	FINE SAND
#100	0.15	1.91	0.93	89.71	10.29	FINE SAND
#200	0.075	18.66	9.10	98.81	1.19	FINE SAND
PAN	PAN	1.16	0.57	99.38	0.62	SILT OR CLAY

* = SOIL SEPARATE IN UNIFIED SOIL TEXTURAL CLASSIFICATION SYSTEM.

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(SUPARAT SUTTHISOMBOON)
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20/02/2015

(BANG-ON SIRIPHOKHAR)
LABORATORY MANAGER
20/02/2015

บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด

บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด
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REF. NO. S011/02/15
B-Quo-0265/2015
BM0442/02/58

REPORT NO. 2028/2015
FILE : SEDIMENT1501

SEDIMENT QUALITY ANALYSIS REPORT

PROJECT : ESIA FOR DAWEI SEZ INITIAL PHASE (435 MW: MAIN FACILITY AND 97 MW:BACK UP FACILITY)
ADDRESS : MYANMAR
CLIENT NAME : TEAM CONSULTING ENGINEERING AND MANAGEMENT CO.,LTD
SAMPLING METHOD : GRAB
SAMPLING BY : TEAM CONSULTING ENGINEERING AND MANAGEMENT CO.,LTD

SAMPLING DATE : 21/01/2015
RECEIVED DATE : 06/02/2015
ANALYTICAL DATE : 06-20/02/2015
REPORT DATE : 20/02/2015

SEDIMENT 3- ANDAMAN SEA, DAWEI, MYANMAR. (UTM 396298E, 1569482N)

SIEVE NO.	SIEVE OPENING (mm.)	WEIGHT OF SOIL RETAINED (g dry weight)	RETAINED (% dry weight)	CUMULATIVE RETAINED (% dry weight)	PERCENT FINER	NAME OF SOIL SEPARATE*
#4	4.76	12.34	10.56	10.56	89.44	FINE GRAVEL
#8	2.36	23.29	19.92	30.48	69.52	COARSE SAND
#10	2.00	7.52	6.43	36.91	63.09	COARSE SAND
#20	0.85	36.32	31.07	67.98	32.02	MEDIUM SAND
#40	0.42	21.43	18.33	86.31	13.69	MEDIUM SAND
#80	0.18	12.06	10.32	96.63	3.37	FINE SAND
#100	0.15	1.97	1.69	98.32	1.68	FINE SAND
#200	0.075	1.87	1.60	99.92	0.08	FINE SAND
PAN	PAN	0.06	0.05	99.97	0.03	SILT OR CLAY

* = SOIL SEPARATE IN UNIFIED SOIL TEXTURAL CLASSIFICATION SYSTEM.

****

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20/02/2015

(BANG-ON SIRIPHOKHAR)
LABORATORY MANAGER
20/02/2015

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Tel: (662) 939-4370 (Automatic 5 Lines) Fax: (662) 513-4221 E-mail: sale@spscon.com

REF. NO. S012/02/15
B-Quo-0265/2015
BM0442/02/58

REPORT NO. 2029/2015
FILE : SEDIMENT1501

SEDIMENT QUALITY ANALYSIS REPORT

PROJECT : ESIA FOR DAWEI SEZ INITIAL PHASE (435 MW: MAIN FACILITY AND 97 MW:BACK UP FACILITY)
ADDRESS : MYANMAR
CLIENT NAME : TEAM CONSULTING ENGINEERING AND MANAGEMENT CO.,LTD
SAMPLING METHOD : GRAB
SAMPLING BY : TEAM CONSULTING ENGINEERING AND MANAGEMENT CO.,LTD

SAMPLING DATE : 21/01/2015
RECEIVED DATE : 06/02/2015
ANALYTICAL DATE : 06-20/02/2015
REPORT DATE : 20/02/2015

SEDIMENT 4- ANDAMAN SEA, DAWEI, MYANMAR. (UTM 399529E, 1567402N)						NAME OF SOIL SEPARATE*
SIEVE NO.	SIEVE OPENING (mm.)	WEIGHT OF SOIL RETAINED (g dry weight)	RETAINED (% dry weight)	CUMULATIVE RETAINED (% dry weight)	PERCENT FINER	
#4	4.76	29.23	14.27	14.27	85.73	FINE GRAVEL
#8	2.36	8.29	4.05	18.32	81.68	COARSE SAND
#10	2.00	0.71	0.35	18.67	81.33	COARSE SAND
#20	0.85	11.05	5.39	24.06	75.94	MEDIUM SAND
#40	0.42	23.63	11.53	35.59	64.41	MEDIUM SAND
#80	0.18	107.22	52.34	87.93	12.07	FINE SAND
#100	0.15	0.93	0.45	88.38	11.62	FINE SAND
#200	0.075	20.39	9.95	98.33	1.67	FINE SAND
PAN	PAN	2.01	0.98	99.31	0.69	SILT OR CLAY

* = SOIL SEPARATE IN UNIFIED SOIL TEXTURAL CLASSIFICATION SYSTEM.

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(SUPARAT SUTTHISOMBOON)
ANALYST
20/02/2015

(BANG-ON SIRIPHOKHAR)
LABORATORY MANAGER
20/02/2015

Analysis / Test Report

Report to :	TEAM Consulting Engineering and Management Co., Ltd. 151, Nuan Chan Road, Nuan Chan, Bueng Kum, Bangkok Thailand 10230	**Project Name :**	ESIA for Dawei SEZ initial phase(435 MW :main facility and 97 MW:back up facility)	**Lot ID: 152298**
		Location :	Myanmar	Date Received : Jan 27, 2015
Attn :	Patravut Tadsuan	**P/O :**		Date Reported : Mar 13, 2015
Phone :	0-2509-9000	**Receipt No :**		Report Number : 533143-1 Rev. No.1
Fax :	0-2509-9047			
Email :	patravut_ta@team.co.th	**CC Email. :**		
Cc.Email :	sarawoot_s@team.co.th			

Reference Number	152298-3
Sampling Date	Jan 21, 2015
Sample Description	Sediment 1 - Andaman Sea, Dawei, Myanmar. (UTM 395675E, 1573545N)
Location	ตะกอนดิน
Condition of Sample	packed in two glass bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Date of Analysis	Jan 29, 2015

Analyte	Unit	LOD	Result	Method
Chemical Testing				
Oil & Grease	mg/kg	-	296	Based on US EPA, 9071 B
Organic matter	%	-	0.30	Dichromate Titration
Total Organic Carbon	%	-	0.31	Based on US EPA, Method 9060
Metals Testing				
Arsenic	mg/kg	-	4.96	Based on US EPA, Method 3050B and 6010B
Cadmium	mg/kg	-	<0.50	Based on US EPA, Method 3050B and 6010B
Chromium	mg/kg	-	14.7	Based on US EPA, Method 3050B and 6010B
Copper	mg/kg	-	5.88	Based on US EPA, Method 3050B and 6010B
Iron	mg/kg	-	10056	Based on US EPA, Method 3050B and 6010B
Lead	mg/kg	-	4.87	Based on US EPA, Method 3050B and 6010B
Zinc	mg/kg	-	46.5	Based on US EPA, Method 3050B and 6010B
Mercury	mg/kg	-	<0.10	Based on US EPA, Method 7471B
PHYSICAL PARAMETERS				
Soil Texture		-	Sand	Hydrometer
Sand	%	-	95.2	Hydrometer
Silt		-	2.7	Hydrometer
Clay	%	-	2.1	Hydrometer

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Approved by Sawitree N.

Sawitree Noisangiam
Section Head

Analysis / Test Report

Report to : TEAM Consulting Engineering and Management Co., Ltd.
151, Nuan Chan Road, Nuan Chan, Bueng Kum, Bangkok Thailand 10230
Attn : Patravut Tadsuan
Phone : 0-2509-9000
Fax : 0-2509-9047
Email : patravut_ta@team.co.th
Cc.Email : sarawoot_s@team.co.th

Project Name : ESIA for Dawei SEZ initial phase(435 MW :main facility and 97 MW:back up facility)
Location : Myanmar
P/O :
Receipt No :
CC Email. :

Lot ID: 152298
Date Received : Jan 27, 2015
Date Reported : Mar 13, 2015
Report Number : 533143-1 Rev. No.1

Note:
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Remark :
1. LOD : Limit of Detection
2. "<" : Lower than LOQ (Limit of Quantitation)

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Sawitree Noisangiam
Section Head

Analysis / Test Report

Report to :	TEAM Consulting Engineering and Management Co., Ltd. 151, Nuan Chan Road, Nuan Chan, Bueng Kum, Bangkok Thailand 10230	**Project Name :**	ESIA for Dawei SEZ initial phase(435 MW :main facility and 97 MW:back up facility)
Attn :	Patravut Tadsuan	**Location :**	Myanmar
Phone :	0-2509-9000	**P/O :**	
Fax :	0-2509-9047	**Receipt No :**	
Email :	patravut_ta@team.co.th	**CC Email. :**	
Cc.Email :	sarawoot_s@team.co.th		

Lot ID: 152298

Date Received : Jan 27, 2015

Date Reported : Mar 13, 2015

Report Number : 533144-1 Rev. No.1

Reference Number	152298-4
Sampling Date	Jan 21, 2015
Sample Description	Sediment 2- Andaman Sea, Dawei, Myanmar. (UTM 397446E, 1570914N)
Location	ตะกอนดิน
Condition of Sample	packed in two glass bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Date of Analysis	Jan 29, 2015

Analyte	Unit	LOD	Result	Method
Chemical Testing				
Oil & Grease	mg/kg	-	475	Based on US EPA, 9071 B
Organic matter	%	-	0.20	Dichromate Titration
Total Organic Carbon	%	-	0.17	Based on US EPA, Method 9060
Metals Testing				
Arsenic	mg/kg	-	1.92	Based on US EPA, Method 3050B and 6010B
Cadmium	mg/kg	-	<0.50	Based on US EPA, Method 3050B and 6010B
Chromium	mg/kg	-	7.20	Based on US EPA, Method 3050B and 6010B
Copper	mg/kg	-	3.98	Based on US EPA, Method 3050B and 6010B
Iron	mg/kg	-	4566	Based on US EPA, Method 3050B and 6010B
Lead	mg/kg	-	2.95	Based on US EPA, Method 3050B and 6010B
Zinc	mg/kg	-	44.6	Based on US EPA, Method 3050B and 6010B
Mercury	mg/kg	-	<0.10	Based on US EPA, Method 7471B
PHYSICAL PARAMETERS				
Soil Texture		-	Sand	Hydrometer
Sand	%	-	96.0	Hydrometer
Silt		-	1.9	Hydrometer
Clay	%	-	2.1	Hydrometer

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Sawitree Noisangiam
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Analysis / Test Report

Report to : TEAM Consulting Engineering and Management Co., Ltd.
151, Nuan Chan Road, Nuan Chan, Bueng Kum, Bangkok Thailand 10230
Attn : Patravut Tadsuan
Phone : 0-2509-9000
Fax : 0-2509-9047
Email : patravut_ta@team.co.th
Cc.Email : sarawoot_s@team.co.th

Project Name : ESIA for Dawei SEZ initial phase(435 MW :main facility and 97 MW:back up facility)
Location : Myanmar
P/O :
Receipt No :
CC Email. :

Lot ID: 152298
Date Received : Jan 27, 2015
Date Reported : Mar 13, 2015
Report Number : 533144-1 Rev. No.1

Note:
This Analysis test report is reissued to supersede report No. 533144-1, Date Reported : Feb 11, 2015

Remark :
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2. "<" : Lower than LOQ (Limit of Quantitation)

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Analysis / Test Report

Report to : TEAM Consulting Engineering and Management Co., Ltd.
151, Nuan Chan Road, Nuan Chan, Bueng Kum, Bangkok Thailand 10230
Attn : Patravut Tadsuan
Phone : 0-2509-9000
Fax : 0-2509-9047
Email : patravut_ta@team.co.th
Cc.Email : sarawoot_s@team.co.th

Project Name : ESIA for Dawei SEZ initial phase(435 MW :main facility and 97 MW:back up facility)
Location : Myanmar
P/O :
Receipt No :
CC Email. :

Lot ID: 152298
Date Received : Jan 27, 2015
Date Reported : Mar 13, 2015
Report Number : 533145-1 Rev. No.1

Reference Number	152298-5
Sampling Date	Jan 21, 2015
Sample Description	Sediment 3- Andaman Sea, Dawei, Myanmar. (UTM 396298E, 1569482N)
Location	ตะกอนดิน
Condition of Sample	packed in two glass bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Date of Analysis	Jan 29, 2015

Analyte	Unit	LOD	Result	Method
Chemical Testing				
Oil & Grease	mg/kg	-	506	Based on US EPA, 9071 B
Organic matter	%	-	0.09	Dichromate Titration
Total Organic Carbon	%	-	1.77	Based on US EPA, Method 9060
Metals Testing				
Arsenic	mg/kg	-	4.56	Based on US EPA, Method 3050B and 6010B
Cadmium	mg/kg	-	<0.50	Based on US EPA, Method 3050B and 6010B
Chromium	mg/kg	-	7.27	Based on US EPA, Method 3050B and 6010B
Copper	mg/kg	-	5.10	Based on US EPA, Method 3050B and 6010B
Iron	mg/kg	-	18591	Based on US EPA, Method 3050B and 6010B
Lead	mg/kg	-	4.96	Based on US EPA, Method 3050B and 6010B
Zinc	mg/kg	-	15.2	Based on US EPA, Method 3050B and 6010B
Mercury	mg/kg	-	<0.10	Based on US EPA, Method 7471B
PHYSICAL PARAMETERS				
Soil Texture		-	Sand	Hydrometer
Sand	%	-	96.3	Hydrometer
Silt		-	1.6	Hydrometer
Clay	%	-	2.1	Hydrometer

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Sawitree Noisangiam
Section Head

Analysis / Test Report

Report to :	TEAM Consulting Engineering and Management Co., Ltd. 151, Nuan Chan Road, Nuan Chan, Bueng Kum, Bangkok Thailand 10230	**Project Name :**	ESIA for Dawei SEZ initial phase(435 MW :main facility and 97 MW:back up facility)
Attn :	Patravut Tadsuan	**Location :**	Myanmar
Phone :	0-2509-9000	**P/O :**	
Fax :	0-2509-9047	**Receipt No :**	
Email :	patravut_ta@team.co.th	**CC Email. :**	
Cc.Email :	sarawoot_s@team.co.th		

Lot ID: 152298
Date Received : Jan 27, 2015
Date Reported : Mar 13, 2015
Report Number : 533145-1 Rev. No.1

Note:
This Analysis test report is reissued to supersede report No. 533145-1, Date Reported : Feb 11, 2015

Remark :
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2. "<" : Lower than LOQ (Limit of Quantitation)

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Sawitree Noisangiam
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Analysis / Test Report

Report to :	TEAM Consulting Engineering and Management Co., Ltd. 151, Nuan Chan Road, Nuan Chan, Bueng Kum, Bangkok Thailand 10230	**Project Name :**	ESIA for Dawei SEZ initial phase(435 MW :main facility and 97 MW:back up facility)
Attn :	Patravut Tadsuan	**Location :**	Myanmar
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Fax :	0-2509-9047	**Receipt No :**	
Email :	patravut_ta@team.co.th	**CC Email. :**	
Cc.Email :	sarawoot_s@team.co.th		

Lot ID: 152298
Date Received : Jan 27, 2015
Date Reported : Mar 13, 2015
Report Number : 533146-1 Rev. No.1

Reference Number	152298-6
Sampling Date	Jan 21, 2015
Sample Description	Sediment 4- Andaman Sea, Dawei, Myanmar. (UTM 399529E, 1567402N)
Location	ตะกอนดิน
Condition of Sample	packed in two glass bottles, sample containers comply to pretreatment - preservation standards (APHA, USEPA)
Date of Analysis	Jan 29, 2015

Analyte	Unit	LOD	Result	Method
Chemical Testing				
Oil & Grease	mg/kg	-	987	Based on US EPA, 9071 B
Organic matter	%	-	0.13	Dichromate Titration
Total Organic Carbon	%	-	0.11	Based on US EPA, Method 9060
Metals Testing				
Arsenic	mg/kg	-	1.94	Based on US EPA, Method 3050B and 6010B
Cadmium	mg/kg	-	<0.50	Based on US EPA, Method 3050B and 6010B
Chromium	mg/kg	-	6.05	Based on US EPA, Method 3050B and 6010B
Copper	mg/kg	-	1.88	Based on US EPA, Method 3050B and 6010B
Iron	mg/kg	-	4477	Based on US EPA, Method 3050B and 6010B
Lead	mg/kg	-	2.33	Based on US EPA, Method 3050B and 6010B
Zinc	mg/kg	-	17.9	Based on US EPA, Method 3050B and 6010B
Mercury	mg/kg	-	<0.10	Based on US EPA, Method 7471B
PHYSICAL PARAMETERS				
Soil Texture		-	Sand	Hydrometer
Sand	%	-	95.3	Hydrometer
Silt		-	2.6	Hydrometer
Clay	%	-	2.1	Hydrometer

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Approved by Sawitree N.

Sawitree Noisangiam
Section Head

Analysis / Test Report

Report to : TEAM Consulting Engineering and Management Co., Ltd.
151, Nuan Chan Road, Nuan Chan, Bueng Kum, Bangkok Thailand 10230
Attn : Patravut Tadsuan
Phone : 0-2509-9000
Fax : 0-2509-9047
Email : patravut_ta@team.co.th
Cc.Email : sarawoot_s@team.co.th

Project Name : ESIA for Dawei SEZ initial phase(435 MW :main facility and 97 MW:back up facility)
Location : Myanmar
P/O :
Receipt No :
CC Email. :

Lot ID: 152298
Date Received : Jan 27, 2015
Date Reported : Mar 13, 2015
Report Number : 533146-1 Rev. No.1

Note:
This Analysis test report is reissued to supersede report No. 533146-1, Date Reported : Feb 11, 2015

Remark :
1. LOD : Limit of Detection
2. "<" : Lower than LOQ (Limit of Quantitation)

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Approved by Sawitree N.
Sawitree Noisangiam
Section Head

บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด
S.P.S. CONSULTING SERVICE CO., LTD.
7 ซอยพหลโยธิน 24 ถนนพหลโยธิน แขวงจอมพล เขตจตุจักร กรุงเทพฯ 10900
7 Soi Phaholyothin 24, Phaholyothin Rd., Jompol, Chatuchak, Bangkok 10900
Tel: (662) 939-4370 (Automatic 5 Lines) Fax: (662) 513-4221 E-mail: sale@spscon.com

Ref. No. S005/12/15 Report No. 001

Sediment Quality Analysis Report

Project	:	ESIA for Dawei SEZ Initial Phase Development 370 MW Combined Cycle Power Plant Project	Sampling Date	:	7-8 October 2015
Project Location	:	Myanmar	Received Date	:	1 December 2015
Client Name	:	Team Consulting Engineering and Management Co.,Ltd	Analytical Date	:	9-22 October 2015
Sampling Method	:	Grab	Report Date	:	22 October 2015
Sampling by	:	Team Consulting Engineering and Management Co.,Ltd			

Sediment 1(SB1) Sampling Date 8/10/2015						
Sieve No.	Sieve Opening (mm.)	Weight of Soil Retained (g dry weight)	Retained (% dry weight)	Cumulative Retained (% dry weight)	Percent Finer	Name of Soil Separate
#4	4.76	1.52	0.70	0.70	99.30	Fine Gravel
#8	2.36	13.81	6.37	7.07	92.93	Coarse Sand
#10	2.00	2.10	0.97	8.04	91.96	Coarse Sand
#20	0.85	34.13	15.75	23.79	76.21	Medium Sand
#40	0.42	44.59	20.58	44.37	55.63	Medium Sand
#80	0.18	109.31	50.44	94.81	5.19	Fine Sand
#100	0.15	3.60	1.66	96.47	3.53	Fine Sand
#200	0.075	7.34	3.39	99.86	0.14	Fine Sand
PAN	PAN	0.04	0.02	99.88	0.12	Silt or Clay

Reported Results Refer to Submitted Samples Only.
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(Suparat Sutthisomboon)
Scientist

(Bang-on Siriphokhar)
Laboratory Manager

บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด
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7 Soi Phaholyothin 24, Phaholyothin Rd., Jompol, Chatuchak, Bangkok 10900
Tel: (662) 939-4370 (Automatic 5 Lines) Fax: (662) 513-4221 E-mail: sale@spscon.com

Ref. No. S006/12/15

Report No. 001

Sediment Quality Analysis Report

Project	:	ESIA for Dawei SEZ Initial Phase Development 370 MW Combined Cycle Power Plant Project
Project Location	:	Myanmar
Client Name	:	Team Consulting Engineering and Management Co.,Ltd
Sampling Method	:	Grab
Sampling by	:	Team Consulting Engineering and Management Co.,Ltd

Sampling Date	:	7-8 October 2015
Received Date	:	1 December 2015
Analytical Date	:	9-22 October 2015
Report Date	:	22 October 2015

Sediment 2 (SB2) Sampling Date 8/10/2015						
Sieve No.	Sieve Opening (mm.)	Weight of Soil Retained (g dry weight)	Retained (% dry weight)	Cumulative Retained (% dry weight)	Percent Finer	Name of Soil Separate
#4	4.76	77.12	38.29	38.29	61.71	Fine Gravel
#8	2.36	18.20	9.04	47.32	52.68	Coarse Sand
#10	2.00	3.54	1.76	49.08	50.92	Coarse Sand
#20	0.85	24.31	12.07	61.15	38.85	Medium Sand
#40	0.42	24.78	12.30	73.45	26.55	Medium Sand
#80	0.18	21.92	10.88	84.33	15.67	Fine Sand
#100	0.15	8.19	4.07	88.40	11.60	Fine Sand
#200	0.075	18.13	9.00	97.40	2.60	Fine Sand
PAN	PAN	5.06	2.51	99.91	0.09	Silt or Clay

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(Suparat Sutthisomboon)
Scientist

(Bang-on Siriphokhar)
Laboratory Manager

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Ref. No. S007/12/15

Report No. 001

Sediment Quality Analysis Report

Project	:	ESIA for Dawei SEZ Initial Phase Development 370 MW Combined Cycle Power Plant Project
Project Location	:	Myanmar
Client Name	:	Team Consulting Engineering and Management Co.,Ltd
Sampling Method	:	Grab
Sampling by	:	Team Consulting Engineering and Management Co.,Ltd
Sampling Date	:	7-8 October 2015
Received Date	:	1 December 2015
Analytical Date	:	9-22 October 2015
Report Date	:	22 October 2015

Sediment 3 (SB3) Sampling Date 7/10/2015						
Sieve No.	Sieve Opening (mm.)	Weight of Soil Retained (g dry weight)	Retained (% dry weight)	Cumulative Retained (% dry weight)	Percent Finer	Name of Soil Separate
#4	4.76	31.25	15.55	15.55	84.45	Fine Gravel
#8	2.36	15.82	7.87	23.42	76.58	Coarse Sand
#10	2.00	2.74	1.36	24.79	75.21	Coarse Sand
#20	0.85	39.50	19.66	44.44	55.56	Medium Sand
#40	0.42	46.05	22.92	67.36	32.64	Medium Sand
#80	0.18	62.86	31.28	98.64	1.36	Fine Sand
#100	0.15	1.03	0.51	99.15	0.85	Fine Sand
#200	0.075	1.31	0.65	99.80	0.20	Fine Sand
PAN	PAN	0.13	0.06	99.87	0.13	Silt or Clay

Reported Results Refer to Submitted Samples Only.
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(Suparat Sutthisomboon)
Scientist

(Bang-on Siriphokhar)
Laboratory Manager

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Tel: (662) 939-4370 (Automatic 5 Lines) Fax: (662) 513-4221 E-mail: sale@spscon.com

Ref. No. S008/12/15 Report No. 001

Sediment Quality Analysis Report

Project	:	ESIA for Dawei SEZ Initial Phase Development 370 MW Combined Cycle Power Plant Project	Sampling Date	:	7-8 October 2015
			Received Date	:	1 December 2015
Project Location	:	Myanmar	Analytical Date	:	9-22 October 2015
Client Name	:	Team Consulting Engineering and Management Co.,Ltd	Report Date	:	22 October 2015
Sampling Method	:	Grab			
Sampling by	:	Team Consulting Engineering and Management Co.,Ltd			

Sediment 4 (SB4) Sampling Date 7/10/2015						Name of Soil Separate
Sieve No.	Sieve Opening (mm.)	Weight of Soil Retained (g dry weight)	Retained (% dry weight)	Cumulative Retained (% dry weight)	Percent Finer	
#4	4.76	0.58	0.29	0.29	99.71	Fine Gravel
#8	2.36	2.87	1.43	1.71	98.29	Coarse Sand
#10	2.00	1.08	0.54	2.25	97.75	Coarse Sand
#20	0.85	3.78	1.88	4.13	95.87	Medium Sand
#40	0.42	28.90	14.35	18.48	81.52	Medium Sand
#80	0.18	143.04	71.04	89.53	10.47	Fine Sand
#100	0.15	10.18	5.06	94.58	5.42	Fine Sand
#200	0.075	10.45	5.19	99.77	0.23	Fine Sand
PAN	PAN	0.33	0.16	99.94	0.06	Silt or Clay

Reported Results Refer to Submitted Samples Only.

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(Suparat Sutthisomboon)
Scientist

(Bang-on Siriphokhar)
Laboratory Manager

Analysis / Test Report

Report to :	TEAM Consulting Engineering and Management Co., Ltd. 151, Nuan Chan Road, Nuan Chan, Bueng Kum, Bangkok Thailand 10230	**Project Name :**	ESIA for Dawei SEZ Initial Phase Development 370 MW Combined Cycle Power Plant Project
Attn :	Patravut Tadsuan	**Location :**	
Phone :	0-2509-9000	**P/O :**	
Fax :	0-2509-9047	**Receipt No :**	
Email :	patravut_ta@team.co.th		
Cc.Email :	sarawoot_s@team.co.th		

Lot ID: 1557477

Date Received : Oct 08, 2015

Date Reported : Oct 22, 2015

Report Number : 638023-1

Reference Number	1557477-1
Sample Date	Oct 08, 2015
Sample Description	Sediment 1 (SB1)
Condition of Sample	packed in one plastic bag
Date of Analysis	Oct 09, 2015

Analyte	Unit	Result	Guideline TTLC (mg/kg)	Guideline STLC (mg/L)	Guideline Comment	Method
PHYSICAL PARAMETERS						
Soil Texture		Loamy Sand	-	-	n/a	Hydrometer
Sand	%	79.0	-	-	n/a	Hydrometer
Silt	%	18.0	-	-	n/a	Hydrometer
Clay	%	3.0	-	-	n/a	Hydrometer

Technical Management	**Approved by**
Narin Saiseng	Yupaporn Chanpleng
Supervisor	Senior Manager
ทะเบียนเลขที่ ว-204-จ-4715	ทะเบียนเลขที่ ว-204-ค-4700

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Phone : 0-2509-9000
Fax : 0-2509-9047
Email : patravut_ta@team.co.th
Cc.Email : sarawoot_s@team.co.th

Project Name : ESIA for Dawei SEZ Initial Phase Development 370 MW Combined Cycle Power Plant Project
Location :
P/O :
Receipt No :

Lot ID: 1557477
Date Received : Oct 08, 2015
Date Reported : Oct 22, 2015
Report Number : 638023-1

Reference Number	1557477-1
Sample Date	Oct 08, 2015
Sample Description	Sediment 1 (SB1)
Condition of Sample	packed in one plastic bag
Date of Analysis	Oct 09, 2015

Analyte		Unit	Result	Guideline TTLC (mg/kg)	Guideline STLC (mg/L)	Guideline Comment	Method
Total Concentration Test							
Oil & Grease		mg/kg	<100	-	-	n/a	Based on US EPA, 9071 B
Organic matter		%	0.31	-	-	n/a	Soil Chemical Methods - Australasia (2011)
Total Organic Carbon		%	0.21	-	-	n/a	Based on US EPA, Method 9060
Arsenic	TTLC	mg/kg	6.75	500	5	Require STLC	Based on US EPA, Method 3050B and 6010B
Cadmium	TTLC	mg/kg	<0.50	100	1	Pass	Based on US EPA, Method 3050B and 6010B
Chromium	TTLC	mg/kg	11.4	2500	5	Require STLC	Based on US EPA, Method 3050B and 6010B
Copper	TTLC	mg/kg	1.09	2500	25	Pass	Based on US EPA, Method 3050B and 6010B
Iron	TTLC	mg/kg	7103	-	-	n/a	Based on US EPA, Method 3050B and 6010B
Lead	TTLC	mg/kg	4.70	1000	5	Pass	Based on US EPA, Method 3050B and 6010B
Zinc	TTLC	mg/kg	8.03	5000	250	Pass	Based on US EPA, Method 3050B and 6010B
Mercury	TTLC	mg/kg	<0.10	20	0.2	Pass	Based on US EPA, Method 7471B

Guideline: Notification of the Ministry of Industry regarding Waste or Used Material Disposal, published in the Royal Government Gazette, Vol.123, Special Part 11D, dated January 25, B.E. 2549 (2006).

Technical Management

Narin Saiseng
Supervisor
ทะเบียนเลขที่ ว-204-จ-4715

Approved by

Yupaporn Chanpleng
Senior Manager
ทะเบียนเลขที่ ว-204-ค-4700

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Attn : Patravut Tadsuan
Phone : 0-2509-9000
Fax : 0-2509-9047
Email : patravut_ta@team.co.th
Cc.Email : sarawoot_s@team.co.th

Project Name : ESIA for Dawei SEZ Initial Phase Development 370 MW Combined Cycle Power Plant Project
Location :
P/O :
Receipt No :

Lot ID: 1557477
Date Received : Oct 08, 2015
Date Reported : Oct 22, 2015
Report Number : 638023-1

Reference Number	1557477-2
Sample Date	Oct 08, 2015
Sample Description	Sediment 2 (SB2)
Condition of Sample	packed in one plastic bag
Date of Analysis	Oct 09, 2015

Analyte	Unit	Result	Guideline TTLC (mg/kg)	Guideline STLC (mg/L)	Guideline Comment	Method
PHYSICAL PARAMETERS						
Soil Texture		Loamy Sand	-	-	n/a	Hydrometer
Sand	%	84.0	-	-	n/a	Hydrometer
Silt	%	12.0	-	-	n/a	Hydrometer
Clay	%	4.0	-	-	n/a	Hydrometer

Technical Management

Narin Saiseng
Supervisor
ทะเบียนเลขที่ ว-204-จ-4715

Approved by

Yupaporn Chanpleng
Senior Manager
ทะเบียนเลขที่ ว-204-ค-4700

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Analysis / Test Report

Report to :	TEAM Consulting Engineering and Management Co., Ltd. 151, Nuan Chan Road, Nuan Chan, Bueng Kum, Bangkok Thailand 10230	**Project Name :**	ESIA for Dawei SEZ Initial Phase Development 370 MW Combined Cycle Power Plant Project
Attn :	Patravut Tadsuan	**Location :**	
Phone :	0-2509-9000	**P/O :**	
Fax :	0-2509-9047	**Receipt No :**	
Email :	patravut_ta@team.co.th		
Cc.Email :	sarawoot_s@team.co.th		

Lot ID: 1557477
Date Received : Oct 08, 2015
Date Reported : Oct 22, 2015
Report Number : 638023-1

Reference Number	1557477-2
Sample Date	Oct 08, 2015
Sample Description	Sediment 2 (SB2)
Condition of Sample	packed in one plastic bag
Date of Analysis	Oct 09, 2015

Analyte		Unit	Result	Guideline TTLC (mg/kg)	Guideline STLC (mg/L)	Guideline Comment	Method
Total Concentration Test							
Oil & Grease		mg/kg	<100	-	-	n/a	Based on US EPA, 9071 B
Organic matter		%	0.61	-	-	n/a	Soil Chemical Methods - Australasia (2011)
Total Organic Carbon		%	0.52	-	-	n/a	Based on US EPA, Method 9060
Arsenic	TTLC	mg/kg	2.08	500	5	Pass	Based on US EPA, Method 3050B and 6010B
Cadmium	TTLC	mg/kg	<0.50	100	1	Pass	Based on US EPA, Method 3050B and 6010B
Chromium	TTLC	mg/kg	7.30	2500	5	Require STLC	Based on US EPA, Method 3050B and 6010B
Copper	TTLC	mg/kg	1.17	2500	25	Pass	Based on US EPA, Method 3050B and 6010B
Iron	TTLC	mg/kg	6313	-	-	n/a	Based on US EPA, Method 3050B and 6010B
Lead	TTLC	mg/kg	4.08	1000	5	Pass	Based on US EPA, Method 3050B and 6010B
Zinc	TTLC	mg/kg	10.5	5000	250	Pass	Based on US EPA, Method 3050B and 6010B
Mercury	TTLC	mg/kg	<0.10	20	0.2	Pass	Based on US EPA, Method 7471B

Guideline: Notification of the Ministry of Industry regarding Waste or Used Material Disposal, published in the Royal Government Gazette, Vol.123, Special Part 11D, dated January 25, B.E. 2549 (2006).

Technical Management

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Supervisor
ทะเบียนเลขที่ ว-204-จ-4715

Approved by

Yupaporn Chanpleng
Senior Manager
ทะเบียนเลขที่ ว-204-ค-4700

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Phone :	0-2509-9000	**P/O :**	
Fax :	0-2509-9047	**Receipt No :**	
Email :	patravut_ta@team.co.th		
Cc.Email :	sarawoot_s@team.co.th		

Lot ID: 1557477

Date Received : Oct 08, 2015

Date Reported : Oct 22, 2015

Report Number : 638023-1

Reference Number	1557477-3
Sample Date	Oct 07, 2015
Sample Description	Sediment 3 (SB3)
Condition of Sample	packed in one plastic bag
Date of Analysis	Oct 09, 2015

Analyte	Unit	Result	Guideline TTLC (mg/kg)	Guideline STLC (mg/L)	Guideline Comment	Method
PHYSICAL PARAMETERS						
Soil Texture		Sand	-	-	n/a	Hydrometer
Sand	%	97.1	-	-	n/a	Hydrometer
Silt	%	1.0	-	-	n/a	Hydrometer
Clay	%	1.9	-	-	n/a	Hydrometer

Technical Management

Narin Saiseng
Supervisor
ทะเบียนเลขที่ ว-204-จ-4715

Approved by

Yupaporn Chanpleng
Senior Manager
ทะเบียนเลขที่ ว-204-ค-4700

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Cc.Email : sarawoot_s@team.co.th

Project Name : ESIA for Dawei SEZ Initial Phase Development 370 MW Combined Cycle Power Plant Project
Location :
P/O :
Receipt No :

Lot ID: 1557477
Date Received : Oct 08, 2015
Date Reported : Oct 22, 2015
Report Number : 638023-1

Reference Number	1557477-3
Sample Date	Oct 07, 2015
Sample Description	Sediment 3 (SB3)
Condition of Sample	packed in one plastic bag
Date of Analysis	Oct 09, 2015

Analyte		Unit	Result	Guideline TTLC (mg/kg)	Guideline STLC (mg/L)	Guideline Comment	Method
Total Concentration Test							
Oil & Grease		mg/kg	<100	-	-	n/a	Based on US EPA, 9071 B
Organic matter		%	0.27	-	-	n/a	Soil Chemical Methods - Australasia (2011)
Total Organic Carbon		%	0.57	-	-	n/a	Based on US EPA, Method 9060
Arsenic	TTLC	mg/kg	7.03	500	5	Require STLC	Based on US EPA, Method 3050B and 6010B
Cadmium	TTLC	mg/kg	<0.50	100	1	Pass	Based on US EPA, Method 3050B and 6010B
Chromium	TTLC	mg/kg	14.2	2500	5	Require STLC	Based on US EPA, Method 3050B and 6010B
Copper	TTLC	mg/kg	1.46	2500	25	Pass	Based on US EPA, Method 3050B and 6010B
Iron	TTLC	mg/kg	8615	-	-	n/a	Based on US EPA, Method 3050B and 6010B
Lead	TTLC	mg/kg	4.79	1000	5	Pass	Based on US EPA, Method 3050B and 6010B
Zinc	TTLC	mg/kg	9.14	5000	250	Pass	Based on US EPA, Method 3050B and 6010B
Mercury	TTLC	mg/kg	<0.10	20	0.2	Pass	Based on US EPA, Method 7471B

Guideline: Notification of the Ministry of Industry regarding Waste or Used Material Disposal, published in the Royal Government Gazette, Vol.123, Special Part 11D, dated January 25, B.E. 2549 (2006).

Technical Management [signature]
Narin Saiseng
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ทะเบียนเลขที่ ว-204-จ-4715

Approved by [signature]
Yupaporn Chanpleng
Senior Manager
ทะเบียนเลขที่ ว-204-ค-4700

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Analysis / Test Report

Report to :	TEAM Consulting Engineering and Management Co., Ltd. 151, Nuan Chan Road, Nuan Chan, Bueng Kum, Bangkok Thailand 10230	**Project Name :**	ESIA for Dawei SEZ Initial Phase Development 370 MW Combined Cycle Power Plant Project
Attn :	Patravut Tadsuan	**Location :**	
Phone :	0-2509-9000	**P/O :**	
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Email :	patravut_ta@team.co.th		
Cc.Email :	sarawoot_s@team.co.th		

Lot ID: 1557477
Date Received : Oct 08, 2015
Date Reported : Oct 22, 2015
Report Number : 638023-1

Reference Number	1557477-4
Sample Date	Oct 07, 2015
Sample Description	Sediment 4 (SB4)
Condition of Sample	packed in one plastic bag
Date of Analysis	Oct 09, 2015

Analyte	Unit	Result	Guideline TTLC (mg/kg)	Guideline STLC (mg/L)	Guideline Comment	Method
PHYSICAL PARAMETERS						
Soil Texture		Sand	-	-	n/a	Hydrometer
Sand	%	97.2	-	-	n/a	Hydrometer
Silt	%	1.0	-	-	n/a	Hydrometer
Clay	%	1.8	-	-	n/a	Hydrometer

Technical Management

Narin Saiseng
Supervisor
ทะเบียนเลขที่ ว-204-จ-4715

Approved by

Yupaporn Chanpleng
Senior Manager
ทะเบียนเลขที่ ว-204-ค-4700

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any from without written consent from the Laboratory. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

Analysis / Test Report

Report to : TEAM Consulting Engineering and Management Co., Ltd.
151, Nuan Chan Road, Nuan Chan, Bueng Kum, Bangkok Thailand 10230
Attn : Patravut Tadsuan
Phone : 0-2509-9000
Fax : 0-2509-9047
Email : patravut_ta@team.co.th
Cc.Email : sarawoot_s@team.co.th

Project Name : ESIA for Dawei SEZ Initial Phase Development 370 MW Combined Cycle Power Plant Project
Location :
P/O :
Receipt No :

Lot ID: 1557477
Date Received : Oct 08, 2015
Date Reported : Oct 22, 2015
Report Number : 638023-1

Reference Number	1557477-4
Sample Date	Oct 07, 2015
Sample Description	Sediment 4 (SB4)
Condition of Sample	packed in one plastic bag
Date of Analysis	Oct 09, 2015

Analyte		Unit	Result	Guideline TTLC (mg/kg)	Guideline STLC (mg/L)	Guideline Comment	Method
Total Concentration Test							
Oil & Grease		mg/kg	<100	-	-	n/a	Based on US EPA, 9071 B
Organic matter		%	0.16	-	-	n/a	Soil Chemical Methods - Australasia (2011)
Total Organic Carbon		%	<0.1	-	-	n/a	Based on US EPA, Method 9060
Arsenic	TTLC	mg/kg	1.07	500	5	Pass	Based on US EPA, Method 3050B and 6010B
Cadmium	TTLC	mg/kg	<0.50	100	1	Pass	Based on US EPA, Method 3050B and 6010B
Chromium	TTLC	mg/kg	2.95	2500	5	Pass	Based on US EPA, Method 3050B and 6010B
Copper	TTLC	mg/kg	<1.00	2500	25	Pass	Based on US EPA, Method 3050B and 6010B
Iron	TTLC	mg/kg	2213	-	-	n/a	Based on US EPA, Method 3050B and 6010B
Lead	TTLC	mg/kg	1.48	1000	5	Pass	Based on US EPA, Method 3050B and 6010B
Zinc	TTLC	mg/kg	4.34	5000	250	Pass	Based on US EPA, Method 3050B and 6010B
Mercury	TTLC	mg/kg	<0.10	20	0.2	Pass	Based on US EPA, Method 7471B

Guideline: Notification of the Ministry of Industry regarding Waste or Used Material Disposal, published in the Royal Government Gazette, Vol.123, Special Part 11D, dated January 25, B.E. 2549 (2006).

Remark :
1. LOD : Limit of Detection
2. "<" : Lower than LOQ (Limit of Quantitation)

Technical Management

Narin Saiseng
Supervisor
ทะเบียนเลขที่ ว-204-จ-4715

Approved by

Yupaporn Chanpleng
Senior Manager
ทะเบียนเลขที่ ว-204-ค-4700

The above results are valid only for the analyzed/tested sample(s) as indicated in this report. No part of this report or certificate may be reproduced in any from without written consent from the Laboratory. ALS Laboratory Group (Thailand) strongly recommends that this report is not reproduced except in full.

APPENDIX 5G

LABORATORY CERTIFICATION

Ref. No. 0318/(1) 6362 Department of Industrial Works

31st March 2015

Subject: Extension of Laboratory License

To: Geotechnical & Foundation Engineering Co., Ltd. (GFE)

With reference to the request of Geotechnical & Foundation Engineering Co., Ltd. (GFE) dated on 26th February 2015 for extension of Laboratory License which is located at 151, Nuan Chan Road, Nuan Chan, Bueng Kum Bangkok 10230 Thailand, Department of Industrial Works had considered and approved extension of the Laboratory License no. 048 until 26th March 2018.

Items for Laboratory Test service cover 7 items of wastewater, as annexed hereto.

Industrial Environment Research and Development Bureau

Industrial Environment Research and Development Centre

ที่ อก ๐๓๑๘/(๑) ๖๓๖๒

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ เขตราชเทวี
กรุงเทพมหานคร ๑๐๔๐๐

๓๑ มีนาคม ๒๕๕๘

เรื่อง ต่ออายุหนังสืออนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน ผู้รับอนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน บริษัท วิศวกรรมธรณีและฐานราก จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุหนังสืออนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๒๖ กุมภาพันธ์ ๒๕๕๘

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสืออนุญาตต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน บริษัท วิศวกรรมธรณีและฐานราก จำกัด จำนวน ๑ แผ่น

ตามหนังสือที่อ้างถึงบริษัท วิศวกรรมธรณีและฐานราก จำกัด ขอต่ออายุหนังสืออนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๐๔๘ สถานที่ตั้งเลขที่ ๑๕๑ ถนนนวลจันทร์ แขวงนวลจันทร์ เขตบึงกุ่ม กรุงเทพมหานคร ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว อนุญาตให้ต่ออายุหนังสืออนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์
นายภัทราวุธ หัดสวน ทะเบียนเลขที่ ว-๐๔๘-ค-๔๙๕๗

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์
นายศราวุธ สิงห์พรมมา ทะเบียนเลขที่ ว-๐๔๘-จ-๖๒๙๒

ค. สารมลพิษที่อนุญาตให้วิเคราะห์ในน้ำเสีย จำนวน ๗ รายการ ตามสิ่งที่ส่งมาด้วย

หนังสืออนุญาตฉบับนี้จะหมดอายุในวันที่ ๒๖ มีนาคม ๒๕๖๑ หากประสงค์จะต่ออายุหนังสืออนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรมก่อนวันที่หนังสืออนุญาตจะหมดอายุไม่น้อยกว่า ๓๐ วัน ซึ่งคำขอต่ออายุดังกล่าวขอรับได้ที่กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นางสาวพะเยาว์ คำมุข)
ผู้อำนวยการสำนักวิจัยและพัฒนาสิ่งแวดล้อมโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

สำนักวิจัยและพัฒนาสิ่งแวดล้อมโรงงาน
ศูนย์วิจัยและพัฒนาสิ่งแวดล้อมโรงงานส่วนกลาง
โทร. ๐ ๒๒๐๒ ๔๑๔๖-๗ ๐ ๒๒๐๒ ๔๐๐๒
โทรสาร ๐ ๒๓๕๔ ๓๒๐๘ ๐ ๒๓๕๔ ๓๔๑๕

เอกสารแนบท้ายหนังสืออนุญาตต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท วิศวกรรมธรณีและฐานราก จำกัด เลขทะเบียน ว-048
ที่ อก ๐๓๑๘/(๑) ๖๓๖๒ ลงวันที่ ๓๑ มีนาคม ๒๕๕๘
สารมลพิษที่อนุญาตให้วิเคราะห์ จำนวน 7 รายการ

น้ำเสีย จำนวน 7 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Biochemical Oxygen Demand	5-Day BOD Test, Azide Modification Method[2]
2	Chemical Oxygen Demand	Closed Reflux, Titrimetric Method[1]
3	Oil & Grease	Soxhlet Extraction Method[2]
4	pH	Electrometric Method[2]
5	Suspended Solids	Dried at 103-105 °C[1]
6	Temperature	Laboratory and Field Method[2]
6	Total Dissolved Solids	Dried at 103-105 °C[2]

เอกสารอ้างอิง

1. สมาคมวิศวกรรมสิ่งแวดล้อมแห่งประเทศไทย. คู่มือวิเคราะห์น้ำเสีย. พิมพ์ครั้งที่ 4. กรุงเทพฯ: เรือนแก้วการพิมพ์, 2547.

2. APHA, AWWA, WEF. **Standard Methods for the Examination of Water and Wastewater**. 22nd ed. Washington, DC: APHA, 2012.

Ref. No. 0318/(1) 2294 Department of Industrial Works

28th January 2015

Subject: Extension of Laboratory License

To: ASL Laboratory Group (Thailand) Co, Ltd.

With reference to the request of ASL Laboratory Group (Thailand) Co, Ltd. dated on 15th August 2014 for extension of Laboratory License which is located at 104 Soi Phatthanakan 40, Phattanakan Road, Suan Luang, Bangkok 10205, Thailand, Department of Industrial Works had considered and approved extension of the Laboratory License no. 204 until 2nd September 2017.

Items for Laboratory Test service cover:

Wastewater	45 items
Air Pollution	16 items
Industrial Wastes	35 items
Total	96 items , as annexed hereto.

Industrial Environment Research and Development Bureau

Industrial Environment Research and Development Centre

ที่ อก ๐๓๑๘/(๑) ๒๒๙๙

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ เขตราชเทวี
กรุงเทพมหานคร ๑๐๔๐๐

๒๘ มกราคม ๒๕๕๘

เรื่อง ต่ออายุหนังสืออนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน ผู้รับอนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุหนังสืออนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
ลงวันที่ ๑๕ สิงหาคม ๒๕๕๗

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสืออนุญาตต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด จำนวน ๑๑ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด ขอต่ออายุหนังสืออนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๒๐๔ สถานที่ตั้งเลขที่ ๑๐๔ ซอยพัฒนาการ ๔๐ ถนนพัฒนาการ แขวงสวนหลวง เขตสวนหลวง กรุงเทพมหานคร ต่อ กรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว อนุญาตให้ต่ออายุหนังสืออนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์

๑) นางสาวยุพาพร จันทร์เปล่ง	ทะเบียนเลขที่ ว-๒๐๔-ค-๔๗๐๐
๒) นางสาวชัชนัย โกมารกุล ณ นคร	ทะเบียนเลขที่ ว-๒๐๔-ค-๔๗๐๑
๓) นายศรายุทธ จิตรานนท์	ทะเบียนเลขที่ ว-๒๐๔-ค-๔๗๐๒
๔) นางสาวกนกกร เอนก	ทะเบียนเลขที่ ว-๒๐๔-ค-๖๑๑๑
๕) นายสุริยา สอนแก้ว	ทะเบียนเลขที่ ว-๒๐๔-ค-๖๑๑๒
๖) นายวิชาญ ขุณหรัต	ทะเบียนเลขที่ ว-๒๐๔-ค-๖๑๑๓

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์

๑) นายจิโรจ มั่งมี	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๐๕
๒) นางสาวจินดา โชจุลธรรม	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๐๘
๓) นางสาวสาวิตรี น้อยเสงี่ยม	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๐๙
๔) นางสาวชณัฐกาญจน์ อิ่มชม	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๑๐
๕) นางสาวสุพัทชา พลขันธ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๑๒
๖) นางสาวนิภาภรณ์ บุสทิพย์	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๑๓
๗) นางสาวนรินทร์ สายเส็ง	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๑๕
๘) นางสาวนันทวดี สมบูรณ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๑๖
๙) นางสาวศรัณยา เฉลิมธำรงค์	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๑๗

/ ๑๐) นางสาวสรารัศมิ์ ...

๑๐) นางสาวสรารัศมิ์ มงคลจิรวุฒิ	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๑๙
๑๑) นางสาวศิริลักษณ์ พึ่งแพง	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๒๐
๑๒) นางสาวเบญจลักษณ์ วังอนานนท์	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๒๑
๑๓) นางสาววันวิสา ยิ้มใส	ทะเบียนเลขที่ ว-๒๐๔-จ-๔๗๒๒
๑๔) นายนพพงศ์ จันทรพันธุ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๐๘
๑๕) นายรตนันท์ แตงเจริญ	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๑๐
๑๖) นายนรเศรษฐ์ โกมาลย์	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๑๑
๑๗) นายวรวุฒิ สิรินิธิประภา	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๑๓
๑๘) นายธันวา จริยา	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๑๔
๑๙) นางสาวเกศรินทร์ แก้วมั่น	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๑๖
๒๐) นางสาวสุวิมล ชัยเรืองวุฒิ	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๑๗
๒๑) นางสาวสุดาภรณ์ สมบัติดี	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๑๙
๒๒) นางสาวสุชาดา ธรรมถาวร	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๒๑
๒๓) นางสาวเปมิกา ชัยเดชธนกุล	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๒๓
๒๔) นางสาวศศิธร หมูสวัสดิ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๒๔
๒๕) นางสาวเสาวลักษณ์ ภู่นภาอำพร	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๒๕
๒๖) นายอภิสิทธิ์ สิงหา	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๒๖
๒๗) นายศักดิ์สิทธิ์ ไพศาลพิสุทธิ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๒๗
๒๘) ว่าที่ร้อยตรีหญิง พรรณิภา ขำเจริญ	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๒๘
๒๙) นายณัฐวุฒิ ทาหาวงษ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๒๙
๓๐) นางสาวจิลดา ปาลีพงศ์พันธุ์	ทะเบียนเลขที่ ว-๒๐๔-จ-๕๔๓๑
๓๑) นางสาวบี ภู่เพชร	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๑๔
๓๒) นางสาวอรวรรณ รักยง	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๑๕
๓๓) นางสาวตลฤดี ชาเฮา	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๑๖
๓๔) นางสาวพัชรี ถือมาลา	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๑๗
๓๕) นางสาวณชา ดวงสิน	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๑๘
๓๖) นางสาวนพรัตน์ แย้มกรานต์	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๑๙
๓๗) นายจุลเดช วารินทร์	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๐
๓๘) นางสาวคายุรัตน์ ร้องคำ	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๑
๓๙) นายนคร สุขเจริญ	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๒
๔๐) นายบัญชา นามเขตต์	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๓
๔๑) นายนพรัตน์ จำปาแขม	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๔
๔๒) นายพรมมี ศรีปัตเนตร	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๕
๔๓) นายอุทิศ อุ่นสิม	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๖
๔๔) นายสุทิน จั่นเพชร	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๗
๔๕) ว่าที่ร้อยตรี เฉลิมเกียรติ อมรศรีเสริม	ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๘

/๔๖) นางสาววริยา...

๔๖) นางสาววิยา สร้างนา ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๒๙

๔๗) นายอนุพงศ์ รัตนศรีประเสริฐ ทะเบียนเลขที่ ว-๒๐๔-จ-๖๑๓๐

๔๘) นางสาวจุฑารัตน์ โอนสันเทียะ ทะเบียนเลขที่ ว-๒๐๔-จ-๖๒๔๒

ค. สารมลพิษที่อนุญาตให้วิเคราะห์ในน้ำเสีย จำนวน ๔๕ รายการ อากาศเสีย จำนวน ๑๖ รายการ และกากอุตสาหกรรม จำนวน ๓๕ รายการ รวมทั้งสิ้นจำนวน ๙๖ รายการ ตามสิ่งที่ส่งมาด้วย

หนังสืออนุญาตฉบับนี้จะหมดอายุในวันที่ ๒ กันยายน ๒๕๖๐ หากประสงค์จะต่ออายุหนังสืออนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรมก่อนวันที่หนังสืออนุญาตจะหมดอายุไม่น้อยกว่า ๓๐ วัน ซึ่งคำขอต่ออายุดังกล่าวขอรับได้ที่กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นางสาวพะเยาว์ คำมุข)
ผู้อำนวยการสำนักวิจัยและพัฒนาสิ่งแวดล้อมโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

สำนักวิจัยและพัฒนาสิ่งแวดล้อมโรงงาน
ศูนย์วิจัยและพัฒนาสิ่งแวดล้อมโรงงานส่วนกลาง
โทร. ๐ ๒๒๐๒ ๔๑๔๖-๗ ๐ ๒๒๐๒ ๔๐๐๒
โทรสาร ๐ ๒๓๕๔ ๓๒๐๘ ๐ ๒๓๕๔ ๓๔๑๕

เอกสารแนบท้ายหนังสืออนุญาตต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอแอลเอส แลบอราทอรี กรุ๊ป (ประเทศไทย) จำกัด เลขทะเบียน ว-204
ที่ อก ๐๓๑๘/(๑) ๒๒๙๔ ลงวันที่ ๒๘ มกราคม ๒๕๕๘
สารมลพิษที่อนุญาตให้วิเคราะห์ จำนวน 96 รายการ

<u>น้ำเสีย จำนวน 45 รายการ</u>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	Liquid- Liquid Extraction, Gas Chromatographic Method[4]
2	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[4] 2) Digestion, Inductively Coupled Plasma Method[24] 3) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]
3	Barium	1) Digestion, Direct Nitrous Oxide-Acetylene Flame Method[4] 2) Digestion, Inductively Coupled Plasma Method[24] 3) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]
4	α -BHC	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
5	β-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
6	γ-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
7	Biochemical Oxygen Demand	1) 5-Day BOD Test, Azide Modification Method[4] 2) 5-Day BOD Test, Membrane Electrode Method[4]
8	Cadmium	1) Digestion, Direct Air-Acetylene Flame Method[4] 2) Digestion, Inductively Coupled Plasma Method[24] 3) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]
9	Chemical Oxygen Demand	1) Closed Reflux, Colorimetric Method[4] 2) Open Reflux, Titrimetric Method[4]
10	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
11	Chromium	1) Digestion, Direct Air-Acetylene Flame Method[4] 2) Digestion, Inductively Coupled Plasma Method[24] 3) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]
12	Copper	1) Digestion, Direct Air-Acetylene Flame Method[4] 2) Digestion, Inductively Coupled Plasma Method[24] 3) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]
13	Cyanide	Distillation, Colorimetric Method[4]
14	o,p'-DDD	Liquid-Liquid Extraction, Gas Chromatographic Method[4]

/15 p,p'-DDD...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
15	p,p'-DDD	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
16	o,p'-DDE	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
17	p,p'-DDE	Liquid-Liquid Extraction, Gas Chromatographic Method[1]
18	o,p'-DDT	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
19	p,p'-DDT	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
20	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
21	Endosulfan sulfate	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
22	Endosulfan I	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
23	Endosulfan II	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
24	Endrin	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
25	Endrin Aldehyde	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
26	Formaldehyde	Distillation, Colorimetric Method[2]
27	Free Chlorine	1) DPD Ferrous Titrimetric Method[4] 2) Iodometric Method[4]
28	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
29	Heptachlor Epoxide	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
30	Hexavalent Chromium	Filtration, Colorimetric Method[4]
31	Lead	1) Digestion, Direct Air-Acetylene Flame Method[4] 2) Digestion, Inductively Coupled Plasma Method[24] 3) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]
32	Manganese	1) Digestion, Direct Air-Acetylene Flame Method[4] 2) Digestion, Inductively Coupled Plasma Method[24] 3) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]
33	Mercury	1) Cold-Vapor Atomic Absorption Spectrometric Method[4] 2) Cold-Vapor Fluorescence Spectrometric Method[12]
34	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
35	Nickel	1) Digestion, Direct Air-Acetylene Flame Method[4] 2) Digestion, Inductively Coupled Plasma Method[24] 3) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]
36	Oil & Grease	1) Liquid-Liquid, Partition-Gravimetric Method[4] 2) Soxhlet Extraction Method[4]
37	pH	Electrometric Method[4]
38	Phenols	Distillation, Chloroform Extraction Method[4]

/39 Selenium...

ตาม ใบอนุญาต

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
39	Selenium	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[4] 2) Digestion, Inductively Coupled Plasma Method[24] 3) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]
40	Sulfide	ZnS Precipitation, Iodometric Method[4]
41	Suspended Solids	Dried at 103-105°C[4]
42	Temperature	Laboratory and Field Methods[4]
43	Total Dissolved Solids	1) Dried at 103-105°C[4] 2) Dried at 180°C[4]
44	Total Kjeldahl Nitrogen	1) Digestion, Semi-Automated Colorimetric Method[6] 2) Digestion, Semi-Micro Kjeldahl Method[4]
45	Zinc	1) Digestion, Direct Air-Acetylene Flame Method[4] 2) Digestion, Inductively Coupled Plasma Method[24] 3) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[4]

อากาศเสีย (ปล่องระบาย) จำนวน 16 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	Isokinetic, Digestion, Inductively Coupled Plasma Method[5]
2	Arsenic	1) Isokinetic, Digestion, Hydride Generation/ Atomic Absorption Spectrometric Method[5] 2) Isokinetic, Digestion, Inductively Coupled Plasma Method[5]
3	Carbon Monoxide	1) Sampling bag, Non-Dispersive Infrared Method[5] 2) Non-Dispersive Infrared Method[5]
4	Chlorine	1) Absorption, Ion Chromatographic Method[5] 2) Isokinetic, Ion Chromatographic Method[5]
5	Copper	1) Isokinetic, Digestion, Direct Air-Acetylene Flame Method[5] 2) Isokinetic, Digestion, Inductively Coupled Plasma Method[5]
6	Dioxins	Isokinetic Sampling, Analysis by ISO/IEC 17025 Accredited Laboratory[5]
7	Hydrogen Chloride	1) Absorption, Ion Chromatographic Method[5] 2) Isokinetic, Ion Chromatographic Method[5]

/8 Hydrogen ...

ตาม ใบอนุญาต

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
8	Hydrogen Sulfide	Absorption, Iodometric Method[5]
9	Lead	1) Isokinetic, Digestion, Direct Air-Acetylene Flame Method[5]
		2) Isokinetic, Digestion, Inductively Coupled Plasma Method[5]
10	Mercury	1) Isokinetic, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[5]
		2) Isokinetic, Digestion, Cold-Vapor Atomic Fluorescence Spectrometric Method[5]
11	Opacity	Ringelmann's Method[3]
12	Oxides of Nitrogen	1) Absorption, Phenoldisulfonic Acid Method[5]
		2) Chemiluminescence Method[5]
13	Sulfur Dioxide	1) Absorption, Barium-Thorin Titrimetric Method[5]
		2) UV-Fluorescence Method[5]
14	Sulfuric Acid	Isokinetic, Barium-Thorin Titrimetric Method[5]
15	Total Suspended Particulate	Isokinetic, Gravimetric Method[5]
16	Xylene	Adsorption, Gas Chromatographic Method[5]

กากอุตสาหกรรม จำนวน 35 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	1) Waste Extraction, Gas Chromatographic Method[1,4]
		2) Soxhlet Extraction, Gas Chromatographic Method[16,18]
2	Antimony	4) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,8,13]
		2) Waste Extraction, Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[1,8,23]
		3) Digestion, Inductively Coupled Plasma Method[8,13]
		4) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[8,23]
3	Arsenic	1) Waste Extraction, Digestion, Hydride Generation/ Atomic Absorption Spectrometric Method[1,8,9]
		5) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,8,13]
		3) Waste Extraction, Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[1,8,23]
		4) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[8,9]
		5) Digestion, Inductively Coupled Plasma Method[8,13]

/6) Digestion...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
		6) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[8,23]
4	Barium	1) Waste Extraction, Digestion, Direct Nitrous Oxide-Acetylene Flame Method[1,8,14]
		2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,8,13]
		3) Waste Extraction, Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[1,8,23]
		4) Digestion, Direct Nitrous Oxide-Acetylene Flame Method[8,14]
		5) Digestion, Inductively Coupled Plasma Method[8,13]
		6) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[8,23]
5	Beryllium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,8,13]
		2) Waste Extraction, Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[1,8,23]
		3) Digestion, Inductively Coupled Plasma Method[8,13]
		4) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[8,23]
6	Cadmium	1) Waste Extraction, Digestion, Direct Air-Acetylene Flame Method[1,8,14]
		2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,8,13]
		3) Waste Extraction, Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[1,8,23]
		4) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[8,9]
		5) Digestion, Inductively Coupled Plasma Method[8,13]
		6) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[8,23]
7	Chlordane	1) Waste Extraction, Gas Chromatographic Method[1,4]
		2) Soxhlet Extraction, Gas Chromatographic Method[16,18]
8	Chromium	1) Waste Extraction, Digestion, Direct Air-Acetylene Flame Method[1,8,14]
		2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,8,13]

/3) Waste...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
		3) Waste Extraction, Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[1,8,23] 4) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[8,9] 5) Digestion, Inductively Coupled Plasma Method[8,13] 6) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[8,23]
9	Cobalt	1) Waste Extraction, Digestion, Direct Air-Acetylene Flame Method[1,8,14] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,8,13] 3) Waste Extraction, Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[1,8,23] 4) Digestion, Direct Air-Acetylene Flame Method[8,14] 5) Digestion, Inductively Coupled Plasma Method[8,13] 6) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[8,23]
10	Copper	1) Waste Extraction, Digestion, Direct Air-Acetylene Flame Method[1,8,14] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,8,13] 3) Waste Extraction, Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[1,8,23] 4) Digestion, Direct Air-Acetylene Flame Method[8,14] 5) Digestion, Inductively Coupled Plasma Method[8,13] 6) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[8,23]
11	Cyanide	1) Distillation, Colorimetric Method Method[21,22] 2) Waste Extraction, Distillation, Colorimetric Method[1,22]
12	2,4-D	1) Waste Extraction, Gas Chromatographic Method[1,4] 2) Soxhlet Extraction, Gas Chromatographic Method[16,18]
13	DDD	1) Waste Extraction, Gas Chromatographic Method[1,4] 2) Soxhlet Extraction, Gas Chromatographic Method[16,18]
14	DDE	1) Waste Extraction, Gas Chromatographic Method[1,4] 2) Soxhlet Extraction, Gas Chromatographic Method[16,18]
15	DDT	1) Waste Extraction, Gas Chromatographic Method[1,4] 2) Soxhlet Extraction, Gas Chromatographic Method[16,18]

/16) Dieldrin...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
16	Dieldrin	1) Waste Extraction, Gas Chromatographic Method[1,4] 2) Soxhlet Extraction, Gas Chromatographic Method[16,18]
17	Endrin	1) Waste Extraction, Gas Chromatographic Method[1,4] 2) Soxhlet Extraction, Gas Chromatographic Method[16,18]
18	Heptachlor	1) Waste Extraction, Gas Chromatographic Method[1,4] 2) Soxhlet Extraction, Gas Chromatographic Method[16,18]
19	Hexavalent Chromium	1) Waste Extraction, Colorimetric Method[1,7] 2) Digestion, Colorimetric Method[7,17]
20	Lead	13) Waste Extraction, Digestion, Direct Air-Acetylene Flame Method[1,8,14] 14) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,8,13] 3) Waste Extraction, Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[1,8,23] 4) Digestion, Direct Air-Acetylene Flame Method[8,14] 5) Digestion, Inductively Coupled Plasma Method[8,13] 6) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[8,23]
21	Lindane	1) Waste Extraction, Gas Chromatographic Method[1,4] 2) Soxhlet Extraction, Gas Chromatographic Method[16,18]
22	Mercury	1) Waste Extraction, Cold-Vapor, Atomic Absorption Spectrometric Method[1,15] 2) Waste Extraction, Cold-Vapor Atomic Fluorescence Spectrometric Method[1,11] 3) Digestion, Cold-Vapor, Atomic Absorption Spectrometric Method[15] 4) Digestion, Cold- Vapor Atomic Fluorescence Spectrometric Method[11]
23	Methoxychlor	1) Waste Extraction, Gas Chromatographic Method[1,4] 2) Soxhlet Extraction, Gas Chromatographic Method[16,18]
24	Mirex	1) Waste Extraction, Gas Chromatographic Method[1,4] 2) Soxhlet Extraction, Gas Chromatographic Method[16,18]
25	Molybdenum	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,8,13] 2) Waste Extraction, Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[1,8,23]

/3) Digestion...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
		3) Digestion, Inductively Coupled Plasma Method[8,13] 4) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[8,23]
26	Nickel	1) Waste Extraction, Digestion, Direct Air-Acetylene Flame Method[1,8,14] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,8,13] 3) Waste Extraction, Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[1,8,23] 4) Digestion, Direct Air-Acetylene Flame Method[8,14] 5) Digestion, Inductively Coupled Plasma Method[8,13] 6) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[8,23]
27	Polychlorinated biphenyls (PCBs)	1) Waste Extraction, Gas Chromatographic Method[1,19] 2) Soxhlet Extraction, Gas Chromatographic Method[16,19]
28	Pentachlorophenol	1) Waste Extraction, Gas Chromatographic Method[1,4] 2) Soxhlet Extraction, Gas Chromatographic Method[16,18]
29	pH	Electrometric Method[10]
30	Selenium	1) Waste Extraction, Digestion, Hydride Generation Atomic Absorption Spectrometric Method[1,8,20] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,8,13] 3) Waste Extraction, Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[1,8,23] 4) Digestion, Continuous Hydride Generation/Atomic Absorption Spectrometric Method[8,20] 5) Digestion, Inductively Coupled Plasma Method[8,13] 6) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[8,23]
31	Silver	1) Waste Extraction, Digestion, Direct Air-Acetylene Flame Method[1,8,14] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,8,13] 3) Waste Extraction, Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[1,8,23] 4) Digestion, Direct Air-Acetylene Flame Method[8,14]

/5) Digestion...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
		5) Digestion, Inductively Coupled Plasma Method[8,13] 6) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[8,23]
32	Thallium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,8,13] 2) Waste Extraction, Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[1,8,23] 3) Digestion, Inductively Coupled Plasma Method[8,13] 4) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[8,23]
33	Toxaphene	1) Waste Extraction, Gas Chromatographic Method[1,4] 2) Soxhlet Extraction, Gas Chromatographic Method[16,18]
34	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,8,13] 2) Waste Extraction, Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[1,8,23] 3) Digestion, Inductively Coupled Plasma Method[8,13] 4) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[8,23]
35	Zinc	1) Waste Extraction, Digestion, Direct Air-Acetylene Flame Method[1,8,14] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,8,13] 3) Waste Extraction, Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[1,8,23] 4) Digestion, Direct Air-Acetylene Flame Method[8,14] 5) Digestion, Inductively Coupled Plasma Method[8,13] 6) Digestion, Inductively Coupled Plasma-Mass Spectrometry Method[8,23]

<u>เอกสารอ้างอิง</u>

1. กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2548 เรื่อง การกำจัดสิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว. ราชกิจจานุเบกษา. 25 มกราคม 2549. เล่มที่ 123 ตอนพิเศษ 11 ง.

2. สมาคมวิศวกรรมสิ่งแวดล้อมแห่งประเทศไทย. คู่มือวิเคราะห์น้ำเสีย. พิมพ์ครั้งที่ 4. กรุงเทพฯ: เรือนแก้วการพิมพ์, 2547.

3. กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2549 เรื่อง กำหนดค่าปริมาณเขม่าควันที่เจือปนในอากาศที่ระบายออกจากปล่องของหม้อน้ำโรงสีข้าวที่ใช้แกลบเป็นเชื้อเพลิง. ราชกิจจานุเบกษา. 4 ธันวาคม 2549. เล่มที่ 123 ตอนพิเศษ 125 ง.

/ 4. APHA ...

4. APHA, AWWA, WEF. Standard Methods for the Examination of Water and Wastewater. 22nd ed. Washington, DC: APHA, 2012.

5. United States Environmental Protection Agency. Standard of Performance for New Stationary Sources. 40 CFR 60 Appendix A, 2013.

6. United States Environmental Protection Agency. Determination of Total Kjeldahl Nitrogen by Semi Automate Colorimetric. Method 351.2, 1993.

7. United States Environmental Protection Agency. Alkaline Digestion for Hexavalent Chromium. SW-846 Method 3060A, 1996.

8. United States Environmental Protection Agency. Acid Digestion of Sludges and Sediments and Soils. SW-846 Method 3050B, 1996.

9. United States Environmental Protection Agency. Arsenic (Atomic Absorption Gaseous Hydride). SW-846 Method 7062, 2007.

10. United States Environmental Protection Agency. Soil and Waste pH. SW-846 Method 9045C, 1996.

11. United States Environmental Protection Agency. Mercury in Sediment and Tissue Sample by Atomic Fluorescence Spectrometry. SW-846 Method 7474, 2007.

12. United States Environmental Protection Agency. Mercury in Water by Oxidation, Purge and Trap, CVAFS. Method 1631, 2002.

13. United States Environmental Protection Agency. Inductively Coupled Plasma-Atomic Emission Spectrometry. SW-846 Method 6010B, 1996.

14. United States Environmental Protection Agency. Flame Atomic Absorption Spectrophotometry. SW-846 Method 7000B, 2007.

15. United States Environmental Protection Agency. Mercury in Solid or Semisolid Waste (Manual Cold-Vapor Technique). SW-846 Method 7471A, 1994.

16. United States Environmental Protection Agency- Soxhlet Extraction. SW-846 Method 3540C, 1996.

17. United States Environmental Protection Agency. Chromium, Hexavalent (Colorimetric). SW-846 Method 7196A, 1992.

18. United States Environmental Protection Agency. Organochlorine Pesticides by Gas Chromatrography SW-846 Method 8081B, 2007.

19. United States Environmental Protection Agency. Polychlorinate Biphenyls (PCBs) by Gas Chromatrography SW-846 Method 8082, 1996.

20. United States Environmental Protection Agency. Selenium Atomic Absorption, Borohydride Reduction. SW-846 Method 7742, 1992.

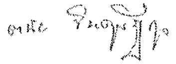
21. United States Environmental Protection Agency. Cyanide Extraction Procedure for Solids and Oil SW-846 Method 9013A, 1996.

22. United States Environmental Protection Agency. Total and Amenable Cyanide: Distillation SW-846 Method 9010B, 1996.

/ 23. United ....

23. United States Environmental Protection Agency. Inductively Coupled Plasma-Mass Spectrometry. SW-846 Method 6020A, 2007.

24. United States Environmental Protection Agency. Determination of Metals and Trace Element in water and Wastes by Inductively Coupled Plasma-Atomic Emission Spectrometry. SW-846 Method 200.7, 1994.



