

Prepared by



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Revised (02) Report Au

August 2022



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ABBREVIATIONS

CO Carbon Monoxide CO₂ Carbon Dioxide

CPOP Crude Palm Oil Plant

CPOPE Crude Palm Oil Plant Effluent
CSR Corporate Social Responsibility
dBA 'A' weighted equivalent decibels

ECD Environmental Conservation Department

EMP Environmental Management Plan
EMT Environmental Management Team

ERT Emergency Response Team

HQ Head Quarter

HSE Health, Safety and Environmental

IC Incident Coordinator

IEC Independent Environmental Consultant

km Kilometer

KVA Kilo (Volt P x Amps)

Kw Kilowatt

MIC Myanmar Investment Commission

MONREC Ministry of Natural Resources and Environmental Conservation

MOECAF Ministry of Environmental Conservation and Forestry

MT Metric Ton

NA Not Applicable NO_x Nitrogen Dioxide

O₃ Ozone

OIC-AA Officer-in-charge at Assembly Area

PAP People Affected Person

POM Palm Oil Plant

POME Palm Oil Plant Effluent

PM Particulate Matter

PPE Personal protective equipment

Qty. Quantity

RST Report Supported Team

SO₂ Sulphur Dioxide

US\$ US Dollar



USD US Dollar

WHO World Health Organization

YCDC Yangon City Development Committee YESC Yangon Electricity Supply Corporation

°C Celsius

 $\begin{array}{ll} \mu g & \quad \ \ Micro \ gram \\ m^3 & \quad \ \ Cubic \ meter \end{array}$



1. EXECUTIVE SUMMARY

This Environmental Management Plan (EMP) report presents environmental and social assessments and management plan of the Kanbauk Crude Palm Oil Plant in accordance with the Environmental Conservation Rules on 5th June 2014 and Environmental Impact Assessment Procedures on 29th December 2015.

According to the instruction from Department of Environmental Conservation, Tanintharyi Region, to develop Environemntal Management Plans for the plant's operations, management of the Plant engaged GREEN ENVIRONMENTAL, HEALTH, SAFETY & SOCIAL CONSULTANCY CO., LTD. to prepare Environmental Management Plan (EMP) report to assess and identify potential environmental impacts associated with the plant's activities and to mitigate the impacts effectively.

The scope of the project report covers the operation and decommissioning phases of the Palm Oil Plant. The assessment's spatial boundary extends to 3000 meters from the Plant based on the sensitive areas.

1.1 Plant Location

Kanbauk Palm Oil Factroy is located near to Gan Gaw Taung, Kan Bauk region, Ye Phyu Township, Thawei, Thanithary Division, Myanmar at the coordinate's grids between E 98. 07° to 98.08° and N 14.62° to 14.62°. Kanbauk-Kalainaung road is situated at 2.15 km north of the plant. The land size is 450′x750 with total 7.75 acres.

The Plant is surrounded with 6791 acres of palm oil plantations. Nearby residential areas are Enidayaza village at 5.5km north and Kanbauk at 5.5 km southeast of the plant. 2 km radius of the plant is mostly covered with the palm plantations.



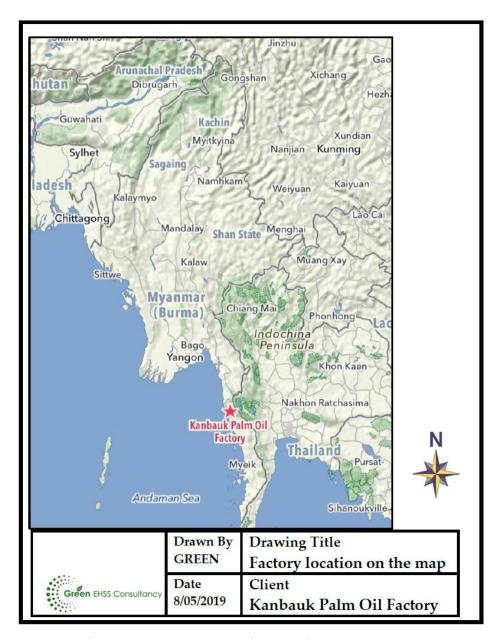


Figure 1.1 Factory Location on the Country Map



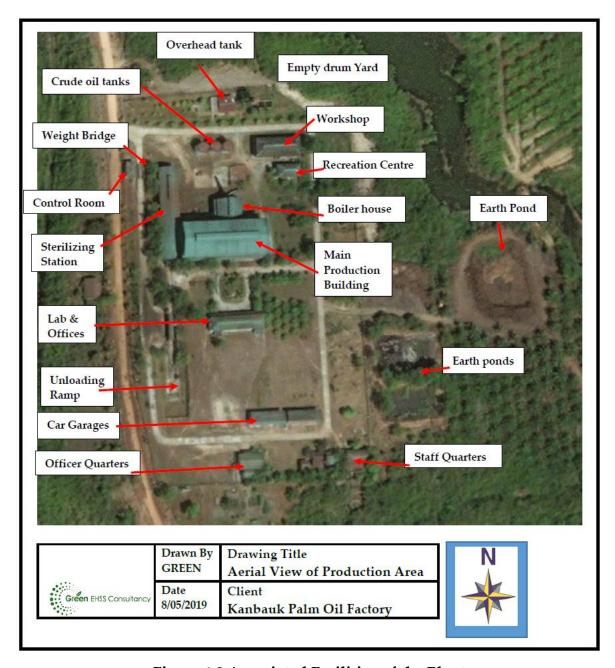


Figure 1.2 Associated Facilities of the Plant

2.1 Legal Framework

Environmental Conservation Department (ECD) is set up as a separate organization under the Ministry of Natural Resources and Environmental Conservation-MONREC (Former- Ministry of Environmental Conservation and Forestry) on 11 October 2012. The Ministry of Natural Resources and Environmental Conservation- MONREC (Former- Ministry of Environmental Conservation and Forestry) promulgated The Environmental Conservation Law on 30th March, 2012. MOCAF issued



Environmental Conservation Rules on 5th June 2014 and Environmental Impact Assessment procedures on 29th December 2015.

EMP team observed thoroughly the legal requirements that Kanbauk Crude Palm Oil Plant shall comply with are as follows:

- 1. Occupational Safety and Health Law (2019)
- 2. Environmental Conservation Law (2012)
- 3. Environmental Conservation Rules (2014)
- 4. Environmental Impact Assessment (EIA) Procedure (2015)
- 5. National Environmental Quality (Emission) Guidelines (2015)
- 6. The Conservation of Water Resources and River Law, (2013)
- 7. Myanmar Investment Law (2016)
- 8. Myanmar Investment Rule (2017)
- 9. The Import Export Law (2012)
- 10. Building Regulations (2014)
- 11. The Amended Law for Plant Act (2016)
- 12. Myanmar Fire Brigade Law (2015)
- 13. Myanmar's Land Acquisition, Resettlement and Rehabilitation Law 2019
- 14. The Payment of Wages Law (2016)
- 15. Minimum Wage Notification 1/2018
- 16. The Social Security Law (2012)
- 17. Social Security Acts (1954)
- 18. The Leave and Holiday Act, 1951(Law Amended July, 2014)
- 19. Second Amendment to the Labour Dispute Settlement Law (2019)
- 20. Law Amending the Workmen's Compensation Act, 1923
- 21. The Public Health Law
- 22. Prevention and Control of Communicable Diseases Law (1995)
- 23. The Law Amending the Conservation of Water Resources and Rivers
- 24. The Labour Organization Law (2011)
- 25. The Labour Organization Rules (2012)
- 26. Motor Vehicle Rules (1989)
- 27. Vehicle Laws (1964)
- 28. Inland Water Transportion Law (2017)
- 29. National Health Policy (1993)
- 30. Underground Water Act (1930)



- 31. National Land Use Policy (2016)
- 32. Inland Vessel Law (2015)
- 33. Laws amending the 1951 Factories Acts (2016)
- 34. Explosive Substances Act (2018)
- 35. Emergency provisions Act (1950)
- 36. Prevention of Hazard from Chemical and Related Substances Rules (2016)
- 37. Myanmar Port Law (2015)
- 38. Control of Smoking and Consumptions of Tobacco Products Laws (2006)
- 39. ရေအရင်းအမြစ်နှင့် မြစ်ချောင်းများထိန်းသိမ်းရေးဥပဒေ (၂၀၀၆)
- 40. ရေအရင်းအမြစ်နှင့် မြစ်ချောင်းများထိန်းသိမ်းရေးနည်းဥပဒေ (၂၀၁၃)
- 41. ရေအရင်းအမြစ်နှင့် မြစ်ချောင်းများထိန်းသိမ်းရေးဥပဒေ (၂၀၀၆)
- 42. သစ်တောဥပဒေ (၂၀၁၈)
- 43. သစ်တောနည်းဥပဒေ (၁၉၉၅)
- 44. တောရိုင်းတိရိစ္ဆာန်နှင့် သဘာဝအပင်များကာကွယ်ရေးနှင့် သဘာဝနယ်မြေများ ထိန်းသိမ်းရေးဥပဒေ (၁၉၉၄)
- 45. အလုပ်သမားလျော်ကြေးအက်ဥပဒေ (၁၉၅၁)
- 46. အလုပ်ရှင်နှင့် အလုပ်သမား အက်ဥပဒေ
- 47. မြေစာရင်း မြေအမိန့် နှင့် ညွှန်ကြားချက်များ (၂၀၀၆)
- 48. မြေစာရင်းလက်စွဲဥပဒေ (၁၉၆၄)
- 49. မြေလွှတ်မြေရှိုင်းစီမံခန့်ခွဲရေး

Other Applicable Laws, Acts, Standards and Guidelines and the related laws enacted by the respected Regional Hlauttaw and rules issued by respected Regional Government.

The following references were used in assessing and evaluating the focal environmental impacts relating to the Plant activities.

Water Quality:

- WHO Water Quality Standard, World Bank Standards,
- Yangon City Development Committee Standards
- Wastewater, Storm Water Runoff, Effluent and Sanitary Discharges (General Application) National Environmental Quality Guidelines



Air Quality:

- Air Emission Level of National Environmental Quality (Emission) Guidelines Soil Quality:
 - Canada Environmental Parameters Guidelines for Human Health and Environment

Noise Level:

• Noise Level of National Environmental Quality (Emission) Guidelines

Safety, Health and Environment:

- Plant Acts, Myanmar
- Occupational Health and Safety Acts, Ministry of Labour, Myanmar
- General Environmental, Health and Safety Guidelines, IFC

Moreover, the project owner ensures to meet the Requirements of Applicable Licenses and Permits.

The following references were used in assessing and evaluating the focal environmental impacts relating to the Plant activities.

3.1 Prodcution Processes

The Plant has the capacity to handle 10 tonnes per hour of fresh fruit bunch (FFB). The entire palm oil production process does not need any chemicals as a processing aid. Main raw materials required for the production are FFBs, kernels, water and steam. The detailed processes is shown in the Figures 1.3 and 1.4.



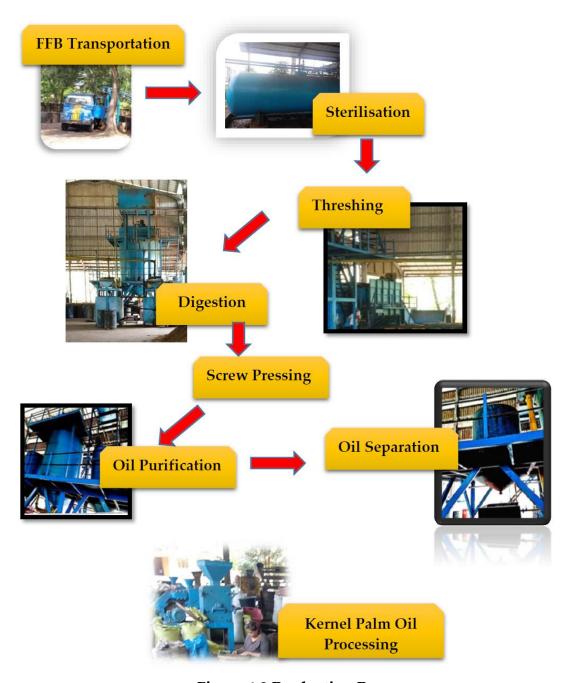


Figure 1.3 Production Process



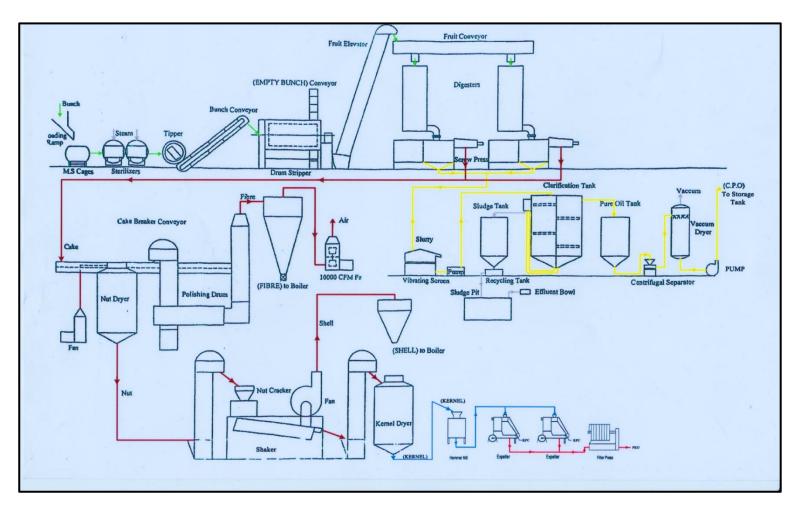


Figure 1.4 Process Activities Flowchart



4.1 Particulars of Kanbauk Crude Palm Oil Plant

Name of Plant : Kanbauk Crude Palm Oil Plant

Year of Established : October 2003

Address : Kan Bauk region, Ye Phyu Township, Thawei,

Thanithary Division, Myanmar

Name of Principal Organization: MYANAMA ECONOMIC HOLDING

PUBLIC COMPANY LTD.(MEHPCL)

Type of Business : Manufacturing of Crude Palm Oil

Type of Investment : 100% Local Investment

System of Sales : 100% Local Total Land Area : 6791 acres The Plant Area : 7. 75 acres

Commence date of Construction: 2006

Commence date of Operation : February 2009

Plant Manager : U Kyaw Soe Moe (Plant Manager)

09 8612182, 09346163616

5.1 Environmental Quality

The Environmental Management Plan for the Kanbauk Crude Palm Oil Plant is developed by Green Environmental, Health, Safety and Social Consultancy Co., Ltd. Green EHSS conducted the site visit and environmental background data measurements during May, June and July 2019. Baseline air quality, noise levels were measured during the site visit on May 2019. Ssurface water quality from the retaining ponds, underground water quality form the factory tubewell and final treated water quality from treatment pond were collected and tested in July 2019.

Based on the site surveys, references and monitoring and tested data, the potential environmental impacts associated with the plant's production activities and decommission phase were predicted, identified and evaluated. The environmental impact assessment was developed by anylizing severity/ magnitude of the impact, occurrence/probability of the impacts and existing control measures.

Following table stated summary of environmental risks related to the plant construction, operation and decommission phases.



Table 1.1 Summuary of Environmental and Social Risk Assessment

| | | Scop | oing R | esults | Asses Resul | | | |
|-----------------------|---------------|--------------|-----------|--------------|----------------|-----------|--------------|---|
| Category | Scoping Item | Construction | Operation | Decommission | Construction | Operation | Decommission | Reason of Impact level Consideration |
| | Air Quality | NA | M | L | - | M | L | The main air pollution sources include the emission from generator and boiler. The significance impact is considered to be medium due to existing controls and small scale production of the plant. Emission of dusts may occur during demolition of the structures. However, The plant is a small scale plant and emission of dust can be controllable. This impact will be considered to be low with proper mitigation. |
| Environmental Impacts | Noise | | M | L | | M | L | Procesessing activities and use of noisy machines can generate the high level of noise. The generator is kept inside the separated room and other noise exposure is temporary. Due to noise level monitoring results, some machines emitted high levels of noise, therefore, the level of impact is considered as medium. It is recommended to provide hearing protectors to workers and to ensure not to allow unauthorized person near to the machine. Noise emission may occur from some demolition activities, however, the exposure is considered as a short time and temporary. The impact level is, therefore, low. |
| Environ | Water Quality | - | М | L | - | М | L | Palm Oil production release POME effluent as by prducts. The plant is |



| | | | | | | | small scale and the effluent is considerably small quantity. In addition, the plant is far from surface water source. However, if the plant does not properly manage the effluent, it can impact on the underground water quality. Therefore, the impact level is considered as Medium for operation phase. Low impact level in demolition phase as it is unlikely to have an impact during demolition. |
|-------------------------------|---|---|---|---|---|----|---|
| Solid Waste | - | L | L | - | L | L | As a small scale plant, the small quantity of solid wastes are properly managed and reused. In addition, the by products from the productions are organic and easily decomposed as soil fertilizer. In this reasons, the impact level of Solid wastes is Low. Soild wastes generated from the demolition will be resued or recycled. Unusable wastes will be collected by a waste collector. The impact is considerd as Low for demolition phase. |
| Waste Water Effluent, POME | - | M | L | - | M | NA | Kanbauk Plant is a small scale and seasonal producer of palm oil. The effluents from the processes The Plant treates and reuses the effluents. The amount of POME is small and manageable. The water quality results including BOD and COD of final discharged water from the treatment pond and drainage showed acceptable and within the YCDC' starget level. Due to the water quality results, existing condition and control measures, the impact level is assumed Medium. However, it is recommended to |



| | | | | | | | monitor and manage the POME to ensure no impact on the soil. It is unlikely to discharge waste water during demolition phase. The impact level is regarded as Low. |
|-----------------------|---|---|----|---|---|----|--|
| Soil Contamination | - | M | L | | M | NA | Palm Oil production releases POME effluent as by prducts. Mintenance activities can create spillage of oil, grease and fuels. Scattered vegetations were found in the treatment ponds that shows soil quality in the final treatment ponds is considerably unimpacted by the effluents. Due to the soil pH results, existing condition and control measures, the impact level is assumed Medium. The floors of ehicle garage and maintenance workshop are built with concrete. No fuel filling area exists in the plant. However, it is suggested to provide spill tray at the maintenance areas. |
| | | | | | | | It is unlikely to impact the soil during demolition as no chemical or hazardous materials will be released. The impact level is regarded as Low. |
| Water Consumption | | L | NA | | L | NA | The Plant uses mainly the surface water from the retaining pond for production and domestic uses. It is less likely to impact groundwater avalibility due to the production. The impact on ground subsidence is condisered as Low. |
| | | | | | | | There will be no impact on ground subsidence during demolition. |
| Odor | - | L | NA | - | L | NA | Production process may result odor impact. However, the plant manages the odor sources. Moreover, the production area is far from the community residents. This impact is expected to be Low. |



| | | | | | | | 1 | |
|---------------------|---------------------------------|---|----|----|---|----|----|--|
| | | | | | | | | Not applicable for demolition. |
| | Bottom Sediment | - | NA | NA | - | NA | NA | The Plant is far from the surface water sources and no discharge of the solid wastes into any river. Not applicable for bottom sediment. |
| | | | | | | | | Not applicable for demolition. |
| | Protected Area | - | NA | NA | - | NA | NA | There is no protected area in the project area. |
| Natural Environment | Flora/Fauna and Ecosystem | | L | NA | - | L | NA | Impact of the existing ecosystem is considered to be low as the Plant itself is surrounded by approximately 6700 acres of plantation. Moreover, small woodlands and trees are growed withing the palnt premises. These plantations provide good shelters and foods for fauna as food chains. |
| En | | | | | | | | Not applicable for demolition. |
| Natural | Topography and geology | - | L | NA | - | L | NA | Topography and geology impacts are considered to be low. |
| | In voluntary Resettlement | - | NA | NA | - | NA | NA | No physical resettlement involved for the plant's processes. |
| | Local conflict of interests | - | L | NA | - | L | NA | The plant complies with laws and relevant internal guidelines and cooperates with local authorities and community. There is no conflict of interest as the plant is owned by MEHCL and no local authorities involves in the ownership. |
| Social Environment | Gender | - | L | NA | - | L | NA | The workforce is mainly locals and women workers are employed without gender discrimination. Employment conditions meets national laws and international standards. The impact is Low. |
| Social | Ethnic minorities and | - | NA | NA | - | NA | NA | There are no indigenous people in the project area. |



| | indigenous peoples | | | | | | | |
|--|--|---|----|----|---|----|----|---|
| | Poor | | +H | M | | +H | L | Positive impact for operation phase. It is expected to accept and to be employed in the project's activities with high hopes for improvement in neighborhood would bring higher living standard and education status. Loss of employment is negative impact for decommissioning phase. |
| | Living and livelihood | - | +M | L | - | +M | L | Job opportunities and business development should be considered as positive economic impact for regional or national development. It is considered to be significant positive impact for local people. |
| | Existing social infrastructures and services | - | L | NA | - | L | NA | There is low significance impact for existing rural condition. |
| | Cultural heritage | | NA | NA | | NA | NA | There are no historical and cultural monuments located nearby the project site. |
| | Landscape | | L | NA | | +L | NA | Landscape is expected to be low impact without mitigation and becoming positive impact as the factory applies management on greening. |
| | Risks for infectious disease such as AIDS/HIV | - | L | NA | - | L | NA | Influx of people may cause negative impact on health condition of local people. The significance assigned to this impact for the operation phase is considered to be low with mitigation by knowledge and health care support. |
| | Working Conditions (including occupational safety) | - | L | M | - | L | L | The plant working hour comply with the labour laws. The plant provides residents for the staff from other regions. Workers are provided necessary PPE. The potential impact is considered as Low. |



| | Accident | - | M | L | - | L | L | The machines and equipment are regularly maintained and inspected. Emergency team is formed to tackle the potential emergency situation. Fire extinguishers and emergency fire water are provided in the plant compound. The potential impact, therefore, is Low. However, it is recommended to provide some training like first aid and basic fire fighting. |
|-------|-------------------|---|---|----|---|---|----|---|
| | | | | | | | | Accident for decommissioning phase is expected to be low impact with proper mitigation such as providing PPE, fencing, warning sign, etc. |
| Other | Global Warming | - | L | NA | - | L | NA | The plant is surrounded by trees and 6700 acres plantations. The trees can reduce global warming by transpiration and managing climate change. As a small scale plant, the machines and vehicles used for the processes are manageable quantity. Due to this reason, the impact on the global warming is considered Low. |

NA: Not Applicable +: positive impact

6.1 Environmental Impact and Mitigation Measures

After evaluating the environment impacts of the Kanbauk Crude Palm Oil Plant, potential environmental Impacts and mitigation measures were developed to manage the identified impacts. Assessments and management plans of the environemental impacts were selected based on collected and baseline monitored data. The management palns for air emissions, water quality, noise emission, waste generation, land contamination, occupational and community heath and safety hazards and impacts on the public traffics.



7.1 Stakeholder Engagement and Information Disclosure

In the frame of the preparation of this EMP report, Green EHSS has organized meetings with stakeholders with the active support of Kanbauk CPOM.

In June 2019, two face to face meetings were conducted.

- 1) Face to face meeting with Representative of Kanbauk Village.
- 2) Face to face meeting with Eindayaza Village Administrator.

During June 2019, household surveys were conducted with 26 respondents in total from Eindayaza Village, Gan Gaw Taung Village and Shin Pyan Village.

On 7th June 2019, public consultation and participation was conducted by Green EHSS Social consultants with representatives of Kanbauk factory. It was held at Meeting Hall of Kanbauk Factory with 63 attendees. The results of public consultation and socio-economic survey show that respondents were positive on the project for the operation of Kanbauk Factory. 14 attendees provided no comments on the operation of the factory. The views are as follows:

- To prepare for the occupational health and safety.
- To appoint enough employees.
- To increase the employee salary.
- To inform the village administrator about job opportunity
- To control the air and water pollution.
- To manage waste properly.
- To promote CSR activities.
- To support health and illness.

Responses and action plan from the Kanbauk Factory are described in section 7.

8.1 Monitoring Plan

In line with proposed environmental management plans, the monitoring plans for crucial parameters including frequency of monitoring were developed.

The budget in environmental monitoring program is estimated to be **10,000,000 kyats** (kyat 100 lakhs) for operation phase. According to the monitoring plan, the management of the plant will be responsible for the implementation of monitoring for air, noise, water and safety measures. Results of air quality and noise level monitoring,



and analysis of water quality will be recorded in files to check and audit. Monitoring will be carried out strictly as required by the related national regulations and the monitoring results of required parameters should be reported to local authorities.

9.1 Environmental Management Plans

According to the outcomes from the Environmental and Social Impact Analysis, **ENVIRONMENTAL MANAGEMENT PLANS** are addressed to mitigate the potential impacts. The EMP generally takes account of the following mitigation plans.

- 1) Environmental Management Plan for Palm Oil Plant Waste
- 2) Environmental Management Plan for Palm Oil Plant Effluent
- 3) Occupational Health and Safety Management
- 4) Emergency Response Plan
- 5) Natural Environmental Management
- 6) Social Environmental Management

10.1 Conclusion

Kanbauk Palm Oil is considered as a small- scaled palm oil producer. The plant's average operation days per year is 128 days.

Potential environmental impacts together with management plans were identified in this Environmental Management Plan (EMP) report.

Baseline monitoring of ambient air quality, underground water quality, soil pH, demonstrated that all monitoring results are within the National Emission Standards and acceptable levels. Noise levels from some machines exceeded the acceptable level.

In accordance with the assessment data, the impacts on ambient air quality, surface water and underground water quality, soil quality, occupational health and safety hazards and risks to the workers and community, traffic congestion and odor emission were identified and evaluated as medium to low impacts.

It can be concluded that the exiting control measures are likely to be adequate; however, it is required to monitor the impacts continuously and obtain the stakeholder feedbacks as necessarily.



အကျုဉ်းချုပ်အစီရင်ခံစာ

ကံပေါက်စားအုန်းဆီကြမ်းစက်ရုံ၏ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီရင်ခံစာ (EMP Report) တွင် ပတ်ဝန်းကျင် နှင့် လူမှုရေးဆိုင်ရာ သက်ရောက်မှုများ ဆန်းစစ်ချက်များ နှင့် စီမံခန့်ခွဲမှု အစီအစဥ် များ ကိုရေးသားတင်ပြထားပြီး ၄င်းတို့ကို သယံဧာတ နှင့် သဘာဝ ပတ်ဝန်းကျင် ထိန်းသိမ်းရေး ဝန်ကြီးဌာန မှ ၂၀၁၄ ခုနှစ် စွန်လ ၅ ရက်နေ့တွင် ထုန်ပြန်ထားသော ပတ်ဝန်းကျင် ထိန်းသိမ်းရေး ဥပဒေ နှင့် ၂၀၁၅ ခုနှစ် ဒီဇင်ဘာလ ၂၉ ရက်နေ့တွင် ထုန်ပြန်ထားသော ပတ်ဝန်းကျင် ဆိုင်ရာ သက်ရောက်မှုများဆန်းစစ် ခြင်း လုပ်ငန်းစဥ် များ အရ ရေးဆွဲ တင်ပြထားပါသည်။

တနင်္သာရီတိုင်းဒေသကြီး၊ ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးဦးစီးဌာန မှ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီရင်ခံစာ တင်ပြရန် ညွှန်ကြားချက် အရ စက်ရုံတာဝန်ရှိသူများသည် စက်ရုံလည်ပတ်ခြင်း နှင့် လုပ်ငန်းလုပ်ကိုင် ဆောင်ရွက် ခြင်းကြောင့် ဖြစ်ပေါ်လာနိုင်သော ပတ်ဝန်းကျင်ထိခိုက်မှု ဖြစ်ပေါ်စေနိုင်မည့် အကြောင်းအရာများကို သတ်မှတ် ဖော်ထုတ်ခြင်း၊ ထိခိုက်မှုများ သက်ရောက်နိုင်မည့် အတိုင်းအတာ ပမာဏများကို ခန့်မှန်းတွက်ချက်ခြင်း၊ သက်ရောက်မှု လျော့ချနိုင်မည့် အရေးယူ ကုစားနိုင်မည့် နည်းလမ်းများကို ဖော်ထုတ်တင်ပြနိုင်ရေးအတွက် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီရင်ခံစာ ပြုစုရေးသားရန် အကြံပေးအဖွဲ့ဖြစ်သော GREEN Environmental, Health, Safety & Social Consultancy Co., Ltd နှင့် ဆက်သွယ်ဆောင်ရွက်ခဲ့ပါသည်။

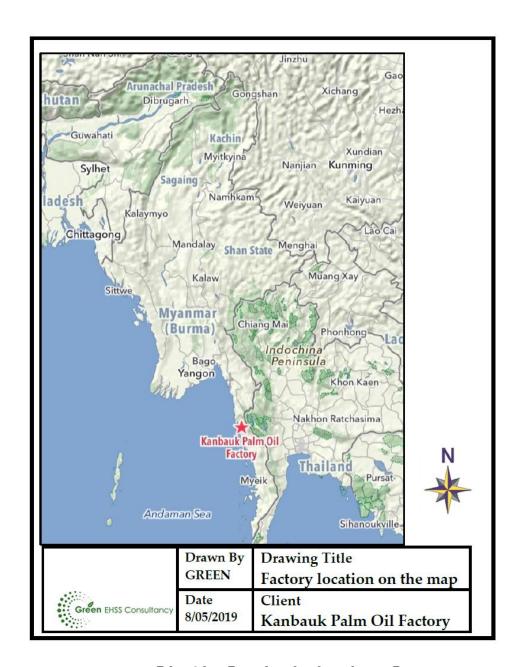
စီမံကိန်း၏ အစီရင်ခံစာနယ်ပယ်သည် ကံပေါက်စားအုန်းဆီကြမ်းစက်ရုံ၏ လုပ်ငန်း လည်ပတ် နေစဥ်ကာလ နှင့် စက်ရုံပိတ်သိမ်းသည့် ကာလများအတွက် အကြုံးဝင်ရန် တင်ပြထားပါသည်။ ထိခိုက်မှု များကို ခန့်မှန်း တွက်ချက် ရာတွင် နယ်နိမိတ်အကျယ်အဝန်းကို ထိခိုက်နိုင်သော ဒေသများ အပေါ် အခြေခံပြီး စက်ရုံမှ မီတာ ၃၀၀၀ အကွာ အကျယ်အထိသတ်မှတ်ခဲ့ပါသည်။

၁.၁ နိဒါန်း

ကံပေါက်စားအုန်းဆီကြမ်းစက်သည် တနင်္သာရီတိုင်းဒေသကြီး၊ရေဖြူမြို့နယ်၊ကံဘောက်ဒေသရှိ ဂန့်ဂေါ် တောင် ကျေးရွာ အနီးတည်ရှိပြီး အရှေ့လောင်ဂျီကျု ၉၈.၀၇° မှ ၉၈.၀၈° နှင့် မြောက်လတ္တီ ကျု ၁၄.၆၁° မှ ၁၄.၆၂° တွင် တည်ရှိပါသည်။ ကံပေါက်-ကလိန်အောင် ကားလမ်းသည် စက်ရုံ၏ မြောက်ဘက် ၂.၁၅ ကီလိုမီတာ အကွာတွင် တည်ရှိပါသည်။ စက်ရုံမြေ အကျယ်အဝန်းမှာ ၄၅၀ ပေ x ၇၅၀ ပေ ဖြစ်ပြီး ၇.၇၅ ဧက ခန့်ရှိပါသည်။

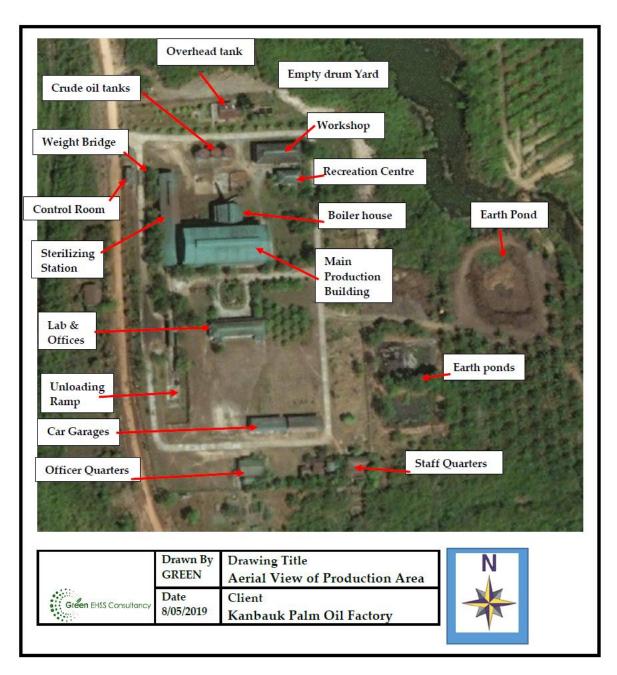
စက်ရုံပတ်ဝန်းကျင်ပတ်လည်တစ်လျောက်တွင် ၆၇၉၁ ဧက အကျယ်ရှိသော ဆီအုန်းစိုက်ခင်းများ ဝန်းရံလျက် ရှိပါသည်။ အနီးဆုံးလူနေထိုင်မှု အဖြစ် အနောက်တောင်ဘက် ၃.၃ ကီလိုမီတာ အကွာရှိ ဂန့်ဂေါ်တောင် ကျေးရွာ၊ အနောက်တောင်ဘက် ၅.၅ ကီလိုမီတာ အကွာရှိ ကံပေါက် ကျေးရွာ နှင့် မြောက်ဘက် ၅.၅ ကီလိုမီတာ အကွာရှိ အိန္ဒရာဇာ ကျေးရွာ တို့ဖြစ်ပါသည်။ စက်ရုံ၏ ရေဒီယပ် ၂ ကီလိုမီတာ အကွာနယ်မြေများ သည် ဆီအုန်းစိုက်ခင်းများဖြင့် ဖုံးလွှမ်းလျက်ရှိပါသည်။





ပုံ ၁.၁ မြန်မာနိုင်ငံမြေပုံတွင် စက်ရုံ၏ တည်နေရာပြပုံ





ပုံ ၁.၂ စက်ရုံတည်ဆောက်ထားမှု အပြင်အဆင်



၂.၁ ဥပဒေအကြောင်းဆိုင်ရာမူဘောင်

ပတ်ဝန်းကျင် ထိန်းသိမ်းရေး ဦးစီးဌာန (ECD) ကို ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး နှင့် သစ်တောရေးရာဝန်ကြီးဌာန (MOECAF) ၏ လက်အောက် သီးခြားအဖွဲ့ အစည်း အဖြစ် အောက်တိုဘာလ ၁၁ ရက် ၂၀၁၂ ခုနှစ် တွင် ဖွဲ့ စည်းခဲ့ပါသည်။ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး နှင့် သစ်တောရေးရာဝန်ကြီးဌာန မှ ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးဥပဒေ (Environmental Conservation Law) ကိုမတ်လ ၃၀ ရက် ၂၀၁၂ ခုနှစ် တွင် ထုတ်ပြန် ကြောငြာခဲ့ပါသည်။ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး နှင့် သစ်တောရေးရာဝန်ကြီးဌာန မှ ပတ်ဝန်းကျင် ထိန်းသိမ်းရေး နှင့် သစ်တောရေးရာဝန်ကြီးဌာန မှ ပတ်ဝန်းကျင် ထိန်းသိမ်းရေး နည်းဥပဒေများ (Environmental Conservation Rules) နှင့် ပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်းစစ်ခြင်း ဆိုင်ရာ လုပ်ထုံးလုပ်နည်း (Environmental Impact Assessment procedures) ကို စွန်လ ၅ ရက် ၂၀၁၄ နှင့် ၂၀၁၅ ခုနှစ် ဒီဇင်ဘာလ ၂၉ ရက်နေ့တွင် အသီးသီး ထုတ်ပြန် ခဲ့ပါသည်။

(EMP)အဖွဲ့သည် အမှတ် ကံပေါက်စားအုန်းဆီကြမ်းစက်ရုံမှ ဥပဒေဆိုင်ရာ လိုက်နာရန် လိုအပ်ချက် များပါ အောက်ဖော်ပြပါ အချက်များအပေါ် လိုက်နာမှု ရှိစေရန် သေချာစွာ စောင့်ကြည့် လေ့လာမှု ပြုထားပါသည်။

- ၁. လုပ်ငန်းခွင် ဘေးအန္တရာယ်ကင်းရှင်းရေး နှင့် ကျမ်းမာရေးဆိုင်ရာဥပဒေ (၂၀၁၉)
- ၂. ပတ်ဝန်းကျင် ထိန်းသိမ်းရေး ဥပဒေ (၂၀၁၂)
- ၃. ပတ်ဝန်းကျင် ထိန်းသိမ်းရေး နည်းဥပဒေ (၂၀၁၄)
- ၄. ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း
- ၅. အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ
- ၆. ရေအရင်းအမြစ်နှင့် မြစ်ချောင်းများ ထိန်းသိမ်းရေး ဥပဒေ (၂၀၁၃)
- ဂု. မြန်မာနိုင်ငံရင်းနှီးမြုပ်နှံမှု ဥပဒေ (၂၀၁၆)
- ၈. မြန်မာနိုင်ငံရင်းနှီးမြှုပ်နှံမှု နည်းဥပဒေများ (၂၀၁၇)
- ၉.ပို့ကုန်သွင်းကုန်ဥပဒေ (၂၀၁၂)
- ၁၀. အဆောက်အအုံဆိုင်ရာ နည်းဥပဒေများ (၂၀၁၄)
- ၁၁. အလုပ်ရုံအက်ဥပဒေကိုပြင်ဆင်သည့် ဥပဒေ (၂၀၁၆)
- ၁၂. မြန်မာနိုင်ငံမီးသတ်တပ်ဖွဲ့ ဥပဒေ (၂၀၁၅)
- ၁၃. မြေသိမ်းဆည်းခြင်း၊ ပြန်လည်နေရာချထားခြင်း နှင့် ပြန်လည်ထူထောင်ခြင်းဆိုင်ရာ ဥပဒေ
- ၁၄.၂၀၁၆ ခုနှစ် အခကြေးငွေပေးချေရေးဥပဒေ
- ၁၅. အနည်းဆုံး လုပ်ခ လစာ ထုတ်ပြန်ချက် (၂/၂၀၁၈)
- ၁၆. လူမှုဖူလုံရေး ဥပဒေ (၂၀၁၂)
- ၁၇. လူမှုဖူလုံရေး အက်ဥပဒေ (၁၉၅၄)
- ၁၈. ခွင့်နှင့် အလုပ်ပိတ်ရက် ကိုပြင်ဆင်သည့် ဥပဒေ (ဇူလိုင် ၂၀၁၄)
- ၁၉. အလုပ်သမားရေးရာ အငြင်းပွားမှုဖြေရှင်းရေး ဥပဒေကို ခုတိယအကြိမ်ပြင်ဆင်သည့်ဥပဒေ (၂၀၁၉)
- ၂၀. အလုပ်သမားလျော်ကြေးအက်ဥပဒေ (၁၉၂၃) (ပြင်ဆင် ၂၀၀၅)
- ၂၁. ပြည်သူ့ကျမ်းမာရေးဆိုင်ရာဥပဒေ
- ၂၂. ကူးစက်ရောဂါများကာကွယ်နှိမ်နှင်းရေးဥပဒေ (၁၉၉၅)
- ၂၃. ရေအရင်းအမြစ်နှင့်မြစ်ချောင်းများ ထိန်းသိမ်းရေးဥပဒေကိုပြင်ဆင်သည့်ဥပဒေ ၂၀၁၇
- ၂၄. အလုပ်သမားအဖွဲ့ အစည်း ဥပဒေ (၂၀၁၁)
- ၂၅. အလုပ်သမားအဖွဲ့ အစည်း နည်းဥပဒေ (၂၀၁၁)



၂၆. မော်တော်ယာ၌နည်း ဥပဒေ (၁၉၈၉) ၂၇. မော်တော်ယာ၌ဥပဒေ(၁၉၆၄) ၂၈. ပြည်တွင်းရေကြောင်း ပို့ဆောင်ရေးဥပဒေ (၂၀၁၇) ၂၉. ပြည်သူ့ကျမ်းမာရေးပေါ်လစီ (၁၉၉၃) ၃၀. မြေအောက်ရေ အက်ဥပဒေ (၁၉၃၀) ၃၁.အမျိုးသားမြေအသုံးချမှုမှုဝါဒ (၂၀၁၆) ၃၂. ပြည်တွင်းရေကြောင်းသွားရေယာဥ်ဥပဒေ (၂၀၁၅) ၃၃. ၁၉၅၁ စက်ရုံများအက်ဥပဒေ ကိုပြင်ဆင်သည့် ဥပဒေ (၂၀၁၆) ၃၄. လုပ်ငန်းခွင်သုံးပေါက်ကွဲ စေတတ် သော ဝတ္ထုပစ္စည်းများဆိုင်ရာ ဥပဒေ (၂၀၁၈) ၃၅. ဓာတုပစ္စည်း နှင့် ဆက်စပ်ပစ္စည်းများ အန္တရာယ်မှ တားဆီးကာကွယ်ရေးနည်းဥပဒေများ (၂၀၁၆) ၃၆. မြန်မာ့ဆိပ်ကမ်းအာဏာပိုင်ဥပဒေ (၂၀၁၅) ၃၇. ဆေးလိပ်နှင့် ဆေးရွက်ကြီးထွက်ပစ္စည်း သောက်သုံးမှုထိန်းချုပ်ရေးဥပဒေ ၂၀၀၆ ၃၈. အခြားသော လိုက်နာရမည့် ဥပဒေ၊ နည်း ဥပဒေ၊ စံနှုန်း နှင့် လမ်းညွှန်ချက်များ၊ သက်ဆိုင်ရာ ဒေသဆိုင်ရာ အစိုးရ နှင့် လွှတ်တော်တို့မှ အခါအားလျော်စွာ ထုတ်ပြန်ထားသော ဥပဒေများ ၃၉. ရေအရင်းအမြစ်နှင့် မြစ်ချောင်းများထိန်းသိမ်းရေးဥပဒေ (၂၀၀၆) ၄၀. ရေအရင်းအမြစ်နှင့် မြစ်ချောင်းများထိန်းသိမ်းရေးနည်းဥပဒေ (၂၀၁၃) ၄၁. ရေအရင်းအမြစ်နှင့် မြစ်ချောင်းများထိန်းသိမ်းရေးဥပဒေ (၂၀၀၆) ၄၂. သစ်တောဥပဒေ (၂၀၁၈) ၄၃. သစ်တောနည်းဥပဒေ (၁၉၉၅) ၄၄. တောရိုင်းတိရိစ္ဆာန်နှင့် သဘာဝအပင်များကာကွယ်ရေးနှင့် သဘာဝနယ်မြေများ ထိန်းသိမ်းရေးဥပဒေ ၄၅. အလုပ်သမားလျော်ကြေးအက်ဥပဒေ (၁၉၅၁) ၄၆. အလုပ်ရှင်နှင့် အလုပ်သမား အက်ဥပဒေ ၄၇. မြေစာရင်း မြေအမိန့် နှင့် ညွှန်ကြားချက်များ (၂၀၀၆) ၄၈. မြေစာရင်းလက်စွဲဥပဒေ (၁၉၆၄)