Ref No. : 0303/780

CERTIFICATE OF TESTING LABORATORY ACCREDITATION

This is to certify that

ALS Laboratory Group (Thailand) Co., Ltd.
104 Soi Phatthanakan 40, Phatthanakan Road,
Suan Luang, Bangkok 10250

Have successfully undergone assessment according to ISO/IEC 17025 : 2005 and under the Bureau of Laboratory Accreditation, Department of Science Service for the requirements, regulations and criteria for the competence of testing laboratories

Accreditation Number TESTING - 0009

The scope of accreditation is as annexed hereto

Issue date : *26th January 2015*

Expired date : *7th December 2015*

Signature : Suthiweth T. Saengchantara

(Mr. Suthiweth T. Saengchantara)

Chairperson of Laboratory Accreditation Committee

Bureau of Laboratory Accreditation, Department of Science Service, Ministry of Science and Technology

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
1	Food packaging	- Aerobic plate count cfu/50 cm^2	Compendium of Methods for the Microbiological Examination of Foods, 4th ed., 2001, chapter 3 item 3.51 and chapter 7
		- Coliforms cfu/50 cm^2 Detected or not detected	Compendium of Methods for the Microbiological Examination of Foods, 4th ed., 2001, chapter 3 item 3.51 and chapter 8
		- *E. coli* cfu/50 cm^2 Detected or not detected	Compendium of Methods for the Microbiological Examination of Foods, 4th ed., 2001, chapter 3 item 3.51 and chapter 8
		- Fecal coliforms Detected or not detected	Compendium of Methods for the Microbiological Examination of Foods, 4th ed., 2001, chapter 3 item 3.51 and chapter 8

Initial Issue Date 30th August 2006 Issue Number 8

Scope of Testing Laboratory Accreditation

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Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
1 (cont.)	Food packaging	- *Salmonella* spp. Detected or not detected	Compendium of Methods for the Microbiological Examination of Foods, 4th ed., 2001, chapter 3 item 3.51 and chapter 37
		- *Staphylococcus aureus* cfu/50 cm^2 Detected or not detected	Compendium of Methods for the Microbiological Examination of Foods, 4th ed., 2001, chapter 3 item 3.51 and chapter 39
		- *Bacillus cereus* cfu/50 cm^2 Detected or not detected	Compendium of Methods for the Microbiological Examination of Foods, 4th ed., 2001, chapter 3 item 3.51 and chapter 32
		- *Clostridium perfringens* cfu/50 cm^2 Detected or not detected	Compendium of Methods for the Microbiological Examination of Foods, 4th ed., 2001, chapter 3 item 3.51 and chapter 34

Initial Issue Date 30th August 2006 Issue Number 8

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Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
1 (cont.)	Food packaging	- *Listeria monocytogenes*, and *Listeria* spp. Detected or not detected	Compendium of Methods for the Microbiological Examination of Foods, 4th ed., 2001, chapter 3 item 3.51 and chapter 36
		- Yeast and Mold count cfu/50 cm^2	Compendium of Methods for the Microbiological Examination of Foods, 4th ed., 2001, chapter 3 item 3.51 and chapter 20
2	Plastics food packaging	- Overall migration (10% ethanol) 2 mg/dm^2 to 100 mg/dm^2 - Overall migration (20% ethanol) 2 mg/dm^2 to 100 mg/dm^2 - Overall migration (50% ethanol) 2 mg/dm^2 to 100 mg/dm^2 - Overall migration (3% acetic acid) 2 mg/dm^2 to 100 mg/dm^2	The European Standard BS EN 1186-3,5 : 2002 and Commission Regulations (EU) No.10/2011

Initial Issue Date 30th August 2006 Issue Number 8

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Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
2 (cont.)	Plastics food packaging	- Overall migration (vegetable oil) 1 mg/dm^2 to 50 mg/dm^2	In - house method : STM 04-056 based on The European Standard BS EN 1186-2,4 : 2002 and Commission Regulations (EU) No.10/2011
	- Polyethylene - Polypropylene - Polystyrene - Polyvinyl chloride - Polyethylene terephthalate	- Residue after evaporation in 20% ethanol simulant 5 mg/dm^3 to 100 mg/dm^3 - Residue after evaporation in 4% acetic acid simulant 5 mg/dm^3 to 100 mg/dm^3	Specifications, Standards and Testing Methods for Foodstuffs, Implements, Containers and Packaging, Toys, Detergents 2008, Japan External Trade Organization, JETRO, section II, B-5

Initial Issue Date 30th August 2006 Issue Number 8

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Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
2 (cont.)	Plastics food packaging - Polyethylene - Polypropylene - Polystyrene - Polyvinyl chloride - Polyethylene terephthalate	- Residue after evaporation in n- heptane simulant 5 mg/dm^3 to 500 mg/dm^3 - Residue after evaporation in water simulant 5 mg/dm^3 to 100 mg/dm^3	Specifications, Standards and Testing Methods for Foodstuffs, Implements, Containers and Packaging, Toys, Detergents 2008, Japan External Trade Organization, JETRO, section II, B-5
		- Potassium permanganate consumption 0.5 mg/dm^3 to 15.0 mg/dm^3	Specifications, Standards and Testing Methods for Foodstuffs, Implements, Containers and Packaging, Toys, Detergents 2008, Japan External Trade Organization, JETRO, section II, B-1 and C-3
	- Polyethylene - Polypropylene - Polystyrene - Polyvinyl chloride	- Substances soluble in xylene at 25 °C 100 mg/kg to 100,000 mg/kg	TIS 656 : 2529

Initial Issue Date 30th August 2006 Issue Number 8

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Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
2 (cont.)	Plastics food packaging - Polyethylene - Polypropylene - Polystyrene - Polyvinyl chloride	- Material test Cadmium 0.50 mg/kg to 90 mg/kg Lead 3.0 mg/kg to 90 mg/kg	In - house method : STM 05-015 based on Specifications, Standards and Testing Methods for Foodstuffs, Implements, Containers and Packaging, Toys, Detergents 2008, Japan External Trade Organization, JETRO, section II, B-3
		Arsenic 0.05 mg/kg to 10 mg/kg	In - house method : STM 05-017 based on Specifications, Standards and Testing Methods for Foodstuffs, Implements, Containers and Packaging, Toys, Detergents 2008, Japan External Trade Organization, JETRO, section II, B-7

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Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
2 (cont.)	Plastics food packaging - Polyethylene - Polypropylene - Polystyrene - Polyvinyl chloride - Polycarbonate - Polyethylene terephthalate - Nylon	- Material test Arsenic 0.50 mg/kg to 90 mg/kg Cadmium 0.50 mg/kg to 90 mg/kg Lead 3.0 mg/kg to 90 mg/kg	In - house method : STM 05-019 based on Specifications, Standards and Testing Methods for Foodstuffs, Implements, Containers and Packaging, Toys, Detergents 2008, Japan External Trade Organization, JETRO, section II, B-9
		Total heavy metal (as Pb) Less than 10 mg/kg	In - house method : STM 05-016 based on Compendium of Methods for Food Analysis, DMSc & ACFS, 1st ed., 2003

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Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
2 (cont.)	Plastics food packaging - Polyethylene - Polypropylene - Polystyrene - Polyvinyl chloride - Polycarbonate - Polyethylene terephthalate - Nylon	- Migration test Antimony $0.01\ mg/dm^3$ to $4.0\ mg/dm^3$ Germanium $0.01\ mg/dm^3$ to $4.0\ mg/dm^3$	In - house method : STM 05-021 based on Specifications, Standards and Testing Methods for Foodstuffs, Implements, Containers and Packaging, Toys, Detergents 2008, Japan External Trade Organization, JETRO, section II, B-9
		Total heavy metal (as Pb) Less than $0.5\ mg/dm^3$	In - house method : STM 05-018 based on Specifications, Standards and Testing Methods for Foodstuffs, Implements, Containers and Packaging, Toys, Detergents 2008, Japan External Trade Organization, JETRO, section II, B-4

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Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
2 (cont.)	Plastics food packaging - Polystyrene	- Toluene 200 mg/kg to 5,000 mg/kg - Ethylbenzene 200 mg/kg to 5,000 mg/kg - Isopropyl benzene 200 mg/kg to 5,000 mg/kg - Styrene 200 mg/kg to 5,000 mg/kg - n-Propyl benzene 200 mg/kg to 5,000 mg/kg	In - house method : STM 04-058 based on Specifications, Standards and Testing Methods for Foodstuffs, Implements, Containers and Packaging, Toys, Detergents 2008, Japan External Trade Organization, JETRO, section II, D-2
	- Polyethylene - Polypropylene	- Substance soluble in n-Hexane 500 mg/kg to 50,000 mg/kg	TIS 656 : 2556

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Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
3	Water	- pH 6.0 to 10.0	In - house method : STM 04-003 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 4500 - H^+ B
		- BOD 2 mg/dm^3 to 500 mg/dm^3	In - house method : STM 04-005 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 5210 B, part 4500 - O G
		- Cyanide 0.005 mg/dm^3 to 5 mg/dm^3	In - house method : STM 04-007 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 4500 - CN^- C, E

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Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
3 (cont.)	Water	- Nitrate – Nitrogen 0.2 mg/dm^3 to 50 mg/dm^3	In - house method : STM 04-004 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 4110 B
		- Total Kjeldahl Nitrogen 1 mg/dm^3 to 500 mg/dm^3	In - house method : STM 04-009 based on United States Environmental Protection Agency, 1993, EPA Method 351.2
		- Oil & Grease 3 mg/dm^3 to 200 mg/dm^3	In - house method : STM 04-014 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 5520 B

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Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
3 (cont.)	Water	- Standard plate count cfu/ml	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 9215 B
		- Coliforms MPN/100 ml Detected or not detected	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 9221 B
		- *E. coli* MPN/100 ml Detected or not detected	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 9221 F
		- Fecal coliforms MPN/100 ml Detected or not detected	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 9221 E

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Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
3 (cont.)	Water	- *Salmonella* spp. Detected or not detected	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 9260 B
		- *Clostridium perfringens* cfu/100 ml, cfu/250 ml	Health Protection Agency National Standard Method W5 : 2005
		- *Clostridium perfringens* Detected or not detected	In - house method : STM 01-094 based on Health Protection Agency National Standard Method W5 : 2005
		- *Staphylococcus aureus* cfu/100 ml, cfu/250 ml	Health Protection Agency National Standard Method W10 : 2005
		- *Staphylococcus aureus* Detected or not detected	In - house method : STM 01-055 based on Health Protection Agency National Standard Method W10 : 2005

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Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
3 (cont.)	Water	- Mercury 0.1 $\mu g/dm^3$ to 1.5 $\mu g/dm^3$	In - house method : STM 05-007 based on United States Environmental Protection Agency, 2002, EPA Method 1631, Revision E
		- Arsenic 0.001 mg/dm^3 to 0.04 mg/dm^3 - Selenium 0.001 mg/dm^3 to 0.04 mg/dm^3	In - house method : STM 05-012 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 3114 C
		- Hexavalent chromium 0.01 mg/dm^3 to 8 mg/dm^3	In - house method : STM 05-020 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 3500 B

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Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
3 (cont.)	Water	- Aluminium 0.01 mg/dm^3 to 40 mg/dm^3 - Antimony 0.005 mg/dm^3 to 40 mg/dm^3 - Arsenic 0.01 mg/dm^3 to 40 mg/dm^3 - Barium 0.005 mg/dm^3 to 40 mg/dm^3 - Beryllium 0.002 mg/dm^3 to 40 mg/dm^3 - Bismuth 0.05 mg/dm^3 to 10 mg/dm^3 - Boron 0.005 mg/dm^3 to 40 mg/dm^3 - Cadmium 0.001 mg/dm^3 to 40 mg/dm^3 - Calcium 0.10 mg/dm^3 to 1,000 mg/dm^3	In - house method : STM 05-014 based on United State Environmental Protection Agency, 1994, EPA Method 200.7

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Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
3 (cont.)	Water	- Chromium 0.002 mg/dm^3 to 40 mg/dm^3 - Cobalt 0.01 mg/dm^3 to 40 mg/dm^3 - Copper 0.005 mg/dm^3 to 40 mg/dm^3 - Iron 0.01 mg/dm^3 to 40 mg/dm^3 - Lead 0.01 mg/dm^3 to 40 mg/dm^3 - Lithium 0.01 mg/dm^3 to 40 mg/dm^3 - Magnesium 0.10 mg/dm^3 to 900 mg/dm^3 - Manganese 0.005 mg/dm^3 to 40 mg/dm^3 - Molybdenum 0.005 mg/dm^3 to 40 mg/dm^3	In - house method : STM 05-014 based on United State Environmental Protection Agency, 1994, EPA Method 200.7

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Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
3 (cont.)	Water	- Nickel 0.005 mg/dm^3 to 40 mg/dm^3 - Phosphorus 0.05 mg/dm^3 to 1,000 mg/dm^3 - Potassium 0.10 mg/dm^3 to 900 mg/dm^3 - Selenium 0.01 mg/dm^3 to 3 mg/dm^3 - Silver 0.01 mg/dm^3 to 10 mg/dm^3 - Sodium 0.10 mg/dm^3 to 1,000 mg/dm^3 - Strontium 0.002 mg/dm^3 to 10 mg/dm^3 - Sulfur 0.10 mg/dm^3 to 1,000 mg/dm^3 - Tellurium 0.01 mg/dm^3 to 10 mg/dm^3	In - house method : STM 05-014 based on United State Environmental Protection Agency, 1994, EPA Method 200.7

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Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
3 (cont.)	Water	- Thallium 0.01 mg/dm^3 to 40 mg/dm^3 - Tin 0.01 mg/dm^3 to 40 mg/dm^3 - Titanium 0.005 mg/dm^3 to 40 mg/dm^3 - Vanadium 0.005 mg/dm^3 to 40 mg/dm^3 - Zinc 0.01 mg/dm^3 to 40 mg/dm^3	In - house method : STM 05-014 based on United State Environmental Protection Agency, 1994, EPA Method 200.7
		- 1,1,1-Trichloroethane 0.5 µg/dm^3 to 1,000 µg/dm^3 - 1,1,2-Trichloroethane 0.5 µg/dm^3 to 1,000 µg/dm^3 - 1,1-Dichloroethylene 0.5 µg/dm^3 to 1,000 µg/dm^3	In - house method : STM 04-048 based on United State Environmental Protection Agency, 1994, EPA, method 5030 B

Initial Issue Date 30th August 2006 Issue Number 8

Bureau of Laboratory Accreditation, Department of Science Service, Ministry of Science and Technology

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Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
3 (cont.)	Water	- 1,2-Dichloroethane 0.5 µg/dm^3 to 1,000 µg/dm^3 - Benzene 0.5 µg/dm^3 to 1,000 µg/dm^3 - Carbontetrachloride 0.5 µg/dm^3 to 1,000 µg/dm^3 - *cis*-1,2-Dichloroethane 0.5 µg/dm^3 to 1,000 µg/dm^3 - Dichloromethane 0.5 µg/dm^3 to 1,000 µg/dm^3 - Ethylbenzene 0.5 µg/dm^3 to 1,000 µg/dm^3 - Styrene 0.5 µg/dm^3 to 1,000 µg/dm^3 - Tetrachloroethylene 0.5 µg/dm^3 to 1,000 µg/dm^3	In - house method : STM 04-048 based on United State Environmental Protection Agency, 1994, EPA, method 5030 B

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Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
3 (cont.)	Water	- Toluene 0.5 μg/dm^3 to 1,000 μg/dm^3 - *o* -Xylene 0.5 μg/dm^3 to 1,000 μg/dm^3 - *m* -Xylene 0.5 μg/dm^3 to 1,000 μg/dm^3 - *p* -Xylene 0.5 μg/dm^3 to 1,000 μg/dm^3 - Total Xylene 1.0 μg/dm^3 to 1,000 μg/dm^3 - trans-1,2-Dichloroethylene 0.5 μg/dm^3 to 1,000 μg/dm^3 - Trichloroethylene 0.5 μg/dm^3 to 1,000 μg/dm^3 - Vinylchloride 0.5 μg/dm^3 to 1,000 μg/dm^3 - 2-Butanone 0.5 μg/dm^3 to 1,000 μg/dm^3	In - house method : STM 04-048 based on United State Environmental Protection Agency, 1994, EPA, method 5030 B

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Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
3 (cont.)	Water	- 2,4-DDD 0.02 μg/dm^3 to 200 μg/dm^3 - 2,4-DDE 0.02 μg/dm^3 to 200 μg/dm^3 - 2,4-DDT 0.02 μg/dm^3 to 200 μg/dm^3 - 4,4-DDD 0.02 μg/dm^3 to 200 μg/dm^3 - 4,4-DDE 0.02 μg/dm^3 to 200 μg/dm^3 - 4,4-DDT 0.02 μg/dm^3 to 200 μg/dm^3 - Aldrin 0.02 μg/dm^3 to 200 μg/dm^3 - α -BHC 0.02 μg/dm^3 to 200 μg/dm^3	In - house method : STM 04-036 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 6630 C

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
3 (cont.)	Water	- β-BHC 0.02 µg/dm^3 to 200 µg/dm^3 - δ-BHC 0.02 µg/dm^3 to 200 µg/dm^3 - Chlordane 0.02 µg/dm^3 to 200 µg/dm^3 - Dieldrin 0.02 µg/dm^3 to 200 µg/dm^3 - Endosulfan I 0.02 µg/dm^3 to 200 µg/dm^3 - Endosulfan II 0.02 µg/dm^3 to 200 µg/dm^3 - Endrin 0.02 µg/dm^3 to 200 µg/dm^3 - Heptachlor 0.02 µg/dm^3 to 200 µg/dm^3	In - house method : STM 04-036 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 6630

Initial Issue Date 30th August 2006 Issue Number 8

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
3 (cont.)	Water	- Heptachlor-epoxide 0.02 µg/dm^3 to 200 µg/dm^3 - Hexachlorobenzene 0.02 µg/dm^3 to 200 µg/dm^3 - Lindane 0.02 µg/dm^3 to 200 µg/dm^3 - Methoxychlor 0.02 µg/dm^3 to 200 µg/dm^3	In - house method : STM 04-036 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 6630
		- BOD 2 mg/dm^3 to 500 mg/dm^3	In - house method : STM 04-005 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 5210 B

Initial Issue Date 30th August 2006 Issue Number 8

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
3 (cont.)	Water	- Aluminium 0.01 mg/dm^3 to 15 mg/dm^3 - Antimony 0.0001 mg/dm^3 to 3 mg/dm^3 - Arsenic 0.0001 mg/dm^3 to 3 mg/dm^3 - Barium 0.0001 mg/dm^3 to 15 mg/dm^3 - Beryllium 0.0001 mg/dm^3 to 3 mg/dm^3 - Bismuth 0.001 mg/dm^3 to 3 mg/dm^3 - Boron 0.001 mg/dm^3 to 3 mg/dm^3 - Cadmium 0.0001 mg/dm^3 to 3 mg/dm^3	In - house method : STM 05-039 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 3125

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
3 (cont.)	Water	- Cerium 0.0001 mg/dm^3 to 0.4 mg/dm^3 - Cesium 0.0001 mg/dm^3 to 0.4 mg/dm^3 - Chromium 0.0001 mg/dm^3 to 3 mg/dm^3 - Cobalt 0.0001 mg/dm^3 to 3 mg/dm^3 - Copper 0.0001 mg/dm^3 to 15 mg/dm^3 - Dysprosium 0.0001 mg/dm^3 to 0.4 mg/dm^3 - Erbium 0.0001 mg/dm^3 to 0.4 mg/dm^3 - Europium 0.0001 mg/dm^3 to 0.4 mg/dm^3	In - house method : STM 05-039 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 3125

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
3 (cont.)	Water	- Gadolinium 0.0001 mg/dm^3 to 0.4 mg/dm^3 - Gallium 0.0001 mg/dm^3 to 0.4 mg/dm^3 - Gold 0.0001 mg/dm^3 to 0.4 mg/dm^3 - Hafnium 0.0001 mg/dm^3 to 0.4 mg/dm^3 - Holmium 0.0001 mg/dm^3 to 0.4 mg/dm^3 - Iridium 0.0001 mg/dm^3 to 0.4 mg/dm^3 - Iron 0.001 mg/dm^3 to 15 mg/dm^3 - Lanthanum 0.0001 mg/dm^3 to 0.4 mg/dm^3	In - house method : STM 05-039 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 3125

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
3 (cont.)	Water	- Lead 0.0002 mg/dm^3 to 3 mg/dm^3 - Lithium 0.001 mg/dm^3 to 3 mg/dm^3 - Manganese 0.0001 mg/dm^3 to 15 mg/dm^3 - Molybdenum 0.0001 mg/dm^3 to 3 mg/dm^3 - Neodymium 0.0001 mg/dm^3 to 0.4 mg/dm^3 - Nickel 0.0001 mg/dm^3 to 15 mg/dm^3 - Niobium 0.0001 mg/dm^3 to 0.4 mg/dm^3 - Palladium 0.0001 mg/dm^3 to 0.4 mg/dm^3	In - house method : STM 05-039 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 3125

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
3 (cont.)	Water	- Platinum 0.0001 mg/dm^3 to 0.4 mg/dm^3 - Praseodymium 0.0001 mg/dm^3 to 0.4 mg/dm^3 - Rhodium 0.005 mg/dm^3 to 0.4 mg/dm^3 - Rthenium 0.0001 mg/dm^3 to 0.4 mg/dm^3 - Rubidium 0.0001 mg/dm^3 to 0.4 mg/dm^3 - Ruthenium 0.0001 mg/dm^3 to 0.4 mg/dm^3 - Samarium 0.0001 mg/dm^3 to 0.4 mg/dm^3 - Selenium 0.0001 mg/dm^3 to 3 mg/dm^3	In - house method : STM 05-039 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 3125

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
3 (cont.)	Water	- Silver 0.0001 mg/dm^3 to 3 mg/dm^3 - Strontium 0.0001 mg/dm^3 to 0.4 mg/dm^3 - Tantalum 0.0001 mg/dm^3 to 0.4 mg/dm^3 - Tellurium 0.0001 mg/dm^3 to 3 mg/dm^3 - Terbium 0.005 mg/dm^3 to 0.4 mg/dm^3 - Thallium 0.0001 mg/dm^3 ถึง 3 mg/dm^3 - Thorium 0.0001 mg/dm^3 to 0.4 mg/dm^3 - Thulium 0.0001 mg/dm^3 to 0.4 mg/dm^3	In - house method : STM 05-039 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 3125

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
3 (cont.)	Water	- Tin 0.0001 mg/dm^3 to 3 mg/dm^3 - Titanium 0.001 mg/dm^3 to 0.4 mg/dm^3 - Tungsten 0.0001 mg/dm^3 to 0.4 mg/dm^3 - Uranium 0.0001 mg/dm^3 to 0.4 mg/dm^3 - Vanadium 0.0001 mg/dm^3 to 3 mg/dm^3 - Ytterbium 0.0001 mg/dm^3 to 0.4 mg/dm^3 - Yttrium 0.0001 mg/dm^3 to 0.4 mg/dm^3 - Zinc 0.005 mg/dm^3 to 15 mg/dm^3 - Zirconium 0.0001 mg/dm^3 to 0.4 mg/dm^3	In - house method : STM 05-039 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 3125

Initial Issue Date 30th August 2006 Issue Number 8

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

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Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
3 (cont.)	Water	- *Legionella* spp. cfu/l	ISO 11731-1 : 1998
		- *Legionella* spp. cfu/l	ISO 11731-2 : 2004
		- *Salmonella* spp. Detected or not detected	ISO 19250 : 2010
		- *Staphylococcus aureus* Detected or not detected	In - house method : STM 01-054 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 9213 B
		- Coliforms cfu/100 ml	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 9222 B

Initial Issue Date 30th August 2006 Issue Number 8

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
3 (cont.)	Water	- *E. coli* cfu/100 ml	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 9222 G
		- Fecal coliforms cfu/100 ml	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 9222 D
		- *Clostridium perfringens* cfu/100 ml	Environment Agency Methods for the Examination of Waters and Associated Materials, 2010, part 6, A-B, UK

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
4	Wastewater	- pH 4.0 to 10.0	In - house method : STM 04-003 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 4500 - H^+ B
		- Total Kjeldahl Nitrogen 1 mg/dm^3 to 500 mg/dm^3	In - house method : STM 04-009 based on United State Environmental Protection Agency, 1993, EPA Method 351.2
		- Oil & Grease 3 mg/dm^3 to 2,000 mg/dm^3	In - house method : STM 04-014 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 5520 B

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
4 (cont.)	Wastewater	- COD 5 mg/dm^3 to 20,000 mg/dm^3	In - house method : STM 04-006 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 5220 D
		- Cyanide 0.005 mg/dm^3 to 5 mg/dm^3	In - house method : STM 04-007 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 4500 - CN^- C, E
		- Total dissolved solids at 103 °C – 105 °C 100 mg/dm^3 to 20,000 mg/dm^3	In - house method : STM 04-010 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 2540 C

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
4 (cont.)	Wastewater	- Total dissolved solids at 180 °C 100 mg/dm^3 to 20,000 mg/dm^3	In - house method : STM 04-011 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 2540 C
		- Total suspended solids 5 mg/dm^3 to 5,000 mg/dm^3	In - house method : STM 04-012 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 2540 D
		- Standard plate count cfu/ml	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 9215 B

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
4 (cont.)	Wastewater	- Coliforms MPN/100 ml Detected or not detected	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 9221 B
		- *E. coli* MPN/100 ml Detected or not detected	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 9221 F
		- Fecal coliforms MPN/100 ml Detected or not detected	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 9221 E

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
4 (cont.)	Wastewater	- *Salmonella* spp. Detected or not detected	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 9260 B
		- *Clostridium perfringens* cfu/100 ml	Health Protection Agency National Standard Method W5 : 2005
		- *Clostridium perfringens* Detected or not detected	In - house method : STM 01-094 based on Health Protection Agency National Standard Method W5 : 2005
		- *Staphylococcus aureus* cfu/100 ml	Health Protection Agency National Standard Method W10 : 2005
		- *Staphylococcus aureus* Detected or not detected	In - house method : STM 01-055 based on Health Protection Agency National Standard Method W10 : 2005

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
4 (cont.)	Wastewater	- Mercury 0.1 µg/dm^3 to 20 µg/dm^3	In - house method : STM 05-007 based on United States Environmental Protection Agency, 2002, EPA Method 1631, Revision E
		- Arsenic 0.001 mg/dm^3 to 0.09 mg/dm^3 - Selenium 0.001 mg/dm^3 to 0.04 mg/dm^3	In - house method : STM 05-012 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 3114 C
		- Silver 0.05 mg/dm^3 to 5 mg/dm^3	In - house method : STM 05-005 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 3111 B

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
4 (cont.)	Wastewater	- Aluminium 1 mg/dm^3 to 200 mg/dm^3 - Barium 0.30 mg/dm^3 to 200 mg/dm^3 - Cadmium 0.02 mg/dm^3 to 40 mg/dm^3 - Cobalt 0.10 mg/dm^3 to 200 mg/dm^3 - Chromium 0.10 mg/dm^3 to 200 mg/dm^3 - Copper 0.05 mg/dm^3 to 500 mg/dm^3 - Iron 0.10 mg/dm^3 to 500 mg/dm^3 - Manganese 0.05 mg/dm^3 to 200 mg/dm^3 - Nickel 0.10 mg/dm^3 to 200 mg/dm^3	In - house method : STM 05-004 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 3111 B, D

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road,
Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
4 (cont.)	Wastewater	- Lead 0.10 mg/dm^3 to 200 mg/dm^3 - Zinc 0.03 mg/dm^3 to 500 mg/dm^3	In - house method : STM 05-004 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 3111 B, D
		- Hexavalent chromium 0.01 mg/dm^3 to 200 mg/dm^3	In - house method : STM 05-020 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 3500 B
		- Aluminium 0.01 mg/dm^3 to 200 mg/dm^3 - Antimony 0.005 mg/dm^3 to 40 mg/dm^3 - Arsenic 0.01 mg/dm^3 to 40 mg/dm^3	In - house method : STM 05-014 based on United State Environmental Protection Agency, 1994, EPA Method 200.7

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road,
Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
4 (cont.)	Wastewater	- Barium 0.005 mg/dm^3 to 200 mg/dm^3 - Beryllium 0.002 mg/dm^3 to 40 mg/dm^3 - Bismuth 0.05 mg/dm^3 to 10 mg/dm^3 - Boron 0.005 mg/dm^3 to 40 mg/dm^3 - Cadmium 0.001 mg/dm^3 to 40 mg/dm^3 - Calcium 0.10 mg/dm^3 to 1,000 mg/dm^3 - Chromium 0.005 mg/dm^3 to 200 mg/dm^3 - Cobalt 0.01 mg/dm^3 to 40 mg/dm^3 - Copper 0.005 mg/dm^3 to 200 mg/dm^3	In - house method : STM 05-014 based on United State Environmental Protection Agency, 1994, EPA Method 200.7

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

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Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
4 (cont.)	Wastewater	- Iron 0.01 mg/dm^3 to 200 mg/dm^3 - Lead 0.01 mg/dm^3 to 40 mg/dm^3 - Lithium 0.01 mg/dm^3 to 40 mg/dm^3 - Magnesium 0.10 mg/dm^3 to 900 mg/dm^3 - Manganese 0.005 mg/dm^3 to 200 mg/dm^3 - Molybdenum 0.005 mg/dm^3 to 40 mg/dm^3 - Nickel 0.005 mg/dm^3 to 200 mg/dm^3 - Phosphorus 0.05 mg/dm^3 to 1,000 mg/dm^3 - Potassium 0.10 mg/dm^3 to 900 mg/dm^3	In - house method : STM 05-014 based on United State Environmental Protection Agency, 1994, EPA Method 200.7

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Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
4 (cont.)	Wastewater	- Selenium 0.01 mg/dm^3 to 4 mg/dm^3 - Silver 0.01 mg/dm^3 to 10 mg/dm^3 - Sodium 0.10 mg/dm^3 to 1,000 mg/dm^3 - Strontium 0.002 mg/dm^3 to 10 mg/dm^3 - Sulfur 0.10 mg/dm^3 to 1,000 mg/dm^3 - Tellurium 0.01 mg/dm^3 to 10 mg/dm^3 - Thallium 0.01 mg/dm^3 to 40 mg/dm^3 - Tin 0.01 mg/dm^3 to 40 mg/dm^3 - Titanium 0.005 mg/dm^3 to 40 mg/dm^3	In - house method : STM 05-014 based on United State Environmental Protection Agency, 1994, EPA Method 200.7

Scope of Testing Laboratory Accreditation

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Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
4 (cont.)	Wastewater	- Vanadium 0.005 mg/dm^3 to 40 mg/dm^3 - Zinc 0.01 mg/dm^3 to 200 mg/dm^3	In - house method : STM 05-014 based on United State Environmental Protection Agency, 1994, EPA Method 200.7
		- 1,1,1-Trichloroethane 0.5 µg/dm^3 to 1,000 µg/dm^3 - 1,1,2-Trichloroethane 0.5 µg/dm^3 to 1,000 µg/dm^3 - 1,1-Dichloroethylene 0.5 µg/dm^3 to 1,000 µg/dm^3 - 1,2-Dichloroethane 0.5 µg/dm^3 to 1,000 µg/dm^3 - Benzene 0.5 µg/dm^3 to 1,000 µg/dm^3 - Carbontetrachloride 0.5 µg/dm^3 to 1,000 µg/dm^3	In - house method : STM 04-048 based on United State Environmental Protection Agency, 1994, EPA Method 5030 B

Scope of Testing Laboratory Accreditation

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Accreditation Number : Testing - 0009

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Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
4 (cont.)	Wastewater	- *cis*-1,2-Dichloroethane 0.5 µg/dm^3 to 1,000 µg/dm^3 - *trans*-1,2-Dichloroethane 0.5 µg/dm^3 to 1,000 µg/dm^3 - Dichloromethane 0.5 µg/dm^3 to 1,000 µg/dm^3 - Ethylbenzene 0.5 µg/dm^3 to 1,000 µg/dm^3 - Styrene 0.5 µg/dm^3 to 1,000 µg/dm^3 - Tetrachloroethylene 0.5 µg/dm^3 to 1,000 µg/dm^3 - Toluene 0.5 µg/dm^3 to 1,000 µg/dm^3 - *o* -Xylene 0.5 µg/dm^3 to 1,000 µg/dm^3	In - house method : STM 04-048 based on United State Environmental Protection Agency, 1994, EPA Method 5030 B

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Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
4 (cont.)	Wastewater	- *m* -Xylene 0.5 µg/dm³ to 1,000 µg/dm³ - *p* -Xylene 0.5 µg/dm³ to 1,000 µg/dm³ - Total Xylene 1.0 µg/dm³ to 1,000 µg/dm³ - Trichloroethylene 0.5 µg/dm³ to 1,000 µg/dm³ - Vinylchloride 0.5 µg/dm³ to 1,000 µg/dm³ - 2-Butanone 0.5 µg/dm³ to 1,000 µg/dm³	In - house method : STM 04-048 based on United State Environmental Protection Agency, 1994, EPA Method 5030 B

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Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
4 (cont.)	Wastewater	- 2,4-DDD 0.02 µg/dm³ to 200 µg/dm³ - 2,4-DDE 0.02 µg/dm³ to 200 µg/dm³ - 2,4-DDT 0.02 µg/dm³ to 200 µg/dm³ - 4,4-DDD 0.02 µg/dm³ to 200 µg/dm³ - 4,4-DDE 0.02 µg/dm³ to 200 µg/dm³ - 4,4-DDT 0.02 µg/dm³ to 200 µg/dm³ - Aldrin 0.02 µg/dm³ to 200 µg/dm³ - α -BHC 0.02 µg/dm³ to 200 µg/dm³	In - house method : STM 04-036 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 6630

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
4 (cont.)	Wastewater	- β-BHC 0.02 μg/dm^3 to 200 μg/dm^3 - δ-BHC 0.02 μg/dm^3 to 200 μg/dm^3 - Chlordane 0.02 μg/dm^3 to 200 μg/dm^3 - Dieldrin 0.02 μg/dm^3 to 200 μg/dm^3 - Endosulfan I 0.02 μg/dm^3 to 200 μg/dm^3 - Endosulfan II 0.02 μg/dm^3 to 200 μg/dm^3 - Endrin 0.02 μg/dm^3 to 200 μg/dm^3 - Heptachlor 0.02 μg/dm^3 to 200 μg/dm^3	In - house method : STM 04-036 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 6630

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
4 (cont.)	Wastewater	- Heptachlor-epoxide 0.02 μg/dm^3 to 200 μg/dm^3 - Hexachlorobenzene 0.02 μg/dm^3 to 200 μg/dm^3 - Lindane 0.02 μg/dm^3 to 200 μg/dm^3 - Methoxychlor 0.02 μg/dm^3 to 200 μg/dm^3	In - house method : STM 04-036 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 6630
		- BOD 2 mg/dm^3 to 5,000 mg/dm^3	In - house method : STM 04-005 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 5210 B

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
4 (cont.)	Wastewater	- Aluminium 0.01 mg/dm^3 to 15 mg/dm^3 - Antimony 0.0001 mg/dm^3 to 15 mg/dm^3 - Arsenic 0.0001 mg/dm^3 to 15 mg/dm^3 - Barium 0.0001 mg/dm^3 to 15 mg/dm^3 - Beryllium 0.0001 mg/dm^3 to 15 mg/dm^3 - Bismuth 0.001 mg/dm^3 to 15 mg/dm^3 - Boron 0.001 mg/dm^3 to 15 mg/dm^3 - Cadmium 0.0001 mg/dm^3 to 15 mg/dm^3	In - house method : STM 05-039 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 3125

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
4 (cont.)	Wastewater	- Cerium 0.0001 mg/dm^3 to 15 mg/dm^3 - Cesium 0.0001 mg/dm^3 to 15 mg/dm^3 - Chromium 0.0001 mg/dm^3 to 15 mg/dm^3 - Cobalt 0.0001 mg/dm^3 to 15 mg/dm^3 - Copper 0.0001 mg/dm^3 to 15 mg/dm^3 - Dysprosium 0.0001 mg/dm^3 to 15 mg/dm^3 - Erbium 0.0001 mg/dm^3 to 15 mg/dm^3 - Europium 0.0001 mg/dm^3 to 15 mg/dm^3	In - house method : STM 05-039 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 3125

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
4 (cont.)	Wastewater	- Gadolinium 0.0001 mg/dm^3 to 15 mg/dm^3 - Gallium 0.0001 mg/dm^3 to 15 mg/dm^3 - Gold 0.0001 mg/dm^3 to 15 mg/dm^3 - Hafnium 0.0001 mg/dm^3 to 15 mg/dm^3 - Holmium 0.0001 mg/dm^3 to 15 mg/dm^3 - Iridium 0.0001 mg/dm^3 to 15 mg/dm^3 - Iron 0.001 mg/dm^3 to 15 mg/dm^3 - Lanthanum 0.0001 mg/dm^3 to 15 mg/dm^3	In - house method : STM 05-039 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 3125

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
4 (cont.)	Wastewater	- Lead 0.0002 mg/dm^3 to 15 mg/dm^3 - Lithium 0.001 mg/dm^3 to 15 mg/dm^3 - Manganese 0.0001 mg/dm^3 to 15 mg/dm^3 - Molybdenum 0.0001 mg/dm^3 to 15 mg/dm^3 - Neodymium 0.0001 mg/dm^3 to 15 mg/dm^3 - Nickel 0.0001 mg/dm^3 to 15 mg/dm^3 - Niobium 0.0001 mg/dm^3 to 15 mg/dm^3 - Palladium 0.0001 mg/dm^3 to 15 mg/dm^3	In - house method : STM 05-039 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 3125

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
4 (cont.)	Wastewater	- Platinum 0.0001 mg/dm^3 to 15 mg/dm^3 - Praseodymium 0.0001 mg/dm^3 to 15 mg/dm^3 - Rhodium 0.005 mg/dm^3 to 15 mg/dm^3 - Rthenium 0.0001 mg/dm^3 to 15 mg/dm^3 - Rubidium 0.0001 mg/dm^3 to 15 mg/dm^3 - Ruthenium 0.0001 mg/dm^3 to 15 mg/dm^3 - Samarium 0.0001 mg/dm^3 to 15 mg/dm^3 - Selenium 0.0001 mg/dm^3 to 15 mg/dm^3	In - house method : STM 05-039 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 3125

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
4 (cont.)	Wastewater	- Silver 0.0001 mg/dm^3 to 15 mg/dm^3 - Strontium 0.0001 mg/dm^3 to 15 mg/dm^3 - Tantalum 0.0001 mg/dm^3 to 15 mg/dm^3 - Tellurium 0.0001 mg/dm^3 to 15 mg/dm^3 - Terbium 0.005 mg/dm^3 to 15 mg/dm^3 - Thallium 0.0001 mg/dm^3 to 15 mg/dm^3 - Thorium 0.0001 mg/dm^3 to 15 mg/dm^3 - Thulium 0.0001 mg/dm^3 to 15 mg/dm^3	In - house method : STM 05-039 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 3125

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
4 (cont.)	Wastewater	- Tin 0.0001 mg/dm^3 to 15 mg/dm^3 - Titanium 0.001 mg/dm^3 to 15 mg/dm^3 - Tungsten 0.0001 mg/dm^3 to 15 mg/dm^3 - Uranium 0.0001 mg/dm^3 to 15 mg/dm^3 - Vanadium 0.0001 mg/dm^3 to 15 mg/dm^3 - Ytterbium 0.0001 mg/dm^3 to 15 mg/dm^3 - Yttrium 0.0001 mg/dm^3 to 15 mg/dm^3 - Zinc 0.005 mg/dm^3 to 15 mg/dm^3 - Zirconium 0.0001 mg/dm^3 to 15 mg/dm^3	In - house method : STM 05-039 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 3125

Initial Issue Date 30th August 2006 Issue Number 8

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
4 (cont.)	Wastewater	- *Legionella* spp. cfu/l	ISO 11731-1 : 1998
		- *Legionella* spp. cfu/l	ISO 11731-2 : 2004
		- *Salmonella* spp. Detected or not detected	ISO 19250 : 2010
		- *Staphylococcus aureus* Detected or not detected	In - house method : STM 01-054 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 9213 B

Initial Issue Date 30th August 2006 Issue Number 8

Scope of Testing Laboratory Accreditation

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Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
4 (cont.)	Wastewater	- Coliforms cfu/100 ml	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 9222 B
		- *E. coli* cfu/100 ml	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 9222 G
		- Fecal coliforms cfu/100 ml	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 9222 D

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
5	Sea water	- Mercury 0.05 $\mu g/dm^3$ to 1.6 $\mu g/dm^3$	In - house method : STM 05-007 based on United States Environmental Protection Agency, 2002, EPA Method 1631, Revision E
6	Air	- Aerobic plate count cfu/15 min	Compendium of Methods for the Microbiological Examination of Foods, 4th ed., 2001, chapter 3 Item 3.71 and chapter 7
		- Yeast and Mold count cfu/15 min	Compendium of Methods for the Microbiological Examination of Foods, 4th ed., 2001, chapter 3 Item 3.71 and chapter 20

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

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Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
6 (cont.)	Air	- Benzene 1 μg/tube to 200 μg/tube - Toluene 1 μg/tube to 200 μg/tube - Total - xylene *o* –xylene 1 μg/tube to 200 μg/tube *m* –xylene 1 μg/tube to 200 μg/tube *p* –xylene 1 μg/tube to 200 μg/tube	In - house method : STM 04-032 based on NIOSH Manual of Analytical Methods, 4th ed. Issue 2, 1994, NMAM method 1501 (Exclude sampling)
		- Hydrochloric acid 3 μg/tube to 200 μg/tube - Nitric acid 3 μg/tube to 200 μg/tube - Sulfuric acid 3 μg/tube to 200 μg/tube	NIOSH Manual of Analytical Methods, 4th ed. Issue 2, 1994, NMAM method 7903 (Exclude sampling)

Initial Issue Date 30th August 2006 Issue Number 8

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
6	Air - Workplace air	- Total dust 0.15 mg/filter to 10 mg/filter	In - house method : STM 04-049 based on NIOSH 0500 : 1994 (Exclude sampling)
		- Respirable dust 0.15 mg/filter to 10 mg/filter	In-house method : STM 04-050 based on NIOSH 0600 : 1994 (Exclude sampling)
	- Environmental air	- Total suspended particulate 0.05 mg/filter to 10 mg/filter	In - house method : STM 04-051 based on U.S. Environmental Protection Agency 40 CFR, method 50 Appendix B (Exclude sampling)
		- Particulate matter (PM-10) 0.05 mg/filter to 10 mg/filter	In - house method : STM 04-052 based on U.S. Environmental Protection Agency 40 CFR, method 50 Appendix B (Exclude sampling)

Initial Issue Date 30th August 2006 Issue Number 8

Scope of Testing Laboratory Accreditation

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Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
6 (cont.)	Air - Workplace air	- Total suspended particulate 0.05 mg/filter to 10 mg/filter	In - house method : STM 04-053 based on U.S. Environmental Protection Agency 40 CFR, method 5 (Exclude sampling)
	- Emission from stationary sources	- Hydrogen chloride 1 µg/sample to 500 µg/sample - Hydrogen fluoride 1 µg/sample to 500 µg/sample - Chlorine 1 µg/sample to 500 µg/sample	In - house method : STM 04- 054 based on U.S. Environmental Protection Agency 40 CFR, method 26 (Exclude sampling)

Scope of Testing Laboratory Accreditation

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Accreditation Number : Testing - 0009

Laboratory Status : ☐ Permanent ☑ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
6 (cont.)	Air - Emission from stationary sources	- Sulfur dioxide 0.26 mg/m^3 to 1,675 mg/m^3	In - house method : STM 06 - 002 based on U.S. Environmental Protection Agency 40 CFR, method 6C
		- Oxide of nitrogen 0.19 mg/m^3 to 752 mg/m^3	In - house method : STM 06 - 003 based on U.S. Environmental Protection Agency 40 CFR, method 7E
		- Carbon monoxide 0.11 mg/m^3 to 1,832 mg/m^3	In - house method : STM 06 - 004 based on U.S. Environmental Protection Agency 40 CFR, method 10

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

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Accreditation Number : Testing - 0009

Laboratory Status : ☐ Permanent ☑ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
7	Environmental noise	- Sound level Equivalent sound level $L_{eq,T}$ 20 dB (A) to 130 dB (A) Maximum sound level L_{max} 20 dB (A) to 130 dB (A)	In - house method : STM 06 - 001 based on ISO 1996-1 : 2003
		- Noise level Background noise level L_{90} 20 dB (A) to 130 dB (A) Non nuisance period noise level $L_{eq,T}$ 20 dB (A) to 130 dB (A) Nuisance period noise level $L_{eq,T}$ 20 dB (A) to 130 dB (A) Noise level 10 dB (A) to 30 dB (A)	In - house method : STM 06 - 001 based on ISO 1996-1 : 2003

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
8	Animal feeding stuffs	- Moisture 2 g/100 g to 20 g/100 g	AOAC Official Methods of Analysis 19th ed., 2012, method 930.15
		- Ash 1 g/100 g to 40 g/100 g	AOAC Official Methods of Analysis 19th ed., 2012, method 942.05
		- Protein 5 g/100 g to 85 g/100 g	In - house method : STM 03-019 based on AOAC Official Methods of Analysis 19th ed., 2012, method 981.10
		- Fat 0.3 g/100g to 45 g/100 g	In - house method STM : 03-087 based on AOAC Official Methods of Analysis 19th ed., 2012, method 954.02
		- Carbohydrate	Method of Analysis for Nutrition Labeling, AOAC, 1993, chapter 6

Scope of Testing Laboratory Accreditation

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Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
8 (cont.)	Animal feeding stuffs	- Calories	Method of Analysis for Nutrition Labeling, AOAC, 1993, chapter 6
		- Crude fiber 0.1 g/100g to 40 g/100 g	In - house method STM 03-105 based on AOAC Official Methods of Analysis 19th ed., 2012, method 978.10
		- Aerobic plate count cfu/g, cfu/ml	ISO 4833 : 2003
		- Coliforms MPN/g, MPN/ml	ISO 4831 : 2006
		- Presumptive *E. coli* MPN/g, MPN/ml	ISO 7251 : 2005

Initial Issue Date 30th August 2006 Issue Number 8

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
8 (cont.)	Animal feeding stuffs	- *E. coli* MPN/g, MPN/ml	In - house method : STM 01-049 based on ISO 7251 : 2005
		- *Salmonella* spp. Detected or not detected	ISO 6579 : 2002
		- *Salmonella* spp. Detected or not detected	ALTERNATIVE ANALYTICAL METHODS FOR AGRIBUSINESS, certified by AFNOR Certification, SOL 37/01-06/13
		- *Staphylococcus aureus* cfu/g, cfu/ml	ISO 6888-1 : 1999
		- Presumptive *Bacillus cereus* cfu/g, cfu/ml	ISO 7932 : 2004
		- *Bacillus cereus* cfu/g, cfu/ml	In - house method : STM 01-063 based on ISO 7932 : 2004
		- Yeast and Mold count cfu/g, cfu/ml	ISO 21527 : 2008

Initial Issue Date 30th August 2006 Issue Number 8

Scope of Testing Laboratory Accreditation

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Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
8 (cont.)	Animal feeding stuffs	- *Clostridium perfringens* cfu/g, cfu/ml	ISO 7937 : 2004(E)
		- Enterobacteriaceae cfu/g, cfu/ml	ISO 21528-2 : 2004
		- Coliforms cfu/g, cfu/ml	ISO 4832 : 2006
		- *E.coli* cfu/g, cfu/ml	ISO 16649-2 : 2001
		- *Listeria monocytogenes* cfu/g	ISO 11290 – 2 : 1998 / Amd 1 : 2004 (E)
		- *Listeria* spp. cfu/g.	ISO 11290 – 2 : 1998 / Amd 1 : 2004 (E)

Initial Issue Date 30th August 2006 Issue Number 8

Scope of Testing Laboratory Accreditation

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Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
8 (cont.)	Animal feeding stuffs	- Arsenic 0.10 mg/kg to 40 mg/kg	In - house method : STM 05-009 based on BS EN 14546 : 2005
		- Mercury 0.005 mg/kg to 0.20 mg/kg	In - house method : STM 05-011 based on United State Environmental Protection Agency, 1994, EPA Method 7474
		- Aluminium 0.50 mg/kg to 200 mg/kg - Antimony 0.30 mg/kg to 40 mg/kg - Arsenic 0.20 mg/kg to 40 mg/kg - Barium 0.20 mg/kg to 40 mg/kg - Beryllium 0.20 mg/kg to 40 mg/kg	In - house method : STM 05-013 based on AOAC Official Methods of Analysis 19th ed., 2012, method 984.27

Initial Issue Date 30th August 2006 Issue Number 8

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road, Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
8 (cont.)	Animal feeding stuffs	- Bismuth 0.50 mg/kg to 40 mg/kg - Boron 0.50 mg/kg to 40 mg/kg - Cadmium 0.10 mg/kg to 40 mg/kg - Calcium 20.0 mg/kg to 20,000 mg/kg - Chromium 0.20 mg/kg to 40 mg/kg - Cobalt 0.20 mg/kg to 30 mg/kg - Copper 0.20 mg/kg to 240 mg/kg - Iron 1.00 mg/kg to 250 mg/kg - Lead 0.20 mg/kg to 40 mg/kg	In - house method : STM 05-013 based on AOAC Official Methods of Analysis 19th ed., 2012, method 984.27

Initial Issue Date 30th August 2006 Issue Number 8

Scope of Testing Laboratory Accreditation

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Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
8 (cont.)	Animal feeding stuffs	- Lithium 0.20 mg/kg to 40 mg/kg - Magnesium 20.0 mg/kg to 20,000 mg/kg - Manganese 0.30 mg/kg to 40 mg/kg - Molybdenum 0.20 mg/kg to 40 mg/kg - Nickel 0.20 mg/kg to 40 mg/kg - Phosphorus 20.0 mg/kg to 20,000 mg/kg - Potassium 65.0 mg/kg to 20,000 mg/kg - Sodium 20.0 mg/kg to 20,000 mg/kg - Sulfur 20.0 mg/kg to 240 mg/kg	In - house method : STM 05-013 based on AOAC Official Methods of Analysis 19th ed., 2012, method 984.27

Initial Issue Date 30th August 2006 Issue Number 8

Scope of Testing Laboratory Accreditation

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Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
8 (cont.)	Animal feeding stuffs	- Strontium 0.20 mg/kg to 40 mg/kg - Thallium 0.20 mg/kg to 40 mg/kg - Tin 0.30 mg/kg to 450 mg/kg - Titanium 0.20 mg/kg to 40 mg/kg - Vanadium 0.20 mg/kg to 40 mg/kg - Zinc 0.50 mg/kg to 200 mg/kg	In - house method : STM 05-013 based on AOAC Official Methods of Analysis 19th ed., 2012, method 984.27
		- Selenium 0.03 mg/kg to 5 mg/kg	AOAC Official Methods of Analysis 19th ed., 2012, method 966.17

Initial Issue Date 30th August 2006 Issue Number 8

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Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
8 (cont.)	Animal feeding stuffs	- *Listeria monocytogenes* Detected or not detected	ISO 11290 – 1 : 1996 / Amd 1 : 2004
		- *Listeria* spp. Detected or not detected	ISO 11290 – 1 : 1996 / Amd 1 : 2004
		- Melamine 1 mg/kg to 50 mg/kg - Ammeline 1 mg/kg to 50 mg/kg - Ammelide 1 mg/kg to 50 mg/kg - Cyanuric Acid Screening 1 mg/kg to 50 mg/kg	In - house method STM 03-091 based on USFDA, Laboratory InformationBulletin LIB No.4423, Vol.24 : 2008
		- Ochratoxin A 0.4 µg/kg to 20 µg/kg	In - house method STM 03-092 based on AOAC Official Methods of Analysis 19th ed., 2012, method 2000.03

Initial Issue Date 30th August 2006 Issue Number 8

Scope of Testing Laboratory Accreditation

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Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
8 (cont.)	Animal feeding stuffs	- Total Aflatoxin Aflatoxin G1 2 µg/kg to 40 µg/kg Aflatoxin B1 2 µg/kg to 40 µg/kg Aflatoxin G2 0.6 µg/kg to 12 µg/kg Aflatoxin B2 0.6 µg/kg to 12 µg/kg	In - house method STM 03-093 based on AOAC Official Methods of Analysis 19th ed., 2012, method 991.31

Initial Issue Date 30th August 2006 Issue Number 8

Bureau of Laboratory Accreditation, Department of Science Service, Ministry of Science and Technology

Scope of Testing Laboratory Accreditation

Laboratory Name : ALS Laboratory Group (Thailand) Co., Ltd.

Address : 104 Soi Phatthanakan 40, Phatthanakan Road,
Suan Luang, Bangkok 10250

Accreditation Number : Testing - 0009

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
9	Feather	- Total nitrogen (Calculated as N) 70 g/100 g to 85 g/100 g	In - house method : STM 03-019 based on AOAC Official Methods of Analysis 19th ed., 2012, method 981.10

Issue Date : 26th January 2015

Signature : [signature]

(Mr. Suthiweth T.Saengchantara)

Chairperson of Laboratory Accreditation Committee

Initial Issue Date 30th August 2006 Issue Number 8

Bureau of Laboratory Accreditation, Department of Science Service, Ministry of Science and Technology

Ref. No. 0318/(1) 9071 Department of Industrial Works

10th July 2014

Subject: Extension of Laboratory License

To: S.P.S. Consulting Service Company Limited

With reference to the request of S.P.S. Consulting Service Company Limited dated on 13th February 2014 for extension of Laboratory License which is located at 7 Soi Phahon Yothin 24, Phahon Yothin Road, Jompol, Chatuchak, Bangkok 10900, Thailand, Department of Industrial Works had considered and approved extension of the Laboratory License no. 011 until 10th July 2017.

Items for Laboratory Test service cover:

Wastewater	60 items
Air Pollution	28 items
Industrial Wastes	33 items
Total	121 items , as annexed hereto.

Industrial Environment Research and Development Bureau

Industrial Environment Research and Development Centre

ที่ อก ๐๓๑๘/(๑) ๙๐๗๑

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ เขตราชเทวี
กรุงเทพมหานคร ๑๐๔๐๐

๑๐ กรกฎาคม ๒๕๕๗

เรื่อง ต่ออายุหนังสืออนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน ผู้รับอนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด

อ้างถึง ๑. คำขอขึ้นทะเบียน/ต่ออายุหนังสืออนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๑๓ กุมภาพันธ์ ๒๕๕๗

๒. หนังสือบริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด SPS_AM.๐๒๗/๐๔/๒๐๑๔ ลงวันที่ ๓๐ เมษายน ๒๕๕๗

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสืออนุญาตต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด จำนวน ๘ แผ่น

ตามหนังสือที่อ้างถึง ๑ และ ๒ บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด ขอต่ออายุหนังสืออนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๐๑๑ สถานที่ตั้งเลขที่ ๗ ซอยพหลโยธิน ๒๔ ถนนพหลโยธิน แขวงจอมพล เขตจตุจักร กรุงเทพมหานคร ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว อนุญาตให้ต่ออายุหนังสืออนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบ ดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์

๑) นายสมชาย ธนาวิบูลเศรษฐ	ทะเบียนเลขที่ ว-๐๑๑-ค-๕๓๖
๒) นายพีระ เดชอุดม	ทะเบียนเลขที่ ว-๐๑๑-ค-๖๔๐
๓) นางสาวบังอร ศิริโพธิ์คา	ทะเบียนเลขที่ ว-๐๑๑-ค-๒๙๕๕
๔) นายยุทธนา ธาณาธะระนิต	ทะเบียนเลขที่ ว-๐๑๑-ค-๔๕๔๙
๕) นางสาวธชาณันทน์ เติมกสิพาณิชย์	ทะเบียนเลขที่ ว-๐๑๑-ค-๕๔๕๖
๖) นางสาวสุภัทชา นาคพุ่ม	ทะเบียนเลขที่ ว-๐๑๑-ค-๕๔๕๗
๗) นางสาวศรีนวล ศรีเหรา	ทะเบียนเลขที่ ว-๐๑๑-ค-๕๔๕๘
๘) นางสาวสุภาวดี ทองทิพย์	ทะเบียนเลขที่ ว-๐๑๑-ค-๕๔๕๙
๙) นางสาวจุฑามาส วรรณนิยม	ทะเบียนเลขที่ ว-๐๑๑-ค-๕๔๖๐
๑๐)นางสาวจุฑารัตน์ ภูผ่าน	ทะเบียนเลขที่ ว-๐๑๑-ค-๕๔๖๑
๑๑)นายกิตติ ศรีทองหล่อ	ทะเบียนเลขที่ ว-๐๑๑-ค-๕๔๖๒
๑๒)นางสาวนลินี สีมาก	ทะเบียนเลขที่ ว-๐๑๑-ค-๕๙๐๒
๑๓)นายวิทยา โพนชัย	ทะเบียนเลขที่ ว-๐๑๑-ค-๕๙๐๓

/ข. เจ้าหน้าที่ประจำ...

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์

๑) นายยีซัน ลอแม	ทะเบียนเลขที่ ว-๐๑๑-จ-๓๕๒๖
๒) นายเกษม สีมาพล	ทะเบียนเลขที่ ว-๐๑๑-จ-๓๕๓๖
๓) นายภาณุพงษ์ ลาภประสพ	ทะเบียนเลขที่ ว-๐๑๑-จ-๓๕๓๘
๔) นางสาววรรยารักษ์ เครือมังกร	ทะเบียนเลขที่ ว-๐๑๑-จ-๓๕๔๑
๕) นางสาวสุจิตรา นาวารัตน์	ทะเบียนเลขที่ ว-๐๑๑-จ-๔๕๖๗
๖) นายวรวิทย์ เหล่าตระกูล	ทะเบียนเลขที่ ว-๐๑๑-จ-๔๕๖๙
๗) นายพุฒิคุณ ชัยน้อย	ทะเบียนเลขที่ ว-๐๑๑-จ-๔๕๗๐
๘) นายภูเบศร์ สารยศ	ทะเบียนเลขที่ ว-๐๑๑-จ-๔๕๘๓
๙) นางสาวจินดาพร ภารกุล	ทะเบียนเลขที่ ว-๐๑๑-จ-๕๑๓๓
๑๐) นายชลิต เขียวระยับ	ทะเบียนเลขที่ ว-๐๑๑-จ-๕๑๓๕
๑๑) นางสาวอุทุมพร แท่นทอง	ทะเบียนเลขที่ ว-๐๑๑-จ-๕๑๓๖
๑๒) นางสาวเพ็ญภา วิภาสธวัช	ทะเบียนเลขที่ ว-๐๑๑-จ-๕๑๓๙
๑๓) นางสาวปรียานุช ทองวิเชียร	ทะเบียนเลขที่ ว-๐๑๑-จ-๕๑๔๑
๑๔) นางสาวศรัจจันทร์ แววสุวรรณ	ทะเบียนเลขที่ ว-๐๑๑-จ-๕๑๔๒
๑๕) นางสาวศศิธร สังข์อ่อนดี	ทะเบียนเลขที่ ว-๐๑๑-จ-๕๑๔๓
๑๖) นางสาวภาวดี คำภูษา	ทะเบียนเลขที่ ว-๐๑๑-จ-๕๑๔๔
๑๗) นางสาวภัทรียา จันทร์ประสิทธิ์	ทะเบียนเลขที่ ว-๐๑๑-จ-๕๔๖๓
๑๘) นายเสถียร จิตตยานันต์	ทะเบียนเลขที่ ว-๐๑๑-จ-๕๔๖๗
๑๙) นายสมบูรณ์ บุตรจันทร์	ทะเบียนเลขที่ ว-๐๑๑-จ-๕๔๖๘
๒๐) นางสาวเบญจพร ทองนอก	ทะเบียนเลขที่ ว-๐๑๑-จ-๕๙๐๔
๒๑) นางสาวธารทิพย์ รัตนะ	ทะเบียนเลขที่ ว-๐๑๑-จ-๕๙๐๕
๒๒) นางสาวอินทิรา อยู่พงษ์	ทะเบียนเลขที่ ว-๐๑๑-จ-๕๙๐๖
๒๓) นายกิตติพงษ์ แสนวงศ์	ทะเบียนเลขที่ ว-๐๑๑-จ-๕๙๐๗
๒๔) นายพงษ์สิน เกษตรสิน	ทะเบียนเลขที่ ว-๐๑๑-จ-๕๙๐๘
๒๕) นางสาววิภารัตน์ ทองเด็จ	ทะเบียนเลขที่ ว-๐๑๑-จ-๕๙๐๙
๒๖) นางสาวสุภารัตน์ ศุทธิสมบูรณ์	ทะเบียนเลขที่ ว-๐๑๑-จ-๕๙๑๐
๒๗) นางสาวกรรณิกา บัวเรียน	ทะเบียนเลขที่ ว-๐๑๑-จ-๕๙๑๑

ค. สารมลพิษที่อนุญาตให้วิเคราะห์ในน้ำเสีย จำนวน ๖๐ รายการ อากาศเสีย จำนวน ๒๘ รายการ และกากอุตสาหกรรม จำนวน ๓๓ รายการ รวมทั้งสิ้นจำนวน ๑๒๑ รายการ ตามสิ่งที่ส่งมาด้วย

/หนังสืออนุญาต...

หนังสืออนุญาตฉบับนี้จะหมดอายุในวันที่ ๑๐ กรกฎาคม ๒๕๖๐ หากประสงค์จะต่ออายุหนังสืออนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรมก่อนวันที่หนังสืออนุญาตจะหมดอายุไม่น้อยกว่า ๓๐ วัน ซึ่งคำขอต่ออายุดังกล่าวขอรับได้ที่กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นางสาวพะเยาว์ คำมุข)
ผู้อำนวยการสำนักวิจัยและพัฒนาสิ่งแวดล้อมโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

สำนักวิจัยและพัฒนาสิ่งแวดล้อมโรงงาน
ศูนย์วิจัยและพัฒนาสิ่งแวดล้อมโรงงานส่วนกลาง
โทร. ๐ ๒๒๐๒ ๔๑๔๖-๗ ๐ ๒๒๐๒ ๔๐๐๒
โทรสาร ๐ ๒๓๕๔ ๓๒๐๘ ๐ ๒๓๕๔ ๓๔๑๕

เอกสารแนบท้ายหนังสืออนุญาตต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด เลขทะเบียน ว-011
ที่ อก ๐๓๑๘/(๑) ๙๐๓๖ ลงวันที่ ๑๐ กรกฎาคม ๒๕๕๗
สารมลพิษที่อนุญาตให้วิเคราะห์ จำนวน 121 รายการ

น้ำเสีย จำนวน 60 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic Method[3]
2	Anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[5,7]
3	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[3] 2) Digestion, Inductively Coupled Plasma Method[3]
4	Barium	Digestion, Inductively Coupled Plasma Method[3]
5	α-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method[3]
6	β-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method[3]
7	γ-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method[3]
8	δ-BHC	Liquid-Liquid Extraction, Gas Chromatographic Method[3]
9	Biochemical Oxygen Demand	1) 5-Day BOD Test, Azide Modification Method[3] 2) 5-Day BOD Test, Membrane Electrode Method[3]
10	Cadmium	1) Digestion, Electrothermal Atomic Absorption Spectrometric Method[3] 2) Digestion, Direct Air-Acetylene Flame Method [3] 3) Digestion, Inductively Coupled Plasma Method[3]
11	Chemical Oxygen Demand	1) Closed Reflux, Titrimetric Method[3] 2) Open Reflux, Titrimetric Method[3]
12	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[5,7]
13	Chromium	1) Digestion, Direct Air-Acetylene Flame Method[3] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method[3] 3) Digestion, Inductively Coupled Plasma Method[3]
14	Copper	1) Digestion, Direct Air-Acetylene Flame Method[3] 2) Digestion, Inductively Coupled Plasma Method[3]
15	Cyanide	Distillation, Colorimetric Method[3]
16	2,4-D	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[5,6]

/17 4,4'-DDD ...

สำเนาถูกต้อง

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
17	4,4'-DDD	Liquid-Liquid Extraction, Gas Chromatographic Method[3]
18	4,4'-DDE	Liquid-Liquid Extraction, Gas Chromatographic Method[3]
19	4,4'-DDT	Liquid-Liquid Extraction, Gas Chromatographic Method[3]
20	Dichlorvos	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[5,21]
21	Dicrotophos	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[5,21]
22	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic Method[3]
23	Dimethoate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[5,21]
24	Edifenphos	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[5,21]
25	Endosulfan I	Liquid-Liquid Extraction, Gas Chromatographic Method[3]
26	Endosulfan II	Liquid-Liquid Extraction, Gas Chromatographic Method[3]
27	Endosulfan Sulfate	Liquid-Liquid Extraction, Gas Chromatographic Method[3]
28	Endrin	Liquid-Liquid Extraction, Gas Chromatographic Method[3]
29	Endrin Aldehyde	Liquid-Liquid Extraction, Gas Chromatographic Method[3]
30	EPN	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[5,21]
31	Fenitrothion	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[5,21]
32	Formaldehyde	Distillation, Colorimetric Method[2]
33	Free Chlorine	Iodometric Method[3]
34	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic Method[3]
35	Heptachlor Epoxide	Liquid-Liquid Extraction, Gas Chromatographic Method[3]
36	Hexavalent Chromium	Filtration, Colorimetric Method[3]
37	Lead	1) Digestion, Direct Air-Acetylene Flame Method[3] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method[3] 3) Digestion, Inductively Coupled Plasma Method[3]
38	Manganese	1) Digestion, Direct Air-Acetylene Flame Method[3] 2) Digestion, Inductively Coupled Plasma Method[3]
39	Malathion	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[5,21]
40	Mercury	Cold-Vapor Atomic Absorption Spectrometric Method[3]

/41 Methamidophos ...

ตน. (signature)

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
41	Methamidophos	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[5,21]
42	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic Method[3]
43	Methidathion	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[5,21]
44	Methyl Parathion	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[5,7]
45	Mevinphos	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[5,21]
46	Monocrotophos	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[5,21]
47	Nickel	1) Digestion, Direct Air-Acetylene Flame Method[3] 2) Digestion, Inductively Coupled Plasma Method[3]
48	Oil & Grease	1) Liquid-Liquid, Partition-Gravimetric Method[3] 2) Soxhlet Extraction Method[3]
49	pH	Electrometric Method[3]
50	Phenols	Distillation, Direct Photometric Method[3]
51	Selenium	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[3] 2) Digestion, Inductively Coupled Plasma Method[3]
52	Silvex	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method [5,6]
53	Sulfide	1) ZnS Precipitation, Iodometric Method[3] 2) ZnS Precipitation, Colorimetric Method[3]
54	Suspended Solids	Dried at 103-105^{0}C[3]
55	Temperature	Laboratory and Field Methods[3]
56	Total Dissolved Solids	1) Dried at 103-105^{0}C[3] 2) Dried at 180^{0}C[3]
57	Total Kjeldahl Nitrogen	Macro-Kjeldahl Method[3]
58	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method [5,7]
59	Triazophos	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[5,21]
60	Zinc	1) Digestion, Direct Air-Acetylene Flame Method[3] 2) Digestion, Inductively Coupled Plasma Method[3]

/อากาศเสีย...

ตน. (signature)

อากาศเสีย(ปล่องระบาย) จำนวน 28 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	1) Isokinetic, Digestion, Direct Air-Acetylene Flame Method[8] 2) Isokinetic, Digestion, Inductively Coupled Plasma Method[8]
2	Arsenic	1) Isokinetic, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[8] 2) Isokinetic, Digestion, Inductively Coupled Plasma Method[8]
3	Cadmium	Isokinetic, Digestion, Inductively Coupled Plasma Method[8]
4	Carbon Monoxide	Non-Dispersive Infrared Method[8]
5	Chromium	Isokinetic, Digestion, Inductively Coupled Plasma Method[8]
6	Chlorine	1) Absorption, Ion Chromatographic Method[8] 2) Isokinetic, Ion Chromatographic Method[8]
7	Cobalt	Isokinetic, Digestion, Inductively Coupled Plasma Method[8]
8	Copper	1) Isokinetic, Digestion, Direct Air-Acetylene Flame Method[8] 2) Isokinetic, Digestion, Inductively Coupled Plasma Method[8]
9	Cresol	Adsorption, Gas Chromatographic Method[8]
10	Dioxins/Furans	Isokinetic Sampling[8], Analysis by Accredited Laboratory
11	Hydrogen Chloride	1) Absorption, Ion Chromatographic Method[8] 2) Isokinetic, Ion Chromatographic Method[8]
12	Hydrogen Fluoride	1) Absorption, Ion Chromatographic Method[8] 2) Isokinetic, Ion Chromatographic Method[8]
13	Hydrogen Sulfide	Absorption, Iodometric Method[8]
14	Lead	1) Isokinetic, Digestion, Direct Air-Acetylene Flame Method[8] 2) Isokinetic, Digestion, Inductively Coupled Plasma Method[8]
15	Manganese	Isokinetic, Digestion, Inductively Coupled Plasma Method[8]
16	Mercury	Isokinetic, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[8]
17	Nickle	Isokinetic, Digestion, Inductively Coupled Plasma Method[8]
18	Opacity	Ringelmann's Method
19	Oxides of Nitrogen	1) Absorption, Phenoldisulfonic Acid Method[8] 2) Chemiluminescence Method[8]
20	Selenium	Isokinetic, Digestion, Inductively Coupled Plasma Method[8]
21	Sulfur Dioxide	1) Isokinetic, Barium-Thorin Titrimetric Method[8] 2) Absorbtion, Barium-Thorin Titrimetric Method[8] 3) Fluorescence Method[8]
22	Sulfuric acid	Isokinetic, Barium-Thorin Titrimetric Method[8]

/23 Tellurium ...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
23	Tellurium	Isokinetic, Digestion, Inductively Coupled Plasma Method[8]
24	Tin	Isokinetic, Digestion, Inductively Coupled Plasma Method[8]
25	Total Suspended Particulate	Isokinetic, Gravimetric Method[8]
26	Vanadium	Isokinetic, Digestion, Inductively Coupled Plasma Method[8]
27	Xylene	Adsorption, Gas Chromatographic Method[8]
28	Zinc	1) Isokinetic, Digestion, Direct Air-Acetylene Flame Method[8] 2) Isokinetic, Digestion, Inductively Coupled Plasma Method[8]

กากอุตสาหกรรม จำนวน 33 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	1) Waste Extraction, Gas Chromatographic Method[1,5,9] 2) Soxhlet Extraction, Gas Chromatographic Method[4,9]
2	Antimony	1) Waste Extraction, Direct Air-Acetylene Flame Method[1,10,12] 2) Waste Extraction, Inductively Coupled Plasma Method[1,10,11] 3) Digestion, Direct Air-Acetylene Flame Method[10,12] 4) Digestion, Inductively Coupled Plasma Method[10,11]
3	Aroclor 1254	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[4,7]
4	Arsenic	1) Waste Extraction, Hydride Generation/Atomic Absorption Spectrometric Method[1,10,13] 2) Waste Extraction, Inductively Coupled Plasma Method[1,10,11] 3) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[10,13] 4) Digestion, Inductively Coupled Plasma Method[10,11]
5	Barium	1) Waste Extraction, Inductively Coupled Plasma Method[1,10,11] 2) Digestion, Inductively Coupled Plasma Method[10,11]
6	Beryllium	1) Waste Extraction, Inductively Coupled Plasma Method[1,10,11] 2) Digestion, Inductively Coupled Plasma Method[10,11]
7	γ-BHC	1) Waste Extraction, Gas Chromatographic Method[1,5,9] 2) Soxhlet Extraction, Gas Chromatographic Method[4,9]
8	Cadmium	1) Waste Extraction, Direct Air-Acetylene Flame Method[1,10,12] 2) Waste Extraction, Inductively Coupled Plasma Method[1,10,11] 3) Digestion, Direct Air-Acetylene Flame Method[10,12] 4) Digestion, Inductively Coupled Plasma Method[10,11]

/9 Chlordane ...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
9	Chlordane	1) Waste Extraction, Gas Chromatographic Method[1,5,7] 2) Soxhlet Extraction, Gas Chromatographic Method[4,7]
10	Chromium	1) Waste Extraction, Direct Air-Acetylene Flame Method[1,10,12] 2) Waste Extraction, Inductively Coupled Plasma Method[1,10,11] 3) Digestion, Direct Air-Acetylene Flame Method[10,12] 4) Digestion, Inductively Coupled Plasma Method[10,11]
11	Cobalt	1) Waste Extraction, Direct Air-Acetylene Flame Method[1,10,12] 2) Waste Extraction, Inductively Coupled Plasma Method[1,10,11] 3) Digestion, Direct Air-Acetylene Flame Method[10,12] 4) Digestion, Inductively Coupled Plasma Method[10,11]
12	Copper	1) Waste Extraction, Direct Air-Acetylene Flame Method[1,10,12] 2) Waste Extraction, Inductively Coupled Plasma Method[1,10,11] 3) Digestion, Direct Air-Acetylene Flame Method[10,12] 4) Digestion, Inductively Coupled Plasma Method[10,11]
13	2,4-D	Waste Extraction, Gas Chromatographic Method[1,5,6]
14	4,4'-DDD	1) Waste Extraction, Gas Chromatographic Method[1,5,9] 2) Soxhlet Extraction, Gas Chromatographic Method[4,9]
15	4,4'-DDE	1) Waste Extraction, Gas Chromatographic Method[1,5,9] 2) Soxhlet Extraction, Gas Chromatographic Method[4,9]
16	4,4'-DDT	1) Waste Extraction, Gas Chromatographic Method[1,5,9] 2) Soxhlet Extraction, Gas Chromatographic Method[4,9]
17	Dieldrin	1) Waste Extraction, Gas Chromatographic Method[1,5,9] 2) Soxhlet Extraction, Gas Chromatographic Method[4,9]
18	Endrin	1) Waste Extraction, Gas Chromatographic Method[1,5,9] 2) Soxhlet Extraction, Gas Chromatographic Method[4,9]
19	Heptachlor	1) Waste Extraction, Gas Chromatographic Method[1,5,9] 2) Soxhlet Extraction, Gas Chromatographic Method[4,9]
20	Hexavalent Chromium	1) Waste Extraction, Colorimetric Method[1,16] 2) Digestion, Colorimetric Method[15,16]
21	Lead	1) Waste Extraction, Direct Air-Acetylene Flame Method[1,10,12] 2) Waste Extraction, Inductively Coupled Plasma Method[1,10,11] 3) Digestion, Direct Air-Acetylene Flame Method[10,12] 4) Digestion, Inductively Coupled Plasma Method[10,11]
22	Mercury	Waste Extraction, Cold-Vapor Atomic Absorption Spectrometric Method[1,17,18]

/23 Methoxychlor ...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
23	Methoxychlor	1) Waste Extraction, Gas Chromatographic Method[1,5,9] 2) Soxhlet Extraction, Gas Chromatographic Method[4,9]
24	Molybdenum	1) Waste Extraction, Direct Nitrous Oxide-Acetylene Flame Method[1,10,12] 2) Waste Extraction, Inductively Coupled Plasma Method[1,10,11] 3) Digestion, Direct Nitrous Oxide-Acetylene Flame Method[10,12] 4) Digestion, Inductively Coupled Plasma Method[10,11]
25	Nickel	1) Waste Extraction, Direct Air-Acetylene Flame Method[1,10,12] 2) Waste Extraction, Inductively Coupled Plasma Method[1,10,11] 3) Digestion, Direct Air-Acetylene Flame Method[10,12] 4) Digestion, Inductively Coupled Plasma Method[10,11]
26	Selenium	1) Waste Extraction, Hydride Generation/Atomic Absorption Spectrometric Method[2,10,14] 2) Waste Extraction, Inductively Coupled Plasma Method[1,10,11] 3) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[10,14] 4) Digestion, Inductively Coupled Plasma Method[10,11]
27	Silver	1) Waste Extraction, Direct Air-Acetylene Flame Method[1,10,12] 2) Waste Extraction, Inductively Coupled Plasma Method[1,10,11] 3) Digestion, Direct Air-Acetylene Flame Method[10,12] 4) Digestion, Inductively Coupled Plasma Method[10,11]
28	Silvex	Waste Extraction, Gas Chromatographic Method[1,5,6]
29	Thallium	1) Waste Extraction, Inductively Coupled Plasma Method[1,10,11] 2) Digestion, Inductively Coupled Plasma Method[10,11]
30	Toxaphene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[4,7]
31	Trichloroethene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[19,20]
32	Vanadium	1) Waste Extraction, Inductively Coupled Plasma Method[1,10,11] 2) Digestion, Inductively Coupled Plasma Method[10,11]
33	Zinc	1) Waste Extraction, Direct Air-Acetylene Flame Method[1,10,12] 2) Waste Extraction, Inductively Coupled Plasma Method[1,10,11] 3) Digestion, Direct Air-Acetylene Flame Method[10,12] 4) Digestion, Inductively Coupled Plasma Method[10,11]

/เอกสารอ้างอิง ...

<u>เอกสารอ้างอิง</u>

1. กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2548. เรื่องการกำจัดสิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว. ราชกิจจานุเบกษา. 25 มกราคม 2549. เล่มที่ 123 ตอนพิเศษ 11ง.

2. สมาคมวิศวกรรมสิ่งแวดล้อมแห่งประเทศไทย. คู่มือวิเคราะห์น้ำเสีย. พิมพ์ครั้งที่ 4. กรุงเทพฯ: เรือนแก้วการพิมพ์, 2547.

3. APHA, AWWA, WEF. Standard Methods for the Examination of Water and Wastewater. 22nd ed. Washington, DC: APHA, 2012.

4. United States Environmental Protection Agency. Soxhlet Extraction. SW-846 Method 3540C, 1996.

5. United States Environmental Protection Agency. Separatory Funnel Liquid-Liquid Extraction. SW-846 Method 3510C, 1996.

6. United States Environmental Protection Agency. Chlorinated Herbicides by GC Using Methylation or Pentafluorobenzylation Derivatization. SW-846 Method 8151A, 2007.

7. United States Environmental Protection Agency. Semivolatile Organic Compounds by Gas Chromatrography/Mass Spectrometry (GC/MS). SW-846 Method 8270C, 1996.

8. United States Environmental Protection Agency. Standards of Performance for New Stationary Sources. 40 CFR 60 Appendix A, 1999.

9. United States Environmental Protection Agency. Organochlorine Pesticides by Gas Chromatrography. SW-846 Method 8081B, 2007.

10. United States Environmental Protection Agency. Acid Digestion of Sediments, Sludges, and Soils. SW-846 Method 3050B, 1996.

11. United States Environmental Protection Agency. Inductively Coupled Plasma-Atomic Emission Spectrometry. SW-846 Method 6010C, 2007.

12. United States Environmental Protection Agency. Flame Atomic Absorption Spectrophotometry. SW-846 Method 7000B, 2007.

13. United States Environmental Protection Agency. Arsenic (Atomic Absorption, Gaseous Hydride). SW-846 Method 7061A, 2007.

14. United States Environmental Protection Agency. Selenium (Atomic Absorption, Gaseous Hydride) . SW-846 Method 7741A, 2007.

15. United States Environmental Protection Agency. Alkaline Digestion for Hexavalent Chromium. SW-846 Method 3060A, 1996.

16. United States Environment Protection Agency. Chromium, Hexavalent (Colorimetric). SW-846 Method 7196A, 1992.

17. United States Environmental Protection Agency. Mercury in Solid or Semisolid Waste (Manual Cold-Vapor Technique). SW-846 Method 7471A, 1994.

18. United States Environmental Protection Agency. Mercury in Liquid Waste (Manual Cold-Vapor Technique). SW-846 Method 7470A, 1994.

/19. United...

19. United States Environmental Protection Agency. Purge-and-Trap for Aqueous Samples. SW-846 Method 5030B, 1996.

20. United States Environmental Protection Agency. Volatile Organic Compounds by Gas Chromatrography/Mass Spectrometry (GC/MS). SW-846 Method 8260B, 1996.

21. United States Environmental Protection Agency. Organophosphorus Compounds by Gas Chromatography. SW-846 Method 8141B, 2007.

ที่ อก ๐๓๑๘/(๑) ๙๓๖

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖เขตราชเทวี
กรุงเทพมหานคร๑๐๔๐๐

๑๔ มกราคม ๒๕๕๘

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน ผู้รับอนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชนบริษัท เอส.พี.เอส. คอนซัลติ้งเซอร์วิส จำกัด

อ้างถึง หนังสือบริษัท เอส.พี.เอส. คอนซัลติ้งเซอร์วิส จำกัด SPS_AM.๐๘๘/๑๒/๒๐๑๔
ลงวันที่ ๒๒ ธันวาคม ๒๕๕๗

ตามหนังสือที่อ้างถึง บริษัท เอส.พี.เอส. คอนซัลติ้งเซอร์วิส จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๐๑๑ สถานที่ตั้งเลขที่ ๗ ซอยพหลโยธิน ๒๔ ถนนพหลโยธิน แขวงจอมพล เขตจตุจักร กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

๑. ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑ ราย
นางสาวกรรณิกา บัวเรียน ทะเบียนเลขที่ ว-๐๑๑-จ-๕๙๑๑

๒. ให้เพิ่มผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑ ราย
นางสาวอุทุมพร แท่นทอง ทะเบียนเลขที่ ว-๐๑๑-ค-๖๒๒๑

๓. ให้เพิ่มเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๑ ราย
นางสาววศินี สิงห์สุทธิ์ ทะเบียนเลขที่ ว-๐๑๑-จ-๖๒๒๒

อนึ่ง หนังสืออนุญาตฉบับนี้จะหมดอายุพร้อมหนังสืออนุญาตต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ที่ อก ๐๓๑๘/(๑) ๙๐๗๑ ลงวันที่ ๑๐กรกฎาคม ๒๕๕๗ คือในวันที่๑๐กรกฎาคม ๒๕๖๐

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นางสาวพะเยาว์ คำมุข)
ผู้อำนวยการสำนักวิจัยและพัฒนาสิ่งแวดล้อมโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

สำนักวิจัยและพัฒนาสิ่งแวดล้อมโรงงาน
ศูนย์วิจัยและพัฒนาสิ่งแวดล้อมโรงงานส่วนกลาง
โทร. ๐๒๒๐๒ ๔๑๕๖-๗ ๐๒๒๐๒ ๔๐๐๒
โทรสาร ๐๒๓๕๔ ๓๒๐๘ ๐๒๓๕๔ ๓๔๑๕

"กระทรวงอุตสาหกรรม เป็นที่พึ่งของผู้ประกอบการและประชาชนอย่างแท้จริง"

ที่ อก ๐๓๑๘/(๑) ๑๙๒๘๗

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ เขตราชเทวี
กรุงเทพมหานคร ๑๐๔๐๐

๒๖ พฤศจิกายน ๒๕๕๘

เรื่อง เปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์

เรียน ผู้รับอนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด

อ้างถึง หนังสือบริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด ที่ SPS_AM. ๐๐๒๐/๐๔/๒๐๑๕ ลงวันที่ ๑๖ ตุลาคม ๒๕๕๘

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือเปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์ บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด จำนวน ๒ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๐๑๑ สถานที่ตั้งเลขที่ ๗ ซอยพหลโยธิน ๒๔ ถนนพหลโยธิน แขวงลาดยาว เขตจตุจักร กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

๑. ให้ยกเลิกผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๓ ราย

๑) นางสาวธชาณันทน์ เติมกสิพาณิชย์ ทะเบียนเลขที่ ว-๐๑๑-ค-๕๔๕๖
๒) นางสาวสุภัทชา นาคพุ่ม ทะเบียนเลขที่ ว-๐๑๑-ค-๕๔๕๗
๓) นางสาวศรีนวล ศรีเหรา ทะเบียนเลขที่ ว-๐๑๑-ค-๕๔๕๘

๒. ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๔ ราย

๑) นางสาวภัทรียา จันทร์ประสิทธิ์ ทะเบียนเลขที่ ว-๐๑๑-จ-๕๔๖๓
๒) นางสาวธารทิพย์ รัตนะ ทะเบียนเลขที่ ว-๐๑๑-จ-๕๙๐๕
๓) นายพงษ์สิน เกษตรสิน ทะเบียนเลขที่ ว-๐๑๑-จ-๕๙๐๘
๔) นางสาววิภารัตน์ ทองเสด็จ ทะเบียนเลขที่ ว-๐๑๑-จ-๕๙๐๙

๓. ให้เพิ่มสารมลพิษที่อนุญาตให้วิเคราะห์ในน้ำเสีย จำนวน ๑๔ รายการ และกากอุตสาหกรรม จำนวน ๙ รายการ รวมทั้งสิ้นจำนวน ๒๓ รายการ ตามสิ่งที่ส่งมาด้วย

อนึ่ง หนังสืออนุญาตฉบับนี้จะหมดอายุพร้อมหนังสืออนุญาตต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ที่ อก ๐๓๑๘/(๑) ๙๐๗๑ ลงวันที่ ๑๐ กรกฎาคม ๒๕๕๗ คือในวันที่ ๑๐ กรกฎาคม ๒๕๖๐

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นางสาวพะเยาว์ คำมุข)
ผู้อำนวยการสำนักวิจัยและพัฒนาสิ่งแวดล้อมโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

สำนักวิจัยและพัฒนาสิ่งแวดล้อมโรงงาน
ศูนย์วิจัยและพัฒนาสิ่งแวดล้อมโรงงานส่วนกลาง
โทร. ๐ ๒๒๐๒ ๔๑๔๖-๗ ๐ ๒๒๐๒ ๔๐๐๒
โทรสาร ๐ ๒๓๕๔ ๓๒๐๘ ๐ ๒๓๕๔ ๓๔๓๕

เอกสารแนบท้ายหนังสืออนุญาตเปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์
บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด เลขทะเบียน ว-011
ที่ อก ๐๓๑๘/(๑) ๑๙๒๘๗ ลงวันที่ ๒๖ พฤศจิกายน ๒๕๕๘

สารมลพิษที่อนุญาตให้วิเคราะห์ จำนวน 23 รายการ

น้ำเสีย จำนวน 14 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldicarb	High-Performance Liquid Chromatographic Method[2]
2	Aldicarb Sulfone	High-Performance Liquid Chromatographic Method[2]
3	Aldicarb Sulfoxide	High-Performance Liquid Chromatographic Method[2]
4	Carbaryl	High-Performance Liquid Chromatographic Method[2]
5	Carbofuran	High-Performance Liquid Chromatographic Method[2]
6	Chemical Oxygen Demand	Closed Reflux, Colorimetric Method[2]
7	Glyphosate	High-Performance Liquid Chromatographic Method[2]
8	3-Hydroxyl Carbofuran	High-Performance Liquid Chromatographic Method[2]
9	Methiocarb	High-Performance Liquid Chromatographic Method[2]
10	Methomyl	High-Performance Liquid Chromatographic Method[2]
11	1-Naphthol	High-Performance Liquid Chromatographic Method[2]
12	Oxamyl	High-Performance Liquid Chromatographic Method[2]
13	Phenols	Distillation, Chloroform Extraction Method[2]
14	Propoxur	High-Performance Liquid Chromatographic Method[2]

กากอุตสาหกรรม จำนวน 9 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acrylonitrile	Purge and Trap, Gas Chromatography/mass Spectrometry Method[6,7]
2	Asbestos	Microscopy Stereo and Polarized Light[3]
3	α-BHC	1) Waste Extraction, Gas Chromatographic Method[1,4,8] 2) Soxhlet Extraction, Gas Chromatographic Method[5,8]
4	β-BHC	1) Waste Extraction, Gas Chromatographic Method[1,4,8] 2) Soxhlet Extraction, Gas Chromatographic Method[5,8]
5	γ-BHC (Lindane)	1) Waste Extraction, Gas Chromatographic Method[1,4,8] 2) Soxhlet Extraction, Gas Chromatographic Method[5,8]
6	Endrin Aldehyde	1) Waste Extraction, Gas Chromatographic Method[1,4,8] 2) Soxhlet Extraction, Gas Chromatographic Method[5,8]
7	Heptachlor Epoxide	1) Waste Extraction, Gas Chromatographic Method[1,4,8] 2) Soxhlet Extraction, Gas Chromatographic Method[5,8]

/ 8 Pentachlo...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
8	Pentachlorophenol	1) Waste Extraction, Gas Chromatographic Method[1,4,8] 2) Soxhlet Extraction, Gas Chromatographic Method[5,8]
9	Vinyl Chloride	Purge and Trap, Gas Chromatography/mass Spectrometry Method[6,7]

<u>เอกสารอ้างอิง</u>

1. กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม, พ.ศ. 2548. เรื่อง การกำจัดสิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว. ราชกิจจานุเบกษา. 25 มกราคม 2549. เล่มที่ 123 ตอนพิเศษ 11ง.

2. APHA, AWWA, WEF. Standard Methods for the Examination of Water and Wastewater. 22nd ed. Washington, DC: APHA, 2012.

3. NIOSH Manual of Analytical Methods. 4th ed. U.S. Department of Health and Human Services, 1994

4. United States Environmental Protection Agency. Separatory Funnel Liquid-Liquid Extraction. SW-846 Method 3510C, 1996.

5. United States Environmental Protection Agency. Soxhlet Extraction. SW-846 Method 3540C, 1996

6. United States Environmental Protection Agency. Closed-System Purge-And-Trap and Extraction for Volatile Organics in Soil and waste Samples. SW-846 Method 5035, 1996.

7. United States Environmental Protection Agency. Volatile Organic Compounds by Gas Chromatrography/Mass Spectrometry (GC/MS). SW-846 Method 8260B, 1996.

8. United States Environmental Protection Agency. Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS). SW-846 Method 8270D, 2007.

ที่ อก ๐๓๑๘/(๑) ๒๕๒๗

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ เขตราชเทวี
กรุงเทพมหานคร ๑๐๔๐๐

๑๒ กุมภาพันธ์ ๒๕๕๙

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน ผู้รับอนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด

อ้างถึง หนังสือบริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด SPS_AM. ๐๐๐๕/๐๑/๒๐๑๖
ลงวันที่ ๒๕ มกราคม ๒๕๕๙

ตามหนังสือที่อ้างถึง บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๐๑๑ สถานที่ตั้งเลขที่ ๗ ซอยพหลโยธิน ๒๔ ถนนพหลโยธิน แขวงจอมพล เขตจตุจักร กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

๑. ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๔ ราย

๑) นางสาวเพ็ญภา วิภาสธวัช ทะเบียนเลขที่ ว-๐๑๑-จ-๕๑๓๙
๒) นางสาวศศิธร สังข์อ่อนดี ทะเบียนเลขที่ ว-๐๑๑-จ-๕๑๔๓
๓) นางสาวภาวดี คำภูษา ทะเบียนเลขที่ ว-๐๑๑-จ-๕๑๔๔
๔) นางสาวสุภารัตน์ ศุทธิสมบูรณ์ ทะเบียนเลขที่ ว-๐๑๑-จ-๕๙๑๐

๒. ให้เพิ่มผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๕ ราย

๑) นางสาวเพ็ญภา วิภาสธวัช ทะเบียนเลขที่ ว-๐๑๑-ค-๖๖๔๕
๒) นางสาวศศิธร สังข์อ่อนดี ทะเบียนเลขที่ ว-๐๑๑-ค-๖๖๔๖
๓) นางสาวภาวดี คำภูษา ทะเบียนเลขที่ ว-๐๑๑-ค-๖๖๔๗
๔) นางสาวสุภารัตน์ ศุทธิสมบูรณ์ ทะเบียนเลขที่ ว-๐๑๑-ค-๖๖๔๘
๕) นางสาวธันยพัฒน์ หลานเศษฐา ทะเบียนเลขที่ ว-๐๑๑-ค-๖๖๔๙

อนึ่ง หนังสืออนุญาตฉบับนี้จะหมดอายุพร้อมหนังสืออนุญาตต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ที่ อก ๐๓๑๘/(๑) ๙๐๗๑ ลงวันที่ ๑๐ กรกฎาคม ๒๕๕๗ คือในวันที่ ๑๐ กรกฎาคม ๒๕๖๐

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นางสาวพะเยาว์ คำมุข)
ผู้อำนวยการสำนักวิจัยและพัฒนาสิ่งแวดล้อมโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

สำนักวิจัยและพัฒนาสิ่งแวดล้อมโรงงาน
ศูนย์วิจัยและพัฒนาสิ่งแวดล้อมโรงงานส่วนกลาง
โทร. ๐ ๒๒๐๒ ๔๑๔๖-๗ ๐ ๒๒๐๒ ๔๐๐๒
โทรสาร ๐ ๒๓๕๔ ๓๒๐๘ ๐ ๒๓๕๔ ๓๔๑๕

Ref No. : 0303/5823

CERTIFICATE OF TESTING LABORATORY ACCREDITATION

This is to certify that

Laboratory of S.P.S. Consulting Service Company Limited
7 Soi Phahon Yothin 24, Phahon Yothin Road, Jompol, Chatuchak,
Bangkok 10900

Have successfully undergone assessment according to ISO/IEC 17025 : 2005 and under the Bureau of Laboratory Accreditation, Department of Science Service for the requirements, regulations and criteria for the competence of testing laboratories

Accreditation Number TESTING - 0054

The scope of accreditation is as annexed hereto

Issue date : *19th April 2013*
Expired date : *21st June 2016*
Signature :
(Miss Saowanee Musidang)
Chairperson of Laboratory Accreditation Committee

Bureau of Laboratory Accreditation, Department of Science Service, Ministry of Science and Technology

Scope of Testing Laboratory Accreditation

Laboratory Name : Laboratory of S.P.S. Consulting Service Company Limited
Address : 7 Soi Phahon Yothin 24, Phahon Yothin Road, Jompol, Chatuchak, Bangkok 10900
Accreditation Number : Testing - 0054
Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
1	Water	COD 10 mg/dm^3 to 50 mg/dm^3	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 5220 B
		- COD 40 mg/dm^3 to 400 mg/dm^3	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 5220 C
2	Wastewater	COD 10 mg/dm^3 to 50 mg/dm^3	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 5220 B
		- COD 40 mg/dm^3 to 400 mg/dm^3	Standard Methods for the Examination of Water and Wastewater, APHA, AWWA & WEF, 22nd ed., 2012, part 5220 C

Initial Issue Date 22nd June 2009 Issue Number 2

Scope of Testing Laboratory Accreditation

Laboratory Name : Laboratory of S.P.S. Consulting Service Company Limited

Address : 7 Soi Phahon Yothin 24, Phahon Yothin Road, Jompol, Chatuchak, Bangkok 10900

Accreditation Number : Testing - 0054

Laboratory Status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
3	Workplace	Benzene 0.05 mg/m³ to 285 mg/m³ - Toluene 0.05 mg/m³ to 285 mg/m³ - Ethylbenzene 0.02 mg/m³ to 285 mg/m³ - *o*-Xylene 0.04 mg/m³ to 285 mg/m³ - *m*-Xylene 0.06 mg/m³ to 285 mg/m³ *p*-Xylene 0.05 mg/m³ to 285 mg/m³	In - house method : TWA039 based on NIOSH Manual of Analytical Methods (NMAM), 4th ed., March 2003, method 1501 (exclude sampling)

Initial Issue Date 22nd June 2009 Issue Number 2

Bureau of Laboratory Accreditation, Department of Science Service, Ministry of Science and Technology

Scope of Testing Laboratory Accreditation

Laboratory Name : Laboratory of S.P.S. Consulting Service Company Limited

Address : 7 Soi Phahon Yothin 24, Phahon Yothin Road, Jompol, Chatuchak, Bangkok 10900

Accreditation Number : Testing - 0054

Laboratory Status : ☐ Permanent ☑ Site ☐ Temporary ☐ Mobile

Item Number	Test Material / Product	Test Item / Range of Testing	Test Method / Technique Used
4	Environmental noise	- Sound level $L_{eq,t}$ 30 dB (A) to 120 dB (A) L_{max} 30 dB (A) to 120 dB (A)	In - house method : W913 based on ISO 1996-1 : 2003
5	Workplace noise	- Sound level $L_{eq,t}$ 30 dB (A) to 120 dB (A) L_{max} 30 dB (A) to 120 dB (A)	In - house method : W914 based on ISO 11202 : 1995

Issue Date : 19th April 2013

Signature : Saowanee Musidang

(Miss Saowanee Musidang)

Chairperson of Laboratory Accreditation Committee

Initial Issue Date 22nd June 2009 Issue Number 2

Bureau of Laboratory Accreditation, Department of Science Service, Ministry of Science and Technology

Certificate No. 14T034/0116

Form NSC/TISI 2

(Garuda)

Certificate of Laboratory Accreditation

By virtue of National Standardization Act B.E. 2551 (2008)

Secretary-General, Thai Industrial Standards Institute

Issue this Certificate for

S.P.S. Consulting Service Company Limited

Laboratory address :

7 Phahol Yothin Soi 24, Phahol Yothin Road, Jomphol, Chatuchak, Bangkok

This laboratory is accredited for testing

in accordance with the Thai Industrial Standard TIS 17025-2548 (2005) (ISO/IEC 17025:2005)

General Requirements for the Competence of Testing and Calibration Laboratories

Accreditation No. TESTING 0107

The scope of accreditation is as annexed hereto.

Issue date : 21 April B.E. 2557 (2014)
Valid until : 20 April B.E. 2560 (2017)

(Signature)
(Urit Srinongkote)
Secretary-General
Thai Industrial Standards Institute

Translation approved
(Vannapat Uthongsap)
Director,
Office of the National Standardization Council
Date: 23 December 2014

Date of initial issue: 8 September B.E. 2546 (2003)
Ministry of Industry, Thai Industrial Standards Institute

Translation Note: In the event of doubt or misunderstanding, the original in Thai shall be the authoritative.

Scope of Accreditation for Testing

Certificate No. 14T034/0116

Laboratory name : S.P.S. Consulting Service Company Limited
Address : 7 Phahol Yothin Soi 24, Phahol Yothin Road, Jomphol, Chatuchak, Bangkok
Accreditation No. : TESTING 0107
Laboratory status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Field of Tested	Parameter	Test Method
Environmental Field Water and wastewater	- Heavy metal • Cadmium 0.1 mg/l to 2.0 mg/l • Chromium 0.1 mg/l to 5.0 mg/l • Lead 0.2 mg/l to 10.0 mg/l • Iron 0.1 mg/l to 5.0 mg/l • Nickel 0.1 mg/l to 2.0 mg/l • Zinc 0.1 mg/l to 1.0 mg/l • Copper 0.1 mg/l to 5.0 mg/l	- In-house method :SPS. T01 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 22nd edition, 2012, part 3030 E and 3111 B
	-Total suspended solids 10 mg/l to 10 000 mg/l	- In-house method :SPS. T02 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 22nd edition, 2012, part 2540 D
	-Total dissolved solids 50 mg/l to 10 000 mg/l	- Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 22nd edition, 2012, part 2540 C at 180 °C

Scope of Accreditation for Testing

Certificate No. 14T034/0116

Accreditation No. : TESTING 0107

Laboratory status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Field of Tested	Parameter	Test Method
Environmental Field Water and wastewater	- Total dissolved solids 50 mg/l to 10 000 mg/l	- In-house method :SPS. T03 Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 22nd, edition 2012, part 2540 C at 104 ± 2 °C
	- pH 4.0 to 10.0	- Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 22nd, edition 2012, part 4500-H^+ B
	- BOD 2 mg/l to 10 000 mg/l	- Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 22nd, edition 2012, part 5210 B & 4500 O G
	- Hardness 5 mg/l to 1000 mg/l (expressed as $CaCO_3$)	- Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 22nd, edition 2012, part 2340 C

Scope of Accreditation for Testing

Certificate No. 14T034/0116

Accreditation No. : TESTING 0107

Laboratory status : ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Field of Tested	Parameter	Test Method
Environmental Field Water and wastewater	- Heavy metal • Beryllium 0.005 mg/l to 50.0 mg/l • Cadmium 0.005 mg/l to 50.0 mg/l • Cobalt 0.01 mg/l to 50.0 mg/l • Chromium 0.01 mg/l to 50.0 mg/l • Copper 0.01 mg/l to 50.0 mg/l • Iron 0.01 mg/l to 50.0 mg/l • Manganese 0.01 mg/l to 50.0 mg/l • Nickel 0.01 mg/l to 50.0 mg/l • Lead 0.01 mg/l to 50.0 mg/l • Vanadium 0.01 mg/l to 50.0 mg/l • Zinc 0.02 mg/l to 50.0 mg/l	- In-house method :SPS. T67 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 22nd edition, 2012, part 3030 (3030F) and 3120 B

Issue date : 21 April B.E. 2557 (2014)

(Signature)

(Urit Srinongkote)
Secretary-General
Thai Industrial Standards Institute

APPENDIX 5H

QUESTIONAIRES TO INTERVIEW KEY INFORMANTS AND VILLAGERS

QUESTIONNAIRE FOR SOCIO-ECONOMIC SURVEY (AFFECTED HOUSEHOLD)
Of 420 MW Gas Fired Power Plant Project

Village name...

Sub-district ....District ....

Province...

No. of house ....

How long distance from Power Plant....................Km.

1. INFORMATION OF RESPONDENT

1.1 Gender of respondent

☐ Male ☐ Female

1.2 Age of respondent ....years

1.3 Education

☐ Illiterate ☐ Elementary

☐ Mid-Education ☐ Graduated/Higher

☐ Other (Specified)..

1.4 Ethnic group

☐ Bamar ☐ Karen

☐ Mon

☐ Other (Specified)..

1.5 Religion

☐ Buddhism ☐ Islamic

☐ Christian ☐ Others...

1.6 How long have you been in the village..................................years

2. SOCIO-ECONOMIC OF HOUSEHOLD

2.1 Number of household member .... persons

- Male .... person/s
- Female ....person/s
- Employment .... person/s
- Unemployment .... person/s

2.2 Current occupation of household (1 answer)

1) Main occupation

☐ Agriculturist ☐ Government officer

☐ Trading ☐ General wage labour

☐ Employee ☐ Handicraft

☐ Others (specified)..

2) Supplementary occupation (more than 1 answer)

☐ Agriculturist ☐ Government officer

☐ Trading ☐ General wage labour

☐ Employee ☐ Handicraft

☐ Others (specified)..

3) Household member working outside the village

☐ Yes .... person (specified district, province ....)

Type of Work...

☐ No

2.3 Current land holding

1) Total number of plot ....Plot

- Inside village..................Plot..................acre

- Outside village Plot..................acre

2) Total area of land holding ....acre

2.4 Major Sources of income in 2014 (for the whole year)

1) Farm income

- Crop ....kyats / year

- Livestock ....kyats / year

- Fishery...kyats / year

2) Off farm income

- Salary ....kyats / year

- Trade ....kyats / year

- Labour ....kyats / year

-Other..kyats / year

3) Other Sources of Income from Other Household Members ....kyat / year

4) Total Income..kyat/year

2.5 Expenditure on the following items in 2014 (for the whole year)

1) Farm expenditure

- Crop ....kyats / year

- Livestock ....kyats / year

- Fishery...kyats / year

2) Household expenditure
- Food .... kyats / year
- Clothes .... kyats / year
- Religion/donation .... kyats / year
- Education .... kyats / year
- Medical care .... kyats / year
- Cooking Fuel .... kyats / year
- Social activities.. kyats / year
- Tax .... kyats / year
- Transportation cost .... kyats / year
- House repair... kyats / year
- Communication (Phone).. kyats / year
- Others.. kyats / year

3) **Total household expenditure .... kyat/year**

2.6 Sufficiency of household income

☐ Sufficient ☐ Insufficient, problem solving by ....

2.7 Debt and saving

1) Debt

☐ No

☐ Yes .... kyat

2) Saving

☐ No

☐ Yes .... kyat

2.8 Pls specify number of family members who are unemployed (age 15 – 60)?

Sr No.	Function of Family member	Sex	Age	Reason
1.				
2.				
3.				
4.				
5.				

3. SATISFACTION OF THE LIVING CONDITION

3.1 Environment (air, water, soil, noise....etc)

☐ 1. Satisfaction ☐ 2. Not satisfied, specified.......................................

3.2 Social Welfare Service

☐ 1. Satisfaction ☐ 2. Not satisfied, specified.......................................

3.3 Crop production condition

☐ 1. Satisfaction ☐ 2. Not satisfied, specified.......................................

3.4 Relation with people in the neighborhood

☐ 1. Satisfaction ☐ 2. Not satisfied, specified..

3.5 Are you satisfied with current situation of your life?

☐ 1. Satisfaction ☐ 2. Not satisfied, specified..

3.6 Common diseases found in your family and treatment methods (order from high to low)

Types of disease	Treatment methods
1.	
2.	
3.	
4.	
5.	

4. Water uses source

Source of water you are normally using for various purposes at present

Type of water use	(A) Source (name)	(B) Disinfection	Distance from home (meter)	How long per trip (minute)	(C) Quality	Sufficiency
Drinking cooking						
Washing/cleaning						
Irrigation						
Other...............						

A: 1 = House connection 2 = Pumping wells 3 = Yard connection (pond) 4 =Shallow wells
5 = Deep wells 6 = Rain water tanks 7 = Surface water

B: 1 = No 2 = Boiling 3 = Alum 4 = Chlorinating 5 = Others (specify)

C: 1= Good 2= fair 3= poor

Interviewer ....

Date ....Month..........................

Year.......................Time ....

KEY QUESTIONS FOR VILLAGE PROFILE SURVEY

Place..

Date ..../ ..../ ....

PART 1 : PARTICIPANTS (Person in Charge : ....)

Participant	Position in villages
1.	
2.	
3.	
4.	
5.	
6.	

Note:

People to be interviewed:

- Community Leader and Key Informants

- 3-4 persons/villages

PART 2 : HISTORY OF COMMUNITY (Person in Charge: ....)

1. Settlement pattern of village (line type along the road, cluster type and others)

   (Specify)..

   ....

2. Age of the community ....
4. Previous location that the residents came from ....
3. Decision on moving to this village
   1) Group decision and follow by the others.

      ....

   2) Each person relocates to this village by his/her own decision.

....

4. Reasons or incentives of people to settle in this Area ....

....

PART 3 : DEMOGRAPHIC STRUCTURE (Person in Charge: ....)

5. Number of household at present and Population in **2014** (Approximately)

Number of	Year 2014
Population	
Households	

6. Classification of population

Description	Number of persons	%
1. Sex		
- Male		
- Female		
2. Age *		
- 0-5 years		
- 6-12 years		
- 13-19 years		
- 20-59 years		
- More than 60 years		
Note :		

* Age group can be categorized following existing information.

7. Population change during 2014

Description	Number of Persons
1. Birth	
2. Death	
3. In-migration	
4. Out-migration	
Note : Reason of in-migration;	
Reason of out-migration	

8. Ethnic minorities

Ethnic group/Indigenous	No. of household	Religion	Language	Norm/belief
1.				
2.				
3.				

9. Vulnerable groups in the village

Vulnerable Group	Number of household/s	How are they taken care?
1. Disabled in family.		
2. Head of households over 60 years old.		
3. Women who are a head of household.		
4. Only one person live alone in a household.		
5. Homeless		
6. Others (specified)		

10. Education

Level of education	Number of persons	%
1. Pre-school child		
2. Current study		
- Primary school		
- Secondary and high school		
- University		
3. Education level		
- Children before school		
- Never attended school		
- Primary school		
- Secondary and high school		
- University		

Level of education	Number of persons	%
4. Others		

11. Public Health

Please identify communicable diseases in this village (Priority from high to low)?

1. ....
2. ....
3. ....
4. ....
5. ....

Major medical service location

1. Hospital.....................................distance...........Km.
2. Health care center..............................distance...........Km.
3. Private clinic ....distance...........Km.
4. Others (specified) ....distance...........Km.

12. Roles of male and female in families or community

Who make decision in these activities?	Male	Female
Children's education		
Cooking		
Political		
Communicate/Negotiation		
Participation in activities of community		
Participation in activity of religion		
Purchase of house		
Religion activities		

PART 4 : ECONOMIC STRUCTURE

13. Main Occupations

Main Occupations	Number of Household	%
Agriculture		
Trade		

Fishery		
Government officer		
General wage labour		
Employee		

14. Employment and wage in the village (skilled and unskilled labour)

Employment	Wage/Day	
	Skilled labour	Unskilled
Boy		
Girl		
Male		
Female		
Elderly Male		
Elderly Female		

15. Number of villagers working outside the village

1) None ....

2) Yes .... : ....Person

(1) Working outside the village all year or in some seasons

...1) Whole year

...2) In some seasons between...............to ....

(2) Type of work

Male's occupation (Specified) ....Wage/day ....kyat

Female's occupation (Specified)...................Wage/day ....kyat

16. Land Holding and Land Use

1. Average Land Holding ....acres /hh
2. Land Rights Document

1) ....

2) ....

3) ....

17. Cropping pattern, both in rainy and dry seasons (i.e., rice, corn, chili, onion, garlic, bean, etc.)

Types of Crop	Starting Month	Harvest Period (month)	Area (acres)	Production (specified)
Paddy rice				
Corn				

18. Crop distribution

Types of Crop	Reserve (kg)	Selling		
		Kg.	Price (kyat/kg.)	Buyer Source
Paddy rice				
Corn				

19. Livestock

Types of livestock	No. of household raised	Average head / household	Purpose of raising (consumption/sale)
Pig			
Pouty			
Cattle			
Fish			

20. Household income and expenditure

1. Average household income ....kyat/hh/year
   -Maximum...kyat/hh/year
   -Minimum...kyat/hh/year
2. Main sources of income
   1) ....
   2) ....
   3) ....
3. Average household expenditure ....kyat/hh/year
   -Maximum...kyat/hh/year
   -Minimum...kyat/hh/year
4. Main sources of expenditure
   1) ....
   2) ....
   3) ....

PART 5 : INFRASTRUCTURE AND FACILITIES

21. Infrastructure facilities

(1) Availability of electricity (Yes/No) ....
If yeas, pls specify source of electricity ....
If no, what are sources of lighting ....

(2) What fuel use for cooking ....Sources?...................

(3) Drinking water source (specified):...
Quantity/Sufficiency/Quality:...

(4) Water use sources: ....
Quantity/ Sufficiency/Quality:..

(5) Common mode of road transport from village to district: (Rank from most likely use)
1) ....
2) ....
3) ....

(6) Characteristic/type of road in village...
Problem:...

(7) Is there any boat transportation in this village (Yes, No) ....
If yes, pls specify:

Type of boat ....

Purpose ....

Route (from where to where) ....

(8) Is there any unexploded ordnance existing in the vicinity of the village area? (Yes, No) ....

If yes, how far ....

22. Community facilities

(1) No. of service places

Types of service	Yes/No	Number of service place	Remarks
1. Market			
2. Factory			
3. Pre-school/Nursery			
4. Primary School			
5. Secondary School			
6. Temple			
7. Church			
8. Mosque			
9. Cemetery			
10. Hospital			
11. Health Center			
12. Pharmacy			
13. Village Meeting Hall			

(2) School facilities

Types of school	No. of class	No. of teacher	No. of pupils
1. Pre-school/Nursery			
2. Primary School			
3. Secondary School			

(3) Nursing facilities

Types of nursing place	No. of doctor	No. of nurse	No. of bed
1. Hospital			

Types of nursing place	No. of doctor	No. of nurse	No. of bed
2. Health Center			

23. Are there any political and social organizations in this village?

Group name	Number of group member (identified household or person)	Functions
Political Group		
1. Group		
2. Group		
3. Group		
Social Group		
4. Group		
5. Group		
6. Group		
7. Group		

PART 6 : VILLAGE RESOURCES (Informant : ....)

24. Village area

Total village area approximately..acres

(1) Residential area ....acres

(2) Paddy field ....acres

(3) Orchard land ....acres

(4) Pasture area ....acres

(5) Public area ....acres

(6) Idle area ....acres

(7) Forest area ....acres

(8) Other (Specified) ....acres

(Specified) ....acres

(Specified) ....acres

25. Culture and aesthetics

(1) Important historic places (specified)...

(2) Archeological place (specified) ....

(3) Antiquities (specified)...

(4) Building with aesthetic value/building to be conserved (specified) ....

(5) Sacred place (specified) ....

(6) Religions places (specified) ....

(7) Life style/identical activities (specified)...

(8) Natural scenic area (specified)..

(9) Tourism site (specified) ....

26. Natural resources uses

Types	Harvested Period (month-month)	Sufficiency*
30.1 Food		
1)		
2)		
3)		
4)		
5)		
30.2 Medicine		
1)		
2)		
3)		
4)		
5)		
30.3 Household Use/ Building Materials/ Handicrafts/Fire wood		
1)		
2)		
3)		
4)		
5)		

Note:* 1) Abundance 2) Sufficient 3) Insufficient 4) Rare

PART 7 : OPINIONS TOWARD PROJECT DEVELOPMENT

27. What are your opinions about the project development?

……1) Agree, Reasons: ____________________

……2) No Opinion, Reasons: ____________________

……3) Disagree, Reasons: ____________________

……4) Other ____________________

28. Concerns about the Project:

-Construction period

In case of positive impacts (reason)	**Reason**
1) Employment …..Yes …..No	
2) CSR …..Yes …..No.	
3) Amenities …..Yes …..No	
4) Modernity …..Yes …..No	
5) Others (specifies)	
In case of negative impacts	**Reason**
1) Waste water …..Yes …..No	
2) Air pollution …..Yes …..No.	
3) Noise …..Yes …..No	
4) Waste …..Yes …..No	
5) Dust …..Yes …..No	
6) Traffic …..Yes …..No	

-Operation period

In case of positive impacts (reason)	**Reason**
1) Employment …..Yes …..No	
2) CSR …..Yes …..No.	
3) Amenities …..Yes …..No	
4) Modernity …..Yes …..No	
5)…………………………………………………	
In case of negative impacts	**Reason**
1) Waste water …..Yes …..No	
2) Air pollution …..Yes …..No	

3) Noise . ….Yes … ..No	
4) Waste …..Yes …..No	
5) Dust …..Yes …..No	
6) Traffic …..Yes …..No	

29. Suggestions to the Project:

....
....
....

APPENDIX 5I

RESULTS OF TRAFFIC COUNTING

Result of Traffic Counting at TC1 (Sunday, 25 January 2015)

Type of Vehicle	Direction	6.00 - 7.00 a.m.	7.00 - 8.00 a.m.	8.00 - 9.00 a.m.	9.00 - 10.00 a.m.	10.00 - 11.00 a.m.	11.00 - 12.00 a.m.	12.00 a.m. - 1.00 p.m.	1.00 - 2.00 p.m.	2.00 - 3.00 p.m.	3.00 - 4.00 p.m.	4.00 - 5.00 p.m.	5.00 - 6.00 p.m.	Total (vehicle/day)
Motorcycle	out	3	-	-	4	1	2	2	2	1	3	2	3	23
	in	1	1	5	3	3	3	3	1	5	2	3	2	32
Bicycle and Tricycle	out	-	-	-	-	-	-	1	2	-	-	1	2	6
	in	-	-	-	1	1	-	-	-	-	-	1	2	5
Car/Taxi	out	-	-	1	-	-	-	-	-	-	1	-	-	2
	in	2	-	1	-	-	-	-	3	-	1	-	-	7
Ligth Bus	out	-	-	-	-	-	-	-	-	-	-	-	-	0
	in	-	-	-	-	-	-	-	-	-	1	-	-	1
Medium Bus	out	-	-	-	-	-	-	-	-	-	-	-	-	0
	in	-	-	-	-	-	-	-	-	-	-	-	-	0
Rough Terrain Crane, Motorgrader	out	-	-	-	-	-	-	-	-	-	-	-	-	0
	in	-	-	-	-	-	-	-	-	-	-	-	-	0
Light Truck	out	1	-	-	-	-	-	-	-	-	-	-	-	1
	in	-	-	-	1	-	-	1	-	-	1	-	-	3
Six-wheeled Truck	out	-	-	-	-	-	-	-	-	-	-	-	-	0
	in	-	1	-	-	-	-	-	-	-	-	-	-	1
Ten-wheeled Truck	out	-	-	-	1	-	-	-	-	-	-	-	-	1
	in	-	2	1	1	-	1	-	-	-	1	-	-	6
Heavy Truck including Trailer	out	-	-	-	-	-	-	-	-	-	-	-	-	0
	in	-	-	-	-	-	-	-	-	-	-	-	-	0
Total (No. of vehicle/hour)		7	4	8	11	5	6	7	8	6	10	7	9	88

Result of Traffic Counting at TC2 (Sunday, 25 January 2015)

Type of Vehicle	Direction	6.00 - 7.00 a.m.	7.00 - 8.00 a.m.	8.00 - 9.00 a.m.	9.00 - 10.00 a.m.	10.00 - 11.00 a.m.	11.00 - 12.00 a.m.	12.00 a.m. - 1.00 p.m.	1.00 - 2.00 p.m.	2.00 - 3.00 p.m.	3.00 - 4.00 p.m.	4.00 - 5.00 p.m.	5.00 - 6.00 p.m.	Total (vehicle/day)
Motercycle	out	3	-	1	2	4	3	3	3	3	6	3	4	35
	in	-	1	-	-	3	2	2	1	2	-	2	1	14
Bicycle and Tricycle	out	-	-	-	-	-	-	-	1	2	-	-	1	4
	in	-	-	-	-	-	1	-	-	-	-	-	1	2
Car/Taxi	out	-	-	-	-	-	-	-	-	1	-	-	-	1
	in	2	-	-	-	1	-	-	-	-	-	1	1	5
Ligth Bus	out	-	-	-	-	-	-	-	-	-	-	-	-	0
	in	-	-	-	-	-	-	-	-	-	-	1	-	1
Medium Bus	out	-	-	-	-	-	-	-	-	-	-	-	-	0
	in	-	-	-	-	-	-	-	-	-	-	-	-	0
Rough Terrain Crane, Motorgrader	out	-	-	-	-	-	-	-	-	-	-	-	-	0
	in	-	-	-	-	-	-	-	-	-	-	-	-	0
Light Truck	out	-	-	-	1	-	-	-	-	-	-	-	-	1
	in	-	-	-	1	1	-	-	-	1	-	1	1	5
Six-wheeled Truck	out	-	-	-	-	-	-	-	-	-	-	-	-	0
	in	-	-	-	-	-	1	-	-	-	-	-	-	1
Ten-wheeled Truck	out	-	-	-	-	-	-	-	-	-	-	3	-	3
	in	-	-	1	-	-	-	-	-	-	-	-	-	1
Heavy Truck including Trailer	out	-	-	-	-	-	-	-	-	-	-	-	-	0
	in	-	-	-	-	-	-	-	-	-	-	-	-	0
Total (No. of vehicle/hour)		5	1	2	4	9	7	5	5	9	6	11	9	73

Result of Traffic Counting at TC1 (Monday, 26 January 2015)

Type of Vehicle	Direction	6.00 - 7.00 a.m.	7.00 - 8.00 a.m.	8.00 - 9.00 a.m.	9.00 - 10.00 a.m.	10.00 - 11.00 a.m.	11.00 - 12.00 a.m.	12.00 a.m. - 1.00 p.m.	1.00 - 2.00 p.m.	2.00 - 3.00 p.m.	3.00 - 4.00 p.m.	4.00 - 5.00 p.m.	5.00 - 6.00 p.m.	Total (vehicle/day)
Motercycle	out	1	3	2	2	-	3	-	-	-	-	1	-	**12**
	in	-	3	2	1	2	2	-	1	-	-	-	-	**11**
Bicycle and Tricycle	out	-	-	-	-	-	1	-	-	3	-	1	1	**6**
	in	-	-	-	-	-	1	-	1	4	-	1	1	**8**
Car/Taxi	out	1	-	1	-	-	-	1	-	-	-	4	2	**9**
	in	1	-	4	3	1	-	1	1	2	1	1	1	**16**
Ligth Bus	out	-	-	-	-	-	-	-	-	-	-	-	-	**0**
	in	-	-	-	-	-	-	-	-	-	-	-	-	**0**
Medium Bus	out	-	-	-	-	-	-	-	-	-	-	-	-	**0**
	in	-	-	-	-	-	-	-	-	-	-	-	-	**0**
Rough Terrain Crane, Motorgrader	out	-	-	-	-	-	-	-	-	-	-	1	-	**1**
	in	-	-	-	-	-	-	-	1	-	-	-	-	**1**
Light Truck	out	-	-	-	-	-	-	-	-	-	-	1	1	**2**
	in	-	-	1	-	-	1	-	-	-	1	-	1	**4**
Six-wheeled Truck	out	-	-	1	-	-	-	-	1	-	1	-	-	**3**
	in	-	-	1	-	-	-	-	-	1	2	-	-	**4**
Ten-wheeled Truck	out	-	-	1	-	1	-	1	-	-	1	3	-	**7**
	in	-	-	2	-	-	-	1	1	-	1	-	-	**5**
Heavy Truck including Trailer	out	-	-	-	-	-	-	-	-	-	-	-	-	**0**
	in	-	-	-	-	-	-	-	-	-	-	-	-	**0**
Total (No. of vehicle/hour)		3	6	15	6	4	8	4	6	10	7	13	7	**89**

Result of Traffic Counting at TC2 (Monday, 26 January 2015)

Type of Vehicle	Direction	6.00 - 7.00 a.m.	7.00 - 8.00 a.m.	8.00 - 9.00 a.m.	9.00 - 10.00 a.m.	10.00 - 11.00 a.m.	11.00 - 12.00 a.m.	12.00 a.m. - 1.00 p.m.	1.00 - 2.00 p.m.	2.00 - 3.00 p.m.	3.00 - 4.00 p.m.	4.00 - 5.00 p.m.	5.00 - 6.00 p.m.	Total (vehicle/day)
Motercycle	out	3	4	3	2	3	1	2	4	3	4	4	3	36
	in	6	5	3	4	1	2	3	3	2	1	3	3	36
Bicycle and Tricycle	out	1	-	-	-	-	1	-	-	-	-	-	1	3
	in	1	1	-	-	-	1	-	3	2	-	1	1	10
Car/Taxi	out	-	-	4	-	3	-	-	-	-	-	1	-	8
	in	-	-	-	-	1	-	-	-	-	-	1	-	2
Ligth Bus	out	-	-	-	-	-	-	-	-	-	-	-	-	0
	in	-	-	-	-	-	-	-	-	-	-	-	-	0
Medium Bus	out	-	-	-	-	-	-	-	-	-	-	-	-	0
	in	-	-	-	-	-	-	-	-	-	-	-	-	0
Rough Terrain Crane, Motorgrader	out	-	-	-	-	-	-	-	-	-	-	-	-	0
	in	-	-	-	-	-	-	-	-	-	-	-	-	0
Light Truck	out	-	-	1	2	-	-	-	-	-	-	-	-	3
	in	-	-	-	1	-	-	-	1	-	-	-	-	2
Six-wheeled Truck	out	-	-	-	-	-	2	-	-	-	-	-	-	2
	in	-	-	-	-	-	-	-	-	-	-	-	-	0
Ten-wheeled Truck	out	-	-	-	-	-	-	-	-	-	-	-	-	0
	in	-	-	-	-	-	-	-	-	-	-	-	-	0
Heavy Truck including Trailer	out	-	-	-	-	-	-	-	-	-	-	-	-	0
	in	-	-	-	-	-	-	-	-	-	-	-	-	0
Total (No. of vehicle/hour)		11	10	11	9	8	7	5	11	7	5	10	8	102

APPENDIX 6A

CALCULATION OF CONSTRUCTION MATERIAL QUANTITY

APPENDIX 6A

CALCULATION OF CONSTRUCTION MATERIAL QUANTITY

Area of concrete slab	8	ha	
	80,000	m2	
Assume slab thickness	10	in.	
	25	cm	
Total concrete volume	20,320	m3	
	26,562	cubic yard	1 cubic yard=0.765 m3
Concrete ratio	1:2:4		
Roughly, it takes 42 cu.ft of materials to make	1 cubic yard of concrete		
Volume of materials required	1,115,608	ft3	
cement	159,373	ft3	
fine aggregrate (sand)	318,745	ft3	
coarse aggregrate	637,490	ft3	
Weight of 1cubic feet of			
cement	94	lb/ft3	
fine aggregrate (sand)	100	lb/ft3	
coarse aggregrate	100	lb/ft3	
Total weight of cement , tonnes	6,794	tonnes	
Total weight of sand , tonnes	14,456	tonnes	
Total weight of coarse aggregrate , tonnes	28,911	tonnes	
Total weight of materials	50,161	tonnes	
Concreting period	3	months	
	557.34	tonnes/day	
	2.79	trips/hour	
Water volume required	0.126	ft3/ft3 of materials	
	140,567	ft3	
	3,980	m3	

APPENDIX 6B

TRAINING PROGRAM

APPENDIX 6B

TRAINING PROGRAM

Training program will be arranged following the requirement under **Employment and Skill Development Law (2013), Section 14** which states as:

> *"The employer shall carry out the training program in accord with the work requirement in line with the policy of the skill development team to develop the skill relating to the employment for the workers who are proposed to appoint and working at present."*

Training program, therefore, will be conducted in accordance with implementation of three phases of pre-construction and construction, operation and deactivation. Details are described as follows:

1. TRAINING FOR PRE-CONSTRUCTION AND CONSTRUCTION PHASES

1.1 Training

The Contractor is required to conduct training of its key staff from the foreman level up to the Project Manager. Key staff of the Owner's Project Management Office will also attend the training. The objective of the training is to ensure that all concerned in the Project construction can efficiently and effectively perform their responsible tasks in environmental management. To achieve this objective, the training scope should cover the following subjects:

ENV1-Environmental Management of the Project Construction

All trainees are required to attend this introductory subject. It will cover:

(i) scope of the Project;

(ii) existing characteristics and conditions of the Project site;

(iii) the nature and scope of construction- civil works and mechanical and electrical works;

(iv) construction plan and schedule;

(v) laws and regulations relevant to construction environmental management;

(vi) environmental issues that need to be addressed during construction;

(vii) environmental performance targets;

(viii) impact mitigation measures; and

(ix) EMS-monitoring and evaluation program, documentation, reporting requirements, and corrective actions; (x) roles and responsibility of the Contractor and the Contractor; and (xi) mechanisms for coordinating between the Contractor and the Owner in environmental management of the Project construction.

ENV2-Construction Environmental Management plan

The key staff of the two parties will jointly review this CEMP to ensure the two parties have a common understanding of the Owner's requirements of environmental performance of the Contractor. The two parties will collaborate to identify areas in the CEMP that could be improved. The Contractor's key staff will prepare the Contractor CEMP for use in the construction environmental management.

ENV3-Specific Training

Specific training will be organized specifically for each mitigation measures and monitoring program and each environmental management task. The objective is to ensure that key staff of the Contractor responsible for each mitigation measures and monitoring program and each environmental management task have adequate competency to carrying out tasks under their responsibilities. The training should cover such subjects as:

(i) construction waste and hazardous waste management;

(ii) biomass waste management;

(iii) environmental quality control of the work sites;

(iv) environmental management of the worker camp;

(v) community resources and local livelihood; and

(vi) management of social impacts from the influx of workers.

The Contractor will be required to submit a detailed plan for conducting the three training modules. The detailed training plan will include at least the following subjects:

(i) detailed scope of each module and each subject within Course ***ENV3***;

(ii) methods of training of each subject;

(iii) training duration;

(iv) names and positions of staff to receive training for each course and subjects in Course ***ENV3***;

(v) names and CV of the trainers;

(vi) training schedule;

(vii) management of the training program; and

(viii) assessment of the results of training.

1.2 Site Induction

The Contractor will ensure that all personnel working onsite have received an initial site induction. Under no circumstances can anyone enter or work onsite without having first attended a formal induction session. Induction will be provided by the Contractor to the Owners Project Management Team prior to each employee commencing work onsite.

Visitors must undergo a short induction which includes basic environmental, health and safety considerations/procedures. Visitors must be accompanied by a fully inducted employee or contractor at all times.

The induction of personnel living on site should cover such topics as:

(i) sensitive local cultures and customs;

(ii) sensitive environmental spots;

(iii) health and safety requirements and standards;

(iv) personal hygiene and sanitation of the worker camp;

(v) forbidden behaviors unfriendly to the environment; and

(vi) conflict resolution procedures.

Information on these matters should be provided on billboards or public relation bulletins.

2. TRAINING FOR OPERATION PHASE

Personnel requirements for the EMS are estimated as shown in ***Table 1***. The total number of personnel would be about 18.

TABLE 1

ESTIMATES OF PERSONNEL REQUIREMENTS FOR EMS

Position	Number	Function
EHS Manager	1	Overall management of the EMS
Air Quality Technician	2	O&M of stack emission
Noise Control Technicians	2	O&M of machinery generated noise at source such as water intake, gas turbine/generator, HRSG and exhaust pipes.
Wastewater Manager	1	Supervision and control of wastewater treatment facilities
Wastewater and Cooling Water System Technicians	3	O&M of wastewater treatment and cooling water system facilities
Solid Waste Manager	1	Supervision and control of solid wastes treatment facilities
Solid Waste Technicians	1	O&M of solid wastes facilities
Mangrove Management and Participatory Approach Technicians	2	Facilitate and technical support Mangrove Resource Management Program (MGRMP)
Emergency Response Manager and Emergency Response Team	5	Responsible for emergency situation

All recruited personnel should have some experiences in environmental management of gas-fired power plant operations. However they will need to undergo the training as shown in ***Table 2***. The training will include theories and principles of each subject followed by on-the-job training in a gas-fired power plant. Each subject will cover about 1-2 weeks, as shown below.

TABLE 2

TRAINING REQUIREMENTS

Subject	Personnel	Duration
Environmental Management of Gas-fired Power Plant	EHS Manager, Wastewater Manager, Plant Manager, and Operation Manager	2 weeks
Management of Air Quality Control	Air Quality Technician	1 week
Management of Noise Control	Noise Control Technicians	1 week
Management of Wastewater Treatment Facilities	Wastewater Manager	1 week
O&M of Wastewater Treatment and Cooling Water Facilities	Wastewater and Cooling Water System Technicians, Wastewater Manager	1 week
Solid Waste Management Facilities and O&M System	Solid Waste Technicians, Solid Waste Manager	1 week
Mangrove Resource Management and Participatory Approach	Mangrove Management and Participatory Approach Technicians	2 weeks
Emergency Response Management	Emergency Response Manager and Emergency Response Team	2 weeks

Source: TEAM Consulting Engineering and Management Co., Ltd. (2016)

3. TRAINING DURING DECOMMISSIONING PHASE

The Demolition Contractor will be required to conduct training of its key staff from the foreman level up to the Project Manager. Key staff of the Demolition Project Management Office will also attend the training. The objective of the training is to ensure that all concerned in the demolition works can efficiently and effectively perform their responsible tasks in environmental management. Similar to the training for the construction, the training for the demolition works scope should cover the following subjects: (i) Environmental Management of the Demolition Project; (ii) Demolition Environmental Management Plan; and (iii) Specific Training. The last training course will be important as the demolition of gas-fired power plant would require some special skills to minimize risks related to hazardous wastes and accidental fires.

The Contractor will also be required to ensure that all personnel working onsite have received an initial site induction.

APPENDIX 6C

TYPES OF NATURAL GAS EXPLOSION

APPENDIX 6C

TYPES OF NATURAL GAS EXPLOSION

Taken from: Is Natural Gas Really So Safe, March 23, 2010, *depletedcranium.com/is-natural-gas-really-so-safe/*

- **Boiling Liquid Expanding Vapor Explosion** – This type of explosion occurs in liquid natural gas vessels, typically when a fire starts outside the main vessel, such as might occur if a leak catches fire. The heat causes the tank temperature to rise and the liquid to boil. Eventually the tank ruptures and the liquid inside flash evaporates and catches fire to explode. (Known as a BLEVE) BLEVE explosions are more common with LPG than natural gas, but can happen in liquid natural gas storage facilities.
- **Combustion within gas container or pipeline** – This type of explosion is relatively rare. It occurs when improper procedure or equipment malfunction allows air to enter a gas storage tank or pipeline. Normally gas cannot burn in such circumstances, as there is no oxygen. The most common cause of this is when an empty gas tank is open to the atmosphere and then later filled with gas without first being purged of oxygen. In enclosed systems like a tank or pipeline, it does not take very much to set off an explosion.
- **Gas contained within a structure** – This occurs when a gas leak allows natural gas to enter a building or other structure, where it mixes with air and is contained, not allowed to disperse. Since the structure contains the natural gas, only a small leak is required to build up a huge volume of gas, given enough time. As natural gas is lighter than air, it will often tend to build up at ceiling level and as more and more gas fills the structure, the level will slowly move down. The explosion can occur if the level of the gas eventually reaches that of an ignition source such as a pilot light or if another source, such as an electrical switch, static electricity or friction causes it to ignite. This type of explosion is common in vacant structures.
- **Gas cloud explosion** – This occurs when a large volume of gas is released from a leak, purge or other operation. The time that the gas lingers can depend on a number of factors, including temperature, winds, structures and the temperature of the gas. A large cloud of lingering gas can easily ignite and explode.
- **Tank rupture and explosion** – This occurs when a tank or pipe containing compressed gas explodes due to the internal pressure. The reason for the failure may be corrosion, materials fatigue or defects in the vessel. It can also happen if the pressure is too high and exceeds the design specs of the tank or pipe. The rupture can be violent and send pieces of the tank flying. The gas does not always ignite when a tank bursts, but it often does due to the violence of the rupture producing sparks.

APPENDIX 6D

RISK ASSESSMENT DURING OPERATION PHASE OF THE LNG TERMINAL PROJECT

APPENDIX 6D

RISK ASSESSMENT DURING OPERATION PHASE OF THE LNG TERMINAL PROJECT

The most important operational risk of this Project, is the risk of accidental fires and explosions. Release of LNG due to spills, leaks, or intentional draining can expose facility personnel to several hazards. These hazards include oxygen deficiency and freezing injuries but the primary hazards are related to the flammability of LNG and the vapor clouds generated on release of LNG to the environment. These flammability hazards may be manifested as Fireball, if it ignites immediately. A domino effect could occur if the Fireball impinges on other process plant and then escalates to become a large conflagration. An un-ignited can quickly generate a large inflammable cloud which may drift until it finds an ignition source, and it can then yield a Vapor Cloud Explosion (VCE).

Therefore, risk assessment (RA) of the Project during the operational phase will be focused on fire and explosion risk caused by leaks. This issue is critically important and deserves utmost attention from the Project Proponent.

The objective of operational risk management of the Project is to minimize the likelihood of occurrence of accidental fires and explosions in the operation of the LNG Terminal and its associated facilities.

The RA has been undertaken to identify the potential risks associated with the project using the methodology and guidelines established by relevant agencies as the following documents:

- Techniques for Assessing Industrial Hazards a Manual, World Bank (1989)
- Handbook of Chemical Hazard Analysis Procedures, US.EPA.(1990)
- Prevention of Major Industrial Accidents, ILO (1991)
- Methodologies for Hazard Analysis and Risk Assessment in the Petroleum Refining and Storage Industry, CONCAWE (1982)
- High Integrity Systems and Safety Management in Hazardous Industries, J.R. Thomson (2015)
- Lee's Loss Prevention in the Process Industries, Hazard Identification, Assessment and Control Volume 1-3, Sam Mannan (2004)
- NFPA 59A, Standard for the Production, Storage, and Handling of Liquefied Natural Gas (LNG) (2013)

1. BRIEFLY PROJECT DESCRIPTION

The LNG Terminal Project is part of the infrastructure development under the Initial Phase Development of DSEZ, this Project was conceived to supply natural gas to a proposed 420 MW Power Plant project.

The coordinates of the site at its center are 1570784.577 N and 398720.391 E. The site is about 8.3 km from the entrance of DSEZ and can be reached by the existing unpaved coastal road running from the entrance of DSEZ to the existing small port.

This Project can be divided into two major components: (i) onshore component; and (ii) offshore component. The onshore facilities will be constructed on a 124 acres, and the offshore facilities will cover about 370 acres.

2. POTENTIAL RISK AREAS

According to the secondary reviewed of Significant Incidents of the hydrocarbons storage tanks from various source; i.e., Prevention of Major Industrial Accidents (ILO, 1991), Methodologies for Hazard Analysis and Risk Assessment in the Petroleum Refining and Storage Industry (CONCAWE, 1982), High Integrity Systems and Safety Management in Hazardous Industries (J.R. Thomson, 2015), and Base Resource Documents of API Publication 581 (API, 2000). Major incidents in refineries nearly always have more than one single cause. In most cases, there is a prime cause resulting in a loss of containment of hydrocarbons which may catch fire and possibly explode. It is firmly established that all of major fire and explosion incidents can be traced back to one or more of the following causes, most of which can be controlled or their consequence mitigated.

- Design/construction failure
- Operating error
- Equipment failure which may derive from operating error
- Maintenance inadequacies
- Insufficient supervision and training
- Natural phenomena such as earthquake, lightning, flooding, subsidence, etc.
- External interference such as sabotage, acts of war, etc.

Therefore, risk management of the Project will need to cover all phases of the Project starting from planning and design to operation. Considering the project description, the potential risk areas of the project are LNG Storage Tanks. The briefly of LNG storage tank as below:

Types of Storage Tank	Horizontal
Dimension, m	10.0 × 45.5 (Diameter × Length) with capacity of 3,000 m^3
Operation Condition	
- **Temperature,°C**	-197 to 38
- **Pressure, bar(g)**	2
- **Liquid Density, kg/m^3**	441
Number of Tank	3
Total Capacity, m^3	9,000
Total LNG Quantity, ton	3,969
Connecting Pipe	Input: ø 6 inches and Output: ø 16 inches

3. SEVEITY OF CONSEQUENCE

The severity of consequence of incidents are estimated by the consequence analysis techniques according to the Techniques for Assessing Industrial Hazards a Manual, World

Bank (1990) and the Base Resource Documents of API Publication 581 (API, 2000), NFPA 59A, Standard for the Production, Storage, and Handling of Liquefied Natural Gas (LNG) (2013) as steps below;

1. *Representative Material:* Considering the components of LNG gas, C_1 and C_2 hydrocarbons is the majority component which 98.15 % mol.
2. *The Final Phase of Material:* The LNG in the storage tank is the Liquefied, and after it release to ambient, the final phase is Gaseous.
3. *The Design Spill:* The design spill shall be determined in accordance with section 5.2.3.5 of NFPA 59A, Standard for the Production, Storage, and Handling of Liquefied Natural Gas (LNG) (2013).Assume the LNG storage tank is began leak at the connecting flange with 16 inches diameter, which below the liquid level with internal shutoff valves, and the spill duration is 10 minutes, the design spill is about 55.36m^3/min or 22.75 ton/min
4. *Types of Release:* According to API Publication 581 (API, 2000), the potential release rate of the Project is about 100 kg/sec more than 10,000 lbs. within 3 minutes. It can defined as "Instantaneous Release".
5. *The Consequence of Release:* According to API Publication 581 (API, 2000)

The consequence of release for the total rupture of LNG storage tank can be described as below:

Representative Material	C_1-C_2 Hydrocarbons
The Final Phase of Material	- Liquefied in Storage Tank - Gaseous at Ambient
Design Spill	
- **Design Spill rate**	3,969 m^3/min
- **Spill Duration**	10 minutes
Types of Release	Instantaneous Release
Operation Condition	- The process temperature is less than auto ignition temperature of LNG plus 80 °F, this condition will be defined as "Auto Ignition Not Likely"
Consequences of Released	
- **No Ignited**	0.80
- **Ignited**	0.20
Ignition Types	
- **Vapor Cloud Explosion, VCE**	0.04
- **Fireball or BLEVE**	0.01
- **Flash Fire**	0.15
- **Jet Fire**	0.00
- **Pool Fire**	0.00

4. DETERMINING THE AFFECTED AREA BY INCIDENTS

4.1 Mathematical Model

The mathematical model used in the study was BREEZE Incident Analyst model, developed by Trinity Consultants Inc., based on Quantitative Risk Assessment (QRA) as suggested by the United States of America Environmental Protection Agency (U.S.EPA).

BREEZE Incident Analyst models three hazard categories: toxic gas dispersion, fires, and explosions. It employs several different models, including neutrally buoyant and dense gas air dispersion models that estimate the movement and dispersion of chemical gas clouds, explosion models to estimate the overpressure values from a vapor cloud explosion, and fire models to determine the thermal radiation from fires. Incident Analyst is a fully integrated family of consequence models for performing offsite consequence modeling and emergency response planning for the following initiatives:

- Section 112(r) of the Clean Air Act
- Occupational Safety and Health (OSHA) & Process Safety Management (PSM)
- European Economic Community (EEC) Directive 82/501: Also known as the Seveso Directive
- National Fire Protection Agency (NFPA) 59A Standard for the Production, Storage, and Handling of Liquefied Natural Gas(LNG)
- Department of Transportation (DOT) Federal Standard 49
- CFR 193

4.2 Meteorology Data

The meteorological conditions at the time of the incident will be complied in accordance with the NFPA 59A, Standard for the Production, Storage, and Handling of Liquefied Natural Gas (LNG) (2013), the meteorological conditions for analyzes the distances of thermal radiation and flammable vapor gas dispersion can be summarized as below:

Meteorology Parameters	Thermal Radiation	Flammable Vapor Gas Dispersion
Wind Speed, m/s	0.5	2.0
Wind Direction	-	135
Temperature, °C	21	21
Relative Humidity,%	50	50
Anemometer Height, m	10	10
Pressure, atm	1	1
Surface Roughness Factor, m	0.03	0.03
Atmosphere Stability Class	F	F

4.3 Thermal Exclusive Zone

The thermal radiation and vapor dispersion calculations have been prepared in compliance with the NFPA 59A, Standard for the Production, Storage, and Handling of Liquefied Natural Gas (LNG) (2013).

This NFPA 59A code requires that the thermal radiation flux from a fire shall not exceed the limits listed in Table below;

Thermal Radiation Flux		**Exposure**
Btu/hr/ft^2	**kW/m^2**	
1,600	5	- A property line that can be built upon for ignition of a design spill - The nearest point located outside the owner's property line that, at the time of plant siting, is used for outdoor assembly by groups of 50or more persons for a fire in an impounding area
3,000	9	- The nearest point of the building or structure outside the owner's property line that is in existence at the time of plant siting and used for assembly, educational, health care, detention and correction, or residential occupancies for a fire in an impounding area.
10,000	30	- A property line that can be built upon for a fire over an impounding area

4.4 Flammable Vapor Gas Dispersion

The lower flammable limit is the lower flammable limit at which natural gas will ignite and burn (approximately 5% by volume for natural gas in air) in the presence of an ignition source. Ignition can occur at concentrations between 5% and 15% in natural gas and would result in a flame front that travels to the source of the gas.

Therefore, this NFPA 59A code requires the spacing of an LNG tank impoundment to the property line to ensure that an average concentration of methane in air of 50 percent of the lower flammability limit (LFL) does not extend beyond the property line.

5. RESULTS OF RISK ASSESESSMENT

5.1 Thermal Exclusive Zone

According to the consequence of LNG storage tanks rupture as above, ignition types are VCE, Fireball or BLEVE, and Flash fire, the thermal radiation will be focused on Fireball or BLEVE due to VCE and Flash fire are the fire which generated from the inflammable cloud which may drift until it finds an ignition source. The effects of them will be discussed in term of Flammable Vapor Gas Dispersion. The thermal radiation distance at the level of 5, 9, and 30kW/m^2, can be summarized as table below:

Thermal Radiation Flux, kW/m^2	Distance, m	Details of Affected Area
5	1,382	-Andaman Sea - Nga Pitat Village - Nga Pitat School - Road in Nga Pitat Village - Mangrove forest - Coconut - Cashew/Perennial - Cashew - Agricultural Land - Open Area - Beach Forest - Sand Beach - 420 MW Small Power Plant - Boil-off Gas Power Plant - Project Site
9	1,030	- Andaman Sea - Nga Pitat Village - Road in Nga Pitat Village - Mangrove forest - Cashew - Open Area - Beach Forest - Sand Beach - 420 MW Small Power Plant - Boil-off Gas Power Plant - Project Site
30	564	-Andaman Sea - Cashew - Mangrove forest - Sand beach - Project site

5.2 Flammable Vapor Gas Dispersion

The results of DEGADIS, the sub model in the BREEZE Incident Analyst finding show that, the flammable vapor dispersion distance is about 68 meter within the project properties line.

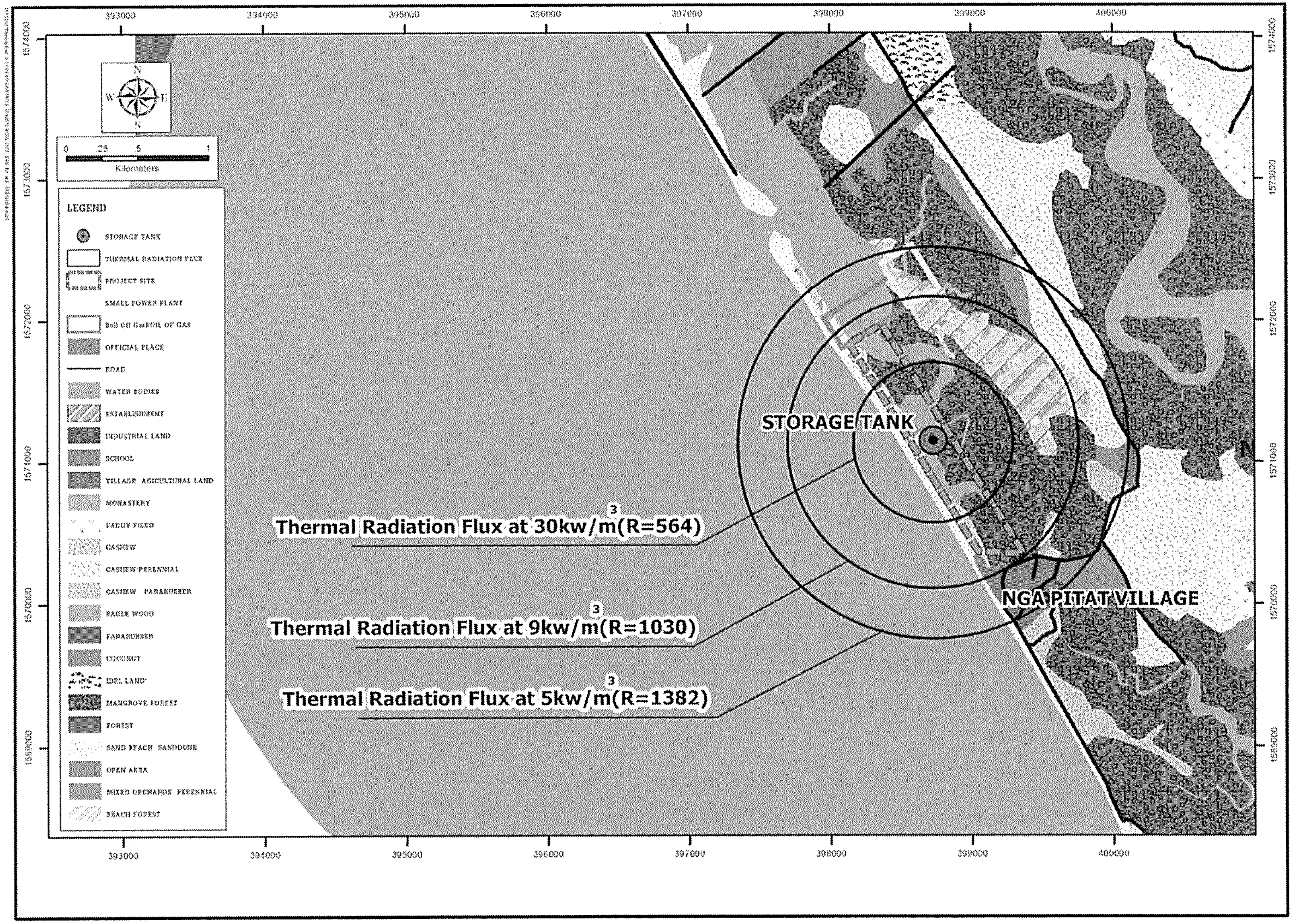

FIGURE 1: THE THERMAL RADIATION DISTANCE RADIUS

APPENDIX 9A

NAME LIST OF PARTICIPANTS WHO ATTENDED THE TWO PERIODS OF PUBLIC CONSULTATION MEETINGS

APPENDIX 9A-1

NAME LIST OF VILLAGERS WHO ATTENDED THE FIRST CONSULTATION MEETING IN MUDU

[illegible] EIA / SIA [illegible]

Public Consultation Attendance List Date 7/10/2015

စဉ်	အမည်	နေရပ်	အဖွဲ့အစည်း/ရာထူး	လက်မှတ်
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17	[illegible]	[illegible]		[illegible]
18	[illegible]	[illegible]		[illegible]

Certificated by [illegible]

Position [illegible]

Public Consultation Attendance List

Date: 7/10/2015

စဉ်	အမည်	နေရပ်	အဖွဲ့အစည်း/ရာထူး	လက်မှတ်
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38	[illegible]	[illegible]		[illegible]

Certificated by: [illegible]

Position: [illegible]

Public Consultation Attendance List

Date: 7/10/2015

စဉ်	အမည်	နေရပ်	အဖွဲ့အစည်း/ရာထူး	လက်မှတ်
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52	[illegible]	[illegible]		[illegible]
53	[illegible]	[illegible]		[illegible]
54	[illegible]	[illegible]		[illegible]
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57	[illegible]	[illegible]		[illegible]
58	[illegible]	[illegible]		[illegible]
59	[illegible]	[illegible]		[illegible]

Certificated by: [illegible]

Position: [illegible]

[illegible] EIA/SIA [illegible]

Public Consultation Attendance List

Date 7/10/2015

စဉ်	အမည်	နေရပ်	အဖွဲ့အစည်း/ရာထူး	လက်မှတ်
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64	[illegible]	[illegible]		[illegible]
65	[illegible]	[illegible]		+
66	[illegible]	[illegible]		+
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69	[illegible]	[illegible]		[illegible]
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71	[illegible]	[illegible]		[illegible]
72	[illegible]	[illegible]		[illegible]
73	[illegible]	[illegible]		

Certificated by [signature]

Position [illegible]

APPENDIX 9A-2

NAME LIST OF VILLAGERS WHO ATTENDED THE FIRST CONSULTATION MEETING IN NYAUNG BIN SEIK

ကျောင်းပင်ဆိပ်ကျေးရွာတွင် EIA / SIA လူထုတွေ့ဆုံ [illegible]

Public Consultation Attendance List

Date 7/10/2015

စဉ်	အမည်	နေရပ်	အဖွဲ့အစည်း/ရာထူး	လက်မှတ်
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2	[illegible]	〃		×
3	[illegible]	〃		[illegible]
4	[illegible]	〃		+
5	[illegible]	〃		[illegible]
6	[illegible]	〃		*
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21	[illegible]	〃		[illegible]

Certificated by [illegible]

Position

ဒေါ့ပင်းဆိပ်ကျေးရွာတွင် EIA / SIA လူထုနှင့်တွေ့ဆုံဆွေးနွေးပွဲ

Public Consultation Attendance List

Date 7/10/2015

စဉ်	အမည်	နေရပ်	အဖွဲ့အစည်း/ရာထူး	လက်မှတ်
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24	ဦးကြည်ရိုး	〃		ကြည်ရိုး
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36	ဦးအောင်[illegible]	[illegible]	[illegible]	[illegible]
37	[illegible]	[illegible]		[illegible]
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39	ဦး[illegible]			[illegible]
40	ဒေါ်[illegible]	ဒေါ့ပင်းဆိပ်		[illegible]

Certificated by............

Position............