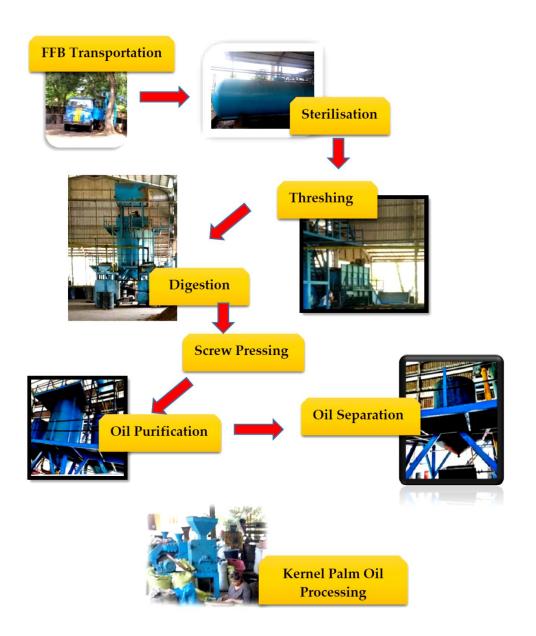
စက်ရုံ၏ လုပ်ဆောင်မှုများနှင့် ဆက်နွယ်သော ပတ်ဝန်းကျင်ဆိုင်ရာ အဓိကသက်ရောက်မှုများ ကို ခန့်မှန်းခြင်း အကဲဖြတ်ခြင်း တို့ကို ပြုလုပ်ရာတွင် အောက်ဖော်ပြပါ ကိုးကားမှုများကို ထည့်သွင်း အသုံးပြု ထားပါသည်။

၃.၁ ကုန်ထုတ်လုပ်မှုလုပ်ငန်းစဉ်

၄၉. မြေလွတ်မြေရိုင်းစီမံခန့်ခွဲရေး

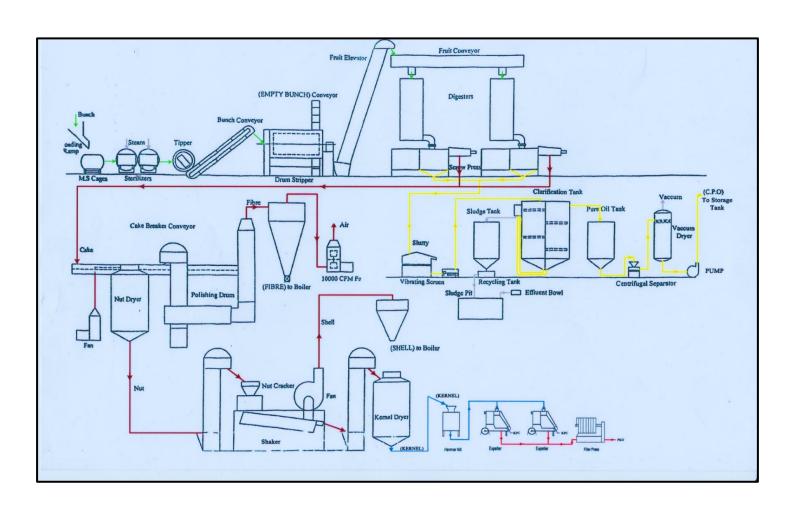
ကံပေါက်ဆီကြမ်းစက်ရုံသည် တစ်နာရီဆီသီးခိုင် (၁၀) တန်ကျ ဆီအုန်းဆီကြမ်းကြိတ်စက်ရုံ ဖြစ်ပါသည်။ ဆီကြမ်းထုတ်လုပ်သည့် လုပ်ငန်းစဥ် အဆင့်ဆင့်တွင် ဓာတုပစ္စည်းသုံးစွဲရန်မလိုအပ်ပါ။ ဆီခုတ်လုပ်မှုအတွက် အဓိက ကုန်ကြမ်းများမှာ ဆီသီးခိုင် (FFBs)၊ ဆီစေ့အဆံ (Kerneks) ရေနှင့် ပေါင်းခံငွေ့ တို့ဖြစ်ပါသည်။ ထုတ် လုပ်ခြင်းအသေးစိတ် လုပ်ငန်းအဆင့်ဆင့် များကို ပုံ (၁.၃) နှင့် (၁.၄) တို့တွင် ရှင်းလင်းပြထားပါသည်။





ပုံ ၁.၃ ကုန်ထုတ်လုပ်မှုလုပ်ငန်းစဥ်ပြပုံ





ပုံ ၁.၄ ကုန်ထုတ်လုပ်ခြင်းအသေးစိပ်လုပ်ငန်းအဆင့်ဆင့်



၄.၁ ကံပေါက်စားအုန်းဆီကြမ်းစက်ရုံ၏ အကြောင်းအရာများ

စက်ရုံအမည် : ကံပေါက်စားအုန်းဆီကြမ်းစက်ရုံ၏

တည်ထောင်သည့်ခုနှစ် : အောက်တိုဘာလ၂၀၀၃

လိပ်စာ : ကံပေါက်ဒေသ၊ ရေဖြူမြို့နယ်၊ တနင်္သာရီတိုင်းဒေသကြီး၊

မြန်မာ

Name of Principal Organization : MYANAMA ECONOMIC HOLDING PUBLIC COMPANY

LTD.(MEHPCL)

လုပ်ငန်းအမျိုးအစား : ဆီအုန်းဆီထုတ်လုပ်ခြင်း ရင်းနှီးမြုပ်နှံမှုအမျိုးအစား : ၁၀၀% ပြည်တွင်းမြုပ်နှံမှု

ရောင်းချမှုစနစ် : ၁၀၀% ပြည်တွင်း

စက်ရုံအကျယ်အဝန်း : ၇.၇၅ ဧက ဆောက်လုပ်ရေးစတင် သည့်အချိန် : ၂၀၀၆

ထုတ်လုပ်မှုစတင်သည့် အချိန် : ဖေဖော်ဝါရီ၂၀၀၉

စက်ရုံမန်နေဂျာ : ဦးကျော်စိုးမိုး ၊ ဖုန်း ဝ၉၈၆၁၂၁၈၂၊ ဝ၉၃၄၆၁၆၃၆၁၆

၅.၁ ပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေးများ

ကံပေါက်စားအုန်းဆီကြမ်းစက်ရုံ၏ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီရင်ခံစာကို Green Environmental Health, Safety and Social Consultancy Co., Ltd (Green EHSS) မှ တာဝန်ယူ ရေးဆွဲပေးပြီး ပတ်ဝန်းကျင်ဆိုင်ရာ အခြေခံ အချက်အလက်များတိုင်းတာမှုများကို ၂၀၁၉ ခုနှစ် မေလ၊ ဇွန်လ နှင့် ဇူလိုင်လများအတွင်း ကွင်းဆင်းရယူ ခဲ့ပါသည်။ ပတ်ဝန်းကျင်လေထု အရည်အသွေး နှင့် ဆူညံသံ အဆင့်များ ကို ၂၀၁၉ ခုနှစ် မေလတွင် ကွင်းဆင်းတိုင်း တာခဲ့ပါသည်။ မြေပေါ် ရေအရည်အသွေးအတွက် ရေလှောင်ကန်မှလည်းကောင်း၊ မြေအောက်ရေ အရည်အသွေး အတွက် စက်ရုံသုံး အဝီစိတွင်းရေ မှလည်းကောင်း၊ စက်ရုံ နောက်ဆုံးစွန့်ပစ်ရေကို ရေစစ်ကန်မှလည်းကောင်း၊ ရယူခဲ့ပြီး ၂၀၁၉ ခုနှစ် ဇူလိုင်လတွင် စမ်းသပ်စစ်ဆေးခဲ့ပါသည်။

ကွင်းဆင်းစစ်ဆေးမှုများ နှင့် လေ့လာစောင့်ကြည့်ခြင်း နှင့် စမ်းသပ်ရရှိသော အချက်အလက်များကို ကိုးကားခြင်း တို့အပေါ်မူတည်၍ စက်ရုံလုပ်ငန်းလည်ပတ် ဆောင်ရွက်သည့်ကာလ၊ နှင့် စက်ရုံပိတ်သိမ်း ဖြိုဖျက်မည့်ကာလ တို့တွင် ပတ်ဝန်းကျင်ဆိုင်ရာ သက်ရောက်နိုင်မည့် အတိုင်းအတာ ပမာဏများကို ခန့်မှန်းတွက်ချက်ခြင်း၊ သတ်မှတ် ဖော်ထုတ်ခြင်း၊ အကဲဖြတ်ခြင်းများပြုလုပ်ထားပါသည်။ ပတ်ဝန်းကျင်ဆိုင်ရာ သက်ရာက်မှုများ ဆန်းစစ်ခြင်း ကို သက်ရောက်နိုင်မည့် ပြင်းထန်မှု အတိုင်းအတာ၊ ပမာဏ၊ ဖြစ်ပေါ်နိုင်သည့် အကြိမ်အရေအတွက် နှင့် လက်ရှိလုပ် ဆောင်လျက်ရှိသော ထိန်းချုပ်ကုစားနည်းလမ်းများ ပေါ်မူတည်၍ အကဲဖြတ်ခြင်းဖြစ်ပါသည်။

စက်ရုံတည်ဆောက်သောကာလ၊ စက်ရုံလည်ပတ်သောကာလ နှင့် စက်ရုံပိတ်သိမ်းသော ကာလတို့ အတွက် သဘာဝ ပတ်ဝန်းကျင် နှင့်လူမူစီးပွား အကျိုးသက်ရောက်နိုင်မှုများ အကျဥ်းချုပ်ကို အောက်ပါဇယားတွင် ဖော်ပြထား ပါသည်။



ဇယား ၁.၁ သဘာဝပတ်ဝန်းကျင်နှင့် လူမှုစီးပွားအကျိုးသက်ရောက်နိုင်မှုများအကျဦးချုပ်

| | အကြောင်းအရာ ၏နယ်ပယ် | သက်ရောဂ | ာ်မှုအလား | အလာ | 39(| ကဲဖြတ်ရလ | ŝ | |
|--|------------------------|--------------------|---------------------|---------------------|--------------------|----------------------------|---------------------|--|
| အမျိုး အစား | | တည်ဆောက်သည့် အဆင့် | స్తులరులన్ని ఇవిక్గ | ပိတ်သိမ်းသည့် အဆင့် | တည်ဆောက်သည့် အဆင့် | స్తవాల్లు స్తాబర్గు ఆవార్థ | ဝိတ်သိမ်းသည့် အဆင့် | သက်ရောက်မှု အဆင့် သတ်မှတ်ရသည့် အကြောင်းရင်း |
| သဘာဝပတ်ဝန်းကျင်ဆိုင်ရာ သက်ရောက်မှုများ | လေအရည်အ သွေး | သက်ဆိုင်မှုမရှိ | အသင့်အတင့် | အနည်းငယ် | - | အသင့်အတင့် | အနည်းငယ် | မီးစက် နှင့် ဘွိုင်လာတို့မှ အခိုးအငွေ့ ထုတ်လွှတ်မှုများသည် လေထု ညစ် ညမ်းစေ သော အဓိက ဇစ်မြစ်များ ဖြစ်သည်။ လက်ရှိ ထိန်းချုပ်မှုများ နှင့် စက်ရုံ၏ ပမာဏ အနည်းငယ် သာ ထုတ်လုပ်မှုတို့ အရ ဆိုးကျိုး သက်ရောက်နိုင်မှုမှာ အသင့်အတင့် (M) ဟုမှတ်ယူနိုင်ပါသည်။ အဆောက်အဦးများး ဖြိုချခြင်း လုပ် ငန်းခွင် မှ ထွက်သောဖုန်မှုန့် များ သည် ပတ်ဝန်းကျင် နေရာ များသို့ ပြန့်လွှင့်ပြီး လေထုကို ညစ်ညမ်း နိုင် ပါသည်။ သို့သော စက်ရုံသည် အသေးစားအရွယ်ဖြစ်ပြီး ဖုန်မှုန့် ပျံ့လွှင့် မှုများကို ထိန်းချုပ် နိုင်ပါ သည်။ ထို့ကြောင့် သက်ရောက်မှု အနည်းငယ် (L) ဟု မှတ်ယူ နိုင်ပါ သည်။ |
| ď | ဆူညံသံ | - | ခဲ့ထဧခွံဇေ | အနည်းငယိ | • | ဒုံ <i>ထ</i> ဧးဒုံကဧ | အနည်းငယိ | စက်ပစ္စည်းများ အသုံးပြုခြင်းသည် ဆူညံသံ နှင့် တုန်ခါမှုများကို အသင့် အတင့် ဖြစ်ပေါ်စေပါသည်။ မီးစက်များကို သီးခြား အခန်း အ တွင်း ထား ခြင်း နှင့် အခြား ထွက်ပေါ် လာသော ဆူညံသံ များ သည် ယာယီ အချိန်မျှသာ ဖြစ်ပါ သည်။ |



| | | | | | အချို့သော စက်များ သည် ဆူညံ သံများ စွာ ထွက်ရှိသော်လည်း ဆူညံ သံ တိုင်းတာ ရရှိမှု ရလဒ်များ အရ ဆူညံသံ၏ သက်ရောက်မှု ကို အသင့် အတင့် ဟု မှတ်ယူ နိုင်ပါ သည်။ ဆူညံသံများသော နေရာ ရှိဝန် ထမ်း များကို နား အကာအကွယ် (earplugs) များပေးထား ခြင်း၊ တာဝန်ရှိသူမှအပ စက်ပစ္စည်း များ အနီးသို့ သွားလာခြင်းကို ခွင့်မပြုရန် တို့ကို ပြုလုပ်ပါရန် အကြံပြုပါသည်။ |
|-----------------|-------------|----------|-------------|----------|---|
| ရေအရည်အ သွေး | ဒုံထဧးဒုံကေ | အနည်းငယိ | ဒုံထၕာ္ဒံကေ | အနည်းငယိ | စားအုန်းဆီ ထုတ်လုပ်မှုတွင် ဘေး ထွက် ပစ္စည်း အဖြစ် POME effluent စွန့်ပစ်ရေ ထွက်ရှိပါသည်။ စက်ရုံ သည် အသေးစား စက်ရုံ ဖြစ်ခြင်း ကြောင့် စွန့်ပစ်ရေပမာဏ မှာ အ နည်းငယ်သာ ဖြစ်ပါသည်၊ ထို့အပြင် စက်ရုံသည် မြေပေါ်ရေ အရင်းအမြစ် မှ ဝေးကွာပါသည်။ သို့သော် စက်ရုံသည် နောက်ဆုံး စွန့်ပစ်ရေ အား ကောင်းမွန်စွာ စီမံ ခန့်ခွဲမှု မရှိပါက ၄င်းသည် မြေ အောက်ရေ အရည်အသွေး ကို သက် ရောက်နိုင်ပါသည်။ ထို့ကြောင့် လုပ် ငန်းလည်ပတ်သည့် ကာလ အတွင်း သက်ရောက်မှုမှာ အသင့်အတင့် (Medium) ဖြစ်ပါသည်။ စက်ရုံပိတ်သိမ်းခြင်းကာလအတွက် ဖြိုဖျက် ခြင်းလုပ်ငန်းမှ သက် ရောက် မှု မရှိ နိုင်၍ ၄င်း ကာလအတွက် သက်ရောက်မှုမှာ အနည်း ငယ် (L) သာဖြစ်သည်။ |



| စွန့်ပစ်ပစ္စည်း အစိုင်အခဲ | | အနည်းငယိ | အနည်းငယ် | | အနည်းငယ် | အနည်းငယိ | အသေးစားစက်ရုံ ဖြစ်၍ ထွက်ရှိ လာ သော စွန့်ပစ်ပစ္စည်း အနည်းငယ်ကို ပြန်လည် အသုံးပြုခြင်း နှင့် ကောင်း မွန်စွာ စီမံခန့်ခွဲ နိုင်ပါသည်။ ထို့အပြင် ကုန်ထုတ် လုပ်မှုမှု ဘေးထွက် ပစ္စည်းများမှာ အော်ဂဲနစ် နှင့် မြေဆီ လွှာ မြေဩဇာ အဖြစ် အလွယ်တကူ ကြေပျက်နိုင်ပြပါသည်။ ထို အ ကြောင်းရင်း များကြောင့် စွန့်ပစ် အစိုင် အခဲ ၏ သက် ရောက်မှု မှာ အနည်းငယ် (L) ဖြစ်သည်။ စက်ရုံပိတ်သိမ်းသည့် ကာလ များ တွင် အဆောက်အဦး များ ဖြိုချ ခြင်း ကြောင့် ဖြစ်ပေါ်လာသော အပျက် အစီး များကို ပြန်လည် အသုံးပြုမည် ဖြစ်ပါသည်။ ပြန်လည် အသုံးပြုမည် ဖြစ်ပါသည်။ ပြန်လည် အသုံးပြု၍ မရသော အရာများကို စွန့်ပစ်ပစ္စည်း သိမ်းဆည်းသူ (waste collector) မှတဆင့် စွန့်ပစ်မည် ဖြစ်သည်။ စက်ရုံပိတ်သိမ်းသည့် ကာလအတွက် သက်ရောက်မှုမှာ အနည်းငယ် (L) |
|------------------------------|---|-------------|----------|---|---------------|------------------|--|
| နောက်ဆုံးစွန့် ပစ်ရေ POME | _ | ဒုံယဧးဒုံကဧ | အနည်းငယ် | • | င့်တင်းခွံကမေ | သက်ဆိုင်မှု မရှိ | ကံပေါက်စားအုန်းဆီကြမ်းစက်ရုံ သည် small scale စက်ရုံတစ်ခု ဖြစ်ပြီး ရာသီအလိုက်ဆီထုတ်လုပ် ခြင်းဖြစ်ပါသည်။ စက်ရုံသည် စွန့်ပစ် ရေ အား သန့်စင်ပြီး ပြန်လည် အသုံး ပြုပါသည်။ POME စွန့်ပစ်ရေ ပမာ ဏ မှာ အနည်းငယ်သာ ဖြစ်ပြီး စီမံ ခန့်ခွဲနိုင်ပါသည်။ နောက်ဆုံးစွန့်ပစ်ရေကန်နှင့်ရေဆင်း မြောင်းတို့ မှထွက်ရှိ သည့် စွန့်ပစ် ရေ၏ BOD နှင့် COD ပါ ဝင်သည့် ရေ အရည်အသွေးတိုင်း တာ မှု ရလဒ်မှာ သတ်မှတ် အဆင့်အတွင်းရှိ၍ လက် ခံ နိုင်သည့် အတိုင်းအတာ ဖြစ်ပါ သည်။ |



| | | | | | | | ရေအရည်အသွေး ရလဒ်၊ လက်ရှိထိန်းချုပ်မှုနည်းလမ်းများ အရ သက်ရောက်မှုမှာ အသင့်အတင့် ဖြစ်ပါသည်။ သို့ရာတွင် POME စွန့် ပစ်ရေသည် မြေဆီလွှာ ညစ်ညမ်း မှု ကိုမဖြစ်ပေါ်စေရေး အတွက် စောင့် ကြပ်ကြည်ရှု ရန်နှင့် စီမံခန့်ခွဲ ရန် လို အပ်ကြောင်း အကြံပြုအပ် ပါသည်။ စက်ရုံဖြိုဖျက်ခြင်း အတွက် စွန့်ပစ် ရေ နှင့် သက်ဆိုင်မှု မရှိပါ။ သက် ရောက် မှု မှာ အနည်းငယ်သာ ဖြစ် ပါသည်။ |
|---------------------------|---|----------------------|----------|---|-------------|-------------------|--|
| မြေဆီလွှာ ညစ်ညမ်းခြင်း | - | ဒုံ <i>ယ</i> ဧးဒုံကဧ | ကားငှာမှ | • | င့်ပဇာ္ခံလေ | မြန်ခုန်ခွင့်မှာလ | စားအုန်းဆီ ထုတ်လုပ်ခြင်းသည် ဘေးထွက် ပစ္စည်း အဖြစ် ထွက်ရှိ စေ ပါသည်။ စက်ပစ္စည်း များ ပြုပြင်ခြင်း သည် စက်ဆီ၊ ချောဆီ၊ ဒီဇယ် ဖိတ်စင်မှု များကို ဖြစ်ပေါ်စေပါသည်။ စွန့်ထုတ်ရေ နှင့် ဖိတ်စင်မှု များကို ကောင်းမွန် စွာ စီမံမှုမရှိပါက မြေဆီ လွှာကို ပျက်စီးစေပါသည်။ စက်ရုံ သည် စွန့်ပစ်ရေ ကို ပြုပြင်ခြင်း ပြန် လည်အသုံးပြုခြင်း တို့ လုပ် ဆောင် ပါသည်။ စွန့်ပစ်ရေ၏ ပမာဏ အနည်းငယ်သာဖြစ်ပြီး ကောင်း မွန် စွာ စီမံခန့်ခွဲနိုင်ပါသည်။ ရေစစ်ကန်အတွင်း သဘာဝပေါက် ပင် များ ပြန့်ကျဲစွာ ပေါက်ရောက် နေခြင်း သည် နောက်ဆုံးကန် (final treatment ponds) အတွင်းရှိ မြေ ဆီလွှာ အရည်အသွေး သည် နောက် ဆုံး စွန့်ပစ်ရေ (effluents) သက် ရောက်မှု မရှိကြောင်း ဖော်ပြ နေ ပါသည်။ |



| | | | | | | | မြေဆီလွှာ pH စစ်ဆေးမှုရလဒ်၊ လက်ရှိ အခြေအနေနှင့် ထိန်းချုပ်မှု အခြေအနေနှင့် ထိန်းချုပ်မှု အခြေအနေများ ကြောင့် သက် ရောက်မှုကို အသင့်အတင့် (Medium) ဟုယူဆပါသည်။ သို့သော် မြေဆီလွှာအား သက် ရောက်မှုများ မဖြစ်စေရန် POME အား စောင့်ကြပ်ကြည့် ရှုပြီး စီမံ ခန့်ခွဲ ရန် အကြံပြုအပ်ပါသည်။ ကားဂိုဒေါင်နေရာ နှင့် ပြင်ဆင် ထိန်း သိမ်း နေရာတွင် ကွန်ကရစ် အောက် ခင်းထား ပါသည်။ စက်ရုံအတွင်း လောင်စာဆီ ဖြည့်တင်းသည့် နေရာ မရှိပါ။ သို့သော် စက်ပြုပြင် ထိန်း သိမ်းသည့် နေရာတွင် ဆီခံဗန်း ထားရှိရန် အကြံပြုအပ်ပါသည်။ စက်ရုံပိတ်သိမ်းသည့် ကာလတွင် ဓာတု ပစ္စည်း သို့မဟုတ် အန္တရာယ် ဖြစ်စေသော အရာများ ထွက်ရှိမည် မဟုတ်၍ မြေဆီလွှာ အပေါ် သက် ရောက်မှု ရှိမည်မဟုတ်ပါ။ သက် ရောက်မှု အဆင့်မှာ အနည်းငယ် (L) ဟမတ်ယနိုင်ပါသည်။ |
|--------------|---|----------|---------------|---|----------|-----------------|---|
| ရေသုံးစွဲမှု | - | အနည်းငယိ | မြန်ခွင့်များ | - | အနည်းငယ် | သက်ဆိုင်မှုမရှိ | ဟုမှတ်ယူနိုင်ပါသည်။ စက်ရုံလည်ပတ်ရန်နှင့် သန့်ရှင်းရေး သုံးရေ နှင့် အိမ်သာတို့မှ စွန့်ပစ်ရေ သုံးရေ တို့ကို မြေပေါ်ရေ ဖြစ်သည့် ရေလှောင်ကန်မှ အဓိက ရယူ သုံးစွဲ ပါသည်။ ကုန်ထုတ်လုပ်မှု အတွက် မြေ အောက်ရေကို သက်ရောက်မှုမှာ အလွန် နည်းပါသည်။ ထို့ ကြောင့် မြေလွှာ နိမ့်ကျနိုင်မှုမှာ သက်ရောက် မှုအနည်းငယ် (L) သာဖြစ်သည်။ စက်ရုံဖြိုဖျက်ခြင်းတွင် မြေလွှာနိမ့် ကျမှု အပေါ် သက်ရောက်မှုမရှိပါ။ |



| | အနံ့ | 1 | အနည်းငယ် | သက်ဆိုင်မှုမရှိ | 1 | အနည်းငယ် | သက်ဆိုင်မှုမရှိ | ကုန်ထုတ်လုပ်မှု လုပ်ငန်းစဥ်သဉ အနံ့ပျံ့ လွင့်မှုကို ဖြစ်စေ နိုင် သေ လည်း စက်ရုံသည် အနံ့ထွက်ရှိရ စစ်မြစ်ကို စီမံမှုများ ပြုလုပ် ထာ |
|----------------------------------|---|---|----------------------------|--------------------|---|-------------------|----------------------------|---|
| | | | | | | | | ပါသည်။ သို့သော် စက်ရုံသည် လူနေထိုင်သေ ဒေသ များနှင့် လွန်စွာဝေးကွာသဉ ဖြစ်၍ သက် ရောက်မှုကို အနည် ငယ်ဟုသာ ယူဆ နိုင် သည်။ စက်ရုံပိတ်သိမ်းသည့် ကာလတွ |
| | မြစ်ကြောင်း အနည် ကျခြင်း | 1 | သက်ဆိုင်မှုမရှိ | သက်ဆိုင်မှုမရှိ | | သက်ဆိုင်မှုမရှိ | သက်ဆိုင်မှုမရှိ | သက်ဆိုင် မှုမရှိပါ။ စက်ရုံသည် မြေပေါ် ရေဇစ်မြစ် နှ ဝေးကွာပြီး စက်ရုံသည် စွန့်ပ ပစ္စည်း များကို မြစ်အတွင်းသို့ စွန့်ပ ခြင်းမပြုပါ။ ထို့ကြောင့် အနည်ဂ |
| | ကာကွယ်ထား | ı | , , , , , , | င်မှုမရှိ | 1 | ှိ မိုဗုမ္ပ | , , , , , , | စက်ရုံပိတ်သိမ်းသည့် ကာလအတွင် သက်ဆိုင်မှု မရှိပါ။ စီမံကိန်း နယ်မြေအတွင်း ကာကွပ |
| | သော ဧရိယာ | | သက်ဆိုင်မှုမရှိ | ရု သက်ဆိုင်မှုမရှိ | |) သက်ဆိုင်မှုမရှိ | သက်ဆိုင်မှုမရှိ | ထိန်းသိမ်း ထားသော ဧရိယာ မရှိပါ၊ |
| ဇီဝမျိုးစုံအပေါ် သက်ရောက်မှုများ | အပင် အကောင် နှင့် ဇီဝဗေဒ | | အနည်းငယ် | သက်ဆိုင်မှုမရှိ | | အနည်းငယ် | ဒုံ ထင်း ဒုံကဧ | စက်ရုံဘေးပတ်လည် ၆၇၀၀ ဧက မှ စိုက်ခင်းများဖြင့် ဝိုင်းနေသည်ဖြစ်စွ လက်ရှိ ဇီဝစနစ်အပေါ် အကျိုးသဂ ရောက်မှုမှာ အနည်းငယ်သာ ဖြမ သည်။ ထို့အပြင် သစ်တောသစ်ပင် အနည်း ငယ်တို့မှာ စက်ရုံအဝန်းအဝိုင်း ဒ တွင်း ပေါက်ရောက်လျက် ရှိပါသည် အဆိုပါ ပေါက်ရောက်မှုများမှာ ဝ ရိစ္ဆာန်များ အတွက် နေထိုင်စရာ နှ အစာရေစာ အဖြစ် ဖြစ်တည် နေပါသည်။ စက်ရုံပိတ်သိမ်းသည့် ကာလအတွက |
| | မြေမျက်နှာ သွင်ပြင်နှင့် ဘူမိ အနေအထား | ı | အနည်းငယ် | သက်ဆိုင်မှုမရှိ | 1 | အနည်းငယ် | သက်ဆိုင်မှုမရှိ | သက်ဆိုင်မှု မရှိပါ။ မြေမျက်နှာ သွင်ပြင် နှင့် ဘူမိအေ အထားအတွက် သက်ရောက်မှုမှ အနည်းငယ်သာ ဖြစ်သည်။ |



| | ပြောင်းရွှေ့ နေရာ ချထားမှုများ | ı | သက်ဆိုင်မှုမရှိ | သက်ဆိုင်မှုမရှိ | | သက်ဆိုင်မှုမရှိ | သက်ဆိုင်မှုမရှိ | စီမံကိန်းကြောင့် မူလနေထိုင်သူများ အတွက် ပြောင်းရွေ့နေရာ ချထား မှုများမရှိပါ။ |
|---|--------------------------------------|---|-------------------------------|-----------------|---|-------------------------------|-----------------|---|
| | ဒေသတွင်းမကျေ နပ်မှု ဖြစ်ပွားခြင်း | • | အနည်းငယ် | သက်ဆိုင်မှုမရှိ | | အနည်းငယ် | သက်ဆိုင်မှုမရှိ | စက်ရုံသည် နိုင်ငံတော်မှ ချမှတ် ထားသော ဥပဒေ၊ နည်းဥပဒေ နှင့် လုပ်ထုံးလုပ်နည်း များကို လိုက်နာ ကျင့်သုံးလျက်ရှိ ပြီး ဒေသဆိုင်ရာ အာဏာပိုင်များကို လိုက်နာ ကျင့်သုံး လျက်ရှိပြီး ဒေသဆိုင်ရာ အာဏာ ပိုင် များ ဒေသခံများ နှင့် ပူးပေါင်းလုပ် ဆောင်လျက် ရှိပါသည်။ စက်ရုံသည် ဦးပိုင်မှ ပိုင်ဆိုင်ပြီး ပိုင်ဆိုင်မှု နှင့် ပက်သက်၍ အာဏာပိုင် များမှ ပါဝင် ခြင်းမရှိဘဲ ဒေသတွင်း မကျေနပ်မှု ဖြစ်ပွားခြင်း မရှိပါ။ |
| | တိုင်းရင်းသား လူနည်းစုများ | 1 | သက်ဆိုင်မှုမရှိ | သက်ဆိုင်မှုမရှိ | • | သက်ဆိုင်မှုမရှိ | သက်ဆိုင်မှုမရှိ | စက်ရုံဧရိယာ အတွင်းနှင့် ပတ်ဝန်း ကျင် တွင် တိုင်းရင်းသား လူနည်းစု များ မရှိပါ။ |
| No: | ဆင်းရဲနွမ်းပါးမှု | • | သိသာသောကောင်းကျိုး သက်ရာက်မှု | င့်ထင်္ခေ့ဇာ | | သိသာသောကောင်းကျိုး သက်ရာက်မှု | အနည်းငယိ | လူမှုစီးပွားကို ကောင်းကျိုးပြုစေ ပါသည်။ စီမံကိန်း အကောင်အထည် ဖော်ခြင်း ကြောင့် အနီးပတ်ဝန်းကျင် နေထိုင်သူ များအတွက် အလုပ် အကိုင် အခွင့် အလမ်းများ ဖန်တီးပေး နိုင်ပြီး လူနေမှု အဆင့် အတန်း နှင့် ပညာရည် မြင့်မားမှု တို့ကို ဖြစ်ပေါ်စေပါသည်။ စက်ရုံပိတ်သိမ်းသော အခါ အလုပ်အ ကိုင် ဆုံးရှုံးမှုများ ဖြစ်ပေါ်စေနိုင်၍ ဆိုးကျိုးကို ဖြစ်ပေါ်စေပါသည်။ |
| လူမှုပတ်ဝန်းကျင်ဆိုင်ရ၁ သက်ရောက်မှုများ | လူနေထိုင်မှုနှင့် ဝင်ငွေရရှိမှု | 1 | သိသာသောကောင်းကျိုး သက်ရာက်မှု | သနည်းငယွ | | သိသာသောကောင်းကျိုး သက်ရာက်မှု | အနည်းငယ် | အလုပ်အကိုင်များ ဖန်တီးပေးနိုင်မှု နှင့် စက်မှုစီးပွားလုပ်ငန်းများ ဖွံ့ဖြိုးမှု တို့သည် ဒေသဆိုင်ရာ ဖွံ့ဖြိုးမှု နှင့် နိုင်ငံစီးပွားတိုးတက်မှုများ အတွက် စီးပွားရေးဆိုင်ရာ ကောင်းကျိုးများ ကို ဖြစ်ထွန်းစေပါသည်။ ထိုမှတဖန် ဒေသခံတို့ အတွက် သိသာသော ကောင်းကျိုးများ ကို ဖြစ်ပေါ်စေ ပါသည်။ |



| လက်ရှိ လူမှုဆိုင် ရာ အခြေခံ အ ဆောက်အအုံ များ နှင့် ဝန် ဆောင်မှုများ | 1 | အနည်းငယ် | သက်ဆိုင်မှုမရှိ | • | အနည်းငယ် | သက်ဆိုင်မှုမရှိ | လက်ရှိဖြစ်ပေါ် နေသော ကျေးလက် အခြေအနေမျာ အပေါ် သက်ရောက် မှုမှာ အနည်းငယ်ဟု မှတ်ယူ နိုင်ပါ သည်။ |
|---|---|-----------------|-----------------|---|---------------------------------|-----------------|---|
| ယဥ်ကျေးမှု ဆိုင် ရာ အမွေ အနှစ် | - | သက်ဆိုင်မှုမရှိ | သက်ဆိုင်မှုမရှိ | 1 | သက်ဆိုင်မှုမရှိ | သက်ဆိုင်မှုမရှိ | စက်ရုံအနီးတဝိုက်တွင် ယဥ်ကျေးမှု ဆိုင်ရာ အဆောက်အဦးများ မရှိပါ။ |
| ရှုခင်းအနေ အထား | - | အနည်းငယ် | သက်ဆိုင်မှုမရှိ | | + ကောင်းကျိုး သက်ရာက်မှုအနည်ငယ် | သက်ဆိုင်မှုမရှိ | စီမံကိန်း ဖော်ဆောင်ခြင်းကြောင့် ရှု ခင်း အနေအထား အပေါ် သက်ရာက် မှု မရှိနိုင်ပါ။ စိမ်းလန်းစိုပြေခြင်း အစီ အစဥ်အရ အပင်များ စိုက်ပျိုး လာ သော အခါ ပိုမိုလှပသော အနေ အထား ဖြစ်လာ မည်ဖြစ်ပေသည်။ |
| ကူးစက်ရောဂါ ပျံ့နှံ့ခြင်း ဥပမာ AIDS/HIV | | အနည်းငယ် | သက်ဆိုင်မှုမရှိ | • | အနည်းငယ် | သက်ဆိုင်မှုမရှိ | ကျမ်းမာရေး ရှုထောင့်အရ လူဦးရေ ရွှေပြောင်း အခြေချမှုများ သည် ဒေသခံများ အပေါ် ဆိုးကျိုး သက် ရောက်မှုကို ဖြစ်စေနိုင်ပါသည်။ သို့ သော် ကျမ်းမာရေး ဆိုင်ရာ ဗဟုသု တ နှင့် စောင့်ရှောက်မှု များ ပြုလုပ် ပေးခြင်းဖြင့် သက်ရောက် မှုများကို လျော့နည်းအောင် ပြုလုပ်နိုင် ပါ သည်။ |
| လုပ်ငန်းခွင် ဘေး အန္တရာယ် | - | အနည်းငယ် | ခံ့ထဧးခံ့ဇဧ | | အနည်းငယ် | အနည်းငယ် | စက်ရုံသည် လုပ်ငန်းချိန်များတွင် အလုပ်သမား ဥပဒေ အတိုင်း လိုက်နာ ဆောင်ရွက် လျက်ရှိ ပါသည်။ အခြားဒေသ များမှ ဝန်ထမ်း များကို အိမ်ယာ စီစဥ် ပေးလျက်ရှိပါ သည်။ လိုအပ်သော PPE များကို လည်း ဝန်ထမ်းများကို အသုံးပြု စေပါသည်။ သက်ရောက် နိုင်မှု အလား အလာမှာ အနည်းငယ်သာ ဖြစ်ပါသည်။ |



| မတော်တဆ မှုများ | - ဒုံထဧးဒုံကဧ | အနည်းငယ် | အနည်းငယ် အနည်းငယ် | စက်ကိရိယာများကို ပုံမှန် ထိန်းသိမ်း စစ်ဆေးခြင်း ကိုပြုလုပ်ပါသည်။ ဖြစ် ပေါ်လာနိုင်သည့် အရေးပေါ် အခြေ အနေ များအတွက် အရေး ပေါ် ကယ်ဆယ်ရေး အဖွဲ့ကို ဖွဲ့စည်း ခဲ့ပါ သည်။ အရေးပေါ်မီးသတ်ရေ နှင့် မီးသတ် ဆေးဗူးများကို လည်း စက်ရုံ အတွင်းထားရှိပါသည်။ ထို့ကြောင့် သက်ရောက်မှုမှာ အနည်းငယ်သာ ဖြစ်ပါသည်။ သို့သော် ရှေးဦးသူနာပြု သင်တန်း ကဲ့သို့သောသင်တန်းများ ကို ပြုလုပ်ပေးသင့်ကြောင်း အကြံပြု အပ်ပါသည်။ အဆောက်အဦးများ ဖြုဖျက်ရာတွင် မတော်တဆ မှုများ ဖြစ်ပေါ်နိုင် ပါသည်။ အကာအရံများကို ပြုလုပ် ပေးခြင်း၊ သတိပေးဆိုင်းဘုတ်များ တပ်ဆင်ခြင်း တို့ဖြင့် သက်ရောက်မှု လျော့နည်းအောင် ပြုလုပ် နိုင်ပါ |
|--------------------|---------------|----------|----------------------|--|
|--------------------|---------------|----------|----------------------|--|

NA : သက်ဆိုင်မှုမရှိ + :ကောင်းကျိုး သက်ရာက်မှု

၆.၁ ပတ်ဝန်းကျင်ဆိုင်ရာ သက်ရောက်မှုများ နှင့် လျော့ပါးစေရေးနည်းလမ်းများ

ကံပေါက်စာအုန်းဆီကြမ်းစက်ရုံ၏ ပတ်ဝန်းကျင်ဆိုင်ရာ သက်ရောက်မှုများကို အကဲဖြတ် မှု ပြုလုပ်ပြီးနောက် သတ်မှတ် ဖော်ထုတ်ထားသော သက်ရောက်မှုများ ကို စီမံခန့်ခွဲနိုင်ရေးအတွက် ပတ်ဝန်းကျင် ဆိုင်ရာ သက်ရောက် မှု များ နှင့် လျော့ပါးစေရေးနည်းလမ်းများ ကို ဖော်ထုတ်ခဲ့ပါသည်။ ပတ်ဝန်းကျင်ဆိုင်ရာ သက်ရောက်မှု များကို အကဲဖြတ်ခြင်းနှင့် စီမံခန့်ခွဲမှု အစီအစဥ်များစုဆောင်း ရရှိသော အချက်အလက်များ နှင့် စောင့်ကြပ်ကြည့်ရှု မှု ရလဒ်များအရ ရွေးချယ်ထားပါသည်။ ထုတ်လွှတ်အခိုးအငွေ့၊ ရေအရည်အသွေး၊ ဆူညံသံ ထုတ်လွှတ်မှု၊ စွန့်ပစ်အ စိုင်အခဲ၊ မြေထုညစ်ညမ်းခြင်း၊ လုပ်ငန်းခွင်နှင့် ရပ်ရွာ ကျမ်းမာရေး နှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး စီမံချက် နှင့ ယာဥ်ကြောကြပ်မှု စီမံခန့်ခွဲရေးတို့ပါဝင်ပါသည်။

၇.၁ အစီအစ၌ အများပြည်သူ နှင့် တိုင်ပင်ဆွေးနွေးခြင်းနှင့် သတင်းအချက်အလက်များထုတ်ဖော်တင်ပြခြင်း

ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဥ်ကို ပြင်ဆင်ရေးဆွဲရာတွင် အကြံပေးအဖွဲ့ Green EHSS သည် ကံပေါက် စားအုန်း ဆီကြမ်း စက်ရုံရှိ တာဝန်ရှိသူများ၏ ကူညီထောက်ပံ့မှုများဖြင့် ဒေသခံများနှင့် တိုင်ပင် ဆွေးနွေးခြင်း များ ကို ပြုလုပ်ခဲ့ပါသည်။



၂၀၁၉ ခုနှစ်၊ ဇွန်လအတွင်း face to face meeting နှစ်ခုကို ပြုလုပ်ခဲ့ပါသည်။

- ၁) ကံပေါက် ကျေးရွာ ကိုယ်စားလှယ် နှင့် face to face meeting ပြုလုပ်ခဲ့ပါသည်။
- ၂) အိန္ဒရာဇာ ကျေးရွာ အုပ်ချုပ်ရေးမှူး နှင့် face to face meeting ပြုလုပ်ခဲ့ပါသည်။

၂၀၁၉ ခုနှစ် နွန်လအတွင်းတွင် householdsurveys ကိုပြုလုပ်ခဲ့ရာ အိန္ဒရာဇာ ကျေးရွာ၊ ဂန့်ဂေါ်တောင်ကျေးရွာ နှင့် ရှင်ပျံကျေးရွာ တို့အတွင်းရှိ အိမ်ထောင်စုပေါင်း ၂၆ ခုတို့ကို ကွင်းဆင်း၍ စက်ရုံနှင့် ပက်သက်၍ ဒေသခံများ၏ သဘောထားမှတ်ချက် များကို ကောက်ခံခဲ့ပါသည်။

၂၀၁၉ ခုနှစ် ဇွန်လ (၇) ရက်နေ့တွင် ဒေသခံ ပြည်သူလူထုနှင့် တွေ့ဆုံဆွေးနွေး ညှိနှိုင်းမှုများ ဆောင်ရွက် သည့် အစည်းအဝေးကို ပြုလုပ်ခဲ့ပါသည်။ ထို အစည်းအဝေးကို စက်ရုံမှ ကိုယ်စားလှယ်များ နှင့် ဝန်ထမ်းများလည်း တက်ရောက် ခဲ့ပါသည်။ အဆိုပါ အစည်းအဝေးကို စက်ရုံ၏ အစည်းအဝေးခန်းမတွင် ကျင်းပခဲ့ပြီး ဒေသခံ ၆၃ ဦး တက် ရောက်ခဲ့ကြပါသည်။

ဒေသခံပြည်သူလူထုနှင့် တွေ့ဆုံဆွေးနွေး ညှိနှိုင်းမှုများ ဆောင်ရွက် သည့် အစည်းအဝေးနှင့် ဒေသတွင်း ကွင်းဆင်း၍ သဘေထားမှတ်ချက် များရယူခြင်းများ၏ ရလဒ်များအရ ဖြေကြားသူ အများစုမှာ စက်ရုံစီမံကိန်း နှင့် ပက်သက်၍ ထောက်ခံကြကြောင်းတွေ့ရပါသည်။ ဖြေကြားသူများ အနက် ၁၄ ဦးမှာ စက်ရုံလည်ပတ်ခြင်း နှင့် ပက် သက်၍ အကြံပြုချက် တင်ပြရန် မရှိကြောင်း ဖြေကြားကြပါသည်။

သီးခြားအကြံပြုချက်များမှာ အောက်ပါအတိုင်းဖြစ်ပါသည်။

- -အလုပ်သမားများ ဘေးအန္တရာယ် ကင်းရှင်းစေချင်သည်။
- -အလုပ်သမားဦးရေ လုံလောက်စွာ ထားပေးစေချင်သည်။
- -အလုပ်သမား လစာတိုးပေးစေချင်သည်။
- -စက်ရုံအတွက် အလုပ်သမားလိုအပ်ပါက အုပ်ချုပ်ရေးမှူးရုံးကို လည်းအသိပေးရန်။
- -လေထုညစ်ညမ်းခြင်းမဖြစ်စေရန်
- -စွန့်ပစ်ပစ္စည်းကို ကောင်းမွန်စွာစီမံဆောင်ရွက်ရန်
- -ရပ်ရွာသို့ ကူညီမှုများ ပိုမိုကူညီပေးရန်
- -ကျမ်းမာရေးအကူအညီပေးစေချင်သည်။

စက်ရုံမှ ပြန်ကြားချက်များ နှင့် ဆောင်ရွက်မည့် လုပ်ငန်းများကို အခန်း (၇) တွင် ဖော်ပြထားပါသည်။

၈.၁ ပတ်ဝန်းကျင်စောင့်ကြပ်ကြည့်ရှုမှု

အဆိုပြုထားသော ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှုအစီအစ၌ ကိုက်ညီရန် ပတ်ဝန်းကျင် စောင့်ကြပ်ကြည့်ရှုသည့် အကြိမ်အရေအတွက် အပါအဝင်အဓိက သတ်မှတ်ချက် ပါရာမီတာများ (parameters) ပါဝင်သည့် ပတ်ဝန်းကျင် စောင့်ကြပ်ကြည့်ရှုမှု အစီအစ၌ ကို ရေးဆွဲထားပါသည်။



စီမံကိန်းလည်ပတ်စဥ် ကာလအတွက် ပတ်ဝန်းကျင် စောင့်ကြပ်ကြည့်ရှုမှု အစီအစဥ်ကို အကောင်အထည် ဖော် ဆောင်ရွက်ရန် အသုံးစရိတ်ရံပုံငွေကို တစ်နှစ်လျင် ၁၀,၀၀၀,၀၀၀ ကျပ် ခန့်လျာထားပါသည်။ ပတ်ဝန်းကျင် စောင့် ကြပ်ကြည့်ရှုမှု အစီအစဥ်အရ စီမံကိန်းပိုင်ရှင်သည် ဝန်းကျင်လေထု အရည်အသွေး၊ ဆူညံသံ၊ စွန့်ထုတ်ရေ အရည် အသွေး နှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေးတို့ကို စောင့်ကြပ်ကြည့်ရှု ရမည် ဖြစ်သည်။ စောင့်ကြပ်ကြည့်ရှု၍ ရရှိလာ သော လေထုတိုင်းတာ ရရှိမှုများ၊ ရေအရည်အသွေး၊ တိုင်းတာရရှိမှုများ၊ နှင့် ဆူညံသံ တိုင်းတာ ရရှိမှု ရလဒ်များကို ပြန်လည်စိစစ် စစ်ဆေးနိုင်ရေးအတွက် မှတ်တမ်းများကို ဖိုင်များဖြင့် သေချာစွာ သိမ်းဆည်းထိန်းသိမ်း ထားရန် လို အပ်ပြီး သက်ဆိုင်ရာ တာဝန်ရှိ ဌာနများသို့ တင်ပြအစီရင်ခံရမည် ဖြစ်ပါသည်။

၉.၁ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ့်

စီမံကိန်းကြောင့် ဖြစ်ပေါ်နိုင်သည့် ထိခိုက်မှုများကို လျော့နည်းစေရန် အတွက် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဥ် Environmental Management Plans (EMP) ကို သဘာဝပတ်ဝန်းကျင် နှင့် လူမှုဝန်းကျင် ထိုခိုက်မှု ဆန်းစစ်ခြင်း ရလဒ်များကို အခြေခံ၍ ရေးဆွဲပါသည်။ EMP ၏ အဓိက အရေးပါသော စီမံခန့်ခွဲမှုစီမံချက်များမှာ အောက်ပါ အတိုင်း ဖြစ်ပါသည်။

- ၁) လေထုတ်လွှတ်မှု နှင့် အမှုန်အမွှားလျော့နည်းစေရေးစီမံချက်
- ၂) စားအုန်းဆီစက်ရုံ အစိုင်အခဲ စွန့်ပစ်ပစ္စည်းစီမံခန့်ခွဲမှု
- ၃) စားအုန်းဆီစက်ရုံ စွန့်ပစ်အရည် စီမံခန့်ခွဲမှု
- ၄)လုပ်ငန်းခွင် ကျမ်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေးစီမံချက်
- ၅) အရေးပေါ် တုံ့ပြန်ရေးစီမံချက်

၁၀.၁ နိဂုံး

ကံပေါက် စားအုန်းဆီကြမ်းစက်ရုံသည် ပမာဏ အနည်းငယ်သာ ထုတ်လုပ်သည့် စက်ရုံအမျိုးအစား အဖြစ် မှတ်ယူ နိုင်ပါသည်။ စက်ရုံသည် တစ်နှစ်လျင် ပျမ်းမျှ စက်လည်ပတ်ရက် ၁၂၈ ရက်သာ ရှိပါသည်။

သဘာဝပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီရင်ခံစာ စာအုပ်တွင် ပတ်ဝန်းကျင်ဆိုင်ရာ သက်ရောက်နိုင်မည့် အလား အလာ နှင့် စီမံခန့်ခွဲ မှုအစီအစဥ်များကို သတ်မှတ်ဖော်ထုတ်ထားပါသည်။



2. INTRODUCTION

2.1 PROJECT PROPONENT AND BACKGROUND

Kanbauk Palm Oil factory is located near to near to Gan Gaw Taung, Kan Bauk region, Ye Phyu Township, Thawei, Thanithary Division and was built in October 2003.

The Kanbauk Palm Oil factory is 100% owned by MYANAMA ECONOMIC HOLDING PUBLIC COMPANY LTD.(MEHPCL). MEHPCL was established in February 1990 under the Special Companies Act. Myanmar Economic Holding Limited has been transformed into a public company in 2016. MEHPCL has operated various industries around the Myanmar including Kanbauk Crude Palm Oil factory.

In order to supply raw crude palm oils to the Padonmar Soap factory operated by MEHPCL as well as other private industries. MEHPCL instigated a plan to establish the Crude Palm Oil factory and planation near to Kanbauk village in 2003 October.

MEHPCL and Department of Small- Scaled Home Industry, Ministry of Cooperatives (Present: Department of Small, and Medium Enterprise, Ministry of Industry) signed the mutual agreement on 10th October 2006 to build the palm oil factory. The factory was transferred to MEHPCL on 27th February 2009. The factory has started operating since April 2016 till present.

The capacity of crude oil production of the Kanbauk Palm Oil factory is 10 tons /hr.

Environmental Department of Tanintharyi Region suggested Kanbauk Palm Oil to develop the Environmental Management Plan (EMP) to ensure to minimize the potential impacts associated to the factory's operations. Kanbauk Palm Oil factory, therefore, engaged GREEN EHSS CONSULTANCY CO., LTD. to prepare an EMP report as a third -party consultant on behalf of the factory.

The factory's operationa phase is approximately 60 years. There is no plan to build new building and all infrastructures were constructed in 2006.



2.2 CURRENT TECHNOLOGY AND MAJOR ENVIRONMENTAL AND SOCIAL FINDING

Kanbauk CPOM employ a wet process for the oil extraction, utilizing fresh fruit bunch (FFB). ဆီကြမ်းစက်ရုံသည် ဖြစ်ပြီး သက်တမ်းမှာ (၁၄) နှစ်ရှိပြီ ဖြစ်ပါသည်။ ဆီကြမ်းစက်ရုံ အနီး ပတ်ဝန်းကျင် (၂) မိုင်ခန့် အတွင်း ဆီအုန်းပင်များသာ ရှိပြီး လူနေကျေးရွာမရှိပါ။ ဆီသီးခိုင်ရရှိမှု ပေါ်မူတည်၍ တစ်လလျှင် (၄)ရက် မှ (၁၇) ရက် ထိသာ စက်လည်ပတ်မှုရှိပါသည်။

Air quality is also impacted by mill emissions during oil palm processing. Kanbauk Palm Oil Plant uses fibre and shell wastes as fuel source in boiler to produce steam for palm oil production processes. The incomplete combustion process in the furnace of the boiler may releases emissions. Based on the values of air quality monitoring, boiler air quality is considerably within the acceptable and Standards levels.

The final processd liquid wastes from the Kanbauk Palm Oil plant is Palm Oil Plant Effulenet (POME). POME consists of 0.6–0.7% palm oil, 95–96% water, 4–5% total solid, and 2–4% suspended solids for the source of fruit debris and is knows as a non-toxic substance. The factory installed oil traps sludge pits as an initial treatment measure, the first earth pond and the final treatment pond. The accumulated effluents in the final treatment ponds were mainly dried in dry season.

During this process, solid wastes are also generated such as empty fruit bunches (EFB), palm kernel shell and fibre from the nuts No chemicals are added during the oil extraction process from the oil palm fruits, theraby making all wastes generated as non-toxic to the environment. These wates can be used and sold as biomass fuels for other industries, such as cement and power plants. Kanbauk factory reuses shell and fiber as fuel for factory boiler. Utilisation of these residues could reduce factory's waste disposal costs and reduce impacts to the receiving environment simultaneously.

Palm oil becomes the major consumed oil although groundnut and sesame oils are primarily produced and sold in Myanmar. To fulfill the domestic requirement of the country, different types of edible oil have been imported from foreign countries and the vast majority of imported oil is palm oil. The import of palm oil to Myanmar increased from 583,000 MT to 945,000 MT between 2012 and 2018. Thus, oil palm tree plantations are spreading across Myanmar especially in Tanintharyi (160,273 hectares) and Region Mon State (511 hectares). In Tanintharyi Region, the yield of fresh fruit bunches of oil palm ranges from 12 MT to 17 MT per hectare. At present, crude palm oil can only be procuced in Tanintharyi Region and only three edible oil refineries in



Yangon and therefore palm oil refining production plants need to be developed. For Yebu Township, total sown areas of palm oil were 14919 acres (see table bellow) and most of battalion and smallholder farms depend on Kanbauk crude palm oil mill, because of the FFB from the farms must be brought to the mill within 24 hours after harvesting.

နှစ်ရှည်သီးနှံစိုက်ပျိုးမှုအခြေအနေ

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| စဉ် | မြို့နယ်/မြို့ | သီးနှံ အမည် | စိုက် (ဧက) | အစေးလှီး/ အသီးခူး (ဧက) | အထွက် နှုန်း (ပိဿာ) | အထွက် ပေါင်း (ပိဿာ) |
| 0 | ရေဖြူ | ရာဘာ | ა 6ეიი | റിാര | ၁၅၉.၈၈ | იიექეგი |
| | | ဆီအုန်း | <u> ე</u> | ၈၄၇၈ | გე ^ც .ეგ | ફ ા ગિંગ્ફ |
| J | ကလိန်အောင် | ရာဘာ | ၁၂၈၂ | ၁၀၅၀ | ၁၆၃.၂၄ | აეავივ |
| | | ဆီအုန်း | ၅ | ၅ | ၁၃၆.၈ | ၆၈၄ |
| (| မြို့နယ် ချုပ် | ရာဘာ | ၄၀၄၈၂ | ၈၂၆၀ | ၁၆၀.၃၁ | აგებაგბ |
| | | ဆီအုန်း | ე ე ე | ၈၄၈၃ | გენ.၄၁ | ၃၀၂၃၃၈၇ |

Source: "ရေဖြူမြို့နယ်ဒေသဆိုင်ရာအချက်အလက်များ-2019"

Kanbauk factory provides regular employment. This is the positive effect on the involvement of local people including women and poor people and providing life skill training for income generation activities and skill development. Local people involved in the project will find easier to find jobs in similar nature of projects as a skilled labour.

The total workforce of the Kanbauk Palm Oil plant is 37 including 20 permanent staff and 17 daily wage earners. The factory arranges the staff house and labour house in the factory premise for staff from another region. And the factory is surrounded by fencing. Taking precautions to avoid being the victim of crime is as simple as the installing fencing qaround the factory. Factory gates are closed and securely locked in

the night-secutity considerations. 2 miles radius of the plant is mostly covered with the palm plantations. Nearby residential areas as Enidayaza village and Gan Gaw Taung villages are at 5.5 km of the plant. Thus, potential for conflict between people of different backgrounds and cultural beliefs are low.



2.3 SALIENT FEATURES OF THE COMPANY

The salient features of the company are mentioned below.

Name of Plant : Kanbauk Crude Palm Oil Plant

Year of Established : October 2003

Address : Kan Bauk region, Ye Phyu Township, Dawei,

Thanithary Division, Myanmar

Name of Principal Organization: MYANAMA ECONOMIC HOLDING

PUBLIC COMPANY LTD.(MEHPCL)

Type of Business : Manufacturing of Crude Palm Oil

Type of Investment : 100% Local Investment

System of Sales : 100% Local

Total Land Area : 6791 acres

The Plant Area : 7. 75 acres

Commence date of Construction: 2006

Commence date of Operation : February 2009

Contact Person : U Kyaw Soe Moe (Plant Manager)

09 8612182, 09346163616

Address : ကံပေါက်ဆီအုန်းခြံ၊ ကံပေါက်ဒေသ၊ ရေဖြူမြို့နယ်၊

ထားဝယ်ခရိုင်၊ တနင်္သာရီတိုင်းဒေသကြီး

Mail : Kyawsoemoe41@gmail.com

2.4 PURPOSES OF THE ENVIRONMENTAL MANAGEMENT PLAN

GREEN ENVIRONMENTAL, HEALTH, SOCIAL & SAFETY CONSULTANCY CO., LTD. conducted Environmental Management Plan for KANBAUK CRUDE PALM OIL PLANT on production of crude palm oil and associated by products.

The purpose of this EMP report is to identify the potential environmental and social (E&S) impacts associated with production processes and provide the effective management programs for the identified E &S impacts of Kanbauk Palm Oil plant. The environmental management plan will help the plant to understand and manage the potential E&S impacts and to improve its E&S performances at every operational activities through regular monitoring systems.



2.5 CONSULTANT TEAM

Environmental Management Plan for operation of **KANBAUK CRUDE PALM OIL PLANT** is conducted by **GREEN ENVIRONMENTAL**, **HEALTH**, **SAFETY & SOCIAL CONSULTANCY COMPANY LIMITED**. GREEN EHSS COMPANY LIMITED is established in Myanmar under Incorporate Registration No: 4289/2011-12.

Green EHSS Consultancy firm has been providing Environmental, Health, Safety and Social related services for local and international organizations. EMP consultant team includes competent professionals with more than 20 years of local and international experience in Environment, Health, Safety and Social domain.

2.5.1 PERSONNEL INFORMATION OF CONSULTANT TEAM

| No. | Name | Designation | Academic and Professional Qualifications | Field of EIA |
|-----|------------------------------|---|---|---|
| 1 | Catherine Soe Soe Aung | Team Leader, Sr. Environmentalist Certified Environmental Professional, Canada Approved Risk Consultant, MOM, Singapore ADB's Consultant Management | Master in Environmental Engineering, National University of Singapore Master in Zoology, YU Bachelor in Zoology, YU | Air Pollution Soil and Noise and Vibration Occupational health and safety |
| | Contact | catherine@greenehss.com 09 42 5353553 | | |
| 2 | Dr. May Thin Swe | Department Head Jivitadana Sangha Hospital | M.B.B.S(Yangon) | Health Assessment |
| | Contact | 09765026245 | | |
| 2 | Dr. Theingi Ye Myint | Waste Management and Water Quality Specialist | Ph.D(YU) Master in Environmental Engineering, NUS | Waste Management Water pollution |



| | | T | T | 1 |
|---|---------------------|---|---|--------------------------------------|
| | | | Master in Industrial Chemistry, YU | |
| | | | Bachelor in Industrial Chemistry, YTU | |
| | Contact | 095095555 | | |
| 3 | Dr. Esther Kumar | Biodiversity Specialist, Fauna Team Leader | Master in Zoology, YU Bachelor in Zoology, YU | Biodiversity |
| | Contact | info@greenehss.com | <u> </u> | |
| 4 | U San Aye | Mapping and GIS Specialist | Bachelor in Maths, Diploma in Mapping, Japan | Geology and Map |
| | Contact | marketing@greenehss.com | | |
| 5 | Daw Swe Swe Aung | Social Impact Assessment Specialist | Master in Geography, YU Bachelor in Geography, YU | Social Impact Assessment |
| | | | Diploma in GIS, | |
| | | | Communication Skill for Business, Singapore Polytechnic | |
| | Contact | green.sweaung@gmail.com 095026245 | | |
| 6 | Daw Mi Mi Soe | Social Impact Assessment Specialist | Master in Public Administration Bachelor in Chemistry | Social Impact Assessment |
| | | | Diploma in Computer Science Post-Graduate Diploma In Applied | |
| | Contact | 09965026245 | Psychology | |
| 7 | U Aung Aung | Project Assistant | B.Sc (Chemistry) | Monitoring and Data collection |
| 8 | U Aung Ze Ya | Project Manager | B.Sc (Math) | Oversee project |



| | T | |
|---------|-------------|---|
| Contact | 09787874674 | |
| | | 1 |

2.5.2 CONSULTANTS CERTIFICATES AND CONSULTANT FIRM REGISTRATION



ကုမ္ပဏီမှတ်ပုံတင်လက်မှတ် Certificate of Incorporation

သဘာဝပါတ်ဝန်းကျင်ဆိုင်ရာ စိမ်းလန်းစိုပြေမှု အတိုင်ပင်ခံ ကုမ္ပဏီ လိမိတက် GREEN EHSS CONSULTANCY COMPANY LIMITED Company Registration No. 103494397

မြန်မာနိုင်ငံကုမ္ပဏီများအက်ဥပဒေ ၁၉၁၄ ခုနှစ် အရ သဘာဝပါတံဝန်းကျင်ဆိုင်ရာ စိမ်းလန်းစိုပြေမှု အတိုင်ပင်စံ ကုမ္ပဏီ လိမိတက် အား ၂၀၁၂ ခုနှစ် မတ်လ ၁၂ ရက်နေ့တွင် အစုရှယ်ယာအားဖြင့် တာဝန်ကန့်သတ်ထား သည့် အများနှင့်မသက်ဆိုင်သောကုမ္ပဏီ အဖြစ် ဖွဲ့စည်းမှတ်ပုံတင်ခွင့် ပြုလိုက်သည်။

This is to certify that

GREEN EHSS CONSULTANCY COMPANY LIMITED

was incorporated under the Myanmar Companies Act 1914 on 12 March
2012 as a Private Company Limited by Shares.



ကုမ္ပဏီမှတ်ပုံတင်အရာရှိ Registrar of Companies

99 72 9 2

ရင်းနှီးမြှုပ်နှံမှုနှင့်ကုမ္ပဏီများညွှန်ကြားမှုဦးစီးဌာန

Directorate of Investment and Company Administration

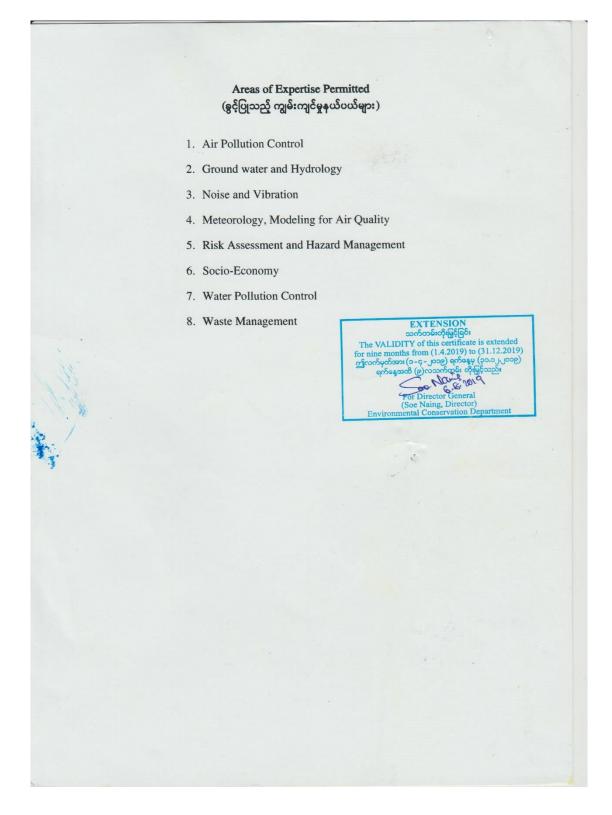


Former Registration No. 4289/2011-2012

















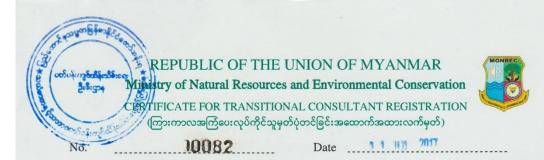


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| တ်ပန်းကျွန် | REPUBLIC OF TH | IE UNION OF MYANMAR |
| 2:5: | | rces and Environmental Conservation |
| 1 | 1 2 11 | TIONAL CONSULTANT REGISTRATION |
| Solos Solo | ကြားကာလအကြံပေးလုပ်ကိုင်း | သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်) |
| No. | 10080 | Date O'T Jet 2017 |
| The 1 | Ministry of Natural Decourses | |
| certifi | icate to the person under Environment | Environmental Conservation, hereby, issues this |
| No. 6 | 16/2015. | mental Impact Assessment Procedure, Notification |
| | | ည်ထုံးလုပ်နည်း၊ အမိန့်ကြော်ငြာစာအမှတ်၊ ၅၁၆/၂၀၁၅ အရ |
| သယံစ | ာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမို | ာယုံးလုပ်နည်း၊ အမန့်ကြောဇြာစာအမှတ်၊ ၅၁၆/၂၀၁၅ အရ ခ်းရေးဝန်ကြီးဌာနသည် ဤအထောက်အထားလက်မှတ်ကို |
| | လ်အားထုတ်ပေးလိုက်သည်။) | ောင်းပရပြားဌာနသည် ဤအထောကအထားလက်မှတ်ကို |
| | | |
| (a) | Name of Consultant | Daw Catherine Soe Soe Aung |
| (b) | (အကြံပေးပုဂ္ဂိုလ်အမည်) Citizenship | |
| (0) | (နိုင်ငံသား) | Myanmar |
| (c) | Identity Card / Passport Number | 12/ Ka Ma Ya (N) 030356 |
| (-) | (မှတ်ပုံတင်/နိုင်ငံကူးလက်မှတ် အမှတ်) | 12/ Ka Ma Ta (N) 030356 |
| (d) | Address | 140 (B), Sayar San Road, Bahan Township, |
| | (ဆက်သွယ်ရန်လိပ်စာ) | Yangon, Myanmar |
| | | catherine@greenehss.com, 09 425353553 |
| (e) | Organization | Green EHSS Consultancy Co., Ltd. |
| (6) | (အဖွဲ့အစည်း) | |
| (f) | Type of Consultancy (အကြံပေးလုပ်ကိုင်မှုအမျိုးအစား) | Person |
| (g) | Duration of validity | 21 March 2019 |
| 10/ | (သက်တမ်းကုန်ဆုံးရက်) | 31 March 2018 |
| | (1-1-1-7-) | |
| 1 | EXTENSION | |
| - 1 | The VALIDITY of this certificate is extended | |
| 0 | for one year from (1.4.2018) to (31.3.2019) | |
| | ရက်နေ့အထိ တစ်နှစ်သွဲ့တ်တမ်း တိုရမြင့်သည်။ | Y', Cally In |
| | For Director General | 7% |
| | (Soe Naing, Director) Environmental Conservation Department | Director General |
| | | vironmental Conservation Department |
| | Ministry of Na | stural Resources and Environmental Conservation |
| | | Acsources and Environmental Conservation |
| | | |
| | | |
| | | |
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| | * | |



Areas of Expertise Permitted (ခွင့်ပြုသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ) 1. Air Pollution Control 2. Meteorology, Modeling for Air Quality 3. Noise and Vibration 4. Risk Assessment and Hazard Management EXTENSION သက်တမ်းတိုးမြှင့်ခြင်း The VALIDITY of this certificate is extended for nine months from (1.4.2019) to (31.12.2019) တိုလက်မှတ်အား (၁-၄-၂၀၁၉) ရက်နေမှ (၃၁.၁၂,၇၁၉) ရက်နေအထိ (၉)လဆက်တမ်း တိုးမြှင့်သည်။





The Ministry of Natural Resources and Environmental Conservation, hereby, issues this certificate to the person under Environmental Impact Assessment Procedure, Notification No. 616/2015.

(ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း၊ အမိန့်ကြော်ငြာစာအမှတ်၊ ၅၁၆/၂၀၁၅ အရ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသည် ဤအထောက်အထားလက်မှတ်ကို လူပုဂ္ဂိုလ်အားထုတ်ပေးလိုက်သည်။)

(a) Name of Consultant (အကြံပေးပုဂ္ဂိုလ်အမည်)

(b) Citizenship (နိုင်ငံသား)

Myanmar

(c) Identity Card / Passport Number (မှတ်ပုံတင်/နိုင်ငံကူးလက်မှတ် အမှတ်)

7/ Tha Ka Na (N) 000559

Dr. Theingi Ye Myint

(d) Address (ဆက်သွယ်ရန်လိပ်စာ)

Township, Yangon tgym559@gmail.com 095095555 Yangon Technological University

No. C-3, Kabaraye Villa Residence, Mayangone

(e) Organization

Person

(အဖွဲ့အစည်း) (f) Type of Consultancy

(အကြံပေးလုပ်ကိုင်မှုအမျိုးအစား)

31 March 2018

(g) Duration of validity (သက်တမ်းကုန်ဆုံးရက်)

EXTENSION သက်တဝီးတိုးမြှင့်ခြင်း The VALIDITY of this certificate is extended for one year from (1.4.2018) to (31.3.2019) ကိုလက်မှတ်အား (၁-၄-၂၀၁၀) ရက်ခနေ (၃၀၃၂၀၁၉) ရက်ခန္ဓအဓာ တစ်နှင့်သက်တဝီး တိုးမြှင့်သည်။

For Director General
(Soe Naing, Director)
mental Conservation Department

Envir

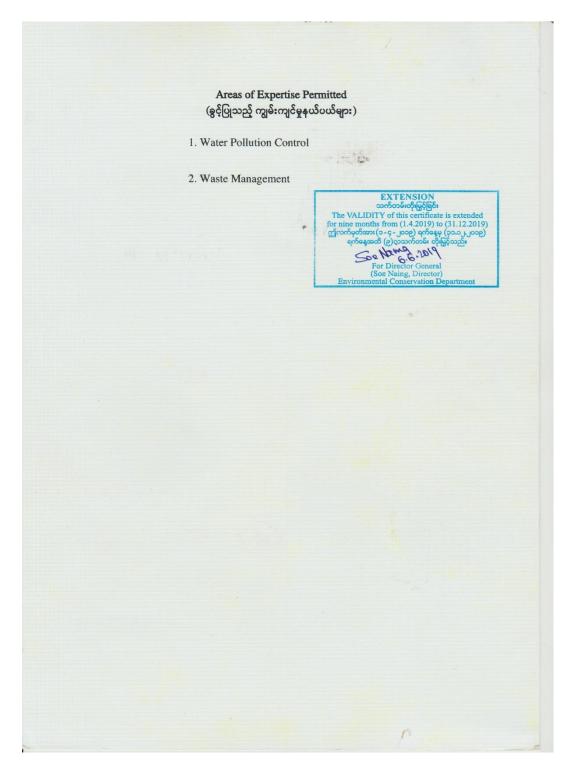
7: A. 4070

Director General

Environmental Conservation Department

Ministry of Natural Resources and Environmental Conservation







NATIONAL UNIVERSITY OF SINGAPORE



This is to certify that

Soe Soe Aung

having fulfilled the requirements prescribed by the University was conferred the degree of

Master of Science (Environmental Engineering)

on

31 December 2003

Chairman of Council

President



UNIVERSITY OF YANGON ရန် ကုန် တက္က သိုလ် မဟာ သိပ္ပံဘွဲ့ Master of Science ဤတက္ကသိုလ်၏ ...၁၁.၀ဥ္သ တင္သာဒီမဟာသိပ္မွ် ဘွဲ့ ကို အပ်နှင်းချီးမြှင့်လိုက်သည်။ This is to certify that SEP.1992 Soe Soe Aung - son / daughter of
U Their Aung has been admitted to the Degree of Master of Science in..... in this University. Registered Graduate No. S.A. - . 4.18.39. @/nG



Translated Version of Degree Certificate UNIVERSITY OF YANGON. This is to certify that MA SOE SOE AUNGdaughter of U THEIN AUNG, has been admitted to the Degree of Backelor of Science in this University. She is eligible to proceed to M Sc (Qualifying)Course. Passed the Examination by Correspondence Course. Specialized SubjectZoology Registered Graduate No. SA-41839 Vertebrates (Ornithology) DISTINCTIONS GAINED November 1984 Min Oo Tun Maung

Rector,

Yangon.

Registrar,
University of Yangon
Yangon.

University of Yangon,

Registrar,

University of Yangon,

Yangon.

Yangon, dated the 20th



The University of Tennessee

KNOXVILLE, TENNESSEE

University Outreach and Continuing Education

Soe Soe Aung

Has Participated in a Program Entitled

Introduction to Environmental Assessment Methods

conducted by The University of Tennessee, University Outreach and Continuing Education,

Department of Professional and Personal Development

October 7, 2005







This document certifies that

Catherine Soe Soe Aung

has successfully completed the course

Introduction to Environmental Management

through Continuing Studies at the University of Northern British Columbia on October 13, 2015

Lisa Haslett Continuing Studies Manager

*** This is NOT an official Certificate *













Exam Certificate

This document certifies that:

Catherine Soe Soe Aung

Has successfully passed:

TL - Leading Management Systems Audit Teams v2.0

And is deemed competent for:

Leading Management Systems Audit Teams

BSI is an Exemplar Global certified training provider for the modules listed above.

For and on behalf of BSI:

Reg Blake, Vice President, Regulatory Affairs, BSI Group America Inc.

Course Date: Passed Date: 9/20/2016 Certificate Number: 8501870/84635-159809



...making excellence a habit.

This certificate remains the property of BSI and is bound by the conditions of contract.

The British Standards Institution is incorporated by Royal Charter. BSI Group Canada Inc., 6205B Airport Road, Suffe 414, Mississaugua, ON L4V 1E3, Canada BSI Group America Inc., 12550 Worldgate Drive, Suffe 800, Herndon, VA 20170, USA.





Certificate of Attainment

Awarded to

Catherine Soe Soe Aung

who has been assessed as having successfully completed the following course

UNDERSTANDING AN OH&S MANAGEMENT SYSTEM (ISO 45001:2018)

This course fulfils the TPECS requirements of the following Exemplar Global qualification/s

Exemplar Global OH 45001 - Occupational Health & Safety Management Systems ISO 45001:2018

Date of Attainment: July 20, 2018

Duration/CPD: Approx. 16 hours (equivalent to 16 CPD hours or 2 days full-time study)

Certificate no: EGCA/33251086/18

Jackie Stapleton
DIRECTOR – TRAINING

Student ID: 2307

Certificate Issued: July 20, 2018







Certificate

This document is to certify that:

Catherine Soe Soe Aung

Has attended:

ISO 9001:2015 Lead Auditor (TPECS)

For and on behalf of BSI:

Reg Blake, Vice President, Regulatory Affairs, BSI Group America Inc.

Course Date: 2016-09-12 - 2016-09-15 Certificate Number: 8501870-159809

Issue Date: 2016-09-20 CEUs Awarded: 3.2

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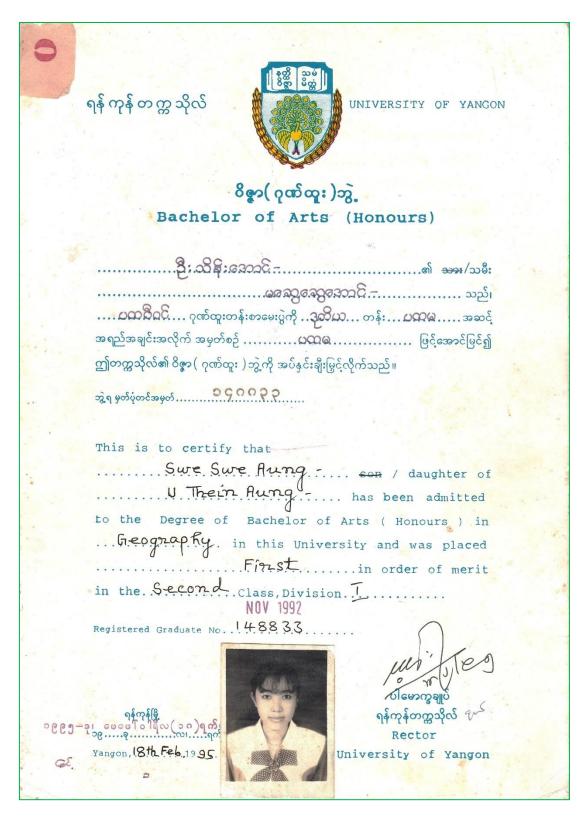
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Centre for Human Resource Development University of Yangon



Diploma in Geographic Information Systems



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Chairman

Centre for Human Resource Development University of Yangon

Dated 18 DCT 2003 Yangon

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Centre for Human Resource Development University of Yangon



Diploma in English

This is to certify that .Ma. Swe...Swe...Aung....son / daughter of U. Thein...Aung......has successfully completed Course No. (2/2004) of the Diploma in English and is hereby awarded this certificate.