APPENDIX 9A-3

NAME LIST OF VILLAGERS WHO ATTENDED THE FIRST CONSULTATION MEETING IN NGA PITAT

ဒေါ်တက်ကျေးရွာ EIA / SIA လူထုညှိနှိုင်းအစည်းအဝေး

Public Consultation Attendance List

Date 8/10/2015

စဉ်	အမည်	နေရပ်	အဖွဲ့အစည်း/ရာထူး	လက်မှတ်
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3	ဦးအေးအောင်	〃		[illegible]
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7	ဒေါ်ဒီးသာ	〃		[illegible]
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				[illegible]

Certificated by [illegible]

Position ကျေးရွာအုပ်ချုပ်ရေးမှူး

ငပိတောက်ကျေးရွာ EIA/SIA ဆွေးနွေးပွဲ [illegible]

Public Consultation Attendance List

Date: 8/10/2015

စဉ်	အမည်	နေရပ်	အဖွဲ့အစည်း/ရာထူး	လက်မှတ်
21	ဒေါ်ထီးဝင်း	ငပိတောက်		[illegible]
22	ဒေါ်မွှားကြည်	〃		[illegible]
23	ဒေါ်မြင့်မြင့်	〃		[illegible]
24	ဒေါ်ချိုချိုလှိုင်	〃		[illegible]
25	ဒေါ်သန်းရီ	〃		[illegible]
26	ဒေါ်မြနွေ	〃		[illegible]
27	ဦးလှမောင်	〃		[illegible]
28	ဒေါ်ဆောင်ထား	〃		[illegible]
29	ဒေါ်ချိုနွေ	〃		[illegible]
30	ဒေါ်မြခိုင်	〃		[illegible]
31	ဒေါ်ကျင်သန်း	〃		[illegible]
32	ဒေါ်ရီလှ	〃		[illegible]
33	ဒေါ်တင်တင်	〃		[illegible]
34	ဒေါ်တင်တင်ချို	〃		[illegible]
35	ဒေါ်နှင်းနှင်းယု	〃		[illegible]
36	ဒေါ်စုကြည်	〃		[illegible]
37	ဒေါ်ခင်မွှေး	〃		[illegible]
38	ဒေါ်ခင်ဝင်း	〃		[illegible]
39	ဒေါ်မြို	〃		[illegible]
40	ဒေါ်စု	〃		[illegible]
41	ဒေါ်မိုးငယ်	〃		[illegible]

Certificated by: [illegible]

Position: [illegible]

ပုလိတာက်ကျေးရွာတွင် EIA / SIA လူထုတွေ့ဆုံဆွေးနွေးပွဲ

Public Consultation Attendance List

Date 8 / 10 / 2015

စဉ်	အမည်	နေရပ်	အဖွဲ့အစည်း/ရာထူး	လက်မှတ်
42	ဒေါ်မိုမို	ပုလိတာက်		ဒေါ်မိုမို
43	ဒေါ်ကြူကြူကို	〃		ကြူကြူကို
44	ဒေါ်သီတာဝေ	〃		သီတာဝေ
45	ဦးအောင်သိန်း	〃		[illegible]
46	ဦးကျော်ဆွေ	〃		[illegible]
47	ဦးတင်ရွှေ	〃		TIN SHWE
48	ဦးမိုးသိန်း	〃		ဦး[illegible]
49	ဦးလှကြည်	〃		[illegible]
50	ဦးကျော်သိန်း	〃		[illegible]
51	ဦးသိန်းမေလေး	〃		သိန်းမေလေး
52	ဦးအောင်ကျော်	〃		အောင်ကျော်
53	ဒေါ်နုနီ	〃		[illegible]
54	ဦးစော်ဝင်း	〃		[illegible]
55	ဦးထွန်းခိုင်	〃		ထွန်းနိုင်
56	ဦးဖိုး	〃		ဖိုး
57	ဦးသိန်းမေ	〃		သိန်းမေ
58	ဦးလှဝင်း	〃		လှဝင်း
59	ဦးတင်	〃		[illegible]
60	ဦးတင်ဆွေ	〃		တင်ဆွေ
61	ဦးကံညွန့်	〃		ကံညွန့်
62	ဦးလှညွန့်	〃		ဦးလှညွန့်

Certificated by [signature]

Position ရပ်ကျေးအုပ်ချုပ်ရေးမှူး

ဗေါတက်ကျေးရွာတွင် EIA / SIA [illegible] ဆွေးနွေးပွဲ

Public Consultation Attendance List

Date 8/10/2015

စဉ်	အမည်	နေရပ်	အဖွဲ့အစည်း/ရာထူး	လက်မှတ်
63	ဦး [illegible]	ဗေါတက်		[illegible]
64	ဦး [illegible]	〃		[illegible]
65	[illegible]	〃		[illegible]
66	[illegible]	〃		[illegible]
67	[illegible]	〃		[illegible]

Certificated by [signature]

Position [illegible]

APPENDIX 9A-4

NAME LIST OF GOVERNMENT OFFICIALS WHO ATTENDED THE SECOND CONSULTATION MEETING AT ITD MEETING HALL

Public Consultation Attendance List

Date 2/12/2015

စဉ်	အမည်	နေရပ်	ဌာန/ရာထူး	လက်မှတ်
1.	U Kyaw Naing	Yaphyu	GAD	
2	U THAN HLA AUNG	IMMIGRATION	IMMIGRATION	
၃	U Thet Oo	ITD, SWB	DOL	
၄.	U Aung Htoo Than	SWB	GAD	
၅	U Ko Ko Naing	SWB	DOL	
၆	U KYAW MAW HTUN	SW/R	IMMIGRATION	
7	U Khin Mg Win	SWB	Port (MPA)	
8	U Khin Mg Than	Dawei	D.D	
9.	U Khin Mg Cho	Dawei	Director of GAD	
10	U Yan Naing Maung	Dawei	GAD	
11	U Hla Win Aung	Yaphyu	GAD	
12	U Htun Win Myint	Dept. of fisheries.	Director (Regional fisheries Officer	
13	U Ag Khine Soe	ECD (TNI)	D.D	
14	U Khin Maung Soe.	"	Deputy S O.	
15	U Soe Thant	Department Fishery	Senior Officer	
16	Daw Zin Mar Win	ECD (TNI)	DSO	
17	U Zaw Lin Phyo			
18	U Htun Wai Oo	Dawei	EPC / AE	
19.	U Aung Kyaw Moe	Dawei		
20	U Kyaw Kyaw Latt	GA Dawei District	UD	

Certificated by.................................

Position.................................

Public Consultation Attendance List

Date: 2/12/2015

စဉ်	အမည်	ရာထူး	ဌာန/အဖွဲ့အစည်း/နေရပ်	လက်မှတ်
21	Mr. Chinnavuth Liurungwang	SVP-BDD2 ~~EGCO~~	EGCO	[signature]
22	Ms. Siriluck Soontornruengyot	AVP-Environment	EGCO	Siriluk
23	Mr. Suphap Satthatham	PE	ITD	[signature]
24	Mr. Ruangrit Somnarai	PM	ITD	S.R.NA
25	MR. Kasin Aksornnudech	ENGINEER	ITD	[signature]
26	MS. Supansa Kruejan.	Environmental Engineer	MZE	[signature]
27	Mrs Parichat Makorncan	Deputy Envi Mgr.	MIE	[signature]
28	MISS YAOWAPA CHUWONG	Sociologist	TEAM	[signature]
29	Ms Chalida Neobulya	Env. Scientist	TEAM	CHALIDA N.
30	Mr. Yongyut Khenchentet	Env. Scientist	TEAM	Yongyut
31.	Mr. Nipat Somkleeb	Env. Scientist	TEAM	Nipat Somkleeb
32.	Mr. Plian Manuya	ENV. Scientist	TEAM	[signature]
33	Mr. SONGRUCK KUMA	ENG.	ITD	[signature]
34	Ms. Supichaya Wongchinawit	TEAM - Env. Scientist	TEAM	Supichaya
35	Mr Natt Dumkum	ENV. scientist	TEAM	[signature]

Certificated by...

Position...

APPENDIX 9A-5

NAME LIST OF VILLAGERS WHO ATTENDED THE SECOND CONSULTATION MEETING IN NGA PITAT

Public Consultation Attendance List

Date ၄.၁၂.၁၅

စဉ်	အမည်	နေရပ်	အဖွဲ့အစည်း/ရာထူး	လက်မှတ်
၁။	ဦးဖေအောင်	ငဖိတော်		ဖေအောင်
၂။	ဦးကံကြိုင်	〃		ဦးကံကြိုင်
၃။	ဒေါ်သန်းရီ	〃		သန်းရီ
၄။	ဒေါ်နွဲ့	〃		နွဲ့
၅။	မမာချို	〃		မာချို
၆။	မမော်တော်	〃		မမော်တော်
၇။	မခင်ရွှေ	〃		ခင်ရွှေ
၈။	ကိုလှကြည်	〃		လှကြည်
၉။	မချိလေး	〃		ချိလေး
၁၀။	မနှင်းဖူး	〃		နှင်းဖူး
၁၁။	ဒေါ်သန်းရီ	〃		ရီ
၁၂။	ဒေါ်မြသောင်း	〃		မြသောင်း
၁၃။	ဒေါ်မြင့်ရွှေ	〃		မြင့်ရွှေ
၁၄။	မခင်ချို	〃		ခင်ချို
၁၅။	မမမိုး	〃		မိုး
၁၆။	မမာခိုင်	〃		ခိုင်
၁၇။	ဒေါ်ကျင်သောင်း	〃		ကျင်သောင်း
၁၈။	ဒေါ်လှကြူ	〃		ကြူ
၁၉။	မအေးသီတာ	〃		သီတာ
၂၀။	ဦးကျော်ရွှေ	〃		ကျော်ရွှေ
၂၁။	ဒေါ်ကြည်ရွှေ	〃		မကြည်ဝေ

Certificated by...........................

Position...........................

Public Consultation Attendance List

Date ၉.12.15

စဉ်	အမည်	နေရပ်	အဖွဲ့အစည်း/ရာထူး	လက်မှတ်
၂၂။	ဦးကျော်ဝင်း	ပိတောက်		
၂၃။	ဒေါ်ခင်အေး	〃		
၂၄။	မဂိဂိသိ	〃		
၂၅။	ဒေါ်သန်းစိ	〃		
၂၆။	ဒေါ်လှကျင်	〃		
၂၇။	မဘိ	〃		
၂၈။	ကိုဆန်းမြင့်	〃		
၂၉။	ကိုဝေယျာဦး	〃		
၃၀။	ဒေါ်ညိုမြို	〃		
၃၁။	ကိုမင်းဟန်	〃		
၃၂။	မဟာသူရိ	〃		
၃၃။	မမွှန်းဖြိုး	〃		
၃၄။	မဟာဟာအေး	〃		
၃၅။	ဒေါ်ညိုအေး	〃		
၃၆။	ယဉ်အေး	〃		
၃၇။	ဒေါ်ကြည်ဝင်း	〃		
၃၈။	ဒေါ်ဝေးသိန်း	〃		
၃၉။	မအုံ့ရွှေ	〃		
၄၀။	မခင်ဂိ	〃		
၄၁။	မဖြိုးမီ	〃		
၄၂။	ဒေါ်စိန်သာ	〃		

Certificated by..

Position..

[illegible]

Public Consultation Attendance List

Date ၉.၁၂.၁၅

စဉ်	အမည်	နေရပ်	ဆက်သွယ်ရန်ဖုန်း/လိပ်စာ	လက်မှတ်
၄၃။	ဒေါ်သင်းသိန်း	ဗေတာတ		သင်းသိန်း
၄၄။	ဒေါ်ပိုသန်း	〃		ပိုသန်း
၄၅။	ဒေါ်ဝါနု	〃		ဝါနု
၄၆။	မစီ	〃		စီ
၄၇။	ဒေါ်ငွေသိန်း	〃		ငွေသိန်း
၄၈။	မကြူဝင်း	〃		မကြူဝင်း
၄၉။	မလှအေးသိ	〃		မလှအေးသိ
၅၀။	ဒေါ်ရင်ကြူ	〃		ရင်ကြူ
၅၁။	ဒေါ်မြင့်မြင့်စိုး	〃		မြင့်မြင့်စိုး
၅၂။	ဒေါ်စွန်းသိန်း	〃		စွန်းသိန်း
၅၃။	မစေစေသိ	〃		စေစေသိ
၅၄။	ဒေါ်ကြိုင်	〃		ကြိုင်
၅၅။	ကိုစိုးသန်း	〃		စိုးသန်း
၅၆။	မမြင့်ဝင်း	〃		မမြင့်ဝင်း
၅၇။	မခင်သန်း	〃		ခင်သန်း
၅၈။	သာမာရဝင်	〃		သာမာရဝင်
၅၉။	မသိန်းမေ	〃		သိန်းမေ
၆၀။	ဒေါ်ခိုင်ယယ်	〃		ယယ်
၆၁။	ဒေါ်ဒိုသိ	〃		သိ
၆၂။	မသိုင်ဗော	〃		မသိုင်ဗော
၆၃။	မချိုမြိုင်	〃		မချိုမြိုင်

Certificated by..........[signature]..........

Position..........

Public Consultation Attendance List

Date ၂.၁၂.၂၀၁၅

စဉ်	အမည်	နေရပ်	အဖွဲ့အစည်း/ရာထူး	လက်မှတ်
၆၄.	ဒေါ်ကြူရီ	ပိတောက်		မ
၆၅.	မဝရယ်	〃		ဝေရယ်
၆၆.	မဇော	〃		ဝေဇော
၆၇.	ဒေါ်သိန်းဝင်း	〃		သိန်းဝင်း
၆၈.	မစိုးသိန်း	〃		စိုးညို
၆၉.	ဦးတင်ဆွေ	〃		တင်ဝင်း
၇၀.	မရိုးရိုးသန်း	〃		ရိုးရိုးသန်း
၇၁.	မရိုး	〃		ရိုး
၇၂.	ဦးအောင်သိုး	〃		[illegible]
၇၃.	ဦးသိုက်လေ	〃		[illegible]
၇၄.	ဦးဆောင်ကျော်	〃		[illegible]
၇၅.	မကြိုင်ကြိုင်ဝင်း	〃		ကြိုင်ကြိုင်ဝင်း
၇၆.	မဖောဖော	〃		ဖောဖော
၇၇.	မခိုင်နွဲ့	〃		မီးနွဲ့
၇၈.	မဝန်းလှ	〃		ဝန်းလှ
၇၉.	မရိုလာဝင်း	〃		ရိုလာဝင်း
၈၀.	မဝဒါ	〃		ဝဒါ
၈၁.	မှုန်းဝေ	〃		မှုန်းဝေး
၈၂.	မညီညီ	〃		ညီညွန့်

Certificated by [signature]

Position

APPENDIX 9A-6

NAME LIST OF VILLAGERS WHO ATTENDED THE SECOND CONSULTATION MEETING IN NYAUNG BIN SEIK

Public Consultation Attendance List

Date 3.12.15

စဉ်	အမည်	နေရပ်	အဖွဲ့အစည်း/ရာထူး	လက်မှတ်
၁.	ဦး [illegible]	[illegible]	[illegible]	[illegible]
၂.	ဦး ခင်မောင်	[illegible]		[illegible]
၃.	ဦး [illegible]			[illegible]
၄.	ဒေါ် [illegible]	[illegible]		[illegible]
၅.	ဒေါ် [illegible]	[illegible]		+
၆.	ဒေါ်ကြူ	"		[illegible]
၇.	ဒေါ် [illegible]	"		[illegible]
၈.	ဒေါ်ခင်သိန်း	"		[illegible]
၉.	ဒေါ်ခင်မို	"		+
၁၀.	ဒေါ် [illegible]	"		+
၁၁.	ဒေါ်မိစုကြီး	"		[illegible]
၁၂.	ဒေါ်ငွေ [illegible]	"		[illegible]
၁၃.	ဒေါ် [illegible]	"		[illegible]
၁၄.	မ [illegible]	"		[illegible]
၁၅.	မ [illegible]	"		[illegible]
၁၆.	[illegible]	"		[illegible]
၁၇.	[illegible]	"		[illegible]
၁၈.	[illegible]	"		[illegible]
၁၉.	ဒေါ် [illegible]	"		[illegible]
၂၀.	ဒေါ်ခင် [illegible]	"		[illegible]
၂၁.	ဒေါ် [illegible]	"		[illegible]

Certificated by [illegible]

Position

Public Consultation Attendance List

Date 3.12.15

စဉ်	အမည်	နေရပ်	အဖွဲ့အစည်း/ရာထူး	လက်မှတ်
၂၂	မမာလာအေး	[illegible]		[signature]
၂၃	မစန်းဝေအား	〃		[signature]
၂၄	[illegible]	〃		[signature]
၂၅	[illegible]	〃		[signature]
၂၆	[illegible]	〃		[signature]
၂၇	ဒေါ်အေးရှင်	〃		[signature]
၂၈	ဒေါ်တင်ရှင်	〃		[signature]
၂၉	ဒေါ်ချစ်ကြီး	〃		[signature]
၃၀	ဒေါ်မေသား	〃		[signature]
၃၁	[illegible]	〃		[signature]
၃၂	[illegible]	〃		[signature]
၃၃	ဒေါ်ခင်စိုး	〃		[signature]
၃၄	ဒေါ်စိုးသိန်း	〃		[signature]
၃၅	ဒေါ်ရွှေဝေ	〃		[signature]
၃၆	ဒေါ်သိန်းနု	〃		[signature]
၃၇	ဦးစိုးလှိုင်	〃		[signature]
၃၈	[illegible]	〃		[signature]
၃၉	[illegible]	〃		[signature]
၄၀	[illegible]	〃		[signature]
၄၁	[illegible]	〃		[signature]
၄၂	[illegible]	〃		[signature]

Certificated by [signature]

Position

Public Consultation Attendance List

Date 3.12.15.

စဉ်	အမည်	နေရပ်	အဖွဲ့အစည်း/ရာထူး	လက်မှတ်
၄၃။	ကိုကြီးဝင်း	[illegible]		[illegible]
၄၄။	သိန်းဦး	〃		[illegible]
၄၅။	[illegible]	〃		[illegible]
၄၆။	[illegible]	〃		[illegible]
၄၇။	သီတာ	〃		[illegible]
၄၈။	ဦးကျော်ဇွဲ	〃		[illegible]
၄၉။	ဒေါ်မအေး	〃		အေး
၅၀။	မဆိုးငယ်	〃		မိုးငယ်
၅၁။	ခင်ညို	〃		ခင်ညို
၅၂။	မတင်ရွှေ	〃		မတင်ရွှေ
၅၃။	မခင်ဆန်ရီ	〃		ခင်ဆန်ရီ
၅၄။	မလှဝင်း	〃		မလှဝင်း
၅၅။	ဦးဆိုးလင်း	〃		ဆိုးလင်း
၅၆	ဦးကျော်သိန်း	〃		ကျော်သိန်း
၅၇။	ဘသက်ဝင်း	〃		သက်
၅၈။	မလှသိန်း	〃		မလှသိန်း
၅၉။	ကိုရာဆန်းဦး	〃		ရာဆန်းဦး
၆၀။	မသန်းအေး	〃		အေး
၆၁။	ဦးတင်မိုးအောင်	〃		[illegible]
၆၂။	မသီတာ	〃		သီတာ
၆၃။	ဒေါ်လှသန်း	〃		သန်း

Certificated by [illegible]

Position

Public Consultation Attendance List

Date 3.12.15

စဉ်	အမည်	နေရပ်	အဖွဲ့အစည်း/ရာထူး	လက်မှတ်
၆၄.	[illegible]	[illegible]		[illegible]
၆၅.	[illegible]	〃		[illegible]
၆၆.	[illegible]	〃		[illegible]

Certificated by [signature]

Position

APPENDIX 9A-7

NAME LIST OF VILLAGERS WHO ATTENDED THE SECOND CONSULTATION MEETING IN MUDU

Public Consultation Attendance List

Date 3.12.15

စဉ်	အမည်	နေရပ်	[illegible]/ရာထူး	လက်မှတ်
1.	ဦး [illegible]	[illegible]		[signature]
2.	ဦး [illegible]	"		[signature]
3.	ဦး [illegible]	"		[signature]
4.	ဦး [illegible]			[signature]
5.	[illegible]			[signature]
6.	ဒေါ်[illegible]	"		[signature]
7.	ဒေါ်[illegible]	"		[signature]
8.	[illegible]	"		[signature]
9.	[illegible]	"		[signature]
10.	[illegible]	"		[signature]
11.	[illegible]	"		[signature]
12.	[illegible]	"		[signature]
13.	[illegible]	"		[signature]
14.	[illegible]	"		[signature]
15.	[illegible]	"		[signature]
16.	ဦး [illegible]	"		[signature]
17.	ဦး [illegible]	"		[signature]
18.	[illegible]	"		[signature]
19.	ဦး [illegible]	"		[signature]
20.	ဦး [illegible]	"		[signature]
21.	ဒေါ်[illegible]	"		[signature]

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Position

Public Consultation Attendance List

Date 3.12.15

စဉ်	အမည်	နေရပ်	အဖွဲ့အစည်း/ရာထူး	လက်မှတ်
22.	[illegible]	[illegible]		[illegible]
23.	[illegible]	〃		[illegible]
24.	[illegible]	〃		[illegible]
25.	[illegible]	〃		[illegible]
26.	[illegible]	〃		[illegible]
27.	[illegible]	〃		[illegible]
28.	[illegible]	〃		[illegible]
29.	[illegible]	〃		[illegible]
30.	[illegible]	〃		[illegible]
31	[illegible]	〃		[illegible]
32.	[illegible]	〃		[illegible]
33.	[illegible]	〃		[illegible]
34.	[illegible]	〃		[illegible]
35.	[illegible]	〃		[illegible]
36.	[illegible]	〃		[illegible]
37.	[illegible]	〃		[illegible]
38	[illegible]	〃		[illegible]
39.	[illegible]	〃		[illegible]
40.	[illegible]	〃		[illegible]
41	[illegible]	〃		[illegible]
42.	[illegible]	〃		[illegible]

Certificated by .... [signature]

Position ....

Public Consultation Attendance List

Date 3.12.15

စဉ်	အမည်	နေရပ်	အဖွဲ့အစည်း/ရာထူး	လက်မှတ်
43	[illegible]	[illegible]		[illegible]
44.	[illegible]	[illegible]		[illegible]
45.	[illegible]	[illegible]		[illegible]
46.	[illegible]	"		[illegible]
47.	[illegible]	"		[illegible]
48.	[illegible]	"		[illegible]
49.	[illegible]	"		[illegible]
50.	[illegible]	"		[illegible]
51.	[illegible]	"		[illegible]
52.	[illegible]	"		[illegible]
53	[illegible]	"		[illegible]
54.	[illegible]	"		[illegible]
55.	[illegible]	"		[illegible]
56.	[illegible]	"		[illegible]
57.	[illegible]	"		[illegible]
58.	[illegible]	"		[illegible]
59.	[illegible]	"		[illegible]
60.	[illegible]	"		[illegible]
61.	[illegible]	"		[illegible]
62.	[illegible]	"		[illegible]

Certificated by [illegible]

Position

Public Consultation Attendance List

Date 3.12.15

စဉ်	အမည်	နေရပ်	အဖွဲ့အစည်း/ရာထူး	လက်မှတ်
		မုံနဲ့		
63.	ဦးသိန်းမြင့်	〃		[illegible]
64.	ကိုဝင်းမောင်	〃		[illegible]
65.	ဦးသိုက်ဇိုး	〃		[illegible]
66.	ဒေါ်ခင်ညို	〃		[illegible]
67.	[illegible]	〃		[illegible]
68.	ဦးကျော်ဒွေး	〃		[illegible]
69.	ကိုချစ်ဝေ	〃		[illegible]
70.	ဦးရွှေဒေါ	〃		[illegible]
71.	မခိုင်ရွှေ	〃		[illegible]
72.	မသိန်း	〃		[illegible]
73.	မဝင်း	〃		[illegible]
74.	[illegible]	〃		[illegible]
75.	[illegible]	〃		[illegible]
76.	တင်ဦး	ကျုံမောင်		တင်ဦး
77.	မကျင်ရွှေ	〃		[illegible]
78.	မစန်းအေး	〃		[illegible]
79.	[illegible]	〃		[illegible]
80.	ရှုး	〃		[illegible]
81.	သန်းဝင်း	〃		[illegible]
82.	ဝင်း	〃		[illegible]

Certificated by [signature]

Position

Public Consultation Attendance List

Date 3.12.15

စဉ်	အမည်	နေရပ်	အဖွဲ့အစည်း/ရာထူး	လက်မှတ်
83	[illegible]	[illegible]		[illegible]
84	[illegible]	〃		[illegible]
85	[illegible]	〃		[illegible]
86	[illegible]	〃		[illegible]
87	[illegible]	〃		[illegible]
88	[illegible]	〃		[illegible]
89	[illegible]	〃		[illegible]

Certificated by [signature]

Position

APPENDIX 9B

MINUTES OF MEETING OF EACH CONSULTATION MEETING

APPENDIX 9B-1

THE FIRST PERIOD OF CONSULTATION MEETING

Minutes of the Meeting with Support Working Body of DSEZ - SWB

Date: 6th October, 2015

Time: 9:00-10:30 hrs.

Venue: SWB Office

Subject: Information disclosure about the Initial Phase Power Plant Project and Consultation Activities

Participants:

1. Myanmar Authority

Mr. Aung Kyaw Nyien	Secretary / Myanmar Port Authority
Mr. Aung Hone Than	Officer, Administration Department
Mr. U Thet Oo	Officer, Labour Department
Mr. Khin Htun	Officer, Immigration Department
Mr. Kyaw Min Oo	Chief Officer, Myanmar Police Force
Mr. Wai Linn Zaw	Officer, Administration Department

2. ITD Staff

Mr. Kyaw Kyaw	Assistant

3. TEAM Consulting Engineering and Management Co., Ltd.-TEAM Staff

Dr. Siriluck Sirisup	Socio-Economic / Public Consultation Specialist
Mr. Plian Maneeya	Human Specialist

Minutes:

- The consultant disclosed information about the Project information, EIA study and the first public consultation at the scoping stage. Discussion was particular on consultation at the three villages and one community situated within 5 km radius of the Project site.
- The meeting with the SWB Committee was essentially a question and answer session. The major questions of the Committee and answers provided by the Consultant are summarized below:

Questions/Feedbacks from the Local	Clarifications by the Project
Question on types of activities to be carried out in the field survey between 5 – 11 October 2015	• The field survey will collect necessary environmental and social information to set up baseline environmental and social parameters before the Project. The baseline conditions before the Project will be used in the assessment of potential environmental and social impacts during project construction and operation. • It is necessary to conduct two sessions of field surveys, both of the wet and dry seasons. • During project implementation, some environmental and social parameters will be monitored. • The field survey will involve the following activities: - Environmental surveys, including air and water quality sampling, and noise and vibration measurement - Water quality sampling of sea water - Socio-economic surveys - Public consultation meetings
Question on the method to protect mangrove forest, not to be exploited by the project development	The protection can be achieved by means of: • Design the dredging and breakwaters not to damage the mangroves • Sound mangroves management program

Recommendations by SWB

- To inform the village headmen and ECD officials concerned before the conduct of public consultations and household surveys.

The consultation meeting was closed around 10.30 hrs.

Minutes of the Meeting with Head of Yebyu Township Administration

Date: 6th October, 2015

Time: 11:30-12:00 hrs.

Venue: Yebyu Township Office

Subject: Information disclosure about the Initial Phase Power Plant Project and Consultation Activities

Participants:

1. Myanmar Authority
   Mr. Daw Let Let Htwe Head of Yebyu Township Administration
2. ITD Staff
   Mr. Kyaw Kyaw Assistant
3. TEAM Consulting Engineering and Management Co., Ltd.-TEAM Staff
   Dr. Siriluck Sirisup Socio-Economic / Public Consultation Specialist

Minutes:

- The consultant disclosed information about the Project information, EIA study and the first public consultation at the scoping stage. Discussion was particular on consultation at the three villages and one community situated within 5 km radius of the Project site.
- Comment of Head of Yebyu Township Administration was to implement the Project activities follow official bureaucracy.
- The consultant acknowledged with thank, and would practice accordingly.

The consultation meeting was closed around 12.00 hrs.

Minutes of the Meeting with Secretary of Tanintharyi Regional Government Office

Date: 6th October, 2015

Time: 14:00-15:00 hrs.

Venue: Tanintharyi Regional Government Office

Subject: Information disclosure about the Initial Phase Power Plant Project and Consultation Activities

Participants:

1. Myanmar authority
   Mr. U Tin Thein — Secretary of Tanintharyi Regional Government Office
2. ITD Staff
   Mr. Kyaw Kyaw — Assistant
3. Total Business Solution-TBS Staff
   Ms. Thet Htar Myint — Socio-Economic / Public Consultation Specialist
4. TEAM Consulting Engineering and Management Co., Ltd.-TEAM Staff
   Dr. Siriluck Sirisup — Socio-Economic / Public Consultation Specialist

Minutes:

- The consultant disclosed information about the Project information, EIA study and the first public consultation at the scoping stage. Discussion was particular on consultation at the three villages and one community situated within 5 km radius of the Project site.
- Secretary of Tanintharyi Regional Government Office had comments on:
  - Concerns that the communities may raise questions that would be influenced by the Non-Governmental Organizations (NGOs).
  - Organization of the consultation meetings at the village level must be in line with the official procedure.
  - The village-level meetings must first receive approval of the Regional Government Office. The Regional Government Office will then inform the General Administration of Dawei District, and the Yebyu and Launglon Township Administrations, accordingly.
- The consultant acknowledged with thank, and would practice accordingly.

The consultation meeting was closed around 15.00 hrs.

Minutes of the Meeting with Deputy Director of ECD Regional Office

Date: 6th October, 2015

Time: 16:30-17:30 hrs.

Venue: ECD Office, Dawei

Subject: Information disclosure about the Initial Phase Power Plant Project and Consultation Activities

Participants:

1. Myanmar Authority

   Mr. U Aung Khine Soe — Deputy Director of Environmental Conservation Department for Tanintharyi Region

2. ITD Staff

   Mr. Kyaw Kyaw — Assistant

3. Total Business Solution-TBS Staff

   Ms. Thet Htar Myint — Socio-Economic / Public Consultation Specialist

4. TEAM Consulting Engineering and Management Co., Ltd.-TEAM Staff

   Dr. Siriluck Sirisup — Socio-Economic / Public Consultation Specialist

Minutes:

- The consultant disclosed information about the Project information, EIA study and the first public consultation at the scoping stage. Discussion was particular on consultation at the three villages and one community situated within 5 km radius of the Project site.
- Deputy Director of ECD for Tanintharyi Region had comments on:
  - The ECD Deputy Director informed that civil organizations active in Dawei have negative views on the proposed development in Dawei area.
  - The Consultant should answer all questions raised by communities.
  - The ECD Deputy Director will join the meeting at Mudu Village on 7 October 2015.
- The consultant acknowledged with thank, and would practice accordingly.

The consultation meeting was closed around 17.30 hrs.

Minutes of the Meeting at Mudu Village

Date: 7th October, 2015

Time: 09:30-11:00 hrs.

Venue: House of Mudu Village Headman

Subject: Information disclosure about the Initial Phase Power Plant Project

Participants:

1. Villagers of Mudu village — 73 persons, Name list attached (including Ka Myaing swea Community)
2. ITD Staff
   - Mr. Panno Kraiwanit — Project Manager, Infrastructure Development
   - Mr. Kyaw Kyaw — Assistant
3. MIE Staff
   - Ms. Supansa Kruajan — Environmental Engineer
   - Mr. Sawan Phoothiwut — Environmental Engineer
4. LNG Plus Staff
   - Ms. Kulravee Soentiluck — Supervisor Project Coordinator
5. Total Business Solution-TBS Staff
   - Ms. Thet Htar Myint — Socio-Economic / Public Consultation Specialist
6. TEAM Consulting Engineering and Management Co., Ltd.-TEAM Staff
   - Mr. Plian Maneeya — Human Specialist
   - Mr. Natt Dumkum — Environmental Scientist
   - Dr. Siriluck Sirisup — Socio-Economic / Public Consultation Specialist
   - Dr. Supichaya Wongchinawit — Environmental Scientist

Minutes:

The consultant disclosed information about:

- Objectives of EIA study for the Initial Phase Power Plant Project
- Project location and layout
- Generation capacity
- Main project components including:
  - Total generation capacity of 420 MW in combined cycle operation
  - Gas pipeline connecting to the LNG Regasification Station in order to get the gas supply
  - Once-through cooling water system using sea water, consisting of intake pipes, pumping station, and outfall pipes
  - Demineralization plant with demineralized water storage tanks

- Wastewater treatment facility to treat the waste water following official guidelines
- Firefighting system for the entire plant
- Continuous emission monitoring system
- Distribution control system
- Other related facilities

- Field activities related to environmental survey, including air quality /noise, seawater quality, marine ecology, fisheries, groundwater quality, sediment quality, terrestrial resources, wildlife resource and land use
- Field activities related to social survey, comprising public consultation and socio-economic survey
- Tentative schedule of the study
- Contact persons
- Open for discussion
- Questions from villagers and answers/qualifications by the consultant are summarized as follows:

Questions/Feedbacks from the Local	Clarifications by the Project
Concern on not being able to live in the communities due to emission from the power plant.	Citing, as an example, a gas-fired power plant near Yangon where air quality of nearby communities is not affected.
Concern on negative impacts on the communities, and effectiveness of the monitoring system.	The EIA will thoroughly identify and study potential impacts of the project. Preventive and mitigation measures will be formulated in accordance with applicable Myanmar standards. Representatives of each community will be members of a tri-partite committee to monitor the project implementation.
Request to repair the road from the village to the monastery.	The request was noted by ITALIAN-THAI DEVELOPMENT PLC (ITD). The road will be repaired after the rainy season ends.

The consultation meeting was closed around 11.00 hrs.

Minutes of the Meeting at Nyaung Bin Seik Village

Date: 8th October, 2015

Time: 09:30-11:00 hrs.

Venue: Temple of Nyaung Bin Seik

Subject: Information disclosure about the Initial Phase Power Plant Project

Participants:

1. Nyaung Bin Seik Villagers — 40 persons, Name list attached
2. ITD Staff
   - Mr. Panno Kraiwanit — Project Manager, Infrastructure Development
   - Mr. Kyaw Kyaw — Assistant
3. MIE Staff
   - Ms. Supansa Kruajan — Environmental Engineer
   - Mr. Sawan Phoothiwut — Environmental Engineer
4. LNG Plus Staff
   - Ms. Kulravee Soentiluck — Supervisor Project Coordinator
5. Total Business Solution-TBS Staff
   - Ms. Thet Htar Myint — Socio-Economic / Public Consultation Specialist
6. TEAM Consulting Engineering and Management Co., Ltd.-TEAM Staff
   - Dr. Siriluck Sirisup — Socio-Economic / Public Consultation Specialist
   - Dr. Supichaya Wongchinawit — Environmental Scientist

Minutes:

The consultant disclosed information about:

- Objectives of EIA study for the Initial Phase Power Plant Project
- Project location and layout
- Generation capacity
- Main project components including:
  - Total generation capacity of 420 MW in combined cycle operation
  - Gas pipeline connecting to the LNG Regasification Station in order to get the gas supply
  - Once-through cooling water system using sea water, consisting of intake pipes, pumping station, and outfall pipes
  - Demineralization plant with demineralized water storage tanks

- Wastewater treatment facility to treat the waste water following official guidelines
- Firefighting system for the entire plant
- Continuous emission monitoring system
- Distribution control system
- Other related facilities

- Field activities related to environmental survey, including air quality / noise, seawater quality, marine ecology, fisheries, groundwater quality, sediment quality, terrestrial resources, wildlife resource and land use
- Field activities related to social survey, comprising public consultation and socio-economic survey
- Tentative schedule of the study
- Contact persons
- Open for discussion
- Questions from villagers and answers / qualifications by the consultant are summarized as follows:

Questions/Feedbacks from the Locals	Clarifications by the Project
Concern on not being able to live in the community due to emission from the power plant.	Cite, as an example, a gas-fired power plant in Kanbuak, where air quality in the nearby communities is not affected.
Concern that the villagers cannot access the mangroves resources (e.g. fish, crab, shrimp, fuel wood etc.) at Nabule creek during project implementation.	The project implementation will not affect Nabule creek and its resources.
Can the villagers be supplied by electricity generated by the project?	The electricity will serve consumers in DSEZ.
Request to repair the road to Nyaung Bin Seik village.	The request will be conveyed to ITD.

The consultation meeting was closed around 11.00 hrs.

Minutes of the Meeting at Nga Pitat Village

Date: 8th October, 2015

Time: 14:00-15:30 hrs.

Venue: Community hall of Nga Pitat Village

Subject: Information disclosure about the Initial Phase Power Plant Project

Participants:

1. Nga Pitat Villagers — 67 persons, Name list attached
2. ITD Staff
   - Mr. Panno Kraiwanit — Project Manager, Infrastructure Development
   - Mr. Kyaw Kyaw — Assistant
3. MIE Staff
   - Ms. Supansa Kruajan — Environmental Engineer
   - Mr. Sawan Phoothiwut — Environmental Engineer
4. LNG Plus Staff
   - Ms. Kulravee Soentiluck — Supervisor Project Coordinator
5. Total Business Solution-TBS Staff
   - Ms. Thet Htar Myint — Socio-Economic / Public Consultation Specialist
6. TEAM Consulting Engineering and Management Co., Ltd.-TEAM Staff
   - Dr. Siriluck Sirisup — Socio-Economic / Public Consultation Specialist
   - Dr. Supichaya Wongchinawit — Environmental Scientist

Minutes:

The consultant disclosed information about:

- Objectives of EIA study for the Initial Phase Power Plant Project
- Project location and layout
- Generation capacity
- Main project components including:
  - Total generation capacity of 420 MW in combined cycle operation
  - Gas pipeline connecting to the LNG Regasification Station in order to get the gas supply
  - Once-through cooling water system using sea water, consisting of intake pipes, pumping station, and outfall pipes.
  - Demineralization plant with demineralized water storage tanks
  - Wastewater treatment facility to treat the waste water following official guidelines

  - Firefighting system for the entire plant
  - Continuous emission monitoring system
  - Distribution control system
  - Other related facilities

- Field activities related to environmental survey, including air quality/noise, seawater quality, marine ecology, fisheries, groundwater quality, sediment quality, terrestrial resources, wildlife resource and land use
- Field activities related to social survey, comprising public consultation and socio-economic survey
- Tentative schedule of the study
- Contact persons
- Open for discussion
- Questions from villagers and answers/qualifications by the consultant are summarized as follows:

Questions/Feedbacks from the Local	Clarifications by the Project
Concern on air pollution when the wind changes direction.	The emission issue is currently being studied to assess its impacts on ambient air quality. The power plant will adopt effective mitigation measures to ensure acceptable air quality in accordance with applicable Myanmar standards. Villagers' representatives will be members of a tri-partite committee to monitor the project implementation.
Concern on the project's impacts on livelihoods, especially loss of mangroves resources. Earning from project employment will be less than that from fisheries and mangrove resources, and will not be adequate to cover household expenses and support the whole family.	The EIA includes an assessment of the impacts on livelihood which may be caused by the project. If the impacts are confirmed, effective measures will be formulated and implemented to mitigate the impacts. Villagers' representatives will be members of a tri-partite committee to monitor the project implementation. For project employment, wage rates will follow applicable laws and regulations.

The consultation meeting was closed around 15.30 hrs.

APPENDIX 9B-2

THE SECOND PERIOD OF CONSULTATION MEETING

Minutes of the Meeting with Myanmar Officials

Date: 2nd December, 2015

Time: 09:00-11:00 hrs.

Venue: ITD Hall

Subject: Information disclosure about the Initial Phase Power Plant Project

Participants:

1. Twenty Myanmar officials, comprising

Mr. U Khin Maung Cho	Dawei District	Directory of General Administration Department
Mr. U Khin Maung Than	Dawei District	Deputy Director
Mr. U Yan Naing Maung	Dawei District	General Administration Department
Mr. U Kyaw Kyaw Hlatt	Dawei District	General Administration Department
Mr. U Zaw Lin Phyo	Dawei District	
Mr. U Aung Kyaw Moe	Dawei District	
Mr. U Htun Wai Oo	Dawei District	Electric Power Corporation
Mr. U Thet Oo	ITD, SWB	Department of Labor
Mr. U Aung Hom Than	SWB	General Administration Department
Mr. U Ko Ko Naing	SWB	Department of Labor
Mr. U Khin Maung Win	SWB	Myanmar Port Authority
Mr. U Kyaw Maw Htun	SWB	Immigration
Mr. U Than Hla Aung	Immigration	Immigration
Mr. U Aung Khine Soe	ECD(TNI)	Deputy Director
Mr. U Khin Mang Soe	ECD(TNI)	Department Senior Officer
Mr. Daw Zin Mar Win	ECD(TNI)	Department Senior Officer
Mr. U Htun Win Myint	Department of Fisheries	Director (Regional Fisheries Officer)
Mr. U Soe Thant	Department Fishery	Senior Officer
Mr. U Kyaw Naing	Yebyu	General Administration Department
Mr. U Hla Win Aung	Yebyu	General Administration Department

2. ITD Staff

Mr. Panno Kraiwanit	Project Manager, Infrastructure Development
Mr. Kasin Aksorndech	Engineer
Mr. Ruangrit Sornnarai	Engineer
Mr. Kyaw Kyaw	Assistant

3. MIE Staff

Mr. Sawan Phoothiwut	Environmental Engineer
Ms. Supansa Kruajan	Environmental Officer
Mrs. Parichat Makakhan	Environmental Officer

4. LNG Plus Staff

Ms. Kulravee Soentiluck	Supervisor Project Coordinator

5. EGCO Staff

Mr. Chinnavuth Liurungruang	SVP-BDD2
Ms. Siriluck Soontornruengyot	AVP Environment

6. Total Business Solution-TBS Staff

Ms. Thet Htar Myint	Socio-Economic / Public Consultation Specialist
Mr. Shwe Thein	Assistant

7. TEAM Consulting Engineering and Management Co., Ltd.-TEAM Staff

Mr. Plian Maneeya	Human Specialist
Mr. Natt Dumkum	Environmental Scientist
Mr. Nipat Somkleeb	Environmental Scientist
Dr. Siriluck Sirisup	Socio-Economic / Public Consultation Specialist
Dr. Supichaya Wongchinawit	Environmental Scientist
Mr. Yongyut Khonjunthet	Environmental Scientist
Ms. Yaowapa Chuwong	Socio-Economic / Public Consultation Specialist
Mrs. Chalida Nyiewbubpha	Environmental Scientist

Minutes:

The consultant disclosed information about:

- Objectives of EIA study for the Initial Phase Power Plant Project
- Project location and layout
- Project Information which consists of:
  - 420 MW capacity, using natural gas as primary fuel to be supplied by the adjacent LNG terminal
  - A 115 kV conventional air/gas insulated switchyard located in the plant boundary

- Once-through seawater cooling system
- Continuous Emission Monitoring System (CEMs)
- Five phases of Construction
- 30 years operation period

- The conduct and results of environmental and social study in the study area, in October 2015 comprise:
  - Environmental measurement of air quality, water quality, soil resources, terrestrial ecology, marine ecology and transportation
  - Public consultation at the village level
  - Socio-economic survey at the household level
- Open for discussion
- Questions from Myanmar officials and answers/qualifications by the consultant are summarized as follows:

Questions/Feedbacks from the Officers	Clarifications by the Project
Asking about length of the pipeline of Cooling System which would be laid on seabed.	About 2 km long.
Asking about the impact of Thermal Plume in the sea.	Will be within IFC standard.
Asking whether the discharged water from cooling system will be treated or not?	No, because the water will be not polluted.
Concerning on impact of discharged water from the cooling system on aquatic animal.	There will be small impact on aquatic animals as the water discharged will be within EIA standard. However it will be benefit on algae.
Asking about the plan to provide electricity to nearby village.	• In the initial phase, electricity will serve to Initial Industrial Estate. • For the community, CSR program will be implemented by project developer in other activities.

Recommendations by the Myanmar officials:

- Suggested the Project to provide electricity to nearby community at the lower rate than actual official rate.

The consultation meeting was closed around 11.00 hrs.

Minutes of the Meeting at Nga Pi Tat Village

Date: 2nd December, 2015

Time: 13:00-15:00 hrs.

Venue: Nga Pi Tat Community Hall

Subject: Information disclosure about the Initial Phase Power Plant Project

Participants:

1. Villagers from Nga Pi Tat Village 82 persons, Name list attached
2. ITD Staff
   - Mr. Panno Kraiwanit — Project Manager, Infrastructure Development
   - Mr. Kasin Aksorndech — Engineer
   - Mr. Kyaw Kyaw — Assistant
3. MIE Staff
   - Mr. Sawan Phoothiwut — Environmental Engineer
   - Ms. Supansa Kruajan — Environmental Officer
   - Mrs. Parichat Makakhan — Environmental Officer
4. LNG Plus Staff
   - Ms. Kulravee Soentiluck — Supervisor Project Coordinator
5. EGCO Staff
   - Mr. Chinnavuth Liurungwang — SVP-BDD2
   - Ms. Siriluck Soonbrnruengyot — AVP Environment
6. Total Business Solution-TBS Staff
   - Ms. Thet Htar Myint — Socio-Economic / Public Consultation Specialist
   - Mr. Shwe Thein — Assistant
7. TEAM Consulting Engineering and Management Co., Ltd.-TEAM Staff
   - Mr. Plian Maneeya — Human Specialist
   - Mr. Natt Dumkum — Environmental Scientist
   - Mr. Nipat Somkleeb — Environmental Scientist
   - Dr. Siriluck Sirisup — Socio-Economic / Public Consultation Specialist
   - Dr. Supichaya Wongchinawit — Environmental Scientist

Minutes:

The consultant disclosed information about:

- Objectives of EIA study for the Initial Phase Power Plant Project
- Project location and layout

- Project Information which consists of:
  - 420 MW capacity, using natural gas as primary fuel to be supplied by the adjacent LNG terminal
  - A 115 kV conventional air/gas insulated switchyard located in the plant boundary
  - Once-through seawater cooling system
  - Continuous Emission Monitoring System (CEMs)
  - Five phases of Construction
  - 30 years operation period
- The conduct and results of environmental and social study in the study area, in October 2015 comprise:
  - Environmental measurement of air quality, water quality, soil resources, terrestrial ecology, marine ecology and transportation
  - Public consultation at the village level
  - Socio-economic survey at the household level
- Open for discussion
- Questions from villagers and answers/qualifications by the consultant are summarized as follows:

Questions/Feedbacks from the Locals	Clarifications by the Project
Concerning on negative impact to marine resources by laying pipeline on the seabed, which will be indirect affected on their livelihood/in-come.	The laying pipeline area will be very small in comparison to the sea. However the developer will notify and have consultation meeting with villagers again, before construction.
Concerning on limitation of fishing area will be during laying pipelines.	Demarcation zone of pipeline will be marked to notify the fishermen during construction. They can use the area after construction completed.
• Asking about duration of construction period. • Concerning on decline of in-come in relation to long construction period.	• Laying pipelines will be carried out within a short period and the construction area is very small in comparison to the sea. • Information about environmental existing situation and monitoring after the project implementation will be disclosed to villagers.
• Asking about the age limitation in relation to the project employment. • Concerning on unskilled labour of villagers which will not be employed by the Project.	Consideration will be based on qualifications and positions.

Questions/Feedbacks from the Locals	Clarifications by the Project
Requesting to provide electricity into their village.	Electricity will serve consumers in Initial Industrial Estate, under the commitment of Concession Agreement. However the MIE will discuss with Myanmar authorities about this request.

The consultation meeting was closed around 15.00 hrs.

Minutes of the Meeting at Mudu Village

Date: 3rd December, 2015

Time: 09:00-11:00 hrs.

Venue: Mudu Village Community Ground

Subject: Information disclosure about the Initial Phase Power Plant Project

Participants:

1. Villagers of Mudu village — 89 persons, Name list attached (including Ka Myaing swea Community)
2. ITD Staff
   - Mr. Panno Kraiwanit — Project Manager, Infrastructure Development
   - Mr. Kyaw Kyaw — Assistant
3. MIE Staff
   - Mr. Sawan Phoothiwut — Environmental Engineer
4. LNG Plus Staff
   - Ms. Kulravee Soentiluck — Supervisor Project Coordinator
5. EGCO Staff
   - Mr. Chinnavuth Liurungruang — SVP-BDD2
   - Ms. Siriluck Soontornruengyot — AVP Environment
6. Total Business Solution-TBS Staff
   - Ms. Thet Htar Myint — Socio-Economic / Public Consultation Specialist
   - Mr. Shwe Thein — Assistant
7. TEAM Consulting Engineering and Management Co, Ltd.
   - Mr. Plian Maneeya — Human Specialist
   - Mr. Natt Dumkum — Environmental Scientist
   - Mr. Nipat Somkleeb — Environmental Scientist
   - Dr. Siriluck Sirisup — Socio-Economic / Public Consultation Specialist
   - Dr. Supichaya Wongchinawit — Environmental Scientist

Minutes:

The consultant disclosed information about:

- Objectives of EIA study for the Initial Phase Power Plant Project
- Project location and layout
- Project Information which consists of:

- 420 MW capacity, using natural gas as primary fuel to be supplied by the adjacent LNG terminal
- A 115 kV conventional air/gas insulated switchyard located in the plant boundary
- Once-through seawater cooling system
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- 30 years operation period

- The conduct and results of environmental and social study in the study area, in October 2015 comprise:
  - Environmental measurement of air quality, water quality, soil resources, terrestrial ecology, marine ecology and transportation
  - Public consultation at the village level
  - Socio-economic survey at the household level
- Open for discussion
- Questions from villagers and answers/qualifications by the consultant are summarized as follows:

Questions/Feedbacks from the Locals	Clarifications by the Project
Asking about the monitoring system of the project, regarding the project impact.	Ministry of Forestry and Environmental Conservation will involve in organizing the third party to monitor the project implementation.
• Asking about the present project activity is data collection or not? • Asking about the study procedure.	• The activity at this time is not data collection, but providing information about the project, previous field activities, presenting potential impact and mitigation measures including listening to feedbacks from villagers. • After data collection, we carried out impact assessment during construction and operation phases and used as base information to formulate the proposed mitigation measures in order to minimize the project impacts.
Suggest to monitor short and long term impact of the project implementation.	• Will do.

The consultation meeting was closed around 11.00 hrs.

Minutes of the Meeting at Nyaung Bin Seik Village

Date: 3rd December, 2015

Time: 13:00-15:00 hrs.

Venue: Nyaung Bin Seik Monastery

Subject: Information disclosure about the Initial Phase Power Plant Project

Participants:

1. Villagers of Nyaung Bin Seik 66 persons, Name list attached
2. ITD Staff
   - Mr. Panno Kraiwanit Project Manager, Infrastructure Development
   - Mr. Kyaw Kyaw Assistant
3. MIE Staff
   - Mr. Sawan Phoothiwut Environmental Engineer
4. LNG Plus Staff
   - Ms. Kulravee Soentiluck Supervisor Project Coordinator
5. EGCO Staff
   - Mr. Chinnavuth Liurungruang SVP-BDD2
   - Ms. Siriluck Soontornruengyot AVP Environment
6. Total Business Solution-TBS Staff
   - Ms. Thet Htar Myint Socio-Economic / Public Consultation Specialist
   - Mr. Shwe Thein Assistant
7. TEAM Consulting Engineering and Management Co., Ltd.-TEAM Staff
   - Mr. Plian Maneeya Human Specialist
   - Mr. Natt Dumkum Environmental Scientist
   - Mr. Nipat Somkleeb Environmental Scientist
   - Dr. Siriluck Sirisup Socio-Economic / Public Consultation Specialist
   - Dr. Supichaya Wongchinawit Environmental Scientist

Minutes:

The consultant disclosed information about:

- Objectives of EIA study for the Initial Phase Power Plant Project
- Project location and layout
- Project Information which consists of:
  - 420 MW capacity, using natural gas as primary fuel to be supplied by the adjacent LNG terminal

- A 115 kV conventional air/gas insulated switchyard located in the plant boundary
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- The conduct and results of environmental and social study in the study area, in October 2015 comprise:
  - Environmental measurement of air quality, water quality, soil resources, terrestrial ecology, marine ecology and transportation
  - Public consultation at the village level
  - Socio-economic survey at the household level
- Open for discussion
- Questions from villagers and answers/qualifications by the consultant are summarized as follows:

Questions/Feedbacks from the Locals	Clarifications by the Project
Concerning on the project impacts to the community during construction and operation phase.	• No negative impact as this village is far from the power plant. • The village is not within a direction of emissions.
Villagers have understanding about the project, and agreeable in case it is benefit to villagers.	• Cited. • Villagers will have benefits in terms of generating local employment.

The consultation meeting was closed around 15.00 hrs.

Minutes of the Meeting with Tavoyan Women's Union

Date: 4th December, 2015

Time: 13:00-15:00 hrs.

Venue: 702, Shwe Taung Sar Road, North Village, Dawei

Subject: Information disclosure about the Initial Phase Power Plant Project

Participants:

1. Ms. Ma Marlar — Head of Tavoyan Women's Union (total of 9 persons)
2. ITD Staff
   - Mr. Panno Kraiwanit — Project Manager, Infrastructure Development
   - Mr. Kyaw Kyaw — Assistant
3. Total Business Solution-TBS Staff
   - Ms. Thet Htar Myint — Socio-Economic / Public Consultation Specialist
4. TEAM Consulting Engineering and Management Co., Ltd.-TEAM Staff
   - Mr. Plian Maneeya — Human Specialist
   - Dr. Siriluck Sirisup — Socio-Economic / Public Consultation Specialist
   - Dr. Supichaya Wongchinawit — Environmental Scientist

Minutes:

The consultant informed the Tavoyan Women's Union about the second public consultation activities during 2-3 December 2015, and provided them a set of information presented in the village meeting.

Members of the Tavoyan Women's Union proposed to participate the public consultation meeting at the village level in the future. This was agreeable in both parties and hope for mutual understanding.

The consultation meeting was closed around 15.00 hrs.

APPENDIX 9C

PROJECT INFORMATION POSTED ON THE WEBSITE

PROJECT SUMMARY DOCUMENTS
Initial Phase Power Plant Project

Prepared By

TEAM Consulting Engineering and Management Co., Ltd.

Total Business Solution Co., Ltd.

December 2015

Project Background

In 2015, the Ministry of Electric Power (MOEP) of the Republic of the Union of Myanmar signed a concession agreement (CA) with Dawei Power Company Limited (DPC)[1], on the development of the Initial Phase Power Plant Project (the Project) in Dawei Special Economic Zone)DSEZ(. This Project will install multiple units of gas engine generators and a natural gas-fired combined cycle power plant and associated facilities with a total capacity of 420 MW. Its objective is to initially support operations of industries to be established in an area in DSEZ designated as the Initial Phase Development. As DSEZ has no access to the supply from the national power grid, the Project will be a critical component of the infrastructure development in DSEZ.

The Project is critically linked to the small port and Liquefied natural gas)LNG(terminal project which will be developed and implemented in parallel to the Project for supplying natural gas to the Project.

The project facilities will be constructed on a 37. 19 acre land plot in DSEZ, equivalent to 0. 15 km^2 area designated as industrial estate area in DSEZ. Its location is about 800 m from Andaman Sea to the west, and 1 km from a small tidal creek to the east. The site is vacant and sparsely covered with some sand dune vegetation commonly found in the region. The site is relatively flat and will need to fill to raise its elevation. The closet village to the site is Nga Pitat.

Project Location

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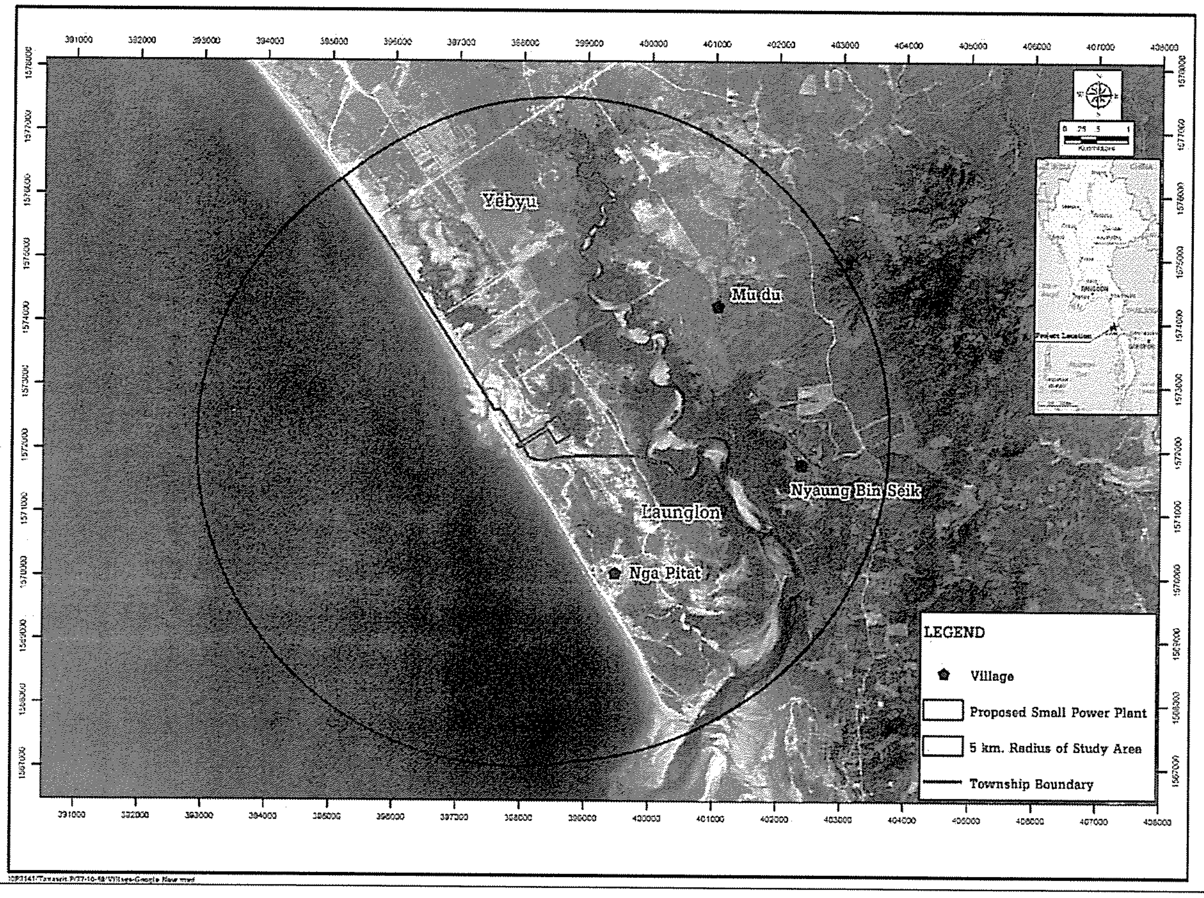
[1] DPC was jointly established for this Project by Electricity Generating Public Company Limited (EGCO) and Italian Thai Development Public Company Limited (ITD)

Project Features

The physical development of the Project will cover the following facilities and infrastructure:)i(420 MW)net(combination of gas engine power plant and combined cycle power plant using natural gas as fuel;)ii(once-through cooling water system using sea water as coolant;)iii(switch yard;)iv(short access road connecting the power plant site with the existing road in DSEZ;)v(emergency diesel generators;)vi(water demineralization plant;)vii(gas-regulating station;)viii(diesel oil unloading and storage tanks;)ix(utility systems inside the power plant premise, including water treatment plant, firefighting system, wastewater treatment plant, drainage, and communication system; and)x(support facilities including office and control buildings; internal road, access road, and guard houses. A 115-kV transmission line from the project site boundary will be constructed under another project for conveying electricity from the project site to the distribution grids serving DSEZ areas.



Project Layout

Environmental and Social Impact Assessment

The EIA Procedure prescribes that: An EIA investigation shall consider all biological, physical, social, economic, health, cultural and visual components of the environment, together with all pertinent legal matters relating to the environment (including land use, resources use, ownership and rights of land, and other resources) that may be affected by the Project during all project phases including preconstruction, construction, operation, decommissioning, closure, and post-closure; and shall identify and assess all Adverse Impacts, residual impact, cumulative impact, and risks for environment, social and, if relevant, health that potentially could arise from the Project. It is clear that the scope of EIA is broad covering all types of project externalities that could cause by a development project in all project phases.

The study area for this EIA will cover area about 5 km extending from the center of the project site. Equivalent to 78.57 km^2 of circular area around the project. As the project site is on the coastal area, the study area covers coastal waters and land area.

This area is defined by administrative boundaries to provide an overview of socio-economic setting and natural environmental setting. However, the impact analysis will focus on the impact areas. There are several impact areas-one impact area for each issue. An impact area is an area in which the consequences of a project construction or operation activity could be detected.

Main Environmental Impacts and Mitigation Measures

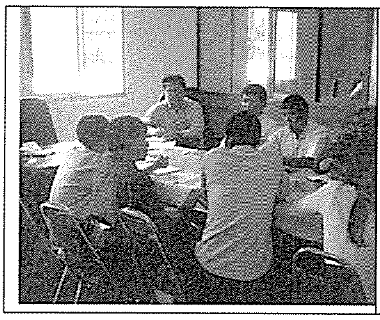
Environmental Aspect	Impacts	Mitigation Measures
Pre-Construction Phase		
Noise and Vibration	- Noise and vibration by transportation of materials	- Limit speed for vehicles and trucks not to exceed 40 km/h
Air Quality	- Fugitive dust generated from site clearance, filling and compaction of the Project site and equipment transportation	- Spray water at and around the construction areas and access roads during site preparation and grading - Cover construction materials by canvas during transportation - Establish a vehicle washing facilities to minimize the quantity of material deposited on the roads
	- Exhaust gas from vehicles	- Routine maintenance of vehicles
Traffic	- Increasing of local traffic on main road from equipment and materials transportation - Risk of community health, safety and security	- Limit speed for vehicles and trucks not to exceed 40 km/h - Avoid transportation of construction materials in the morning and evening of traffic rush hours - Consultation with villagers to inform them about the increase of traffic and duration of transportation works
Construction Phase		
Noise and Vibration	- Noise and vibration caused by construction activities (piling foundation and structural work)	- Install the temporary metal sheet fence to block the noise emanating to the receptor - Provide personal with protective equipment (earmuffs), as necessary - Regularly monitor ambient noise levels at the receptors, particularly during the noise generation period such as piling - Routine maintenance of construction equipment
	- Noise and vibration caused by transportation	- Limit speed for vehicles and trucks not to exceed 40 km/h - Routine maintenance of vehicles
Air Quality	- Fugitive dust generated from pilling foundation and structural work	- Limit speed for vehicles and trucks not to exceed 40 km/h - Cover construction materials with canvas or equivalent during transportation into project area - Spray water at and around the construction areas and access roads during site preparation and grading - Establish a vehicle washing facilities to minimize the quantity of material deposited on the roads
	- Exhaust gas from vehicles and construction machinery	- Routine maintenance of construction equipment and vehicles
Sea water quality	- Increase water turbidity	- Offshore pipe laying will be carried out within the smallest area and the short period of time
Marine Organisms	- Damage to benthic organisms	
Effluent	- Effluent generate from domestic use of workers	- Construct temporary drainage channel and sedimentation pond to accommodate surface runoff from the construction area - Establish temporary fence surrounded in order to limit the distribution of sediment washed from construction area
Waste Disposal	- Waste generated from construction activities and workers	- Dispose waste from site preparation by contractors with approval of concerned authority

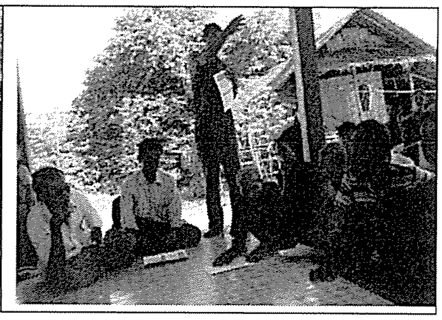
Environmental Aspect	Impacts	Mitigation Measures
Social Impact	- Inconvenient of fishing boat navigation	- Demarcation the construction area and notice the construction period in the public
	- Social conflict between villagers and construction workers from outside	- Inform non-local personnel about the local custom and culture - Develop and practice mechanism to review complaints
	- Health, safety and security risks	- Installation of warning and prohibition signs in the area dangerous for health and safety - Information disclosure prior to construct major components and during construction - Provision of water supply, waste disposal, sewage treatment and first aid supplies within the construction site for employees
	- Increase income from direct and indirect employment for the locals - Generate job opportunities - Improve cash flow from demand for services and goods like food, transportation and accommodation	- Give priority to local employment during the construction period especially the close village of Nga Pitat - Recruitment process should be fair and transparent together with fair wage rate in accordance with qualifications
Road traffic	- Increasing in traffic load on the main road	- Avoid transportation of construction materials in the morning and evening traffic rush hours - Consultation with villagers to inform them about the increase of traffic and duration of transportation works
Operation Phase		
Ambient Noise	- Noise from turbine generators in the power plant	- Provide personal protective equipment (earplugs) to all onsite workers - Carry out periodic noise monitoring at sensitive receptors, and adopt appropriate measures to reduce noise levels if it exceeds the standard - Grow perennial tree as the fence of project boundary
	- Noise caused by water pump	- All equipment and machines will be design to meet noise standard
Air Quality	- Emission from gas combustion	- Install the Continuous Emission Monitoring System (CEMS) in order to measure NOx, O_2, flow rate and heat temperature of emission gas - Install the Dry Low NOx Combustor for Gas Turbine - Regularly check and maintain gas turbine
Sea Water Quality	- Increases in water temperature caused by discharge of warm spent cooling water	- Control water temperature at discharge point not to exceed the standard by outfall diffuser design. - Regularly monitor water temperature at discharge point
	- Effluent discharge from the power plant	- Treat process wastewater from the power plant and auxiliary facilities with proper procedure and passed process of quality control - Collect all treated wastewater, excluding cooling water, into the effluent pond and reuse it as much as possible
Marine Organisms	- Pumping in a large volume of cooling water from the sea will have impacts on marine organisms	- Install screen at the inlet of water pump
Social Impact	- Increased income from direct and indirect employment for the locals - Improved cash flow from demand for services and good like food, transportation and accommodation	- Set up Corporate Social Responsibilities (CSR) Programs which will work close relation with local people and local authorities

Public Consultation during Preparation of the EIA Report

Involving the public in the preparation of EIA studies is a fundamental prerequisite for increasing understanding about the project, and for gaining acceptance. For the proponent it is also necessary part of understanding how the project may affect living conditions and it helps to identify impacts and issues that may not be immediately obvious to EIA preparation team. The earlier in the project preparation process that the public can be involved, the more likely that a trusting relationship can be built and useful recommendations made. According to the EIA Procedure, public consultations should be conducted at different times during the preparation of the EIA.

During preparation of the EIA report, the Project Proponent has to organize consultation meetings at national, regional and local level with project affected peoples, authorities, community based organizations and civil society and consult with concerned government organizations including the ministry, the concerned sector ministry, regional government authorities and others. The consultation meetings explained the general situation of the investment project, as well as the benefits, and impacts on the environment and society with may arise from the project, measures to prevent and minimize impacts on the environment and society, and summarize the comments and opinions given in the meeting to incorporate in to the EIA report.





Contact Us

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APPENDIX 9D

SLIDES AND HANDOUTS OF THE TWO PERIODS OF MEETING

APPENDIX 9D-1

SLIDES AND HANDOUTS OF THE FIRST CONSULTATION MEETING

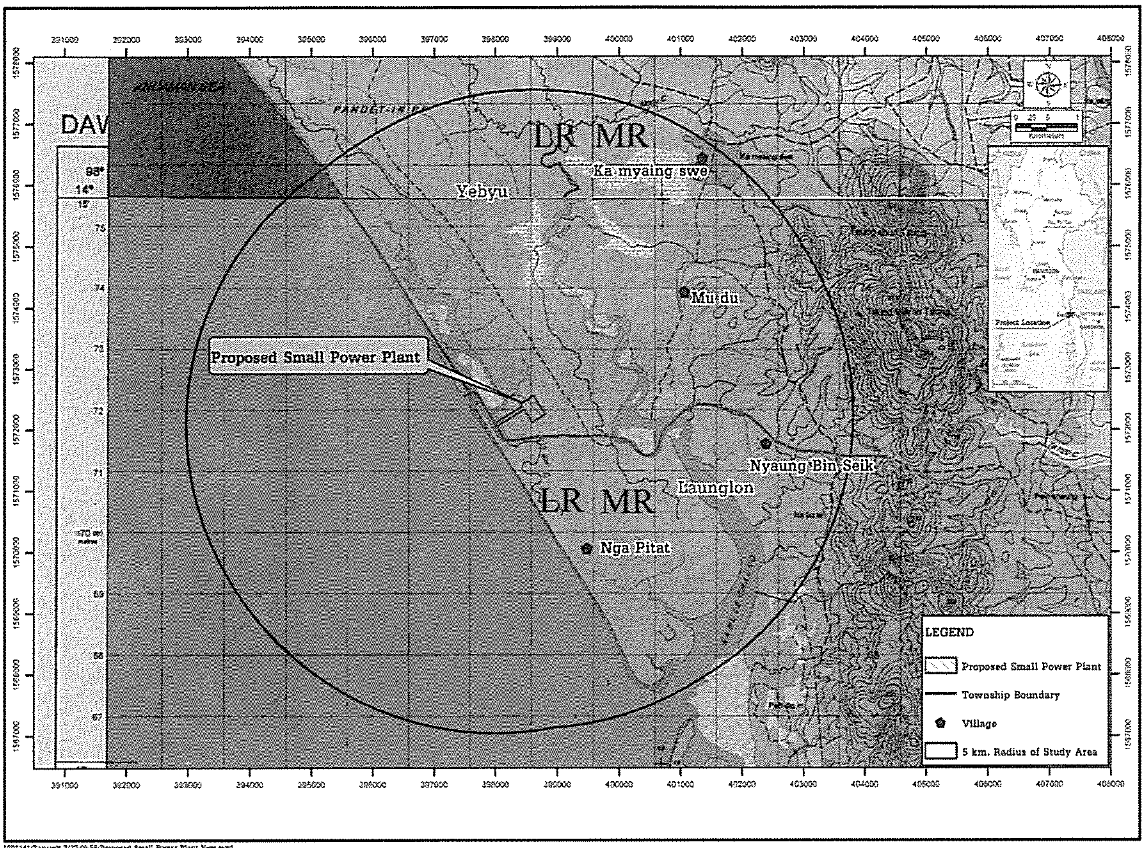
ထားဝယ်အထူးစီးပွားရေးဇုံ ကဏ္ဍဦး ၃၇၀ မဂ္ဂါဝပ် လျှပ်စစ်ဓာတ်အား ပေးစက်ရုံတည်ဆောက်ခြင်း၏ ပတ်ဝန်းကျင်နှင့် လူမှုရေးရာ အကျိုးသက်ရောက်ခြင်း အကဲဖြတ်လေ့လာမှုများ

(၂၀၁၂)ခုနှစ်မြန်မာနိုင်ငံပတ်ဝန်းကျင်ထိန်းသိမ်းစောင့်ရှောက်ခြင်းနှင့်အကျိုးသက်ရောက်မှုများ ပတ်ဝန်းကျင် ထိန်းသိမ်း စောင့်ရှောက်ရေးဝန်ကြီးဌာန၏ပတ်ဝန်းကျင်ရေးရာအကျိုးသက်ရောက်မှု လုပ်ငန်းစဉ် များအရ သဘာဝ ဓာတ်ငွေ့ ဓာတ်အားပေး စီမံကိန်း၏ ပတ်ဝန်းကျင်ရေးရာ အကျိုး သက်ရောက်မှုအကဲဖြတ် လေ့လာ ဆန်းစစ်ခြင်းကို စီမံကိန်းမစတင်မီတွင် အတည် ပြုချက် ရယူနိုင်ရန် ပြင်ဆင်ရန် လိုအပ်ပါသည်။

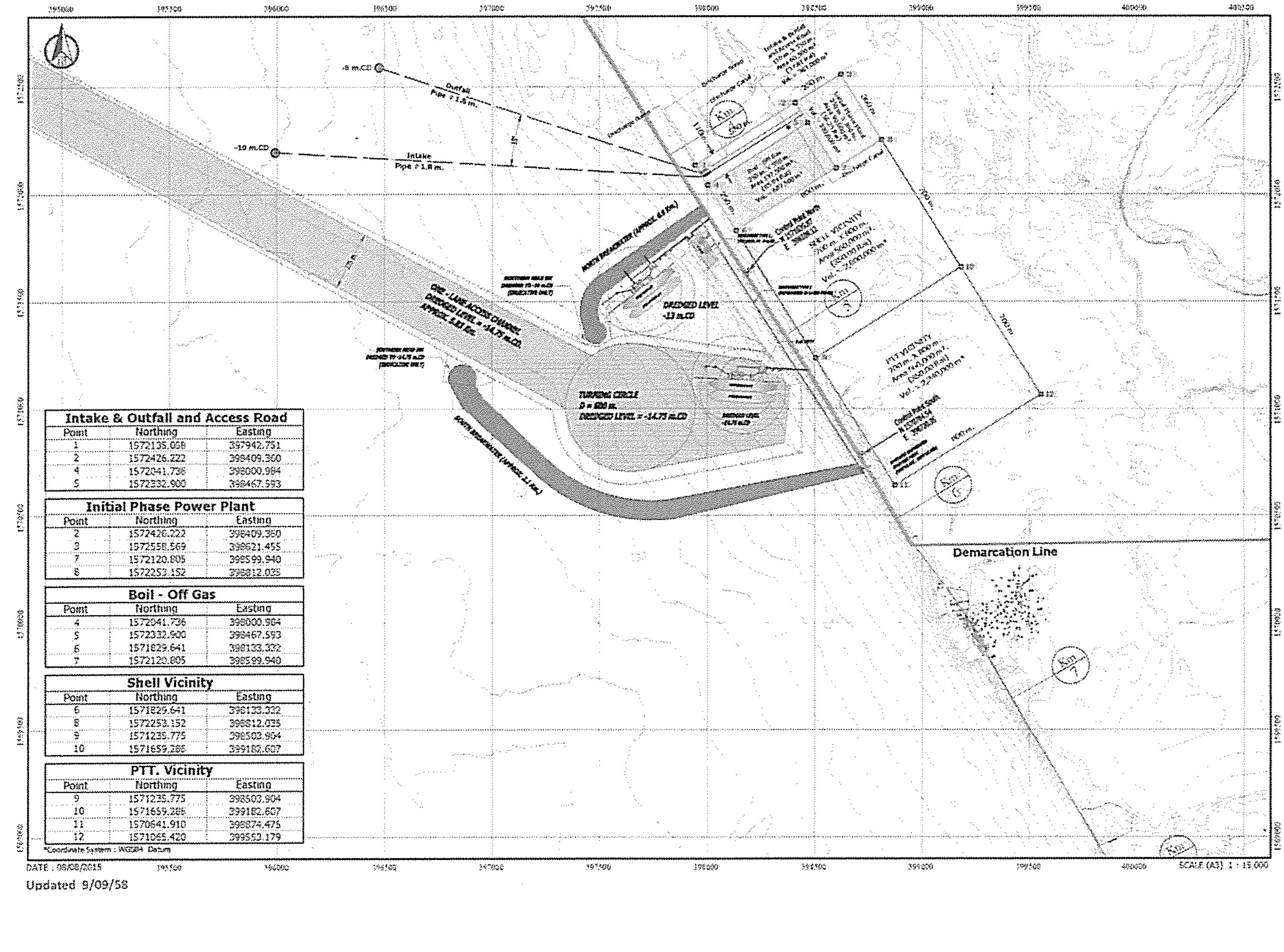
သဘာဝပတ်ဝန်းကျင်နှင့် လူမှုရေးရာ အကျိုးသက်ရောက်မှုများလေ့လာဆန်းစစ်ခြင်းရည်ရွယ်ချက်

- စီမံကိန်းတည်ဆောက်မည့်နေရာအနီးတဝိုက်ရှိပတ်ဝန်းကျင်လေ့လာမှု
- စီမံကိန်း၏ အင်္ဂါရပ်များကို ပြန်လည်ဆန်းစစ်ခြင်း
- စီမံကိန်းမှ ဖြစ်နိုင်ခြေရှိသော ကောင်းကျိုးနှင့် ဆိုးကျိုး သက်ရောက်မှုများ၏ ပမာဏကိုဖော်ထုတ် ခြင်းတွင်
  (ရုပ်ဝတ္ထုပတ်ဝန်းကျင်ဆိုင်ရာများ၊သက်ရှိတို့၏ဂေဟစနစ်လူသားတို့၏ အသုံးချမှု၊ ဓလေ့စရိုက် အရည်အသွေးများနှင့် ကျန်းမာရေးစံနှုန်းများ)
- အဆိုပြုကာကွယ်ခြင်းများဆိုးကျိုးသက်ရောက်မှုလျှော့ချခြင်းနှင့် စောင့်ကြည့်ကြီးကြပ်ခြင်းများ

စီမံကိန်း တည်နေရာ ပြမြေပုံ



စီမံကိန်း တည်ဆောက်ပုံ



Intake & Outfall and Access Road		
Point	Northing	Easting
1	1572135.058	397942.751
2	1572426.222	398409.360
4	1572041.736	398000.984
5	1572332.900	398467.593

Initial Phase Power Plant		
Point	Northing	Easting
2	1572426.222	398409.360
3	1572558.569	398621.455
7	1572120.805	398599.940
8	1572253.152	398812.035

Boil - Off Gas		
Point	Northing	Easting
4	1572041.736	398000.984
5	1572332.900	398467.593
6	1571829.641	398133.332
7	1572120.805	398599.940

Shell Vicinity		
Point	Northing	Easting
6	1571829.641	398133.332
8	1572253.152	398812.035
9	1571235.775	398503.904
10	1571659.286	399182.607

PTT. Vicinity		
Point	Northing	Easting
9	1571235.775	398503.904
10	1571659.285	399182.607
11	1570641.910	398874.475
12	1571065.420	399553.179

*Coordinate System : WGS84 Datum

DATE : 08/08/2015

Updated 9/09/58

စီမံကိန်း အချက်အလက်များ

- ပေါင်းစပ်လည်ပတ်နှုန်းစွမ်းအား ၃၇၀ မဂ္ဂါဝပ်
- ဓာတ်ငွေ့ပိုက်လိုင်းအသစ်နှင့် ဆက်သွယ်မည့်တောင်ဘက်အရပ်သို့ ဦးတည်သည့်သဘာဝဓာတ် ငွေ့ရည်စက်ရုံတည်နေရာ
- ဓာတ်အားပေးစက်ရုံမှဗို့အား ၁၁၅ကီလိုဗို့ရှိသည့် ဓာတ်အားပေးစက်ရုံသို့ သွယ်ယူမည့် ဓာတ် အားလိုင်း
- (အအေးခံစနစ်) အဓိကအအေးခံပစ္စည်း "ရေ"
- ၄င်းရေများကို ပယင်းဖြူရေလှောင်ကန်မှ သွယ်ယူခြင်း

5

စီမံကိန်း အချက်အလက်များ (အဆက်)

- ရေသန့်စင်ခြင်း အဆောက်အအုံ
- ဓာတ်အားပေးစက်ရုံတခုလုံးအတွက် မီးသတ်စနစ်
- ဓာတ်အားပေးစက်ရုံမှ ထုတ်လွှတ်မှုများလျော့ချစောင့်ကြည့်ခြင်းစနစ်
- ဖြန့်ဝေမှု ထိန်းချုပ်စနစ်
- အခြားသော အထောက်အပံ့အင်္ဂါများ

ပတ်ဝန်းကျင်ရေးရာနှင့် လူမှုရေးရာ အခြေအနေ များ ကွင်းဆင်းဆောင်ရွက်ခြင်း ရည်ရွယ်ချက်

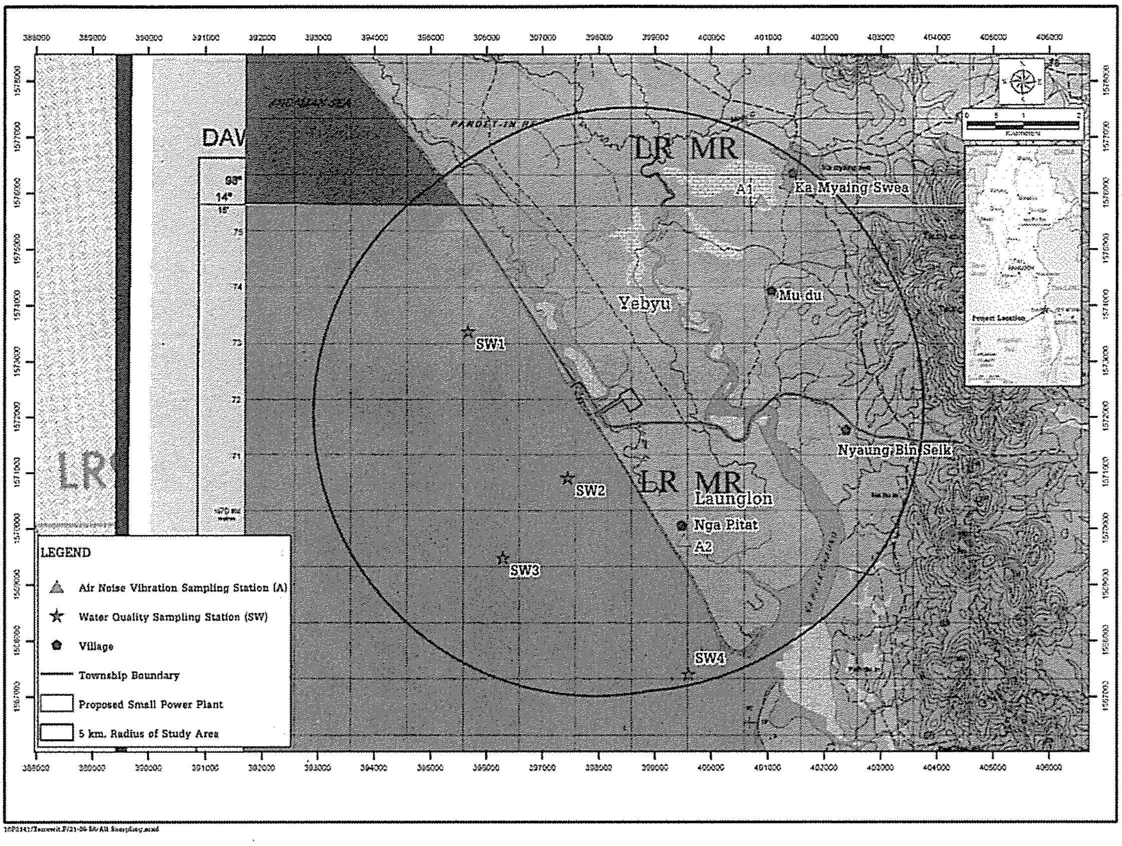
- စီမံကိန်း မစတင်မီနှင့် စီမံကိန်းလည်ပတ်ရန် အခြေခံ အချက်အလက်များ ခိုင်မာစေသည်
- ထိုအချက်အလက်များကို အသုံးပြုခြင်းဖြင့် စီမံကိန်း မစတင်မီပတ်ဝန်းကျင်ရေးရာနှင့် လူမှုဝန်းကျင် အခြေအနေများ ပိုမိုဆိုးရွားလာခြင်းမရှိစေရန် ကာကွယ်ခြင်းလျှော့ချ လျှော့နည်းစေခြင်း နည်းလမ်း များကို ဖော်ထုတ်ခြင်း

ပတ်ဝန်းကျင်ရေးရာတိုင်းတာသတ်မှတ်ချက်မူဘောင်များ

၎င်းတို့မှာ

၁။ လေထုဝန်းကျင်နှင့် အသံအမျိုးအစားများ
၂။ ပင်လယ်ရေ၏ အရည်အသွေး
၃။ ပင်လယ်တွင်းသက်ရှိဝန်းကျင်
၄။ ငါးဖမ်းလုပ်ငန်းများ
၅။ မြေအောက်ရေအခြေအနေ
၆။ အနည်ကျမှုအဆင့်အတန်း
၇။ ကုန်းတွင်းအရင်းအမြစ်များ
၈။ တောရိုင်းတိရစ္ဆာန်အရင်းအမြစ်များ
၉။ မြေယာခွဲဝေသုံးစွဲမှုပုံစံ

ပတ်ဝန်းကျင်လေ့လာမှု ဆိုင်ရာ နမူနာ နေရာများ



လူမှုစီးပွားစစ်တမ်း အတွက် ဒေသခံပြည်သူများနှင့် ဆွေးနွေးခြင်း

လူမှုရေးရှုထောင့်	ကွင်းဆင်းလေ့လာဆောင်ရွက်ချက် အကျဉ်းချုပ်
၁။ဒေသခံပြည်သူများ နှင့် ဆွေးနွေးခြင်း	▪ စီမံကိန်းနှင့် ပတ်သက်သည့် သတင်းအချက်အလက်များကို ဒေသခံပြည်သူများအားအသိပေး တင်ပြရန် ▪ ဒေသခံပြည်သူများ၏ ထင်မြင်ချက်များ၊ ဆွေးနွေးချက်များသိနိုင်စေရန် ▪ စီမံကိန်းနှင့် သက်ဆိုင်သော မူဒူးရွာ၊ ညောင်ပင်ဆိပ်ရွာ၊ ငပိတက်ရွာနှင့် ကမြိုင်ဆွဲကျေးရွာများရှိ ဒေသခံ ပြည်သူများနှင့် ဆွေးနွေးခြင်း
၂။လူမှုစီးပွားစစ်တမ်း	▪ စီမံကိန်းတည်ဆောက်ရမည့်ရွာ ရွာလေးရွာအတွင်းရှိ အိမ်ထောင်စုများ၏လူမှုစီးပွားစစ်တမ်း ကောက်ယူခြင်း၊ ▪ ဒေသခံပြည်သူများ၏ လူမှုစီးပွားရေးအခြေအနေ၊ ထင်မြင်ယူဆချက်များ ဆွေးနွေးမှုများကို လေ့လာ ဆန်းစစ်ခြင်း၊

စီမံကိန်း ဆောင်ရွက်မှု လျာထားအချိန် ဇယား

Activities	September 2015				October 2015				November 2015				December 2015				January 2016			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Task 1 : Preparation of ESIA Document																				
1.1 Compilation of Project Information	—	—																		
1.2 Data Collection / Field Survey			—	—																
1.3 Establishment of Existing / Environmental Condition			—	—	—	—	—	—	—	—	—	—	—							
1.4 Impact Assessment					—	—	—	—	—	—	—	—	—							
1.5 Mitigation Measures						—	—	—	—	—	—	—	—	—						
1.6 Monitoring Program						—	—	—	—	—	—	—	—	—						
2. Task 2 : Public Consultation Program																				
2.1 Identification of target groups		—	—																	
2.2 Consultation with district and provincial officials				—									—		—					
2.3 Preparation and dissemination of project information/mitigation measures			—	—	—							—	—	—	—					
2.4 Public consultations				PP1									PP2		PP3					
2.5 Evaluation of the program and recommendations					—	—	—							—	—	—				
3. Task 3 : Report Preparation and Submission																				
3.1 Scoping Report (30 October 2015)								▼												
3.2 Draft Final ESIA Report (15 December 2015)														▼						
3.3 Final ESIA Report (4 January 2016)																▼				

ဆက်သွယ်ရန်

၁။ မစ္စတာ ကီတီပွန် သွန်နွမ် - တာဝန်ခံကျွမ်းကျင်အရာရှိ
အီတာလီယံ- ထိုင်း၊ ဓာတ်အားပေးကုမ္ပဏီ
၂၀၃၄/ ၁၆၁၊ အီတယ်- ထိုင်းအဆောက်အဦး (၄၃)ထပ်
နယူးဖက်ဘူရီလမ်း၊ ဟွေ့ခွမ်၊ ဘန်ကောက် ၁၀၃၁၀၊ ထိုင်းနိုင်ငံ။

၂။ မစ္စဆီရီလပ် ဘွန်တွန်နယူရွတ်
အေဝိဗိ အင်ဗိုင်းရွန်းမင့်၊ လျှပ်စစ်ဓာတ်အားလည်ပတ်ရေးကုမ္ပဏီ
၂၂၂၊ ဂျီအီးစီအို တာဝါ၊ (၁၄-၁၅) ထပ် မူ-၅
ဝိဖာဝဒီလမ်း၊ ရမ်ဆစ်၊ လတ်ဆီ၊ ဘန်ကောက် ၁၀၂၁၀

၃။ မစ္စတာ ပလိန်မနီယာ၊ စီမံကိန်းမန်နေဂျာ
TEAM အင်ဂျင်နီယာ နှင့် စီမံအုပ်ချုပ်ရေး ကုမ္ပဏီ
TEAM အဆောက်အဦး၊ (၁၅၅) နူဝင်ကျန်လမ်း၊ ဘန်ခူ၊ ဘန်ကောက်
၁၀၂၃၀။ ထိုင်းနိုင်ငံ နှင့်
တိုတယ်ဘစ်နက်ရုံး၊ အမှတ် ၅၄ အခန်း ၇၀၄၊ ဝေဇယန္တာတာဝါ၊
ဝေဇယန္တာလမ်း၊ သင်္ဃန်းကျွန်းမြို့နယ်၊ ရန်ကုန်မြို့၊ မြန်မာ။

APPENDIX 9D-2

SLIDES AND HANDOUTS OF THE SECOND CONSULTATION MEETING

ထားဝယ်အထူးစီးပွားရေးဇုံအတွက်လျှပ်စစ်ဓါတ်အားပေးစက်ရုံ၏ ပတ်ဝန်းကျင်နှင့်လူမှုစီးပွားထိခိုက်မှုရှိမရှိလေ့လာဆန်းစစ်ခြင်း (ESIA)

၂၀၁၂ ခုနှစ်တွင်အတည်ပြုလိုက်သောပြည်ထောင်စုမြန်မာနိုင်ငံတော်၏ ပတ်ဝန်းကျင်နှင့်လူမှုစီးပွားထိခိုက်မှုရှိမရှိလေ့လာဆန်းစစ်ခြင်း(ESIA) ဥပဒေအရသဘာဝဓါတ်ငွေ့သုံးလျှပ်စစ်ဓါတ်အားပေးစက်ရုံသည် လုပ်ငန်းတည်ဆောက်ခွင့်ပြုချက်မရမှီ၎င်း၏ပတ်ဝန်းကျင်နှင့် လူမှုစီးပွားရေး အခြေအနေများအားကြိုတင်လေ့လာရပါသည်။

ESIA လေ့လာမှု၏ရည်ရွယ်ချက်

- စီမံကိန်းဧရိယာတဝိုက်ရှိပတ်ဝန်းကျင်အခြေအနေများအားလေ့လာရန်
- စီမံကိန်းအသွင်သဏ္ဍာန်လားကြည့်ရှုသုံးသပ်ရန်
- လျှပ်စစ်စက်ရုံစီမံကိန်း၏ ပတ်ဝန်းကျင်(ရုပ်ဝတ္ထုဆိုင်ရာ၊ ဂေဟစံနစ်ဆိုင်ရာ၊လူ့အသုံးချမှုများ၊လူ့ဘဝအရည်အသွေးနှင့်ကျန်းမာရေးတန်ဖိုးများ)အပေါ်သက်ရောက်မည့်ကောင်းကျိုးဆိုးကျိုးတို့၏အရည်အသွေးနှင့်အရေအတွက်တို့အားဖေါ်ထုတ်သတ်မှတ်ရန်
- ဆိုးကျိုးသက်ရောက်မှုအားကာကွယ်ရန်၊လျှော့ချရန်နှင့် စောင့်ကြည့်ရန်နည်းလမ်းများကိုတင်ပြပေးရန်

ပတ်ဝန်းကျင်နှင့်လူမှုစီးပွားထိခိုက်မှုရှိမရှိလေ့လာ ဆန်းစစ်ခြင်း (ESIA)

- လျှပ်စစ်စက်ရုံ၏ (၅)ကီလိုမီတာ အဝိုင်းအဝန်းအတွင်းလေ့လာခြင်း
- ပတ်ဝန်းကျင်နှင့်ဆိုင်သောမူဝါဒ၊လမ်းညွှန်ချက်များနှင့် ဥပဒေရေးရာတို့အားလေ့လာခြင်း
- စီမံကိန်းဖော်ပြချက်တို့အားစုဆောင်းခြင်း
- အချက်အလက်ရှာဖွေစုဆောင်းခြင်းနှင့်ကွင်းဆင်းကောက်ခံခြင်း
- ပတ်ဝန်းကျင်နှင့်ဆိုင်သောစီမံခန့်ခွဲမှု အစီအမံ (EMP)အားတင်ပြခြင်း
- အများပြည်သူလူထုအားတွေ့ဆုံတိုင်ပင်ခြင်း

စီမံကိန်းအကြောင်း

- Dawei Power Company Limited (DPC) မှဓါတ်ငွေ့သုံး လျှပ်စစ်ဓါတ်အားပေးစက်ရုံ အား ထားဝယ်အထူးစီးပွားရေးဇုံအတွင်းတည်ရန်ရှိပါသည်
- သဘာဝဓါတ်ငွေ့အားမူလလောင်စာအဖြစ်အသုံးပြုပြီး လျှပ်စစ်ဓါတ်အား(၄၃၀)မီဂါဝပ်အထိ ထုတ်လုပ်နိုင်ရန် တည်ဆောက်တပ်ဆင်ပါမည်။
- စက်ရုံဝင်းအတွင်း (၁၁၅)ကီလိုဗို့ဖြန့်ဖြူးရန်ရှိမည်

စီမံကိန်းအကြောင်း

- စီမံကိန်းဧရိယာ (၃၇.၁၉)ဧကပေါ်တွင် လမုပင်၊ဒီရေတောနှင့် ရေမျက်နှာပြင်ပါဝင်မည်
- အနီးရှိဓါတ်ငွေ့ပိုက်လိုင်းမှ LNG ဓါတ်ငွေ့များဖြန့်ဖြူးပေးမည်
- ဓါတ်ငွေ့လိုအပ်ချက်မှာတစ်နေ့လျှင်ကုဗပေပေါင်း (၆၅)သန်းဖြစ်သည်
- ဒီဇယ်ကိုဘေးကင်းစွာစက်ပိတ်ရန်အတွက်သာအသုံးပြုမည်
- တစ်နေ့လျှင်ပင်လယ်ရေ (၆၇၉၀၀)ကုဗမီတာအသုံးပြုသောအအေးခံစံနစ်ရှိမည်
- သုံးစွဲရေအရန်အတွက် ဒေသတွင်းရှိရေလှောင်တမံ အရင်းအမြစ်မှ ဖြစ်မည်

စီမံကိန်းအကြောင်း

အဓိကပါဝင်သောအစိတ်အပိုင်းများ

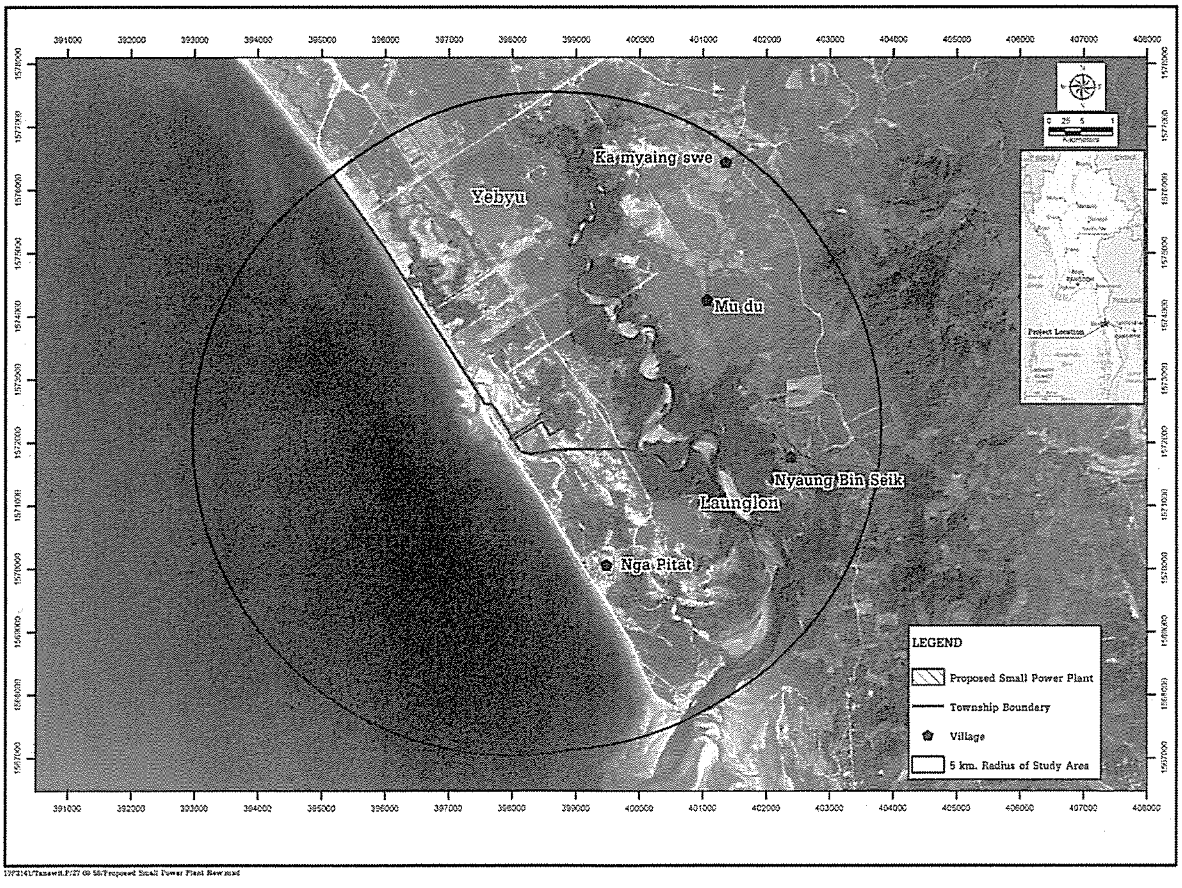
- ဓါတ်ငွေ့အင်ဂျင် (၉)လုံး
- ကာဗွန်မိုနော့ဆိုက် (NOx) အနည်းငယ်ထွက်သော ဓါတ်ငွေ့လောင်ကျွမ်းစေသည့်တာဘိုင် (၅)လုံး
- ရေနွေးငွေ့တာဘိုင် (၃)လုံး
- စဉ်ဆက်မပြတ်စောင့်ကြည့်စစ်ဆေးသည့် စံနစ် (CEMs)

စီမံကိန်းအကြောင်း

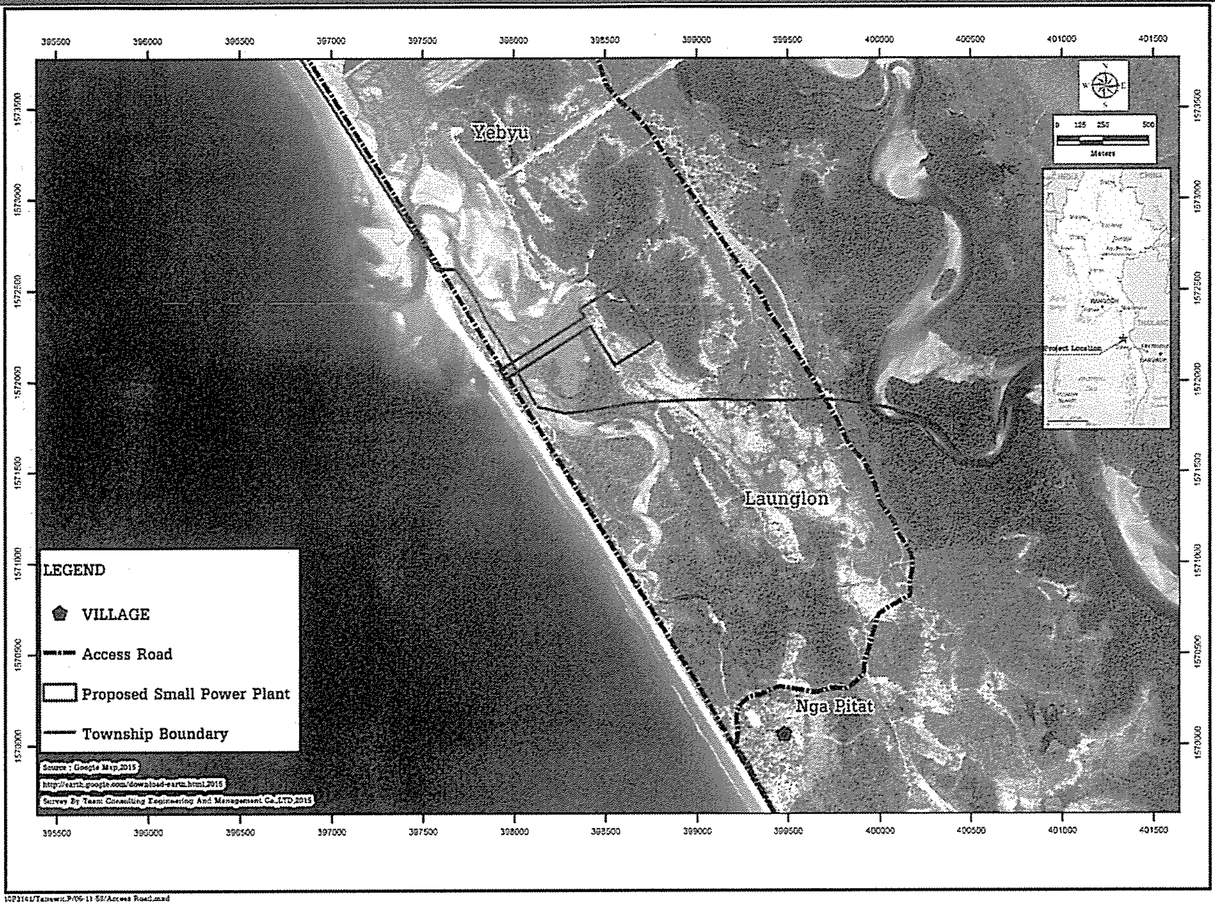
စီမံကိန်းအကောင်အထည်ဖော်ခြင်း

- ➢ လုပ်ငန်းပြင်ဆင်ခြင်းအတွက် (၄)လ
- ➢ အဆင့်(၅)ဆင့်ဖြင့်လုပ်သား(၆၀၀)ဦးအထိဆောင်ရွက်ရန်
    - ပထမအဆင့်၊ လုပ်ငန်းစတင်ခွင့်ပြုချက်အရ (၁၂)လကြာမည့် (၄၀)မီဂါဝပ်အထွေထွေ ဓါတ်အားစက်ရုံ
    - ဒုတိယအဆင့်၊ လုပ်ငန်းစတင်ခွင့်ပြုချက်အရ (၂၄)လကြာမည့် (၁၄၀)မီဂါဝပ်ဓါတ်ငွေ့သုံး လျှပ်စစ်ဓါတ်အားပေးစက်ရုံ
    - တတိယအဆင့်၊လုပ်ငန်းစတင်ခွင့်ပြုချက်အရ (၁၂)လကြာမည့် (၃၀)မီဂါဝပ်အထွေထွေ ဓါတ်အားပေးစက်ရုံ
    - စတုတ္ထအဆင့်၊လုပ်ငန်းစတင်ခွင့်ပြုချက်အရ (၂၄)လကြာမည့် (၁၄၀)မီဂါဝပ်ဓါငွေ့သုံး လျှပ်စစ်ဓါတ်အားပေးစက်ရုံ
    - ပဥ္စမအဆင့်၊ လုပ်ငန်းစတင်ခွင့်ပြုချက်အရ (၂၄)လကြာမည့် (၇၀)မီဂါဝပ်ဓါတ်ငွေ့သုံး လျှပ်စစ်ဓါတ်အားပေးစက်ရုံ
- ➢ ဝန်ထမ်းအင်အား(၅၀)ဦးဖြင့် နှစ်(၃၀)လည်ပတ်ရန်

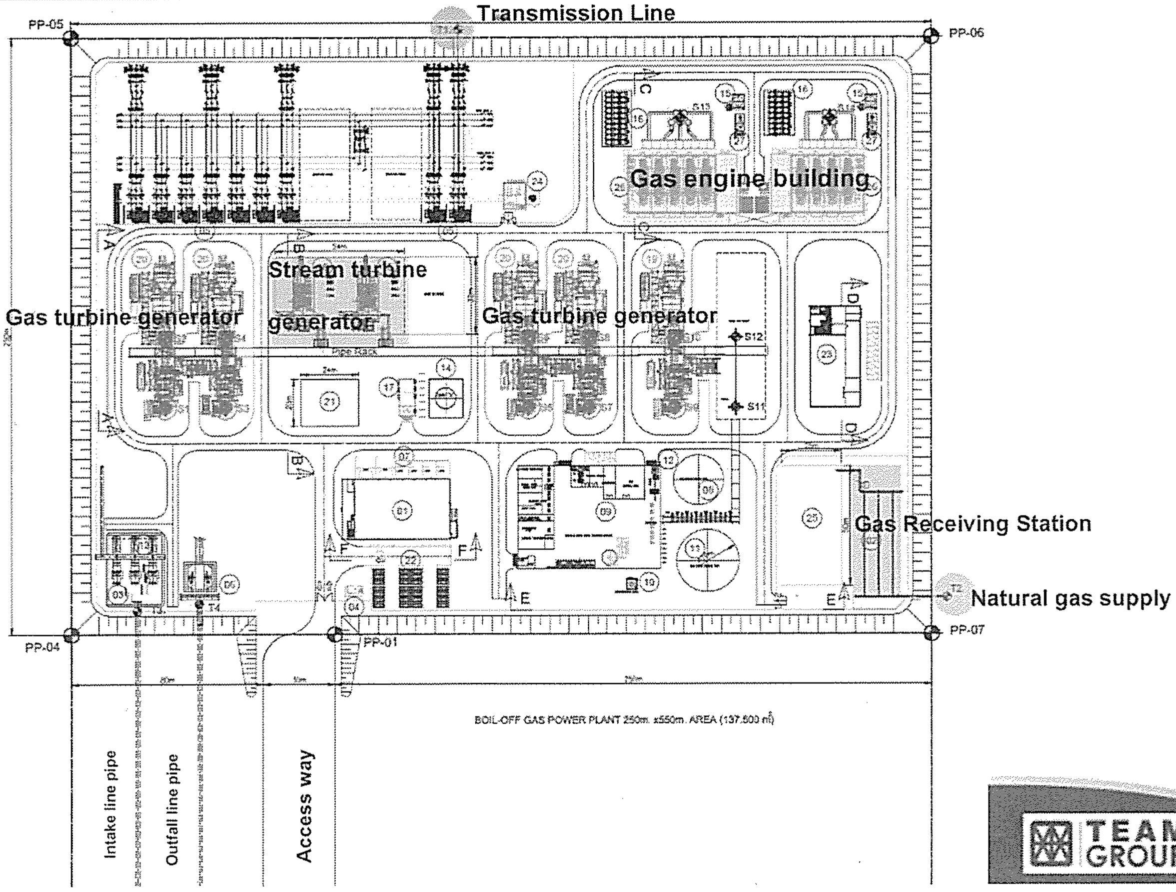
လျှပ်စစ်ဓါတ်အားစက်ရုံတည်နေရာ



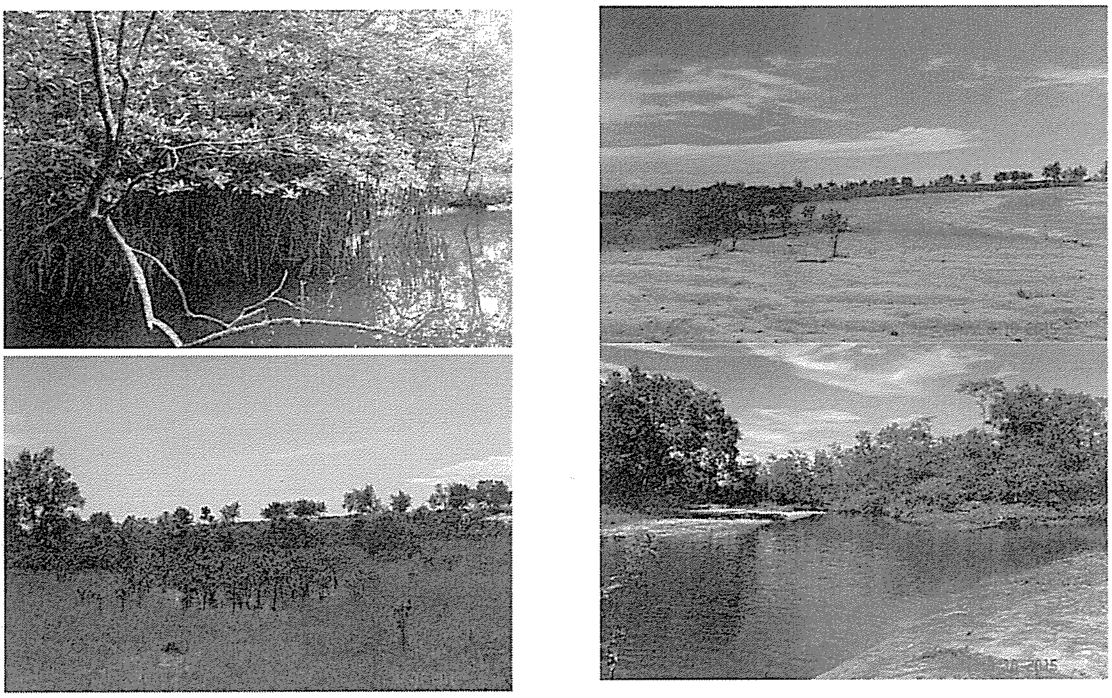
စီမံကိန်းနေရာသို့ရောက်ရှိနိုင်သည့်လမ်းကြောင်း



စီမံကိန်းလျာထားချက်ပုံစံ



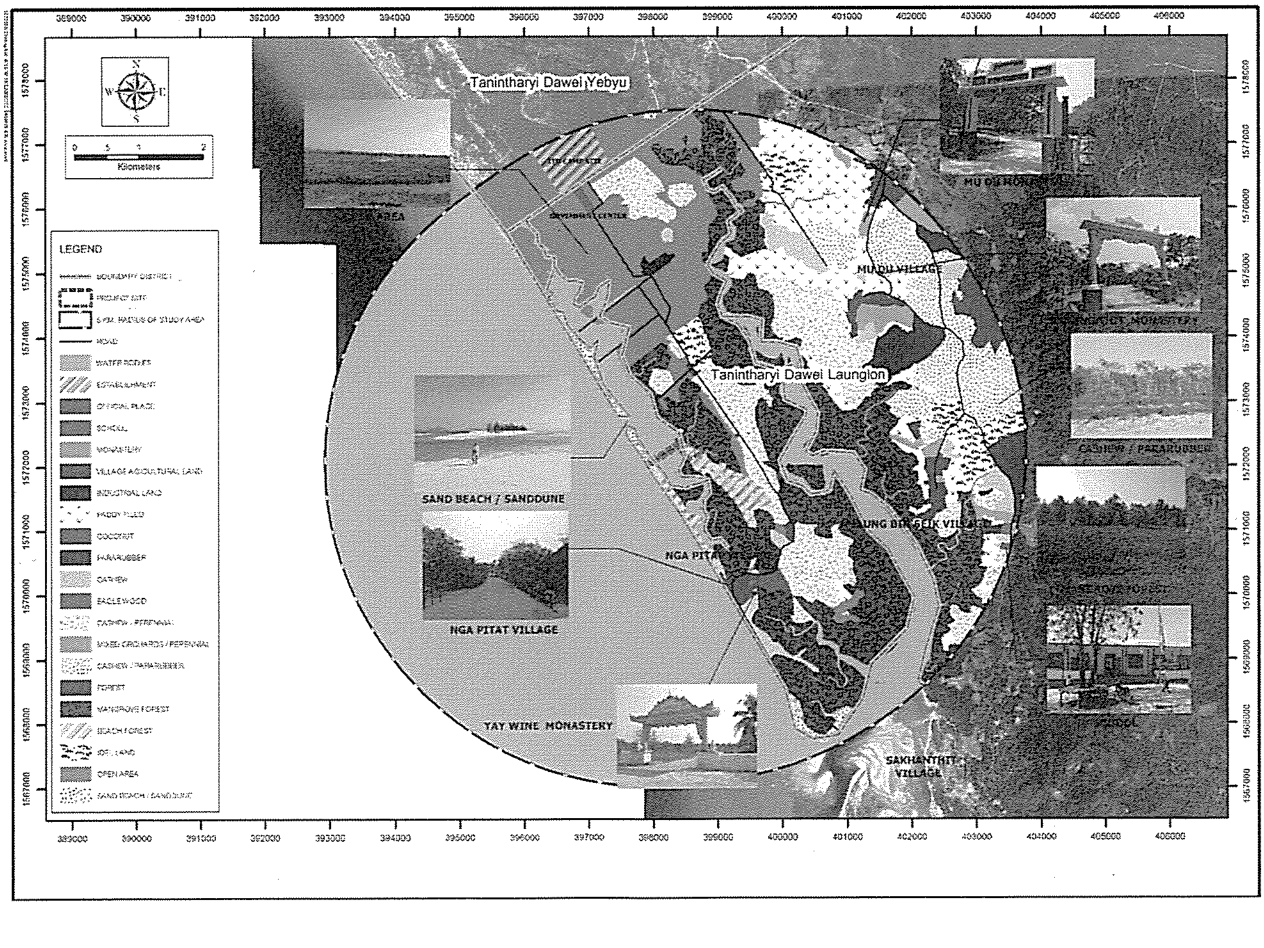
စီမံကိန်းမြေနေရာအခြေအနေ



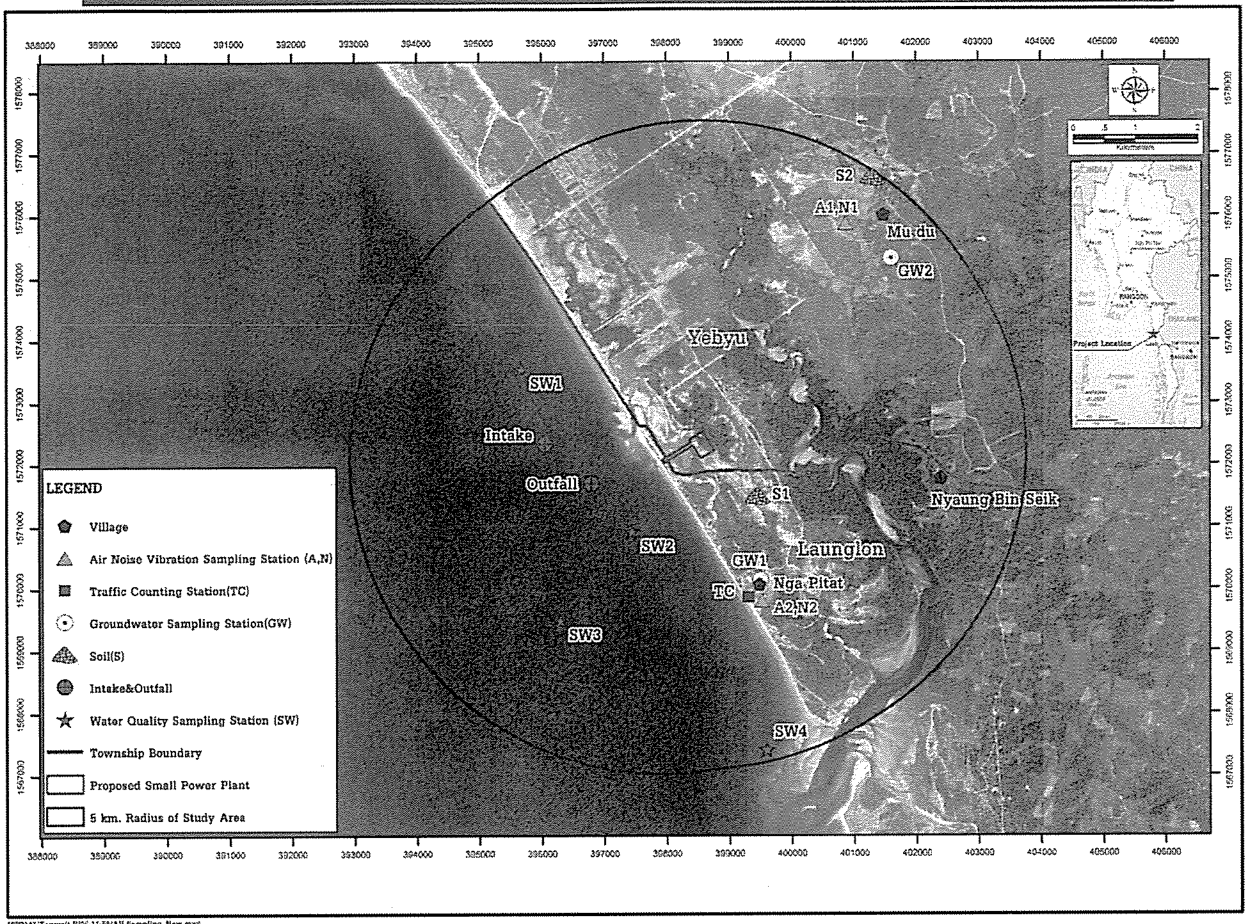
လျှပ်စစ်ဓါတ်အားပေးစက်ရုံအတွက်လျာထားသောလက်ရှိမြေနေရာ

TEAM GROUP

အဆိုပြုထားသည့်လျှပ်စစ်ဓါတ်အားပေးစက်ရုံတစ်ဝိုက် လေ့လာမှုပြုခြင်း



ပတ်ဝန်းကျင်အခြေအနေနမူနာစစ်တမ်းကောက်သည့်နေရာများ

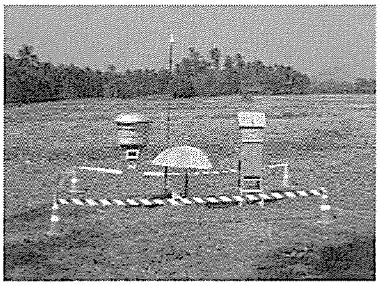


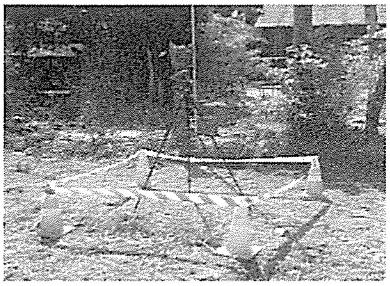
ပတ်ဝန်းကျင်ထိခိုက်မှုလေ့လာဆန်းစစ်ခြင်း

- ရုပ်ပိုင်းဆိုင်ရာလက္ခဏာ
- ဇီဝပိုင်းဆိုင်ရာလက္ခဏာ
- လူမှု-စီးပွားဆိုင်ရာလက္ခဏာ
- ယဉ်ကျေးမှုနှင့်မျက်မြင်နိုင်သောသွင်ပြင်လက္ခဏာ
- ပြည်သူနှင့်တွေ့ဆုံတိုင်ပင်ခြင်း

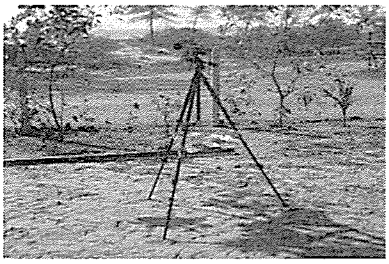
ရုပ်ပိုင်းဆိုင်ရာသွင်ပြင်လက္ခဏာ

❖ လေထုအရည်အသွေးနှင့်ဆူညံသံ





A1&N1 မူဒူးကျေးရွာ



A2&N2 ငပိတက်ကျေးရွာ

ရုပ်ပိုင်းဆိုင်ရာသွင်ပြင်လက္ခဏာ

❖ မူဒူးနှင့်ငပိတက်ကျေးရွာများရှိ လေအရည်အသွေးနှင့်ဆူညံသံနမူနာအခြေအနေ

➢ **လေထုအရည်အသွေး**

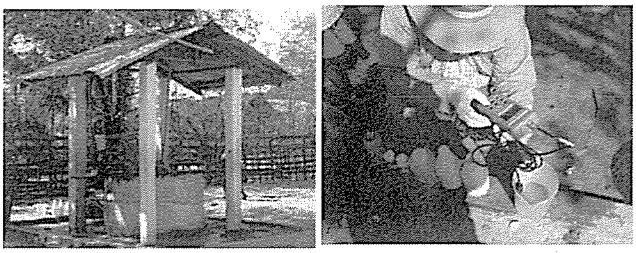
- နမူနာကောက်ယူထားသောနေရာ(၂)နေရာလုံးမှလေထုသန့်စင်မှုရှိပါသည်

➢ **ဆူညံသံ**

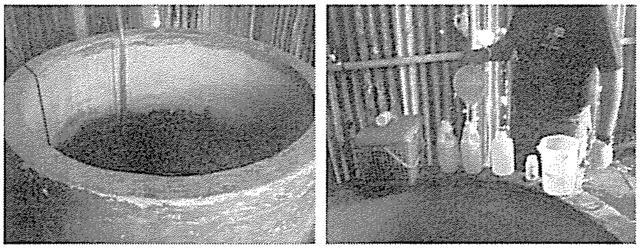
- တစ်နာရီအတွင်းတိုင်းထွာသောဆူညံသံအဆင့် (LAeq-1 hr) သည်IFC ၏စံနှုန်းသတ်မှတ်ချက်ထက်ကျော်လွန်ပါသည်
- ပျမ်းမျှတိုင်းထွာသောဆူညံသံအဆင့် (Leq 24 hr) သည် အမေရိကန်EPA ၏စံနှုန်းသတ်မှတ်ချက်အောက်တွင်ရှိပါသည်။

ရုပ်ပိုင်းဆိုင်ရာသွင်ပြင်လက္ခဏာ

❖ မြေအောက်ရေအရည်အသွေး



GW1 : ဝပိတက်ရွာမူလတန်းကျောင်း



GW2 : မူဒူးရွာမူလတန်းကျောင်း

နစ်တွင်းလုံးမှနမူနာရေသည် အနည်နှင့်ဆားဓါတ်ပါဝင်မှုနည်းပါသည် ။
သောက်သုံးဖို့အတွက်စံသတ်မှတ်ချက်အောက်တွင်ရှိပါသည်။

ရုပ်ပိုင်းဆိုင်ရာသွင်ပြင်လက္ခဏာ

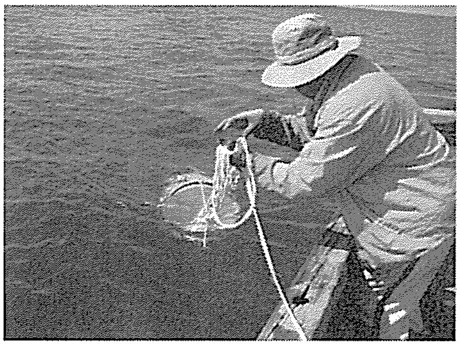
❖ ရေမျက်နှာပြင်အရည်အသွေး

အန်ဒမန်ပင်လယ်ပြင်အတွင်း
နမူနာ (၄)နေရာ

ပင်လယ်ရေနမူနာ(၄)နေရာမှစမ်းသပ်ချက်အရ
ရေသည်အောက်စီဂျင်ပါဝင်မှုမြင့်မားပြီးအော်ဂဲနစ်အနယ်နှင့်သတ္တုအနယ်ထိုင်မှု
အလွန်နည်းပါးသောကြောင့်ရေအရည်အသွေးကောင်းသည်။
အဏ္ဏဝါဂေဟစံနစ်အတွက်သင့်တော်သောရေအမျိုးအစားဖြစ်ပါသည်။

ဇီဝဆိုင်ရာလက္ခဏာ

❖ ရေနေဂေဟနှင့်ငါးလုပ်ငန်း



အန်ဒမန်ပင်လယ်ပြင်အတွင်း
နမူနာ(၄)နေရာ

လူမှု-စီးပွားလက္ခဏာ

❖ စီမံကိန်းအနီးယာဉ်သွားလာမှုရေတွက်မှု (၂)နေရာ

ငပိတက်ကျေးရွာလမ်းဆုံ

ITD ကမ်းခြေလမ်း

လူမှု-စီးပွားလက္ခဏာ

❖ လူမှု-စီးပွား စစ်တမ်း

ကျေးရွာ	မြို့နယ်	နမူနာ*
မူဒူး	ရေဖြူ	85
ညောင်ပင်ဆိပ်	လောင်းလုံး	20
ငပိတက်	လောင်းလုံး	40
ကျေးရွာ(၃)ရွာ	(၂)မြို့နယ်	145

Reference: Israel, Glenn D. 1992.

Normann, D.W., F.D. Worman, J.D. Sietbert and E. Modiakgotla, 1995.

Shaner, W.W., P.F. Phillip, and W.R. Schmehl, 1982.

လူမှု-စီးပွားအခြေအနေ

- **မူဒူး နှင့်အနီးရှိလူနေရပ်ကွက်**
- - ခြံလုပ်ငန်းနှင့်ကျပန်းလုပ်ငန်းဖြင့်အသက်မွေးသူအများစုဖြစ်သည်
- **ညောင်ပင်ဆိပ်နှင့်ငပိတက်**

  - ရေလုပ်ငန်းနှင့်ဒီရေတောကိုမှီခိုပြီးအသက်မွေးသူအများစုဖြစ်သည်
- **လူမျိုးနှင့်ဘာသာ**

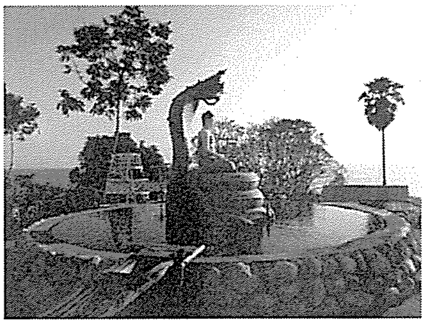
  - အားလုံးနီးပါးထားဝယ်စကားပြောသော၊ထားဝယ်-မြန်မာဖြစ်ပြီးထေရဝါဒဗုဒ္ဓဘာသာ ကိုးကွယ်ကြသည်
- **စီးပွားရေးအခြေအနေ**

  - တစ်နှစ်လျှင်အိမ်ထောင်စုတစ်စု၏ပျမ်းမျှဝင်ငွေနှင့်ထွက်ငွေမှာ အမေရိကန်ဒေါ်လာ အားဖြင့်(၁၄၅၀-၆၀၀၀)အကြားဖြစ်သည်
  - အားလုံးနီးပါးငွေမစုဆောင်းနိုင်ကြပါ

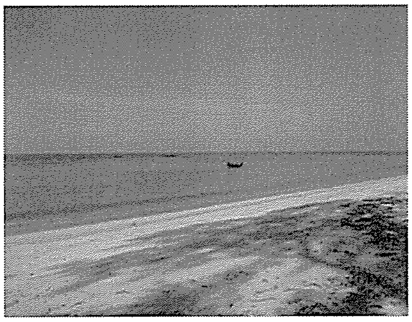
ယဉ်ကျေးမှုနှင့်မျက်မြင်နိုင်သောသွင်ပြင်လက္ခဏာ

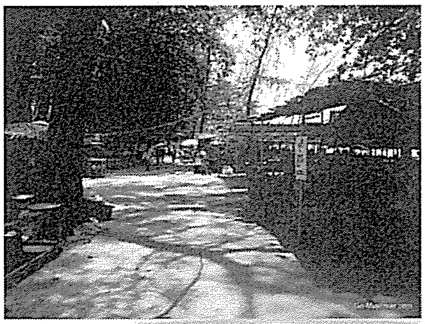
❖ စီမံကိန်းဧရိယာအတွင်းယဉ်ကျေးမှုအမွေအနှစ်နှင့်ခရီးသွားလုပ်ငန်းအခြေအနေလေ့လာဆန်းစစ်ခြင်း

နဘုလယ်ကမ်းခြေ



မောင်းမကန်ကမ်းခြေ





အကြိုတည်ဆောက်ဆဲကာလတွင်ဖြစ်နိုင်ခြေရှိသောအဓိကထိခိုက်မှုများ

➢ **ဖြစ်နိုင်ခြေရှိသောထိခိုက်မှုများ**

1) ပစ္စည်းကိရိယာများသယ်ဆောင်ခြင်း၊မြေပြင်ရှင်းလင်းခြင်း၊မြေဖို့ခြင်းနှင့် မြေညှိခြင်းကြောင့်အခိုက်အတန့်ဖုံမှုန့်ထခြင်း
2) ယာဉ်ယန္တရားများ၏အိပ်ဇောပိုက်မှအခိုးအငွေ့ထွက်ခြင်း
3) ယာဉ်ယန္တရားများသွားလာခြင်း၊ပစ္စည်းကိရိယာများသယ်ယူပို့ဆောင်ခြင်းကြောင့် ဆူညံသံနှင့်တုန်ခါမှုများဖြစ်ပေါ်ခြင်း
4) ယာဉ်ယန္တရားများသွားလာခြင်းကြောင့်အများပြည်သူအသုံးပြုသည့်လမ်းမပေါ်ယာဉ်ကြောပြဿနာနှင့်လမ်းအသုံးပြုသူဒေသခံများအတွက်ယာဉ်အန္တရာယ်ဖြစ်ပေါ်နိုင်ခြင်း

အကြိုတည်ဆောက်ဆဲကာလတွင်ဖြစ်နိုင်ခြေရှိသောအဓိကထိခိုက်မှုများ

➢ **လျော့ကျစေသည့်နည်းလမ်းများ**

- ဆောက်လုပ်ရေးလုပ်ငန်းခွင်နေရာနှင့်သွားရာလမ်းကြောင်းတွင်ရေဖျန်းခြင်း
- ဆောက်လုပ်ရေးဆိုဒ်သို့ ပစ္စည်းများသယ်ယူပို့ဆောင်သည့်အခါ ကင်းဗတ်စ (သို့)အခြားသင့်တော်သောအဖုံးအကာဖြင့်ဖုံးအုပ်ပြီးမှသယ်ဆောင်ခြင်း
- လမ်းမပေါ်မြေကြီးစသည်တို့ကျကျန်ခဲ့မှုလျော့နည်းစေရန်ယာဉ်ဆေးကြောသန့်စင်သည့်နေရာပြုလုပ်ပေးခြင်း
- တစ်နာရီလျင် ကီလိုမီတာ(၄၀)ထက်မပိုသောနှုန်းဖြင့်ယာဉ်များ၏အရှိန်ကိုကန့်သတ်ခြင်း
- ယာဉ်ယန္တယားများကိုပုံမှန်စစ်ဆေးပြုပြင်ထိန်းသိမ်းခြင်း
- ဆောက်လုပ်ရေးပစ္စည်းများကိုလူအသွားအလာများသောနံနက်ခင်းနှင့်ညနေခင်းတွင်သယ်ဆောင်ခြင်းမှရှောင်ကြဉ်ခြင်း
- ယာဉ်သွားလာမှုများပြားလာမည်၊ အချိန်ကာလမည်မျှကြာမြင့်မည်ကိုဒေသခံများအားကြိုတင်အသိပေးတိုင်ပင်ခြင်း

တည်ဆောက်ဆဲကာလတွင်ဖြစ်နိုင်ခြေရှိသောအဓိကထိခိုက်မှုများ

➢ **ဖြစ်နိုင်ခြေရှိသောထိခိုက်မှုများ**

1) ပစ္စည်းကိရိယာများသယ်ဆောင်ခြင်း၊မြေပြင်ရှင်းလင်းခြင်း၊ဖြေဖို့ခြင်းနှင့် မြေညှိခြင်းကြောင့်အခိုက်အတန့်ဖုံမှုန့်ထခြင်း
2) ယာဉ်ယန္တယားများ၏အိပ်ဇောပိုက်မှအခိုးအငွေ့ထွက်ခြင်း
3) ယာဉ်ယန္တယားများသွားလာခြင်း၊ပစ္စည်းကိရိယာများသယ်ယူပို့ဆောင်ခြင်းကြောင့် ဆူညံသံနှင့်တုန်ခါမှုများဖြစ်ပေါ်ခြင်း
4) ကမ်းလွန်တွင်ပိုက်လိုင်းများနေရာချခြင်းကြောင့်ရေနောက်ကျိခြင်း၊ ရေနေသတ္တဝါများထိခိုက်မိခြင်း၊ငါးဖမ်းလှေများသွားလာမှုအတွက်အဟန့်အတားဖြစ်ခြင်းနှင့်ငါးဖမ်းလုပ်ငန်းအဆင်မပြေမှုဖြစ်ခြင်း

တည်ဆောက်ဆဲကာလတွင်ဖြစ်နိုင်ခြေရှိသောအဓိကထိခိုက်မှုများ

➢ **လျော့ကျစေသည့်နည်းလမ်းများ**

- ဆောက်လုပ်ရေးလုပ်ငန်းခွင်နေရာနှင့်သွားရာလမ်းကြောင်းတွင်ရေဖျန်းခြင်း
- ဆောက်လုပ်ရေးဆိုဒ်သို့ ပစ္စည်းများသယ်ယူပို့ဆောင်သည့်အခါ ကင်းဗတ်စ (သို့)အခြားသင့်တော်သောအဖုံးအကာဖြင့်ဖုံးအုပ်ပြီးမှသယ်ဆောင်ခြင်း
- လမ်းမပေါ်မြေကြီးစသည်တို့ကျကျန်ခဲ့မှုလျော့နည်းစေရန်ယာဉ်ဆေးကြောသန့်စင်သည့်နေရာပြုလုပ်ပေးခြင်း
- တစ်နာရီလျှင် ကီလိုမီတာ(၄၀)ထက်မပိုသောနှုန်းဖြင့်ယာဉ်များ၏အရှိန်ကိုကန့်သတ်ခြင်း
- ဆူညံမှုကိုလျော့ကျစေရန်ယာယီသံပြားခြံစည်းရိုးကာရံခြင်း
- ယာဉ်ယန္တယားများကိုပုံမှန်စစ်ဆေးပြုပြင်ထိန်းသိမ်းခြင်း
- ကမ်းလွန်ပိုက်လိုင်းနေရာချခြင်းသည်နေရာအနံ့ငယ်သာယူပြီးအချိန်ကာလတိုအတွင်းဆောင်ရွက်ပြီးစီးမည်
- ပိုက်ချသည့်နေရာတပိုက်သတိပေးဆိုင်းဘုတ်နှင့်နယ်မြေသတ်မှတ်မှုပြုလုပ်ထားခြင်း
- ဆူညံသံဖြစ်ပေါ်စေသော တူးဖော်မှုစသည့်လုပ်ငန်းများတွင်ပုံမှန်အသံကျယ်လောင်မှုစစ်ဆေးခြင်း

တည်ဆောက်ဆဲကာလတွင်ဖြစ်နိုင်ခြေရှိသောအဓိကထိခိုက်မှုများ

➢ **ဖြစ်နိုင်ခြေရှိသောထိခိုက်မှုများ**

5) အဓိကလမ်းမပေါ်တွင်ပစ္စည်းကိရိယာများသယ်ဆောင်ခြင်းကြောင့် ယာဉ်သွားလာမှုပိုမိုများပြားလာခြင်း
6) လမ်းပေါ်တွင်ယာဉ်သွားလာမှု၊ပစ္စည်းသယ်ယူမှုများကြောင့် အများပြည်သူတို့အတွက်လုံခြုံဘေးကင်းမှုထိခိုက်နိုင်ခြင်း
7) ပြင်ပအလုပ်သမားများနှင့် ဒေသခံများအကြားခိုက်ရန်ဖြစ်ပွားမှု ဖြစ်ပေါ်နိုင်ခြင်း

တည်ဆောက်ဆဲကာလတွင်ဖြစ်နိုင်ခြေရှိသောအဓိကထိခိုက်မှုများ

➢ **လျော့ကျစေသည့်နည်းလမ်းများ**

- ယာဉ်များ၏အရှိန်နှုန်းကိုတစ်နာရီလျှင် ကီလိုမီတာ(၄၀)နှုန်းဖြင့်မပိုစေရန်ကန့်သတ်ခြင်း
- အများပြည်သူသွားလာမှုများသောနံနက်နှင့်ညနေအချိန်တွင် ပစ္စည်းသယ်ယူပို့ဆောင်ခြင်းမှ ရှောင်ကြဉ်ခြင်း
- ယာဉ်သွားလာမှုပိုများလာမည်၊ အချိန်ကာလမည်မျှအထိကြာမြင့်မည်ကို ဒေသခံပြည်သူတို့အားကြိုတင် အသိပေးတိုင်ပင်ခြင်း
- တည်ဆောက်နေသည့်ကာလအတွင်းတည်ဆောက်မည့်အစိတ်အပိုင်းများအားအများပြည်သူတို့အား အသိပေးခြင်း
- ဆောက်လုပ်ရေးလုပ်ငန်းခွင်ရှိလုပ်သားများအတွက် ရေ၊အမှိုက်စွန့်စံနစ်၊ရေစီးရေလာစံနစ်နှင့် ရှေးဦးသူနာပြုကိရိယာများကိုပံ့ပိုးပေးထားခြင်း
- ကျန်းမာရေးနှင့်ဘေးအန္တရာယ်ထိခိုက်မှုရှိနိုင်သောနေရာများတွင်သတိပေးဆိုင်းဘုတ်နှင့်တားမြစ်ချက်များ စိုက်ထူထားခြင်း
- ဒေသခံများ၏ဓလေ့ထုံးတမ်းစဉ်လာအကြောင်းကို ပြင်ပမှရောက်ရှိလာသူများအား ကြိုတင်အသိပေး ထားခြင်း
- တိုင်တန်းမှုများကို လက်ခံကြည့်ရှုပေးသည့်စံနစ်တည်ထောင်ခြင်း

တည်ဆောက်ဆဲကာလတွင်ဖြစ်နိုင်ခြေရှိသောအဓိကထိခိုက်မှုများ

➢ **ဖြစ်နိုင်ခြေရှိသောထိခိုက်မှု**

8) အလုပ်သားပေါင်း(၆၀၀)မှ နေ့စဉ်စွန့်ပစ်ရေ (၄၂)ကုဗမီတာခန့်ရှိမည်

9) လုပ်သားပေါင်း (၆၀၀)မှ နေ့စဉ် စွန့်ပစ်ပစ္စည်း (၄၈၀)ကီလိုဂရမ်ခန့်ရှိမည်

➢ **လျော့ကျစေသောနည်းလမ်းများ**

- ယာယီရေစွန့်ထုတ်မြောင်းနှင့်အနယ်ထိုင်ကန်များကို ဆောက်လုပ်ရေးလုပ်ငန်းခွင်ထဲတွင်တည်ဆောက်ပေးထားခြင်း
- အာဏာပိုင်မှခွင့်ပြုထားသော အမှိုက်စွန့်ပစ်သည့်ကန်ထရိုက်တာဖြင့် အမှိုက်များစံနစ်တကျစွန့်စေခြင်း
- Establish temporary fence surrounded in order to limit the distribution of sediment washed from construction area

တည်ဆောက်ဆဲကာလတွင်ဖြစ်နိုင်ခြေရှိသောအဓိကထိခိုက်မှုများ

➢ **ဖြစ်နိုင်ခြေရှိသောသက်ရောက်မှုများ**

10) ဒေသစီးပွားရေး

- ဒေသခံများအတွက်တိုက်ရိုက်(သို့)သွယ်ဝိုက်သောနည်းဖြင့် ဝင်ငွေတိုးလာခြင်း
- အလုပ်အကိုင်အခွင့်အလမ်းရှိလာခြင်း
- အစားအစာ၊သယ်ယူပို့ဆောင်ရေးနှင့်တည်းခိုစရာ စသည်များအတွက် ဒေသခံများထံသို့ဝင်ငွေစီးဝင်လာခြင်း

➢ **လျော့ကျစေသည့်နည်းလမ်းများ**

- ဒေသခံများအထူးသဖြင့် ငပိတက်ကျေးရွာရှိလူများအား စီမံကိန်းတည်ဆောက်သည့်ကာလတွင်အလုပ်အကိုင်ဦးစားပေးခန့်အပ်ရန်
- အရည်အချင်းအလိုက်အလုပ်အကိုခန့်အပ်ရာတွင်မျှတသောလုပ်အားခပေးရန်လိုပြီး အလုပ်ခန့်သည့်လုပ်ငန်းစဉ်တွင်လည်း ပွင့်လင်းမြင်သာမှုနှင့်အတူမျှတမှုရှိရမည်

တည်ဆောက်ဆဲကာလတွင်ဖြစ်နိုင်ခြေရှိသောအဓိကထိခိုက်မှုများ

➢ **အဓိကအချက်များ**

1) သဘာဝဓါတ်ငွေ့သုံးလျှပ်စစ်ဓါတ်အားပေးစက်ရုံသည်ကျောက်မီးသွေးသုံးလျှပ်စစ်ဓါတ်အားပေးစက်ရုံထက်သန့်ရှင်းပြီးရိုးရှင်းသည့်စံနစ်ဖြင့်လည်ပတ်ခြင်း

2) ပတ်ဝန်းကျင်အတွက်သင့်တော်သောစီမံကိန်းအဖြစ်အောက်ပါအတိုင်းဆောင်ရွက်မည်

- ပိုက်လိုင်းမှသဘာဝဓါတ်ငွေ့ဖြည့်တင်းပေးမည်
- ဓါတ်ငွေ့သိုလှောင်ကန်မထားရှိပါ
- ဓါတ်ငွေ့တာဘိုင်အတွက်သာထုတ်လုပ်ထားသည့်အတွက်ဒီဇယ်ဆီအသုံးပြုလည်ပတ်လို့မရပါ
- နိုင်ထရိုဂျင်အောက်ဆိုဒ်Nox ဓါတ်ငွေ့အနည်းငယ်ထွက်စေသည့်စက်ကိုသာသုံးမည်
- ပင်လယ်ရေအသုံးပြုသောအအေးခံစံနစ်အသုံးပြုမည်

လုပ်ငန်းလည်ပတ်သည့်ကာလတွင်ဖြစ်နိုင်ခြေရှိသောအဓိကထိခိုက်မှုများ

➢ **ဖြစ်နိုင်ခြေရှိသော ထိခိုက်မှုများ**

1) စက်ရုံမီးခိုးခေါင်းတိုင်မှဓါတ်ငွေ့လောင်ကျွမ်းပြီးသောမီးခိုးထုတ်လွှတ်မည်ဖြစ်ပြီး အဓိကဓါတ်ငွေ့မှာ နိုက်ထရိုဂျင်အောက်ဆိုဒ် (Nox)ဖြစ်မည်

➢ **လျော့ကျစေသောနည်းလမ်းများ**

- နိုက်ထရိုဂျင်ဒိုင်အောက်ဆိုဒ် NOx နှင့် O_2 ဓါတ်ငွေ့များထုတ်လွှတ်နှုန်းနှင့်အပူချိန်ကိုစဉ်ဆက်မပြတ်စောင့်ကြည့်တိုင်းတာသည့်စံနစ်တပ်ဆင်ခြင်း
- ဂက်စ် တာဘိုင် အတွက် NOx အနည်းငယ်သာထုတ်လွှတ်စေသည့်စက်ကိရိယာ တပ်ဆင်ခြင်း
- ဂက်စ် တာဘိုင်အား ပုံမှန်စစ်ဆေးထိန်းသိမ်းမှုပြုခြင်း

လုပ်ငန်းလည်ပတ်သည့်ကာလတွင်ဖြစ်နိုင်ခြေရှိသောအဓိကထိခိုက်မှုများ

➢ **ဖြစ်နိုင်ခြေထိခိုက်မှုများ**

2) ဓါတ်အားပေးစက်ရုံဝင်းအပြင်ဘက်အထိ စက်ရုံ၏တာဘိုင်လည်ပတ်သံနှင့် အအေးခံစနစ်အတွက်ပင်လယ်ရေစုတ်တင်သည့်ဆူညံသံလွှင့်ပျံလာနိုင်ခြင်း

➢ **လျော့ကျစေသည့်နည်းလမ်းများ**

- လုပ်ငန်းခွင်ဝင်ရောက်သည့်ဝန်ထမ်းများအားလုံးအတွက် အထူးနားကြပ်ကိရိယာ တပ်ဆင်ရန်ပေးအပ်ထားခြင်း
- ဆူညံသံအား အထူးစောင့်ကြည့်တိုင်းတာသည့်ကိရိယာတပ်ဆင်ပြီး သတ်မှတ်ချက်ထက်ပိုမိုဆူညံပါက သင့်တော်သောနည်းလမ်းများဖြင့်လျော့ချဆောင်ရွက်စေခြင်း
- စီမံကိန်းနယ်နိမိတ်တွင်နစ်ရှည်ပင်များဝန်းရံစိုက်ပျိုးထားခြင်း
- စက်ပစ္စည်းကိရိယာအစိတ်အပိုင်းအားလုံးသည် အသံဆူညံမှုသတ်မှတ်စံချိန်စံညွှန်းအတိုင်း တပ်ဆင်မည်ဖြစ်ခြင်း

လုပ်ငန်းလည်ပတ်သည့်ကာလတွင်ဖြစ်နိုင်ခြေရှိသောအဓိကထိခိုက်မှုများ

- **ဖြစ်နိုင်ခြေရှိသောထိခိုက်မှုများ**

  3) စက်ရုံမှစွန့်ထုတ်ရေ တစ်နေ့လျှင် (၂၀၀၀)ကုဗမီတာ ပင်လယ်ထဲသို့စွန့်ခြင်း

  4) အအေးခံစံနစ်အတွက်ပင်လယ်ရေကိုတစ်နေ့လျှင်ကုဗမီတာ (၆၇၉၀၀၀)ခန့် စုတ်ယူသည့်အခါ ပင်လယ်သတ္တဝါများ၏အစားအစာဖြစ်သောရေမှော်၊ ပင်လယ်ငါးတို့အား စုတ်ယူမိနိုင်ခြင်း

  5) စွန့်ထုတ်ရေအပူချိန်ကြောင့် ကမ်းခြေပင်လယ်ရေအပူချိန်ကူးစက်နိုင်ခြင်း

- **လျော့ကျစေသည့်နည်းလမ်းများ**

• စက်ရုံနှင့်အခြားဌာနမှထွက်ရှိလာသည့်ရေကိုပြန်လည်သန့်စင်ပြုပြင်ပြီးအရည်အသွေး စစ်ဆေးမှုပြုလုပ်ခြင်း

• ပြန်လည်သန့်စင်ပြုပြင်သည့်ရေအား လက်ခံလှောင်ကန်တွင်သိုလှောင်ထားပြီး အတတ်နိုင်ဆုံးပြန်လည်အသုံးပြုခြင်း

• ရေစုပ်တင်သည့်အဝင်လမ်းကြောင်းတွင် ရေစစ် ဇကာတပ်ဆင်ခြင်း

• မူလဒီဇိုင်းဆွဲထားသည့်အတိုင်း စွန့်ထုတ်မည့်ရေအပူချိန်ကိုသတ်မှတ်စံချိန် နှင့် ကိုက်ညီမှုရှိမရှိထိန်းချုပ်မှုပြုပြီးမှသာစွန့်ထုတ်စေခြင်း

• ရေစွန့်ထုတ်သည့်နေရာတွင်ရေအပူချိန်အားပုံမှန်စောင့်ကြည့်နေခြင်း

လုပ်ငန်းလည်ပတ်သည့်ကာလတွင်ဖြစ်နိုင်ခြေရှိသောအဓိကထိခိုက်မှုများ

- **ဖြစ်နိုင်ခြေရှိသောအကျိုးသက်ရောက်မှု**

  6) ဒေသစီးပွားရေးနှင့်အသက်မွေးဝမ်းကျောင်းမှုပုံစံ

  - ဒေသခံများထံသို့စက်ရုံလုပ်သားများထံမှ သွယ်ဝိုက်သောနည်း (သို့)တိုက်ရိုက် ဝင်ငွေစီးဝင်လာခြင်း
  - အစားအစာ၊ နေထိုင်စရာ၊သယ်ယူပို့ဆောင်မှု စသည်တို့အသုံးပြုရန်အတွက် ဒေသခံများထံသို့ ငွေစီးဝင်လာခြင်း

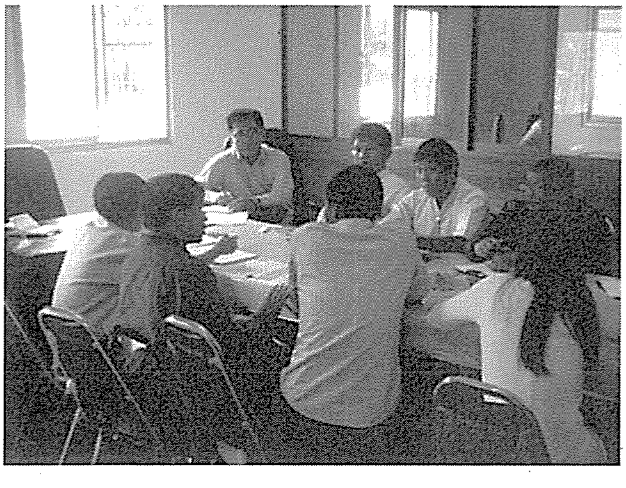
- **လျော့ကျစေသည့်နည်းလမ်း**

• ဒေသခံနှင့်ဒေသအာဏာပိုင်တို့နှင့်နီးကပ်စွာအလုပ်လုပ်ကိုင်မည့် လူမှုအကျိုးပြုစီမံကိန်းများ(CSR) Programs ထူထောင်ပေးခြင်း