Chairman

Centre for Human Resource Development
University of Yangon

Dated 4. 0CT 2005

Yangon

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MINISTRY OF FOREIGN AFFAIRS YANGON, MYANMAR

This is to certify that

Daw Swe Swe Aung

completed the

CERTIFICATE COURSE IN BASIC DIPLOMATIC SKILLS (BDS 15 / 2006)

held from (24-4-2006) to (13-7-2006) and is awarded this

CERTIFICATE OF COMPLETION



Dated: 14 July 2006

- Hampu

Nyan Win Minister for Foreign Affairs



SINGAPORE POLYTECHNIC



CERTIFICATE OF ATTENDANCE

This is to certify that

DAW SWE SWE AUNG

has attended a 24-hour Initiative for ASEAN Integration training course on

COMMUNICATION SKILLS

From 18 to 20 September 2006 as part of IAI Work Plan Project: Capacity Building Programme for the Public Sector in CLMV - Non MFA

> Conducted by Singapore Polytechnic Organised by IAI Unit, the ASEAN Secretariat Funded by Japan-ASEAN General Exchange Fund

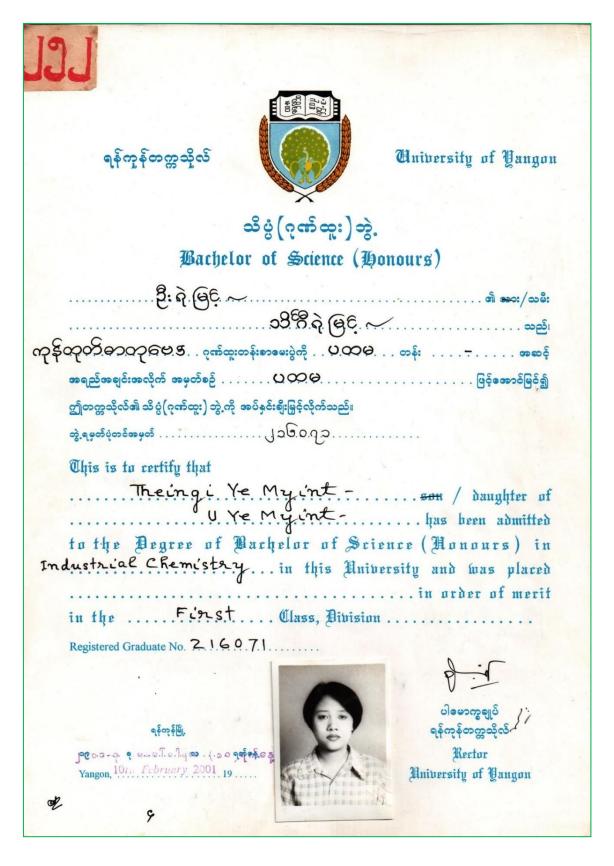
DIRECTOR DEPARTMENT OF INDUSTRY SERVICES

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NATIONAL UNIVERSITY OF SINGAPORE



This is to certify that

Theingi Ye Myint

having fulfilled the requirements prescribed by the University was conferred the degree of

Master of Science (Environmental Engineering)

on

30 June 2003

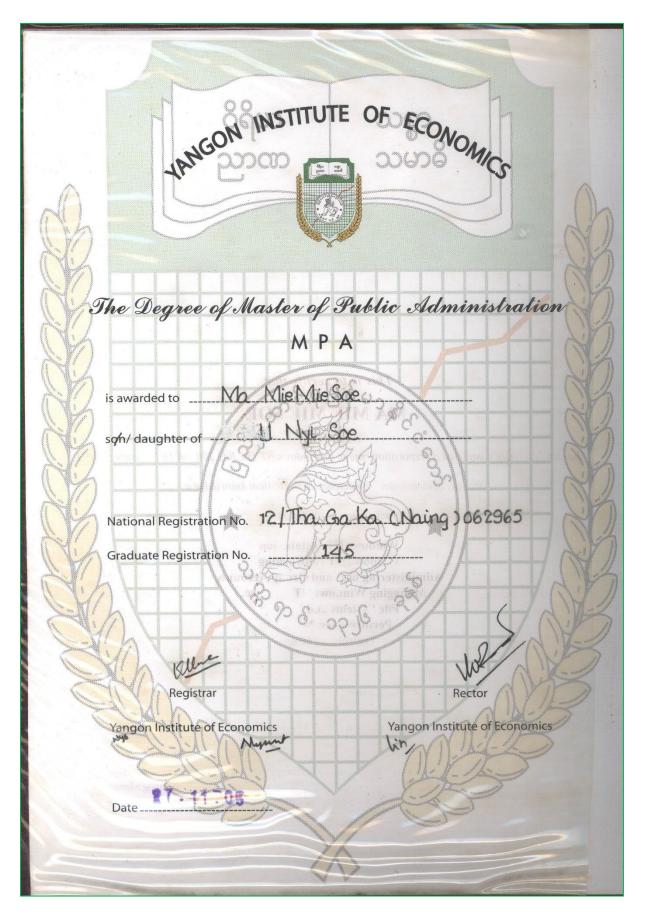
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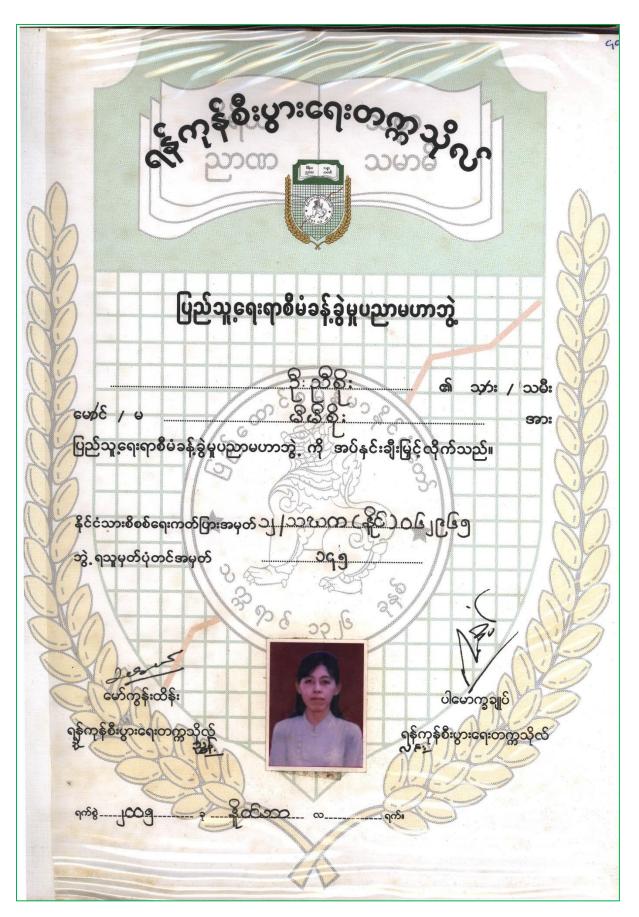


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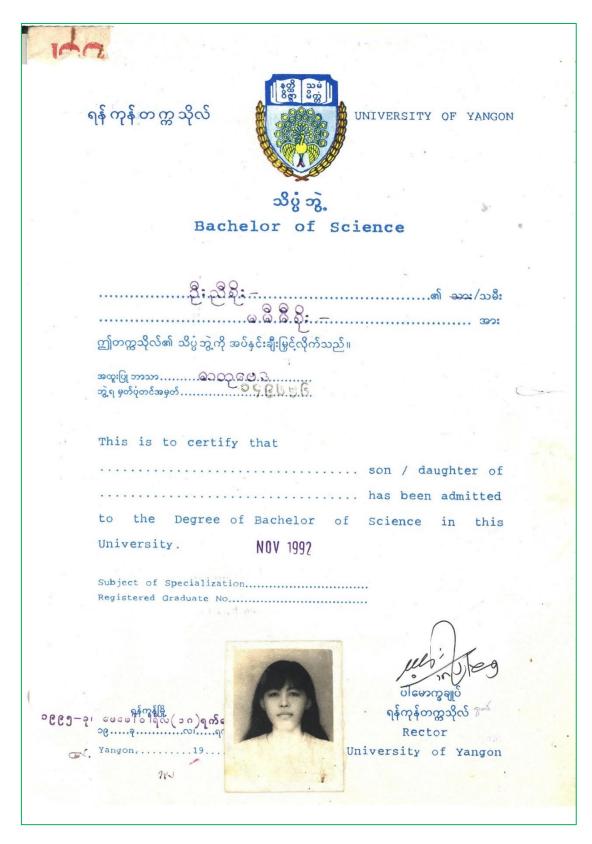
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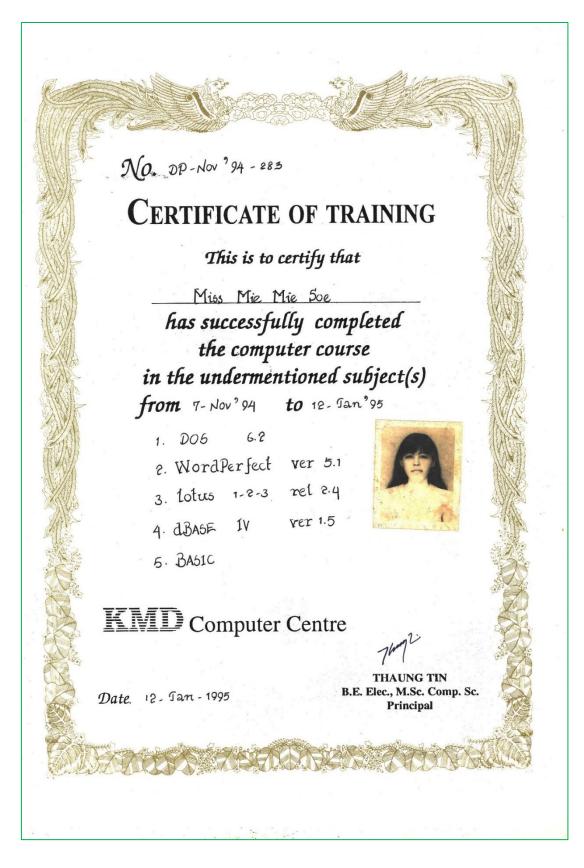
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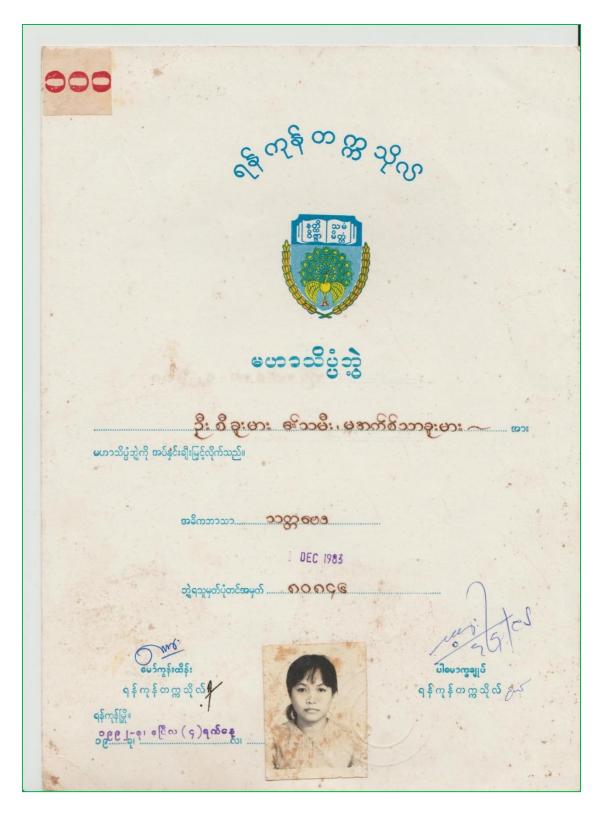














3. LEGAL REQUIREMENT

3.1 ENVIRONMENTAL POLICY OF THE COMPANY

Top management of Kanbauk Palm Oil Plant develops Quality and Environmental policy. The Plant is committed to

- Supply consistent quality products to ensure customers' satisfaction;
- Implement and maintain the requirements of Corporate's Environmnetal, Health & Safety;
- Comply with the legal requirements about Environment, Health and Safety;
- Prevent pollution by minimizing the adverse impacts to the environment and people health and safety, saving natural resources and reducing, reusing and recycling all possible waste; and
- Review periodically and involve our people in the Plant's environmental and safety performances.

3.2 HEALTH POLICY

Since Kanbauk Palm Oil Plant is a small- scaled producer with total 37 permenant and daily wages workers, the Plant does not have an In-House healthcare facility. The staff, however, are provided with emergency first aid boxes, medical leaves and social welfares in accordance with the government guidelines.

3.3 NATIONAL LAWS AND REGULATIONS

The National laws and regulations for the environmental protection applicable to the project are compiled and presented. The Constitution of the Republic of the Union of Myanmar (2008) is the main concern for the environment conservation in Myanmar. The others are as follows:

- 1. Occupational Safety and Health Law (2019)
- 2. Environmental Conservation Law (2012)
- 3. Environmental Conservation Rules (2014)
- 4. Environmental Impact Assessment (EIA) Procedure (2015)
- 5. National Environmental Quality (Emission) Guidelines (2015)
- 6. The Conservation of Water Resources and River Law, (2013)
- 7. Myanmar Investment Law (2016)



- 8. Myanmar Investment Rule (2017)
- 9. The Import Export Law (2012)
- 10. Building Regulations (2014)
- 11. The Amended Law for Plant Act (2016)
- 12. Myanmar Fire Brigade Law (2015)
- 13. Land Acquisition Law (2015)
- 14. The Payment of Wages Law (2016)
- 15. Minimum Wage Notification 1/2018
- 16. The Social Security Law (2012)
- 17. Social Security Acts (1954)
- 18. The Leave and Holiday Act, 1951(Law Amended July, 2014)
- 19. Second Amendment to the Labour Dispute Settlement Law (2019)
- 20. Law Amending the Workmen's Compensation Act, 1923
- 21. The Public Health Law
- 22. Prevention and Control of Communicable Diseases Law (1995)
- 23. The Law Amending the Conservation of Water Resources and Rivers
- 24. The Labour Organization Law (2011)
- 25. The Labour Organization Rules (2012)
- 26. Motor Vehicle Rules (1989)
- 27. Vehicle Laws (1964)
- 28. Inland Water Transportion Law (2017)
- 29. National Health Policy (1993)
- 30. Underground Water Act (1930)
- 31. National Land Use Policy (2016)
- 32. Inland Vessel Law (2015)
- 33. Laws amending the 1951 Factories Acts (2016)
- 34. Explosive Substances Act (2018)
- 35. Emergency provisions Act (1950)
- 36. Prevention of Hazard from Chemical and Related Substances Rules (2016)
- 37. Myanmar Port Law (2015)
- 38. Control of Smoking and Consumptions of Tobacco Products Laws (2006)
- 39. ရေအရင်းအမြစ်နှင့် မြစ်ချောင်းများထိန်းသိမ်းရေးဥပဒေ (၂၀၀၆)
- 40. ရေအရင်းအမြစ်နှင့် မြစ်ချောင်းများထိန်းသိမ်းရေးနည်းဥပဒေ (၂၀၁၃)
- 41. ရေအရင်းအမြစ်နှင့် မြစ်ချောင်းများထိန်းသိမ်းရေးဥပဒေ (၂၀၀၆)
- 42. သစ်တောဥပဒေ (၂၀၁၈)



- 43. သစ်တောနည်းဥပဒေ (၁၉၉၅)
- 44. တောရိုင်းတိရိစ္ဆာန်နှင့် သဘာဝအပင်များကာကွယ်ရေးနှင့် သဘာဝနယ်မြေများ ထိန်းသိမ်း ရေး ဥပဒေ (၁၉၉၄)
- 45. အလုပ်သမားလျော်ကြေးအက်ဥပဒေ (၁၉၅၁)
- 46. အလုပ်ရှင်နှင့် အလုပ်သမား အက်ဥပဒေ
- 47. မြေစာရင်း မြေအမိန့် နှင့် ညွှန်ကြားချက်များ (၂၀၀၆)
- 48. မြေစာရင်းလက်စွဲဥပဒေ (၁၉၆၄)
- 49. မြေလွှတ်မြေရိုင်းစီမံခန့်ခွဲရေး

Other Applicable Laws, Acts, Standards and Guidelines and the related laws enacted by the respected Regional Hlauttaw and rules issued by respected Regional Government.

Moreover, the project owner ensures to meet the Requirements of Applicable Licenses and Permits.

3.4 OTHER ACTS, STANDARDS AND GUIDELINES

The Plant complies with the principal organization, MYANAMA ECONOMIC HOLDING PUBLIC COMPANY LTD.(MEHPCL)'s Rules and Regulations. The Plant also abides the relevant regulations and guideliens issused by the Regional Government, Tanintharyi Region Government. The Plant has obtained the madantory permit and licences required to operate the palm oil production processes.

3.4.1 ENVIRONMENTAL STANDARDS AND GUIDELINES

EMP team will take following references in assessing and evaluating the focal environmental sectors of EMP report for Kanbauk Palm Oil Plant.

Water Quality:

- WHO Water Quality Standard, World Bank Standards,
- Yangon City Development Committee Standards
- Wastewater, Storm Water Runoff, Effluent and Sanitary Discharges (General Application) National Environmental Quality Guidelines

Air Quality:

• Air Emission Level of National Environmental Quality (Emission) Guidelines



Soil Quality:

• Canada Environmental Parameters Guidelines for Human Health and Environment

Noise Level:

Noise Level of National Environmental Quality (Emission) Guidelines

Safety, Health and Environment:

- Factory Acts, Myanmar
- Occupational Health and Safety Acts, Ministry of Labour, Myanmar
- General Environmnetal, Healtht and Safety Guidelines, IFC

3.4.2 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.

3.4.3 IFC'S STANDARDS AND GUIDELINES

IFC's standards and guidelines relevant to this Project are described:

- i. Performance Standards on Environmental and Social Sustainability, January 1, 2012; and
- ii. Environmental, Health, and Safety-General Guidelines, April 30, 2007.
- iii. EHS Guidelines for Vegetable Oil Production and Processing, Feb 2015.

 (https://www.google.com/search?q=ifc+guideline+for+crude+palm+oil+mil
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 &sourceid=chrome&ie=UTF-8#bsht=CgRmYnNtEgIIBA)



Environmental issues associated with the operational phase of vegetable oil production and processing primarily include the following:

- Solid waste and by-products
- Water consumption and management
- Energy consumption and management
- Atmospheric emissions
- Greenhouse gas emissions
- Hazardous materials

3.4.4 LEGAL COMMITMENT

The Kanbauk Crude Palm Oil Plant is committed to comply with all applicable laws, acts, policys, standards and internation and national guidelines as per aformentioed Chapter 3.



4. PROJECT DESCRIPTION

4.1 KANBAUK CRUDE PALM OIK PLANT'S OBJECTIVE

Kanbauk Cruid Palm Oil is established in 2003 to fulfill the crude palm oil demands from Padonmar Soap factory and other private sectors. In addition, in order to create employment opportunities for local peoples and to promote supply chains of local palm oil farmers, the plant has been operated at the Kanbauk areas.

4.2 PROJECT LOCATION

Kanbauk Palm Oil Factroy is located near to Gan Gaw Taung, Kan Bauk region, Ye Phyu Township, Thawei, Thanithary Division, Myanmar at the coordinates grids between E 98. 07° to 98.08° and N 14° 36′ 53.0″ and 98° 04′ 32.7″ E (14.614722, 98.075750) coordinates points (Figure 4.1 to 4.10). Kanbauk-Kalainaung road is situated at 2.15 km north of the plant. The land size is 450′x750 with total 7.75 acres.

The Plant is surrounded with 6791 acres of palm oil plantations. Nearby residential areas are Enidayaza village at 5.5km north and Kanbauk at 5.5km southeast of the plant. 2km radius of the plant is mostly covered with the palm plantations. The plant location was selected based on the suitability and availability of raw materials in Myanmar as explained in Figure 4.3 (Ref: *Ref: Palm Oil in Myanmar: Global Health*). Average elevation of the plant area is 31 m.



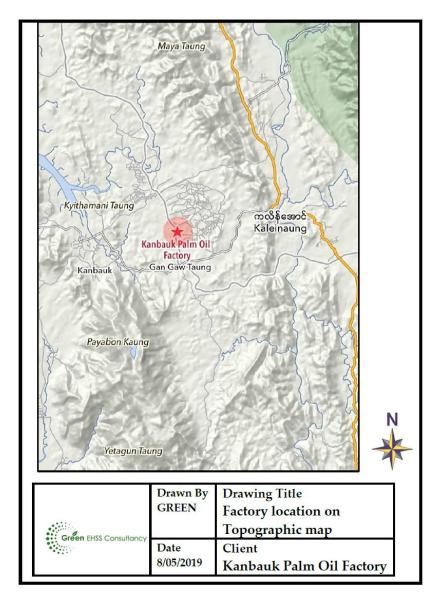


Figure 4.1 Factory Location



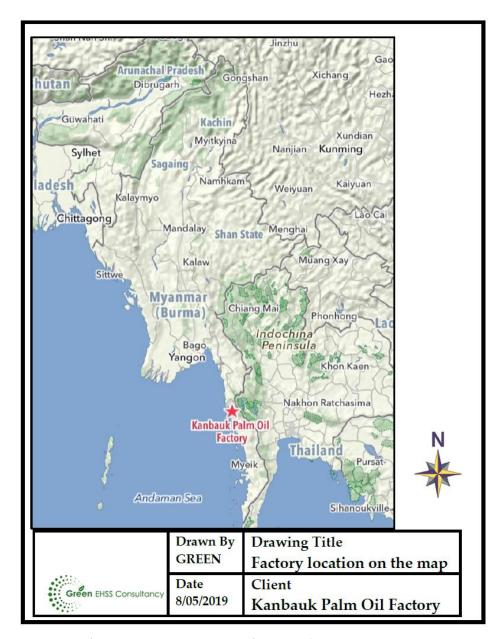
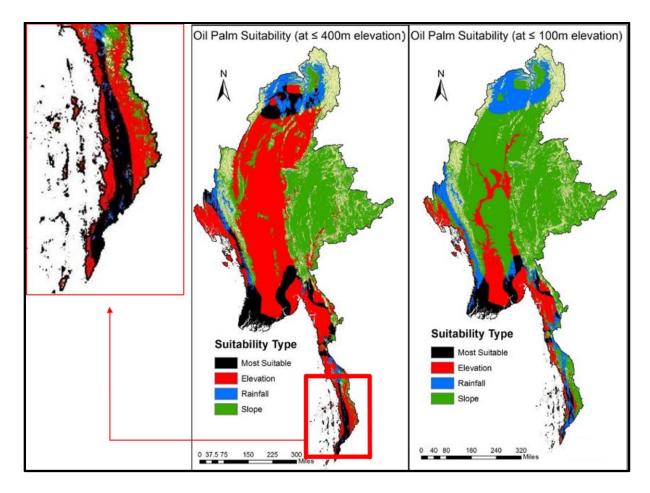


Figure 4.2 Factory Location on the Country Map





(Ref: Palm Oil in Myanmar: Global Health: Science and Practice 2018 | Volume 6)

Figure 4.3 Land Suitability Maps for Palm Oil Production in Myanmar





Figure 4.4 Aerial View of the Plant



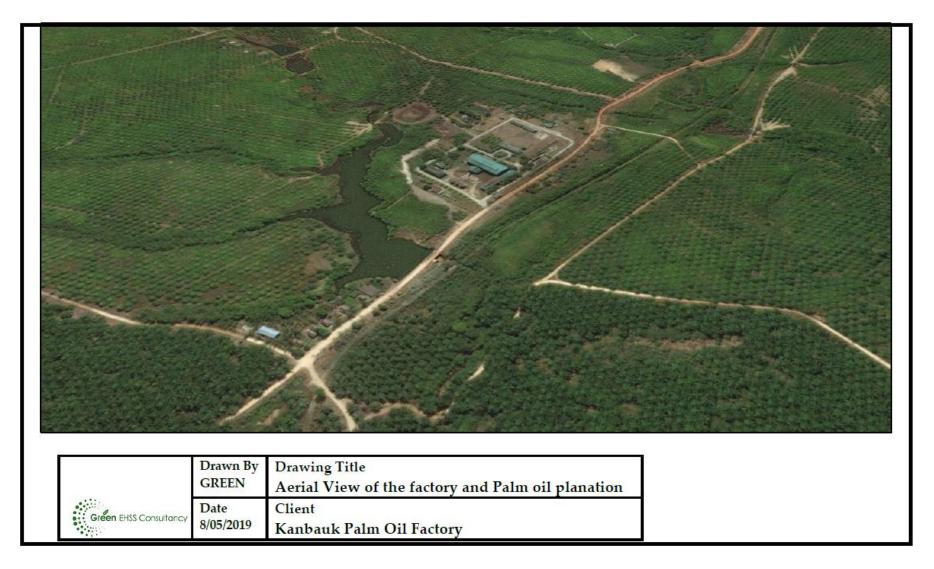


Figure 4.5 Aerial View of the Plant and Surounding Plantation





Figure 4.6 GPS Location of the Factory



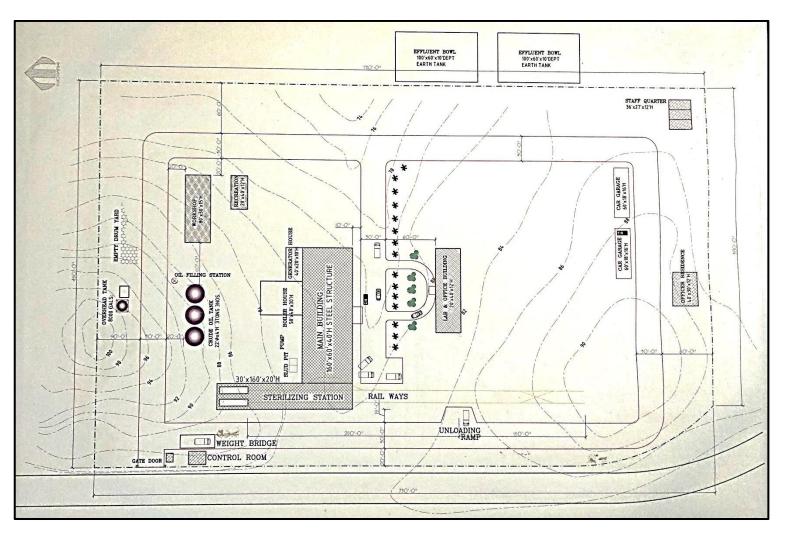


Figure 4.7 Facilities Plan within the Plant Premises



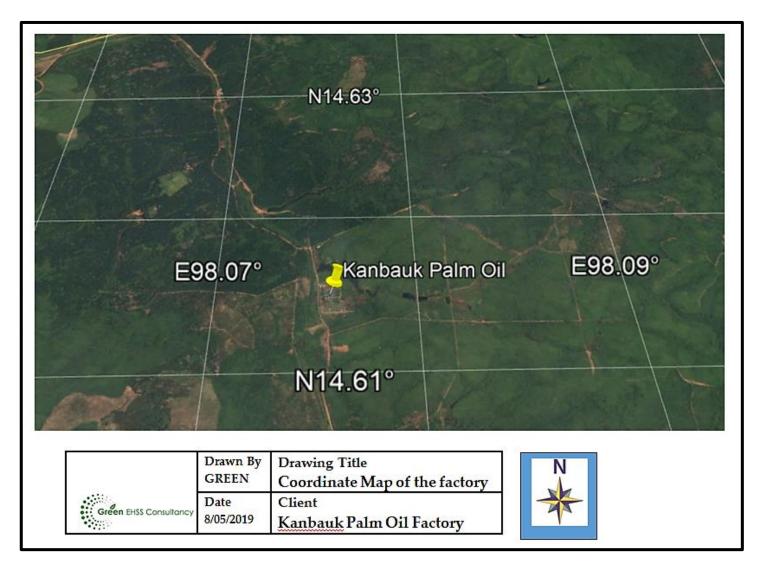


Figure 4.8 Coordinate Map of the Plant





Figure 4.9 Spatial Boundary of the Plant



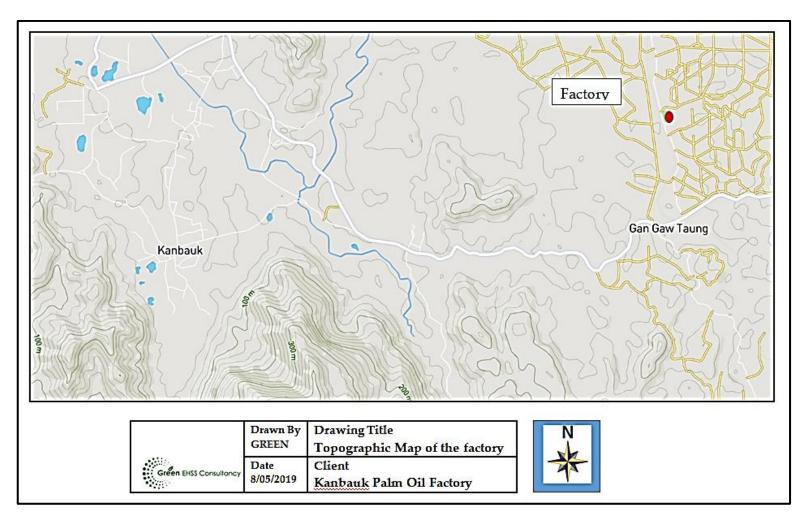


Figure 4.10 Topographic Map around the Plant



4.3 PLANT LAYOUT AND ASSOCIATED FACILITIES

The Plant area is approximately 7.75 acres and surrounded with 6791 acres palm oil plantations. The capacity of the Plant is 10 tons per hour.

Within the Plant compound, total 18 facilities including production units and Staff residents exist and share the boundaries (Figure 4.11). The size of the compound is approximately 7.75 acres. Detailed plant's facilities are listed in Table 4.1.

Table 4.1 List of Production and Associated Facilities

| No. | Facility | Area | Unit |
|-----|--------------------------|--------------------|--------|
| 1 | Main Production Building | 150x60x40H | Sqft |
| 2 | Boiler house | 50x40x30H | Sqft |
| 3 | Overhead tank | 8000 Gallons | Gallon |
| 4 | Three Crude oil tanks | 22 Ø x4H (3 tons) | Tons |
| 5 | Workshop | 80x30x15 H | Sqft |
| 6 | Lab & Offices | 20x40x12H | Sqft |
| 7 | Recreation | 20x40x12H | Sqft |
| 8 | Two Car Garages | 60x18x16H | Sqft |
| 9 | Sterilizing Station | 30X160x20H | Sqft |
| 10 | Generator house | 40x20x10H | Sqft |
| 11 | Earth Pond | 100x60x10D | Sqft |
| 12 | Officer Quarters | 40x30x12H | Sqft |
| 13 | Staff Quarters | 36x27x12H | Sqft |
| 14 | Empty drum Yard | - | Sqft |
| 15 | Rail Way | - | Sqft |
| 16 | Sludge pit | - | Sqft |
| 17 | Control Room | - | Sqft |
| 18 | Weight Bridge | - | Sqft |



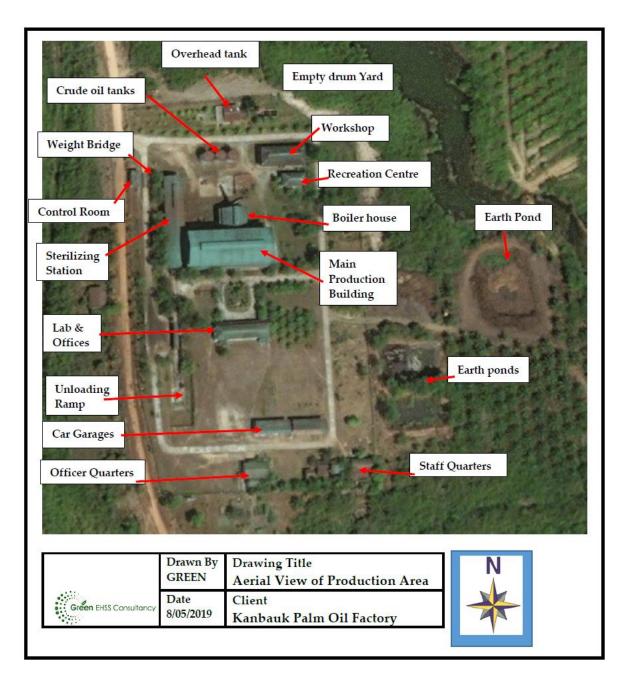


Figure 4.11 Associated Facilities of the Plant



4.4 RAW MATERIAL REQUIREMENTS

The main raw material require in the palm oil production is Fresh Fruit Bunches (FFB). A palm fruit is compsed of three layers, endocarp, mesocarp and kernel, a nut at the centre of a fresh fruit. Crude palm oil is extracted from the mesocarp of the fruit and Kernel Palm Oil (KPO) is from the kernel. A palm tree bears Fresh Fruit Bunches (FFB) after three years. Kanbauk Palm Oil Plant uses about 6000 tons of Fresh Fruit Bunches (FFB) per year in crude palm oil production. The raw materials and by products from the productions are shown in the Figure 4.14.

ကုန်ကြမ်းပစ္စည်း (ဆီသီးခိုင်) များကို ကံပေါက်စားအုန်းခြံမှ လာရောက် ပို့ဆောင်ပြီး စက်ရုံအနေဖြင့် ဆီသီးသယ်တွဲများတွင်ထည့်၍ အမြန်ဆုံးကြိတ်ခွဲပါသည် (Figure 4.12) ။



Figure 4.12 Photos of Raw Material Storage Condition



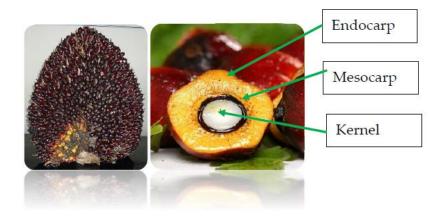
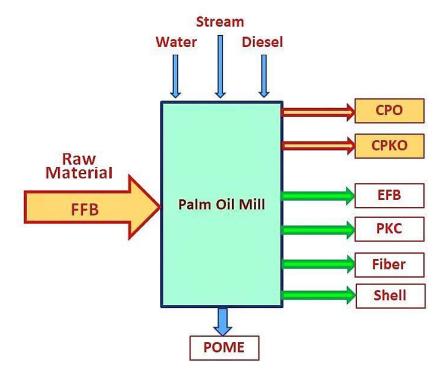


Figure 4.13 Fresh Fruit Bunches & Palm Fruit



FFB- Fresh Fruit Bunches; CPO-Crude Palm Oil; CPKO-Crude Palm Kernel Oil EFT-Empty Fruit Bunches; PKC-Palm Kernel Cake; POME-Palm Oil Plant Effluent Figure 4.14 Material Flow of Palm Oil Production



4.5 MACHINERIES, EQUIPMENT AND OFFICE ACCESSORIES

Machineries and equipment required for production are shown in the following Table 4.2.

Table 4.2 List of Machinery and Equipment

| No. | Particular | Qty |
|-----|-----------------------------|-----|
| 1 | Sterilizer | 2 |
| 2 | M.S Cage | 30 |
| 3 | Tippler | 1 |
| 4 | Bunch Conveyor | 1 |
| 5 | Drum Slripper | 1 |
| 6 | Empty Bunch Conveyor | 1 |
| 7 | Fruit Elevator | 1 |
| 8 | Fruit Conveyor | 1 |
| 9 | Digester | 2 |
| 10 | Double Screw Press | 2 |
| 11 | Vibration Screen | 2 |
| 12 | Hot Water tank | 1 |
| 13 | Clarification tank | 1 |
| 14 | Sludge tank | 1 |
| 15 | Pure Oil tank | 1 |
| 16 | Recycling tank | 1 |
| 17 | Sludge pit | 1 |
| 18 | Vacuum dryer | 1 |
| 19 | Cake Breaker conveyor | 1 |
| 20 | Nut Polishing drum & Column | 1 |
| 21 | Fan & Cyclone set | 1 |
| 22 | Pump | 9 |
| 23 | Nut elevator | 2 |
| 24 | Nut cracker | 1 |
| 25 | Two tray shaker | 1 |



| 26 | 5000 CFM Cyclone & fan | 1 |
|----|-------------------------|---|
| 27 | Nut dryer silo | 1 |
| 28 | Kernel dryer silo | 1 |
| 29 | Boiler | 1 |
| 30 | Generator | 3 |
| 31 | Weight bridge | 1 |
| 32 | Hammer Plant | 1 |
| 33 | Expeller | 2 |
| 34 | Filter press | 1 |
| 35 | 150ton Oil Storage tank | 3 |



Figure 4.15 Weight Bridge



Figure 4.16 Loaing Ramp





Figure 4.17 Boiler room and Stack



Figure 4.18 Clarification Tank



Figure 4.19 Sludge Tank, Clarification Tank and Pure Oil tank





Figure 4.20 150 Tons Oil Storage Tanks



Figure 4.21 Drum Stripper and Fruit Elevator



Figure 4.22 Sterilizer





Figure 4.23 Thresher



Figure 4.24 Hammer Plant and Two Tray Shakers and Nut Crackers



Figure 4.25 Kernel Dryer





Figure 4.26 Security Gate



Figure 4.27 Weight Bridge Building



Figure 4.28 Vehicle Parking Area





Figure 4.29 Workshop and Maintenance Building



Figure 4.30 Meeting Hall



Figure 4.31 Staff Resident



4.6 PRODUCTION PROCESS

The Plant has the capacity to handle 10 tonnes per hour of fresh fruit bunch (FFB). The palm oil plant's production processes mainly use FFEs and fruits. The procedure of extracting oil from the oil palm fruit is summarized as follows:

a) Arrival and Storage of Fresh Fruit Bunches (FFB)

Soon after harvesting, the FFB must be brought to the Plant. In order to avoid an excessive production of free fatty acids due to a natural enzymatic process in the mesocarp, transportation of the fresh fruit bunches (FFB) from harvesting to sterilising should not exceed 24 hours. In normal conditions, palm oil of fresh fruits contains about 1% free fatty acids (FFA). This content increases rapidly by ageing of the fruits with the value of oil decreasing respectively.

b) Sterilisation

FFB are sterilised in order to inactivate the natural enzymatic activity and loosen the fruit, as well as to soften the mesocarp (Figure 4.13), resulting in easier extraction of oil. Sterilisation of FFB is done with the application of "live steam".

c) Threshing

The sterilised FFB are sent to rotary drum threshers to separate the sterilised fruits from the bunch stalks. The generated residues from this process include empty fruit bunches (EFB) which contain moisture.

d) Digestion

The separated fruits are discharged into vertical steam-jacketed drums (digesters) and treated mechanically to convert them into a homogeneous oily mash. Hot water is added to the digester to facilitate homogenisation. This mash is subsequently put into the oil extraction press (screw press).

e) Screw Pressing

Screw pressing is a process to extract palm oil from mash. The extracted oil phase is collected and discharged to the purification section while the solid parts comprising fibre and nuts are separated by physical means.

f) Oil Purification (Clarification and Drying)

Screening of raw crude oil is carried out in order to separate large size of solids such as dirt, fibres and fragments of the pericarps from the liquid phase. Separation of Suspended Solids from Oil process is carried out to produce raw crude oil with expected composition of 90%oil and 10% water. Purification is a



final process during which fine suspended solids are separated and removed from crude oil. Due to high content of water in the purified crude oil, a treatment process referred as oil drying and cooling is required.

g) Oil Separation

Desanding is a process to pre-clean the bottom sludge prior to being passed to the decanter. Desanding is implemented to protect the equipment in the subsequent process steps (in particular centrifuges) against clogging. Decanting process recovers the oil contained in bottom sludge from separation tank. The oil is then returned to oil separation tank.

h) Kernel Palm Oil Processing

The palm cake obtained from pressing is sent to a kernel-crushing plant where the fibre is removed from the nut, the nut is cracked and the endocarp (Figure 4.13) separated from the kernel. The kernel is further processed (e.g. pressed) to obtain crude palm kernel oil (CPKO).

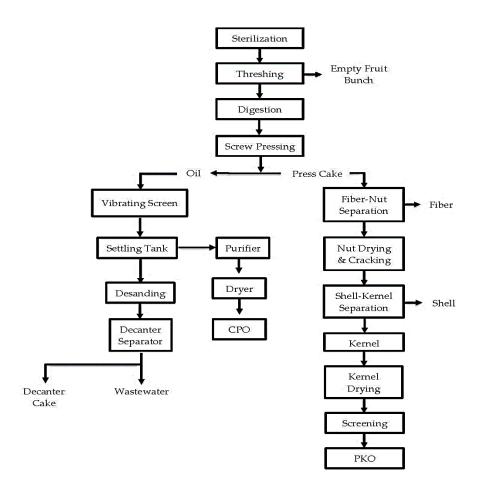


Figure 4.32 Flow Chart of FFB Processing



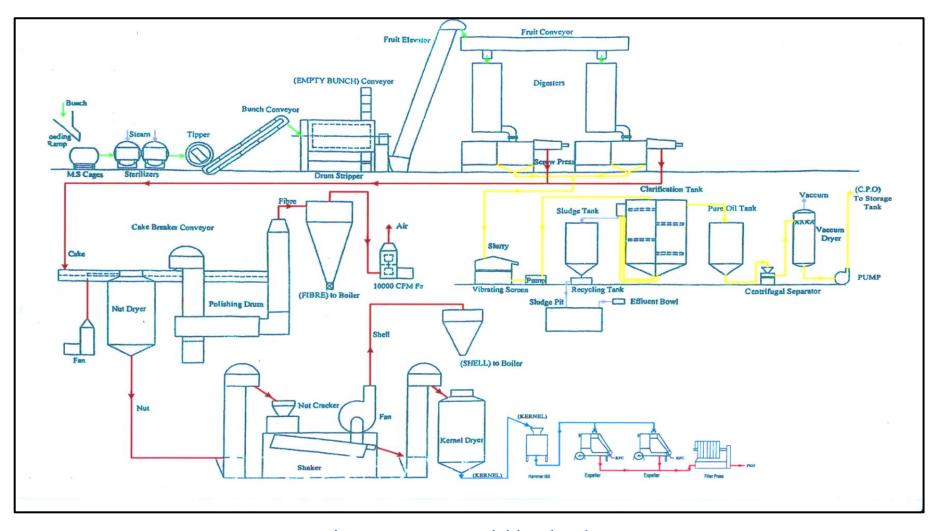


Figure 4.33 Process Activities Flowchart



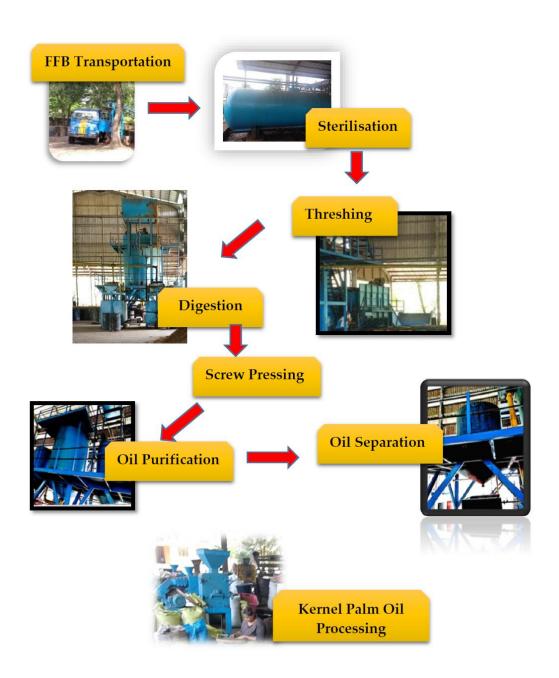


Figure 4.34 Demostation of Production Process





Figure 4.35 Bunch Conveyor



Figure 4.36 Digester



Figure 4.37 Double Screw Press



Figure 4.38 Nut Fibre Conveyor





Figure 4.39 Fiber Silo, Kernel Shell Silo and Nut Silo



Figure 4.40 Fruit Conveyor



Figure 4.41 Polihing Drum



4.7 FINAL PRODUCTS AND BY-PRODUCTS

Crude Palm Oil (CPO) is the major product of the factory.

The generated by-products are Kernel, PKC, Crude Palm Kernel Oil (PKO) and Kernel Palm Cake (KPC). The categories of the products and by-products are mentioned in Table 4.3 and 4.4. Annual capacities of these products are mentioned in section 4.8.

Table 4.3 Lists of Product

| No. | Product |
|-----|----------------------|
| 1 | Crude Palm Oil (CPO) |

Table 4.4 Lists of By-products

| No. | By-product |
|-----|-----------------------------|
| 1 | Kernel |
| 2 | Crude Palm Kernel Oil (PKO) |
| 3 | Kernel Palm Cake (KPC) |

4.8 PRODUCTION CAPACITY

The major product from the processing is Crude Palm Oil (CPO).

Kanbauk Palm Oil Plant's production capacity is 10 tons FFB/hour. The estimated production of CPO is 920 ton annually. The annual production capacities of the byproducts are mentioned in Table 4.6.

The entire palm oil process does not require chemicals and products and by-products and discharged solid wastes are organics. By-products are resold to the different industries. Organic solid wastes are reused for other purposes. Main products and by products from the plant's processes are illustrated in Figure 4. 42.

Table 4.5 Lists of Product and Annual Quantity

| No. | Product | Quantity (Ton) |
|-----|----------------------|----------------|
| 1 | Crude Palm Oil (CPO) | 920 |



Table 4.6 Lists of By-products and Annual Quantity

| No. | By-product | Quantity (Ton) |
|-----|-----------------------------|----------------|
| 1 | Kernel | 174 |
| 2 | Crude Palm Kernel Oil (PKO) | 1.50 |
| 3 | Kernel Palm Cake (KPC) | 1.08 |

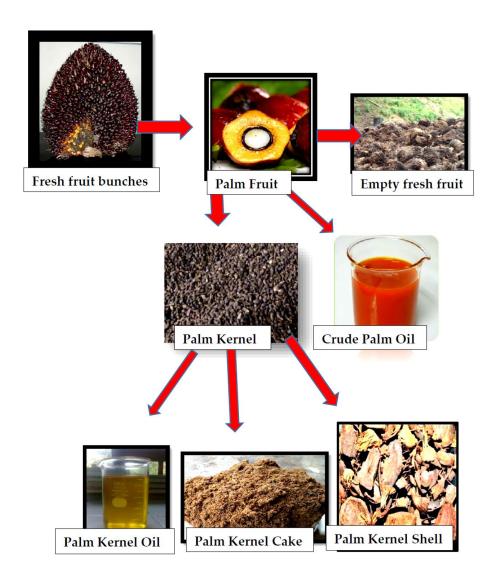


Figure 4.42 Main Products and By Products



4.8.1 SALE SYSTEM

Kanbauk Palm Oil Plant sells crude palm oil to Padaonmar Soap Factory and other industries. In addition, the Plant sells kernel nut, kernel palm oil and palm kernel cake to the industries as per demands.