အများပြည်သူနှင့်တွေ့ဆုံတိုင်ပင်ခြင်း

- ❑ ဝန်ကြီးဌာန
- ❑ အစိုးရဌာနဆိုင်ရာအရာရှိများနှင့်ဒေသအာဏာပိုင်များ
- ❑ စက်ရုံအနီးရှိကျေးရွာဦးဆောင်သူ၊ကျေးရွာသူ/သားများ
  - မူဒူး
  - ညောင်ပင်ဆိပ်
  - ငပိတက်

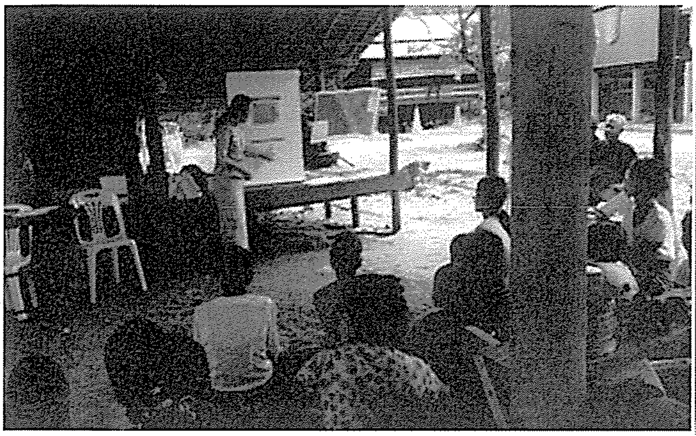
ပထမအကြိမ်အများပြည်သူနှင့်တွေ့ဆုံတိုင်ပင်ခြင်း



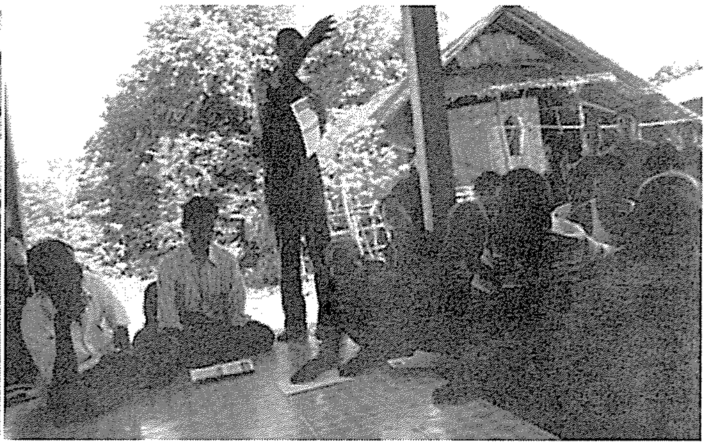
SWB of DSEZ
ဆွေးနွေးတိုင်ပင်ခြင်း

မူဒူးရွာနှင့်အနီးရှိပြည်သူနှင့်တွေ့
ဆုံတိုင်ပင်ခြင်း

ပထမအကြိမ်အများပြည်သူနှင့်တွေ့ဆုံတိုင်ပင်ခြင်း



ကျောင်းပင်ဆိပ်ရွာသူ/သားများနှင့် တွေ့ဆုံတိုင်ပင်ခြင်း



ငပိတက်ရွာသူ/သားများနှင့်တွေ့ ဆုံတိုင်ပင်ခြင်း

ပထမအကြိမ်အများပြည်သူနှင့်တွေ့ဆုံတိုင်ပင်ခြင်းအကျဉ်း

အစိုးရဌာနဆိုင်ရာများ

- လူအများ၏မတူညီသောအမြင်များအပေါ် ပူပန်ခြင်း
- ကျေးရွာအဆင့်အစည်းဝေးများပြုလုပ်သည့်အခါတရားဝင်ခွင့်ပြုချက် ဖြင့်လုပ်ရန်
- ပြည်သူများမေးလာသည့်မေးခွန်းအားလုံးကို ဖြေကြားပေးရန်
- ဒီရေတောအား ကာကွယ်ပေးမည့်နည်းလမ်းအပေါ်စိုးရိမ်မှုရှိပြီး စီမံကိန်းမှ ထိုတောအားဖျက်ဆီးမှုမပြုရန်

ပထမအကြိမ်အများပြည်သူနှင့်တွေ့ဆုံတိုင်ပင်ခြင်း

ကျေးရွာသားများ၏သဘောထားမှတ်ချက်

- စက်ရုံမှထွက်လာမည့်မီးခိုးကြောင့်ကျေးရွာအတွင်းနေထိုင်လို့မရမှာကိုစိုးရိမ်ခြင်း
- မီးခိုးငွေ့ထုတ်လွှတ်မှုကြောင့်ထိခိုက်လာခြင်းနှင့်ထိုမီးခိုးအားထိရောက်စွာစောင့်ကြည့်ထိန်းချုပ်မှုမရှိနိုင်မှာကိုစိုးရိမ်ပူပန်ခြင်း
- စီမံကိန်းကြောင့်အသက်မွေးဝမ်းကြောင်းအထူးသဖြင့်ဒီရေတောအပေါ်ထိခိုက်လာမှာကိုစိုးရိမ်ခြင်း
- ကျေးရွာများအားစီမံကိန်းမှလျှပ်စစ်မီးဖြန့်ဝေပေးရန်အလိုရှိခြင်း
- ကျေးရွာအတွင်းလမ်းများအားပြုပြင်ပေးစေလိုခြင်း

ဆက်သွယ်ရန်

1. Mr. Thunya Siltorn, Chief Operation Officer
   Italian-Thai Power Company Limited
   2034/161 Italthai Tower, 43rd Floor, New Petchaburi Road,
   Bangkapi, Huaykwang, Bangkok 10310
2. Ms. Siriluck Soontornruengyot, AVP-Environment
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3. Mr. Plian Maneeya, Project Manager
   TEAM Consulting Engineering and Management Co, Ltd.
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   and
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APPENDIX 9E

NAME LIST OF PARTICIPANTS WHO ATTENDED THE THIRD CONSULTATION MEETING

အစည်းအဝေးတက်ရောက်သူစာရင်းချုပ်

Summary of Attendant

March 29 , 2018;

စဉ် No.	အစည်းအဝေးတက်ရောက်သူ Attendants	ဦးရေ Number	မှတ်ချက် Remark
1	အစိုးရအဖွဲ့ Government / မီဒီယာများ Local Media	26	
2	ဒေသခံများ Villagers	76	
3	NGO	-	

Government Sector / Local Media

အစိုးရကဏ္ဍ/ဒေသခံမီဒီယာ

တတိယအကြိမ်လူထုတွေ့ဆုံပွဲအခမ်းအနားသို့ တက်ရောက်သူစာရင်း

နေ့စွဲ- ၂၀၁၈ခုနှစ် မတ်လ ၂၉ရက် (မနက်ပိုင်း)

နေရာ - ထားဝယ်အထူးစီးပွားရေးဇုန် ITD ရုံးခန်းမ

No. စဉ်	Name အမည်	Age အသက်	Agency/Organization အဖွဲ့အစည်း	Function in the Agency/ Organization ရာထူး	Contact Phone Number ဖုန်း	Signature လက်မှတ်
၁	ဦး ရဲဝင်း	၃၃		[illegible]	09 [illegible]	[signature]
၂	စော [illegible]	၆၉	KNU	[illegible]	097 [illegible]	[signature]
၃	[illegible]	၄၁	[illegible]	[illegible] (၆၁-၃၇)	09.254700755	[signature]
၄	ဒေါ်[illegible]	၄၃	[illegible]		09.260465514	[signature]

Government Sector / Local Media

အစိုးရကဏ္ဍ/ဒေသခံမီဒီယာ

တတိယအကြိမ်လူထုတွေ့ဆုံပွဲအခမ်းအနားသို့ တက်ရောက်သူစာရင်း

နေ့စွဲ- ၂၀၁၈ခုနှစ် မတ်လ ၂၉ရက် (မနက်ပိုင်း)

နေရာ - ထားဝယ်အထူးစီးပွားရေးဇုန် ITD ခန်းမ

No. စဉ်	Name အမည်	Age အသက်	Agency/Organization အဖွဲ့အစည်း	Function in the Agency/ Organization ရာထူး	Contact Phone Number ဖုန်း	Signature လက်မှတ်
1	[illegible]	၄၆		[illegible]	09250466474	[signature]
2	[illegible]	၄၀		[illegible]	0925046673[illegible]	[signature]
3	[illegible]	[illegible]	[illegible]	[illegible]	09/400-409921	[signature]
4	[illegible]	[illegible]	[illegible]	[illegible]	09.422208702	[signature]
5	[illegible]	[illegible]	[illegible]	[illegible]	0925075[illegible]	[signature]
6	[illegible]	[illegible]	[illegible]	[illegible]	09254694952	[signature]
7	[illegible]	[illegible]	〃	〃	09422190544	[signature]
8	[illegible]	[illegible]	〃	[illegible]	0942209281	[signature]
9	[illegible]	[illegible]	〃	[illegible]	09-4[illegible]03024	[signature]
10	[illegible]	[illegible]	[illegible]	[illegible]	09450[illegible]	[signature]
11	[illegible]	40.	ECD.	AD	09-428123849[illegible]	[signature]

Government Sector / Local Media

အစိုးရကဏ္ဍ/ဒေသခံမီဒီယာ

တတိယအကြိမ်လူထုတွေ့ဆုံပွဲအခမ်းအနားသို့ တက်ရောက်သူစာရင်း

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နေရာ - ထားဝယ်အထူးစီးပွားရေးဇုန် ITD ခန်းမ

No. စဉ်	Name အမည်	Age အသက်	Agency/Organization အဖွဲ့အစည်း	Function in the Agency/ Organization ရာထူး	Contact Phone Number ဖုန်း	Signature လက်မှတ်
၁	ဦးစောအောင်သိမ်း	၂၈	ECD	[illegible]	09-459736585	
၂	ဦးရဲမင်းကျော်	၃၃	[illegible]	[illegible]	09-259035202	
၃	ဦးခိုင်ဇော်	၃၅	ECD	[illegible]	09-444032390	
၄	ဦးဖိုးကျော်	၄၃		အုပ်ချုပ်ရေးမှူး	09-788730698	
၅	ဦးညီညီ	၅၃		။	09 776333858	
၆	ဦး [illegible]	၆၀	စီးပွား/ကုန်သွယ်	[illegible]	095011945	
၇	ဦး [illegible]	၅၅	[illegible]	[illegible]	09-26777342[illegible]	
၈	ဦး [illegible]	၃၉	[illegible]		09, 250334263	
၉	[illegible]		[illegible]		0978817[illegible]4860	
၁၀	ဦး [illegible]		[illegible]		09 4599[illegible]	
၁၁	ဦး [illegible]	၃၂	ဆရာ		09444965967	

Local Community

ဒေသခံများ

တတိယအကြိမ်လူထုတွေ့ဆုံပွဲအစမ်းအနားသို့ တက်ရောက်သူစာရင်း

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နေရာ - ထားဝယ်အထူးစီးပွားရေးဇုန် ITD ခန်းမ

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၁၂	ဦး[illegible]	၅၄	[illegible]	[illegible]	[signature]
၁၃	ဦး[illegible]	၅၁	[illegible]	[illegible]	[signature]
၁၄	ဦး[illegible]	၆၄	[illegible]	[illegible]	[signature]
၁၅	ဦး[illegible]	၃၈	[illegible]	[illegible]	[signature]
၁၆	ဦး[illegible]	၆၀	[illegible]	[illegible]	[signature]
၁၇	ဦး[illegible]	၄၈	[illegible]	၀၉၄၄၇၇၅၈၄၀၄	[signature]
၁၈	ဦး[illegible]	38	[illegible]	0945470036 8	[signature]
၁၉	ဦး[illegible]	56	[illegible]	—	[signature]
၂၀	ဦး[illegible]	43	[illegible]	0977406112	[signature]
၂၁	ဦး[illegible]	35	[illegible]	09793466802	[signature]
၂၂	ဦး[illegible]	45	[illegible]	09786611424	[signature]

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Local Community

ဒေသခံများ

တတိယအကြိမ်လူထုတွေ့ဆုံပွဲအခမ်းအနားသို့ တက်ရောက်သူစာရင်း

နေ့စွဲ- ၂၀၁၈ခုနှစ် မတ်လ ၂၉ရက် (မနက်ပိုင်း)

နေရာ - ထားဝယ်အထူးစီးပွားရေးဇုန် ITD ခန်းမ

No. စဉ်	Name အမည်	Age အသက်	Address လိပ်စာ	Contact Phone Number ဖုန်း	Signature လက်မှတ်
၁	ဦး ဇော်သူထွန်း	၃၆	လဲခြော	0944449534399	
၂	ဦး ဆန်းဝင်း	၄၁	မြို့သစ်	09250948283	
၃	ဦး ဆန်းအောင်	၃၇	〃	—	
၄	ဦး ဝင်း ဦး	၅၁	ပေါ်တယ်	094222348599	
၅	ဦး မောင်နိုင်	၅၁	〃	09260164226	
၆	ဦး ခင်မြအောင်	၄၈	မြို့သစ်	0925088558	
၇	ဦး ကျော်မြင့်	၆၁	〃	09250771462	
၈	ဦး တင်ရွှေ	၃၈	ပေါ်တယ်	09780054361	
၉	ဦး ရွှေဦး	၃၅	〃	09253790676	
၁၀	ဦး စိုးလင်း	၅၀	ထိန်ကြီး	09786495031	
၁၁	ဦး အောင်နိုင်	၄၂	ကလေးကြီး	09260128141	

Local Community

ဒေသခံများ

တတိယအကြိမ်လူထုတွေ့ဆုံပွဲအခမ်းအနားသို့ တက်ရောက်သူစာရင်း

နေ့စွဲ- ၂၀၁၈ခုနှစ် မတ်လ ၂၉ရက် (မနက်ပိုင်း)

နေရာ - ထားဝယ်အထူးစီးပွားရေးဇုန် ITD ခန်းမ

No. စဉ်	Name အမည်	Age အသက်	Address လိပ်စာ	Contact Phone Number ဖုန်း	Signature လက်မှတ်
၂၃	ဦးစိုးမြင့်	49	ကျွန်းသာယာအင်း	09899731418	စိုးမြင့်
၂၄	ဦးကျော်မြင့်ဦး	45	ပုဂံကျွန်း	094225008871	
၂၅	ဦးကံဝင်း	63	မယင်းကြီး	09253884574	
၂၆	ဦးထွန်းအေးဦး	50	လဲချောင်	09 —	
၂၇	ဦးဦးကြည်	56	မကွေးဝ	09 —	
၂၈	ဦးကျော်ဝင်း	40	ပုဂံကျွန်း	09402448518	ဦးကျော်ဝင်း
၂၉	ဦးချိုဝင်း	30	မျက်စိ		ချိုဝင်း
၃၀	ဦးအေး	41	လဲချောင်	094218 71218	
၃၁	ဦးမြင့်	53	ကဝါ		
၃၂	ဦးဝေ့ခေါင်	37		09.444706922	
၃၃	ဦးကျော်မိုးခိုင်	40	ယာဉ်ဝင်သစ်	09[illegible]	

Local Community

ဒေသခံများ

တတိယအကြိမ်လူထုတွေ့ဆုံပွဲအခမ်းအနားသို့ တက်ရောက်သူစာရင်း

နေ့စွဲ- ၂၀၁၈ခုနှစ် မတ်လ ၂၉ရက် (မနက်ပိုင်း)

နေရာ - ထားဝယ်အထူးစီးပွားရေးဇုန် ITD ခန်းမ

No. စဉ်	Name အမည်	Age အသက်	Address လိပ်စာ	Contact Phone Number ဖုန်း	Signature လက်မှတ်
	ဦးကြည်ဘိုနိုင်	56	လဲချောင်	09-788717209	
	ဦးမိုးမြင့်	49	မူးဒွဲ	—	
	ဦးအောင်ရှူးညွှန့်	76	ငပိဒက်	—	
	ကိုညီညီ	23	ရွာတော်ပေါင်ဆိပ်	—	
	ဦးထွန်းဝင်း	49	မုဒေါ်ကြီး	09-260280663	
	ဦးအောင်သိန်း	63	ရလိုင်	09-788167105	
	ဦးစောအောင်	51	ထိုင်ကြီး	09-250771474	
	ဦးဝင်းရွှေ	41	"	09-480456737	
	ဦးမိုး	49	"	09-253811296	
	ကိုဖိုးညီညီမိုး	30	"	09-7738842088	
	ကိုဝေလွင်ထွန်းအောင်	30	"	09781484884	

Local Community

ဒေသခံများ

တတိယအကြိမ်လူထုတွေ့ဆုံပွဲအခမ်းအနားသို့ တက်ရောက်သူစာရင်း

နေ့စွဲ- ၂၀၁၈ခုနှစ် မတ်လ ၂၉ရက် (မနက်ပိုင်း)

နေရာ - ထားဝယ်အထူးစီးပွားရေးဇုန် ITD ခန်းမ

No. စဉ်	Name အမည်	Age အသက်	Address လိပ်စာ	Contact Phone Number ဖုန်း	Signature လက်မှတ်
	ဦးပေါ်သိုက်	61	ပကုဒ်တက်	09-250771624	ပေါ်သိန်း
	ကိုလှိုင်ဖြင့်	29	ပကုဒ်တက်	09-400012863	
	ကိုဇော်မင်းလတ်	36	〃	09-260191906	
	ဦးဖြေအေးမင်း	42	သာစည်ကျိုက်တောင်	09-422361006	
	ဦးတင်မောင်ရှိန်	59	〃	—	
	ကိုကျော်ဝင်း	32	ပကုဒ်တက်	—	ကျော်ဝင်း

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Local Community

ဒေသခံများ

တတိယအကြိမ်လူထုတွေ့ဆုံပွဲအခမ်းအနားသို့ တက်ရောက်သူစာရင်း

နေ့စွဲ- ၂၀၁၈ခုနှစ် မတ်လ ၂၉ရက် (မနက်ပိုင်း)

နေရာ - ထားဝယ်အထူးစီးပွားရေးဇုန် ITD ခန်းမ

No. စဉ်	Name အမည်	Age အသက်	Address လိပ်စာ	Contact Phone Number ဖုန်း	Signature လက်မှတ်
	ဦးဝေဇင်ပွင့်	၄၅	တဆိုးသာ		
	ဦးဇော်ညို	42	ကယုံးဗာ	09 250128141	

Local Community

ဒေသခံများ

တတိယအကြိမ်လူထုတွေ့ဆုံပွဲအခမ်းအနားသို့ တက်ရောက်သူစာရင်း

နေ့စွဲ- ၂၀၁၈ခုနှစ် မတ်လ ၂၉ရက် (မနက်ပိုင်း)

နေရာ - ထားဝယ်အထူးစီးပွားရေးဇုန် ITD ခန်းမ

No. စဉ်	Name အမည်	Age အသက်	Address လိပ်စာ	Contact Phone Number ဖုန်း	Signature လက်မှတ်
	ဦးသောင်းရွှေ	၆၀	ဝဲခေါင်ဂေါ်ချောင်း	09979910145	[signature]
	ဦးအောင်မြင့်	၄၅	"	094530032856	[signature]
	ဦးဇော်ဟိန်း	၃၈	"	09962664622	[signature]
	ဦးအုန်းသိန်း	၅၃	"	09251174286	[signature]
	ဦးဝင်းခိုင်	၅၀	ဘဝါ	0945925272	[signature]
	ဦးကျော်စိုး	၄၀	ပရဒ်ပ	0942600965	[signature]
	ဦးထင်ထွန်း	၄၂	~~ကျိုက်ရပ်ကွက်~~ ကျိုက်သာယာကွက်	09400601296	[signature]
	ဦးထွန်းခိုင်	၄၀	ပုဂါရွာ	09793323553	[signature]
	ဦးမျိုး	၄၆	သင်္ဘောကျင်းချောင်		[signature]

Local Community

ဒေသခံများ

တတိယအကြိမ်လူထုတွေ့ဆုံပွဲအခမ်းအနားသို့ တက်ရောက်သူစာရင်း

နေ့စွဲ- ၂၀၁၈ခုနှစ် မတ်လ ၂၉ရက် (မနက်ပိုင်း)

နေရာ - ထားဝယ်အထူးစီးပွားရေးဇုန် ITD ခန်းမ

No. စဉ်	Name အမည်	Age အသက်	Address လိပ်စာ	Contact Phone Number ဖုန်း	Signature လက်မှတ်
၁.	ဦးမြင့်ကြည်	၅၄	ဆဲဗျောင်	09-771127108	ဦးမြင့်ကြည်
၂.	ဦး ခင်းဖဲ	၃၇	ပေါ်တော်	092609204093	[illegible]
၃.	ဦးထွန်းဝင်း	၆၀	ဒိုးနွဲ		[illegible]
၄.	ဦးပုကြည်	၄၂	ပေါ်တော်	09251144627	ပုကြည်
၅.	ဦးစိုးလင်း	၅၄	ဧယောင်ပင်ဆိပ်		စိုးလင်း
၆	ဦးသိန်းလွင်	၄၄	"		သိန်းလွင်
၇.	ဦးခေါင်လွင်	၄၅	ကလိုင်းသာ	-	[illegible]
၈.	ဦးထွန်းလွင်	၅၂	မုဂေါ်ရွာ		ထွန်းလွင်
၉.	ဦး ကျော်အေး	၅၉	"		အေး
၁၀	ဦးမောင်ခြင်	၅၉	ကျုံလိုင်		[illegible]
	ဦးစိုး သိန်း		ထိန်ကြီး	09 49865533	[illegible]

APPENDIX 9F

MINUTE OF MEETING DURING THE THIRD PUBLIC CONSULTATION MEETING (BY PROJECT)

MINUTE OF MEETING
Project ESIA for Initial Phase Power Plant Project

Venue	Dawei Special Economic Zone, Auditorium Hall	**Date**	29th March, 2018
Subject	Public Consultation Meeting III	**Time**	10.30-12.00 hrs.

Participants:

1. Dr. Myint San — Vice Chairman-2 of DSEZ Committee
2. Environmental Conservation Department (Naypyitaw and Dawei)
3. Dawei Special Economic Zone Management Committees
4. Dawei Power Company Limited (DPC)
5. Myandawei Industrial Estate Company Limited (MIE)
6. Karen National Union
7. Representatives from project affected villages
8. Related government departments
9. TEAM Consulting, Engineering and Management Public Company Limited (TEAM)
10. Total Business Solution Co., Ltd. (TBS)

No.	Attendants	Number	Remark
1.	Government/Local Media	26	
2.	Villagers	76	
3.	NGO	-	

Minutes:

The consultant presented summarized project description, major concerned laws and regulations on environmental and social management, key environmental impacts and mitigation measures, and environmental management plans for project development (***Appendix 9F-1***).

Questions and Responses:

No.	Question	Response
1.	**Mr. Kyaw San (Villager of Mudu)** - Need power plant provide electricity to villagers.	**Dr. Myint San (Vice Chairman-2 of DSEZ Committee)** - Power plant project will distribute electricity only for DSEZ. - Government has plan to get electricity from Kan Bouk within 2 to 3 years for villages in DSEZ area. - Villages outside of DSEZ, regional government will responsible to get electricity for these villages.
2.	**Mr. Soe Naing (Villager of Ya Laing)** - Warning Signs (traffic sign) need to be installed in every village road to reduce accident.	**TEAM** - Project developer will install prior to start construction.

No.	Question	Response
3.	**Mr. Su Nge (Villager of Htain Gyi)** - Nabule village was not got electricity until now while other villages as Pan Din In, Nyaung Bin Seik, and Yebyu already got electricity. - Recently, there is a lot of fugitive dust from road traffic with high speed. - Accidents are also took place along the road due to the fugitive dust reduce visibility. - The structure of bridges are not proper so there are motor-cycle accident at the bridge.	**TEAM** - When the project starts, dust control measures will be employed for example speed of car will be controlled (not more than 40 km/hr). - All of the road and bridge will be maintained when the project starts.
4.	**Mr. Soe Thein (Villager of Htain Gyi)** - Villagers want to learn new skills. - Villagers want to work as not only temporary staff but also permanent staffs. - They want to become skillful workers.	**TEAM** - Training and development process will be proposed for employees.
5.	**Mr. Tun Naing (Villager of Pagow Zoon)** - Villagers want job opportunities in not only construction phase but also operation phase. - Project developer should keep in touch with all villages to know about their difficulties. - When will the compensation be paid?	**Mr. Thanarat (DPC/MIE)** - The resettlement and compensation steps including Compensation and Resettlement Committee will be explained (***Appendix 9F-2***).

The public consultation meeting was closed around 12.00 hrs.

Recorded by: Ms. THIRI TIN HTUT
Date 29th March, 2018

Participants of TEAM

1. Mrs. Budsaba Israngura Na Ayudhya — Environmental Specialist
2. Mrs. Yaowapa Chuwong — Social Specialist
3. Mr. Plian Maneeya — Environmental Specialist
4. Mr. Yongyut Khonchantet — Environmental Specialist
5. Dr. Supichaya Wongchinawit — Environmental Specialist
6. Ms. Thiri Tin Htut — Environmental Engineer

Participants of TBS

1. Mr. Lin Htet Sein — Geologist

APPENDIX 9F-1

SLIDES AND HANDOUTS OF THE THIRD CONSULTATION MEETING

အပြီးသတ် အစီရင်ခံစာ
ထားဝယ်အထူးစီးပွားရေးဇုန်တွင် တည်ဆောက်မည့် ကနဦးကာလ ဓါတ်အားပေးစက်ရုံ စီမံကိန်း၏ ပတ်ဝန်းကျင်နှင့် လူမှုဘဝအပေါ် သက်ရောက်မှု ဆန်းစစ်ခြင်း

သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဝန်ကြီးဌာနမှ ထုတ်ပြန်ထားသော ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ (၂၀၁၂) နှင့် ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း (၂၀၁၅) အရ ၅၀ မဂ္ဂါဝပ်ထက်ကျော်သော သဘာဝဓါတ်ငွေ့သုံး ဓါတ်အားပေး စက်ရုံစီမံကိန်းတို့သည် ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း (EIA)ကို ပြင်ဆင်ရန်လိုအပ်ပြီး ဆောက်လုပ်ရေး မစတင်ခင် အတည်ပြုရန် လိုအပ်ပါသည်။

TEAM GROUP

အပြီးသတ် အစီရင်ခံစာ
ထားဝယ်အထူးစီးပွားရေးဇုန်တွင် တည်ဆောက်မည့် ကနဦးကာလ ဓါတ်အားပေးစက်ရုံ စီမံကိန်း၏ ပတ်ဝန်းကျင်နှင့် လူမှုဘဝအပေါ် သက်ရောက်မှု ဆန်းစစ်ခြင်း

အကြိမ်	ရက်စွဲ
MONREC မှ နယ်ပယ်အတိုင်းအတာသတ်မှတ်ခြင်းအစီရင်ခံစာအား အသိမှတ်ပြုခြင်း	
ပြင်ဆင်ထားသော အပြီးသတ် ပတ်ဝန်းကျင်နှင့် လူမှုရေးအပေါ် ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ အစီရင်ခံစာ မူကြမ်းတင်သွင်းခြင်း	၂၀၁၆ခုနှစ် ဩဂုတ်လ ၃၁ရက်
ထပ်မံပြင်ဆင်ထားသော အပြီးသတ် ပတ်ဝန်းကျင်နှင့် လူမှုရေးအပေါ် ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ အစီရင်ခံစာ မူကြမ်းတင်သွင်းခြင်း (၂၀၁၇ခုနှစ် မေလ)	၂၀၁၇ခုနှစ် ဇွန်လ ၃၀ရက်
MONREC မှ အပြီးသတ် ပတ်ဝန်းကျင်နှင့် လူမှုရေးအပေါ် ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ အစီရင်ခံစာအား အသိအမှတ်ပြုခြင်း	၂၀၁၇ခုနှစ် အောက်တိုဘာလ ၂၅ရက်

TEAM GROUP

နယ်ပယ်အတိုင်းအတာသတ်မှတ်ခြင်းအစီရင်ခံစာနှင့် ESIAအစီရင်ခံစာများအတွက် MONREC မှ အတည်ပြုချက်များ

နယ်ပယ်အတိုင်းအတာသတ်မှတ်ခြင်းအစီရင်ခံစာအတည်ပြုစာ

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ
သယံဇာတနှင့်သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန
ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန
ရုံးအမှတ် (၅၃)၊ နေပြည်တော်

စာအမှတ်၊ အီးအိုင်အေ - ၂/၂/ (၃၅၈ /၂၀၁၇)
ရက်စွဲ ၊ ၂၀၁၇ ခုနှစ် ဇန်နဝါရီလ ၂၃ ရက်

သို့

ဥက္ကဋ္ဌ
ထားဝယ်အထူးစီးပွားရေးဇုန်စီမံခန့်ခွဲမှုကော်မတီ

အကြောင်းအရာ။ Dawei Power Co., Ltd. မှ ထားဝယ်အထူးစီးပွားရေးဇုန် ကနဦး အဆင့်တွင် အကောင်အထည်ဖော်ဆောင်ရွက်မည့် Initial Phase Power Plant စီမံကိန်းနှင့် ပတ်သက်၍ ပြန်လည်တင်ပြလာသော နယ်ပယ်အတိုင်းအတာသတ်မှတ်ခြင်း အစီရင်ခံစာ (Scoping Report) အပေါ် အတည်ပြုပြန်ကြားခြင်း

ရည်ညွှန်းချက်။
(၁) ထားဝယ်အထူးစီးပွားရေးဇုန် စီမံခန့်ခွဲမှုကော်မတီ၏ ၃၀-၁၁-၂၀၁၅ ရက်စွဲပါစာအမှတ်၊ ထဝ-၁/DSEZ/၂၀၁၅ (၂၃)
(၂) ဤဝန်ကြီးဌာန၏ ၁၄-၁၂-၂၀၁၅ရက်စွဲပါစာအမှတ်၊ ၃(၂)/၁၆(ဃ)(၆)/(၃၅၇၆/၂၀၁၅)
(၃) ထားဝယ်အထူးစီးပွားရေးဇုန်စီမံခန့်ခွဲမှုကော်မတီ၏ ၁-၂-၂၀၁၆ ရက်စွဲပါစာအမှတ်၊ ထဝ-၁/DSEZ-၄ /၂၀၁၆ (၀၃၃)
(၄) သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန၊ ပြည်ထောင်စုဝန်ကြီးရုံး၏ ၂၇-၁-၂၀၁၇ ရက်စွဲပါစာအမှတ်၊ (သစ်တော) ၃/၁၆(ဃ) (၂၈၆/၂၀၁၇)

၁။ အကြောင်းအရာပါကိစ္စနှင့်ပတ်သက်၍ Dawei Power Co., Ltd. မှ ထားဝယ်အထူးစီးပွားရေးဇုန်တွင် ဆောက်လုပ်မည့် Initial Phase Power Plant စီမံကိန်းနှင့်ပတ်သက်၍ ပြန်လည်တင်ပြလာသည့် Scoping အစီရင်ခံစာအား ထားဝယ်အထူးစီးပွားရေးဇုန် စီမံခန့်ခွဲမှုကော်မတီမှ ရည်ညွှန်း (၁) ပါစာဖြင့် တင်ပြခဲ့ပြီး အဆိုပါတင်ပြမှုအပေါ် သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနမှ ရည်ညွှန်း (၂) ပါစာဖြင့် သဘောထားမှတ်ချက်ပြန်ကြားခဲ့ရာ ပြန်လည်ပြုစုရေးဆွဲထားသည့် Scoping အစီရင်ခံစာအား ထားဝယ်အထူးစီးပွားရေးဇုန်စီမံခန့်ခွဲမှုကော်မတီမှ ရည်ညွှန်း (၃) ပါစာဖြင့် ပြန်လည်ပေးပို့လာပါသည်။

၂။ အဆိုပြုစီမံကိန်းနှင့်စပ်လျဉ်း၍ ပြန်လည်တင်ပြလာသည့် Initial Phase Power Plant စီမံကိန်း၏ Scoping အစီရင်ခံစာသည် သယံဇာတနှင့်သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနမှ ပြန်ကြားခဲ့သည့် သဘောထားမှတ်ချက်နှင့်အညီ ပြင်ဆင်ဖြည့်စွက်ဖော်ပြထားသည်ကို စိစစ်တွေ့ရှိရသဖြင့် အတည်ပြုပြန်ကြားခွင့်ပြုပါရန် ပြည်ထောင်စုဝန်ကြီးရုံးသို့တင်ပြခဲ့ရာ အတည်ပြုပြန်ကြားရန် ရည်ညွှန်း (၄) ပါစာဖြင့် ညွှန်ကြားလာပါသည်။

အပြီးသတ် ပတ်ဝန်းကျင်ဆိုင်ရာ ဆန်းစစ်ခြင်း (EIA) အစီရင်ခံစာ အတည်ပြုစာ

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ
သယံဇာတနှင့်သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန
ပြည်ထောင်စုဝန်ကြီးရုံး

စာအမှတ် (သစ်တော) ၃(၂)/၁၆(ဃ)(၃၄၄၅/၂၀၁၇)
ရက်စွဲ ၂၀၁၇ ခုနှစ် ၊ အောက်တိုဘာလ ၃ ရက်

သို့

ထားဝယ်အထူးစီးပွားရေးဇုန်စီမံခန့်ခွဲမှုကော်မတီ

အကြောင်းအရာ။ တနင်္သာရီတိုင်းဒေသကြီး၊ ထားဝယ်အထူးစီးပွားရေးဇုန်တွင် အကောင်အထည်ဖော်ဆောင်ရွက်မည့် (၄၂၀)မဂ္ဂါဝပ် လျှပ်စစ်ဓာတ်အားပေး စက်ရုံ တည်ဆောက်ခြင်းလုပ်ငန်း၏ ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း အစီရင်ခံစာအပေါ် အတည်ပြုနိုင်ပါကြောင်း စိစစ်တင်ပြခြင်းကိစ္စ

ရည်ညွှန်းချက် ။ ထားဝယ်အထူးစီးပွားရေးဇုန်စီမံခန့်ခွဲမှုကော်မတီ၏ ၇-၁-၂၀၁၆ ရက်စွဲပါစာအမှတ်၊ ဥညမ-ထဝ-၁/DSEZ-၄/၂၀၁၆(၀၀၇)

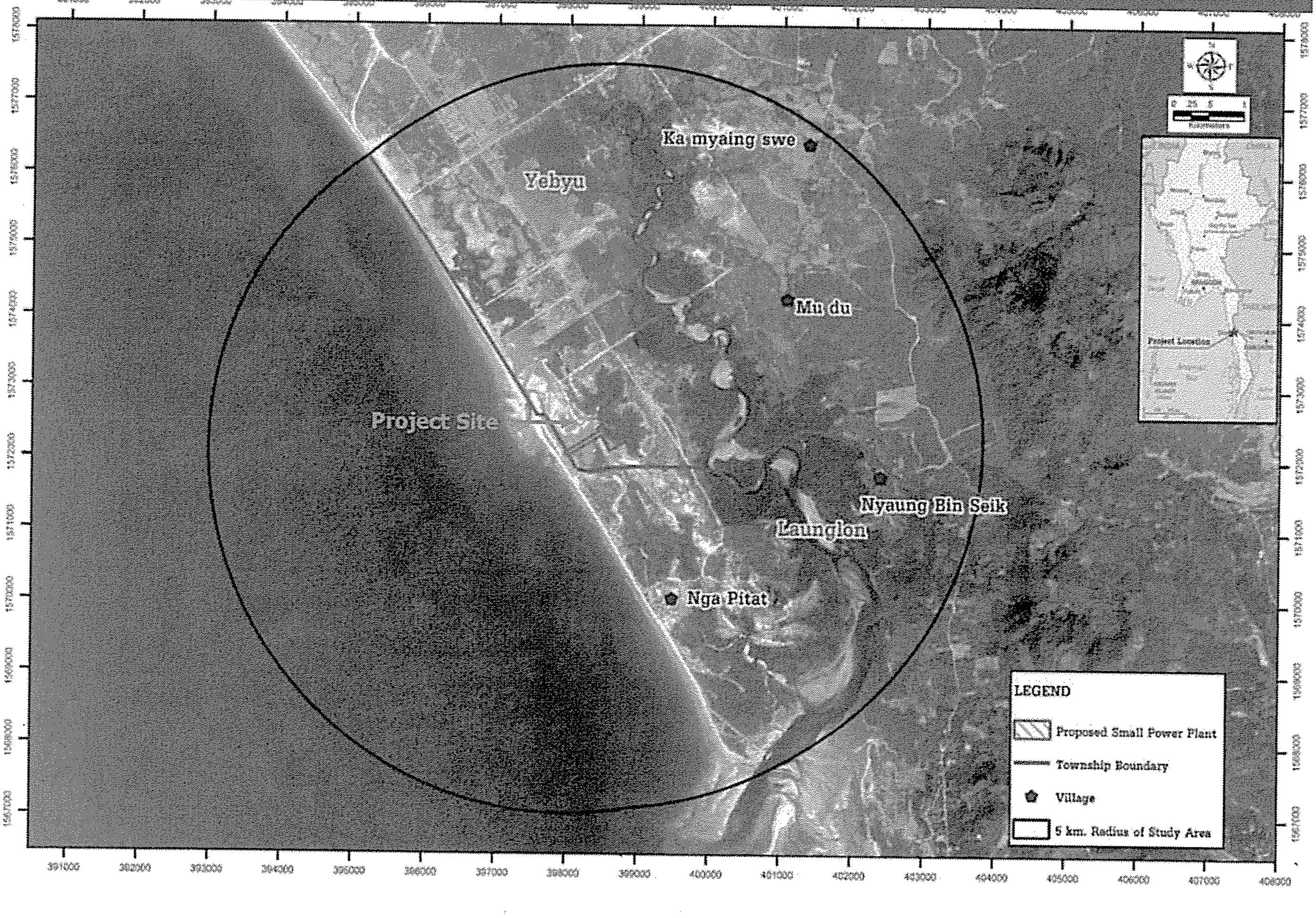
ထားဝယ်လျှပ်စစ်ဓာတ်အားဖြန့်ဝေရေးကုမ္ပဏီ (Dawei Power Company)မှ တနင်္သာရီတိုင်းဒေသကြီး၊ ထားဝယ်အထူးစီးပွားရေးဇုန်တွင် အကောင်အထည်ဖော်ဆောင်ရွက်မည့်(၄၂၀)မဂ္ဂါဝပ် လျှပ်စစ်ဓာတ်အားပေးစက်ရုံ တည်ဆောက်ခြင်းလုပ်ငန်းအတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA) အစီရင်ခံစာတင်ပြလာသည့် ကိစ္စနှင့်ပတ်သက်၍ အဆိုပါအစီရင်ခံစာသည် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း အပိုဒ်(၆၃)ပါအချက်များနှင့် ကိုက်ညီမှုရှိကြောင်း စိစစ်တွေ့ရှိရသဖြင့် တင်ပြလာသည့် အစီရင်ခံစာကို အတည်ပြုပါကြောင်းနှင့် လုပ်ငန်းများဆောင်ရွက်ရာတွင် အောက်ဖော်ပြပါအချက်များအား အလေးထားလိုက်နာ အကောင်အထည်ဖော်ဆောင်ရွက်ရန် လိုအပ်ပါကြောင်း အကြောင်းပြန်ကြားအပ်ပါသည်-

(က) စီမံကိန်းအဆိုပြုသည့် ပတ်ဝန်းကျင်၊ လူမှုရေးနှင့် ကျန်းမာရေးဆိုင်ရာ ထိခိုက်နိုင်မှုများကို လျော့ချမည့် နည်းလမ်းများ၊ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်များ၊ ၎င်းနှင့်ဆက်စပ်သည့် အစီအစဉ်ခွဲများ၊ စောင့်ကြပ်ကြည့်ရှုမည့် နည်းလမ်းများ အပါအဝင် ဆောင်ရွက်ရမည့် ကိစ္စရပ်များအားလုံးကို အတည်ပြုထားသည့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာတွင် ဖော်ပြထားသည့်အတိုင်း လိုက်နာအကောင်အထည်ဖော်ဆောင်ရွက်ရန်၊

(ခ) စီမံကိန်းအဆိုပြုသူသည် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်နှင့် အစီအစဉ်ခွဲများ၊ စောင့်ကြပ်ကြည့်ရှုမည့် အစီအစဉ်များအတွက် လုံလောက်သည့် ရန်ပုံငွေထားရှိသုံးစွဲရန်နှင့် ၎င်းအစီအစဉ်များကို အကောင်အထည်ဖော်ဆောင်ရွက်မည့် အဖွဲ့အစည်းများ ဖွဲ့စည်းဆောင်ရွက်ရန်၊

၁၀.၁၀.၂၀၁၇

ထားဝယ်အထူးစီးပွားရေးဇုန်တွင် တည်ဆောက်မည့် ကနဦးကာလ ဓါတ်အားပေးစက်ရုံ



စီမံကိန်း အချက်အလက်

- ဓါတ်အားပေးစက်ရုံသည် ၅၀ မဂ္ဂါဝပ်ထက် ကျော်လွန်ပြီး ၃၇.၁၉ ဟက်တာ ကျယ်ဝန်းသော ရွှံ့နွံဧရိယာတွင် တည်ရှိပါသည်။
- တည်ဆောက်ရေးကာလသည် ၆နှစ်ကြာမြင့်ပြီး အများဆုံး အလုပ်သမားအရေအတွက် ၆၀၀ ယောက် ရှိနိုင်ပါသည်။ (များသောအားဖြင့် အတွေ့အကြုံမရှိသော အလုပ်သမားများ)
- လုပ်ငန်းလည်ပတ်မှုကာလ အနှစ် ၃၀တွင် ဝန်ထမ်း ၅၀ ယောက် ဖြင့် လည်ပတ်ပါမည်။ (များသောအားဖြင့် ကျွမ်းကျင်ဝန်ထမ်းများ)
- အနီးဆုံး လူမှုအသိုင်းအဝိုင်းသည် ငပိတက်ရွာ ဖြစ်ပြီး စီမံကိန်းနေရာမှ ပျမ်းမျှ ၂.၂၃ ကီလိုမီတာ ကွာဝေးပါသည်။

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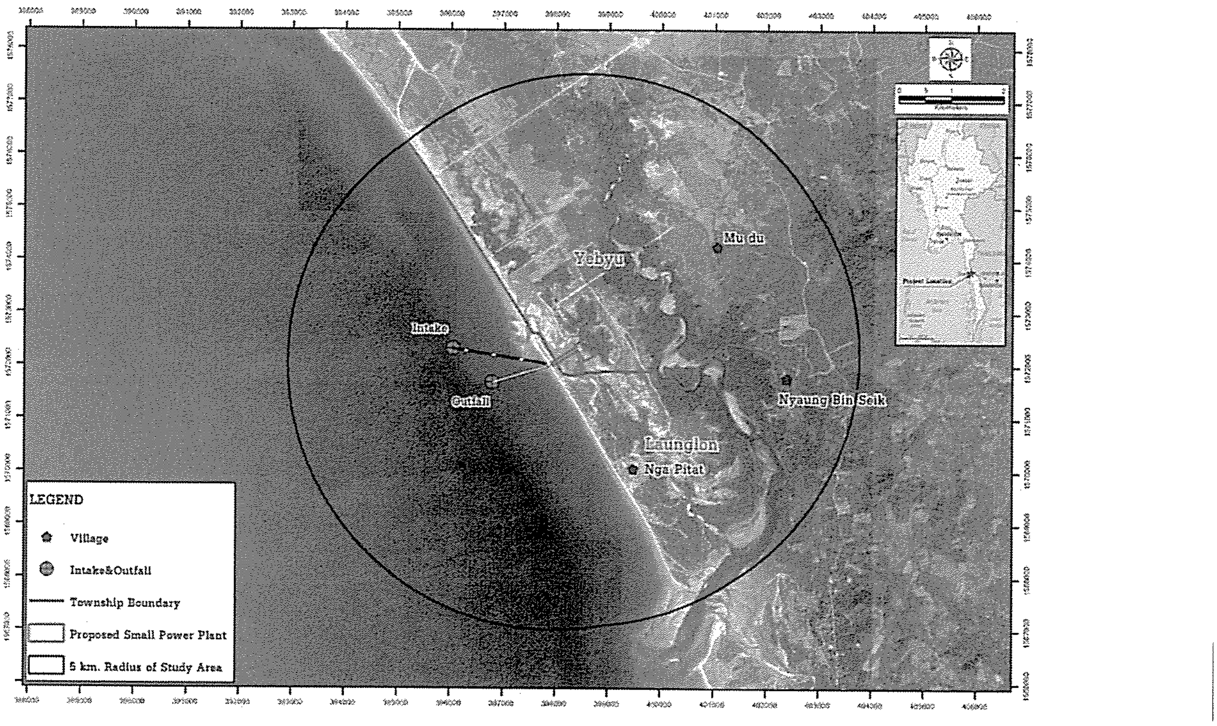
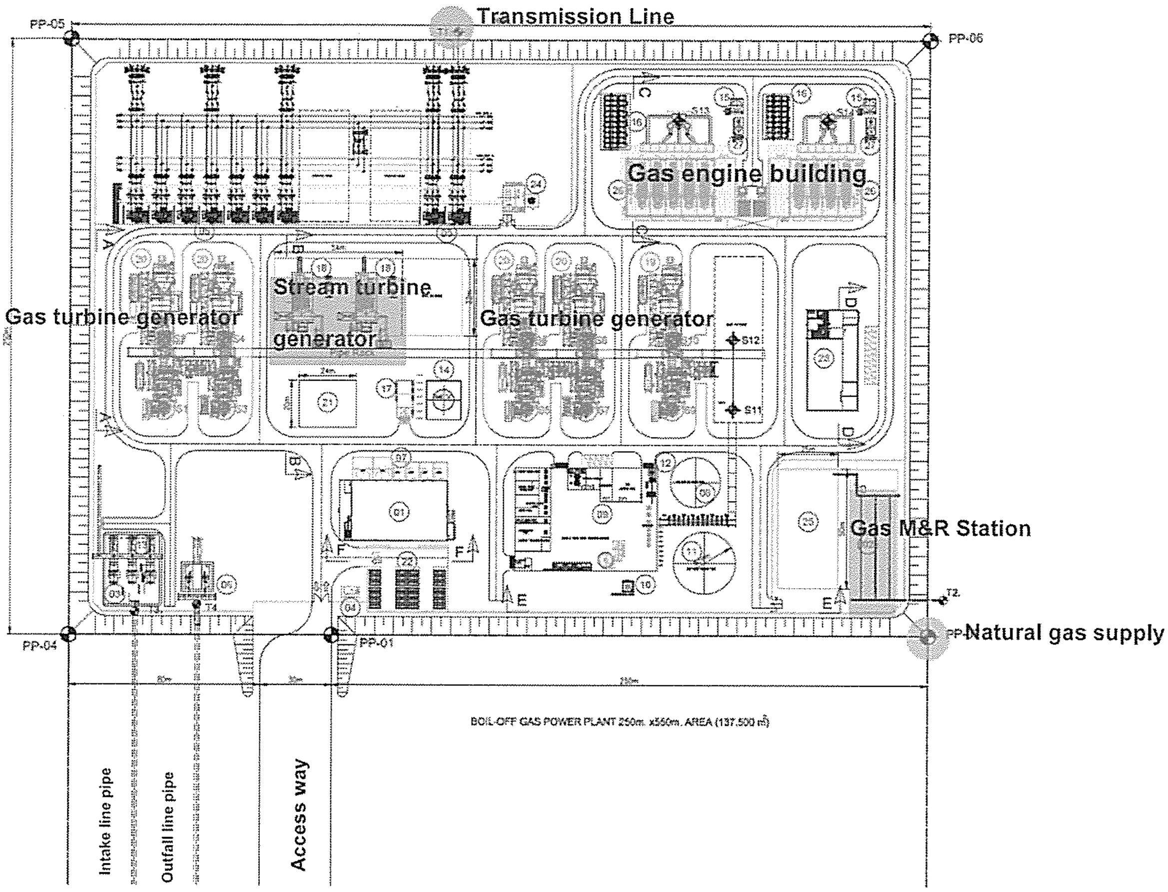
စီမံကိန်း အချက်အလက်

အဓိက အစိတ်အပိုင်းများ	
➢ ၄၂၀ မဂ္ဂါဝပ် ဓါတ်အားပေးစက်ရုံ	➢ ရေအေးစနစ် (Intake/Outfall)
➢ LNG Terminal မှ သဘာဝဓါတ်ငွေ့	➢ အသုံးအဆောင်စနစ်များပါဝင်သော ဓါတ်အားပေးစက်ရုံနေရာ



စီမံကိန်းဖွဲ့စည်းပုံ



ပတ်ဝန်းကျင်ဆိုင်ရာ စီမံခန့်ခွဲမှုနှင့် အဓိက သက်ဆိုင်နေသော ဥပဒေနှင့် စည်းမျဉ်းများ

- ပတ်ဝန်းကျင်ဆိုင်ရာ စီမံခန့်ခွဲမှု အခြေခံ:
  - ❑ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဥပဒေ (၂၀၁၂)
  - ❑ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး နည်းဥပဒေ (၂၀၁၄)
- EIA ဖြစ်စဉ်နှင့် ပတ်ဝန်းကျင်ဆိုင်ရာ စီမံခန့်ခွဲခြင်းနှင့် ကာကွယ်ခြင်း:
  - ❑ ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း (၂၀၁၅)
  - ❑ အမျိုးသား ပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ (၂၀၁၅)
  - ❑ ပတ်ဝန်းကျင်ဆိုင်ရာ ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး ယေဘုယျ လမ်းညွှန်ချက် (၂၀၀၇)နှင့် အပူစွမ်းအင်သုံး ဓါတ်အားပေးစက်ရုံ အတွက် ပတ်ဝန်းကျင်ဆိုင်ရာ ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး လမ်းညွှန်ချက် (၂၀၀၈)
  - ❑ IFC ၏ ပတ်ဝန်းကျင်နှင့် လူမှုရေးဆိုင်ရာ စွမ်းဆောင်ရည် စံနှုန်း (၂၀၁၂)

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ပတ်ဝန်းကျင်ဆိုင်ရာ စီမံခန့်ခွဲမှုနှင့် အဓိက သက်ဆိုင်နေသော ဥပဒေနှင့် စည်းမျဉ်းများ

- လူမှုရေးဆိုင်ရာ ထိခိုက်မှု စီမံခန့်ခွဲခြင်းနှင့် သက်ဆိုင်သော ဥပဒေနှင့် စည်းမျဉ်းများ:
  - ❑ ရေနံ နည်းဥပဒေ (၁၉၃၇)
  - ❑ ပြည်သူ့ကျန်းမာရေး ဥပဒေ (၁၉၇၂)
  - ❑ မြန်မာ့ အာမခံလုပ်ငန်း ဥပဒေ (၁၉၉၃)
  - ❑ လူမှုဖူလုံရေး ဥပဒေ (၂၀၁၂)
  - ❑ ပို့ကုန်သွင်းကုန် ဥပဒေ (၂၀၁၂)
  - ❑ အလုပ်အကိုင်နှင့် ကျွမ်းကျင်မှု ဖွံ့ဖြိုးတိုးတက်ရေး ဥပဒေ (၂၀၁၃)
  - ❑ အနည်းဆုံး အခကြေးငွေ ဥပဒေ (၂၀၁၃)
  - ❑ လျှပ်စစ် ဥပဒေ (၂၀၁၄)
  - ❑ အခကြေးငွေ ပေးချေရေး ဥပဒေ (၂၀၁၆)
  - ❑ စသည်တို့ဖြစ်ပါသည်။

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စီမံကိန်းအကောင်အထည်ဖော်မှုအတွက် လိုက်နာဆောင်ရွက်ရမည့် ကတိကဝတ်များ

အကြိုတည်ဆောက်ရေးလုပ်ငန်းဆောင်ရွက်ခြင်းကာလ

အကြောင်းအရာ	ကတိကဝတ်များ/ လျော့ချခြင်းနည်းလမ်းများ
ဖုန်မှုန့်	- ဖုန်မှုန့်ထွက်ရှိမှုသည် ကမ္ဘာ့ဘဏ်၏ ပတ်ဝန်းကျင်လေထုအရည်အသွေး စံနှုန်းများနှင့် ကိုက်ညီရပါမည်။ (၂၃၀ µg/m3ထက် မကျော်လွန်ရပါ). - စီမံကိန်းနေရာပြင်ဆင်ချိန်တွင် တည်ဆောက်ရေးဧရိယာနှင့် ချဉ်းကပ်လမ်း ဧရိယာများကို ရေဖြန်းပေးရပါမည်။ - ယာဉ်အမြန်နှုန်းကို တစ်နာရီ ၄၀ ကီလိုမီတာထက် မကျော်လွန်စေရန် သတ်မှတ်ထားရပါမည်။
ဆူညံသံ	- ဆောက်လုပ်ရေး၏ ဆူညံသံများထွက်ပေါ်မှုကြောင့် ပတ်ဝန်းကျင် ဆူညံသံအဆင့်မှာ Leq ၂၄နာရီတွင် ၇၀ dB(A) ထက် မကျော်လွန်စေရပါ။ (US.EPA နှင့် WHO စံနှုန်း) - ဆောက်လုပ်ရေး၏ ဆူညံသံများထွက်ပေါ်မှုကြောင့် ပတ်ဝန်းကျင် ဆူညံသံအဆင့်မှာ Leq တစ်နာရီတွင် ၃ dB(A) ထက် မကျော်လွန်စေရပါ။ (IFC standard) - ဆူညံသံများ လျော့ကျစေရန် ၃ မီတာမြင့်သော စတီးအသံကာတံတိုင်းများကို တပ်ဆင်ပေးရမည် ဖြစ်ပါသည်။ - ဆူညံသော လုပ်ငန်းခွင်တွင် လုပ်ကိုင်နေကြသော အလုပ်သမားများအား နားကြပ် သို့မဟုတ် နားအကာအကွယ်များကို ထောက်ပံ့ပေးသွားမည် ဖြစ်ပါသည်။
စီမံကိန်းနေရာ ရှင်းလင်းခြင်း	- စီမံကိန်းရှင်းလင်းခြင်းများမပြုလုပ်ခင် သစ်ပင်ပန်းမန်နှင့် သတ္တဝါအမျိုးအစားများအား စာရင်းပြုစုကာ ရှားပါးမျိုးစိတ်များအား ဖယ်ရှားထိန်းသိမ်းသွားမည် ဖြစ်ပါသည်။ - ခုတ်လှဲထားသော သစ်ပင်များကို ခွဲခြမ်းကာ တတ်နိုင်သမျှ ပြန်လည် အသုံးပြုသွားမည် ဖြစ်ပါသည်။ - ကန်ထရိုက်တာမှ သက်ဆိုင်ရာအာဏာပိုင်၏ခွင့်ပြုချက်ဖြင့် ရွေးချယ်ထားသော အမှိုက်စွန့်ပစ်ရန်နေရာတွင် အသုံးမဝင်သော အမှိုက်များကို စွန့်ပြစ်ရမည် ဖြစ်ပါသည်။ - မီးရှို့ခွင့်မပြုပါ။

GROUP

စီမံကိန်းအကောင်အထည်ဖော်မှုအတွက် လိုက်နာဆောင်ရွက်ရမည့် ကတိကဝတ်များ

အကြိုတည်ဆောက်ရေးလုပ်ငန်းဆောင်ရွက်ခြင်းကာလ

အကြောင်းအရာ	ကတိကဝတ်များ/ လျော့ချခြင်းနည်းလမ်းများ
ရှေးဟောင်းပစ္စည်းနှင့် ယဉ်ကျေးမှု အမွေအနှစ်	- စီမံကိန်းဧရိယာတွင် ရှေးဟောင်းပစ္စည်းနှင့် ယဉ်ကျေးမှု အမွေအနှစ်များ ရှာဖွေတွေ့ရှိခဲ့ပါက ကျေးရွာနှင့် မြို့နယ် အုပ်ချုပ်ရေးမှူး စသော သက်ဆိုင်ရာအာဏာပိုင်များကို အကြောင်းကြားရပါမည်။
ဗျစ်နီမြစ် သုံးရှုံးခြင်း	- Myandawei Industrial Estate Company Limited (MIE)သည် အစားထိုး လှေဆိပ်ကို ချည်ဦးချောင်းဧရိယာတွင် အကောင်အထည်ဖော်ပေးမည်ဟု သဘောတူညီခဲ့ပါသည်။ - ၎င်းအစားထိုးလှေဆိပ်သည် ဗျစ်နီချောင်းတွင် လက်ရှိတည်ရှိနေသော လှေဆိပ်နှင့် အမျိုးအစား၊ အရည်အသွေးတူ လှေဆိပ်အဖြစ် အကောင်အထည်ဖော်ပေးမည် ဖြစ်ပါသည်။ - MIEသည် ချည်ဦးချောင်းတွင် လှေဆိပ်သို့သွားရာ လမ်းကြောင်းအား သောင်တူးဖော်ပြီး အဆင့်မြှင့်တင်ပေးသွားမည် ဖြစ်ပါသည်။

စီမံကိန်းအကောင်အထည်ဖော်မှုအတွက် လိုက်နာဆောင်ရွက်ရမည့် ကတိကဝတ်များ

တည်ဆောက်ဆဲကာလ

အကြောင်းအရာ	ကတိကဝတ်များ/ လျော့ချခြင်းနည်းလမ်းများ
ဓါတ်ငွေ့ထုတ်လွှတ်ခြင်း	- လုပ်ငန်းခွင်အတွက် သင့်တော်သော စက်ပစ္စည်းအရွယ်အစားကိုသာ အသုံးပြုရပါမည်။ - ဓါတ်ငွေ့ထုတ်လွှတ်မှုနည်းသော နည်းပညာ အင်ဂျင်ကို ရွေးချယ်အသုံးပြုရပါမည်။ - ဓါတ်ငွေ့ထုတ်လွှတ်မှုနည်းသော အလေ့အကျင့်ကောင်းများကို သုံးစွဲရမည် ဖြစ်ပါသည်။ - စက်ပစ္စည်းအားလုံးနှင့် ယာဉ်များအား ပုံမှန်ထိန်းသိမ်းမှုများပြုလုပ်ရမည် ဖြစ်ပါသည်။
ဆူညံသံ	- အသံဆူညံမှုထွက်ပေါ်သော လုပ်ငန်းလုပ်ဆောင်မှုများကို နေ့အချိန်တွင်သာ ပြုလုပ်ရန် ကန့်သတ်ထား ရပါမည်။ ညအချိန်တွင် လုပ်ငန်းလုပ်ဆောင်ရန် လိုအပ်လာပါက စီမံကိန်း အင်ဂျင်နီယာ ထံမှ ခွင့်ပြုချက် ရယူရန် လိုအပ်ပါသည်။ - ဆူညံသံများ လျော့ကျစေရန် ၃ မီတာမြင့်သော စတီးအသံကာတံတိုင်းများကို တပ်ဆင်ပေးရမည် ဖြစ်ပါသည်။ - လုပ်ငန်းခွင် ဆူညံမှုသည် လူနေရပ်ကွက်တွင်ရှိရမည့် ပတ်ဝန်းကျင် ဆူညံမှုနှုန်းထားဖြစ်သော Leq တစ်နာရီတွင် နေ့အချိန် ၅၅ dB (A) နှင့် ညအချိန် ၄၅ dB (A) ထက်မကျော်လွန်ရပါ။ (မြန်မာ့ အသံဆူညံမှုအဆင့် စံနှုန်း)
ရေဆိုး	- အိမ်သာအညစ်အကြေးများသည် မိလ္လာကန်သို့ စွန့်ပြစ်သွားမည် ဖြစ်ပါသည်။ - လူသုံးစွန့်ပြစ်ရေများသည် ထိန်းသိမ်းထားသည့်ကန်သို့ စွန့်ပြစ်သွားမည် ဖြစ်ပါသည်။ - ဆေးကြောရေများကို သန့်စင်ကာ အကာအကွယ်မပြုလုပ်ထားသော ဆောက်လုပ်ရေးလုပ်ငန်းခွင် ဧရိယာများတွင် ဖုန်မှုန့်ပျံ့လွင့်မှုများ လျော့နည်းစေရန် ရေဖြန်းခြင်းအတွက် ပြန်လည်အသုံးပြုသွားမည် ဖြစ်ပြီး ပြင်ပသို့ စွန့်ထုတ်မှု မပြုလုပ်ပါ။

စီမံကိန်းအကောင်အထည်ဖော်မှုအတွက် လိုက်နာဆောင်ရွက်ရမည့် ကတိကဝတ်များ

တည်ဆောက်ဆဲကာလ

အကြောင်းအရာ	ကတိကဝတ်များ/ လျော့ချခြင်းနည်းလမ်းများ
ဆောက်လုပ်ရေး စွန့်ပြစ်ပစ္စည်း	- အမှိုက်အမျိုးအစားခွဲခြင်း၊ အမှိုက်သိမ်းဆည်းခြင်းနှင့် သိုလှောင်ခြင်း၊ ပြန်လည်အသုံးချခြင်းနှင့် ပြန်လည်အသုံးပြုခြင်း၊ အမှိုက်စွန့်ပြစ်ခြင်းနှင့် စွန့်ပြစ်နေရာတွင် ထိန်းသိမ်းခြင်း စသော ကဏ္ဍတွင် အမှိုက်ပမာဏကို လျော့နည်းအောင် ဆောင်ရွက်ရပါမည်။ - လိုင်စင်ရရှိထားသော ကန်ထရိုက်တာမှသာ အန္တရာယ်ရှိသော စွန့်ပြစ်ပစ္စည်းများကို ကိုင်တွယ် စွန့်ပြစ်ရမည်။ - စွန့်ပြစ်ပစ္စည်းများ စီမံခန့်ခွဲမှုစနစ်သည် အစိုးရ၏ သက်ဆိုင်ရာဥပဒေများကို လိုက်နာဆောင်ရွက် သွားမည်။
လမ်းပန်းဆက်သွယ်ရေး	- ယာဉ်အသွားအလာများချိန်တွင် ပစ္စည်းသယ်ယူပို့ဆောင်ခြင်းလုပ်ငန်းများကို ရှောင်ရှားရပါမည်။ - ကိရိယာကြီးများသယ်ယူပို့ဆောင်ရန် ယာဉ်ကြီးများကို အသုံးပြုရာတွင် ယာဉ်ထိန်းရဲကား အကူအညီဖြင့် သယ်ဆောင်ခြင်းသို့မဟုတ် ၄င်းပစ္စည်းများသယ်ဆောင်ရန် အထူးဒီဇိုင်းပြုလုပ်ထားသော ယာဉ်များဖြင့် သယ်ယူပို့ဆောင်ရပါမည်။ - ဆောက်လုပ်ရေးလုပ်ငန်းခွင်နေရာတစ်လျှောက်တွင် ယာဉ်အန္တရာယ် သတိပေး ဆိုင်းဘုတ်များကို တပ်ဆင်ရပါမည်။
ဝန်ထမ်းများ၏ လုပ်ငန်းခွင် ဘေးအန္တရာယ် ကင်းရှင်းရေးနှင့် ကျန်းမာရေး	- ဖုန်မှုန့်၊ ဆူညံမှုနှင့် ဓါတ်ငွေ့ထုတ်လွှတ်မှုတို့နှင့် အလုပ်သမားများ ထိတွေ့မှု နည်းစေရန် သင့်တော်သော ကာကွယ်မှု နည်းလမ်းများကို ပြင်ဆင်ကာ လုပ်ငန်းခွင်ရှိ ဖုန်မှုန့်၊ ဆူညံမှုနှင့် ဓါတ်ငွေ့ထုတ်လွှတ်မှုများ လျော့နည်းအောင် ဆောင်ရွက်ရပါမည်။ - အလုပ်သမားများသည် ဆောက်လုပ်ရေးလုပ်ငန်းခွင်အတွင်း လုံလောက်သော ဘေးအန္တရာယ်ကင်းရှင်းစေရေး လိုက်နာမှုများကို သိနားလည်ရမည်။
ဒေသခံ စီးပွားရေး (တိုးတက်မှု)	- ဒေသခံအလုပ်သမားများအား ဦးစားပေး ခန့်အပ်မည်ဖြစ်ပြီး အထူးသဖြင့် ဆောက်လုပ်ရေးလုပ်ငန်းခွင် အနီးအနားရှိ ကျေးရွာများ ဥပမာ ငပိတက်၊ ညောင်ပင်ဆိပ်နှင့် မူးဒူးရွာတို့မှ ဖြစ်ပါသည်။ . - အလုပ်ခေါ်ယူမှုသည် ပွင့်လင်းမြင်သာမှုရှိပြီး မျှတမှုရှိကာ အတွေ့အကြုံနှင့် အရည်အချင်းပေါ်မူတည်၍ လစာနှုန်းထား ပေးအပ်သွားမည် ဖြစ်ပါသည်။ - စီမံကိန်းဆောက်လုပ်ရေးဝန်ထမ်းဖြစ်လာစေရန် ဒေသခံအလုပ်သမားများအား လေ့ကျင့်မှုများ ပြုလုပ်ပေးသွားမည် ဖြစ်ပါသည်။

GROUP

စီမံကိန်းအကောင်အထည်ဖော်မှုအတွက် လိုက်နာဆောင်ရွက်ရမည့် ကတိကဝတ်များ

တည်ဆောက်ဆဲကာလ

အကြောင်းအရာ	ကတိကဝတ်များ/ လျော့ချခြင်းနည်းလမ်းများ
ဒီရေတော စီမံခန့်ခွဲခြင်း	- ဒီရေတော အဓိက စီမံခန့်ခွဲမှုအုပ်စုနှင့် ဒီရေတောအရင်းအမြစ် ရေရှည်ထိန်းသိမ်းရေးထောက်ပံ့မှုများ ကို အကောင်အထည်ဖော်ဆောင်ရွက်ရပါမည်။ ဥပမာ- ဒီရေတော စီမံခန့်ခွဲမှုဧရိယာ၊ ဒီရေတောဇုန်၊ ပြန်လည်စိုက်ပျိုးခြင်း၊ ဒေသပြောင်းလဲခြင်း၊ ရေရှည်အသုံးပြုနိုင်ရန် နည်းစနစ်များ အကောင်အထည်ဖော်ခြင်းတို့ဖြစ်ပါသည်။
အဆောက်အအုံနှင့် ဝန်ဆောင်မှုများ	- ကန်ထရိုက်တာသည် ရှေးဦးသူနာပြု ဝန်ဆောင်မှုနှင့် သာမာန်ဖျားနာခြင်းအတွက် ကျန်းမာရေး ကုသမှုများကို ထောက်ပံ့ပေးထားမည်။ - စီမံကိန်းရှိလူများ ပြင်းထန်သော ကျန်းမာရေးပြဿနာများဖြစ်ပေါ်လာခဲ့ပါက ထားဝယ်ဆေးရုံသို့ ပို့ဆောင်ကုသမည်ဖြစ်ပါသည်။
ယဉ်ကျေးမှုနှင့် ရိုးရာ	- စီမံကိန်းသက်ဆိုင်သူများအားလုံးသည် ဒေသခံယဉ်ကျေးမှု၊ ရိုးရာနှင့် ဓလေ့ထုံးစံများကို လိုက်နာ ရမည်။ - စီမံကိန်းအကောင်အထည်ဖော်သူများသည် ရိုးရာနှင့် ယဉ်ကျေးမှုပွဲများကို တက်ကြွစွာ ထောက်ပံ့ပြီး ပါဝင်လုပ်ဆောင်ရပါမည်။
ဒေသခံ ကျန်းမာရေး၊ ဘေးအန္တရာယ်ကင်းရှင်း ရေးနှင့် လုံခြုံရေး	- ရွေးချယ်ခြင်းခံရသော အလုပ်သမားများအားလုံးသည် အလုပ်မခန့်အပ်မီ အဓိကကူးစက်ရောဂါများ ကူးစက်မှု ရှိ/မရှိကို ကျန်းမာရေး စစ်ဆေးမှုများပြုလုပ်ရပါမည်။. - ကန်ထရိုက်တာသည် မူးယစ်ဆေးဝါးသုံးစွဲမှု ကာကွယ်ခြင်း စသော စီမံကိန်းလုံခြုံမှုစနစ်နှင့် အခြား သင့်တော်သော နည်းလမ်းများကို အကောင်ထည်ဖော်ရန် လိုအပ်ပါသည်။
ဒေသဖွံ့ဖြိုးတိုးတက်ရေး ထောက်ပံ့မှုများနှင့် CSR	- စီမံကိန်းအနီးအနားရှိ ကျေးရွာများအတွက် ပညာရေး၊ ကျန်းမာရေး၊ ကိုးကွယ်မှု၊ ယဉ်ကျေးမှု၊ အလုပ်အကိုင် အခွင့်အရေးနှင့် လူမှုဖွံ့ဖြိုးရေးစသော ဒေသထောက်ပံ့ခြင်းလုပ်ဆောင်မှုများကို ပြုပေးရပါမည်။ - ဆုံးရှုံးနစ်နာမှုအတွက် ပြင်ဆင်ရန် ဖြေလျော့ခြင်း သို့မဟုတ် လိုက်နာတုံ့ပြန်ခြင်းတို့ပြုလုပ်ပေးရပါမည်။

စီမံကိန်းအကောင်အထည်ဖော်မှုအတွက် လိုက်နာဆောင်ရွက်ရမည့် ကတိကဝတ်များ

လုပ်ငန်းလည်ပတ်ဆောင်ရွက်သည့်ကာလ

အကြောင်းအရာ	ကတိကဝတ်များ/ လျော့ချခြင်းနည်းလမ်းများ
ဓါတ်ငွေ့ထုတ်လွှတ်မှု	- NO_x ထုတ်လုပ်မှုနည်းသော ကွန်ဘက်စတာကို ဓါတ်ငွေ့တာဘိုင်တွင် တပ်ဆင်ခြင်းဖြင့် NO_x ထုတ်လွှတ်မှုကို လျော့နည်းစေပါသည်။ - Continuous Emission Monitoring System (CEMS) ကိုတပ်ဆင်ခြင်းဖြင့် NOx, O_2, flow rateနှင့် ထွက်ရှိသော ဓါတ်ငွေ့၏ အပူချိန်ကို တိုင်းတာနိုင်ပါသည်။ - ASME ဘွိုင်လာနှင့် Pressure Vessel Code ကဲ့သို့ အပူပြန်ရယူမှုအငွေ့ဂျန်နရေတာ ခေါင်းတိုင် တပ်ဆင်ရပါမည်။ - ဓါတ်ငွေ့ထုတ်လွှတ်မှု ထိန်းချုပ်ခြင်းသည် အပူစွမ်းအင်သုံး ဓါတ်အားပေးစက်ရုံအတွက် ပတ်ဝန်းကျင်ဆိုင်ရာ ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး လမ်းညွှန်ချက် (၂၀၀၈)နှင့် အမျိုးသာ ပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ (၂၀၁၅) ကို လိုက်နာမည်ဖြစ်ပါသည်။
ရေဆိုး	- သတ္တုဓါတ်များဖယ်ရှားခြင်းစနစ်မှ ထွက်ရှိလာသော ရေဆိုးနှင့် ဘွိုင်လာမှထွက်ရှိလာသော အအေးခံရည်များနှင့်ရောကာ အခြားရေဆိုးများနှင့် မပေါင်းစပ်ခင် ဓါတ်ပြယ်ခြင်းနေရာတွင် ဓါတ်ပြယ်မှုများဖြစ်ပေါ်ပြီး အခြားသန့်စင်ခြင်းကို ပြုလုပ်ရပါမည်။ - မျက်နှာပြင်ရေများစီးဆင်းမှုအတွက် ရေမြောင်းစနစ်ကို ပြုလုပ်ပေးမည်ဖြစ်ပြီး စွန့်ပြစ်ရေများကို ထိန်းသိမ်းကန် သို့မဟုတ် ပင်လယ်တွင်းသို့ထွက်ရာလမ်းကြောင်းမှ စွန့်ပြစ်မည် ဖြစ်ပါသည်။ အဆီများဖြင့် ထိတွေ့မိသော မျက်နှာပြင်ရေများကို မြောင်းမကြီးသို့ မစွန့်ပြစ်မီ အဆီဖယ်ထုတ်ခြင်းစနစ်ဖြင့် အဆီဖယ်ထုတ်ပြီးမှ စွန့်ပြစ်ရပါမည်။