4.9 RESPURCE REQUIREMENTS FOR PROJECT MANAGEMENT

4.9.1 HUMAN RESOURCE

The total workforce of the Kanbauk Palm Oil plant is 37 including 20 permanent staff and 17 daily wage earners. In general, total 23 male staff and 14 famale staff are employed (Table 4.7). The plant employed mainly locals from nearby villages and towns. The Plant Manager oversees and recommends the overall production processes. Assistant Plant Manager is responsible for managing the staff and handling administrative works.

Table 4.7 Manpower based on Gneder

| No. | | Men | Women |
|-----|-----------|-----|-------|
| 1 | Permanent | 15 | 5 |
| 2 | Contract | 8 | 9 |
| | Total | 23 | 14 |

Table 4.8 List of Staff per Section

| No. | Type of Employee | Number |
|-----|------------------------------|--------|
| 1 | Generator Section | 2 |
| 2 | Boiler Section | 4 |
| 3 | Sterilizers | 4 |
| 4 | Tippler | 2 |
| 5 | Screw Press | 3 |
| 6 | Crude Oil Separation Section | 3 |
| 7 | Nut Cracker | 3 |
| 8 | Vehicle Section | 3 |
| 9 | Office | 5 |
| 10 | Weight Bridge | 1 |
| 11 | Mechanic Section | 2 |
| 12 | Unloading Areas | 5 |



4.9.2 VEHICLE USE FOR OPERATION AND FUEL REQUIREMENTS

Three Dump trucks and two small trucks are used to deliver fresh fruit brunches from the Kanbauk palm oil plantations to the factory.

Two farm tractor trailer and three trailer jeeps are used to transport the empty fruit branches, boiler ashes, fiber wastes and small machineries to the designated areas. Final products and kernels are delivered by using the external supplier's trucks.

The annual diesel requirements for the trucks and the vehicles are approximately 7128 gallons per year. Detailed diesel requirement is shown in the Table 4.9.

Table 4.9 List of Diesel Requirements per Vehicles

| No | Vehicle | Diesel Amount (Gallon) |
|----|----------------------------------|---------------------------|
| 1 | 3 Dump Truck | 4752 |
| 2 | 3 trailer jeeps | 792 |
| 3 | Trailer jeep attached with a car | 1584 |
| | Total Diesel Requirement | 7182 |

4.9.3 WORKING HOUR

Since Kanbauk Crude Palm oil plant operates a small-scale production, the plant runs only two days per week for production processes. The operation hours is from 9 a.m to 5 p.m. In general, Kanbauk Palm Oil Plant runs the productions average 128 days per year. When the production was halted, the plant performed maintenance, cleaning and inspection of machines and equipment. Detailed yearly working days is shown in Table 4.10.



Table 4.10 Production Days per Year

| | ၂၀၁၆-၂၀၁၇ ၂၀၁၇-၂၀၁၈ | | ၂၀၁၈ | ၂၀၁၈- | ၂၀၁၉ | | |
|-----|---------------------|--------|--------------|----------|---------|--------|-----------|
| စဉ် | လအမည် | စက်လည် | အလုပ် | စက်လည် | အလုပ် | စက်လည် | အလုပ် |
| | | ရက် | ဆင်းရက် | ရက် | ဆင်းရက် | ရက် | ဆင်းရက် |
| 0 | ပြေီလ | ၁၂ | ၁၃ | ၁၆ | ഠ്വ | e | ၁ဓ |
| J | မေလ | ၁၅ | JJ | JJ | ၂၁ | ၁၉ | \subset |
| 9 | ဇွန်လ | e | JJ | ၁၅ | JJ | 20 | ၂၁ |
| 9 | ဇူလိုင်လ | J | Jo | ૧ | Jo | 9 | Jo |
| 9 | ဩဂုတ်လ | 9 | J8 | <u> </u> | JP | 9 | JP |
| હ | စက်တင်ဘာလ | 9 | JJ | ရ | ၂၁ | 9 | Jo |
| ૧ | အောက်တိုဘာလ | ૧ | ၂၁ | ၁၂ | ၂၁ | E | Jo |
| ၈ | နိဂင်ဘာလ | 20 | Jo | ാ | Jo | 6 | Jo |
| e | ဒီဇင်ဘာလ | 00 | ၂၁ | 99 | ၁၉ | ေ | ၁၉ |
| 00 | ဇန်နပါရီလ | E | ၂၁ | 00 | ၂၁ | E | ၂၁ |
| ၁၁ | ဖေဖော်ဂါရီလ | ၁၁ | Jo | ၁၅ | ၁၉ | ව | ၁၉ |
| ၁၂ | မတ်လ | 99 | ၂၁ | ၁၇ | ၁၉ | e | ၁၉ |
| | စုစုပေါင်း | 209 | ე ၄ ၆ | ၁၅၃ | ၂၃၈ | ၉၀ | J9J |

4.10 WATER AND ENERGY REQUIREMENTS

4.10.1 ELECTRICITY

Electricity source of the plant operations and the staff residents is from the generators. Two set of 400 KVA generators and one 60 KVA generators are mainly used for the production processes. The office electricity is supplied by a 10 KVA generator. Annual electricity usage is approximately 351MWH/hr.

The generator sets exist in the separated generator room with the size of 40′x10x20′. Adjacent to the generator room is the plant's boiler room. Generator rooms and gen sets are show in Figure 4.43.

Fuel Requirement

Annual fuel requirement for diesel is 6,120gallons.







Figure 4.43 Generator Set

4.10.2 WATER SUPPLY

A rainwater retaining pond is built at the north of the Plant to store rain water as a water source of the plant's operations and the facilities. 20,000 gallons water is pumped into the water storage tank from the pond. From the ground water tank, water is raised to the 8,000 gallons overhead water storage tank by using a motor pump. The water supply for the production areas and the residents are distributed through the pipes from the overhead tank. In addition, two tube wells located at the north and south of the plant are used.

Regular cleaning and debris removal are conducted in the water retaining pond to ensure to maintain good water quality. The stored water quality is considerably acceptable to use as only rainwater is stored in the pond.

In addition, two tube wells located at the north and south of the plant are used. The depth of the underground water at the tube well area is 120 feet.



The monthly and yearly water requirements for the plant's facilities are shown in the following Table 4.11.

Table 4.11 Monthly Water Requirements for the facilities

| No. | Facility | Gallons/Month | Gallons/Year |
|-----|-------------------------------|---------------|--------------|
| 1 | Production | 352,000 | 4,224,000 |
| 2 | Domestics water for Residents | 240,000 | 2,880,000 |
| | Total | 592,000 | 7,104,000 |



Figure 4.44 Water Storage Tanks and Over Head Tanks

4.10.3 DRAINAGE

To facialitate to discharge the rainwater, the Plant constructed concrete drainage system around the plant. Rainwater is collected by gutters of the roofs and transported the water into the drains around the plant buildings. Final runoff water from the internal drain is released into the sludge pits located outside the plant through the external drainage (Figure 4.45 and 4.46).



Figure 4.45 Internal and External Drainage System



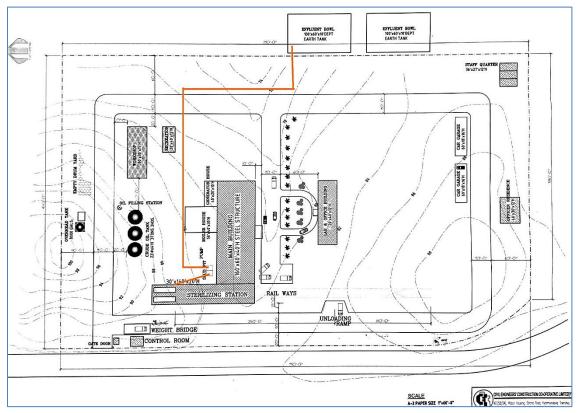


Figure 4.46 Map Showing Drainage Line to the Earth Pond

4.11 WASTE TYPES OF THE FACTORY

Kanbauk Palm Oil plant is a small- scaled palm oil producer based on the quantity of crude palm oil production per hour. It can be considered that the amount of waste generations from the process is likely small and controallble with effective waste managemnt systems.

Chemical use does not involve in the production process in the Kanbauk plant

In general, crude palm oil production creates two types of organic wastes, solid wastes and semi-liquid wastes. The generated solid wastes include empty fresh fruit bunches, kernel nut shells, branches, kernel cakes and fibers. The liquid wastes discharged from the production is Palm Oil Plant Effluent (POME).



4.11.1 SOLID WASTE (TYPE/AMOUNT/MANAGEMENT)

a) Process Waste Types and Amount

The main solids wates generated from the production activities are considerably organics such as empty fruit bunches (EFB), palm kernel cake, palm kernel shell and fibre from the nuts. The annual solid wastes amount is approximately 20000 tons.

b) Domestic Wastes Types and Amount

The domestic waste and waste from office, canteen and dormitory are collected first at the garbage space for normal waste. Annual domestic waste amount of the plant is approximately 3200 tons.

4.11.1.1 MANAGEMENT AND DSIPOSAL OF SOLID WASTES

Empty fruit bunches are disposed in the earth pond (100'x100'x5'). The waste bunches are burnt to obtain the ashes and reused as fertilizers for palm plantations. The broken kernel shells and nut fibers are transported by using a blower to the boiler as fuels.

Other **non-hazardous solid** wastes include office, kitchen, and dormitory wastes. Waste from canteen and dormitory and sanitary wastes from office are disposed of at bins and buried at the landfill area.

Palm kernel cake is a by-product of oil extraction from palm kernel seeds. It is sold to farmers to be used as animal feeds.



Figure 4.47 Empty Furit Bunches



4.11.1.2 MANAGEMENT AND DSIPOSAL OF DOMESTIC SOLID WASTES

The domestics wastes were regularly disposed at the land fill area. The organic food wastes are taken by the workers as animal feeds.

4.11.2 LIQUID WASTES (TYPES AND AMOUNT)

The final processd liquid wastes from the Kanbauk Palm Oil plant is Palm Oil Plant Effulenet (POME). POME consists of 0.6–0.7% palm oil, 95–96% water, 4–5% total solid, and 2–4% suspended solids. (Processing of palm oil Plant wastes based on zero waste technology, Irvan, 2018).

The amount of process liquid waste is approximately 2000 gallons per month and annual amount is 24000 gallons.

4.11.2.1 MANAGEMENT AND DISPOSAL OF LIQUID WASTES

Semi-liquid wastes like sludges are firstly transported into the oil separation tank (Figure 4.48) to deposit the sludges at the bottom of the tank. From the separation tank, the sludges are delivered to the sludge pit (Figure 4.51) through the pipelines. This oil sludge/traps pits is considered as an initial a treatment measure for the POME. The oil to be recovered from this may be sold to soap manufacturers.

The accumulated sludges at the pit are pumped into the earth ponds (100'x60'x14') located outside the plant. In the first earth pond, the pumped sludges are separated as liquid layer at the top and solid layer at the bottom.

The liquid at the top of the pond is transported into second (final) earth pond (100'x100'x14'). CaO is added into the pond for the removal of organic srbstances in POME by photocatalytic degradation process. Photocatalysis process can degrade organic pollutants contained in wastewater into water, carbon dioxide or small molecules, and reduce or oxidize inorganic pollutants to harmless substances. Photocatalytic reaction is a chemical reaction that takes place under the joint action of light and the photocatalyst. This technology possesses several advanges, including environmental protection, the complete drgradation of pollutants, and no secondary pollution.



The activated liquid is used as liquid fertilizers for the palm oil plantation. The Plant is considerably a small scale producer and accumulated little or zero liquid effluent at the final treatment pond.

The small shrubs and vegetations are recorded in the wastewater treatment ponds. (Figure 4.53 and 4.54). Detailed flowchart of solid wastes generated and liquid wastes treatment is explained in Figure 4.56.

The Plant reuses the usable oils from the sludge pit and sell the oils to outside buyers (Shown in Figure 4.55).



Figure 4.48 Photo of Oil Separation Tank



Figure 4.49 Photo of Oil Sludge Tank





Figure 4.50 Photo of Oil Sludge Sedimentation Tank



Figure 4.51 Photo of Sludge Pit





Figure 4.52 Photo of Siudge Pit Pump



Figure 4.53 First Water treatment pond



Figure 4.54 Final Water treatment pond





Figure 4.55 Reused Oils from The Sludge

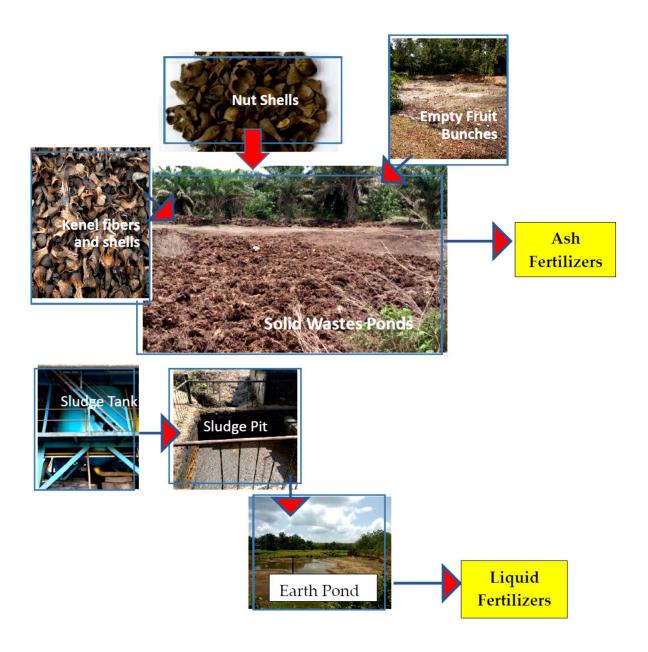


Figure 4.56 Palm Oil Plant Residues Waste and Utilities



4.11.3 OCCUPATIONAL HEALTH AND SAFETY

Workers are provided Uniforms and Personal Portective Equipment based of the assigned tasks. (Figure 4.57). Basic Fire Fighting training, Boiler operator training, Boiler inspection and machine operator training are provided to the relevant workers.

Warning signages and emergency Assembly point are displayed at designated areas. (Figure 4.58). Workers are informed potential hazards and risks associated with assigned tasks by Supervisors before commencement of work.



Figure 4.57 Uniforms and PPE



Figure 4.58 Warning Signages

4.12 AIR EMISSION MANAGEMENT

Air quality is also impacted by mill emissions during oil palm processing.

Greenhouse gases

The POME ponds produce methane and carbon dioxide. Carbon dioxide and certainly methane are so called greenhouse gases (GHGs).



The rate of GHG emissions from POM can be reduced by more than 80% by installing POME biogas capturing equipment (if applicable). Increasing boilers efficiency and raising the rate of palm oil process performance could be helpful in GHG reduction.

Smoke and Dust Emissions

From the palm oil combustion process, the pollutants released mainly consist of carbon monoxide (CO), particulate matter (PM), nitrogen oxide (NOx), and sulphur dioxide (SO2). At the milling stage of palm oil production, the boiler is the most significant contributor of air pollutants.

Kanbauk Palm Oil Plant uses fibre and shell wastes as fuel source in boiler to produce steam for palm oil production processes. Economically, the usage of palm waste material as fuel is seen as productive since the material will not be wasted. However, incomplete combustion process in the furnace of the boiler releases emissions. From the palm oil combustion process, the pollutants released mainly consist of particulate matters (PM), carbon monoxide (CO), nitrogen oxide (NOx) and sulphur dioxide (SO2).

The emission of particulates can be controlled basically using follows:

- 1) Routine boiler maintenance is done to minimizing emission.
- 2) The boiler tubes are clean pneumatically. The pneumatic tube cleaning helps to minimize the soot build-up on the heat exchange surfaces of the boiler and therefore helps to maintain the optimum boiler efficiency.
- 3) The emission of particulate can be avoided by ensuring proper feeding of fuel (i.e. fibre and shell)
- 4) Optimum conditions of the combustion process.
 - a. Control air fuel ratio
 Insufficient air supply may lead to poor combustion which results in black smoke. Thus, air supply is kept in achieving complete combustion.
 - b. Control fuel feeding
 - c. Sufficient time complete combustion process
- 5) Using a cleaner fuel also help in eliminating black smoke.
- 6) The boiler stack height is 56 feet and it is sufficiently high to allow for adequate air dispersion.
- 7) The factory uses fiber as fuel in the boiler. Fiber causes low particulate matter emission, resulting in a low impact of air pollution from the factory.



- 8) Another factor to be considered is the forest around the factory. Palm oil plantation and forest have the ability to filter out and hence reduce air pollution levels (by absorbing and utilizing certain substances from the air/the ability to absorb certain substances (e.g. CO2). ကံပေါက်ဆီအုန်း စက်ရုံသည် ကံပေါက်ဆီအုန်းခြံ အလယ်တွင် တည်ရှိ သောကြောင့် ဘွိုင်လာ မီးခိုးခေါင်းတိုင်မှ ထွက်ရှိသော မီးခိုးများသည် ဆီအုန်းပင် အလက်များမှ ထုတ်လုပ် သည့် ကာဗွန်ပမာဏသည် အောက်ဆီဂျင် ထုတ်လုပ်မှု ထက် များစွာ လျော့နည်း သောကြောင့် ပတ်ဝန်း ကျင် ထိခိုက်မှု လျော့နည်းစေပါသည်။
- 9) The factory provides the boiler operator adequate operator training to compromise boiler availability, emission and efficiency.

4.13 CORPORATE SOCIAL RESPONSIBILITY(CSR)

The Kanbauk Palm Oil factory has contributed both financially and providing other supports in the social activities such as cash and material donations, assisting in road renovation and religious ceremonies (Figure 4.59 and 4.60).

In addition, the palm oil factory has developed a budget allocation including Kyats 8,000,000 for CSR activities. In order to raise the CSR budget continually, the factory management has planned potential fundraising activities such as transportation and palm leave roofs manufacturing.

Moreover, the factory creates the career opportunities for the locals and contract opportunities for the local suppiers.









Figure 4.59. Donation of Palm Leaves for the roofs and bamboo sticks for the floor



Figure 4.60. Assisting in Village's Road Renovation



5. BASELINE ENVIRONMENTAL AND SOCIAL QUALITY

Kanbauk Crude Plam Oil plant is located in the ye-Phyu township within Kanbauk region. The key features of Ye-Phyu township were explained in the following sections.

5.1 METHODOLOGY AND DATA COLLECTION

In the frame of the preparation of this EMP report, Green EHSS consultant teams has conducted site surveys for receiving current environmental data. Air quality, water quality, noise quality and soil quality of the project area were monitored by using monitoring devices and geographical positioning system device (GPS) (described detailed in section 5.2 & 5.6.2).

The social assessment team used both qualitative and quantitative techniques to collect data and information on the social and economic status of the community. The team used a participatory assessment method tools including *literature review*, questionnaires and observation.

A detailed desk study of **Yebyu Township Profile in 2018** was analyzed to collect upto-date and precise information on the current socio-economic conditions of the Yebyu Township conditions.

For nearest villages of Kanbauk Factory such as Kanbauk village, Eindayaza Village and Gan Gaw Taung Village, GREEN EHSS team conducted survey and collected the socio-economic data of these villages by using *questionnaires and observation* methods.

5.2 PROJECT BOUNDARY

Kanbauk Palm Oil Factroy is located near to Gan Gaw Taung, Kan Bauk region, Ye Phyu Township, Thawei, Thanithary Division, Myanmar at the coordinates grids between E 98. 07° to 98.08° and N 14° 36′ 53.0″ and 98° 04′ 32.7″ E (14.614722, 98.075750) coordinates points (Figure 5.1).

The EMP report includes consideration of the spatial boundaries to assess the crucial environmental parameters.

Spatial Boundaries is spatial limitation that is confined to activities associated with Kanbauk Palm Oil pant's manufacturing processes (Figure 5.2 and Figure 5.3).



The spatial environmental setting of the plant is considered within 3000 meters of the plant area based on the following criteria:

- The extent of potential effects arising from noise and atmospheric emissions for those plant activities.
- Lands used for residential, commercial, industrial, recreational, cultural, and aesthetic purposes by communities whose areas include the physical extent of the plant.





Figure 5.1 GPS Location of the Factory





Figure 5.2 Spatial Boundary of the Plant



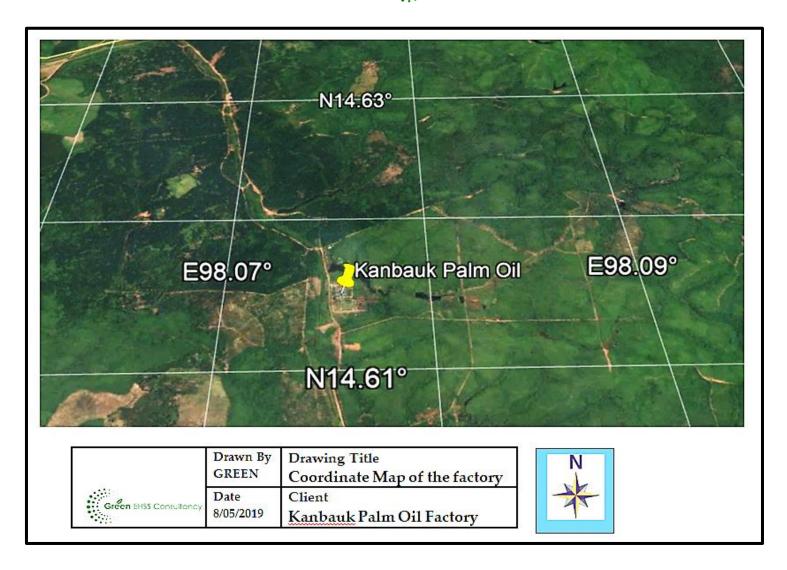


Figure 5.3 Coordinate Map of the Plant



5.3 BACKGROUND HISTORY OF YEBYU TOWNSHIP

ရေဖြူမြို့နယ်သည် ရေးအခါက သာဂရမြို့ (လောင်းလုံမြို့နယ်၊ မြို့ဟောင်းရွာ) မှ မြောက်ဘက် ၁၄ မိုင်ခန့် ကွာဝေးသော နေရာတွင် စိမ်းလန်း၊ စိုပြေကျက်သရေ နှင့် ပြည့်စုံလှသော တောသာယာ ခေါ် တောကြီးတစ် ခုရှိပြီး တောအတွင်းရှိ တောင်တန်းပေါ်တွင် ထူးဆန်း၍ ရေဆူနေသော ကျောက်ရေတွင်းကြီး ရှိခဲ့ပါသည်။ ထို ရေဆူနေသည်ကို အကြောင်းပြု၍ ၄င်းတောင်ကို ရေဆူတောင်ဟု ခေါ်တွင်ခဲ့ပါသည်။ ထိုတောင်အနီးတွင် နေထိုင်သော ရွာကို ရေဆူရွာဟုခေါ်တွင်ခဲ့ကြပါသည်။ ကာလရွေ့လျားလာသော အခါ ရေဆူမှ ရေဖြူရွာဟု တင်စားခေါ်တွင်ခဲ့ကြပါသည်။ ပြည်ထဲရေးနှင့် သာသနာရေး ဝန်ကြီးဌာန၏ (၂၂.၇.၁၉၇၂) ရက်စွဲပါ စာအမှတ် ၁၀၃/၃၅/စိတ် (၁) ဖြင့် ထုတ်ပြန်သည့် အမိန့်စာအရ ရေဖြူမြို့အဖြစ် ပြင်ဆင်ဖွဲ့စည်းခဲ့ပါသည်။

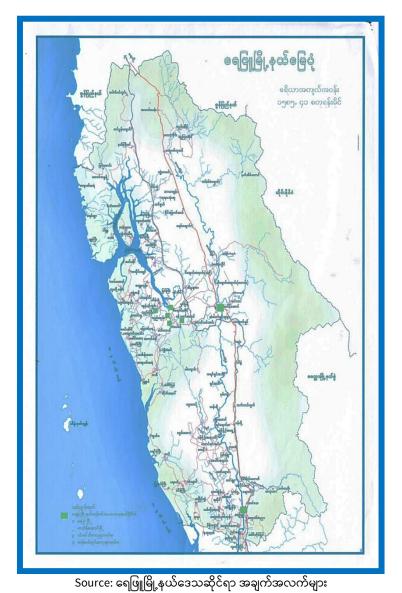


Figure 5.4 Map of Yebyu Township of Tanintharyi Region



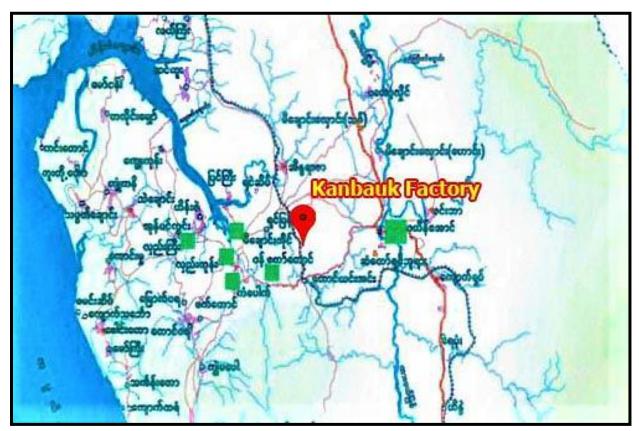


Figure 5.5 Regional Map of Kanbauk Factory

5.3.1 LOCATION AND AREA OF YEBYU TOWNSHIP

Yebyu Township is situated in Dawei District of Taninthayi Region. It is located between 14° 12′ N and 15° 15′ N, and 97° 45″ E and 98° 36″ E. Area of the township is as follows:

Table 5.1 Particulars of nearby Townships

| No. | Township/ Town | Town Sq. | Villages | Township |
|-------|----------------|----------|-----------|----------|
| | | Mile | Tract Sq. | Sq. Mile |
| | | | Mile | |
| 1 | Yebyu | 0.38 | 1584.84 | 1585.22 |
| | Kaleinaung | 0.18 | 1 | 0.18 |
| Total | | 0.56 | 1584.84 | 1585.4 |

Source: ရေဖြူမြို့နယ်ဒေသဆိုင်ရာ အချက်အလက်များ





Figure 5.6 Map of Dawei District of Tanintharyi Region

5.4 ENVIRONMENTAL QUALITY OF THE PROJECT

5.4.1 PROJECT BOUNDARY AND MONITORING POINTS FOR ENVIRONMENTAL PARAMETERS

The EMP report includes consideration of the spatial boundaries to assess the crucial environmental parameters.

Spatial Boundaries is spatial limitation that is confined to activities associated with Kanbauk Palm Oil pant's manufacturing processes.

The spatial environmental setting of the plant is considered within 3000 meters of the plant area based on the following criteria:

- The extent of potential effects arising from noise and atmospheric emissions for those plant activities.
- Lands used for residential, commercial, industrial, recreational, cultural, and aesthetic purposes by communities whose areas include the physical extent of the plant.





Figure 5.7 Spatial Boundary of the Plant

5.4.2 ENVIRONMENTAL PARAMETERS MONITORING POINTS

Within 3000 meters, mainly plantations are covered the lands. Total 11 monitoring points (Figure 5.8) are carefully selected based on potential emission sources of air, water, noise and soil pollutants.

Geographic positions of the monitoring are described in Table 5.2.



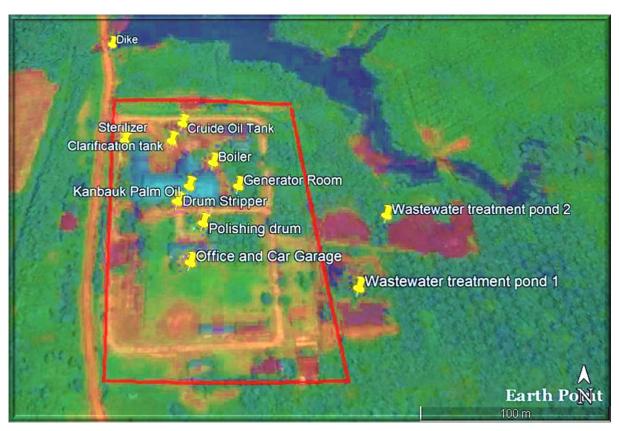


Figure 5.8 Environemntal Parameters Monitoring Points

Table 5.2 Geographic Position of Air and Noise Monitoring Points within Kanpauk Palm Oil Factory

| | Tunipum Tuni On Tuetory | | | | | |
|-----|-------------------------|---------------|----------------|-----------|--|--|
| No. | Direction | North | East | Elevation | | |
| 1 | Drum Stripper | 14 ° 36.876 ′ | 098 ° 04.538 ′ | 180 | | |
| 2 | Polishing Drum | 14 °36.867 ′ | 098 ° 04.548 ′ | 210 | | |
| 3 | Clarification | 14 °36.905 ′ | 098 ° 04.534 ′ | 298 | | |
| 4 | Boiler | 14 ° 36.895 ′ | 098 ° 04.551 ′ | 119 | | |
| 5 | Crude Oil Tank | 14 ° 36.914 ′ | 098 °04.538 ′ | 142 | | |
| 6 | Sterilizers | 14 °36.905 ′ | 098 °04.515 ′ | 58 | | |
| 7 | Dike | 14 °36.970 ′ | 098 ° 04.501 ′ | 70 | | |
| 8 | Waste Water | 14 °36.841 ′ | 098 ° 04.603 ′ | 116 | | |
| 9 | Waste Water | 14 °36.872 ′ | 098 °04.617 ′ | 87 | | |
| 10 | Generator | 14 °36.884 ′ | 098 °04.561 ′ | 94 | | |
| 11 | Office & Car garage | 14 °36.851 ′ | 098 °04.544 ′ | 125 | | |



5.4.3 AIR QUALITY MONITORING

In accordance with National Air Emission guidelines, baseline ambient air quality was monitored in and around the Plant. Totoal 9 parameters of air quality were measured during the site survey at the plant.

Ministry of Natural Resources and Environmental Conservation- MONREC (Former-Ministry of Environmental Conservation and Forestry) legislated general air emission guidelines for general industry to reduce air pollution form the industrial activities. Standard parameters of general air emission include Sulphur Dioxide (SO₂), Nitrogen Dioxide (NO_x), Particular matter PM₁₀, Particular matter PM_{2.5} and Ozone (O₃). National Air Emission standards and US EPA standards are shown in Table 5.3.

Table 5.3 Air Emission Standards

| n . | National Guideline | | |
|--|--------------------|---------------------|--|
| Parameter | Value μg/m³ | US-EPA Standards | |
| | (Averaging Period) | | |
| Nitrogen Dioxide | 400 (1-year) | | |
| | 200 (1-hour) | | |
| Ozone | 100 (8-hours daily | | |
| | maximum) | | |
| Particular matter PM10a | 20 (1-year) | 150 μg/m3 (24-hour) | |
| | 50 (24-hour) | | |
| Particular matter PM _{2.5} ^b | 10 (1-year) | 25 µg/m² (24 hour) | |
| | 25 (24-hour) | 35 μg/m3 (24-hour) | |
| Sulphur Dioxide | 20 (1-hour) | 75 nnm (1 hour) | |
| | 500 (10-minute) | 75 ppm (1-hour) | |

^a Particular matter 10 micrometer or less in diameter

a) Methodology

Even though National Emission Standards imposes five crucial parameters for general industry, GREEN EHSS team measured 9 parameters at potential emission sources within the plant including production areas, machines, vehicle garages and generator room. 11 air monitpring points were carefully chosen to cover the production. Detailed geographic positionings of the monitoring points are shown in Table 5.2.

^b Particular matter 2.5 micrometer or less in diameter



The air quality monitoring is performed by using Aeroqual Series 500 Air monitoring device from New Zealand and 770-1100 HAZ-DUST I, Aerosol Monitor, 110-240V from USA. The Aerosol Sensor heads for Carbon Monoxide, Nitrogen Oxide and Sulphur Dioxide and H₂S. Aerosol monitor is used to monitor dusts. PM2.5 and PM10 were monitored by using HOLDPEAK 5800D PM2.5/PM10 Monitor Detector.

Carbon dioxide concentration was measured with Carbon Dioxide sensor meter M0198132S.

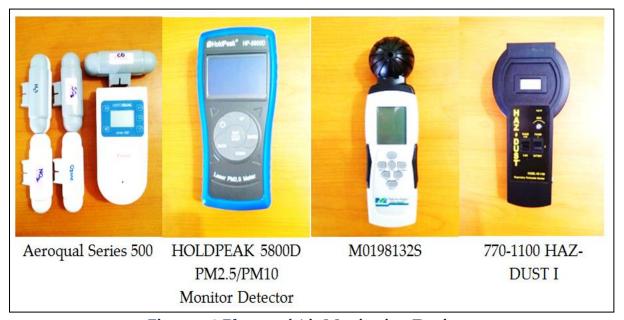


Figure 5.9 Photos of Air Monitoring Devices

b) Results

The air monitoring analysis results were compared with National Environmental Quality (Emission) Guideline and US-EPA Standards.

All parameters at all monitoring points lie within the range of National Environmental Quality (Emission) Guideline for Myanmar. The measured values of PM₁₀ are within the range of the US-EPA Standards values.





Figure 5.10 Air Quality Monitoring

Table 5.4 Air Quality Parameters Monitoring Results

| Area | H ₂ S ppm | SO ₂ | NO ₂ | CO ppm | CO ₂ | O ₃ ppm | PM (2.5) μg/m ³ | PM (10) μg/m ³ | TSP (Dusts) Mg/m³ |
|-----------------------------------|-------------------------|-----------------|-----------------|-----------|-----------------|--------------------|-------------------------------|------------------------------|-------------------------|
| Drum Stripper | 0.1 | 0.00 | 0.011 | 1.49 | 485 | 0.004 | 32.7 | 52.8 | 00.2 |
| Polishing Drum | 0.0 | 0.00 | 0.019 | 1.02 | 451 | 0.000 | 25.1 | 43.5 | 00.1 |
| Clarification Tank | 0.0 | 0.00 | 0.018 | 0.01 | 441 | 0.006 | 17.3 | 31.1 | 00.1 |
| Boiler | 0.0 | 0.00 | 0.023 | 0.82 | 437 | 0.000 | 16.2 | 30.4 | 00.2 |
| Crude Oil Tank | 0.1 | 0.00 | 0.020 | 1.64 | 436 | 0.000 | 9.9 | 17.1 | 00.2 |
| Sterilizers | 0.0 | 0.00 | 0.014 | 0.46 | 446 | 0.002 | 11.1 | 18.1 | 00.2 |
| Dike | 0.0 | 0.00 | 0.028 | 0.05 | 430 | 0.009 | 11.0 | 19.5 | 00.1 |
| Waste Water Treatment Pond (2) | 0.0 | 0.00 | 0.027 | 0.00 | 430 | 0.006 | 14.3 | 29.7 | 00.1 |
| Waste Water Treatment Pond (1) | 0.1 | 0.00 | 0.014 | 0.00 | 431 | 0.005 | 11.9 | 24.1 | 00.1 |
| Generator | 0.1 | 0.00 | 0.039 | 3.06 | 437 | 0.000 | 15.1 | 38.6 | 00.1 |
| Boiler Stack | 0.0 | 0.00 | 0.15 | 0.91 | 412 | 0.002 | 19.1 | 29.5 | 00.1 |
| Office & Car garage | 0.0 | 0.00 | 0.026 | 1.51 | 425 | 0.001 | 14.4 | 30.0 | 00.1 |



Table 5.5 Comparison of Air Quality between Observed Value at the Boiler and National Emission Guideline Value

| Parameter | Unit | Observed Value | Guidelines Value |
|-----------------------|-------|-------------------|---------------------|
| NO ₂ | μg/m³ | 43.25 | 200 |
| O ₃ | μg/m³ | 00 | 100 |
| PM _{2.5} | μg/m³ | 16.2 | 25 |
| PM ₁₀ | μg/m³ | 30.4 | 50 |
| SO ₂ | μg/m³ | 00 | 500 |

Table 5.6 Comparison of Air Quality between Observed Value at the Generator room and National Emission Guideline Value

| Parameter | Unit | Observed Value | Guidelines Value |
|-----------------------|-------|-------------------|---------------------|
| NO ₂ | μg/m³ | 73.34 | 200 |
| O ₃ | μg/m³ | 00 | 100 |
| PM _{2.5} | μg/m³ | 15.1 | 25 |
| PM ₁₀ | μg/m³ | 38.36 | 50 |
| SO ₂ | μg/m³ | 00 | 500 |

Table 5.7 Comparison of Air Quality between Observed Value at the Sterilizer and National Emission Guideline Value

| Parameter | Unit | Observed Value | Guidelines Value |
|-------------------|-------|-------------------|---------------------|
| NO ₂ | μg/m³ | 26.36 | 200 |
| O ₃ | μg/m³ | 00 | 100 |
| PM _{2.5} | μg/m³ | 11.1 | 25 |
| PM ₁₀ | μg/m³ | 18.1 | 50 |
| SO ₂ | μg/m³ | 00 | 500 |



Table 5.8 Comparison of Air Quality between Observed Value at the Stack and National Emission Guideline Value

| Parameter | Unit | Observed Value | Guidelines Value |
|-------------------|-------|-------------------|---------------------|
| NO ₂ | μg/m³ | 28 | 200 |
| O ₃ | μg/m³ | 3.93 | 100 |
| PM _{2.5} | μg/m³ | 19.1 | 25 |
| PM ₁₀ | μg/m³ | 29.5 | 50 |
| SO ₂ | μg/m³ | 00 | 500 |

Table 5.9 Comparison of Air Quality between Observed Value at the Treatment Pond (1) and National Emission Guideline Value

| Parameter | Unit | Observed Value | Guidelines Value |
|-----------------------|-------|-------------------|---------------------|
| NO ₂ | μg/m³ | 26.37 | 200 |
| O ₃ | μg/m³ | 9.82 | 100 |
| PM _{2.5} | μg/m³ | 11.9 | 25 |
| PM ₁₀ | μg/m³ | 24.1 | 50 |
| SO ₂ | μg/m³ | 00 | 500 |

Table 5.10 Comparison of Air Quality between Observed Value at the Treatment Pond (2) and National Emission Guideline Value

| Parameter | Unit | Observed Value | Guidelines Value |
|-----------------------|-------|-------------------|---------------------|
| NO ₂ | μg/m³ | 50.8 | 200 |
| O ₃ | μg/m³ | 11.78 | 100 |
| PM _{2.5} | μg/m³ | 14.3 | 25 |
| PM ₁₀ | μg/m³ | 29.7 | 50 |
| SO ₂ | μg/m³ | 00 | 500 |

c) Existing Control Measures

Based on the values of air quality parameters, ambient air quality in and around the plant is considerably within the acceptable and Standards levels.



The Plant has regularly inspected and maintained the equipment and machine. In addition, the Plant has palnned to upgrade the existing processes upon approval from the principal organization.

Boiler is regularly inspected by the township Boiler Inspection Department. The latest boiler inspection record is shown in the Figure 5.11.

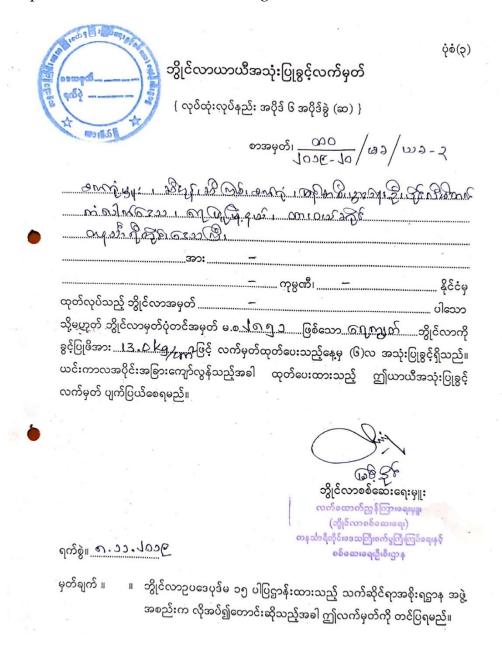


Figure 5.11 Boiler Inspection Record



5.4.4 WATER QUALITY

5.4.4.1 SURFACE AND GROUND WATER QUALITY

a) Methodology

There is no river or stream near to the Kanbauk Palm Oil Plant. The Plant uses mainly rain water stored in the retaining pond for production. The stored water from the pond is pumped and transported to the water tanks. The water samples were collected from the retaining pond and water tank to assess the water quality.

In order to analyze the ground water quality, the water sample was gathered from the tube well located within the plant.

The sanitized water bottles were used and sent the sample bottles to the lab at Myanmar Water Engineering and Products Co., Ltd. for detailed water quality tests.



Figure 5.12 Water Sample Collection

b) Assessment Results

Table 5.11 shows the baseline data of water quality during November, 2018. According to the result, surface water collected from the retaining ponds is high in iron content.

The groundwater sample was collected from the factory's tube well. The test results showed the crucial parameters of water quality are within WHO drinking water quality standards. Comparisons between sample water quality and WHO drinking water quality Standards are shown in Table 5.11 and 5.12.