စီမံကိန်းအကောင်အထည်ဖော်မှုအတွက် လိုက်နာဆောင်ရွက်ရမည့် ကတိကဝတ်များ

လုပ်ငန်းလည်ပတ်ဆောင်ရွက်သည့်ကာလ

အကြောင်းအရာ	ကတိကဝတ်များ/ လျော့ချခြင်းနည်းလမ်းများ
အအေးခံရေ	- မှုတ်ထုတ်သည့်နေရာတွင် ၁၀စင်တီမီတာရှိသော ရေနေသတ္တဝါများအား တားဆီးနိုင်ရန် ၁၀ စင်တီမီတာရှိသော ဇကာကွက်ကို ကာထားပြီး ၁၀ မီလီမီတာထက်သေးငယ်သော ရေနေသတ္တဝါများအား ကာကွယ်ရန် ၁၀မီလီမီတာ ဇကာကွက်ကို တပ်ဆင်ထားပါသည်။
အပူထုတ်လွှတ်ခြင်း	- အပြင်သို့ထွက်ရှိသော ဒီဇိုင်းမှာ ပင်လယ်ရေအား အပူထိတွေ့ခြင်းကြောင့် ထိခိုက်မှုဖြစ်ပေါ်ခြင်း အနည်းဆုံးသော လုပ်ဆောင်မှုများဖြင့် ပြုလုပ်ထားပါသည်။ ပင်လယ်ကြမ်းပြင်သို့ စွန့်ထုတ်လိုက်ချိန်တွင် ၅၁၇ခုသော ပျံ့နှံ့မှုများသည် အလျားလိုက်ရောထွေးခြင်းများဖြစ်ပေါ်ပြီး အပူအလွှာလိုက် ထွက်ပေါ်မှုကို လျော့ကျစေပါသည်။ - ရေထွက်ပျံ့နှံ့မှုဒီဇိုင်းအရ ရေထွက်ရှိရာနေရာတွင် သတ်မှတ်ထားသော ရေအပူချိန်ထက် ကျော်လွန်ခြင်းမရှိအောင် ထိန်းသိမ်းရပါမည်။ TELEMA Modeling အရ စွန့်ပြစ်ရာနေရာမှ မီတာ ၁၀၀ အကွာရှိ ရေအပူချိန်တိုးလာမှုသည် ၃ ဒီဂရီဆဲစီးရပ်ထက် နည်းစေရပါမည်။ - စွန့်ပြစ်ရာနေရာတွင် ရေအပူချိန် စောင့်ကြည့်လေ့လာမှုများကို ပုံမှန်ပြုလုပ်သွားမည် ဖြစ်ပါသည်။
ဒေသဖွံ့ဖြိုးတိုးတက်ရေး ထောက်ပံ့မှုများနှင့် CSR	- စီမံကိန်းအနီးအနားရှိ ကျေးရွာများအတွက် ပညာရေး၊ ကျန်းမာရေး၊ ကိုးကွယ်မှု၊ ယဉ်ကျေးမှု၊ အလုပ်အကိုင် အခွင့်အရေးနှင့် လူမှုဖွံ့ဖြိုးရေးစသော ဒေသထောက်ပံ့ခြင်းလုပ်ဆောင်မှုများကို ပြုပေးရပါမည်။ - ဆုံးရှုံးနစ်နာမှုအတွက် ပြင်ဆင်ရန် ဖြေလျော့ခြင်း သို့မဟုတ် လိုက်နာတုံ့ပြန်ခြင်း တို့ပြုလုပ်ပေးရပါမည်။
ဒီရေတော စီမံခန့်ခွဲခြင်း အစီအစဉ်	- ဒီရေတောအရင်းအမြစ်စီမံခန့်ခွဲခြင်းကို ရေရှည်ဖြစ်ထွန်းစေရန် ထောက်ပံ့ထိန်းသိမ်းပေးခြင်းဖြင့် အသက်မွေးဝမ်းကြောင်းတိုးတက်မှုကို ထောက်ပံ့ပေးနိုင်ပါသည်။

စီမံကိန်းအကောင်အထည်ဖော်မှုအတွက် လိုက်နာဆောင်ရွက်ရမည့် ကတိကဝတ်များ

လုပ်ငန်းရပ်စဲခြင်းကာလ	
အကြောင်းအရာ	**ကတိကဝတ်များ/ လျော့ချခြင်းနည်းလမ်းများ**
ဖုန်မှုန့်၊ ဓါတ်ငွေ့ထုတ်လွှတ်မှု၊ ဆူညံသံ၊ လုပ်ငန်းရပ်စဲခြင်း စွန့်ပြစ်ပစ္စည်း၊ လမ်းပန်းဆက်သွယ်ရေး၊ လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေး	- အကြိုတည်ဆောက်ရေးလုပ်ငန်းဆောင်ရွက်ခြင်းကာလနှင့် တည်ဆောက်ဆဲကာလများအတိုင်း ပြုလုပ်သွားမည် ဖြစ်ပါသည်။
မြေယာပြန်လည်ပြုပြင်ခြင်း	- လုပ်ငန်းရပ်စဲခြင်း ပြီးစီးသွားသည့်အချိန်တွင် စီမံကိန်းနေရာအား စီမံခန့်ခွဲမှုများ ပြုလုပ်နိုင်ရန် ဒေသခံအာဏာပိုင်များနှင့် ဒေသခံကျေးရွာလူထုတို့နှင့် ဆွေးနွေးတိုင်ပင်ဆောင်ရွက်ရပါမည်။ - အခြေခံအဆောက်အအုံများ အသုံးပြုရန် စီမံကိန်းအကောင်အထည်ဖော်သူ၊ အစိုးရ အာဏာပိုင်နှင့် ကျေးရွာလူထုတို့ အတူတကွ ဆွေးနွေးရပါမည်။

TEAM GROUP

စီမံကိန်းအကောင်အထည်ဖော်မှုအတွက် လိုက်နာဆောင်ရွက်ရမည့် ကတိကဝတ်များ

ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ် (EMP)

EMP ၏ ရည်ရွယ်ချက်: လျော့ချရေးနည်းလမ်းများကို သင့်တော်စွာ ပြီးမြောက်စေရန် EMP ကို ပြင်ဆင်ခြင်းဖြစ်ပါသည်။

EMP ၏ အပိုင်း: EMPတွင် အပိုင်း (၃) ပိုင်းပါဝင်ပါသည်။

၁။ အကြိုတည်ဆောက်ရေးလုပ်ငန်းဆောင်ရွက်ခြင်းကာလနှင့် တည်ဆောက်ဆဲကာလများတွင် ကန်ထရိုက်တာမှ ပြီးမြောက်အောင်ဆောင်ရွက် ရမည့် CEMP

၂။ လုပ်ငန်းလည်ပတ်ဆောင်ရွက်သည့်ကာလတွင် စီမံကိန်းပိုင်ရှင်မှ ပြီးမြောက်အောင်ဆောင်ရွက်ရမည့် OEMP

၃။ လုပ်ငန်းရပ်စဲခြင်းကာလတွင် ကန်ထရိုက်တာမှ ပြီးမြောက်အောင်ဆောင်ရွက်ရမည့် DEMP တို့ဖြစ်ပါသည်။

TEAM GROUP

တည်ဆောက်ဆဲကာလ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ် (CEMP)

အကြိုတည်ဆောက်ရေးလုပ်ငန်းများဆောင်ရွက်ခြင်းကာလနှင့် တည်ဆောက်ဆဲကာလများ၏ ပြဿနာများအား စီမံခန့်ခွဲခြင်း

၁။ ယေဘုယျဆောက်လုပ်ရေး
၂။ ဇီဝစွန့်ပြစ်ပစ္စည်းစီမံခန့်ခွဲခြင်း အစီအစဉ်
၃။ ဒီရေတော စီမံခန့်ခွဲခြင်း အစီအစဉ်
၄။ လေထုအရည်အသွေးစီမံခန့်ခွဲခြင်း အစီအစဉ်
၅။ ဆူညံသံစီမံခန့်ခွဲခြင်း အစီအစဉ်
၆။ ရေဆိုးစီမံခန့်ခွဲခြင်း အစီအစဉ်
၇။ ဆောက်လုပ်ရေးစွန့်ပြစ်ပစ္စည်း စီမံခန့်ခွဲခြင်း အစီအစဉ်
၈။ လမ်းပန်းဆက်သွယ်ရေး စီမံခန့်ခွဲခြင်း အစီအစဉ်
၉။ လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေး (OHS) စီမံခန့်ခွဲမှု
၁၀။ အရင်းအမြစ် စီမံခန့်ခွဲမှု အစီအစဉ်
၁၁။ လူမှုစီးပွား ပူးပေါင်းတာဝန်ခံမှု အစီအစဉ် (CSR)
၁၂။ အရေးပေါ်စီမံခန့်ခွဲမှု အစီအစဉ် တို့ဖြစ်ပါသည်။

- ❑ ပြဿနာတစ်ခုချင်းဆီအတွက် သီးသန့် အစီအစဉ်ခွဲများရှိပြီး ၎င်းတို့သည် အမျိုးသားနှင့် အပြည်ပြည်ဆိုင်ရာ စံနှုန်း သို့မဟုတ် ဒေသခံများ လက်ခံနိုင်မှုနှင့် ကိုက်ညီစွာ စီမံ ဆောင်ရွက်ရပါမည်။
- ❑ တာဝန်ယူမှုအဖွဲ့ အစည်း: စီမံကိန်းပိုင်ရှင်နှင့် ကန်ထရိုက်တာ
- ❑ တစ်နှစ်လျှင်နှစ်ကြိမ် အစီရင်ခံစာပြုစုကာ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဝန်ကြီးဌာန (MONREC) သို့ တင်ပြပါမည်။

TEAM GROUP

လုပ်ငန်းလည်ပတ်ဆောင်ရွက်သည့်ကာလ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ် (OEMP)

ဓါတ်အားပေးစက်ရုံ၏ လည်ပတ်ခြင်းနှင့်ထိန်းသိမ်းခြင်း (O&M)နှင့် ၎င်း၏ အဆောက်အဦးများကြောင့် ထင်ရှားသော ပတ်ဝန်းကျင်ဆိုင်ရာထိခိုက်မှုများ ဖြစ်ပေါ်ခြင်းမရှိကြောင်း EIA လေ့လာမှုမှ အတည်ပြုရရှိပါသည်။ OEMP တွင် ကဏ္ဍ (၇)ခု ပါဝင်ပါသည်။

၁။ လေထုအရည်အသွေးစီမံခန့်ခွဲခြင်း အစီအစဉ်
၂။ ဆူညံသံစီမံခန့်ခွဲခြင်း အစီအစဉ်
၃။ ရေဆိုးစီမံခန့်ခွဲခြင်း အစီအစဉ်
၄။ လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေး (OHS) စီမံခန့်ခွဲမှု
၅။ လူမှုစီးပွား ပူးပေါင်းတာဝန်ခံမှု အစီအစဉ် (CSR)
၆။ ဒီရေတော စီမံခန့်ခွဲမှု အစီအစဉ်
၇။ အရေးပေါ်စီမံခန့်ခွဲမှု အစီအစဉ် တို့ဖြစ်ပါသည်။

- ❑ ပြဿနာတစ်ခုချင်းဆီအတွက် သီးသန့် အစီအစဉ်ခွဲများရှိပြီး ၎င်းတို့သည် အမျိုးသားနှင့် အပြည်ပြည်ဆိုင်ရာ စံနှုန်း သို့မဟုတ် ဒေသခံများ လက်ခံနိုင်မှုနှင့် ကိုက်ညီစွာ စီမံ ဆောင်ရွက်ရပါမည်။
- ❑ တာဝန်ယူမှုအဖွဲ့ အစည်း: စက်ရုံလည်ပတ်ရေးအဖွဲ့ နှင့် တတိယ အဖွဲ့ အစည်း
- ❑ တစ်နှစ်လျှင်နှစ်ကြိမ် အစီရင်ခံစာပြုစုကာ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဝန်ကြီးဌာန (MONREC) သို့ တင်ပြပါမည်။

TEAM GROUP

လုပ်ငန်းရပ်စဲခြင်းကာလ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ် (DEMP)

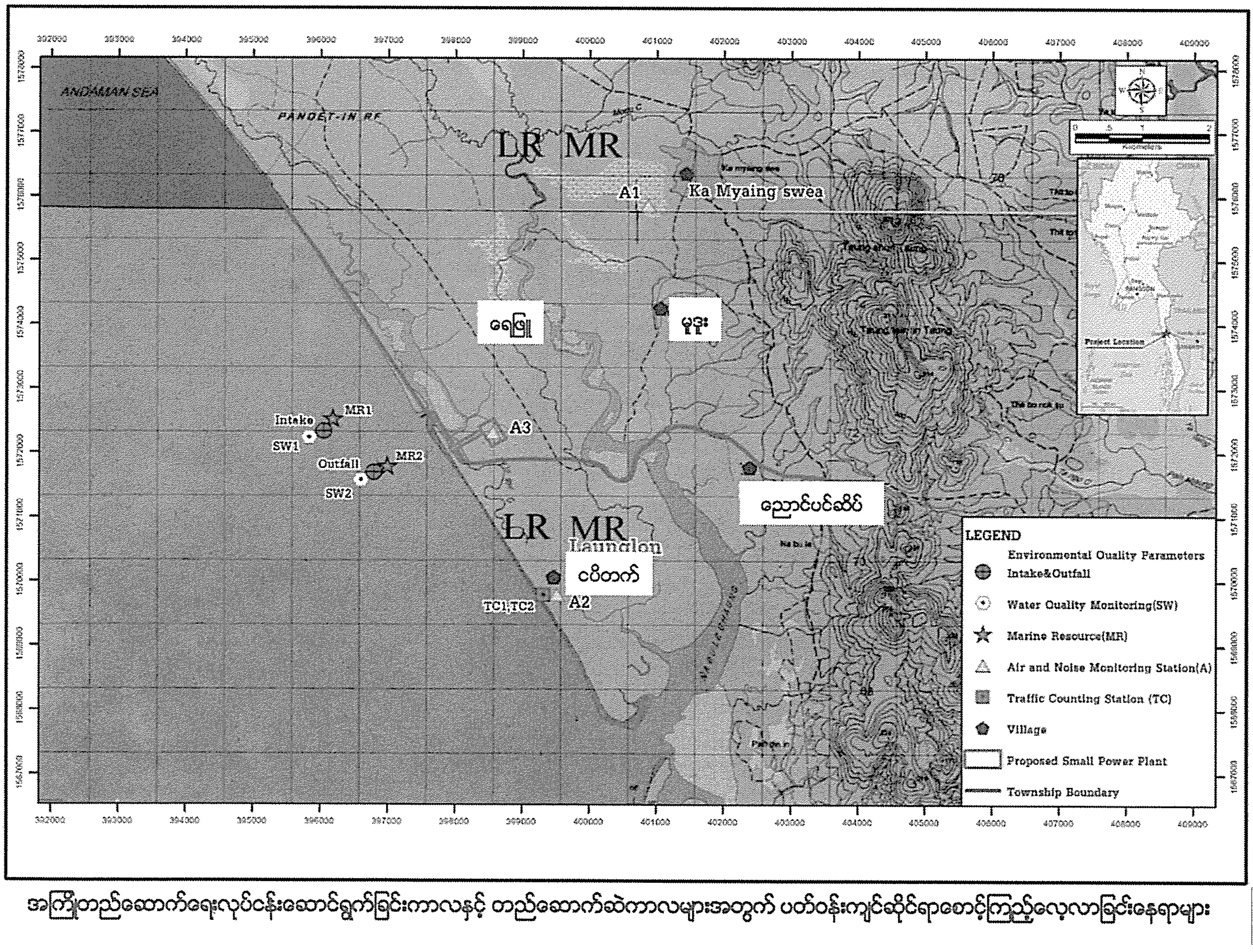
ယခု EIA တွင် DEMP ကို ပြင်ဆင်ထားသော်လည်း စီမံကိန်းသက်တမ်း နှစ် (၃၀)ကြာသော အချိန်တွင် အသုံးပြု၍ ရမည်မဟုတ်သောကြောင့် EIA အသစ်ကို အခြေခံ၍ DEMP အသစ်ကို ပြန်လည်အစားထိုး သွားမည်ဖြစ်ပါသည်။

သို့သော် ခန့်မှန်းထားသော ထိခိုက်မှုနှင့် လျော့ချရေးနည်းလမ်းများနှင့် ကိုက်ညီသော အစီစဉ်ခွဲ (၆)ခုကို အောက်တွင် ဖော်ပြထားပါသည်။

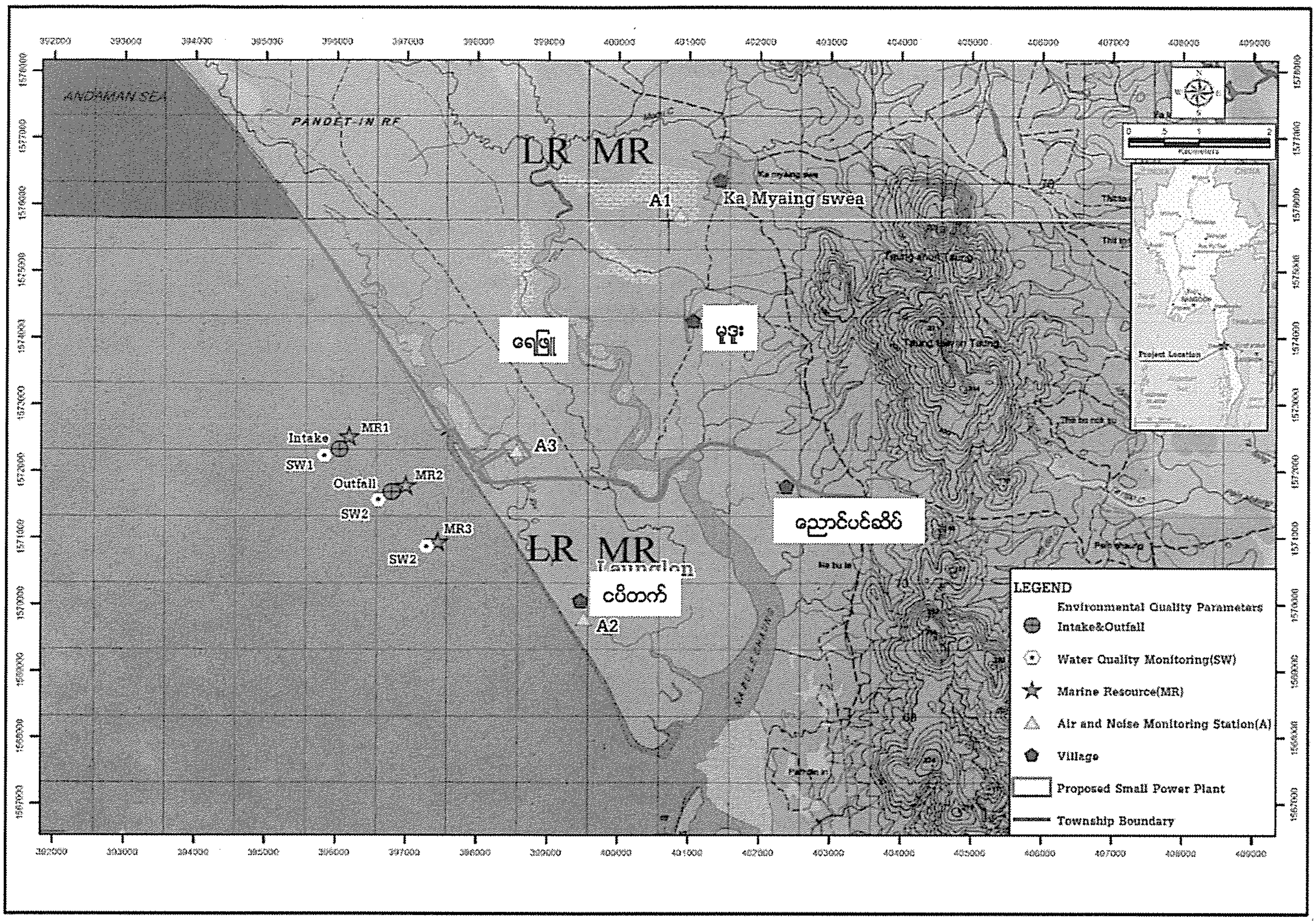
၁။ လေထုအရည်အသွေးစီမံခန့်ခွဲခြင်း အစီအစဉ်
၂။ ဆူညံသံစီမံခန့်ခွဲခြင်း အစီအစဉ်
၃။ ရေဆိုးစီမံခန့်ခွဲခြင်း အစီအစဉ်
၄။ လမ်းပန်းဆက်သွယ်ရေး စီမံခန့်ခွဲခြင်း အစီအစဉ်
၅။ လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေး (OHS) စီမံခန့်ခွဲမှု
၆။ ပတ်ဝန်းကျင်နှင့် လူမှုရေးဆိုင်ရာ စီမံခန့်ခွဲမင အစီအစဉ် တို့ဖြစ်ပါသည်။

- ပြဿနာတစ်ခုချင်းဆီအတွက် သီးသန့် အစီအစဉ်ခွဲများရှိပြီး ၎င်းတို့သည် အမျိုးသားနှင့် အပြည်ပြည်ဆိုင်ရာ စံနှုန်း သို့မဟုတ် ဒေသခံများ လက်ခံနိုင်မှုနှင့် ကိုက်ညီစွာ စီမံ ဆောင်ရွက်ရပါမည်။
- တာဝန်ယူမှုအဖွဲ့အစည်း: စီမံကိန်းပိုင်ရှင်နှင့် ကန်ထရိုက်တာ

TEAM GROUP



အကြိုတည်ဆောက်ရေးလုပ်ငန်းဆောင်ရွက်ခြင်းကာလနှင့် တည်ဆောက်ဆဲကာလများအတွက် ပတ်ဝန်းကျင်ဆိုင်ရာစောင့်ကြည့်လေ့လာခြင်းနေရာများ



လုပ်ငန်းလည်ပတ်ဆောင်ရွက်သည့်ကာလအတွက် ပတ်ဝန်းကျင်ဆိုင်ရာစောင့်ကြည့်လေ့လာခြင်းနေရာများ

ကျေးဇူးတင်ပါသည်။

TEAM GROUP

APPENDIX 9F-2

THE RESETTLEMENT AND COMPENSATION STEPS

Resettlement and Compensation Steps

1. Set up the organization
   - To set up the Relocation and Compensation Committee (must have authority and project affected people representative)
   - Legal framework
   - Stakeholders engagement plan
   - Grievance Management Process
2. Preparation Stage (approximate 6 months)
   a) Baseline information gathering/ Resettlement impacts identification
      - Census and Socio-Economic Survey
      - Land Survey
      - Asset Inventory Survey
      - Proposed Cut-off date

   b) Planning
      - Resettlement options and eligibility & entitlements
      - Livelihood restoration plans
3. Implementation Stage
   - Payment for land acquisition and compensation
   - Physical displacement
   - Monitoring and reporting

APPENDIX 9G

MINUTE OF MEETING DURING THE THIRD PUBLIC CONSULTATION MEETING (BY OVERALL)

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ
ထားဝယ်အထူးစီးပွားရေးဇုန်စီမံခန့်ခွဲမှုကော်မတီ

စာအမှတ်၊ ထဝ-၁/DSEZ-D/၂၀၁၈ (၀၄၁)
ရက် စွဲ ၊ ၂၀၁၈ ခုနှစ်၊ ဧပြီ လ ၉ ရက်

သို့

ဥက္ကဋ္ဌ
ထားဝယ်အထူးစီးပွားရေးဇုန်စီမံခန့်ခွဲမှုကော်မတီ
နေပြည်တော်

အကြောင်းအရာ။ **EIA/SIA အစီရင်ခံစာများနှင့် ပတ်သက်၍ (Public Consultation) လူထုကြားနာပွဲမှတ်တမ်း ပေးပို့တင်ပြခြင်း**

အထက်အကြောင်းအရာပါကိစ္စနှင့် ပတ်သက်၍ (၂၈. ၃. ၂၀၁၈)ရက်နေ့နှင့် (၂၉. ၃. ၂၀၁၈) ရက်နေ့များတွင် ထားဝယ်အထူးစီးပွားရေးဇုန်၊ ITD အစည်းအဝေးခန်းမ၌ ကျင်းပပြုလုပ်ခဲ့သည့် ထားဝယ်အထူးစီးပွားရေးဇုန်စီမံကိန်း အကောင်အထည်ဖော်ရာတွင် ကနဦးစီမံကိန်းလုပ်ငန်းများ၏ EIA / SIA အစီရင်ခံစာများနှင့် ပတ်သက်၍ (Public Consultation)လူထုကြားနာပွဲမှတ်တမ်းအား သိရှိနိုင်ပါရန်နှင့် လိုအပ်သည်များလမ်းညွှန်မှုပြုနိုင်ပါရန် ပူးတွဲပါအတိုင်း တင်ပြအပ်ပါသည်။

တွဲဖက်အတွင်းရေးမှူး(၁)

မိတ္တူကို-

- ဒုတိယဥက္ကဋ္ဌ (၁)၊ ထားဝယ်အထူးစီးပွားရေးဇုန်စီမံခန့်ခွဲမှုကော်မတီ
- ဒုတိယဥက္ကဋ္ဌ (၂)၊ ထားဝယ်အထူးစီးပွားရေးဇုန်စီမံခန့်ခွဲမှုကော်မတီ
- အတွင်းရေးမှူး၊ ထားဝယ်အထူးစီးပွားရေးဇုန်စီမံခန့်ခွဲမှုကော်မတီ
- လက်ခံ/မျှောစာတွဲ

(၂၈-၃-၂၀၁၈) ရက်နေ့ နံနက် (၁၈၀၀) နာရီအချိန်တွင် ITD အစည်းအဝေးခန်းမ၌ ကျင်းပပြုလုပ် သည့် ထားဝယ်အထူးစီးပွားရေးဇုန်စီမံကိန်း အကောင်အထည်ဖော်ရာတွင် ကနဦးစီမံကိန်းများ၏ EIA၊ ESIA အစီရင်ခံစာများနှင့်ပတ်သက်၍ (Public Consultation) လူထုကြားနာပွဲမှတ်တမ်း

အခမ်းအနားတက်ရောက်သူများ

၁။ အခမ်းအနားသို့ တက်ရောက်သူများမှာ အောက်ပါအတိုင်းဖြစ်ပါသည် -

(က)	ဦးဟိုပင်	လူမှုရေးနှင့်စည်ပင်သာယာရေး ဝန်ကြီး	တနင်္သာရီတိုင်းဒေသကြီးအစိုးရအဖွဲ့
(ခ)	ဦးဖြိုးဝင်းထွန်း	ဒုတိယဥက္ကဋ္ဌ-၁	ထားဝယ်အထူးစီးပွားရေးဇုန်စီမံခန့်ခွဲမှုကော်မတီ
(ဂ)	ဦးစောလုကာ	ကရင်တိုင်းရင်းသားလူမျိုးများ ရေးရာဝန်ကြီး	တနင်္သာရီတိုင်းဒေသကြီးအစိုးရအဖွဲ့
(ဃ)	ဦးကြည်စိုး	ဒုတိယဥက္ကဋ္ဌ	တနင်္သာရီတိုင်းဒေသကြီးလွှတ်တော်
(င)	ဒေါက်တာမြင့်ဆန်း	ဒုတိယဥက္ကဋ္ဌ-၂	ထားဝယ်အထူးစီးပွားရေးဇုန်စီမံခန့်ခွဲမှုကော်မတီ
(စ)	ဦးလှမော်ဦး	ညွှန်ကြားရေးမှူးချုပ်	စားသုံးသူရေးရာဦးစီးဌာန
(ဆ)	ဦးလှထွန်းဦး	ဒုတိယညွှန်ကြားရေးမှူးချုပ်	ဆောက်လုပ်ရေးဝန်ကြီးဌာန
(ဇ)	ဦးသောင်းမြင့်ထွန်း	အင်ဂျင်နီယာချုပ်	ဆောက်လုပ်ရေးဝန်ကြီးဌာန
(ဈ)	ဦးစောဘီးလယ်		KNU အဖွဲ့
(ည)	ဦးဆန်းဦး	ညွှန်ကြားရေးမှူး	သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင် ထိန်းသိမ်းရေးဝန်ကြီးဌာန
(ဋ)	ဦးမြတ်စိုးဝင်း	တိုင်းတာဝန်ခံ	မြန်မာဆိပ်ကမ်းအာဏာပိုင်အဖွဲ့
(ဌ)	ဦးထွန်းထွန်းဝင်း	ညွှန်ကြားရေးမှူး	အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန
(ဍ)	ဒေါက်တာထွန်းထွန်း	တိုင်းဦးစီးမှူး	ရင်းနှီးမြှုပ်နှံမှုနှင့်ကုမ္ပဏီများညွှန်ကြားမှု ဦးစီးဌာန

(ပ) ဦးထွန်းထွန်းလင်း တွဲဖက်အတွင်းရေးမှူး-၁ ထားဝယ်အထူးစီးပွားရေးဇုန်စီမံခန့်ခွဲမှုကော်မတီ

(ဏ) ဒေါ်ခင်မိမိထွေး တွဲဖက်အတွင်းရေးမှူး-၂ ထားဝယ်အထူးစီးပွားရေးဇုန်စီမံခန့်ခွဲမှုကော်မတီ

(တ) ဦးဝင်းမင်းထွဋ် ညွှန်ကြားရေးမှူး ဆောက်လုပ်ရေးဝန်ကြီးဌာန

(ထ) ဦးနေလင်း လ/ထညွှန်ကြားရေးမှူး ထားဝယ်အထူးစီးပွားရေးဇုန်စီမံခန့်ခွဲမှုကော်မတီရုံးအဖွဲ့

(ဒ) ဦးထင်အောင်ကျော် လ/ထညွှန်ကြားရေးမှူး သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန

(ဓ) ဒေါ်ဝေစိုးဇင် ဦးစီးအရာရှိ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန

(န) ဦးစောမောင်သိမ်း ဒု-ဦးစီးမှူး သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန

(ပ) OSSC ကိုယ်စားလှယ်များ

(ဖ) Italian-Thai Development Public Company Limited (ITD) ကိုယ်စားလှယ်များ

(ဗ) Myandawei Industrial Estate Company Limited (MIE) ကိုယ်စားလှယ်များ

(ဘ) Dawei Residence Company Limited (DRC) ကိုယ်စားလှယ်များ

(မ) Dawei Power Company Limited (DPC) ကိုယ်စားလှယ်များ

(ယ) Dawei Power Generating Company Limited (DPG) ကိုယ်စားလှယ်များ

(ရ) Dawei LNG Terminal Company Limited (DLTC) ကိုယ်စားလှယ်များ

(လ) United Analyst And Engineering Consultant Company Limited (UAE) ကိုယ်စားလှယ်များ

(ဝ) TEAM Consulting Engineering and Management Company Limited (TEAM) ကိုယ်စားလှယ်များ

(သ) TOTAL Business Solution Company Limited ကိုယ်စားလှယ်များ

(ဟ) ERM-Siam Company Limited (ERM) ကိုယ်စားလှယ်များ

(ဠ) PHISUT Technology Company Limited (PHISUT) ကိုယ်စားလှယ်များ

(အ)	ဦးတင်မောင်ဦး		အပြည်ပြည်ဆိုင်ရာဥပဒေပညာရှင်အဖွဲ့
(-)	ဦးတင်မောင်သာ		World Wildlife Funds
(-)	ဦးစိုင်းနေဝင်းမြင့်		World Wildlife Funds
(-)	ဒေါ်မာလာ		ထားဝယ်အမျိုးသမီးသမဂ္ဂ
(-)	ဒေါ်သီတာမိုး		ထားဝယ်အမျိုးသမီးသမဂ္ဂ
(-)	ဦးအောင်ဖြိုးဝင်း		ထားဝယ်ဖွံ့ဖြိုးရေးအဖွဲ့
(-)	ဒေါ်သက်အိစံ		ထားဝယ်ဖွံ့ဖြိုးရေးအဖွဲ့
(-)	ကိုဇော်	သတင်းထောက်	တနင်္သာရီဂျာနယ်၊ Dawei Watch
(-)	ဦးတင့်လွင်	သတင်းထောက်	Hinthar Media

(-) အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာနမှ ဝန်ထမ်းများ

(-) ဒေသခံရပ်မိရပ်ဖများနှင့် ရွာသားများ

ရည်ရွယ်ချက်

၂။ ထားဝယ်အထူးစီးပွားရေးဇုန်စီမံကိန်း အကောင်အထည်ဖော်ရေးနှင့်ပတ်သက်၍ ဆောင်ရွက်ရာတွင် လူမှုပတ်ဝန်းကျင်နှင့် သဘာဝပတ်ဝန်းကျင်၏ လေ့လာတွေ့ရှိဆန်းစစ်ချက်များအား ဒေသခံပြည်သူလူထုအား အသိပညာပေးဆွေးနွေးရန်နှင့် ဒေသခံများ၏သဘောထားအား သိရှိနိုင်စေရန် ဆောင်ရွက်ရခြင်းဖြစ်ပါသည်။

ဆွေးနွေးတင်ပြချက်များ

၃။ ထားဝယ် အထူးစီးပွားရေးဇုန် စီမံခန့်ခွဲမှုကော်မတီ ဒုတိယဥက္ကဋ္ဌ(၁)၊ တနင်္သာရီတိုင်းဒေသကြီး စီမံ/ဘဏ္ဍာဝန်ကြီး ဦးဖြိုးဝင်းထွန်းမှ အဖွင့်အမှာစကားပြောကြားရာတွင် ယခုအခမ်းအနားကို တက်ရောက်လာကြသော တိုင်းဒေသကြီးလွှတ်တော်ဥက္ကဋ္ဌ၊ ဌာနဆိုင်ရာမှ အရာရှိကြီးများ၊ ဒေသအာဏာပိုင်အဖွဲ့အစည်းမှ ကိုယ်စားလှယ်များ၊ KNU အဖွဲ့မှ တာဝန်ရှိပုဂ္ဂိုလ်များ၊ ဒေသခံကျေးရွာများမှ တက်ရောက်လာကြသော ရပ်မိရပ်ဖများအားလုံး မင်္ဂလာပါဟု ဦးစွာပဏာမနှုတ်ခွန်းဆက်သပါကြောင်း၊ ယနေ့ပြုလုပ်သောဆွေးနွေးပွဲမှာ ထားဝယ်အထူးစီးပွားရေးဇုန်စီမံကိန်း အကောင်အထည်ဖော်ရေးနှင့်ပတ်သက်၍ လူမှုပတ်ဝန်းကျင်နှင့် သဘာဝပတ်ဝန်းကျင် လေ့လာတွေ့ရှိချက်များအား ဒေသခံပြည်သူလူထုအား ရှင်းလင်းတင်ပြရန် ပြည်သူ့ကြားနာပွဲပြုလုပ်ရခြင်းဖြစ်ပါကြောင်း၊ ပြည်သူတွေကို ပွင့်ပွင့်လင်းလင်းချပြမှာဖြစ်ကြောင်း၊ ယခုပွဲမှာဆိုရင်ဖြင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနမှ ပညာရှင်များ၊ အသိပညာရှင် အတတ်ပညာရှင်များမှ သဘာဝပတ်ဝန်းကျင်ဆိုင်ရာ ဆန်းစစ်မှုနှင့်ပတ်သက်ပြီး ရှင်းလင်းတင်ပြမှာဖြစ်သဖြင့် ပြည်သူလူထုအနေဖြင့် သိရှိလိုသည့်အချက်များအား ပွင့်လင်းစွာမေးမြန်းနိုင်ကြောင်း၊ မည်သည့်လုပ်ငန်းမဆို ပြည်သူမပါက အောင်မြင်မှုမရရှိနိုင်ပါကြောင်း၊ ပြည်သူတွေနှင့် ရင်းရင်းနှီးနှီး တွေ့ဆုံဆွေးနွေးနိုင်အောင် ဤပွဲကို ပြုလုပ်ရခြင်းဖြစ်ကြောင်း၊ အထူးစီးပွားရေးဇုန် (၃) ခုရှိသည့်အနက် ရေနက်ဆိပ်ကမ်းရော အထူးစီးပွားရေးဇုန်ရော ပြုလုပ်နိုင်သည့်ဇုန်မှာ ထားဝယ်ဇုန်ပဲဖြစ်ပါကြောင်း၊ ပထမဆုံးအနေဖြင့် ထားဝယ်-ထီးခီး နှစ်လမ်းသွားကားလမ်း ဖောက်လုပ်မှာဖြစ်ကြောင်းနှင့် စီမံကိန်းလုပ်ငန်းများဆောင်ရွက်ရာတွင် ပြည်သူလူထုထိခိုက်မှုအနည်းဆုံးဖြစ်အောင် ဆောင်ရွက်သွားမည်ဖြစ်ပါကြောင်း၊ မည်သည့်အလုပ်မဆို ပြည်သူနှင့်အစိုးရ တိုင်ပင်ညှိနှိုင်းပူးပေါင်းဆောင်ရွက်မှသာ အောင်မြင်မည်ဖြစ်ကြောင်း၊ ဒီနေ့အခမ်းအနားဟာလည်း (၃) ကြိမ်မြောက် ပြည်သူလူထုနှင့် တွေ့ဆုံခြင်းဖြစ်ကြောင်း၊ ထားဝယ်အထူးစီးပွားရေးစီမံကိန်းနှင့်ပတ်သက်၍ ရင်းရင်းနှီးနှီးအကြံပြုနိုင်ကြောင်း၊ စီမံကိန်းအကောင် အထည်ဖော်ဆောင်ရွက်နိုင်ရေး ဒေသခံပြည်သူများမှ ဝိုင်းဝန်းကူညီဆောင်ရွက်သွားရန် လိုအပ်ပါကြောင်းနှင့် ယခုလိုပြည်သူ့ကြားနာပွဲအား ဒေသခံပြည်သူများအနေဖြင့် စိတ်ပါဝင်စားစွာ အချိန်ပေးပြီး တက်ရောက်လာကြတဲ့အတွက် အထူးပင်ကျေးဇူးတင်ရှိပါကြောင်း နှုတ်ခွန်းဆက်စကားပြောကြားခဲ့ပါသည်။

၄။ Mr Thanarat၊ Italian-Thai Development Public Co.,ltd., မှ ယနေ့သည့် အမှတ်ရစရာနေ့တစ်ရက်ဖြစ်ပါကြောင်း၊ ဒီနေ့ကိုစောင့်စားလာခဲ့တာ ကြာခဲ့ပြီဖြစ်ပါကြောင်း၊ ဒီ Project ကို အမြင်အနေနဲ့ပြောရမယ်ဆိုရင် ကမ္ဘာ့နိုင်ငံရေးမှာ နိုင်ငံတစ်နိုင်ငံသည် တစ်နိုင်ငံတည်းအနေဖြင့် ရပ်တည်ရန်

ခက်ခဲကြောင်း၊ ထို့ကြောင့် နိုင်ငံအများနှင့် ပူးပေါင်းဆောင်ရွက်ရပါကြောင်း၊ မြန်မာနှင့်ထိုင်းသည် အိမ်နီးချင်းမိတ်ဆွေနိုင်ငံများဖြစ်ပါကြောင်း၊ တစ်နိုင်ငံနှင့်တစ်နိုင်ငံ အပြန်အလှန် ဖေးမလက်တွဲမှီခိုနေရပါကြောင်း၊ ယခုစီမံကိန်းသည်လည်း မြန်မာနိုင်ငံနှင့် ထိုင်းနိုင်ငံ၏ ပေါင်းစည်းမှုအတွက် အကောင်းဆုံးပြယုဂ်ဖြစ်ပါကြောင်း၊ ယခုစီမံကိန်းအတွက် အစိုးရတာဝန်ရှိသူများရော ဒေသခံများပါ စီမံကိန်းလုပ်ငန်းများအပေါ် အမြင်ချင်းဖလှယ်နိုင်ရန် သတင်းအချက်အလက်များပေးရန် လာရောက်ခဲ့ခြင်းဖြစ်ပါကြောင်း၊ ထားဝယ်သာမက ဒေသကြီးတစ်ခုလုံးအတွက် ဖွံ့ဖြိုးတိုးတက်ရန်ဖြစ်ပါကြောင်း၊ နောင်အနာဂတ် ဖွံ့ဖြိုးတိုးတက်ရန် ရည်ရွယ်ပါကြောင်း၊ ရင်းနှီးမြှုပ်နှံမှုအား အတူတကွပူးပေါင်း၍ အောင်မြင်အောင်ဆောင်ရွက်လိုပါကြောင်း၊ ယခုအချိန်မှစ၍ တဖြည်းဖြည်းချင်းတိုးတက်အောင် ဆောင်ရွက်သွားပါက တစ်ချိန်တွင် ပြီးမြောက်အောင်မြင်သွားမည်ဖြစ်ပါကြောင်း၊ နှစ်ဦးနှစ်ဖက် မှန်ကန်သောလမ်းကြောင်းမှ အတူတကွ ပူးပေါင်းဆောင်ရွက်သွားရန် မျှော်လင့်ပါကြောင်း ပြောကြားခဲ့ပါသည်။

၅။ ဆက်လက်ပြီး United Analyst and Engineering Consultant company limited (UAE) မှ ထားဝယ်အထူးစီးပွားရေးဇုန်အတွင်းတည်ဆောက်မည့် ကနဦးစက်မှုဇုန်စီမံကိန်းအား ဆွေးနွေးခဲ့ရာ စီမံကိန်းကာလတွင် တည်ဆောက်ရေးကာလနှင့် လုပ်ငန်းလည်ပတ်သည့်ကာလ (၂) ပိုင်းပါဝင်ပြီး ထိခိုက်မှုလေ့လာဆန်းစစ်ခြင်းဧရိယာမှာ (၅) ကီလိုမီတာအချင်း ဝက်ရှိပါကြောင်း၊ စီမံကိန်းတွင် စက်မှုလုပ်ငန်းများအတွက်နေရာချထားမှုများပါဝင်ကြောင်း၊ အခြေခံအဆောက်အဦးနှင့်ဝန်ဆောင်မှုတွင် စက်မှုဇုန်အတွင်း လမ်းဖောက်လုပ်ခြင်း၊ လျှပ်စစ်နှင့် ရေပေးဝေရေးစနစ်၊ ရေကြီး/ရေလျှံမှု ကာကွယ်ရေးစနစ်၊ ရေဆိုးသန့်စင်ခြင်းစနစ်၊ စွန့်ပစ်အမှိုက်စီမံခန့်ခွဲခြင်းစနစ်၊ အရေးပေါ်တုံ့ပြန်ရေးစနစ်၊ အမြဲစိမ်းဧရိယာနှင့် အပမ်းဖြေနေရာလုပ်ဆောင်ခြင်းများပါဝင်ကြောင်း၊ စီမံကိန်းကာလအတွင်း လိုက်နာဆောင်ရွက်သွားမည့် ကတိကဝတ်များတွင် မြန်မာနိုင်ငံအတွင်းတည်ဆဲဥပဒေ၊ နည်းဥပဒေများနှင့် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်များပါဝင်ကြောင်း၊ လူထုတွေ့ဆုံပွဲပြုလုပ်ရာတွင် ထိခိုက်မှုသက်ရောက်နိုင်ချေရှိသောကျေးရွာများနှင့် တွေ့ဆုံဆွေးနွေးခြင်းနှင့် ပြန်လည်နေရာချထားခြင်းနှင့်ပက်သက်၍ ဆွေးနွေးခဲ့ပါကြောင်း၊ ဒေသခံရွာသားများ၏ စိုးရိမ်ပူပန်မှုများ အနှစ်ချုပ်မှာ ကျန်းမာရေး ထိခိုက်မှု၊ ပတ်ဝန်းကျင်ထိခိုက်မှု (အထူးသဖြင့် ရေထုညစ်ညမ်းမှု)၊ မြေနှင့် သီးနှံများအတွက် လျော်ကြေးသမာသမတ်ရှိမှု၊ ဒေသခံများ၏အလုပ်အကိုင်၊ ပညာပေးရေးအစီအစဉ်များ၊ အလုပ်သမားအခွင့်အရေးနှင့် သင့်တော်သောလစာဖန်တီးပေးခြင်း၊ အခြေခံအဆောက်အဦး၊ လျှပ်စစ်၊ ဆရာဝန်လုံလောက်မှု၊ ကျန်းမာရေးစောက်ရှောက်မှုမြင့်တင်ခြင်းများ ဖြစ်ပါကြောင်း၊ လူထုစိုးရိမ်ပူပန်မှုများအား လျော့ပါးသက်သာစေရေးအတွက် တာဝန်ယူမှု/တာဝန်ခံမှုများဖြင့်

ကြိုးပမ်းဆောင်ရွက်သွားမည်ဖြစ်ပါကြောင်းနှင့် စီမံကိန်းဆောင်ရွက်ခြင်းဖြင့် ရရှိနိုင်မည့်အကျိုး ကျေးဇူးများအားဆွေးနွေးခဲ့ပါသည်။

၆။ ဦးစောဘီးလယ်၊ KNU အဖွဲ့မှ စက်မှုဇုန်အကောင်အထည်ဖော်ရေးနှင့်ပတ်သက်၍ (၁၃) ရွာ ထိခိုက်မှုရှိသည်ဟု သိရှိရပါကြောင်း၊ ကျေးရွာများအထိသွားရောက်၍ အနီးကပ်မေးမြန်းသင့်ပါကြောင်း ဆွေးနွေးပြောကြားခဲ့ပါသည်။

၇။ ထို့နောက် UAE အဖွဲ့မှ စက်မှုဇုန်စီမံကိန်းနှင့် ဆက်စပ်နေသည့် ကျေးရွာ (၁၄) ရွာသို့ သွားရောက်ခဲ့ပါကြောင်း၊ ကျေးရွာများသို့ ကြိုတင်ချိန်းဆိုကာ သွားရောက်ခဲ့ပါကြောင်း၊ မိမိတို့ ကျေးရွာများသို့ ရှင်းပြခဲ့သည်များကို ကျေးရွာသားအားလုံးနီးပါး သဘောပေါက်ကြပါကြောင်း၊ မိမိတို့ကွင်းဆင်းချိန်တွင် ကျေးရွာသားများမှ စီမံကိန်းကို မကန့်ကွက်ကြပါကြောင်း စသည်ဖြင့် ဆွေးနွေးပြောကြားခဲ့ပါသည်။

၈။ ထို့နောက် ဦးဘိုတို၊ Upper International အဖွဲ့မှ (၂) လမ်းသွားစီမံကိန်းနှင့် ပတ်သက်၍ ဦးစွာ တင်ပြစေလိုပါကြောင်း၊ အစီရင်ခံစာအား ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနမှ အကြံပြုချက်ပေးထားသည့် အခြေအနေတွင်သာ တွေ့ရှိရပါကြောင်း၊ EIA အစီရင်ခံစာတွင် စာမျက်နှာ (၂၀၀၀) ခန့်ရှိသည်ကို တွေ့ရပါကြောင်း၊ အဆိုပါအစီရင်ခံစာများအား ဒေသခံများနားလည်အောင် မည်သည့်ပုံစံဖြင့် ချပြထားခြင်းရှိသည်ကို သိရှိလိုပါကြောင်း ဆွေးနွေးပြောကြားခဲ့ပါသည်။

၉။ ထို့နောက် UAE အဖွဲ့မှ တနင်္သာရီတိုင်းဒေသကြီးအစိုးရအဖွဲ့သို့ အစီရင်ခံစာအနှစ်ချုပ် ပေးပို့ထားပါကြောင်း ပြန်လည်ဆွေးနွေးတင်ပြခဲ့ပါသည်။

၁၀။ ဆက်လက်၍ ဒေါက်တာဆန်းဦး၊ ညွှန်ကြားရေးမှူး၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနမှ EIA လုပ်ငန်းဆောင်ရွက်ပုံအဆင့်ဆင့်ကို ထုတ်ပြန်ပြီးဖြစ်ပါကြောင်း၊ EIA စိစစ်သုံးသပ်ရေးအဖွဲ့ကို ဖွဲ့စည်းထားပါကြောင်း၊ ထိုအဖွဲ့တွင် မိမိအနေဖြင့် အတွင်းရေးမှူးအနေဖြင့်ပါဝင်ပြီး၊ အဖွဲ့ဝင် (၃၉) ဦးဖြင့် ဖွဲ့စည်းထားပါကြောင်း၊ ၎င်းအဖွဲ့တွင်မှ အဖွဲ့ခွဲ (၄) ခုကို ထပ်မံခွဲခြားထားပါကြောင်း၊ သက်ဆိုင်ရာ ဌာနဆိုင်ရာများမှ အဖွဲ့ခွဲများတွင် ပါဝင်ပါကြောင်း၊ EIA အခြေအနေပေါ်မူတည်၍ SIA ရေးဆွဲသင့်ပါက ရေးဆွဲရန် သတ်မှတ်ပါကြောင်း၊ ယခုစီမံကိန်းနှင့်ပတ်သက်၍ ဒေသခံလူထုနှင့် ဆက်စပ်ပတ်သက်နေခြင်းများကို ဖြေကြားပေးနိုင်ပါကြောင်း၊ ဆွေးနွေးဖြေကြားရင်း သွေဖည်လွဲမှားခြင်းများ အနည်းငယ်ရှိပါက ခွင့်လွှတ်ပေးစေလိုကြောင်း၊ ဆွေးနွေးချက် သွေဖည်လွဲမှားမှုများရှိပါက ယခုတက်ရောက်ကြသော ဒေသခံများ၊ အဖွဲ့အစည်းများမှ ထောက်ပြပေး၍ရပါကြောင်း၊ EIA သုံးသပ်ဆန်းစစ်ခြင်းများပြုလုပ်ရာတွင် ယခု

တင်ပြသွားတဲ့ ဒေါ်ဖြူဖြူရှိန်တို့အဖွဲ့တွေကိုပါ ဖိတ်ကြားပါကြောင်း၊ EIA အစီရင်ခံစာ အကောင်အထည် ဖော်မှု စောင့်ကြည့်ရမည့်အပိုင်းနှင့်ပတ်သက်၍ စောင့်ကြည့်စစ်ဆေးနေပါကြောင်း၊ (၆) လလျှင် တစ်ကြိမ် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဌာနသို့ Monitoring Report တင်ရမည်ဖြစ်ကြောင်း၊ နောက်ဆက်တွဲ လေ့လာစောင့်ကြည့်မှုများ ပြုလုပ်သွားရမည်ဖြစ်ပါကြောင်း၊ EIA, SIA အစီရင်ခံစာပါ လမ်းညွှန်အကြံ ပြုချက်များအား လိုက်နာမှုမရှိပါက အရေးယူ၍ရပါကြောင်း ဆွေးနွေးပြောကြားခဲ့ပါသည်။

၁၁။ ဦးအောင်ဖြိုးဝင်း၊ ထားဝယ်ဖွံ့ဖြိုးရေးအဖွဲ့က EIA Process အား ဆောင်ရွက်ရာတွင် ကျေးရွာ (၁၃) ရွာအား မတ်လ (၁၇) ရက်မှ (၂၂) ရက်နေ့ထိ (၆) ရက်တည်းဖြင့် မည်သို့မည်ပုံ ကွင်းဆင်းသွား သည်ကို သိလိုကြောင်း၊ ကျေးရွာကွင်းဆင်းမှုမှာ တစ်ရက်လျှင် နှစ်ရွာနှင့်အထက်ဖြစ်နေပါကြောင်း၊ တစ်ရွာလျှင် ရွာသားဦးရေမည်မျှ မေးမြန်းရှင်းပြခဲ့သည်ကို သိလိုပါကြောင်း၊ အချင်းဝက် (၅) ကီလိုမီတာ နယ်မြေဆိုသည်မှာ မည်သည့်နေရာများ ပါဝင်သည်ကိုသိလိုကြောင်း၊ ယခုတင်ပြချက်များတွင် ကွင်းဆင်း စစ်ဆေးချိန်တွင် အဓိကတွေ့ရှိရချက်များ မပေါ်လွင်ပဲဖြစ်နေပါကြောင်း၊ မိမိအနေဖြင့် ယခုစီမံကိန်း EIA ကိစ္စနှင့်ပတ်သက်၍ ပြည်သူလူထုကြားနာပွဲပြုလုပ်ပြီးမှ ခွဲခြမ်းစိတ်ဖြာမှု ပြုလုပ်ကာ ပြည်သူလူထုသို့ ချပြရမည်ဖြစ်ပြီး၊ နောက်မှ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဌာနသို့ တင်ပြရမည်ဟု နားလည်ထားပါကြောင်း၊ ယခုလုပ်ထုံးလုပ်နည်း ပြောင်းပြန်ဖြစ်နေသယောင် တွေ့ရှိရပါကြောင်း၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဌာနမှ EIA အစီရင်ခံစာအား ဆန်းစစ်မှုပြုလုပ်ချိန်တွင် တွေ့ရှိချက်များအား သိရှိလိုပါကြောင်း၊ ပြည်သူလူထုသို့ အသိပေးရမည့်အချက်များအား သိလိုပါကြောင်း ဆွေးနွေးပြောကြားခဲ့ပါသည်။

၁၂။ ဦးစိုးနွယ်၊ ရလိုင်ကျေးရွာက ယခုထဆွေးနွေးရာတွင် ဒေသခံများတစ်ယောက်မျှမပါဝင်ပါကြောင်း၊ အလုပ်လုပ်မှ တိုးတက်ကြီးပွားမည်ဖြစ်ကြောင်း၊ မီဒီယာများ ဆွေးနွေးခြင်းကို ကျေးဇူးတင်ရှိပါကြောင်း၊ စီမံကိန်းအား အဖွဲ့ (၃၆) ဖွဲ့မှ ကန့်ကွက်ခြင်းသည် ဘာသဘောလဲသိလိုပါကြောင်း၊ စီးပွားရေးလုပ်မှ အောင်မြင်မည်ဖြစ်ကြောင်း၊ မည်သည့်စီမံကိန်းမျှမစရသေးဘဲ မီဒီယာများအနေဖြင့် အစိုးရတာဝန်ရှိသူ များအား စီမံကိန်းအကောင်အထည်ဖော်မှုနှင့်ပတ်သက်၍ ကန့်ကွက်မှုများ သိပ်ပြီးမပြုလုပ်ရန် ပြောလိုပါ ကြောင်း၊ ဒေသခံပြည်သူများအား သနားငဲ့ညှာသင့်ပါကြောင်း ဆွေးနွေးပြောကြားခဲ့ပါသည်။

၁၃။ UAE အဖွဲ့မှ မိမိတို့အဖွဲ့ ကွင်းဆင်းမည့်ရက်အား ကျေးရွာသို့ ကြိုတင်အကြောင်းကြားပါကြောင်း၊ တစ်ရက်တည်းဖြင့် နှစ်ရွာခန့် ကွင်းဆင်းပြီးသည်များလည်း ရှိပါကြောင်း၊ အချို့ရွာများတွင် လူဦးရေနည်း ပါးခြင်းနှင့် အချို့ရွာများတွင် ရွာချင်းကပ်လျက်ရှိနေပါကြောင်း၊ လူထုထိတွေ့မှုအား UAE အဖွဲ့မှ အဓိက အကြံပေးအဖြစ် ဆောင်ရွက်ပါကြောင်း၊ EIA Process ဆောင်ရွက်ပြီးမှ ဥပဒေထွက်ရှိခြင်းဖြစ်၍

ပြောင်းပြန်ဟုပြော၍မရပါကြောင်း၊ ပြည်သူလူထုသို့ အသိပညာပေးဖြန့်ဝေမှုများ ဆက်လက်လုပ်ဆောင်သွားရမှာဖြစ်ကြောင်း ဆွေးနွေးပြောကြားခဲ့ပါသည်။

၁၄။ ဦးတင်မောင်ဦး၊ အပြည်ပြည်ဆိုင်ရာဥပဒေပညာရှင်များအဖွဲ့မှ ယခု EIA အစီရင်ခံစာ ပြုစုချိန်မည်မျှကြာသည်ကို သိလိုကြောင်း၊ Public Consultation ပြုလုပ်ရာတွင် Scoping အဆင့်နှင့် Investigation အဆင့် နှစ်ဆင့်ရှိသည်ဟု သိရှိရကြောင်း၊ တစ်ဆင့်ပြီးပါကတစ်ကြိမ် Public Consultation ပြုလုပ်ရမည်ဟု ဥပဒေတွင်ပါရှိကြောင်း၊ ယခု ဘယ်အဆင့်များတွင် ပြုလုပ်ခဲ့သည်ကို သိရှိလိုပါကြောင်း၊ EIA ပြုလုပ်ခြင်းသည် စီမံကိန်းကြောင့် ရရှိလာမည့် လူမှုထိခိုက်မှုများ၊ သဘာဝပတ်ဝန်းကျင်ထိခိုက်မှုများကို ပြည်သူလူထုသို့ ချပြရမည်ဟု နားလည်ထားပါကြောင်း၊ ယခုစီမံကိန်းတွင် မြေယာသိမ်းဆည်းမှု နှင့် EIA အစီရင်ခံစာအား မည်သည့်အရာကို ဦးစွာပြုလုပ်သည်ကို သိလိုပါကြောင်း ဆွေးနွေးပြောကြားခဲ့ပါသည်။

၁၅။ ပုဂေါ့ဇွန်း ဒေသခံတစ်ဦးမှ အထူးစီးပွားရေးဇုန်နှင့်ပတ်သက်ပြီး လူထုတွေ့ဆုံပွဲများသာ မကြာခဏပြုလုပ်နေကြောင်း၊ ယခုထိ စီမံကိန်းလုပ်ငန်းများ စတင်သည်ကိုမတွေ့ရသေးကြောင်း၊ ကျေးရွာ (၁၃) ရွာလုံးမှ စီမံကိန်းအား မျှော်လင့်နေပါကြောင်း၊ မဖြစ်နိုင်တာတွေ ကန့်ကွက်နေသရွေ့ စီမံကိန်းအကောင်အထည်ဖော်ဖို့ ခက်ခဲနေမည်ဖြစ်ပါကြောင်း၊ ဒေသခံပြည်သူများအနေဖြင့် လုပ်ငန်းများ လုပ်ဖြစ်မည်/ မလုပ်ဖြစ်မည်၊ ဘယ်အချိန် စတင်နိုင်မည်ကို ရှင်းရှင်းလင်းလင်းသိလိုပါကြောင်း၊ အမှန်တကယ် စီမံကိန်းအကောင်အထည်ဖော်ပါက ဒေသခံရွာများအားလုံးမှ အားပေးနေမည်ဖြစ်ကြောင်း ဆွေးနွေးပြောကြားခဲ့ပါသည်။

၁၆။ UAE အဖွဲ့မှ မိမိတို့အဖွဲ့အနေဖြင့် ပတ်ဝန်းကျင်လေ့လာဆန်းစစ်မှုပြုလုပ်သည့်အဖွဲ့သာဖြစ်ကြောင်း၊ မြေယာကိစ္စများကို ကုမ္ပဏီနှင့် တာဝန်ရှိသူများနှင့်သာ သီးသန့်ဆွေးနွေးစေလိုကြောင်း ဆွေးနွေးပြောကြားခဲ့ပါသည်။

၁၇။ ဆက်လက်ပြီး United Analyst and Engineering Consultant company limited မှ ထားဝယ်အထူးစီးပွားရေးဇုန်အတွင်းတည်ဆောက်မည့် ကနဦးမြို့ပြစီမံကိန်းအားရှင်းလင်းခဲ့ရာ စီမံကိန်းနေရာချထားမှုတွင် ကနဦးအဆင့်အနေဖြင့် လူနေထိုင်ရန် (၅) ထပ်အဆောက်အဦး (၉) လုံး၊ (၈) ထပ်ဝန်ဆောင်မှုအဆောက်အဦး (၁) လုံးနှင့် Retail ဆောင်ရွက်နိုင်ရန် (၃) ထပ်အဆောက်အဦပါဝင်ကြောင်း၊ ဖွံ့ဖြိုးမှုအဆင့်တွင် (၅) ထပ်အဆောက်အဦ (၁၆၇) လုံး၊ ဈေးကွက်လိုအပ်ချက်အပေါ်မူတည်ပြီး (၈) ထပ်

ဝန်ဆောင်မှုအဆောက်အဦ (၂၀) လုံးနှင့် Retail (၃) ထပ်အဆောက်အဦ (၆၂) လုံးတည်ဆောက်နိုင်ရန် ရည်မှန်းထားပါကြောင်း၊စီးပွားရေးဇုံဧရိယာများပါဝင်ပါကြောင်း၊ အခြေခံအဆောက်အဦးနှင့် ဝန်ဆောင်မှုတွင် လမ်းဖောက်လုပ်ခြင်း၊ ရေကြီးရေလျှံမှုကာကွယ်ရေးစနစ်၊ ရေသန့်စင်စက်၊ ရေဆိုးသန့်စင်စက်၊ အမှိုက်စွန့်ပြစ်ရန်နေရာ၊ မီးသတ်ဌာန၊ ဆက်သွယ်ရေးစင်တာ၊ သယ်ယူပို့ဆောင်ရေးနှင့် အပန်းဖြေဧရိယာများပါဝင်ပါကြောင်း၊ ရေကြီးရေလျှံထိန်းချုပ်မှုစနစ်၊ ရေးပေါ်မီးဘေးတုံ့ပြန်ရေးအစီအစဉ်နှင့် မုန်တိုင်းနှင့် ရေကြီး/ရေလျှံမှုများအတွက် အရေးပေါ်ကာကွယ်ရေးအစီအစဉ်များ ပါဝင်ပါကြောင်း၊ ကနဦးမြို့ပြစီမံကိန်းအား တည်ဆောက်ရာတွင် EIA၊ SIA များအတွက် မြန်မာနိုင်ငံအတွင်း တည်ဆဲဥပဒေ၊ နည်းဥပဒေများအတိုင်း လိုက်နာဆောင်ရွက်သွားမည်ဖြစ်ပါကြောင်း၊ လူထုစိုးရိမ်ပူပန်မှုများအား လျော့ပါးသက်သာစေရေးအတွက် တာဝန်ယူမှု/တာဝန်ခံမှုများဖြင့် ကြိုးပမ်းဆောင်ရွက်သွားမည်ဖြစ်ပါကြောင်းနှင့် စီမံကိန်းဆောင်ရွက်ခြင်းဖြင့် ပိုမိုကောင်းမွန်သောအခြေခံအဆောက်အဦးများ၊ ဆက်သွယ်ရန်လမ်းများ၊ လျှပ်စစ်နှင့်ရေပေးဝေရေး၊ ထောက်ပံ့ရေးအဆောက်အဦး မီးသတ်စခန်းနှင့် ဆေးရုံ၊ ပိုမိုကောင်းမွန်သော စီးပွားရေး၊ ဘဝတန်ဖိုးနှင့် လူနေမှုအဆင့်အတန်း၊ ကျွမ်းကျင်မှုအသစ်နှင့်နည်းပညာအသစ်၊ ဝန်ဆောင်မှု အလုပ်အကိုင်/လုပ်ငန်းအခွင့်အလန်းများ စသည့်အကျိုးကျေးဇူးများ ရရှိနိုင်မည်ဖြစ်ကြောင်း ဆွေးနွေးခဲ့ပါသည်။

၁၈။ ဦးစိုးသိန်း၊ လဲရှောင်ကျေးရွာအုပ်ချုပ်ရေးမှူးမှ ယခင်ကပြုလုပ်ခဲ့သော ဆွေးနွေးပွဲများအား အကြိမ်ကြိမ်အခါအခါ တက်ရောက်ခဲ့ပါကြောင်း၊ ဒေသခံများအနေဖြင့် မြေယာလျော်ကြေးများ မှန်မှန်ကန်ကန်ရရှိရေး၊ အလုပ်အကိုင်ရရှိရေးကိစ္စများအတွက် စိုးရိမ်ပူပန်မှုများ ဖြစ်နေပါကြောင်း၊ ကျေးရွာတိုင်းတွင် လိုအပ်ချက်များအားလုံး ချက်ချင်းရရန်မဖြစ်နိုင်သည်ကိုတော့ နားလည်ပါကြောင်း၊ နိုင်ငံတော်စီမံကိန်းဖြစ်သည့်အတွက် အချို့ကိစ္စများတွင် ချက်ချင်းမရနိုင်သည်များကို နားလည်ပါကြောင်း၊ ကုမ္ပဏီမှ ဒေသအတွက် မှန်မှန်ကန်ကန်လုပ်ဆောင်ပေးပါက အထူးပြောစရာမလိုပါကြောင်း၊ ယခုအချိန်တွင် ဒေသခံများက တင်ပြသည်ထက် အခြားဒေသမှလူများက ဝေဖန်မှုများ များပြားနေသည်ကို တွေ့နေရပါကြောင်း၊ ယခင်က တိုင်းဒေသကြီးအစိုးရအဖွဲ့၊ တိုင်းအုပ်ချုပ်ရေးမှူး ဦးတင်သိန်းမှ တာဝန်ယူဆောင်ရွက်စဉ်ကာလတွင် SWB အထောက်အကူပြုလုပ်ငန်းအဖွဲ့နှင့် CSR လုပ်ငန်းဆောင်ရွက်နေသည့်အဖွဲ့များ ချိတ်ဆက်ဆောင်ရွက်ရန် ပြောခဲ့ပါကြောင်း၊ ဒေသတွင်း CSR လုပ်ငန်းအဖွဲ့များကို ပြန်လည်အသက်သွင်းပေးစေလိုကြောင်း၊ ပြင်ပလူမှုအဖွဲ့အစည်းများအနေဖြင့် မိမိတို့ဒေသခံရွာသားများ နားမလည်သည်များ၊ နစ်နာမှုများရှိသည်ကို တွေ့ရှိရပါက လမ်းညွှန်ပေးပါရန် မေတ္တာရပ်ခံပါကြောင်း၊ ထားဝယ်အထူးစီးပွားရေးဇုန်စီမံကိန်းသည် နိုင်ငံတော်နှင့် တိုင်းဒေသကြီးအတွက် အများကြီးအကျိုးရှိမည့် စီမံကိန်းဖြစ်ခြင်းကြောင့်

အစိုးရတာဝန်ရှိသူများနှင့် ကုမ္ပဏီတာဝန်ရှိသူများမှ စီမံကိန်းအား အမြန်ဆုံးအကောင်အထည်ဖော်ပေးစေလိုကြောင်း ဆွေးနွေးပြောကြားခဲ့ပါသည်။

၁၉။ ဦးရီစွမ်း၊ ပုဂေါဖွန်းကျေးရွာအုပ်ချုပ်ရေးမှူးမှ အထူးစီးပွားရေးဇုန် အကောင်အထည်ဖော်မည့်ကုမ္ပဏီအနေဖြင့် တာဝန်ယူမှု၊ တာဝန်ခံမှုရှိရန် လိုအပ်ပါကြောင်း၊ မြေယာကိစ္စနှင့်ပတ်သက်၍ ယခင်ကဲ့သို့ ကြိုက်ရောင်းကြိုက်ဝယ်ပုံစံဖြင့် ဆောင်ရွက်ရန်မှာ လက်ခံ၍မရပါကြောင်း၊ အကောင်အထည်ဖော်မည့်ကုမ္ပဏီမှာ ITD ဖြစ်စေ၊ အခြားကုမ္ပဏီဖြစ်စေ တာဝန်ယူမှု၊ တာဝန်ခံမှုရှိရန် အရေးကြီးပါကြောင်း ဆွေးနွေးပြောကြားခဲ့ပါသည်။

၂၀။ ဝန်ကြီးဦးဖြိုးဝင်းထွန်းမှ မိမိတို့ တနင်္သာရီတိုင်းဒေသကြီးတွင် Infrastructure ပိုင်း အားနည်းပါကြောင်း၊ ယခင်ကော်မတီ၊ ယခင်အစိုးရကာလအတွင်းတွင် အထူးစီးပွားရေးဇုန်လုပ်ငန်းများ လည်းပတ်မှုမရှိခဲ့ပါကြောင်း၊ မြေယာလျော်ကြေးကိစ္စနှင့်ပတ်သက်၍ ညီတူညီမျှဖြစ်စေရမည်ဖြစ်ကြောင်း၊ မိမိတို့တာဝန်ယူချိန်တွင် ပြည်သူလူထုကို ထိခိုက်နစ်နာအောင် ပြုလုပ်မည်မဟုတ်ကြောင်း၊ မိမိတို့အနေဖြင့် ဘဝါကျောက်မိုင်းကြောင့် ဒေသခံများနစ်နာမှုများအတွက် လျော်ကြေးငွေ သိန်းတစ်ထောင်ကျော်ရရှိအောင် ဆောင်ရွက်ပေးခဲ့ပါကြောင်း၊ တနင်္သာရီတိုင်းအနေဖြင့် National Grid လျှပ်စစ်မီးမရရှိသေးပါကြောင်း၊ ကန်ပေါက်ဒေသတွင် ၁၃၀၀ မီဂါဝပ် လျှပ်စစ်ဓာတ်အားရရှိနိုင်မည့် တာဘိုင်တည်ဆောက်နေပါကြောင်း၊ တနင်္သာရီကမ်းမြောင်ဒေသ Master Plan နှင့် SEZ Master Plan တို့အား ရေးဆွဲနေပါကြောင်း၊ ယခင်က စီမံကိန်းဧရိယာအတွင်း အစိုးရအနေဖြင့် ဖွံ့ဖြိုးရေးလုပ်ငန်းများ မလုပ်ဆောင်ခဲ့ကြောင်း၊ တိုင်းဒေသကြီးဘဏ္ဍာငွေဖြင့် သိန်း (၃၀၀၀) ကျော် အကုန်အကျခံကာ မောင်းမကန်ကျေးရွာမှ မူးဒူးရွာသို့ လမ်းပြုပြင်ပေးထားပါကြောင်း၊ အထူးစီးပွားရေးဇုန် စီမံခန့်ခွဲမှုကော်မတီဥက္ကဋ္ဌ၊ လျှပ်စစ်နှင့်စွမ်းအင်ဝန်ကြီးဌာန၊ ဒုတိယဝန်ကြီးအနေဖြင့် ပညာရှင်တစ်ဦးဖြစ်ပါကြောင်း၊ ဒေါက်တာမြင့်ဆန်းနှင့် ဒေါက်တာတင်ထူးနိုင်တို့သည်လည်း နိုင်ငံခြားသို့ သွားရောက်ပညာသင်ထားသည့် စီးပွားရေးပညာရှင်များဖြစ်ကြောင်း၊ ကနဦးစီမံကိန်းများအား ဦးစွာအကောင်အထည်ဖော်သွားမည်ဖြစ်ကြောင်း၊ (၂) လမ်းသွား စီမံကိန်းအား ထိုင်းနိုင်ငံ၊ NEDA အဖွဲ့မှ ချေးငွေ ဘတ် ၄.၅ ဘီလီယံဖြင့် လမ်းဖောက်လုပ်သွားမည်ဖြစ်ကြောင်း၊ နှစ်လမ်းသွားစီမံကိန်းအောင်မြင်သွားပါက ကျွဲကူးရေပါဆိုသလို ထားဝယ်အထူးစီးပွားရေးဇုန်စီမံကိန်းလည်း မအောင်မြင်နိုင်စရာမရှိပါကြောင်း၊ ကျွန်တော်တို့အနေဖြင့် လုပ်ငန်းဆောင်ရွက်ရာတွင် အမှားတွေ့ရှိပါက ထောက်ပြနိုင်ကြောင်း၊ စီမံကိန်းလုပ်ငန်းများနှင့်ပတ်သက်၍ သိရှိလိုသည်များအား

ပွင့်ပွင့်လင်းလင်းမေးမြန်းနိုင်ပါကြောင်း၊ မိမိတို့လူမျိုးများအနေဖြင့် နဂိုဇီဇမည့်ပါကြောင်း၊ အနှစ် (၂၀) အတွင်း စက်ာပူကိုကျော်နိုင်အောင် ကြိုးစားကြမည်ဖြစ်ကြောင်း ဆွေးနွေးပြောကြားခဲ့ပါသည်။

၂၁။ ဦးကျော်ဆန်း၊ မူးဒူးကျေးရွာအုပ်ချုပ်ရေးမှူးမှ မိမိအနေဖြင့် ဒေသခံစစ်စစ်ဖြစ်ပါကြောင်း၊ မိမိတို့ မူးဒူးကျေးရွာ ပြောင်းရွှေ့ရမည့် ကျေးရွာစာရင်းထဲပါဝင်သည်ဟု သိရပါကြောင်း၊ ယခင်ကကောက်ယူထားသည့် အိမ်ခြေစာရင်းထက် ယခုအခါ အိမ်ခြေပိုမိုများပြားလာပြီဖြစ်ကြောင်း၊ ကျေးရွာအတွင်း လူဦးရေ တိုးတက်လာသဖြင့် အိမ်ခြေပိုမိုများပြားခြင်းဖြစ်ကြောင်း၊ ထပ်မံတိုးတက်လာသည့် အိမ်ခြေများအတွက် မည်သို့ပြုလုပ်ပေးမည်ကို သိလိုပါကြောင်း ဆွေးနွေးပြောကြားခဲ့ပါသည်။

၂၂။ ဝန်ကြီးဦးဖြိုးဝင်းထွန်းမှ နာဂစ်ကြောင့် ဧရာဝတီမှလူများ ရန်ကုန်၊ လှိုင်သာယာတွင် လာရောက်ကျူးကျော်သကဲ့သို့ ယခု ထားဝယ်အထူးစီးပွားရေးဇုန်အတွင်း ပြင်ပမှ လာရောက်ကျူးကျော်သူများ မရှိဟု ယုံကြည်ကြောင်း၊ နဂိုဒေသခံမိသားစုမှ တိုးပွားလာသော မိသားစုများ၏ နေအိမ်များသာ ထပ်မံတိုးပွားလာသည်ဟု ယုံကြည်ကြောင်း၊ ဒါတွေဟာ ဖြစ်ရိုးဖြစ်စဉ်များဖြစ်၍ နောက်ဆုံးအခြေအနေအား အကောင်းဆုံးဖြေရှင်းသွားမည်ဖြစ်ကြောင်း ဒေသခံများ နစ်နာအောင်ဆောင်ရွက်မည်မဟုတ်ကြောင်း ပြန်လည်ရှင်းလင်းပြောကြားခဲ့ပါသည်။

၂၃။ ဒေါက်တာမြင့်ဆန်း၊ ဒုဥက္ကဌ-၂၊ ထားဝယ်အထူးစီးပွားရေးဇုန် စီမံခန့်ခွဲမှုကော်မတီမှ ဝန်ကြီးဦးဖြိုးဝင်းထွန်းဦးဆောင်သော မြေယာစီမံခန့်ခွဲမှုကော်မတီကို ဖွဲ့စည်းထားပါကြောင်း၊ နိုင်ငံခြားမှ ERM အဖွဲ့ကိုငှားရမ်း၍ မြေယာသိမ်းဆည်းရေး၊ မြေယာလျော်ကြေးပေးချေရေးကိစ္စများအတွက် ရွာသားများအား သင်တန်းပေးဆောင်ရွက်သွားမည်ဖြစ်ကြောင်း၊ စီမံခန့်ခွဲမှုကော်မတီ၊ တိုင်းဒေသကြီးအစိုးရအဖွဲ့နှင့် ERM အဖွဲ့ တို့ ပူးပေါင်းဆောင်ရွက်သွားမည်ဖြစ်ကြောင်း ဆွေးနွေးပြောကြားခဲ့ပါသည်။

၂၄။ ထားဝယ်အထူးစီးပွားရေးဇုန်တွင် တည်ဆောက်မည့် (၁၅) မဂ္ဂါဝပ် ယာယီဓါတ်အားပေးစက်ရုံ စီမံကိန်း၏ ပတ်ဝန်းကျင်နှင့်လူမှုရေးအပေါ် ထိခိုက်မှုဆန်းစစ်ခြင်းအစီရင်ခံစာအား TEAM (Team Consulting Engineering and Management Co.,Ltd.(Thai) & TOTAL Business Solution Co.,Ltd.(Myanmar) မှ တင်သွင်းဖတ်ကြားခဲ့ရာ ESIA အတွက် ပထမအကြိမ်အစည်းအဝေးကို ၂၀၁၆ ခုနှစ်၊ ဖေဖော်ဝါရီလ (၂၇) ရက်နေ့တွင် ကျင်းပခဲ့ပါကြောင်း၊ နယ်ပယ်အတိုင်းအတာသတ်မှတ်ခြင်း အစီရင်ခံစာကို ၂၀၁၇ ခုနှစ်၊ ဇန်နဝါရီလ (၃၀) ရက်နေ့တွင် အတည်ပြုချက်ရရှိခဲ့ပါကြောင်း၊ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန (MONREC) မှ ESIA အစီရင်ခံစာအတည်ပြု