Table 5.11 Surface Water Quality Test Results of Retaining Pond

| Parameters | Sample Result | WHO Standard |
|------------------------------------|------------------------------|--------------|
| Temperature | | - |
| рН | 7 | 6.5 – 8.5 |
| Colour | Slightly Turbid | Clear |
| Conductivity | 20.31 micro S / cm | - |
| Total Dissolved Solid | 13 mg/l | < 250 |
| Total Hardness | 10 mg/l as CaCO₃ | < 16 |
| Total Alkalinity | 10 mg/l as CaCO₃ | < 250 |
| Sodium (as Na+) | - | - |
| Calcium (as Ca ⁺⁺) | 2.4 mg/l as CaCO₃ | < 8 |
| Magnesium (as Mg++) | 0.95 mg/l as CaCO₃ | < 8 |
| Potassium (as K+) | - | - |
| Iron (as Fe ⁺⁺) | 0.6 mg/l | < 0.3 |
| Chloride (as CL ⁻) | 5 mg/l | < 250 |
| Sulphate (as SO ₄ =) | - | - |
| Bicarbonate (as HCO ₃ - | 10 mg/l as CaCO ₃ | < 250 |
| Carbonate (as Co ₃ =) | ND mg/l | < 250 |
| Hydroxide (as OH-) | - mg/l | < 100 |



Table 5.12 Underground Water Quality Test Results of Tube Well

| Parameters | Sample Result | WHO Standard |
|-------------------------------------|-----------------------|--------------|
| Temperature | | - |
| рН | 7 | 6.5 – 8.5 |
| Colour | Clear | Clear |
| Conductivity | 18.75 micro S / cm | - |
| Total Dissolved Solid | 12 mg/l | < 250 |
| Total Hardness | 10 mg/l as CaCO₃ | < 16 |
| Total Alkalinity | 10 mg/l as CaCO₃ | < 250 |
| Sodium (as Na+) | - | - |
| Calcium (as Ca ⁺⁺) | 2.4 mg/l as CaCO₃ | < 8 |
| Magnesium (as Mg++) | 0.95 mg/l as CaCO₃ | < 8 |
| Potassium (as K+) | - | - |
| Iron (as Fe ⁺⁺) | 0.1 mg/l | < 0.3 |
| Chloride (as CL ⁻) | 5 mg/l | < 250 |
| Sulphate (as SO ₄ =) | - | - |
| Bicarbonate (as HCO ₃ -) | 10 mg/l as CaCO₃ | < 250 |
| Carbonate (as Co₃⁼) | NDmg/l | < 250 |
| Hydroxide (as OH-) | - mg/l | < 100 |

5.4.4.2 DISCHARGED WASTE WATER QUALITY

a) Methodlogy

POME is the effluent from the final stages of palm oil production. It contains 95-96% water, 0.6-0.7% oil and 4-5% total solids including 2-4% suspended solids. In order to analyze the treated effluent water quality, the water sample were collected from the



final treatment pond and the drainage. The collected water sample were sent to the lab at Myanmar Water Engineering and Products Co., Ltd. to analyze crucial parameters in the final treated water.

b) Results

The following parameters in the treatment water pond and drainage were analyzed.

The crucial parameters of discharged water quality from the final treated ponds and drainages are compared to standards of YCDC's discharged water quality. Both final discharged water qualities are within the YCDC's target range. Detailed results are shown in Table 5.13.

Table 5.13 Test Results of Final Effluent and Drainage Water Quality

| Parameters | Waste Water Pond | Waste Water Drain | EQE Guidelines |
|---|---------------------|-------------------------|-------------------|
| Dissolved Oxygen (DO) | 0.8 | 0.9 | - |
| Biochemical Oxygen Demand (BOD₅) (5days at 20°C) (mg/L) | 45.0 | 55.4 | 50 mg/l |
| Chemical Oxygen Demand (COD) (Adaptation of the USEPA 410.4 Approved method) (mg/L) | 24 | 10 | 250 mg/l |
| pH effluent water | 6.77 | 6.58 | 6-9 |
| Suspended solids (SS) | 54 | 49 | 50 |
| Oil and Grease | 8 | 10 | 10 mg/l |

c) Existing Control Measures

Two sludge pits and two final effluent treatment ponds exist in the Plant areas. Semiliquid sludges are boiled to reuse and sell for industrial uses. The final discharged water in both treatment ponds were dried and small vegetations were recorded in the ponds during dry season. The water levels in the treatment ponds were raised during raining season due to rain water.



However, the water quality of the final discharged water meets the national standards, the factory has planned to construct a new overflow pond to diverge the water from the treatment ponds. Generally, the treatment ponds are regularly dry. BOD value exceeds the EQE target by 5.4 mg/L. Since the exceeded limit is a small quantity, therefore, adding the Hydrogen peroxide (H2O2) inside the treatment pond can reduce the BOD level.

The point of final discharge water is designated at the end of the internal drainage. The geographical coordinates of the point of compliance are 14° 36.926'N and 98° 4.506'E.



Figure 5.13 Drainage Water and Final Treated Water Samples Collection during Rainy Season



Figure 5.14 Sludge Pit





Figure 5.15 First Wastewater Treatment Pond during Dry Season



Figure 5.16 Final Wastewater Treatment Pond during Dry Season

5.4.5 SOIL QUALITY

The Plant is surrounded with approximately 6800 acreas plantations. Within the plant compounds, greenish shrubs and trees are recorded. Average soil pH at the monitoring points including wastewater treatment ponds is 6.9. The results show soil quality is neutral and suitable for cultivation.







Figure 5.17 Soil Quality Monitroing



Figure 5.18 Plant compound

Table 5.14 Soil pH and Moisture

| Area | pН | Moisture |
|---------------------------|-----|----------|
| Drum Stripper | 7 | 1 |
| Polishing Drum | 7 | 1 |
| Clarification Tank | 7 | 0.5 |
| Boiler | 6.8 | 0.5 |
| Crude Oil Tank | 7 | 0.5 |
| Sterilizers | 6.8 | 0.5 |
| Dike | 7 | 0.2 |
| Waste Water Treatment (2) | 6.9 | 0.1 |
| Waste Water Treatment (1) | 7 | 1 |
| Office & Car garage | 6.8 | 0.2 |



5.4.6 NOISE

a) Methodlogy

Excessive noise produced from any source is considered as negative impact on human health and environment. GREEN EHSS team conducted the noise level measurement inside and outside of the building. In order to assess the noise levels from the potential noise sources, the noise levels are measured at potential sources by using a digital noise level meter, 5T436355.



Figure 5.19 Photos of Noise Monitoring Device

Noise emission levels for general industry provided in the National Environmental Quality (Emission) Guidelines is used as a standard guideline to assess the noise emitted from the Plant's operations.

Table 5.15 Noise Level Standard

| | Daytime | Nighttime |
|-----------------------------|-------------------------|-------------------------|
| Receptor | 07:00-22:00 | 22:00-07:00 |
| receptor | (10:00-22:00 for Public | (22:00-10:00 for Public |
| | holidays) | holidays) |
| Residential, Institutional, | | |
| educational | 55 | 45 |
| educational | | |
| Industrial, commercial | 70 | 70 |
| | | |

^a Equivalent continuous sound level in decibels



b) Results

Baseline noise quality was measured during the site visit on June 11st, 2018 at potential noise sensitive places including factory work place. Monitored data is shown in Table 5.16.

The plant is considered as an industrial operation, therefore, 70dB(A) is used as a standard noise levels for both day and night. Based on the monitoring results mentioned in Table 5.16, noise levels at office and residential areas, sterilizers, dikes and wastewatewr treatment area are within the Standards. Noise level at production area exceeded the noise value of 70 (dBA). Noise levels at Polishing Drum, Clarification Tank and boiler exceeded 80 dB(A). The highest noise level is recorded at the generator room with 91 dB, however, the generator sets are placed in the separated sound proof room.

Table 5.16 Monitoring Measurement of Noise (dBA)

| Area | Noise level (dB) |
|---------------------------|------------------|
| Drum Stripper | 76.1 |
| Polishing Drum | 88.1 |
| Clarification Tank | 83.8 |
| Boiler | 84.9 |
| Crude Oil Tank | 78.3 |
| Sterilizers | 70.1 |
| Dike | 49.3 |
| Waste Water Treatment (2) | 55.2 |
| Waste Water Treatment (1) | 51.3 |
| Generator | 91.7 |
| Office & Car garage | 51.0 |

c) Existing Control Measures

Generators sets are placed in the separated concrete room. Workers do not require to work inside the generator room for long hours. Only short-term exposure is created in the generator room. Noisy equipment is regularly inspected and maintained.

In order to reduce the noise levels at the production area, Polishing Drum, Clarification Tank and boiler, it is recommended to inspect and maintain the



machines. In addition, the Factory has planned to replace the old machies with the new machines to control the noise levels.

Factory must provide workers with hearing protectors such as ear plug and ear muff to prevent the high level of noise exposure.

For drum stripper and crude oil tank, the noise preventive action will implement and the EMP team will poste a noise notice sign at the workplace to provide the noise information for their workers. The team will inspect and maintain the machines and will provide the wearing of hearing protector in this area. In this context, the use of personal protective equipment including hear protectors seems acceptable to mitigate noise.

5.4.7 VIBRATION

The factory does not use the hevy machinery that can cause vibration, however, the EMP team measured the vibration levels at the production areas. The factory is surrounded by the palm oil plantation and considerably far from the residential areas.

a) Methodology

Vibration levels within the project area and nearby commercial and residential areas were monitored in September 2019. Tivolii digital vibration meter gm63a portable digital vibration meter handheld vibrometer tester device with vibration analyzer gauge is use along with VIBROMETER software to analyze the vibration levels. Total 11 points are selected based on the use of machines and the vehicle movements

b) Vibration Assessment Results

that can probably emit vibration (Table 5.18).

In accrodance with vibration assessment results (Table 5.18) that compared to the Vibration analysis scale develoed by United State Geological Survey, the vibration levels in and around the factory were considered as None to Very Light. It can be concluded that the vibration impact is insignificant to the environment and the workplace. (Table 5.17).



Table 5.17 Vibration Intensity Scale

| Tuble 5.17 Vibration intensity Scare | | | | | |
|--------------------------------------|--------------|------------------------------------|-------------|--|--|
| Intensity | Acceleration | Description | Potential | | |
| Category | (m/s) | | Damage | | |
| I | <0.0167 | Detectable only by instruments | None | | |
| | 0.0167- | Very slight vibration felt by only | None | | |
| II-III | 0.13734 | 3734 some people | | | |
| | 0.13734- | Eagling madenate shaling | None- Very | | |
| IV-V | 0. 9025 | Feeling moderate shaking | light | | |
| | 0.9025- | Strong and very strong shock. | Light- | | |
| VI-VII | 3.3354 | Explicit destruction | Moderate | | |
| | 3.3354- | Sudden shocks. Widespread | Moderate to | | |
| VIII | 12.1644 | destruction | Heavy | | |
| T3 / 3 / | >12.1644 | Change the configuration of land, | Very Heavy | | |
| IX-X | | landslide and cracks | | | |

(Ref: United State Geological Survey)

a. Vibration Assessment Results

Table 5.18 Vibration Intensity Scale

| Location | Within 250 meters Vibration Level (m/s) | Guideline Value |
|---------------------|---|------------------|
| Drum Stripper | 0.21 | 0.13734-0. 9025 |
| · · · · · · · | | None- Very Light |
| Polishing Drum | 0.16 | ii |
| Clarification Tank | 0.14 | ii |
| Boiler | 0.06 | ii |
| Crude Oil Tank | 0.09 | ii |
| Sterilizers | 0.1 | ii |
| Dike | 0.09 | ii |
| Waste Water | 0.08 | ii |
| Treatment (2) | 0.00 | |
| Waste Water | 0.05 | ii |
| Treatment (1) | 0.03 | |
| Generator | 0.11 | ii |
| Office & Car garage | 0.16 | ii |



5.4.8 ODOR

a) Methodlogy

အနံ့ထွက်ရှိမှု နှင့်ပက်သက်၍ စုစည်းအနံ့၊ ပျံ့လွင့်အနံ့တို့အား စီမံကိန်းလုပ်ငန်း၏ အနံ့ထွက်ရှိသော လုပ်ငန်းစဥ် အလိုက် တိုင်းတာ စစ်ဆေးမှုကို တနင်္သာရီတိုင်းဒေသကြီး၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဦးစီးဌာန ညွှန်ကြားရေးမှူးရုံး မှ ၃၀-၅-၂၀၂၂ ရက်နေ့တွင် တိုင်းတာခဲ့ပါသည်။ XP-329 III series ODOR CONCENTRATION METER ကို အသုံးပြု၍ စက်ရုံအတွင်း နှင့် အပြင် နေရာ (၃) နေရာတွင် တိုင်းတာခြင်းဖြစ်ပါသည်။



Figure 5.20 Odor Quality Monitoring



(၃၀–၇–၂၁၂)ရက်နေ့တွင် မြန်မာ့စီးပွားရေးဦးပိုင်အများနှင့်သက်ဆိုင်သောကုမ္ပဏီလီမိတက်၊ ကံပေါက်ဆီအုန်းစက်ရုံ၏ အနံ့ထွက်ရှိမှုအ<mark>ခြေအနေ</mark> တိုင်းတာစစ်ဆေးသည့် တည်နေရာပြပုံ



Figure 5.21 Map Showing Odor Monitoring Points



Table 5.19 Geographic Position of Odor Monitoring Points within Kanpauk Palm Oil Factory

| No. | Location Point | North | East |
|-----|-----------------------|-------------|--------------|
| 1 | OMP1 | 14°36′51.7″ | 098°04′31.5″ |
| 2 | OMP2 | 14°36′51.8″ | 098°04′31.6″ |
| 3 | OMP3 Tank | 14°36′50.8″ | 098°04′34.6″ |

b) Results

Monitored odor quality was data is shown in Table 5.20. In accrodance with vibration assessment results, it can be concluded that the odor impact is insignificant to the environment and the workplace.

Table 5.20 Odor Monitoring Results of Kanpauk Palm Oil Factory

| စဥ် | တိုင်းတာ | တို | င်းတာသည့် Point | ဆန်းစစ်သည့်နေရာ | အနံ့ ထွက်ရှိမှု အခြေအနေ | | တိုင်းတာသည့် | |
|------------|----------------|------|---------------------------------------|--|-------------------------|---------|--------------|--------------------------------------|
| | သည့် နေ့ရက် | | | | ရှိ/မရှိ | ထိခိုက် | မထိခိုက် | စက်ကိရိယာ |
| IIC | 50-J-JoJJ | OMP1 | Lat-14°36´51.7"N Long-98°04´31.5"E | ကံပေါက်ဆီအုန်း စက်ရုံ (အတွင်း) ကုန်ကြမ်းပေါင်းခံသည့် | မရှိ | - | > | XP-329 III series ODOR CONCENTRATION |
| | | | | အချိန် | | | | METER |
| JII | રo-૧-JoJJ | OMP2 | Lat-14°36′51.8"N Long-98°04′31.6"E | ကံပေါက်ဆီအုန်း စက်ရုံ (အတွင်း) ကုန်ကြမ်းပေါင်းခံပြီး စက်များ လည်ပတ်သည့် အချိန် | ์ กั | - | ✓ | XP-329 III series |
| Я П | 50-J-JoJJ | OMP3 | Lat-14°36´50.8"N Long-98°04´34.6"E | ကံပေါက်ဆီအုန်း စက်ရုံ (အပြင်) ကုန်ကြမ်းပေါင်းခံပြီး စက်များ လည်ပတ်သည့် အချိန် | မရှိ | - | ✓ | ODOR CONCENTRATION METER |



5.5 PHYSICAL ENVIRONMENT AROUND THE PROJECT

5.5.1 TOPOGRAPHY

Around the Kanbauk district, recorded minium elevation is 0 ft, maximum elevation is 2871 ft and 354 ft for average elevation. In general, the surrounding areas of the Plant is considerably flat and covered with palm oil plantations. Detailed topographic descriptions of nearby areas are shown in Figures 5.22 and 5.23.



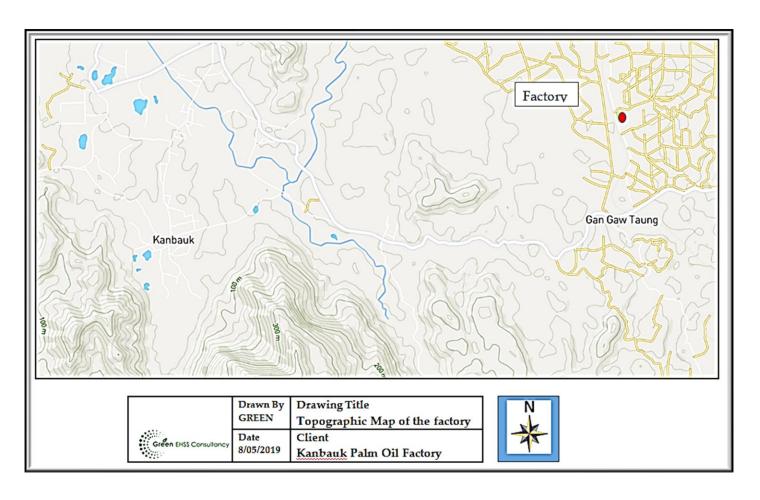
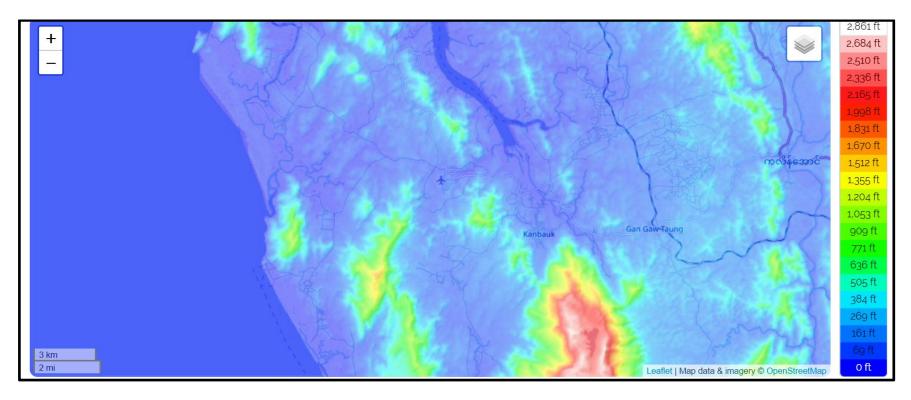


Figure 5.22 Topographic Map of Surrounding Area of the Plant





(Ref: Open Street Map)

Figure 5.23 Topographic Map of Kanbauk District



5.5.2 WATER BODY

5 km radius of the palnt is covered with palm oil plantations. Tokkya Chaung originated from the arms of Adman Sea is located at 5.5 km west of the Plant.

Approximately 8 km east of the plant is Dawei (Tavoy) River that flows from north to south. Dawei River starts from Tenasserim Hills and ends in the Aadaman sea coast (Figure 5.24).

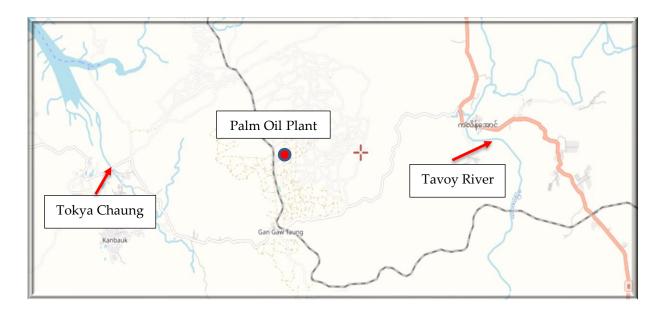


Figure 5.24 Project Location and the Nearest Water Bodies

5.5.3 LAND USE

The total project area is approximately 6791 acres of palm oil plantations and 7.75 acreas of the plant premises. 2 km radius of plant is surrounded with palm oil plantations and no residential area is settled except the Plant's Staff residents. (Figure 5.25 and 5.26).

Within 10 km radius of the plant, mix landus pattern is observerd. Few residential areas including Eindayaza village, Kalainaung village and a small subtown Kanbauk as well as transportation route such as Kanbauk -Kalainaung road are recorded.





Figure 5.25 Landuse at 2 Km radius of the plant

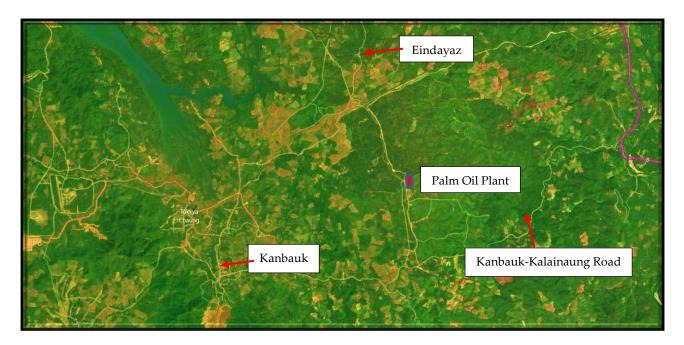


Figure 5. 26 Landuse at 11.25 Km radius of the plant

5.5.4 SOIL COMPOSITION OF THE PLANT AREA

The geological setting around the Tanintharyi region is considered as the Palaeozoic Slate Belt which contains diamictites. (Khin Zaw et Al. 2019). The soil type around the project site is Yellow Brown Laterite soil, Xanthic Farralsol(FAO/UNESCO Soil Classification). The potential crops for the soil type are orchards, forests, rubber, mango, pineapple, tea, coffee and other plantation.



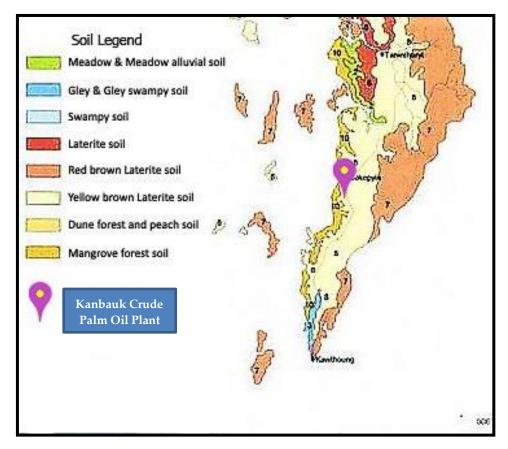


Figure 5.27 Regional Soil Profile

5.5.5 CLIMATE

Nearest city of the Plant is Dawei, Tanintharyi Region. The climate of the region has considered as a tropical monsoon climate under the Köppen climate classification system. The climate summary of the Dawei area shows seasonal variation over the course of the year. During rainy season, the sky is overcast or mostly cloudy 94% of the time. The rainy season is considered from end of February to end of November. The average rainfall throughout the rainy season varies from minimum 0.5 inches to maximum 23 inches.

Over the course of the year, the temperature typically varies from 70°F to 90°F with little variances. Wind direction is most often from the west for 8.4 months from February to October and from the east of 3.3 months from mid of October to end of January from the east. The climate data are collected from the Weather Spark website.



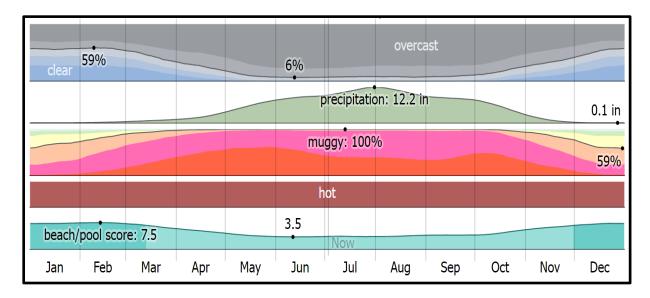


Figure 5.28 Climate Summary of Dawei Region

5.5.6 HAZARD CONSIDERATION

5.5.6.1 FLOODING

Myanmar is prone to various natural hazards that include earthquakes, floods, cyclones, droughts, fires, tsunamis, some of which have the potential to impact large numbers of people.

Since 2002, more than 13 Plantion people have been affected by natural disasters, including three Category 4 cyclones, several major earthquakes, and in 2015 the country experienced the worst flooding in decades. In 2008, Cyclone Nargis devastated southern Myanmar, killing 140,000 people and causing extensive damage to infrastructure. (Ref: United Nations Office for the Coordination of Humanitarian Affairs, Myanmar, 2017).



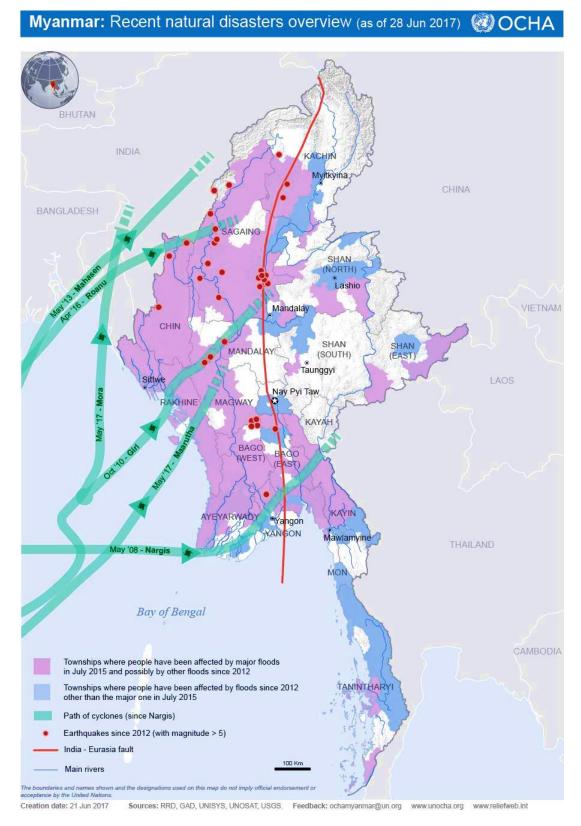


Figure 5.29 Natural Disasters Overview Map of Myanmar (Ref: OCH, Myanmar, UN)



5.6 BIOLOGICAL ENVIRONMENT

The observations on biodiversity show the following features:

Forest : As the project is located in Tanintharyi Region, there are tropical rain forest trees near the project. They are palm plantations near the project compound. All the flora and fauna is of common category. ရေဖြူမြို့နယ် အတွင်း ပေါက်ရောက်သည့် သဘာဝပေါက်ပင်များမှာ သစ်ခါး၊ အင်၊ ကဘန်း၊ ပျဥ်းကတိုး၊ ကညင်၊ သင်္ကန်း စသည်တို့ ပေါက် ရောက်လျက် ရှိပါသည်။

Wildlife: ရေဖြူမြို့နယ်တွင် တွေ့ရသော တောရိုင်းတိရိစ္ဆာန် များမှာ ဂျီ၊ ဆတ်၊ ကြက်၊ တောဝက်၊ ဖြူ၊ မျောက်နှင့် ဒရယ် အမျိုးမျိုး စသည်တို့ဖြစ်ပါသည်။ There is no way appears to endanger or disturb the existing wildlife of the area due to the development of the Kanbauk factory.

Protect areas: The project site and its surroundings, upon investigation, are not classified as protection zone.

5.7 SOCIO-ECONOMIC ENVIRONMENT

Kanbauk Factory is located within Yebyu Township, Tanintharyi Region, Myanmar.

5.7.1 SOCIAL CONDITION

Yebyu Township is 1585.4 sq mi wide. The township has a total population of 119,458 (58,643 male and 60,815 female) with 20,503 households including 210,200 families. Population increasing rate is 1.81.

The population characteristics in Yebyu Township are as follow.

Table 5.21 Population by Sex in Yebyu Township

| | Male | Female | Total |
|-------|-------|--------|--------|
| Urban | 3610 | 4001 | 7611 |
| Rural | 55033 | 56814 | 111847 |
| Total | 58643 | 60815 | 119458 |

Source: ရေဖြူမြို့နယ်ဒေသဆိုင်ရာ အချက်အလက်များ



Table 5.22 Religious Groups of Ethnic in Yebyu Township

| Sr. | Type of Religion | No. of Person |
|-----|------------------|---------------|
| 1 | Buddhist | 113421 |
| 2 | Christian | 5299 |
| 3 | Hindu | 104 |
| 4 | Islam | 631 |
| 5 | Other | 3 |
| | Township Total | 119458 |

Source: ရေဖြူမြို့နယ်ဒေသဆိုင်ရာ အချက်အလက်များ

Table 5.23 Population by Foreigner Living in Yebyu Township

| Sr. | Ethnic Race | No. of Person |
|-----|----------------|---------------|
| 1 | Chinese | - |
| 2 | Indian | 705 |
| 3 | Pakistan | - |
| 4 | Bangladesh | 1 |
| 5 | Other | 18 |
| | Township Total | 723 |

Source: ရေဖြူမြို့နယ်ဒေသဆိုင်ရာ အချက်အလက်များ

Table 5.24 Religious Organization in Yebyu Township

| Sr. | Description | Quantity |
|-----|----------------|----------|
| 1 | Pagoda | 53 |
| 2 | Monastery | 135 |
| 3 | Nun dwelling | 2 |
| 4 | Religious Hall | 2 |

Table 5.25 Number of University and Schools in Yebyu Township

| Sr. | Uni/School | Quantity | | | | |
|-----|------------------------------|----------|--|--|--|--|
| | Basic Educatin | | | | | |
| 1 | State High School | 4 | | | | |
| 2 | State high school (branch) | 7 | | | | |
| 3 | Middle School | 1 | | | | |
| 4 | State Middle school (branch) | 18 | | | | |
| 5 | State Primary School | 120 | | | | |
| 6 | State Primary School (over) | 26 | | | | |
| 7 | Kindergarten | 32 | | | | |

Source: ရေဖြူမြို့နယ်ဒေသဆိုင်ရာ အချက်အလက်များ



5.7.2 NEAREST VILLAGES OF THE KANBAUK FACTORY

5.7.2.1 KANBAUK VILLAGE

Kanbauk village is approximately 3.4 miles to southwest of the Kanbauk plant. The total populace is over 12,000 comprising over 6,000 male and 6,000 females with 2,000 households. Bamar and Mon are main race in the village.

Agriculture is significant economic activity. There are 2,000 acres of paddy field. Rubber and cashew gardening are also found. For animal husbandry, there are about 6 livestock farms in Kanbauk village. The village has 16 monasteries, a church, two mosques, a Hindu temple and a Chinese temple. It has a high school and 7 primary schools with 2500 students in total. Kanbauk village has a Rural Health Centre and a village library.







Figure 5.30 Photos of Kanbauk Village



Figure 5.31 Google Map of Kanbauk Village



5.7.2.2 EINDAYAZA VILLAGE

Having 191 households, Eindayaza Village is located 3.4 miles to the north of factory. Total population is 1,040 including 500 male and 540 females. Mostly are Kayin and Christian. The village has a church. The village has a middle school and a Rural Health Centre. Gardening of cashew, rubber and betel are main business in the village. There are 4875 acres for agriculture land use in total.

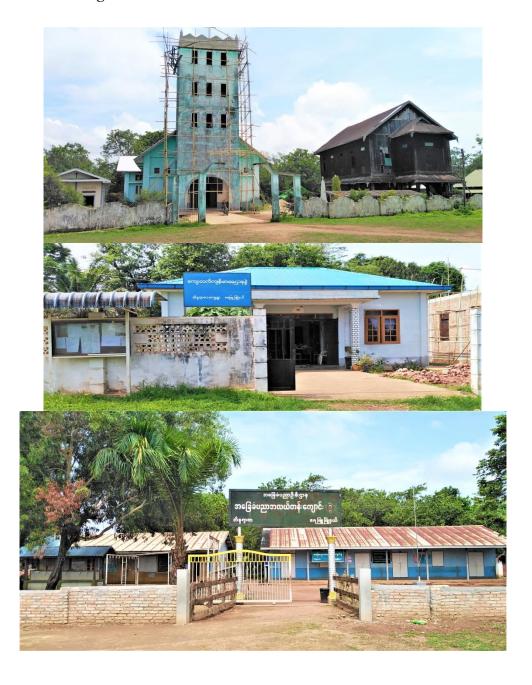






Figure 5.32Photos of Eindayaza Village



Figure 5.33Google Map of Eindayaza Village

5.7.2.3 GAN GAW TAUNG VILLAGE

Gan Gaw Taung, 2.1 miles northwest of the factory, has a population of 1,158 of which 518 are male and 640 are female. There is a total of 220 households in the village. Main economic activity is agriculture. Rubber and betel are cultivated. Gan Gaw Taung village has 4 pagodas and a monastery. It has a primary school. It also has a Rural Health Centre and a village library.





Figure 5.34 Photos of Gan Gaw Taung Village





Figure 5.35 Google Map of Gan Gaw Taung Village

5.7.2.4 SHIN PYAN VILLAGE

Shin Pyan village is approximately 2.0 miles to northwest of the Kanbauk plant. The total populace is 237 comprising over 116 male and 121 females with 47 households. Bamar, Mon and Kayin are main race in the village. The majority of inhabitants are farmers. Betel, cashew and mango are major gardening. The village has a church and a primary school.







Figure 5.36 Photos of Shin Pyan Village



Figure 5.37 Google Map of Eindayaza Village



5.7.3 ECONOMIC CONDITION

Table 5.26 Economic Organization in Yebyu Township

| Sr. | Туре | Quantity |
|-----|--------------------------------|-------------|
| 1 | Industrial Zone | - |
| 2 | Fish farming pond | 1 |
| 3 | Mines (tin and tungsten) | 550,836/ton |
| 4 | Private factory | 6 |
| 5 | Industry and Craft of Domestic | 149 |
| 6 | Beach (Mayingyi Beach) | 1 |
| 7 | Motel/ Inn/ Guest house | 3 |
| 8 | Government Major market | 5 |
| 9 | Private Super Market | - |
| 10 | Government Bank | 1 |
| 11 | Shop house and stores | 512 |

Source: ရေဖြူမြို့နယ်ဒေသဆိုင်ရာ အချက်အလက်များ

5.7.3.1 LAND UTILIZATION

Agricultural and gardening are the dominant land use in **Yebyu Township**. Yebyu Township is 1585.4 square miles (1,014,656 acres). Agricultural land use is 21,009 acres, gardening land use is 90,665 acres, pasture landuse is 4,802 acres, industrial land use is 879 acres, urban land use is 362 acres, rural and settlement land use is 1,205, reserved forest is 526,748 acres and bare land is 102,926 acres.

5.7.1 HEALTH

The main diseases in Yebyu Township are diarrhoea-related illnesses and tuberculosis.

Table 5.27 Number of Hospital and Clinic in Yebyu Township

| Sr. | Туре | Quantity | Remark |
|-----|----------------------------------|----------|---------------|
| 1 | Government General Hospital | 4 | 73 beds |
| 2 | Private Clinic | 1 | Dental Clinic |
| 3 | Department of Health | 7 | |
| 4 | Sub Department of Health (Rural) | 21 | |



5.8 TRANSPORTATION

The plant is located at the rural area near to Kanbauk township and surrounded with oil palm plantation. The nearest public road is Kanbauk – Kalainaung road and located at 2.1 km south of the plant.

Delivery trucks use 5 to 8 trucks/ month on Kanbauk –Kalainaung rode to transport raw materials from nearby local farmers to the plant and final porducts from the plant to the destinations. The delivery trucks mainly pass in the rural areas with palm oil plantations. The delivery routes to and from the plant are shown in Figure 5.38.

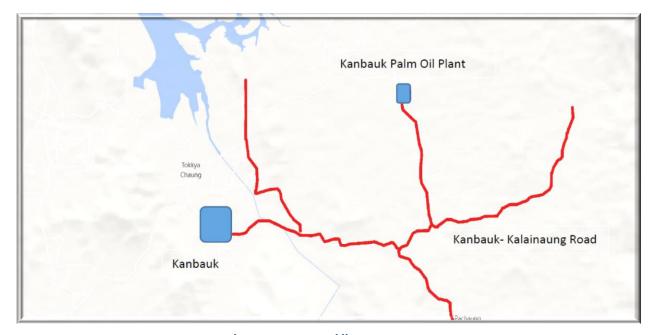


Figure 5.38 Traffic Route

5.9 ARCHAEOLOGICAL AND CULTURAL RESOURCES

There is no archaeological site or recreational area within the project vicinity. Consequently, no impacts to cultural heritage are anticipated.



6. ENVIRONMENTAL IMPACT ASSESSMENT AND MITIGATION MEASURE

6.1 OVERVIEW OF IMPACTS

Based on the scoping of the plant operations, site survery and literature references, potential impact specific to the plant operation phase is regarded as discharge of operation effluents. With timely and proper implementation of this EMP and application of appropriate mitigation measures, the potential impacts can be prevented or minimised. The social outcomes of the factory are expected to be positive by creating employment opportunity. Table 6.6 provides summary of environmental risks related to the construction, operation and decommission phases of the project.

6.2 IMPACT PREDITION METHODOLOGIES

To identify impacts, the methods of description of the environment likely to be affected and description of the likely significant effects are used.

In terms of impact analysis, the following considerations have been applied.

a. Severity

- Magnitude (severity) of impact (will the impact be of high, moderate or low severity?); and
- Scale/extent of impact (will the impact affect the national, regional or local environment, or only that of the site?).

Table 6.1 Evaluation of Severity/ Magnitude of Impacts

| | Severity | Severity of Impact | | | | | | |
|---------------|-------------------|--------------------|-------------|---------|------------|---------|------------|----------|
| Environmental | Scale of | Score | Scale of | Score | Scale of | Score | Scale of | Score |
| Aspects | Impact | | Impact | | Impact | | Impact | |
| | Low | 1 | Medium | 2 | Critical | 3 | High | 4 |
| Reversible/ | Reversibl | le | Reversible | | Irreversib | le | Irreversib | ole |
| Irreversible | | | | | | | | |
| Extent | Site | | Local | | Regional | | National | |
| Duration | Short Term | | Medium Te | erm | Long Terr | n | Permanei | nt |
| Effluent | Non-toxi | С | Low | oxicity | Toxic pol | lutant, | High | toxicity |
| | pollutant, easily | | pollutant(e | .g., | production | n | pollutant | |
| | biodegra | dable | treated | | waters | with | | |
| | (ex: | treated | production | | chemical | | | |
| | domestic | | waters) | | | | | |



| | waters, clean | | content and | |
|----------------|-------------------------------------|----------------------|--------------------------------|------------------------|
| | drainage | | poor treatment. | |
| | effluents) | | | |
| Gaseous | Gas pollutant | Gas < 1 kg of | _ | _ |
| emissions | (PM, NOx, SO ₂ , | pollutant. Flaring | kg of pollutant | pollutant. |
| (abnormal | SO ₃ , CO ₂) | rate increase of | Flaring rate | Increase of |
| situation) | | 100 000 m³ per | increase:100 000 | flaring rate> |
| TAT | г ч | day) | m^3/d to $3Mm^3/d$ | 3Mm³/d |
| Waste | Easily | Inert wastes | Industrial | Industrial toxic |
| Production | recyclable | | wastes, low | waste requires |
| | wastes | | toxicity, available local | specific treatment. |
| | | | treatment | treatment. |
| Hazardous | Low Quantity | Average quantity | Important | Very important |
| wastes | and low effect | spilled and / or | quantity and | quantity and |
| discharge | on environment | low effect on | impact on | impact on |
| 3.23 2.24.2gc | | environment | environment | environment |
| | | (pollution of soils | | (soils and water |
| | | and surface | | table pollution) |
| | | waters) | | , |
| Soil pollution | Low effect on | Moderate effect | Major damage | Immediate |
| | environment, | on environment | on land | planning and |
| | no remediation | | requiring | action required. |
| | required. | | mitigation and | International |
| | | | remediation. | response |
| T 1 T T | A.C.C. 1: C. | 0 1 1 6 | 0.1.1.6.4 | required |
| Land Use | | Somewhat benefit | _ | |
| | lands | to the locals | the project | party |
| | | | owner and no benefit to locals | |
| Use of natural | Use of | Use of resources | Significant effect | Significant loss |
| resources: | renewable | with sustainable | of a high asset | of critical assets |
| water, energy, | resources, use | practices | | and resources |
| raw materials | of recyclable | Less significant | | |
| | resources | effect of a critical | | |
| | | asset | | |
| Impacts on | Very small | Significant loss of | Major damage | Loss of |
| biodiversity | population of | species and | on High | Ecosystem |
| | non- significant | vegetation at local | environmental | Extinction of |
| | fauna and flora | level | sensitive areas | endangered |
| | | | such as primary | |



| | may be | | forest, | species |
|-----------------|----------------|-------------------|-------------------|-------------------|
| | affected. | | endangered | regionally |
| | | | flora and fauna | |
| | | | species | |
| Other impacts | Insignificant | Moderately | Severe damage | Catastrophic |
| <u>on</u> | short-term | environmental | resulting from a | damage with |
| ecosystems: | disturbance | damages and | significant event | potential long- |
| noise, | with no | injuries that can | that can be | term |
| vibration, etc. | environmental | be readily | managed under | consequences |
| | 'scarring ' or | absorbed but | normal | affecting the |
| | injuries. | management | procedures. | environmental |
| | | effort is still | | integrity and |
| | | required to | | livelihood of the |
| | | minimize the | | area. |
| | | impact. | | |
| Public Health | No nuisance or | Acute or Chronic | Chronic effect of | Serious Health |
| & Safety | health effect | effect of some | human health | impacts or death |
| | and safety | sensitive human | | of a person or |
| | hazards to | | | people |
| | human. | | | |

b. Probability of Occurrence (O)

- Probability of occurrence (how likely is it that the impact may occur?); and
- Duration of occurrence (how long may it last?)

This criterion is corresponding to the frequency of the impact occurrence.

Table 6.2 Evaluation of Probability of Occurrence

| Probability of Occurrence | 1 | Annual frequency or never occurred |
|---------------------------|---|------------------------------------|
| | 2 | Monthly Frequency |
| | 3 | Weekly Frequency |
| | 4 | Daily frequency or chronicle |



c. Control (C)

This criterion is used to evaluate the level of control of the aspect, depending on the detection available means, the operating procedures and the precautions taken.

Table 6.3 Evaluation of Level of Existing Controls

| Level | 1 | Highly | Easy detection and control with operating procedures |
|---------|---|---------|--|
| of | | Control | regularly checked and/or important precautions taken to |
| Control | | | lower impact. |
| | 2 | Medium | Detection and control with operation procedures not |
| | | Control | regularly checked and/or average precautions taken to |
| | | | lower impact. |
| | 3 | Low | Detection without control (operating procedures not |
| | | control | adapted) and/or few precautions taken to lower impact. |
| | 4 | No | No detection and/or no precaution taken to lower impact. |
| | | control | _ |

Table 6.4 Matrix of Significant Level of Environmental Risks

| Severity (S) | Probability (P) | Control (C) | Significant Level (SxPxC) | Addition Control | | | | |
|--------------|-----------------|-------------|---------------------------|-----------------------|--|--|--|--|
| (3) | (1) | (C) | (3 x 1 x c) | | | | | |
| 4 | 4 | 4 | 64 | Provide alternative | | | | |
| | 3 | 3 | 36 | Must be implemented | | | | |
| | 2 | 2 | 16 | Should be implemented | | | | |
| | 1 | 1 | 4 | Regular Review | | | | |
| 3 | 4 | 4 | 48 | Must be implemented | | | | |
| | 3 | 3 | 27 | Should be implemented | | | | |
| | 2 | 2 | 12 | Regular Review | | | | |
| | 1 | 1 | 3 | Regular Review | | | | |
| 2 | 4 | 4 | 32 | Should be implemented | | | | |
| | 3 | 3 | 18 | Should be implemented | | | | |
| | 2 | 2 | 8 | Regular Review | | | | |
| | 1 | 1 | 2 | Regular Review | | | | |
| 1 | 4 | 4 | 16 | Should be implemented | | | | |
| | 3 | 3 | 9 | Regular Review | | | | |
| | 2 | 2 | 4 | Regular Review | | | | |
| | 1 | 1 | 1 | Regular Review | | | | |



Table 6.5 Score Evaluation

| Risk Score | Significance of Impact | Significance Description | Remark | | | | | |
|---------------|------------------------|------------------------------|---------------------------------------|--|--|--|--|--|
| 1-15 | Low | No significant | No additional risk control, however, | | | | | |
| 1-15 | LOW | impact | require frequent review. | | | | | |
| 16-32 | Medium | Light impact , try to | Require additional risk control | | | | | |
| 10-32 | Medium | improve | measures and regular review. | | | | | |
| | | Significant impact, | Must provide appropriate risk control | | | | | |
| 33-48 | High | real necessity to | measures and continuous monitoring | | | | | |
| | | improve | the effectiveness of improvement | | | | | |
| 49-64 | Extreme | Unsustainable | Require alternative for the impact | | | | | |
| 49-04 | Extreme | situation | defined. | | | | | |

6.3 SUMMARY OF POTENTIAL IMPACTS

The Environmental risk assessment has been developed through assessing Severity/ Magnitude of the impact(s), Occurrence/Probability of the impacts(s) and existing control measures. Table 6.6 stated summary of environmental risks related to the plant construction, operation and decommission phases.

Table 6.6 Summuary of Potential Environmental and Social Impact Assessment

| | | Scoping Re | | | | sment t | : | |
|-----------------------|--------------|--------------|-----------|--------------|--------------|------------|--------------|---|
| Category | Scoping Item | Construction | Operation | Decommission | Construction | Operation | Decommission | Reason of Impact level Consideration |
| Environmental Impacts | Air Quality | NA | М | L | - | M | L | The main air pollution sources include the emission from generator and boiler. The significance impact is considered to be medium due to existing controls and small scale production of the plant. Emission of dusts may occur during demolition of the structures. However, The plant is a small scale plant and emission of dust can be |



| | | | | | | | considered to be low with proper mitigation. |
|---------------|---|---|---|---|---|---|---|
| Noise | - | M | L | - | M | L | Procesessing activities and use of noisy machines can generate the high level of noise. The generator is kept inside the separated room and other noise exposure is temporary. Due to noise level monitoring results, some machines emitted high levels of noise, therefore, the level of impact is considered as medium. It is recommended to provide hearing protectors to workers and to ensure not to allow unauthorized person near to the machine. Noise emission may occur from some demolition activities, however, the exposure is considered as a short time and temporary. The impact level is, therefore, low. |
| Water Quality | - | M | L | - | M | L | Palm Oil production release POME effluent as by prducts. The plant is small scale and the effluent is considerably small quantity. In addition, the plant is far from surface water source. However, if the plant does not properly manage the effluent, it can impact on the underground water quality. Therefore, the impact level is considered as Medium for operation phase. Low impact level in demolition phase as it is unlikely to have an impact during demolition. |
| Solid Waste | - | L | L | - | L | L | As a small-scaled plant, the small quantity of solid wastes is properly managed and reused. In addition, the by products from the productions are organic and easily decomposed as soil fertilizer. In this reason, the impact level of Solid wastes is Low. |



| | | | | | | | Soild wastes generated from the demolition will be resued or recycled. Unusable wastes will be collected by a waste collector. The impact is considerd as Low for demolition phase. |
|-------------------------------|---|---|---|---|---|----|--|
| Waste Water Effluent, POME | - | M | L | - | M | NA | Kanbauk Plant is a small scale and seasonal producer of palm oil. The effluents from the processes The Plant treates and reuses the effluents. The amount of POME is small and manageable. |
| | | | | | | | The water quality results including BOD and COD of final discharged water from the treatment pond and drainage showed acceptable and within the YCDC' starget level. Due to the water quality results, existing condition and control measures, the impact level is assumed Medium. However, it is recommended to monitor and manage the POME to ensure no impact on the soil. |
| | | | | | | | It is unlikely to discharge waste water during demolition phase. The impact level is regarded as Low. |
| Soil Contamination | - | M | L | - | M | NL | Palm Oil production releases POME effluent as by prducts. Mintenance activities can create spillage of oil, grease and fuels. Improper management of effluents and spillage can pollut the soil. The Plant treates and reuses the effluents. The amount of POME is small and manageable. Scattered vegetations were found in the treatment ponds that shows soil quality in the final treatment ponds is considerably unimpacted by the effluents. Due to the soil pH results, existing condition and control measures, the impact level is assumed Medium. However, it is |



| | | | | | | | | recommended to monitor and manage the POME to ensure no impact on the soil. The floors of ehicle garage and maintenance workshop are built with concrete. No fuel filling area exists in the plant. However, it is suggested to provide spill tray at the maintenance areas. It is unlikely to impact the soil during demolition as no chemical or |
|------------------------|---------------------------------|---|----|----|---|----|----|--|
| | | | | | | | | hazardous materials will be released. The impact level is regarded as Low. |
| | Water Consumption | | L | NA | | L | NA | The Plant uses mainly the surface water from the retaining pond for production and domestic uses. It is less likely to impact groundwater avalibility due to the production. The impact on ground subsidence is condisered as Low. |
| | | | | | | | | There will be no impact on ground subsidence during demolition. |
| | Odor | - | L | NA | - | L | NA | Production process may result odor impact. However, the plant manages the odor sources. Moreover, the production area is far from the community residents. This impact is expected to be Low. Not applicable for demolition. |
| | Bottom Sediment | - | NA | NA | - | NA | NA | The Plant is far from the surface water sources and no discharge of the solid wastes into any river. Not applicable for bottom sediment. |
| | | | | | | | | Not applicable for demolition. |
| t t | Protected Area | - | NA | NA | - | NA | NA | There is no protected area in the project area. |
| Natural Environment | Flora/Fauna and Ecosystem | | L | NA | - | L | NA | Impact of the existing ecosystem is considered to be low as the Plant itself is surrounded by approximately 6700 acres of plantation. Moreover, |



| | Topography and geology | - | L | NA | - | L | NA | small woodlands and trees are growed withing the palnt premises. These plantations provide good shelters and foods for fauna as food chains. Not applicable for demolition. Topography and geology impacts are considered to be low. |
|------------------------|---|---|----|----|---|----|----|---|
| Emergency Situation | Fire and Explosion | | L | NA | | L | NA | Fire Safety plan is developed and no fuel is stored in the plant area. Emergency response team is formed and trained. |
| onment | In voluntary Resettlement | - | NA | NA | - | NA | NA | No physical resettlement involved for the plant's processes. |
| Social Environment | Local conflict of interests | - | L | NA | - | L | NA | The plant complies with laws and relevant internal guidelines and cooperates with local authorities and community. There is no conflict of interest as the plant is owned by MEHCL and no local authorities involves in the ownership. |
| | Gender | - | L | NA | - | L | NA | The workforce is mainly locals and women workers are employed without gender discrimination. Employment conditions meets national laws and international standards. The impact is Low. |
| | Ethnic minorities and indigenous peoples | - | NA | NA | - | NA | NA | There are no indigenous people in the project area. |
| | Poor | | +H | M | | +H | L | Positive impact for operation phase. It is expected to accept and to be employed in the project's activities with high hopes for improvement in neighborhood would bring higher living standard and education status. Loss of employment is negative |



| | Living and livelihood | - | +M | L | - | +M | L | Job opportunities and business development should be considered as positive economic impact for regional or national development. It is considered to be significant positive impact for local people. |
|-------|--|---|----|----|---|----|----|---|
| | Existing social infrastructures and services | - | L | NA | - | L | NA | There is low significance impact for existing rural condition. |
| | Cultural heritage | | NA | NA | | NA | NA | There are no historical and cultural monuments located nearby the project site. |
| | Landscape | | L | NA | | +L | NA | Landscape is expected to be low impact without mitigation and becoming positive impact as the factory applies management on greening. |
| | Risks for infectious disease such as AIDS/HIV | - | L | NA | - | L | NA | Influx of people may cause negative impact on health condition of local people. The significance assigned to this impact for the operation phase is considered to be low with mitigation by knowledge and health care support. |
| | Working Conditions (including occupational safety) | - | L | М | - | L | L | The plant working hour comply with the labour laws. The plant provides residents for the staff from other regions. Workers are provided necessary PPE. The potential impact is considered as Low. |
| Other | Accident | - | M | L | - | L | L | The machines and equipment are regularly maintained and inspected. Emergency team is formed to tackle the potential emergency situation. Fire extinguishers and emergency fire water are provided in the plant compound. The potential impact, therefore, is Low. However, it is recommended to provide some training like first aid and basic fire fighting. |



| | | | | | | | Accident for decommissioning phase is expected to be low impact with proper mitigation such as providing PPE, fencing, warning sign, etc. |
|-------------------|---|---|----|---|---|----|--|
| Global Warming | - | L | NA | - | L | NA | The plant is surrounded by trees and 6700 acres plantations. The trees can reduce global warming by transpiration and managing climate change. As a small scale plant, the machines and vehicles used for the processes are manageable quantity. Due to this reason, the impact on the global warming is considered Low. |

NA: Not Applicable +: positive impact

6.4 ENVIRONMENTAL IMPACT AND MITIGATION MEASURES FOR CONSTRUCTION PHASE

Kanbauk Palm Oil Plant and its associated facilities were already built since 2003. There is no plan to construct new facilities or other infrastructure in near future. Therefore, environmental impacts and mitigation measures for construction is not applicable for this EMP report.

6.5 ENVIRONMENTAL IMPACT AND MITIGATION MEASURES FOR OPERATION PHASE

After evaluating the environment impacts of the KANBAUK CRUDE PALM OIL PLANT's existing operations, Green EHSS has identified environmental risks and prepared mitigation measures to protect the environmental and comply with Myanmar environmental legislation. Environmental impacts and mitigation measures are divided into three phases, construction phase, operation phase and decommissioning phase.

Table 6.7 gives an overview of the air emission, wastewater and solids waste generated from process activities.



Table 6.7 An Overview of the Air Emission, Wastewater and Solids Waste

| Process Activity | Air Emission | Noise | Wastewater | Solid waste and by-product |
|------------------------------------|-------------------------|-------|---------------------|----------------------------|
| Sterilisation | Steam blow down | Noise | Condensate Water | - |
| Threshing | - | 1 | - | Empty Fruit Bunch |
| Digestion | Moisture Evaporation | - | - | - |
| Screw Pressing | - | - | - | Fiber Shell |
| Clarifying CPO in Oil Purification | - | - | Wastewater | Decanter Cake |
| POME Pond | GHGs | - | Wastewater | Sludge |
| Steam Generation | Particulate Matter | - | - | Ash |
| Generator Set | Particulate Matter | Noise | - | - |

6.5.1 AIR EMISSIONS

a. Potential Impacts

Based on the baseline assessment and site survey at the Kanbauk Palm Oil plant, the consultant team identified the following sources as an air emission sources.

- Transportation (Diesel emissions)
- Sterilization of fresh fruit bunches (Boiler stack emissions)
- The POME ponds produce greenhouse gases (GHGs).
- Generators

i. Impacts of Transportation

The production of palnt is considered as small scale and seasonal. In addition, the transportation route passes through the palm plantations and far from residential area, therefore, emission from delivery trucks and other traffics during production period create minor impact on the environment and community



ii. Impacts of Sterilization of fresh fruit bunches (Boiler stack emissions)

Druring sterilization process, steam is emitted from sterilizers. The steam is basically water in gaseoue phase, therefore, except heat exposure to workers and nearby people, there is no environmental impact from sterilizers.

In order to supply the heat for sterilization, boiler is used as an energy source. The Plant utilizes by-products from the processes such as fibers and shells as fuels for the boiler. No coal or other chemical fuels is used in boiler process. Due to the reason, it can be considered that stack gas from the boiler composes less concentration of harmful fugitive pollutants. Boiler is also regularly inspected. However, due to potential emission form the process, the impact level is assumed as Medium.

iii. Greenhouse Gases (GHGs)

The rate of GHG emissions from POM can be reduced by more than 80% by installing POME biogas capturing equipment (if applicable). Increasing boilers efficiency and raising the rate of palm oil process performance could be helpful in GHG reduction.

iv. Impact from Use of Generator

The generator room is separated built with concrete and steel structures. The generators are used only during production period. The genrators are regularly maintained and inspected. The impacts form the generator can be assumed as low.



Table 6.8 Assessment of Significant level of Impact on Ambient Air Quality

| | t of Significant level of | | | | | | TI QU | |
|--|--|----------|-------------|------------------|----------|-------|-------------------|-----------------------------------|
| | | Imp | act A | ssess | men | t | | of ol |
| Project Phases and Activities | Existing Control Measures | Nature | Probability | Existing Control | Severity | Score | Significant Level | Requirement Additional Control |
| Manufacturing | | | | | | | | |
| Emission of particulate matters, dust PM _{2.5} and PM ₁₀ and gases from boiler, generators and from unpaved access roads | Regular maintenance and inspection of boiler Seperated generator room Regular water spraying at the unpaved roads, | Negative | 4 | 2 | 2 | 16 | Medium | Yes |
| Demolition | | | | | | | | |
| Emission of particulate matters and dusts from demolition of structures | • The plant is a small - scaled plant and emission of dusts are considered temporay. | Negative | 3 | 2 | 2 | 12 | Low | Yes |

6.5.1.1 MITIGATION MEASURES

The following mitigation measures can be applied to manage impacts on air quality impacts.

- Generator is equipped with air pollution control program.
- Install proper filer at the boiler.
- Ensure to conduct regular maintainance to increasing boilers efficiency.
- All the heavy equipment and machinery shall be fitted with air pollution control devices that are operating correctly.
- Ensure to do periodic maintenance of all air pollution control equipment like Cyclone, Wet scrubber.
- The rate of GHG emissions from POM can be reduced by more than 80% by installing POME biogas capturing equipment (if applicable);



- Consider biological methods of wastewater treatment, use of waste effluent for irrigation; co-composting of by-products, where appropriate (e.g., oil palm empty fruit bunches with palm oil mill effluent nutrient waste or olive mill waste residue with wastewater); and detoxification by nitrogen fixation *.
- Develop the application that 100% of the EFB that is generated is used;
- Emissions from EFB can be reduced in at least three ways: mulching, pellet production and burning;
 - Mulching consists of spreading EFB across the field, usually in a single layer. The type of mulching depends on plantations characteristics;
 - Pellet production mainly includes the conversion of EFB to uniform and solid pieces that can be used as a fuel;
 - o Burning in boilers may reduce non-CO₂ GHG emissions by 99%.
- Use of vehicles having efficient engines and exhaust system.
- More comprehensive cleaning should be carried out as often as necessary to control dust emission from loading and unloading raw materials;
- Use of mask and efficient ventilation system in factory;
- Effective water spraying will be done on the access roads to control dust during dry season (if required);
- By increasing roadside plantation, localized air pollution will be reduced due to the blocking effect of foliage through photosynthesis, and
- Plantation within project premises and around the boundary will be done.
- Ensure proper maintenance of cleaning, screening, and crushing equipment to reduce emissions of fugitive dust, and avoid the use of compressed air or steam for cleaning *.

6.5.2 ENVIRONMENTAL AND OCCUPATIONAL NOISE IMPACT

a. Potential Impacts

In terms of environmental noise pollution, the Plant is located far from residential areas as well as surrounded with dense plam oil plantation. No envieronmental noise is created from this small sacle production.

However, use of machines and noisy processes from the production can emit high level of noise at the operation areas. The potential noise impact is considered as occupational health hazard for workers working near to the noisy machines or processes.

^{*}https://www.google.com/search?q=ifc+guideline+for+crude+palm+oil+mill&oq



Following activities would result high noise exposure.

- Operation of machines and equipment
- Operation of generator
- Vehicle / traffic movement

Based on the nosie level monitoring at the potential noise sources, exceed noise levels were recorded at certain machines. Generator is placed in the enclosed room and noise exposure from the generator can be considered temporary. It is recommended to provide hearing protectors for the workers who need to enter into the generator room.

Recorded noise levels near to Polishing drum, crude oil tank and clarification tank and boiler were slightly higher than acceptable level. The occupational noise impact to the workers and staff is considered as Medium. It is recommended to inspect and conduct regular maintenance for noisy machines and equipment. Workers must be provided with proper hearing protectors and ensure to wear the protectors. It is suggested to install silencer at the noisy machine if applicable.

Table 6.9 Assessment of Significant level of Impact on Ambient Air Quality

| | | Imp | act A | Ssess | men | ıt | | of ol |
|------------------------------------|--|----------|-------------|------------------|----------|-------|-------------------|-----------------------------------|
| Project Phases and Activities | Existing Control Measures | Nature | Probability | Existing Control | Severity | Score | Significant Level | Requirement Additional Control |
| Manufacturing | | | | | | | | |
| Use of noisy machine and equipment | In termes of environmental noise, the Plant is located away from the residential areas. So as for occupational nose hazard, the workers are provided with hearing protectors for working near to the noisy machine. | Negative | 2 | 3 | 4 | 16 | Medium | Yes |



| | Only authorized person(s) are allowed at the operation areas. | | | | | | | |
|---|---|----------|---|---|---|----|-----|-----|
| Demolition | | | | | | | | |
| Noise emission can occur during demolition of structures. | • The noise exposure will be temporary and short period. | Negative | 3 | 2 | 2 | 12 | Low | Yes |

6.5.2.1 MITIGATION MEASURES FOR OCCUPATIONAL NOISE IMPACTS

Mitigation measures for noise will include

- Regular maintenance is practiced for plant machinery and equipment,
- Proper maintenance of generator and engineered noise controls;
- All preventive measures such as regular operation and maintenance of pumps, motors, and compressor should be carried out,
- Monitor the noise level at the processing areas as per the monitoring schedules,
- Installation of noise enclosure or silenser at the noise sources, and
- Provision of hearing protectors such as earplugs, ear mufflers.

6.5.3 IMPACT ON WATER QUALITY DUE TO EFFLUENTS

a. Potential Impacts

Surface water body is Dawei River and located at approximately 6.30 kms east of the plant. It is unlikely to cause an impact on Tawei river, the nearest surface water body from the production activities of Kanbauk Palm Oil plant due to zero discharge of effluent from the plant to the river.

Oil extraction, washing, and cleaning processes of palm oil production generate liquid waste (palm oil mill effluent - POME). In the oil extraction process, three major operations generate the bulk of POME:

- Sterilizing fresh fruit bunches
- Clarifying extracted crude palm oil: pressing station, separation, clarification
- EFB pressing



The effluents from the process can impact on underground water quality by accumulating high concentration of BOD, COD and suspended solids in a long term. The Plant discharges small quantity of POME from the process. The water quality including BOD and COD of final discharged water from the waste water pond and drainage water showed acceptable and lie within the YCDC's target concentrations.

The leakage of sludge is unlikely as a concrete sludge pit is provided. The accumulated effluents in the final treatment ponds were mainly dried in dry season. During rainy season, the water levels in the ponds were raised due to rain water accumulation. The Plant reuses the water in the ponds by watering water from the final ponds to the surrounding trees and vegetations.

The effluent is treated and reused via biological pond systems. For these reasons, the impact level on the underground water quality is assumed Medium. It is recommended to monitor the underground water quality regularly.

6.5.3.1 MITIGATION MEASURES

The following mitigation measures are recommended for potential impacts on underground water quality.

- Ensure to keep the acceptable level of sludge in the pit to prevent oberflow or leakage from the pit.
- Conduct regular inspection and maintenance of effluent transporting pipes.
- Test and monitor regularly effuent quality from the final pond.
- Monitor water quality before discharge it to the public water course.
- If the final discharged water quality is unacceptable, review and upgrade the treatement system.
- Leakage and spills of engine oils and greases from the maintenance activities must be cleaned immediately.
- Provide a secondary tray at the maintenance workshop.



Table 6.10 Assessment of Significant level of Impact on Water Quality

| | lent of Significant leve | | | Assess | | | Jo | | | | |
|---|--|----------|-------------|------------------|----------|-------|-------------------|-------------------|-------------------|-------------------|-------------------------------------|
| Project Phases and Activities | Existing Control Measures | Nature | Probability | Existing Control | Severity | Score | Significant Level | Significant Level | Significant Level | Significant Level | Requirement o Additional Control |
| Manufacturing | | | | | | | | | | | |
| Effluent POME from the production of palm oil | Proper drainage system is provided. Treatment system is provided. | Negative | 4 | 2 | 4 | 32 | | | | | |
| Spillage of diesel and chemicals on the land that can cause underground water contamination in a long run | Spillage are cleared immediately. Vehicle garage floor is concrete. | Negative | 3 | 2 | 2 | 12 | | | | | |
| Demolition | | | | | | | | | | | |
| It is less likely to discharge wastewater from demolition. | • The plant will ensure to remove or treate all sludge and effluents before demolition | Negative | 2 | 2 | 2 | 8 | Low | Yes | | | |

6.5.4 IMPACTS FROM WASTES

6.5.4.1 NON-HAZARDOUS SOLID WASTES

a. Potential Impacts

In general, all wastes from the palm industry are termed as Palm Oil Plant Wastes (POMW). Palm oil production is characterised by the generation of substantial number of by-products innucluding empty fruit bunch (EFB), palm oil Plant sludge (POMS), palm kernel cake (PKC), fibre and shells from processing.

Solid wastes generation from the following production processes.



a) Threshing - Empty Fruit Bunch (EFB)

b) Oil extraction - kernels fibres, shells

c) Clarifying CPO - palm cake and the sludge

d) Burning in boilers - ash

Kanbauk Plam Oil pant reuses and sells the by products based on loacal demands. Empty Fruit bunches(EFB) are disposed in the landfill area. When large quantity of EFBs accumulates at the lanfill pond, EFTs are burned to collect the ash that is reused as fertilizers for the plantation.

Kernels fibres and broken shells are reused as fules for the boiler. No large quantity of fibres and shell wastes are formed.

The sludge is pumped to the sludge pit from where the sludge is recollected by heating system to collect usable oils. Leftover unusable sludge is transported to the treatement ponds to discharge as final treated water.

Palm ckae is sold to outside local businesses to use as organic fertilizers. In line with site survey and collected information, Kanbauk Palm Oil plant's solid wastes management plan is acceptable and the impacts form the solid wastes is considered Medium.

Small quantity of domestic wastes from office activities are discharged as a small scale plant. It is recommended to monitor the quantity of wastes to control overaccumulations in and around the plant areas.

6.5.4.2 MITIGATION MEASURES FOR NON-HAZARDOUS SOLID WASTES

- To conisder to use EFBs as fules for the boiler.
- Use dried EFB as covering material to protect the soil against erosion, for improvement of moisture retention in the soil surface and as a nutrient.
- EFB can be sold to local farmers for using as a substrate for cultivation and other business such as the production of particleboard.
- Domestic waste should be disposed in bins and segregated by types of waste;.
- Sufficient waste bins for domestic waste will be provided within the plant premises.
- Kernels fibres and broken shells are reused as fules for the boiler.



- Palm ckae is sold to outside local businesses to use as organic fertilizers.
- Sludge is recollected by heating system to collect usable oils.
- Boiler ash can be disposed to farmers for their use as soil conditioner in land.
- Ashes are also reused for road renovation.
- Reduce product losses through better production/storage control (e.g., monitor and adjust air humidity to prevent product losses caused by the formation of molds on edible materials*).
- Return waste and residues to fields to assist in soil nutrient management; for example, EFBs from oil palm plantations with tree trimmings are a valuable soil amendment and/or can be composted with vegetable oil wastewater effluent*.
- Use waste and residues for energy generation in the project plant's boiler(s) *.

Table 6.11 Assessment of Significant level of Impact from Solid Wastes

| | | Impact Assessment | | | | | | of ol |
|--|---|-------------------|-------------|------------------|----------|-------|-------------------|-----------------------------------|
| Project Phases and Activities | Existing Control Measures | Nature | Probability | Existing Control | Severity | Score | Significant Level | Requirement Additional Control |
| Manufacturing | | | | | | | | |
| Solid wastes from the processing activities and unused by products | All remnant organic solid wastes are reused as fuels for boilers and heat generation source. Ashes are reused for road renovation. | Negative | 3 | 2 | | | | |

 $^{*: \ \}underline{https://www.google.com/search?q=ifc+guideline+for+crude+palm+oil+mill\&oq}\\$



| Sludge waste from waste water treatment system | The accumulated sludge wastes are reused in the local agricultural farms Ashes and filter cake are reused in the factory's farms and community farms. | Negative | 3 | 2 | | | | |
|---|--|----------|---|---|---|---|-----|-----|
| Demolition | | | | | | | | |
| In general, solid wastes from demolition activies are reusable. | The plant will reuse or recyle the wastes such as timbers, woods, metals and steel structures. Unusable wastes will be disposed at the designated landfill or by external waste collectors. | Negative | 2 | 2 | 2 | 8 | Low | Yes |

6.5.4.3 HAZARDOUS WASTE

a. Potential Impacts

Main raw materieals for production of Kanbauk Oil Palm plant are palm oil fruits and kernels. The steps of production processes utilize water, heat and organic by-products for boiler fuels through machines and equipment. NO chemical material is used in the processes. In terms of hazardous wastes, only spillage and oil, grease and diesel wastes. The maintenance areas and production are provided with concrete floor. Potential spillage and oil, grease, lubricants, oily cloths, oil filters and fuel wastes discharged are considerably small amount. The total office workforce is only 20 and a few numbers of office related hazardous wastes such as used battries and cartridges are disposed. The impact form hazardous wastes of the plant, therefore, is regarded as Low.



6.5.4.4 MITIGATION MEASURES FOR HAZARDOUS WASTE

- Immediate clean of spillage and leakage of oil, grease, lubricants and fuels.
- Direct or indirect reuse/recycling of used oil and empty container;
- Keeping hazardous waste container with clearly marked at isolated storage area.
- Provide secured storage unit for hazardous wastes before disposal.
- Spill control equipment should be kept in the assigned hazardous waste storage areas.
- Train all employees to identify, reduce and properly handle wastes.
- Dispose at only hazardous waste landfill area if applicable.

Table 6.12 Assessment of Significant level of Impact from Hazardous Wastes

| | | Imp | act A | ct Assessment | | | | of of |
|---|---|----------|-------------|------------------|----------|-------|-------------------|-----------------------------------|
| Project Phases and Activities | Existing Control Measures | Nature | Probability | Existing Control | Severity | Score | Significant Level | Requirement Additional Control |
| Manufacturing | | | | | | | | |
| Spillage of diesel and chemicals on the land that can cause underground water contamination | Spillage are cleared immediately. Vehicle garage floor is concrete. | Negative | 3 | 2 | 2 | 12 | | |
| Demolition | | | | | | | | |
| Only small amount of spillage of oil, grease and fules can be released. | The plant will ensure to clean or dry the spillage immediately. Spillage try will be provided at fuel fiiling areas. | Negative | 2 | 2 | 2 | 8 | Low | Yes |



6.5.5 OCCUPATIONAL HEALTH & SAFETY HAZARDS

Kanabauk Palm Oil plant is a small scale producer and total workforce is only 37 including 17 daily wage workers.

The surrounding areas of the plant are covered with trees and plantations as a buffer zone between the Plant and nearby residential areas. In terms of community health and safety, the production processes do not use hazardous chemicals as well as the residental areas are considerably far from the Plant to have direct health and safety impacts such as noise pollution, air emission, odor emission and degradation of surface water quality.

Plant Manager oversees and ensure the production processes to control or mitigate the potential occupational health and safety hazards and associated risks. The relevant Managers and Supervisors closely manage the workers to perform the assigned tasks safely and healthy.

Workers are trained to handle the machine and equipment properly.

The plant management including the Plant Manager conducts regular environmental, health and safety inspections within the plant to maintain and improve environmental, health and safety performances.

Occupational Health and Safety issues that may be specifically associated with the palm oil manufacturing include the following:

- Physical hazards
- Exposure to dust and biological hazards
- Exposure to vapors and steams
- Exposure to heat from boiler use
- Exposure to noise

d. Physical Hazards

The most common risks for accidents in the plant are trips and falls caused by slippery floors, stairs, and elevated platforms, manual handling, lifting and carrying the heavy items, the incorrect use of equipment, contact with pinch point of machines, accidents involving fruits and kenel delivery conveyor and explosions (boilers).



e. Ergonomic Hazards

Lifting, carrying, and manual handling of heavy items and repetitive works can expose ergonomic hazards during manufacturing.

f. Dust and Biological Hazards

Workers are exposed to dust (including biological and microbiological agents) during packing processes.

g. Noise

Noise may result from a variety of sources such as generators and noisy machines.

h. Electrical Hazards

Use of faulty or damaged electrical devices and ground fault can create a serious risk to workers. Overhead wires can also be struck by overhead lifting machines or ladder.

Table 6.13 Assessment of Significant Occupational Health and Safety Risks

| | • | Imp | act A | Ssess | men | ıt | | of ol |
|---|--|----------|-------------|------------------|----------|-------|-------------------|-----------------------------------|
| Project Phases and Activities | Existing Control Measures | Nature | Probability | Existing Control | Severity | Score | Significant Level | Requirement Additional Control |
| Manufacturing | | | | | | | | |
| Manufacturing activities can expose minor to major occupational health and safety hazards such as physical, electrical, chemical, biological, ergonomic, occupational health, vehicular movements, airborne pollutants, extreme temperature such as cold or heat. | Relevant workers are trained to educate occupational health and safety. Warning signage are provided around the project area Sufficient control measures are provided. | Negative | 2 | 2 | 4 | 16 | Medium | |



| Emergency situations such as fire, explosion, and collapse of structure and malfunction of processing machine and pipeline | Processing activities are automatically managed by control penal. Trained operators are assigned at the processing areas. Operators watch and inspect regularly the processing panels | Negative | 2 | 2 | 4 | 16 | Medium | |
|---|---|----------|---|---|---|----|--------|-----|
| Movement of the plant vehicles delivery vehicles and private vehicles | Speed limit signage are installed. Ensure that all vehicle drivers are properly trained and licensed. | Negative | 2 | 2 | 4 | 16 | Medium | Yes |
| Demolition | | | | | | | | |
| During demolition, workers can face safety hazards related to manual handling and carrying heavy materials, working at height and use of electrical and hand tools. | Provision of proper PPE. Use of mechanical aids to carry and handle heavy materials. Use of trained and competent workers for demolition activities. | Negative | 2 | 2 | 4 | 16 | Low | Yes |

6.5.5.1 CONTROL MEASURES FOR OCCUPATIONAL HELATH & SAFETY HAZARDS

- Responsible workers and operators should be educated and trained about the potential occupational health and safety hazards and effective control measures to minimise and control associated with the operation activities.
- The emergency response team including trained fire fighters and first aiders should be formed and emergency response plan should be prepared.
- The emergency response team with contact numbers should be displayed at site.



- Relevant Supervisors, Site Safety and Health personnel should conduct OHS inspection and consult potential OHS hazards to the workers involved.
- All workers should be provided with proper Personal Protective Equipment.
- Prepare Risk Assessments for all high-risk activities and communicate the risk assessments to the workers involved.
- Clear and understandable warning signage should be displayed accordingly.
- All chemicals must be labelled. The workers must be educated about potential hazards and risks associated with handling of chemicals.
- Incompatible chemicals must be stored separately.
- Regular inspection of all electrical cords, cables, and hand power tools and earth.
- On-site fire drill should be conducted at least once per year.

6.5.6 COMMUNITY HEALTH AND SAFETY HAZARDS

The surrounding areas of the plant are covered with trees and plantations as a buffer zone between the Plant and nearby residential areas. In terms of community health and safety, the production processes do not use hazardous chemicals as well as the residental areas are considerably far from the Plant to have direct health and safety impacts such as noise pollution, air emission, odor emission and degradation of surface water quality.

a. Community Water Quality

There is zero effeluent discharge to the surface water from the Kanbauk Palm Oil plant. It is considered low impacts to the community surface water quality. The final treated effluent is reused to water the surrounding trees and the remaining organic solid wastes are reused as fertilizers.

It is recommended to monitor the discharged water quality and quantity. It is ensuring to meet BOD and COD concentration from discharged water with the applicable national standards.



b. Community Water Consumption

The Plant uses stored water from the retaining ponds and plant own tube well for production. It is unlikely to cause significant impacts on the consumption of community water.

c. Traffic Accident

The plant processes involve delivery of raw materials and final products on the plant and public roads. Traffic safety along the delivery routes should be planned including assessment of potential hazards and risks and appropriate control measures should be implemented to prevent road traffic accident.

d. Fire Hazards

The plant is surrounded with wide areas of plantations and located far from the residential areas. The plant reuses the by products as fules for the boiler and no coals and other combustable fules are used. There is no fuel storage in the plant. The Plant Manangent team conducts regular safety, health and fire inspection within gha around the plant areas. Fire fighting appliances and fire safety measures are provided. The fire hazards on the community is assumed low. It is recommended to ensure to conduct regular fire drill and inspection on fire fighting appliances.

e. Silo Safety

- Avoid heat sources from friction by adopting appropriate practices or technologies*.
- Provide proper grounding and lightning protection for silos following internationally recognized standards *.
- Control access to areas with a high risk of explosion, e.g., limit access to qualified personnel only *.
- Establish a suitable extinguishing operation (e.g., water, foam, inert gas, powder) based on the silo construction and bulk material stored *.

^{*} Environmental, Health, And Safety Guidelines for Vegetable Oil Production and Processing, IFC, Feb 2015.



Table 6.14 Assessment of Significant Community Health and Safety Risks

| | iit of Significant Comi | | | Assess | | | | of _ |
|--|---|----------|-------------|------------------|----------|-------|-------------------|-----------------------------------|
| Project Phases and Activities | Existing Control Measures | Nature | Probability | Existing Control | Severity | Score | Significant Level | Requirement Additional Control |
| Manufacturing | | | | | | | | |
| Impact on community water quality from the processes | Process water is treated before discharged. Final effluent is reused to water the surrounding trees and plantation Only small quantity of effluent is discharged due to small production. | Negative | 3 | 2 | 2 | 16 | Medium | |
| Water consumption for the production | Plant uses stored water from the retaining ponds and own tube well for small scale production. | Negative | 2 | 2 | 2 | 8 | Low | Yes |
| Delivery of raw materials and final products on the plant and public roads | All truck drivers are trained and licensed. Speed limit is controlled. | Negative | 2 | 2 | 2 | 16 | Medium | |

6.5.6.1 CONTROL MEASURES FOR COMMUNITY HEALTH AND SAFETY HAZARDS

- 1. Ensure to monitor final discharge water quality before release.
- 2. Develop extra pnd to divert the overflow effluent during heavy rain or unforseable situation.



- 3. Monitor and test the underground water quality as per monitoring plan.
- 4. All delivery truck and vehicles should be regularly inspected and maintained.
- 5. Potential hazards and risks associated with delivery routes should be identified and communicated with drivers.
- 6. Apply Cleaning-in-Place (CIP) procedures to help reduce chemical, water, and energy consumption in cleaning operations *.

(* Environmental, Health, And Safety Guidelines for Vegetable Oil Production and Processing, IFC, Feb 2015.)

6.5.7 TRAFFIC INCREASING AND CONGESTION

Kanbauk Palm Oil plant is located near to Kanbauk-Kalainaung road. The plant uses Kanbauk –Kalainaung road as a mian transportation route.

The delivery trucks mainly pass in the rural areas with palm oil plantations. No traffic congestion on the delivery routes as public uses of the roads of delivery routes are considerably less. As a small scale and seasonal palm oil procedure, the transportations used for raw materials and final products deliveries are considerably less impacts on existing public traffics.

6.5.7.1 MITIGATION MEASURES FOR TRAFFIC CONGESTION

- Control speed limit and provide traffic signage in and around the plant area.
- Be sure that trucks and other vehicles are in good working order.
- Follow the established truck routes in the community.
- Driver behaviour, awareness and training should be undertaken.

6.5.8 EMERGENCY SITUATION

The plant's management will ensure to prevent any potential emergency situation such as fire and explosion during the operation and decoomssion phases.

In consideration of the explosion, the production processes do not use hazardous chemicals as well as store any explosive materials and fuel. In terms of fire hazards, the sufficient numbers of fire extingusihers are provided. The emergency response team is formed with trained fire fighter and first aiders.



Table 6.15 Assessment of Potential Health and Safety Impacts during Emergency Situation

| | Situation | | act A | Assess | men | ıt | | of |
|--|--|----------|-------------|------------------|----------|-------|-------------------|---|
| Project Phases and Activities | Existing Control Measures | Nature | Probability | Existing Control | Severity | Score | Significant Level | Requirement Additional Control |
| Construction | | | | | | | | |
| Emergency situations such as fire, explosion, and collapse of structure and malfunction of heavy vehicles during construction phase. | All machine and heavy vehicles are operated by trained operator. No on-site fuels and explosive storages. | Negative | 2 | 2 | 4 | 16 | Medium | Regular Inspection and close Supervision |
| Manufacturing | | | | | | | | |
| Emergency situations such as fire, explosion, and collapse of structure and malfunction of processing machine and pipeline | Processing activities are automatically managed by control penal. Trained operators are assigned at the processing areas. Operators watch and inspect regularly the processing panels No explosive materials and fuels are stored in the plant compound. Sufficient numbers of fire extinguishers and emergency response team is formed. | Negative | 2 | 2 | 4 | 16 | Medium | Regular Inspection and close Supervision |
| Demolition | | | | | | | | |



| machines and pipelines | Sufficient numbers of fireextingusihers will | | | | | |
|------------------------|--|----------|--|--|----|---|
| | be provided near the demolition areas. Only comptent technicians will be allowed to deconstruct the electrical wire and | Negative | | | ow | Regular Inspection and close Supervision |

6.6 ENVIRONMENTAL IMPACT AND MITIGATION MEASURES FOR DECOMMISSIONING PHASE

6.6.1 AIR EMISSIONS

Negative impact on ambient air quality such as dust particles emissions could be expected due to demolition works during the decommission phase of the plant after the lifespan of the project. This nuisance will be temporary in nature and is not expected to affect the surrounding environment since the plant is located far from the residential areas as well as a small-scaled plant with few infrestructures.

6.6.2 ENVIRONMENTAL NOISE IMPACT

Temporary noise barriers and occupational preventive measure should be applied in this phase. Workers employing in high noise areas should be provided with hearing protective wear such as earplugs, earmuffs.

6.6.3 WATER ENVIRONMENT

It is unlikely to affect the surface water and underground water quality due to decommission palse of the Kanbauk plant.

6.6.4 SOLID WASTE

During demolition, mainly reusable wastes such as timber wastes, steel structures amd metal wastes will be created. These wastes can be sold to outside buyers. Unusable wastes like concretes or other structures will be disposed by external waste collectors.



6.6.5 IMPACT ON SOIL

It is less likely to cause significant impact on the soil due to demolition activities. It is, however, ensure to use spill tray and be available spill kits whenever handling of oils and greases.

6.6.6 OCCUPATIONAL AND COMMUNITY HEALTH AND SAFETY

During decommissioning phase of the plant, it is unlikely to casue significant community health and safety risks due to the location of the plant and small -scaled infrastructures within the plant.

In terms of occupational health and safety risks, the workers may be exposed hazards related to electrical, physical, ergonomic, chemical, mechanical and vehicle movements. Personal protective equipment (PPE) such as safety harness for working at height, safety gloves, helmet, goggles, earmuffs, etc. should be provided. Trained and competent workers should be used for demolition activities. Close supervision must be provided.

6.6.7 EMERGENCY SITUATION

In the phase of the decommission, the Plant's management will ensure to manage the contractor's team to prevent any emergency sitiation such as fire or explosion. In general, the plant's existing infrastructures will be reused as appropriate. In addition, there is no explosive fuels and chemicals storage in the plant during decommissioning phase.