ချက်ကို ၂၀၁၇ ခုနှစ်၊ အောက်တိုဘာလ (၂၅) ရက်နေ့တွင် ရရှိခဲ့ပါကြောင်း၊ ယခုစီမံကိန်းသည် (၁၅) မဂ္ဂါဝပ် ဓါတ်အားပေးစက်ရုံစီမံကိန်းသာဖြစ်သော်လည်း ပတ်ဝန်းကျင်ထိခိုက်ဆန်းစစ်ခြင်းနှင့် သက်ဆိုင်သော ပတ်ဝန်းကျင်ဆိုင်ရာ ဆန်းစစ်ခြင်း (EIA) ကိုလုပ်ဆောင်ထားပါကြောင်း၊ ယာယီဓါတ်အားပေးစက်ရုံသည် ထားဝယ်အထူးစီးပွားရေးဇုန်၏ တည်ဆောက်ရေးလုပ်ငန်းများအား ထောက်ပံ့ပေးရန်နှင့် ဒီဖိုင်းသက်တမ်းမှာ (၂) နှစ် ကြာမြင့်မည်ဖြစ်ကာ အပူစွမ်းအင်သုံး လျှပ်စစ်ဓါတ်အားပေးစက်ရုံ စတင်လည်ပတ်ပါက ဖယ်ရှားမည်ဖြစ်ပါကြောင်း၊ အဓိကလောင်စာအဖြစ် Liquefied Natural Gas (LNG) ကိုအသုံးပြုပြီး ၄င်းသည် ပတ်ဝန်းကျင်နှင့်လိုက်လျောညီထွေဖြစ်သော ကျောက်ဖြစ်ရုပ်ကြွင်းလောင်စာဖြစ်ပြီး ကာဗွန်ဒိုင်အောက်ဆိုဒ် (CO_2) ထွက်ရှိမှု နည်းပါးပါကြောင်း၊ ပတ်ဝန်းကျင်နှင့်အဓိကသက်ဆိုင်သော ဥပဒေနှင့် စည်းမျဉ်းများအတိုင်း လိုက်နာဆောင်ရွက်သွားမည်ဖြစ်ပြီး စီမံကိန်းအကောင်အထည်ဖော်ရာတွင် အကြိုတည်ဆောက်ရေးလုပ်ငန်း ဆောင်ရွက်ခြင်းကာလ၊ တည်ဆောက်ဆဲကာလ၊ လုပ်ငန်းလည်ပတ်ဆောင်ရွက်သည့်ကာလ၊ လုပ်ငန်းရပ်စဲခြင်းကာလဟူ၍ ကာလများပိုင်းခြားကာ လိုက်နာဆောင်ရွက်ရမည့် ကတိကဝတ်များအတိုင်း ဆောင်ရွက်ကာ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် (EMP) များလည်း ဆောင်ရွက်သွားမည်ဖြစ်ကြောင်းဆွေးနွေးခဲ့ပါသည်။

၂၅။ ဆက်လက်၍ ဦးလေးလွင်၊ ရလိုင်ရွာသားမှ ယခင်က ITD မှ CSR လုပ်ငန်းများဆောင်ရွက်သူ ဦးမင်းကျော်ဝေနှင့် ပြောခဲ့သည်များရှိပါကြောင်းနှင့် ထိုအချက်များအား ယခုတင်ပြမှုတွင် မတွေ့ရပါကြောင်း၊ ယခုဓာတ်အားပေးစက်ရုံကိစ္စနှင့်ပတ်သက်၍ ပုဂေါ်ဖွန်း၊ ရလိုင်၊ မင်းဒပ် စသည့်ကျေးရွာများသို့ ပါလျှပ်စစ်ဓာတ်အားမျှဝေပေးစေလိုကြောင်း၊ (၁) မီဂါဝပ်စက်များ သုံးလုံးခန့် ထပ်မံတပ်ဆင်၍ ကျေးရွာများသို့ လျှပ်စစ်ဖြန့်ဖြူးပေးပါက အကုန်အကျမများဟု ထင်မြင်ကြောင်းနှင့် ကျေးရွာသားများမှ သင့်တော်သောဈေးဖြင့် ဝယ်ယူကြမည်ဖြစ်ကြောင်း၊ ဒေသအတွင်း ကိစ္စတစ်ခုလုပ်တိုင်း ဒေသခံများအတွက်ပါ ထည့်သွင်းစဉ်းစားပေးစေလိုကြောင်း ဆွေးနွေးပြောကြားခဲ့ပါသည်။

၂၆။ ကနဦးရေပေးဝေရေးလုပ်ငန်း၊ ပယင်းဖြူရေလှောင်တမံ ကနဦးပတ်ဝန်းကျင် ဆန်းစစ်ခြင်းအစီရင်ခံစာအား PHISUT (PHISUT Technology) မှ တင်သွင်းဖတ်ကြားရာ ရေအရင်းအမြစ် ရရှိနိုင်သောနေရာများမှာ ပယင်းဖြူရေလှောင်တမံ၊ ဇကနိရွာအနောက်ဘက် ရေသိုလှောင်ကန်၊ ဒွဲတောရေလှောင်တမံ၊ အိုင်းရှည်ရေလှောင်တမံနှင့် ကလုံးထာရေလှောင်တမံနှင့် ရေကာတာများဖြစ်ပြီး ပယင်းဖြူရေလှောင်တမံကို ရွေးချယ်ထားပါကြောင်း၊ သက်ရောက်မှုရှိနိုင်သည့်အချက်များမှာ ပယင်းဖြူရေလှောင်ကန်နှင့် တမံတည်ဆောက်မည့်နေရာတွင် မြေယာသိမ်းယူခံရခြင်းကြောင့် သက်ရောက်နိုင်ခြင်း၊ ချောင်း

အနီးအနားတွင်နေထိုင်သူများ ချောင်းမှဆင်းလာသောရေအား အသုံးပြုနိုင်မှုအား သက်ရောက်နိုင်ခြင်း၊ ထားဝယ်မြစ်နှင့် ပယင်းဖြူချောင်းအကြားရှိ ရွှေ့ပြောင်းနေထိုင်တတ်သော ရေပေါ်/ရေအောက်ငါးများ၊ သက်ရှိသတ္တဝါများ၊ အပင်များနှင့် ပတ်ဝန်းကျင်ဆက်စပ်မှုအခြေအနေကို သက်ရောက်နိုင်ခြင်းတို့ဖြစ်ပါကြောင်း၊ အိမ်များနှင့် ပတ်ဝန်းကျင်အား ကွင်းဆင်းတိုင်းတာခြင်း၊ ဒေသခံများအား အချက်အလက်များကိုပြောပြခြင်းနှင့် ဆွေးနွေးခြင်း၊ ရေစမ်းသပ်ခြင်းနှင့် အချက်အလက်ကောက်ယူခြင်းများ ဆောက်ရွက်ပြီးဖြစ်ပါကြောင်း၊ အသုံးပြုမည့်မြေများအား တိုင်းတာခြင်းနှင့် သီးပင်စားပင်များ စာရင်းကောက်ယူခြင်း၊ ဂေဟနည်းပညာဖြင့် စုံစမ်းစစ်ဆေးခြင်း၊ ရေအရည်အသွေးနှင့် ရေအခြေအနေကို စောင့်ကြည့်စစ်ဆေးခြင်း၊ အများပြည်သူပါဝင်မှုနှင့် တိုင်ပင်ဆွေးနွေးမှုတွင် ပယင်းဖြူရွာ၊ ဥသရဲရွာနှင့် ဝက်ချောင်းရွာမှ လူကြီးများနှင့်လည်းကောင်း၊ အထူးစီးပွားရေးဇုန်အထောက်အကူလုပ်ငန်းအဖွဲ့နှင့် တိုင်းဒေသကြီးအစိုးရအဖွဲ့တို့ဖြင့် ဆွေးနွေးခဲ့ပြီးဖြစ်ကြောင်း၊ ဤစီမံကိန်းသည် ဒေသခံများအား အလုပ်အကိုင်အခွင့်အလမ်းနှင့် စီးပွားရေးဖွံ့ဖြိုးမှုအခွင့်အလမ်းကို အကျိုးဖြစ်ထွန်းစေမည်ဖြစ်ကြောင်း ဆွေးနွေးခဲ့ပါသည်။

၂၇။ ဦးရီစွမ်း၊ ပုဂေါ့ဇွန်းကျေးရွာအုပ်ချုပ်ရေးမှူးမှ မိမိတို့ကျေးရွာအတွင်း စီမံကိန်းကြောင့် ရေလွှမ်းမိုးခံရပြီး လျော်ကြေးမရသေးသောသူများ ရှိနေပါကြောင်း၊ ရေလွှမ်းခံရသည့်သူများကို ဦးစားပေးလျော်ကြေးပေးစေလိုကြောင်း၊ ပယင်းဖြူရေလှောင်တမံနှင့်ပတ်သက်၍ ရေဝပ်ဧရိယာလက်ရှိအတိုင်း လုံလောက်မှုရှိမည်ကို သိလိုပါကြောင်း၊ ရေဝပ်ဧရိယာပိုများလာမည်ကို စိုးရိမ်မိပါကြောင်း ဆွေးနွေးပြောကြားခဲ့ပါသည်။

၂၈။ ဆက်လက်၍ ITD မှ ရေဝပ်ဧရိယာများကို လျော်ကြေးပေးရန်ရှိပါကြောင်း၊ ရေလွှမ်းမိုးမှုကို ထိန်းသိမ်းမည့်အစီအစဉ်များ ရေးဆွဲထားပါကြောင်း၊ လတ်တလောအနေဖြင့် ရေဝပ်ဧရိယာများ ပိုများလာရန်မရှိပါကြောင်း ဆွေးနွေးပြောကြားခဲ့ပါသည်။

၂၉။ နှစ်လမ်းသွားစီမံကိန်းအတွက် ပတ်ဝန်းကျင်နှင့်လူမှုဘဝအပေါ် သက်ရောက်မှု ဆန်းစစ်ခြင်းအစီရင်ခံစာအား TEAM အဖွဲ့မှ တင်သွင်းဖတ်ကြားရာတွင် နယ်ပယ် တိုင်းတာခြင်းအစီရင်ခံစာအား ၂၀၁၅ ခုနှစ်၊ နိုဝင်ဘာလ (၄) ရက်နေ့တွင် တင်သွင်းခဲ့ကြောင်း၊ အပြီးသတ် ESIA အစီရင်ခံစာမူကြမ်းအတွက် MONREC မှ စတုတ္ထအကြိမ်တရားဝင် သုံးသပ်ချက်ကို ၂၀၁၈ ခုနှစ်၊ ဖေဖော်ဝါရီလ (၂၀) ရက်နေ့တွင် ရရှိခဲ့ပါကြောင်း၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ (၂၀၁၂) နှင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ထုံးလုပ်နည်း (၂၀၁၅) အရ ကီလိုမီတာ (၅၀) အထက်ရှည်လျားသောလမ်းဟောင်းကို အဆင့်မြှင့်တင်ခြင်း စီမံကိန်းသည် ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း EIA ပြင်ဆင်ရန် လိုအပ်ပါကြောင်း၊ ထိုင်းနိုင်ငံနယ်စပ်မှ ထားဝယ်အထူးစီးပွားရေးဇုန်အထိ လက်ရှိဖောက်လုပ်ထားပြီး

ဖြစ်သည့် ကျောက်ချောမခင်းရသေးသောလမ်းကို ထိုင်းနိုင်ငံ၏ လမ်းတံတားဌာန၏ စံနှုန်းဖြစ်သည့် အဆင့် (၄) ရှိသော အဝေးပြေးလမ်း ဒီဇိုင်းစံနှုန်းနှင့်အညီ ကတ္တရာလမ်းခင်းသွားမည်ဖြစ်ပြီး စီမံကိန်း၏ အချို့သော လက်ရှိလမ်းပိုင်းများတွင် ဘူမိဆိုင်ရာလမ်းဒီဇိုင်းများကို ပြုပြင်ပြောင်းလဲသွားရမည်ဖြစ်ကြောင်း၊ လမ်းတွင် ယာဉ်အသုံးပြုခကောက်ခံရာနေရာ၊ ဝန်ဆောင်မှုစင်တာ၊ နားနေဆောင်များပါဝင်ကြောင်း၊ Toll Plaza အခြေစိုက်စခန်း၊ မေတ္တာအခြေစိုက်စခန်း၊ Elasto အခြေစိုက်စခန်း (၁) တို့တွင် လေထုအရည်အသွေးတိုင်းတာခြင်း၊ ယာဉ်သွားလာမှု စစ်တမ်းကောက်ယူခြင်း၊ ရေနေသတ္တဝါဂေဟဗေဒ စစ်တမ်းကောက်ယူခြင်း၊ လူမှုစီးပွားစစ်တမ်းကောက်ယူခြင်း၊ အမျိုးသားအဆင့်နှင့် တိုင်းဒေသကြီးအဆင့်အာဏာပိုင်များနှင့် တွေ့ဆုံခြင်း၊ ကျေးရွာများတွင် လူထုတွေ့ဆုံပွဲပြုလုပ်ခြင်းများ ဆောင်ရွက်ခဲ့ပါကြောင်း၊ ကျေးရွာ (၁၅) ရွာကို ဖြတ်သန်းရမည်ဖြစ်ကြောင်း၊ မြေယာပေးလျော်ခြင်းအစီအစဉ်ကို အပြည်ပြည်ဆိုင်ရာစံနှုန်းများနှင့်အညီ ထားဝယ်အထူးစီးပွားရေးဇုန်ကော်မတီနှင့် အခြားသောအစိုးရဌာနများနှင့် ဒေသခံများပါဝင်ကာ ဆောင်ရွက်သွားမည်ဖြစ်ကြောင်း၊ WWF ၏ လမ်းဖောက်လုပ်ခြင်းဒီဇိုင်း လက်စွဲစာစောင်အကြံပြုချက်များအတိုင်း တောရိုင်းတိရစ္ဆာန်များ ဖြတ်သန်းသွားလာရန်နှင့် ဇီဝမျိုးကွဲများအတွက် စီစဉ်ဆောင်ရွက်သွားမည်ဖြစ်ကြောင်း၊ စီမံကိန်းအကောင်အထည်ဖော်စဉ် လိုက်နာရမည့်ကတိကဝတ်များ၊ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု (EMP) အစီအစဉ်များအား လိုက်နာဆောင်ရွက်သွားမည်ဖြစ်ပြီး ခြောက်လတစ်ကြိမ် အစီရင်ခံစာအား ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဌာန ECD သို့ တင်ပြသွားမည်ဖြစ်ကြောင်း ရှင်းလင်းတင်ပြခဲ့ပါသည်။

၃၀။ ဦးစောဘီးလယ်၊ KNU အဖွဲ့မှ ယခင်ကမိမိအနေဖြင့် ပြည်ထောင်စုအဆင့်သို့ တင်ပြခဲ့သည်များရှိပါကြောင်း၊ (၂) လမ်းသွားကားလမ်းဖောက်လုပ်မည့်အစီအစဉ်မှာ ကြာမြင့်နေပြီဖြစ်ကြောင်း၊ ကားလမ်းကြောင်းတစ်လျှောက် ကျေးရွာများတွင် အိမ်ခြေများ တိုးပွားလာမှုရှိနေကြောင်း၊ မေတ္တာမြို့နှင့် ထီးခီးဒေသမှ ဒေသခံများကိုလည်း သွားရောက်ရှင်းပြစေလိုကြောင်း၊ ယခင်က ITD မှ မစ္စတာအာနမ်နှင့်ကွင်းဆင်းခဲ့ဖူးပါကြောင်း၊ သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနှင့် တောရိုင်းတိရိစ္ဆာန်များ ကာကွယ်စောင့်ရှောက်ရေး အစီအစဉ်များကိုလည်း စဉ်းစားပေးစေ လိုကြောင်း၊ ITD ကုမ္ပဏီနှင့် ရပ်ရွာလူထုတို့အမြဲတမ်းထိတွေ့မှုရှိဖို့လိုအပ်ပါကြောင်း၊ ITD၊ အစိုးရနှင့် ပြည်သူလူထု တွေ့ဆုံပွဲများ များများပြုလုပ်လျှင်ပိုမိုကောင်းမွန်လာမည်ဟု ထင်မြင်ပါကြောင်း၊ အစိုးရ၊ KNU နှင့် ဒေသခံပြည်သူတို့ ညှိနှိုင်းဆောင်ရွက်သွားခြင်းဖြင့် တစ်ဦးစီး၏ဆန္ဒများကို ပိုမိုသိရှိလာနိုင်မည်ဖြစ်ကြောင်း၊ မိမိတို့အနေဖြင့် စီမံကိန်းနှင့်ပတ်သက်၍ ညှိနှိုင်းပူးပေါင်းဆောင်ရွက်သွားမည်ဖြစ်ပါကြောင်း၊ တနင်္သာရီတိုင်းအနေဖြင့် သဘာဝပတ်ဝန်းကျင်ကို ထိန်းသိမ်းနိုင်သောတိုင်းဖြစ်စေလိုပါကြောင်း ဆွေးနွေးပြောကြားခဲ့ပါ သည်။

၃၀။ ဦးဖြိုး၊ ပိတောက်ကုန်းရွာ၊ တလိုင်းယာကျေးရွာအုပ်စုမှ မိမိတို့ရွာတွင် လျော်ကြေးပေးချေရန် အိမ် (၉) အိမ်ရှိသည့်အနက် အိမ် (၂) အိမ် လျော်ကြေးပေးရန် ကျန်နေသေးပါကြောင်း၊ ပယင်းဖြူရေလှောင်တမံနှင့် ဆက်စပ်အကောင်အထည်ဖော်မည့် နောက်ထပ်ရေအရင်းအမြစ်ကို သိလိုပါကြောင်း ဆွေးနွေးပြောကြားခဲ့ပါသည်။

၃၂။ Mr Thanarat၊ Italian-Thai Development Public Co.,ltd., က ယခုလုပ်ငန်းစီမံကိန်းအတွက်သာမဟုတ်ဘဲ ထားဝယ်အထူးစီးပွားရေးဇုန်တွင်ပါဝင်သော လုပ်ငန်းများအားလုံးအတွက် လျော်ကြေးပေးလျော်ရမည့်မူဝါဒဖြစ်ကြောင်း၊ ပြန်လည်နေရာချထားမှုနှင့် လျော်ကြေးပေးချေရေးအဆင့်များကို ဆွေးနွေးလိုကြောင်း၊ ရှေးဦးစွာ ဒေသဆိုင်ရာအာဏာပိုင်များနှင့် စီမံကိန်းသက်ရောက်မှုရှိသည့် ဒေသခံကိုယ်စားလှယ်များပါဝင်သော ပြန်လည်နေရာချထားမှုနှင့် လျော်ကြေးပေးချေရေးကော်မတီကို ဖွဲ့စည်း၍ ဥပဒေမူဝါဒများချမှတ်ခြင်း၊ Stakeholder များနှင့်တွေ့ဆုံခြင်း၊ တိုင်တန်းမှုများကို စီမံခန့်ခွဲမှု လုပ်ငန်းစဉ်ချမှတ်ရမည်ဖြစ်ကြောင်း၊ ပြင်ဆင်ခြင်းအဆင့်တွင် (၆) လခန့်ကြာမြင့်နိုင်ကြောင်း၊ အခြေခံသတင်းအချက်အလက်များစုစည်းခြင်းတွင် သန်းခေါင်စာရင်းနှင့် လူမှုစီးပွားစစ်တမ်းကောက်ယူခြင်း၊ မြေပြင်ကွင်းဆင်းခြင်း၊ တန်ဖိုးတွက်ချက်ခြင်း၊ မည်သည့်ကာလအထိသည် နောက်ဆုံးအကျုံးဝင်သည့် နေ့ရက်ဖြစ်သည်ကို သတ်မှတ်ခြင်းများပါဝင်ကြောင်း၊ ပြန်လည်နေရာချထားမှုအစီအစဉ်များ၊ အလုပ်အကိုင်နှင့် သက်မွေးဝမ်းကျောင်းနိုင်ရေးအစီအစဉ်များ ရေးဆွဲခြင်းနှင့် အကောင်အထည်ဖော်ခြင်းအဆင့်တွင် မြေယာပိုင်ဆိုင်မှုအတွက် လျော်ကြေးပေးခြင်း၊ ပြန်လည်နေရာချထားခြင်း၊ စောင့်ကြည့်ခြင်းနှင့် မှတ်တမ်းတင်ခြင်း အစီအစဉ်များပါဝင်ကြောင်း၊ တင်ပြပါအစီအစဉ်များအတိုင်း လျော်ကြေးပေးခြင်း ကိစ္စရပ်များအား ဆောင်ရွက်ပါကြောင်း ပြန်လည်ရှင်းလင်းဖြေကြားခဲ့ပါသည်။

၃၃။ ဦးတင်မောင်ဦး၊ အပြည်ပြည်ဆိုင်ရာဥပဒေပညာရှင်များကော်မရှင်အဖွဲ့မှ ထားဝယ်အထူးစီးပွားရေးဇုန်တစ်ခုလုံးအတွက် EIA, SIA ကိစ္စနှင့်ပတ်သက်၍ မေးခွန်း (၂) ခု မေးမြန်းလိုကြောင်း၊ ထားဝယ်အထူးစီးပွားရေးဇုန်တစ်ခုလုံး၏ EIA, SIA အခြေအနေနှင့် နောက်ထပ် EIA, SIA နှင့်ပတ်သက်သော Public Consultation ပွဲများ ပြုလုပ်ရန်ရှိ/မရှိ သိရှိလိုကြောင်း၊ Third Party ကုမ္ပဏီများမှ EIA, SIA များ ရေးဆွဲပေးသည်မှာ အသေးစိတ်ကျပြီး ကောင်းမွန်ပါကြောင်း၊ စီမံကိန်းကြောင့် ဒေသခံတွေကို ထိခိုက်နစ်နာမည့်အချက်များ ဖော်ပြထားခြင်းမတွေ့ရကြောင်း၊ EIA, SIA ကိစ္စနှင့်ပတ်သက်၍ မြေပြင်ကွင်းဆင်း စစ်ဆေးတွေ့ရှိချက်များအား ဖော်ပြပေးစေလိုကြောင်း၊ ထားဝယ်အထူးစီးပွားရေးဇုန်တစ်ခုလုံးအတွက် EIA ကို ဘယ်သူရေးဆွဲပေးမည်ကို သိလိုပါကြောင်း၊ လူမှုစီးပွားထိခိုက်မှု ဆန်းစစ်ခြင်းမှ အဓိက

တွေ့ရှိချက်များကို တင်ပြပေးစေလိုကြောင်း၊ နောင်ကျင်းပမည့် လူထုကြားနာပွဲများတွင် အဓိကနစ်နာသူများကို ဖိတ်ကြားစေလိုကြောင်း ဆွေးနွေးပြောကြားခဲ့ပါသည်။

၃၄။ ဦးထင်အောင်ကျော်၊ လက်ထောက်ညွှန်ကြားရေးမှူး၊ သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနမှ EIA Procedure မှာလည်း ဘက်စုံစီမံကိန်းတွေအတွက် လိုအပ်ရင် ပြည်သူတို့အဓိကထိခိုက်နေသည့်အရာများအတွက် သီးခြားသတ်မှတ်ချက်များရှိကြောင်း၊ ထားဝယ်အထူးစီးပွားရေးဇုန် စတင်မည့်အချိန်မှာ မသေချာသေးသည့်အချိန်ဖြစ်နေပြီး မည်သူကပိုင်ရှင်ဆိုသည်ကိုလည်း မသိသေးသဖြင့် အားလုံးပေါင်းလုပ်ဖို့အခက်အခဲရှိကြောင်း၊ တစ်ခုချင်းစီအနေဖြင့် စဉ်းစားမည်ဆိုပါက တစ်ခုဆီမှာပါဝင်သည့် သက်ရောက်မှုတွေအပြင် ဆက်စပ်သက်ရောက်မှုတွေပါစဉ်းစားပြီး အစီရင်ခံစာ ပြုစုထားပါကြောင်း၊ ထားဝယ်အထူးစီးပွားရေးဇုန်အတွက် EIA သီးခြားဆွဲရန် မလိုအပ်ပါကြောင်း၊ စီမံကိန်းတစ်ခုချင်းတွင် လျှော့ချမှုများ ရှိနေပါကြောင်း၊ တည်ဆောက်ရေးလုပ်ငန်းများ စတင်လျှင်လည်း လူထုကြားနာပွဲများ ဆက်လက်လုပ်ဆောင်သွားမည်ဖြစ်ပါကြောင်း ပြန်လည်ရှင်းလင်းဖြေကြားခဲ့ပါသည်။

၃၅။ ဦးနေလင်း၊ လက်ထောက်ညွှန်ကြားရေးမှူးမှလည်း IEE ကိစ္စနှင့်ပတ်သက်၍ (၂) ကြိမ်၊ EIA ကိစ္စနှင့်ပတ်သက်၍ (၃) ကြိမ်၊ Public Consultation (၂) ကြိမ်၊ စုစုပေါင်း ပြည်သူလူထုနှင့်တွေ့ဆုံပွဲ (၇) ကြိမ် ကျင်းပပြုလုပ်ပြီးဖြစ်ကြောင်း၊ ဖိတ်ကြားရေးနှင့်ပတ်သက်ပြီး အားလုံးကိုဖိတ်ကြားထားပါကြောင်း၊ တစ်ချို့ဒေသခံများအနေဖြင့် မနက်ပိုင်းမလာရောက်နိုင်သည့်အတွက် Two Land Road စီမံကိန်းနှင့်ပတ်သက်ပြီး ရှင်းလင်းခြင်းအား နေ့လည်အချိန်သို့ ပြောင်းရွှေ့ရှင်းလင်းခဲ့ပါကြောင်း ဆွေးနွေးပြောကြားခဲ့ပါသည်။

၃၆။ မြန်မာနိုင်ငံ၊ ထားဝယ်အထူးစီးပွားရေးဇုန် (DSEZ) ၏ ကနဦးဖွံ့ဖြိုးရေးအဆင့် ရေသန့်စက်ရုံစီမံကိန်းအတွက် ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်လေ့လာခြင်း (IEE) အား ERM(ERM-Siam Co.,Ltd.) မှဆွေးနွေးရာ ရေသန့်စင်စက်ရုံကို ထားဝယ်အထူးစီးပွားရေးဇုန်(စီမံကိန်း) ၏ ကနဦးဖွံ့ဖြိုးရေးအဆင့်အတွက် စက်ရုံသုံးရေပေးပို့နိုင်ရန် တည်ဆောက်သွားမည်ဖြစ်ပါကြောင်း၊ အဆိုပြုထားသောရေသန့်စင်စက်ရုံ (WTP) ကို အသေးစားဆည် (ပယင်းဖြူ) တွင် ထားရှိသွားမည်ဖြစ်ကြောင်း၊ စီမံကိန်းအတွက် ကနဦးပတ်ဝန်းကျင်ဆိုင်ရာဆန်းစစ်ခြင်း (IEE) ကိုဆောင်ရွက်ပြီးဖြစ်ပါကြောင်း၊ ERM နှင့် SEM ကို ဆန်းစစ်လေ့လာခြင်းဆောင်ရွက်နိုင်ရန် MIE အနေဖြင့် ခန့်အပ်ထားပြီးဖြစ်ပါကြောင်း၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ၊ နည်းဥပဒေများ၊ ကွန်ဗင်းရှင်းများနှင့် စံချိန်စံညွှန်းများအတိုင်း လိုက်နာဆောင်ရွက်သွားမည်ဖြစ်ပါကြောင်း၊ စီမံကိန်းအပြီးသတ်အစီအစဉ်ကို အတည်ပြုခြင်း၊ နယ်ပယ်အတိုင်းအတာ

သတ်မှတ်ခြင်း အစီရင်ခံစာကို အတည်ပြုခဲ့ပြီးဖြစ်ကြောင်း၊ ကနဦးပတ်ဝန်းကျင်ဆိုင်ရာ ဆန်းစစ်ခြင်း အပြီးသတ်အစီရင်ခံစာအတည်ပြုချက်ကို ၂၀၁၇ ခုနှစ်၊ မေလ (၂၉) ရက်နေ့တွင်လက်ခံရရှိခဲ့ပါကြောင်း၊ ဝက်ချောင်းကျေးရွာ၏ အရှေ့မြောက်ဘက် (၁.၈) ကီလိုမီတာနှင့် ခမောင်းချောင်းကျေးရွာ၏အရှေ့ဘက် (၃.၅) ကီလိုမီတာတွင် စီမံကိန်းနေရာတည်ရှိပါကြောင်း၊ ပတ်ဝန်းကျင်နှင့် လူမှုဝန်းကျင်ဆိုင်ရာစီမံခန့်ခွဲမှု အစီအစဉ်များ၊ လူထုကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေးအစီအစဉ်များ ချမှတ်အကောင်အထည် ဖော်ဆောင်ရွက်မည့် အစီအစဉ်များအား ဆွေးနွေးခဲ့ပါသည်။

၃၇။ တနင်္သာရီတိုင်းဒေသကြီးလွှတ်တော် ဒုဥက္ကဋ္ဌ ဦးကြည်စိုးမှ တက်ရောက်လာသော ဒေသခံပြည်သူ များ၊ KNU အဖွဲ့အစည်းမှ တာဝန်ရှိပုဂ္ဂိုလ်များ၊ ထားဝယ်အထူးစီးပွားရေးဇုန် ဖြစ်မြောက်ရေးအတွက် ဆောင်ရွက်ပေးသည့်ဝန်ထမ်းများအား ကျေးဇူးတင်ကြောင်း၊ ရှင်းလင်းပြောကြားပေးသောအဖွဲ့များကို လည်း အထူးကျေးဇူးတင်ပါကြောင်း၊ ဒေသခံများအနေဖြင့် စီမံကိန်းအောင်မြင်ရန်အတွက် ပံ့ပိုးကူညီပေး ရန်လိုအပ်ပါကြောင်း၊ လျော်ကြေးရယူထားပြီးဖြစ်သော်လည်း ၎င်းမြေများအား လုပ်ငန်းများမစတင်မီ အချိန်တွင် အလကားမထားပဲ အရင်းအမြစ်ပြုလုပ်၍ စိုက်ပျိုးအသုံးချနိုင်ပါကြောင်း ဆွေးနွေးပြောကြားခဲ့ ပြီး အစည်းအဝေးအား ညနေ (၁၅၀၀) နာရီတွင် ခေတ္တရပ်နားခဲ့ပါသည်။

၃၈။ အစည်းအဝေးဒုတိယနေ့အား (၂၉-၃-၂၀၁၈) ရက်နေ့ နံနက် (၀၈၀၀) နာရီတွင် ပြန်လည်စတင်ခဲ့ ပါသည်။

၃၉။ ထားဝယ်အထူးစီးပွားရေးဇုန် စီမံခန့်ခွဲမှုကော်မတီ ဒုတိယဥက္ကဋ္ဌ (၂) ဒေါက်တာမြင့်ဆန်းမှ အဖွင့် အမှာစကားပြောကြားရာတွင် ယခုအစည်းအဝေးသည် ပြည်သူ့ကြားနာပွဲ၊ ဒေသခံပြည်သူများနှင့်တွေ့ဆုံပွဲ ဖြစ်ပြီး ယခုအကြိမ်သည် တတိယအကြိမ်ဖြစ်ပါကြောင်း၊ အထူးစီးပွားရေးဇုန် (၃) ခုရှိပါကြောင်း၊ ထားဝယ်အထူးစီးပွားရေးဇုန်တွင် စီမံကိန်း (၉) ခုရှိပါကြောင်း၊ အဆိုပါ (၉) ခုအနက်မှ (၄) ခု အကြောင်း တင်ပြမည်ဖြစ်ပါကြောင်း၊ ထားဝယ်အထူးစီးပွားရေးဇုန်သည် ၂၀၀၈ ခုနှစ်မှ စတင်ခဲ့သော်လည်း အကြောင်းကြောင်းကြောင့် နှောင့်နှေးခဲ့ရခြင်းဖြစ်ပါကြောင်း၊ ၂၀၁၆ ခုနှစ် စီမံခန့်ခွဲမှုကော်မတီ အသစ် တာဝန်ထမ်းဆောင်ပြီးနောက်ပိုင်း ITD နှင့် ချုပ်ဆိုထားသော စာချုပ်များကို ပြန်လည်သုံးသပ်ခဲ့ပါ ကြောင်း၊ စီမံကိန်း (၃) ခုကို ရွေးချယ်ပြီး ဆောင်ရွက်သွားမည်ဖြစ်ကြောင်း၊ ၎င်းတို့မှာ (၁) နှစ်လမ်းသွား ကားလမ်းစီမံကိန်း၊ (၂) လျှပ်စစ်မီးရရှိရေးစီမံကိန်းနှင့် (၃) ဆိပ်ကမ်းစီမံကိန်းတို့ ဖြစ်ပါကြောင်း၊ နှစ်လမ်း သွားကားလမ်း ဖောက်လုပ်ရန်အတွက် ထိုင်းနိုင်ငံမှချေးငွေရယူရန် လွှတ်တော်မှ အတည်ပြုပြီးဖြစ်၍ ထိုင်းနိုင်ငံမှ ချေးငွေရရှိရန်ဆောင်ရွက်ပြီး တင်ဒါခေါ်ယူဆောင်ရွက်သွားမည်ဖြစ်ကြောင်း၊ လျှပ်စစ်မီးရရှိ

ရေးအတွက် LNG သဘာဝဓာတ်ငွေ့ဖြင့် ကံပေါက် 1260 MW ခန့် ထုတ်လုပ်ရရှိရန် ပြင်သစ်နိုင်ငံ Total ကုမ္ပဏီနှင့်ဆောင်ရွက်သွားမည်ဖြစ်ကြောင်း၊ တန်ချိန်များတဲ့သင်္ဘောကြီးများ ဆိုက်ကပ်နိုင်တဲ့ ဆိပ်ကမ်း ဆောက်လုပ်ရန်ဖြစ်ပါကြောင်း၊ သင်္ဘောကြီးများ ဆိုက်ကပ်နိုင်တဲ့ ဆိပ်ကမ်းအနေဖြင့် ထားဝယ်နှင့် ကျောက်ဖြူမှာ တည်ဆောက်နိုင်ပြီး သီလဝါတွင် ရေနက်ဆိပ်ကမ်း တည်ဆောက်၍မရပါကြောင်း၊ ရေနက်ဆိပ်ကမ်းအသစ်ဆောက်လုပ်ရန် ဂျပန်နိုင်ငံ၊ JAICA မှ Master Plan ရေးဆွဲနေပြီဖြစ်ကြောင်း၊ လမ်း၊ မီး၊ ရေနက်ဆိပ်ကမ်း ပြည့်စုံမှ ရင်းနှီးမြှုပ်နှံမှုများကို ဖိတ်ခေါ်နိုင်မည်ဖြစ်ကြောင်း၊ မြေပြင်မှာ အကောင်အထည်မဖော်ပြနိုင်သေးသော်လည်း အထက် အဆင့်ဆင့်တွင် စာရွက်စာတမ်းများဖြင့် Process များအား ဆောင်ရွက်ထားပြီးဖြစ်ပါကြောင်း၊ ယခင်နေ့က ဒေသခံများပြောကြားချက်အရ ဖုန်စီမံကိန်းများ ဖြစ်ပေါ်စေရန် မျှော်လင့်နေရသည်မှာ မောနေပြီဖြစ်ကြောင်း၊ ဒေသခံများ၏ စိုးရိမ်စိတ်များအား နားလည်ပါကြောင်း၊ သဘာဝပတ်ဝန်းကျင်နှင့် လူမှုပတ်ဝန်းကျင် ထိခိုက်မှုများသက်သာရန် ITD မှ Third Party ငှားရမ်း၍ ပညာရှင်များဖြင့် EIA, SIA များ ဆောင်ရွက်ပြီး မြန်မာနိုင်ငံဘက် ECD မှ ပညာရှင်များက အစီရင်ခံစာများကို စီစစ်ရကြောင်း၊ သဘာဝပတ်ဝန်းကျင်ဥပဒေများ ၂၀၁၂ နှင့် ၂၀၁၄ တွင်မှ ထွက်ပေါ်ခဲ့၍ ဖုန်၏ EIA, SIA Process များ ပြုလုပ်ချိန်သည် ဥပဒေမထွက်ပေါ်ခင်အချိန်က ပြုလုပ်ခဲ့ရခြင်း ဖြစ်သောကြောင့် အားနည်းချက်များ ရှိနိုင်ပါကြောင်း၊ ဒေသခံလူထုနှင့်တွေ့ဆုံ၍ ၎င်းတို့၏ ဆန္ဒများ၊ စိုးရိမ်စိတ်များအား ပွင့်လင်းမြင်သာစွာ ဆွေးနွေးစေလိုကြောင်း၊ ပြည်သူလူထုထိခိုက်မှု အနည်းဆုံး ဖြစ်အောင် ကြိုးပမ်းဆောင်ရွက်သွားမည်ဖြစ်ကြောင်း၊ အစီခံစာအားလုံးအား Website တင်ပေးသွားမည် ဖြစ်ကြောင်း၊ ၂၀၁၈ ခုနှစ် ဧပြီလတွင် အင်္ဂလိပ်-မြန်မာလို ဖတ်လို့ရအောင် တင်ပြသွားမည်ဖြစ်ကြောင်း၊ အကျိုးပြုမည့် အကြံပြုချက်ကို လက်ခံပါကြောင်း၊ အားလုံးနှင့် ပူးပေါင်းဆောင်ရွက်သွားမည်ဖြစ်ကြောင်း၊ မေးမြန်းလိုသည့်အချက်များရှိပါက မေးမြန်းနိုင်ရန် ဖုန်းနံပါတ်များ၊ E-mail များ ကြော်ငြာထားပါကြောင်း၊ ပွင့်ပွင့်လင်းလင်း ရင်းရင်းနှီးနှီး ဝိုင်းဝန်းအဖြေရှာပေးပါလို့ အဖွင့်အမှာစကား ပြောကြားခဲ့ပါသည်။

၄၀။ ဆိပ်ကမ်းငယ် တည်ဆောက်ခြင်းလုပ်ငန်းအတွက် ပတ်ဝန်းကျင်နှင့် လူမှုဘဝအပေါ် သက်ရောက်မှု ဆန်းစစ်ခြင်းအား အစီရင်ခံစာအား TEAM (Team Consulting Engineering and Management Co.,Ltd.(Thai) & TOTAL Business Solution Co.,Ltd.(Myanmar) မှ တင်သွင်းဖတ်ကြားခဲ့ရာ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ (၂၀၁၂) နှင့် ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း (၂၀၁၅) အရ (၂၅) ဟက်တာ (၆၁.၇၈ ဧက) ထက်ကျယ်ဝန်းသော ဆိပ်ကမ်းစီမံကိန်းသည် ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း (EIA) ပြင်ဆင်ရန်လိုအပ်ပြီး ဆောက်လုပ်ရေးမစတင်ခင် အတည်ပြု

ချက်ရရှိရန်လိုအပ်ခြင်းကြောင့် ပျမ်းမျှဧက (၁၀၀) ကျယ်ဝန်းသော ဆိပ်ကမ်းငယ်စီမံကိန်းသည် ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA) ပြင်ဆင်ရမည်ဖြစ်ပါကြောင်း၊ နယ်ပယ်အတိုင်းအတာသတ်မှတ်ခြင်း အစီရင်ခံစာအတွက် အတည်ပြုချက်ကို ၂၀၁၇ ခုနှစ်၊ ဇန်နဝါရီလတွင် ရရှိခဲ့ပြီး ESIA အစီရင်ခံစာအတွက် အတည်ပြုချက်ကို သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန (MONREC) မှ ၂၀၁၇ ခုနှစ်၊ နိုဝင်ဘာလတွင် ရရှိခဲ့ပါကြောင်း၊ စီမံကိန်းအချက်အလက်များအနေဖြင့် ကမ်းလွန်အဆောက်အဦးများတွင် ပန်ဒင်အင်းမြစ်ဝ ဘယ်ဘက်အခြမ်းမှ (၁.၄) ကီလိုမီတာ ရှိသောလိုင်းကာတစ်ခု၊ အရှည် (၃) ကီလိုမီတာ၊ အကျယ် (၁၅၀) မီတာနှင့် အနက် (၈) မီတာ ရှိသော ချဉ်းကပ်တူးမြောင်းတစ်ခုနှင့် အချင်း (၃၆၀) မီတာနှင့် အနက် (၈) မီတာ ရှိသောTurning Circle တစ်ခုပါဝင်ကြောင်း၊ ကုန်းတွင်းအဆောက်အဦးများအတွက် Stockyard (၂) ခု (စုစုပေါင်း ဧက ၂၀) နှင့် နောက်တိုးအဆောက်အဦးများအတွက် ဧက (၈၀) ဖြစ်ပါကြောင်း၊ အဓိကလုပ်ဆောင်မှုများမှာ သောင်တူးခြင်း၊ သောင်တူး၍ရရှိသော သောင်များကို စွန့်ပစ်ခြင်း၊ လှိုင်းကာတည်ဆောက်ခြင်း၊ စီမံကိန်းချဉ်းကပ်လမ်းဖောက်လုပ်ခြင်း၊ ချဉ်းကပ်လမ်းဖောက်လုပ်ခြင်းကြောင့် ပြောင်းရွှေ့ပေးရမည့် ငပိတက်ရွာမှ အိမ် (၁၂) လုံးအား လျော်ကြေးပေးခြင်း၊ ပြန်လည်နေရာချထား ပေးခြင်းများ ပြုလုပ်ခြင်းများ ဆောင်ရွက်သွားရမည်ဖြစ်ကြောင်း၊ ထိခိုက်ခံရသော အိမ်ထောင်စုများသည် ငပိတက်ရွာရှိ အဆိုပြုထားသောနေရာသို့ပြောင်းရွှေ့ရန် သဘောတူညီထားပြီးဖြစ်ပါကြောင်း၊ ဆောက်လုပ်ပြီးစီးရန် အချိန် (၁၂) လ လိုအပ်ပါကြောင်း၊ သက်ဆိုင်ရာဥပဒေနှင့် စည်းမျဉ်းများ တည်ဆောက်ဆဲကာလနှင့် လုပ်ငန်းလည်ပတ်ဆောင်ရွက်သည့်ကာလအတွက် ပတ်ဝန်းကျင်ဆိုင်ရာ စီမံခန့်ခွဲမှုအစီအစဉ် (EMP) များအတိုင်း ဆောင်ရွက်သွားမည်ဖြစ်ပါကြောင်း၊ ကန်ထရိုက်တာနှင့် ကန်ထရိုက်တာခွဲတို့ အားလုံးသည် သက်ဆိုင်ရာဥပဒေ၊ နည်းဥပဒေနှင့် လုပ်ထုံးလုပ်နည်းအားလုံးကို လိုက်နာရန် တာဝန်ယူရမည်ဖြစ်ပါကြောင်း၊ သောင်တူးဖော်ခြင်းမှ စုပုံလာသော အနည်အနှစ်များကြောင့် ရေနေသတ္တဝါများ ထိခိုက်မှုလျော့နည်းစေရေး ဆောင်ရွက်ရန်နှင့် ဆိပ်ကမ်းအနီးတွင်နေထိုင်သော ဒေသတွင်း ငါးဖမ်းသမားများအား ဆောက်လုပ်ရေးလုပ်ဆောင်မှု အချိန်ဇယားနှင့် သောင်တူးဖော်ခြင်းလုပ်ငန်း ဧရိယာတို့၏ သတင်းအချက်အလက်များကို ဖြန့်ဝေပေးရန် လိုအပ်ပါကြောင်း၊ ဒေသခံပြည်သူများ၏ အကူအညီလိုအပ်ချက်ကို ထောက်ပံ့ပေးနိုင်ရန် CSR အစီအစဉ်ကို ဆောင်ရွက်ရန် လိုအပ်ပါကြောင်း၊ ပိတ်သိမ်းမှုအစီအစဉ် မစတင်ခင် (၁) လနှင့် ပိတ်သိမ်းမှုပြီးစီးသည့်အချိန်တွင် ကမ်းလွန်အဆောက်အဦးများအနီးရှိ ကမ်းရိုးတန်းရေအရည်အသွေးနှင့် အဏ္ဏဝါဂေဟစနစ်တို့ကို စောင့်ကြည့်ရန် လိုအပ်ပါကြောင်း၊ စီမံကိန်းမတည်ဆောက်မီနှင့် တည်ဆောက်ဆဲကာလအတွင်း Grievance Redress Mechanism ကို ပြင်ဆင်ရန် လိုအပ်ပါကြောင်း၊ ဒေသခံပြည်သူများနှင့် စဉ်ဆက်မပြတ်တွေ့ဆုံဆွေးနွေးပြီး ၎င်းတို့၏

အကြံပြုချက်နှင့် လိုလားချက်များအား အလေးထားပေါင်းစပ်ဆောင်ရွက်ရန် လိုအပ်ပါကြောင်း၊ ပတ်ဝန်းကျင်နှင့် လူမှုရေးဆိုင်ရာ စောင့်ကြည့်စစ်ဆေးမှုအစီရင်ခံစာကို သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင် ထိန်းသိမ်းရေးဝန်ကြီးဌာနသို့ (၆) လ တစ်ကြိမ် တင်ပြရမည်ဖြစ်ပါကြောင်း ဆွေးနွေးခဲ့ပါသည်။

၄၁။ ဦးတင်ရွှေ၊ ကျန်းမာရေးမှူး၊ ငပိတက်ငယ်ရွာမှ ဇျစ်နီချောင်းရှိ တံငါလှေများနှင့်ပတ်သက်၍ မည်သို့ဆောင်ရွက်ပေးမည်ကို သိလိုပါကြောင်း၊ EIA စစ်တမ်းကောက်ယူမှုနှင့် ရွာသို့လာရောက်ရှင်းပြခြင်းမရှိသေးပါကြောင်း၊ ယခင်က အိမ်ခြေ (၁၂) လုံးသာရှိခဲ့သော်လည်း ယခုအိမ်ခြေများ ပိုမိုများပြားလာကြောင်း၊ အရှည် (၁) မိုင်ခွဲ၊ အမြင့် (၁၂) ပေရှိ အသံကာတံတိုင်း တည်ဆောက်မည်ဟု သိရှိရပါကြောင်း ဆွေးနွေးပြောကြားခဲ့ပါသည်။

၄၂။ နောက်လတွင် အဆိုပါဇျစ်နီချောင်းတံတားအား ဖျက်သိမ်းပေးမည်ဖြစ်ကြောင်း၊ ဆောက်လုပ်ရေးလုပ်ငန်းများမစတင်ခင် လူထုတွေ့ဆုံပွဲ လုပ်သွားမည်ဖြစ်ကြောင်း Team အဖွဲ့မှ ပြန်လည်ရှင်းလင်းဖြေကြားခဲ့ပါသည်။

၄၃။ ဦးစိုးနိုင်၊ ထိန်ကြီးကျေးရွာအုပ်ချုပ်ရေးမှူးမှ ထိန်ကြီးကျေးရွာအုပ်စု၊ ဇျစ်နီရွာတွင် အိမ်ခြေ (၅၀) ရှိပြီး လူဦးရေ (၂၀၀) ခန့်ရှိပါကြောင်း၊ ဘာသာရေးအဆောက်အဦး၊ ယာယီစာသင်ကျောင်းနှင့် ဘုန်းကြီးကျောင်းအတွက် မြေနေရာများ စီစဉ်ပေးပါရန် ဆွေးနွေးပြောကြားခဲ့ပါသည်။

၄၄။ အဆိုပါတင်ပြချက်အား ထားဝယ်အထူးစီးပွားရေးဇုန်ထဲတွင်ပါဝင်ပါက စီမံခန့်ခွဲမှုကော်မတီမှ ဆောင်ရွက်ပေးသွားမည်ဖြစ်ပြီး ထားဝယ်အထူးစီးပွားရေးဇုန်ပြင်ပဖြစ်ပါက တနင်္သာရီတိုင်းအစိုးရအဖွဲ့မှ ဆောင်ရွက်ပေးနိုင်ရန် တင်ပြပေးမည်ဖြစ်ကြောင်း ဒုတိယဥက္ကဋ္ဌ (၂) ဒေါက်တာမြင့်ဆန်းမှ ရှင်းလင်းဖြေကြားခဲ့ပါသည်။

၄၅။ သဘာဝဓာတ်ငွေ့အရည် (LNG) သိုလှောင်ဖြန့်ဖြူးခြင်းလုပ်ငန်း၏ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအစီရင်ခံစာအား TEAM အဖွဲ့မှ တင်သွင်းဖတ်ကြားရာတွင် လောင်စာဆီနှင့် သဘာဝဓာတ်ငွေ့လုပ်ငန်းအားလုံးသည် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA) ပြင်ဆင်ရန်လိုအပ်ပြီး ဆောက်လုပ်ရေးမစတင်ခင် အတည်ပြုချက်ရရှိရန်လိုအပ်ပါကြောင်း၊ ESIA အစီရင်ခံစာအတွက် အတည်ပြုချက်ကို သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင် ထိန်းသိမ်းရေးဝန်ကြီးဌာန (MONREC) မှ ၂၀၁၇ ခုနှစ်၊ နိုဝင်ဘာလတွင် ရရှိခဲ့ပြီးဖြစ်ကြောင်း၊ စီမံကိန်းအချက်အလက်များအနေဖြင့် တင်ပြပါ ကမ်းလွန်အဆောက်အဦများ၊ လှိုင်းကာဆောက်လုပ်ခြင်းလုပ်ငန်းများ၊ ချဉ်းကပ်တူးမြောင်းများ၊ ဆိပ်ကမ်းများ၊ ကုန်းတွင်း

အဆောက်အဦများ၊ သောင်တူးဖော်ခြင်းလုပ်ငန်းများ၊ တူးဖော်ရရှိသောသောင်များကို စွန့်ပစ်ခြင်း လုပ်ငန်းများပါဝင်ကြောင်း၊ ဆောက်လုပ်ရေးအတွက် အချိန်ဇယားအား (၁၅) လ ခန့်မှန်းရေးဆွဲထားပါကြောင်း၊ သင်္ဘောဖြင့်တင်ဆောင်လာသော LNG များကို အပူချိန် -၁၉၇ ဒီဂရီစင်တီဂရိတ်တွင် ထိန်းသိမ်းထားသော သိုလှောင်ကန်များတွင် အရည်ပုံစံဖြင့် သိုလှောင်ထားမည်ဖြစ်ကြောင်း၊ ပတ်ဝန်းကျင် လေထုအငွေ့ထုတ်စက်ဖြင့် အရည်မှ အငွေ့ပုံစံသို့ပြောင်းလဲသွားမည်ဖြစ်ကြောင်း၊ LNG ဓာတ်ငွေ့ကို (၄၂၀) မဂ္ဂါဝပ် ဓါတ်အားပေးစက်ရုံသို့ ပေးပို့သွားမည်ဖြစ်ကြောင်း၊ ဤ LNG စီမံကိန်းနှင့်ပတ်သက်၍ သက်ဆိုင်ရာဥပဒေနှင့် စည်းမျဉ်းများအတိုင်း လိုက်နာသွားပြီး ပတ်ဝန်းကျင်နှင့် လူမှုရေးဆိုင်ရာအစီအစဉ်များ ချမှတ်ဆောင်ရွက်သွားမည်ဖြစ်ကြောင်း၊ စီမံကိန်းအကောင်အထည်ဖော်မှုကာလတွင် လိုက်နာဆောင်ရွက်ရမည့် ကတိကဝတ်များအား လိုက်နာဆောင်ရွက်သွားမည်ဖြစ်ကြောင်း၊ စောင့်ကြည့်လေ့လာခြင်း အစီရင်ခံစာကို ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနသို့ (၆) လလျှင်တစ်ကြိမ် တင်ပြသွားမည်ဖြစ်ကြောင်း ရှင်းလင်းတင်ပြခဲ့ပါသည်။

၄၆။ ဦးရွှေစိုး၊ ငပိတက်ငယ်ရွာ၊ ရေလုပ်သားသမဂ္ဂဥက္ကဋ္ဌမှ ဆိပ်ကမ်းငယ်စီမံကိန်းအတွက် မည်သူတွေက တာဝန်ယူမှု၊ တာဝန်ခံမှု ဆောင်ရွက်မည်ကို သိလိုကြောင်း၊ စီမံကိန်းနှင့်ပတ်သက်ပြီး ပွင့်လင်းမြင်သာစွာချပြရန် တောင်းဆိုပါကြောင်း၊ စီမံကိန်းကာလအတွင်း အလုပ်သမားရေးရာကိစ္စရပ်များအား မည်သူက တာဝန်ယူဖြေရှင်းပေးမည်ကို သိလိုကြောင်း ဆွေးနွေးပြောကြားခဲ့ပါသည်။

၄၇။ အဆိုပါတင်ပြချက်အား ဒု-ဥက္ကဋ္ဌ (၂) ဒေါက်တာမြင့်ဆန်းမှ ပင်လယ်ကူးသင်္ဘောများ အဝင်/အထွက်ရှိ၍ ငါးဖမ်းလှေများအတွက် အခက်အခဲရှိနိုင်ကြောင်း၊ ဖြစ်ပေါ်လာမည့်အခက်အခဲများကို စီမံကိန်းအကောင်အထည်ဖော်သူမှ ဖြေရှင်းဆောင်ရွက်ပေးရမည်ဖြစ်ကြောင်း ရှင်းလင်းဖြေကြားခဲ့ပါသည်။

၄၈။ အပူစွမ်းအင်သုံး လျှပ်စစ်ဓာတ်အားပေးစက်ရုံ တည်ဆောက်ခြင်းလုပ်ငန်းအတွက် ပတ်ဝန်းကျင်နှင့် လူမှုရေးအပေါ်ထိခိုက်မှု ဆန်းစစ်ခြင်းအစီရင်ခံစာအား TEAM အဖွဲ့မှ တင်သွင်းဖတ်ကြားရာတွင် အပြီးသတ် ESIA အစီရင်ခံစာမူကြမ်းကို ၂၀၁၆ ခုနှစ်၊ ဩဂုတ်လတွင် တင်သွင်းခဲ့ပြီး ESIA အစီရင်ခံစာ အတည်ပြုချက်ကို ၂၀၁၈ ခုနှစ်၊ ဖေဖော်ဝါရီလ (၁၅) ရက်နေ့တွင် သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင် ထိန်းသိမ်းရေးဝန်ကြီးဌာန (MONREC) မှ ရရှိခဲ့ပါကြောင်း၊ စီမံကိန်းအချက်အလက် LNG Tank ၏ ပတ်ဝန်းကျင်အပူကြောင့် ထွက်ရှိလာသော ဓါတ်ငွေ့ကို အပူစွမ်းအင်အဖြစ်အသုံးပြုကာ လျှပ်စစ်ဓါတ်အား ထုတ်လုပ်မည်ဖြစ်ပါကြောင်း၊ ပတ်ဝန်းကျင်နှင့် အဓိကသက်ဆိုင်သော ဥပဒေနှင့် စည်းမျဉ်းများ လူမှုရေးဆိုင်ရာ ထိခိုက်မှုစီမံခန့်ခွဲခြင်းနှင့် သက်ဆိုင်သောဥပဒေနှင့် စည်းမျဉ်းများအတိုင်း လိုက်နာဆောင်ရွက်သွားရမည်ဖြစ်ပြီး တည်ဆောက်ဆဲကာလအတွက် ပတ်ဝန်းကျင်ဆိုင်ရာ စီမံခန့်ခွဲမှုအစီအစဉ်တွင် ဖုန်မှုန့်၊ ဆူညံ

သံ၊ စွန့်ပြစ် ရေဆိုး/ကမ်းရိုးတန်းရေ/အဏ္ဏဝါ ဂေဟဗေဒ၊ လူမှု-စီးပွားတို့တွင် သက်ရောက်မှုများကို လျော့ချနိုင်ရေးနည်းလမ်းများနှင့် စောင့်ကြည့်လေ့လာခြင်းများပြုလုပ်မည့် အစီအစဉ်များကိုလည်းကောင်း၊ လုပ်ငန်းလည်ပတ် ဆောင်ရွက်သည့်ကာလအတွက် ပတ်ဝန်းကျင်ဆိုင်ရာ စီမံခန့်ခွဲမှုအစီအစဉ် (EMP) လေထုအရည်အသွေး၊ စွန့်ပြစ်ရေဆိုး/ကမ်းရိုးတန်းရေ/အဏ္ဏဝါဂေဟဗေဒ၊ လူမှု-စီးပွားကဏ္ဍတို့တွင် ထိခိုက်နိုင်မှုများကို လျော့ချနိုင်ရေးနည်းလမ်းများနှင့် စောင့်ကြည့်လေ့လာခြင်းများပြုလုပ်မည့် အစီအစဉ်များကိုလည်းကောင်း၊ စီမံကိန်း အကောင်အထည်ဖော်မှုကာလတွင် လိုက်နာဆောင်ရွက်ရမည့် ကတိကဝတ်များအား တင်ပြပါ Slides များမှ ဖော်ပြချက်များအတိုင်း လိုက်နာဆောင်ရွက်သွားမည်ဖြစ်ကြောင်း ဆွေးနွေးခဲ့ပါသည်။

၄၉။ ထားဝယ်အထူးစီးပွားရေးဇုန်တွင် တည်ဆောက်မည့် ကနဦးကာလ ဓါတ်အားပေးစက်ရုံ စီမံကိန်း၏ ပတ်ဝန်းကျင်နှင့် လူမှုဘဝအပေါ်သက်ရောက်မှု ဆန်းစစ်ခြင်းအစီရင်ခံစာအား TEAM အဖွဲ့မှ တင်သွင်းဖတ်ကြားရာတွင် MONREC မှ နယ်ပယ်အတိုင်းအတာ သတ်မှတ်ခြင်းအစီရင်ခံစာအား အတည်ပြုပြီးဖြစ်ကြောင်း၊ အပြီးသတ်ပတ်ဝန်းကျင်နှင့် လူမှုရေးအပေါ် ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ အစီရင်ခံစာအား MONREC မှ ၂၀၁၇ ခုနှစ်၊ အောက်တိုဘာလ (၂၅) ရက်တွင် အတည်ပြုခဲ့ကြောင်း၊ ဓါတ်အားပေးစက်ရုံသည် (၅၀) မဂ္ဂါဝပ်ထက် ကျော်လွန်ပြီး (၃၇.၁၉) ဟက်တာ ကျယ်ဝန်းသော ရွံ့နွံဒေသဧရိယာတွင် တည်ရှိကြောင်း၊ တည်ဆောက်ရေးကာလသည် (၆) နှစ် ကြာမြင့်ပြီး အများဆုံး အလုပ်သမားအရေအတွက် (၆၀၀) ယောက် ရှိနိုင်ပါကြောင်း၊ အနီးဆုံး လူမှုအသိုင်းအဝိုင်းသည် ငပိတက်ရွာဖြစ်ပြီး စီမံကိန်းနေရာမှ ပျမ်းမျှ (၂.၂၃) ကီလိုမီတာ ကွာဝေးပါကြောင်း၊ LNG Terminal မှ သဘာဝဓါတ်ငွေ့ကိုအသုံးပြုကာ (၄၂၀) မဂ္ဂါဝပ် ဓါတ်အားပေးစက်ရုံ ပါဝင်ကြောင်း၊ ပတ်ဝန်းကျင်ဆိုင်ရာ စီမံခန့်ခွဲမှုအခြေခံ၊ EIA ဖြစ်စဉ်နှင့် ပတ်ဝန်းကျင်ဆိုင်ရာ စီမံခန့်ခွဲခြင်းနှင့် ကာကွယ်ခြင်း၊ လူမှုရေးဆိုင်ရာ ထိခိုက်မှု စီမံခန့်ခွဲခြင်းနှင့်သက်ဆိုင်သော ဥပဒေနှင့် စည်းမျဉ်းများ၊ စီမံကိန်း အကောင်အထည်ဖော်မှုအတွက် လိုက်နာဆောင်ရွက်ရမည့် ကတိကဝတ်များအား လိုက်နာဆောင်ရွက်သွားရမည်ဖြစ်ကြောင်း၊ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် (EMP) တွင် အပိုင်း (၃) ပိုင်းပါဝင်ပါကြောင်း၊ အကြိုတည်ဆောက်ရေးလုပ်ငန်းဆောင်ရွက်ခြင်းကာလနှင့် တည်ဆောက်ဆဲကာလများတွင် ကန်ထရိုက်တာမှ ပြီးမြောက်အောင်ဆောင်ရွက်ရမည့် CEMP၊ လုပ်ငန်းလည်ပတ်ဆောင်ရွက်သည့်ကာလတွင် စီမံကိန်းပိုင်ရှင်မှ ပြီးမြောက်အောင်ဆောင်ရွက်ရမည့် OEMP၊ လုပ်ငန်းရပ်စဲခြင်းကာလတွင် ကန်ထရိုက်တာမှ ပြီးမြောက်အောင်ဆောင်ရွက်ရမည့် DEMP တို့ဖြစ်ကြောင်း၊ ခန့်မှန်းထားသော ထိခိုက်မှုနှင့် လျော့ချရေး နည်းလမ်းများနှင့်

ကိုက်ညီသော အစီအစဉ်ခွဲ (၆) ခုကို ဖော်ပြထားပါကြောင်း၊ ၄င်းတို့မှာ လေထုအရည်အသွေးစီမံခန့်ခွဲခြင်း အစီအစဉ်၊ ဆူညံသံစီမံခန့်ခွဲခြင်း အစီအစဉ်၊ ရေဆိုးစီမံခန့်ခွဲခြင်း အစီအစဉ်၊ လမ်းပန်းဆက်သွယ်ရေး စီမံခန့်ခွဲခြင်းအစီအစဉ်၊ လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေး (OHS) စီမံခန့်ခွဲမှုနှင့် ပတ်ဝန်းကျင်နှင့် လူမှုရေးဆိုင်ရာစီမံခန့်ခွဲမှုအစီအစဉ် တို့ဖြစ်ပါကြောင်း ရှင်းလင်းကြားခဲ့ပါသည်။

၅၀။ ဦးကျော်ဆန်း၊ မူးဒူးကျေးရွာအုပ်ချုပ်ရေးမှူးမှ ဒေသခံအလုပ်အကိုင်ရရှိရေး စဉ်းစားပေးသည့်အတွက် ကျေးဇူးတင်ကြောင်း၊ ဒေသတွင်းကျေးရွာများ မီးလင်းရေးအတွက် စဉ်းစားပေးစေလိုကြောင်း ဆွေးနွေးပြောကြားခဲ့ပါသည်။

၅၁။ ထားဝယ်အထူးစီးပွားရေးဇုန်းအတွက် ထုတ်လုပ်သော လျှပ်စစ်မီးအား အခြားသို့ရောင်းချခြင်း မပြုရဟု စာချုပ်တွင်ပါရှိသည့်အတွက် ဇုန်ပြင်ပအတွက် လျှပ်စစ်မီးရရှိရေးသည် တနင်္သာရီတိုင်းအစိုးရထံ တင်ပြရမည်ဖြစ်ပါ ကြောင်း ဒု-ဉက္ကဋ္ဌ (၂) ဒေါက်တာမြင့်ဆန်းမှ ရှင်းလင်းဖြေကြားခဲ့ပါသည်။

၅၂။ ဦးစိုးနိုင်၊ ရလိုင်ကျေးရွာမှ ယခု Third Party မှ တင်ပြချက်များအား ယခုမျိုးဆက်ကျေးရွာသားများမှ နောင်မျိုးဆက်များသို့ အသိပေးစေလိုကြောင်း၊ လုပ်ငန်းများဆောင်ရွက်ရာတွင် ယခုတင်သွင်းသော စာတမ်းများအတိုင်း လိုက်နာဆောင်ရွက်မှုရှိ/မရှိ တိုက်ဆိုင်စစ်ဆေးရန် အထောက်အထားများဖြစ်ကြောင်း၊ ဒေသခံရွာများမှ ဇုန်အတွင်းပါဝင်သည့်အတွက် မြစိမ်းရောင်ချေးငွေ၊ လယ်စိုက်ဘဏ်ချေးငွေ စသည်တို့မရဘဲ နစ်နာနေပါကြောင်း ဆွေးနွေးပြောကြားခဲ့ ပါသည်။

၅၃။ ဦးစုငယ်၊ ထိန်ကြီးရွာမှ နဘူးလယ်ဒေသသည် ဇုန်အတွင်းဖြစ်နေပါသဖြင့် ၂၀၁၄ ခုနှစ်မှစ၍ ချေးငွေများမရရှိပါကြောင်း၊ ယခုအခါ ညောင်ပင်ဆိပ်ရွာသို့ လျှပ်စစ်မီးရောက်နေပြီဖြစ်သော်လည်း မိမိတို့ကျေးရွာသို့ (၃) နှစ်ကြာမှ လျှပ်စစ်မီးရရှိမည်ဟုကြားသိရကြောင်း၊ ပျက်စီးနေသော တံတားများနှင့် အန္တရာယ်ရှိသောတံတားများအား ပြုပြင်ပေးစေလိုပါကြောင်း ဆွေးနွေးတင်ပြခဲ့ပါသည်။

၅၄။ ဦးစိုးသိန်း၊ လဲရှောင်ကျေးရွာအုပ်ချုပ်ရေးမှူးမှ ဒေသတွင်းအလုပ်အကိုင်အခွင့်အလမ်းရရှိရေးကို ဦးတည်စဉ်းစားပေးစေလိုကြောင်းနှင့် အသက်မွေးဝမ်းကြောင်း သင်တန်းများ၊ ကျွမ်းကျင်လုပ်သားသင်တန်းများ ဖွင့်လှစ်ပေးစေလိုကြောင်း၊ မြေယာလျော်ကြေးငွေများ ယခင်ကကွက်တိကွက်ကျား ပေးလျော်ခဲ့ပါကြောင်း၊ ဒေသခံများမှ စီမံကိန်းအတွက် အကောင်းမြင်ပါကြောင်း ဆွေးနွေးပြောကြားခဲ့ပါသည်။

၅၅။ ဦးထွန်းလွင်၊ ပုဂေါ့ခွန်းရွာမှ ယခုစီမံကိန်းသည် ဦးတည်ချက်နှင့် ရည်မှန်းချက်ကောင်းပါကြောင်း၊ (၅) ထပ်တိုက်ဘေးတွင် ခြံပိုင်ရှင် (၁၄) ဦးခန့်ရှိပါကြောင်း၊ ၎င်းတို့အတွက် နစ်နာမှုမရှိအောင် ဆောင်ရွက်ပေးစေလိုပါ ကြောင်း၊ ဆွေးနွေးပြောကြားခဲ့ပါသည်။

၅၆။ ဦးရွှေစိုး၊ ငပိတက်ငယ်ရွာ၊ ရေလုပ်သားသမဂ္ဂဥက္ကဋ္ဌမှ အလုပ်အကိုင်အခွင့်အလမ်းနှင့်ပတ်သက်၍ ဒေသခံများအား ဦးစားပေးဆောင်ရွက်ပေးစေလိုကြောင်း၊ ဒေသခံအများစုမှာ ပညာရေးတွင်အားနည်းသော်လည်း ယခုနောက်ပိုင်းတွင် ပညာတတ်လူငယ်များ ထွက်ပေါ်လာပြီဖြစ်၍ ၎င်းတို့၏ ပညာအရည်အချင်းအလိုက် အလုပ်အကိုင်အခွင့်အလမ်းများ ဖန်တီးပေးစေလိုကြောင်း၊ ထားဝယ်အထူးစီးပွားရေးဇုန်အပေါ် ဒေသခံများ၏အမြင်အား သိရှိနိုင်ရန် ပြည်သူနှင့် အစိုးရ အမြဲမပြတ်တွေ့ဆုံဖို့လိုအပ်ကြောင်း၊ ယခုအချိန်တွင် ဒေသခံများအနေဖြင့် အကောင်းမြင်မှုများပါကြောင်း ဆွေးနွေးပြောကြားခဲ့ပါသည်။

၅၇။ ဦးအောင်မိုး၊ ခမောင်းချောင်းကျေးရွာမှ ယနေ့ဆွေးနွေးပွဲအား သဘောတူကျေနပ်မိပါကြောင်း၊ ခမောင်းချောင်းကျေးရွာမှ (၄) ဦး မြေယာလျော်ကြေးမရသေးသည်ကို စာဖြင့်တင်ပြထားကြောင်း၊ မည်သည့်နေ့ အကြောင်းပြန်မလဲ သိလိုပါကြောင်း ဆွေးနွေးပြောကြားခဲ့ပါသည်။

၅၈။ အထက်ပါတင်ပြချက်များကို TEAM အဖွဲ့မှ သတိပေးဆိုင်းဘုတ်များ စိုက်ထူပေးမည်ဖြစ်ကြောင်း၊ ဒေသခံများအား လေ့ကျင့်သင်ကြားပေးပြီး ကျွမ်းကျင်မှုအလိုက် အလုပ်ခန့်ထားပေးမည်ဖြစ်ကြောင်း ပြန်လည်ရှင်းလင်းဖြေကြားသွားပါသည်။

၅၉။ Mr. Thanarat မှ မြေယာပေးလျော်ရေးကိစ္စနှင့် နေရာပြန်လည်ချထားရေးကိစ္စအား နိုင်ငံတကာစံနှုန်းအတိုင်း ဆောင်ရွက်ပေးမှာဖြစ်ကြောင်း၊ ပိုင်ဆိုင်မှုနှင့်ပတ်သက်၍ အိမ်၊ မြေ၊ စိုက်ပျိုးရေးဧရိယာများကို စာရင်းကောက်ယူသွားမည်ဖြစ်ကြောင်း၊ စာရင်းလာရောက်ပေးပို့ရမည့် နောက်ဆုံးရက်ကိုလည်း ထုတ်ပြန်ကြေညာ၍ ဆောင်ရွက်သွားမည်ဖြစ်ကြောင်း၊ ပြန်လည်နေရာချထားရေးနှင့်အတူ အသက်မွေးဝမ်းကျောင်း ပညာရပ်များပါ တပြိုင်တည်းသင်ကြားပေးမည်ဖြစ်ကြောင်း၊ ဒေသခံများ၏ စိတ်ဝင်စားသည့်ပညာရပ်များကို Training Center များ ဖွင့်လှစ်သင်ကြားပေးမည်ဖြစ်ကြောင်း၊ လျော်ကြေးပေးပြီးလျှင်လည်း အဆင်ပြေမှု ရှိ/မရှိ စောင့်ကြည့်သွားမည်ဖြစ်ကြောင်း ပြန်လည်ရှင်းလင်းဖြေကြားသွားပါသည်။

၆၀။ ဒေါက်တာမြင့်ဆန်း၊ ဒုဥက္ကဋ္ဌ-၂၊ ထားဝယ်အထူးစီးပွားရေးဇုန် စီမံခန့်ခွဲမှုကော်မတီမှ နိဂုံးချုပ်စကားပြောကြားရာတွင် ထားဝယ်အထူးစီးပွားရေးဇုန်အနေဖြင့် သီလဝါအထူးစီးပွားရေးဇုန်ထက် ဧရိယာ (၁၀) ဆခန့် ပိုမိုကြီးမားပါကြောင်း၊ ကနဦးစီမံကိန်း၏ မြေယာကိစ္စများနှင့်ပတ်သက်၍ ITD ကုမ္ပဏီဖြင့်

သာ သက်ဆိုင်ပြီး အခြားမြေယာကိစ္စများသည် နောင်လာမည့် Developer နှင့်သာ သက်ဆိုင်ပါကြောင်း၊ ဒေသခံများ နစ်နာမှုမရှိအောင် ဆောင်ရွက်ပေးမည်ဖြစ်ပါကြောင်း၊ EIA, SIA အစီရင်ခံစာပါ အချက်များအား အကောင်အထည်ဖော်မှုနှင့်ပတ်သက်၍ ကျေးရွာသားဒေသခံများမှ စောင့်ကြည့်သွားရမည်ဖြစ်ပြီး နစ်နာမှုများအား စီမံခန့်ခွဲမှုကော်မတီသို့ တင်ပြသွားစေလိုကြောင်း၊ ထားဝယ်အထူးစီးပွားရေးဇုန် ပြင်ပကျေးရွာများ မီးလင်းရေးမှာ တိုင်းအစိုးရအဖွဲ့နှင့်သာ သက်ဆိုင်ပါကြောင်း၊ ယခုစီမံကိန်းသည် ဒေသခံများ လူနေမှုမြင့်မားရေးနှင့် အလုပ်အကိုင်အခွင့်အလမ်းများ ဖန်တီးပေးနိုင်ရေးအတွက်ဖြစ်ပါကြောင်း၊ လမ်းဖောက်လုပ်ရေးအတွက် တင်ဒါခေါ်ယူဆောင်ရွက်သွားမည်ဖြစ်ပါကြောင်း၊ ဒေသခံများအနေဖြင့် ကာယလုပ်သား၊ ဉာဏလုပ်သားများအဖြစ် ပါဝင်ခွင့်ရှိကြောင်း၊ လမ်းတံတားများ ပျက်စီးနေခြင်းအား ပြုပြင်ပေးရန် တောင်းဆိုသွားမည်ဖြစ်ကြောင်း၊ ကနဦးစီမံကိန်းကို ITD မှ ဆောင်ရွက်မည်ဖြစ်ပြီး ပင်မစီမံကိန်းအား မေလခန့်တွင် စတင်နိုင်မည်ဖြစ်ကြောင်း၊ စီမံကိန်းနှင့်ပတ်သက်၍ (၃/၄) လတစ်ကြိမ် ရှင်းပြရန် တာဝန်ရှိပါကြောင်း နိဂုံးချုပ်ပြောကြားခဲ့ပါသည်။

မှတ်တမ်းတင်သူ

(ရဲဝင်းကျော်၊ ဌာနခွဲမှူး)

စက်မှုကြီးကြပ်ရေးနှင့်စစ်ဆေးရေးဦးစီးဌာန

စာအမှတ်၊ ထဝ - ၁ / DSEZ – D / ၂၀၁၈

ရက်စွဲ ၊ ၂၀၁၈ ခုနှစ်၊ ဧပြီလ ၆ ရက်

ဖြန့်ဝေခြင်း -

အစည်းအဝေးတက်ရောက်သူများအားလုံး

မိတ္တူကို

- မျှောစာတွဲ / လက်ခံစာတွဲ