It is crucial to ensure to cut all electricity within the remining infrastructures after decommission. If any demolition activities involve in the decommission, only the competent electrician will be allowed to deconstruct the electrical wiring and associated systems to prevent any electrical shock and fire hazard.

6.6.8 SOCIAL ENVIRONMENT

Loss of jobs of the employees may occur during decommissioning phase and it may reduce by taking responsibility on gradual reducing or transferring of work force.



7. STAKEHOLDER ENGAGEMENTS AND INFORMATION DISCLOSURE

The aim of the public consultation is to ensure that all stakeholders interested in a proposed project (including project beneficiaries and the general public in the vicinity of the proposed project) be identified and their opinion considered during project planning, design, construction, operation, and decommission phase.

Public consultation and information disclosure ensure that communities and stakeholders are part and parcel of the proposed developments and in so doing assure the sustainable use of resources. Public consultations form a useful component for gathering, understanding and establishing likely impacts of projects determining community and individual preferences and selecting alternatives.

Green EHSS has organized meetings with the representatives from Kanbauk CPOP. The objectives of the meeting was to collect up-to-date and precise information on the project activities. The outcome of the meeting will help in the assessment of the anticipated impacts.

Kanbauk CPOP is situated in near to Gan Gaw Taung, Kan Bauk village, Ye Phyu Township, Dawei Region, Thanithary Division. Green EHSS and Kanbauk CPOP had conducted stakeholder engagement with local residents near the plant to inform the local administration on the project, to collect the views, and to obtain the input into the impact and mitigation measures to be included in the EMPs.



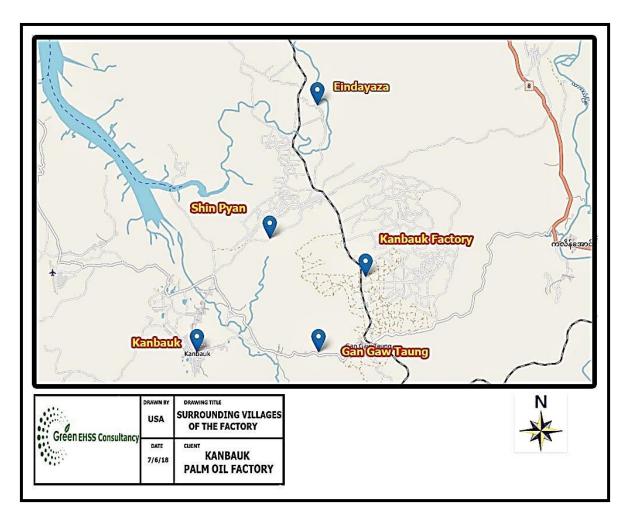


Figure 7.1 Surrounding Villages of the Project Site

7.1 METHODOLOGY

The public consultations for the project were conducted at the time of EMP study and will take actions continuously.

The public consultations for the project were conducted simultaneously with the field work targeting the various groups of stakeholders. The consultations were conducted through use of questionnaire, interviews and public meetings. The consultants developed several formats of questionnaires to target the various groups of stakeholders which included the community members, the local administration and departmental heads.

Kanbauk CPOP will conduct simultaneously public consultation before the project development and during the operation period of the factory. The factory also supportand implement the requirements of the local people.



7.2 ENGAGEMENT TECHNIQUES

Kanbauk CPOP has implemented a comprehensive range of engagement activities using varied techniques to ensure that the project effectively involves stakeholders. The using techniques for aforementioned discussions, meetings and survey are showed in following table.

Table 7.1 Engagement Methods and Techniques

| Tuble 7.1 | Engagement Methods and Techniques |
|-----------------------|---|
| Engagement Technique | Description |
| | |
| Company address, | Kanbauk CPOP provides factory location. |
| Factory address, | This is relevant tactics in easily way of accessibility for |
| | all kinds of stakeholders. |
| | |
| Hot line number | Kanbauk CPOP operates a hot line number which is |
| | available during business hours. |
| | |
| Pamphlet | Kanbauk CPOP has produced pamphlet available in |
| 1 0.11.p.1.100 | community meetings for general information related |
| | with plant activities, environmental management, safety |
| | and community development. |
| | and continuity development. |
| Face to face meetings | Kanbauk CPOP engages directly with a range of |
| | stakeholders as required. |
| | • |
| Questionnaires and | Kanbauk CPOP conducted opinion survey in the vicinity |
| surveys | of the plant location, to evaluate the effectiveness of |
| | engagement mechanisms and gain an understanding of |
| | community perception, interests and issues. |
| | |
| Public Meetings | Kanbauk CPOP has conducted public meeting to |
| | generate more in-depth information around issues and |
| | concerns raised by stakeholders. These were giving |
| | stakeholders an opportunity to directly obtain |
| | information and ask questions concerned with the |
| | project. |
| Grievance Mechanism | Kanbauk CPOP has developed the Grievance |
| | Mechanism to address any concerns raised by |
| | government agencies or any member of the public. The |
| | grievance process will also ensure all complaints from |
| | |



| timely | manner, | with | corrective | actions | being |
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| informe | ed of the ou | tcome. | | | |

7.3 CONSULTATION PROCESS

Key issues and concerns were identified through:

• Discussions with Kanbauk CPOP Authority Persons

Discussions and information sharing with Ethanol Plant throughout the EMP process.

Face to face meeting

Key informant interviews were conducted with Village Administrators from two villages. One of the strategies was to collect the perceptions of village authority persons.

Socio-Economic and Opinion Surveys

Detailed socio economic, and opinion surveys were also conducted during June 2019.

Public Meeting

Public Consultations was conducted in June 2019.

7.3.1 FACE TO FACE MEETING

In June 2019, two face to face meetings were conducted.

- 1) Face to face meeting with Representative of Kanbauk Village.
- 2) Face to face meeting with Eindayaza Village Administrator.

They were informed of the Project activities and face to face meetings were conducted for the commencement of baseline studies and household survey. The key stakeholders were informed of the project activities, environmental management, safety and community development. Face to face meetings were conducted by GREEN EHSS social consultant.





Figure 7.2 Discussion with Representative of Kanbauk Village



Figure 7.3 Discussion with Eindayaza Village Administrator



7.3.2 SOCIO-ECONOMIC AND OPINION SURVEY

The purpose of the socio economic and opinion questionnaire was to collect general socio economic and opinion information in this area and to obtain opinions and understanding of the activities of the factory in Ye Phyu Township.

The household interviews were conducted inform of **socio-economic survey** through the use of predefined questionnaires targeting the PAP. The interviewers targeted the general public residing in the vicinity of the Kanbauk CPOP (Figure 7.4, 7.5, 7.6).

During June 2019, household surveys were conducted in three villages as follows:

- 1) Socio-economic surveys in Eindayaza Village were conducted by Green EHSS consultants. During June 2019, socio-economic surveys were conducted with 9 respondents. The household leaders were consulted with the objective of understanding the existing socio-economic conditions of the area of influence and the immediate surroundings of the project. Data collected during the survey included data on the particulars of the community members and their opinion on the project.
- 2) Socio-economic surveys in **Gan Gaw Taung Village** were conducted by Green EHSS consultants. During June 2019, socio-economic surveys were conducted with 10 respondents. The household leaders were consulted with the objective of understanding the existing socio-economic conditions of the area of influence and the immediate surroundings of the project. Data collected during the survey included data on the particulars of the community members and their opinion on the project.
- 3) Socio-economic surveys in **Shin Pyan Village** were conducted by Green EHSS consultants. During June 2019, Socio-economic surveys were conducted with 7 respondents. The household leaders were consulted with the objective of understanding the existing socio-economic conditions of the area of influence and the immediate surroundings of the project. Data collected during the survey included data on the particulars of the community members and their opinion on the project.





Figure 7.4 Socio-Economic Surveys in Eindayaza Village







Figure 7.5 Socio-Economic Surveys in Gan Gaw Taung Village





Figure 7.6 Socio-Economic Surveys in Shin Pyan Village



7.3.3 PUBLIC CONSULTATIONS

On 7th June 2019, public consultation and participation was conducted by Green EHSS Social consultants. with representatives of Kanbauk Crude Palm Oil Plant. It was held at Briefing Hall, Kanbauk Crude Palm Oil Plant with 47 attendees (25 attendees from the surrounding villages of Kanbauk Village, Gan Gaw Taung Village, Eindayaza Village, Phayar Me Village, Mechaung Ai and Shin Pyan Village and 22 employees from Kanbauk Crude Palm Oil Plant including Factory Manager, Dy. Manager). Public meeting conducted to collect the ideas and opinions of village leaders, village elders, local residents and factory employees with questionnaires to give their perceptions and the potential impacts in order to influence project design, implementation and follow-up.

In an open-ended question, the respondents were asked to identify the negative and positive impacts they expect this project to have on the local community. Moreover, respondents were given an opportunity at the end of the questionnaire to provide any additional comments they wanted recorded.



Figure 7.7 Photo of Meeting Hall of Kanbauk Factory



Table 7.2 List of Participants from Surrounding Villages to the Meeting

မြန်မာ့စီးပွားရေးဦးပိုင်အများနှင့်သက်ဆိုင်သောကုမ္ပဏီလီမိတက် ကံပေါက်ဆီအုန်းစက်ရုံ

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Table 7.3 List of Participants from Kanbauk Factory to the Meeting

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ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်(EMP)ရေးဆွဲရေးအတွက်ဆွေးနွေးပွဲသို့တက်ရောက်သများစာရင်း

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Figure 7.8 Photos of Stakeholder Meeting at Meeting Hall of Kanbauk Factory

7.4 COMMENTS AND SUGGESTIONS FROM THE PUBLIC CONSULTATIONS AND SOCIO-ECONOMIC SURVEY

Consultation with communities affected by the project as well as one by one meeting with local government and ward leaders, socio-economic survey and stakeholder meeting highlighted the important issues. Several of these are issues directly related to the plant activities and facilities during operation.

Public consultation and socio-economic survey were conducted with 63 respondents in total. The views are presented as issues requiring clarification, the anticipated benefits of the project, its negative impacts and proposed recommendations to abate the negative impacts or enhance the project benefits.

In an open-ended question, the respondents were asked to identify the negative and positive impacts they expect this project to have on the local community. They were also asked to indicate if they expected the impact to occur during the operation phase of the project. Respondents were also given an opportunity at the end of the questionnaire to provide any additional comments they wanted recorded.

The results of public consultation and socio-economic survey show that respondents were positive on the project for the operation of Kanbauk Factory. 14 attendees provided no comments on the operation of the factory. The views are presented in a tabular form (Table 7.4).



Table 7.4 Types of Issues raised by Local Residents (N= 63)

| | Tuble 7.11 Types of issues | J | | | | |
|----|---|--------------------|-----------------------------|----------------------|-------------------------|-------------------------|
| No | Questions | Kanbauk Village | Gan Gaw Taung Village | Eindayaza Village | Phayar Me Village | Shin Pyan Village |
| 1 | To prepare for the occupational health and safety. | | | | | J |
| 2 | To appoint enough employees. | | | J | | |
| 3 | To increase the employee salary. | J | | | | |
| 4 | To inform the village administrator about job opportunity | | | V | | |
| 5 | To control the air and water pollution. | J | | | | |
| 6 | To manage waste properly. | | J | | | |
| 7 | To promote CSR activities. | J | | renovation of road | | |
| 8 | To support health and illness. | | J | J | | |

7.5 RESPONSES AND IMPLEMENTATION ACTION FOR COMMENTS

During the discussion process the issues raised are reviewed, and actions for resolution are agreed by the parties. Some issues were agreed at the time of consultation meeting. Responses and action plan from the Kanbauk Factory are shown in Table 7.5.



Table 7.5 Responses of the Factory for the Comment and Suggestion Received

မြန်မာ့စီးပွားရေးဦးပိုင်အများနှင့်သက်ဆိုင်သောကုမ္ပဏီလီဗိတက် ကံပေါက်ဆီအုန်းစက်ရုံအနေဖြင့် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်(E.M.P) ရေးဆွဲပေးသည့် GREEN EHSS Consultancy Co.LTD မှ ကိုယ်စားလှယ်များသည် စက်ရုံပတ်ဝန်းကျင်ကျေးရွာများမှ ပြည်သူများနှင့် တွေ့ဆုံဆွေးနွေးချက်အပေါ်အကြံပြုချက်များနှင့်ပတ်သက်၍ရှင်းလင်းတင်ပြခြင်း

| •දි | အကြံပြုချက်များ | ရှင်းလင်းချက် | | |
|-------------|--|---|--|--|
| IIC | အလုပ်သမားများ/ဘေးအန္တရာယ် ကင်းရှင်းစေချင် | ကံပေါက်ဆီအုန်းစက်ရုံတွင် အလုပ်သမားများဘေးအန္တရာယ်ကင်းရှင်းရေးအ တွက် လုပ်ငန်းခွင် အန္တရာယ်ကင်းရှင်းရေးဆွေးနွေးဟောပြောမှုများ ပြုလုပ် ပေးပါသည်။ လုပ်ငန်းခွင်အတွင်း လုပ်ငန်းဆောင်ရွက်နေသော အလုပ်သမား များအားလည်း ကြီးကြပ်သင်ပြမှုများ ပြုလုပ်ဆောင်ရွက်ပေးပါသည်။ လုပ်ငန်းခွင် အန္တရာယ်ကင်းရှင်းရေးသည် ပထမ၊ မီးသတိပြု၊ ဆေးလိပ်မ သောက်ရ စသည့် သတိပေးကြေငြာဆိုင်းဘုတ်များလည်း မြင်သာသည့်နေရာ များတွင် ချိတ်ဆွဲကပ်ပေးထားပါသည်။ ဝန်ထမ်းများနှင့် နေ့စားလုပ်သား များအား လုပ်ငန်းခွင် အတွင်း ဖိုင်ဘာဦးထုပ်၊ Face Mask ၊ လက်အိတ်များ | | |
| J" | အလုပ်သမားဦးရေလုံလောက်စွာ ထားပေးစေချင် | ကံပေါက်ဆီအုန်းစက်ရုံတွင်ဝန်ထမ်း(၂၀)ဦးရှိပြီးကုန်ထုတ်လုပ်ငန်းများဆောင် ရွက်ရာတွင် လွယ်ကူချောမွေ့စေရေးအတွက် နေ့စားလုပ်သား (၁၇)ဦး ဖြည့် တင်းထားရှိပေးထားသောကြောင့် အလုပ်သမားဦးရေ လုံလောက်မှုရှိပါသည်။ | | |
| S II | ဝန်ထမ်းလစာတိုးမြှင့်ပေးစေချင် | စီမံကိန်းနှင့်ဘဏ္ဍာရေးဝန်ကြီးဌာန၊ ပြည်ထောင်စုဝန်ကြီးရုံး၏ ၂၉.၄.၂၀၁၈ ရက်စွဲပါအမိန့်ကြေငြာစာအမှတ်၊ ၃၀/၂၀၁၈ အရ နိုင်ငံဝန်ထမ်းများ၏ မူရင်း လစာနှုန်းထားများကို အရာထမ်းများအား (၁၀%)၊ အမှုထမ်းများအား (၂၀%) | | |

J

| စဉ် | အကြံပြုချက်များ ရှင်းလင်းချက် | |
|-----|--|---|
| ŞII | ဝန်ထမ်းလိုအပ်လျှင်အုပ်ချုပ်ရေးမှူးမှ တဆင့် ကြောင်းကြားရန် | သို့တိုးမြှင့်ခွင့်ပြုခဲ့သည်ဖြစ်ရာမြန်မာ့စီးပွားရေးဦးပိုင်အများနှင့်သက်ဆိုင်သော ကုမ္ပဏီလီမိတက်တွင်တာဝန်ထမ်းဆောင်လျှက်ရှိသော ဝန်ထမ်းများကိုလည်း ၂၀၁၈ ခုနှစ် ဧပြီလမှစ၍ လစာနှုန်းထားတိုးမြှင့်ပေးခဲ့ပြီးဖြစ်ပါသည်။ နေ့စား လုပ်သားများ အတွက် (၁)ရက် လုပ်ခနှုန်း (၃၆၀၀)ကျပ်မှ ပြည်ထောင်စု မြန်မာနိုင်ငံတော်အစိုးရ၊ အနည်းဆုံးအကြေးငွေသတ်မှတ်ရေးဆိုင်ရာအမျိုး သားကော်မတီ၏ ၁၄.၅.၂၀၁၈ ရက်နေ့အမိန့်ကြေငြာစာအမှတ် ၂/၂၀၁၈ အရ (၁)ရက်လုပ်ခနှုန်း ထား (၄၈၀၀)ကျပ်သို့ ပြောင်းလဲသတ်မှတ်ပေးခဲ့သဖြင့် စက်ရုံရှိ နေ့စား လုပ်သားများကိုလည်း ၂၀၁၈ ခုနှစ် မေလမှစ၍ လုပ်ခ တိုးမြှင့် ပေးခဲ့ပြီး ဖြစ်ပါသည်။ ဝန်ထမ်းလိုအပ်ချက်ရှိပါက စက်ရုံပတ်ဝန်းကျင်ရှိ ကျေးရွာများ၏ အုပ်ချုပ်ရေး မှူးများသို့ အကြောင်းကြားပေးပါမည်။ စက်ရုံတွင်လည်း ပတ်ဝန်းကျင်ကျေး ရွာများဖြစ်သော အိန္ဒရာဇာကျေးရွာ၊ ဂန့်ဂေါ်တောင်ကျေးရွာများရှိ ဒေသခံ များကို ဝန်ထမ်းများ၊ နေ့စားလုပ်သားများအဖြစ် ခန့်အပ်တာဝန်ပေးထားပါ သည်။ စက်ရုံတွင် ဝန်ထမ်းလိုအပ်လာလျှင် ကျေးရွာများမှ ဝန်ထမ်းအဖြစ် လုပ်ကိုင်လိုသူများရှိပါက စက်ရုံသို့ လာရောက် လျှောက်ထားနိုင်ပြီး ဦးပိုင် ရုံးချုပ်သို့ ဆက်လက်တင်ပြပေးသွားမည်ဖြစ်ပါ သည်။ |



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| ∙දි | အကြံပြုချက်များ | ရှင်းလင်းချက် |
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| 9" | ရေထု၊ လေထု ညစ်ညမ်းမှုမရှိစေချင် | စက်ရုံ၏ မြောက်ဘက်တွင် စက်လည်ပတ်မှုနှင့် ဝန်ထမ်းများ ရေသုံးစွဲရန်အ တွက် ရေထိန်းတမံတည်ဆောက်ထားပါသည်။ ရေထိန်းတမံသည် နွေရာသီ တွင် ရေခန်းခြောက်ပြီး မိုးရာသီမှသာ ရေရှိပါသည်။ ရေထိန်းတမံသည် ရေ အမြင့်(၁၁)ပေအထိ ရေထိန်းထားနိုင်ပါသည်။ ဆီကြိတ်ရာမှ ထွက်ရှိလာသော ဆီအနယ်များကို မော်တာပန့်ဖြင့်စက်ရုံခြံစည်းရိုးအပြင်ဘက်ရှိ (မြေကြီးကန်) (၁၀၀ ပေ × ၆၀ ပေ × ၁၄ ပေအနက်) ထဲသို့ ပို့ပါသည်။ ၎င်းမြေကြီးကန်တွင် ရေနှင့်အနယ်များလာပါက ဘေးတွင်ရှိသောမြေကြီးကန် (၁၀၀ ပေ × ၆၀ ပေ × ၁၄ ပေအနက်) ထဲသို့ ရောက်ရှိအောင်ဆောင်ရွက်ထားပါသည်။ ၎င်း ရေနှင့် အနယ်များ အခြားနေရာများသို့ မရောက်ရှိသဖြင့် ရေထုညစ်ညမ်းမှု မရှိ အောင် ပြုလုပ်ထားပါသည်။ စက်ရုံအတွင်းသုံးစွဲသော ရေများသည် ရေမြောင်းများမှတဆင့် စက်ရုံခြံစည်းရိုး အပြင်ဘက်ရှိ မြေကြီးကန်ထဲ ရောက်ရှိပါသည်။ ၎င်းမြေကြီးကန်တွင် ရေများ လာပါက ရေစုပ်စက်ဖြင့် စုပ်ထုတ်၍ အနီးရှိ ဆီအုန်းပင်များအား ရေပက်ဖြန်းပေးသဖြင့် ရေထု ညစ်ညမ်းမှုမရှိအောင် ဆောင်ရွက်ထားရှိပါသည်။ စက်ရုံ၏ ပေါင်းအိုးထဲတွင် ဆီသီးတွဲများပေါင်းရန် ရေနွေးငွေ့ထုတ်ပေးသည့် ဘွိုင်လာသည် Fibre နှင့် Shell ခွံတို့ဖြင့် မီးထိုးသည့်အတွက် မီးခိုးခေါင်းတိုင် မှ မီးခိုးထွက်ရှိပါသည်။ စီးခိုးခေါင်းတိုင်မှထွက်ရှိသော မီးခိုးများသည် စက်ရုံ ဘေးပတ်လည်ရှိဆီအုန်းပင်များ၊ နှစ်ရှည်ပင်များ၊ အလေ့ကျပေါက်သည့်အပင် များမှ စုပ်ယူသည့်အတွက် လေထုညစ်ညမ်းမှုလျော့နည်းပပျောက်စေပါသည်။ |

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| စဉ် | အကြံပြုချက်များ | ရှင်းလင်းချက် | | |
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| | | ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ရေးဆွဲသည့်ကုမ္ပဏီမှလေထုနှင့်ပတ်သက်၍ တိုင်းတာသည့်ပညာရှင်များ၏ အကြံပြုနည်းလမ်းများအတိုင်း လေထု သန့်စင်အောင် စီမံဆောင်ရွက်သွားမည်ဖြစ်ပါသည်။ | | |
| GII | စွန့်ပစ်ပစ္စည်းစနစ်တကျစွန့်ပစ်ရန် | ဆီအုန်းခြံ မြေဧရိယာထဲရှိ ဆီသီးခိုင်စွန့်ပစ်ရန်ပြုလုပ်ထားသော မြေကွက် လပ်နေရာသို့ ဆီသီးခိုင်အလွတ်များအား မော်တော်ယာဉ်ဖြင့် တနစ်တကျ စွန့်ပစ်လျှက်ရှိပါသည်။ ဆီကြိတ်ရာမှထွက်ရှိသော ဆီအနယ် (Sludge)များ ကိုလည်း မော်တာပန့်ဖြင့်ပိုက်လိုင်းမှတဆင့် စက်ရုံခြံစည်းရိုးအပြင်ဘက်ရှိ (မြေကြီးကန်) (၁၀၀ ပေ × ၆၀ ပေ × ၁၄ ပေအနက်) ထဲသို့ ပို့ပါသည်။ | | |
| ?II | CSR အတွက် ပိုမိုကူညီပေးစေချင် | ၎င်းမြေကြီးကန်မှ ရေနှင့် အနယ်များလာပါက ဘေးတွင်ရှိသော မြေကြီးကန် (၁၀၀ ပေ × ၆၀ ပေ × ၁၄ ပေအနက်)ထဲသို့ ရောက်ရှိစေပါသည်။ EMP အစီရင်ခံစာတွင်ပါရှိသော စွန့်ပစ်ပစ္စည်း စီမံခန့်ခွဲမှု အစီအစဉ်အတိုင်း စနစ် တကျ စီမံခန့်ခွဲပါမည်။ ၂၀၁၇–၂၀၁၈ ခုနှစ်တွင် စက်ရုံပတ်ဝန်းကျင်ရှိ ဘုရားမဲကျေးရွာ ဘုန်းကြီး ကျောင်းသို့ တစ်လလျှင်(၄၀၀၀၀)ကျပ်နှုန်းဖြင့် တစ်နှစ်လျှင် (၄၈၀၀၀၀)ကျပ် လှူဒါန်းခဲ့ပါသည်။ ဂန့်ဂေါ်တောင်ဘုန်းကြီးကျောင်း၏ ပရဟိတ ဝေယျာဝစ္စ အတွက် ၂၀၁၈–၂၀၁၉ ခုနှစ်တွင် တစ်လ (၄၀၀၀၀)ကျပ်နှုန်းဖြင့် တစ်နှစ်လျှင် (၄၈၀၀၀၀)ကျပ် လှူဒါန်းပေးခဲ့ပါသည်။ ကလိန်အောင်–ကံပေါက်ကားလမ်းမှ | | |



9

| øᢓ | စဉ် အကြံပြုချက်များ ရှင်းလင်းချက် | |
|----|-----------------------------------|--|
| | | စက်ရုံသို့လာသောလမ်းတစ်လျှောက် လမ်းခင်းခြင်းလုပ်ငန်းအား ဆောင်ရွက် လျှက်ရှိပါသည်။ ဂန့်ဂေါ်တောင် နှစ်ကျိတ်ရှစ်ဆူ ဘုရားပွဲလှည့်လည်ရာတွင် လည်း အလှူငွေများ ထည့်ဝင်လှူဒါန်းပေးပါသည်။ ယခုအခါ CSR အတွက် ကူညီပံ့ပိုးမှုများ ဆက်လက်ဆောင်ရွက်သွားမည်ဖြစ်ပါသည်။ |
| ଗା | ကျန်းမာရေးကူညီပေးစေချင် | စက်ရုံရှိဝန်ထမ်းများ၊ နေ့စားလုပ်သားများ ကျန်းမာရေးမကောင်းပါက ကံပေါက်ဆေးရုံ၊ ဆေးခန်းများသို့ ဆေးကုသမှုခံယူရန် ဆောင် ရွက်ပေးပြီး ဆေးကုသစရိတ်ကူညီပေးခဲ့ပါသည်။ကျန်းမာရေးမကောင်းသူများတွေ့ရှိပါက ကျန်းမာရေးစောင့်ရှောက်မှုများ ဆောင်ရွက်ပေးသွားမည် ဖြစ်ပါ သည်။ |
| | | |
| | | |

7.6 FUTURE PLAN FOR STAKEHOLDER ENGAGEMENT

Stakeholder consultations and disclosure prior to project implementation and throughout project execution period are recommended.

Kanbauk CPOP provides an opportunity to all the stakeholders and communities in the surrounding area as well as all employees to raise issues and concerns pertaining to the factory.

The ongoing consultation process will handle through five mechanisms as follows:

- a) Neighbouring community/stakeholders can directly inform their perception to the Factory Office.
- b) They can give their suggestions to the factory through the village administration office.
- c) Kanbauk CPOP will continue to engage the relevant government departments annually for receiving required permit and license.



- d) Conduct discussions with village leaders both informally through phone conversation and formally through face to face meetings whenever necessary.
- e) ဌာနဆိုင်ရာ အဖွဲ့အစည်းများ၊ အစိုးရမဟုတ်သော အဖွဲ့အစည်းများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း၊ သတင်း အချက်အလက်ထုတ်ပြန်ခြင်း အစီအစဥ်တို့ကို မြန်မာ့စီးပွားရေး ဦးပိုင်(ဥက္ကဌ) ထံတင်ပြပြီး ခွင့်ပြုချက် ရရှိမှု ပေါ်မူတည်၍ ဆောင်ရွက်သွားပါမည်။

The required contact information from both sides of Kanbauk CPOP as well as community contacts had been already disclosure.

7.7 CSR ACTIVITIES AND BUDGET

The Kanbauk Palm Oil factory has contributed both financially and providing other supports in the social activities such as cash and material donations, assisting in road renovation and religious ceremonies. (Figure 7.9, 7.10).

In order to raise the CSR budget continually, the factory management has planned potential fundraising activities such as transportation and palm leave roofs manufacturing.

စီမံကိန်းလုပ်ငန်းကြောင့် ထိခိုက်ခံစားရသည့် ဒေသခံပြည်သူတို့ အတွက် ဒေသဖွံ့ဖြိုးရေး ဆောင်ရွက် ပေးမည့် အစီအစဥ်နှင့် အသုံးပြုမည့် ရန်ပုံငွေလျာထားချက်ကို မြန်မာ့စီးပွားရေးဦးပိုင် (ဥက္ကဋ္ဌ) ထံတင်ပြပြီး ခွင့်ပြုချက် ရရှိမှု ပေါ်မူတည်၍ ဆောင်ရွက်သွားပါမည်။







Figure 7.9. Donation of Palm Leaves for the roofs and bamboo sticks for the floor



Figure 7.10. Assisting in Village's road renovation



8. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

Based on the scoping of the plant operations, potential impact specific to the plant operation phase is regarded as POME and FFB solid waste. The Plant discharges small quantity of POME from the process. The leakage of sludge is unlikely as a concrete sludge pit is provided. The water quality including BOD and COD of final discharged water from the wastewater pond and drainage water showed acceptable. Palm oil production is characterised by the generation of substantial number of by-products innucluding empty fruit bunch (EFB), palm oil Plant sludge (POMS), palm kernel cake (PKC), fibre and shells from processing. These wastes may cause pollution if the the factory can't practise correct utilities. In terms of environmental noise pollution, the plant is located far from residential areas as well as surrounded with dense plam oil plantation. However, use of machines and noisy processes from the production can emit high level of noise at the operation areas. With timely and proper implementation of this EMP and application of appropriate mitigation measures, the potential impacts can be prevented or minimised.

Potential irreversible social impact may not arise because villages are far from the factory and there are only plantations within 2 km radius of the factory. There may be no nuisance or health effect and safety hazards to human. The social outcomes of the factory are expected to be positive by creating employment opportunity. Table 5.6 provides summary of environmental risks related to the operation phase of the project.

The environmental management practices, procedures and responsibilities are defined herein to get full compliance with the existing environmental policy, laws, rules and regulations of the Republic of the Union of Myanmar. The main sections in this Environmental Management Plan (EMP) are as follows:

- 1) Environmental Mitigation Plan
- 2) Summary of Environmental and Social Management Plan
- 3) Occupational Health and Safety Plan
- 4) Emergency Response Plan
- 5) Monitoring Plan



8.1 OBJECTIVES OF ENVIRONMENTAL MANAGEMENT PLAN

Key objectives of the EMP are as follows:

- To ensure continuing compliance with legal requirement and government policies;
- To provide the initial mechanism for ensuring measures identified in this study to mitigate potentially adverse impacts are implemented;
- To provide a framework for mitigating impacts during project execution;
- To provide assurance to regulators and stakeholders that their requirements with respect to HSE performance will be met;
- To undertake monitoring to demonstrate that predictions made within this EMP are valid; and
- To provide a framework for the compliance with auditing inspection programs.

8.2 DESCRIPTION OF RESPONSIBILITIES AND AUTHORITIES FOR IMPLEMENTATION

Top Management of Kanbauk Palm Oil Plant is responsibile for implementing environmental management and monitoring plan during operation periods.

Managers, Supervisor are responsible to ensure to manage and control potential environmental impacts, occupational health and safety risks and potential accident. Emergency Response Team (ERT) is ensure to response any accident and emergency situation effectively and proficiently. All workers have responsibility to assist the management in managing potential environmental impacts, occupational health and safety risks and potential accident.



Table 8.1 Emergency Response Team (ERT)

| စဉ် | အမည် | ရာထူး | Position |
|-----|----------------------|------------------------|-----------------|
| ၁ | <u></u> ဦးသန်းဌေး | စက်ရုံမှူး | Incharge |
| J | | လက်ထောက်စက်ရုံမှူး | Deputy Incharge |
| 5 | ဦးစောရဲအောင် | အလုပ်ရုံစုမ <u>ှူး</u> | Member |
| 9 | ဦးဟန်စိုး | အလုပ်ရုံစုမ <u>ှူး</u> | Member |
| 9 | ဒေါ် အေးအေးသက် | စာရင်းကိုင် (၁) | Member |
| G | වේ ට්ට්ටෙදා | ကျမ်းကျင်အဆင့်(၃) | Member |
| િ | ဦးမင်းကိုကို | ကျမ်းကျင်အဆင့်(၄) | Member |
| ေ | ဒေါ် နော်ကပေါထူး | ကျမ်းကျင်အဆင့်(၄) | Member |
| ၉ | ဦးစောလင်းထိန်သူ | ကျမ်းကျင်အဆင့်(၄) | Member |
| 20 | ဦးကျော်စိုး | ကျမ်းကျင်အဆင့်(၄) | Member |
| ၁၁ | ဦးကျော်ထွန်း | ကျွမ်းကျင်အဆင့်(၅) | Member |
| ၁၂ | ဦးစောကလိုစူး | ကျွမ်းကျင်အဆင့်(၅) | Member |
| ၁၃ | ဦးမင်းဘိုဘိုထွဋ် | ကျွမ်းကျင်အဆင့်(၅) | Member |
| ၁၄ | ဦးမြင့်အောင် | ကျွမ်းကျင်အဆင့်(၅) | Member |

The team members shall have knowledge of or can be trained in responding to emergencies such as emergency plan, firefighting, precautions.

The **ERT** should be on call in case of safety problem that occurs during off-hours/ or Security shall contact the Township Fire Department immediately.



I. <u>Environmental Management Team (EMT)</u>

EMT team is formed with the following memebrs.

Table 8.2 Environmental Management Team

| စဉ် | အမည် | ရာထူး | Position | Education | Contact |
|-----|-----------------|--------------------|-----------------|-----------|-------------|
| ၁ | ဦးသန်းဌေး | စက်ရုံမှူး | Incharge | B.E(E.C) | 098612182 |
| J | ဦးမျိုးမြင့် | လက်ထောက်စက်ရုံမှူး | Deputy Incharge | AGTI (MP) | 09768076531 |
| 5 | ဦးစောရဲအောင် | အလုပ်ရုံစုမှူး | Member | B.Sc | 09340106323 |
| 9 | ဦးဟန်စိုး | အလုပ်ရုံစုမှူး | Member | B.Sc | 09310040482 |
| 9 | <u> </u> | ကျွမ်းကျင်အဆင့်(၃) | Member | B.Sc | 09310040482 |
| G | ဦးစောလင်းထိန်သူ | ကျွမ်းကျင်အဆင့်(၄) | Member | B.Sc | 0932550609 |
| ૧ | ဦးပဏ္ဏစိုး | ကျွမ်းကျင်အဆင့်(၅) | Member | B.A | 09340080832 |
| ၈ | ဦးမြင့်အောင် | ကျမ်းကျင်အဆင့်(၅) | Member | B.A | 09406870053 |

The responsibilities of **EMT** are to ensure to control and mitigate potential impacts from the manufacturing. Incharge and Deputy Incharge are responsible to review and recommend the environmental control procedures. The EMT team members will inspect and supervise the environmental performances of the workers.

The Top Management of the factory will engage the third- party consultant firm for environmental monitoring activities and tests.

II. Roles and Responsibilities for Environmental Management Team

Table 8.3 Roles and Responsibilities of Environmental Management Team

| POSITION | RESPONSIBILITIES | CONTACT DETAILS |
|-----------------|---|--------------------|
| Factory Manager | Play the leading role in handling General Grievances. Responsible for strategic oversight of grievance management. Ensure full commitment and cooperation with third parties. | |



| Line Manager | Authority to ensure that commitments to affected communities are met, and clear reporting lines must be established between senior management and those implementing the grievance mechanism. Resolve complaints. | |
|---|--|--|
| Community Liaison Officers | Administering the grievance mechanism (recording complaints, arranging for collection of additional information, consulting relevant departments or persons within the organization, tracking progress, aggregating and forwarding feedback to complainants, reporting). Facilitate the grievance process and also to provide information/clarification to the local community. | |
| Trained Staff | To serve as an entry point to receive and log complaints. | |
| Village administrators/ representatives | Village representatives from relevant village such as Kanbauk Village, Eindayaza Village, Gan Gaw Taung Village, Shin Pyan Village, Phayar Me Village Serve as process organizers, places to bring a complaint to be passed on to the company/factory. Support increase the level of trust from communities. Assist as facilitators, witnesses and advisors. | |



8.3 BUDGET ALLOCATION FOR MANAGEMENT PLAN

The Factory is in operation phase when this EMP report was prepared. Thus, the estimated budget was more emphasized for the operation phase. The budget in environmental management and monitoring program is estimated to be 10,000,000 kyats (kyat 100 lakhs) for operation phase. But the factory management should consider about contingency plans, if the reporting shows certain failures of environmental monitoring program.

The management of the Kanbauk Oil Plam factory ensures that if the Factory has insufficient funds to carry out the proposed environmental management plans, the management of the factory will increase the effencieny of budget supports to achieve the environmental management goals.

8.4 ENVIRONMENTAL MANAGEMENT PLAN FOR THE OPERATION PHASE

During the operational phase anticipated environmental impacts are grouped into three major areas listed below.

- Emissions to air
- Wastewater
- Solid waste

Therefore this EMP will mainly focus on providing mitigation measures of the three impacts listed above. The three sections are the most important when managing the glass manufacturing environment of the operational phase of Kyaukse Glass Factory.

Based on information on the project operation and knowledge of the project area, impacts of project operation have been identified in Chapter 5. Environmental issues associated with the operational phase primarily include the following issues:

- 1) Air and Dust Emission Reduction
- 2) Palm Oil Plant Waste
- 3) Palm Oil Plant Effluent
- 4) Occupational Health and Safety
- 5) Emergency Response Plan



8.4.1 ENVIRONMENTAL MANAGEMENT PLAN FOR AIR AND DUST EMISSION REDUCTION

Kanbauk Palm Oil plant is a small- scaled producer and the plume from the boiler may generate air pollutants if there is lack of proper management plan. The following table defined the appropriate management plans for potential air emission impacts from the boiler.

Table 8.4 Environmental Management Plan for Boiler Stack Emission Reduction

| Key Indicator | Description | Recommended mitigation measure | Time Frame | Responsible Person |
|------------------------|--------------------------------|--|-------------------------------------|-----------------------|
| Boiler Maintenance | Improve boiler efficiency | Routine boiler maintenance is done to minimizing emission. Regular inspection is done by the township Boiler Inspection Department. | The whole operation period | EMT |
| Boiler Ash | Reducing PM emission | Continual ash removal is done to ensure optimum performance and reduce ash entrainment like PM emission. | The whole operation period | EMT |
| Boiler Tube | Promoting boiler efficiency | • The boiler tubes are clean pneumatically. The pneumatic tube cleaning helps to minimize the soot build-up on the heat exchange surfaces of the boiler and therefore helps to maintain the optimum boiler efficiency. | The whole operation period | EMT |
| Training | Giving training for boiler man | • The factory provides the boiler operator adequate operator training to compromise boiler availability, emission and efficiency. | The whole operation period | EMT |
| PM Filter | Reducing PM emission | Installation of particulate filters to reduce emission of boiler stack Regular cleaning of filters | The whole operation period | EMT |
| Emergency Situation | Unacceptable emission | Inspect the root cause and redesign the stack accordingly Provide proper control measures for stack emission | The whole operation period | EMT |



8.4.2 ENVIRONMENTAL MANAGEMENT PLAN FOR EFFLUENT

During operation, semi-liquid wastes such as POME sludges are generated. In additions, other sources such as sterilization, wash off water from cleaning activities and cooling process of boiler can carry pollutants. In Table 8.5 the environmental management plan for the effluents were stated.

Table 8.5 Environmental Management Plan for Effluent

| Key Indicator | Description | Recommended mitigation measure | Time Frame | Responsible Person |
|-------------------------------------|---|--|-------------------------------------|-----------------------------|
| Steriliser condensate | Easy to separate oil. | Condensate should be separated from other wastewater. | The whole operation period | Production |
| Washing and cleaning water | Reducing water consumption | Water should be minimised.Detergent usage should be minimised. | The whole operation period | Production EMT |
| Cooling water from boiler | Reducing equipment damage. Reducing oil loss through leakage and accident. | Water should be collected for washing and cleaning with routine collection. | The whole operation period | Utility EMT |
| POME effluent | Reducing high COD and BOD values. | Waste water treatment plant is provided to treat effluent from the process. Ensure to apply efficient treatment methods in the treatment process. | The whole operation period | Project Proponent EMT |
| Emergency Situation | Unacceptable effuluent quality | Inspect the root cause and redesign the treatment ponds accordingly Provide proper control measures for effuluent | The whole operation period | EMT |



8.4.3 ENVIRONMENTAL MANAGEMENT PLAN FOR GENERATED WASTES

Waste management is necessary to carry out during transportation, storage, handling and processing of raw materials and final products and disposal of by-products. Table 8.6 specified the effective management plans for generated wastes.

Table 8.6 Environmental Management Plan for Palm Oil Plant Waste Reduction

| Key Indicator | Description | Recommended mitigation measure | Time Frame | Responsible Person |
|--------------------------------------|---|--|---------------------|-----------------------|
| Use of FFB | Identification of improvement opportunities within the process. | Monitor the amount of FFB being used and to estimate and plan crude oil production. | Operation period | Purchasing |
| FFB Quality | FFB quality represents the utilisation of good and consistent quality FFB for palm oil production. Easy to extract and provide better quality. | Raw material should be processed within 24 hrs. Amount of ripe FFB and unripe FFB. | Operation period | Purchasing |
| Improve eco- efficiency | Identification of improvement opportunities within the process. Through material balancing flow, oil loss within the production process could be identified including where the loss is occurring. | Materials flows need to be established and employed in order to understand the inputs and outputs of the production process. More efficient use of materials, resources and energy. | Operation period | Production EMT |
| EFB recycle /Share of EFB Sold | EFB is typically used for plantation such as mushroom cultivation (biomass fuel). Saleable EFB represents the utilisation of EFB as value-added byproduct. | Evaluate the efficiency of EFB utilisation internally. Estimate the volume of EFB being disposed offsite or used by plantation. EFB is transported back to the plantation for using as fertilizer. | Operation period | Utility EMT |



| Total Generation of Shell | Shell is typically by product of palm oil Plant. The generation of shell indicates overall proportion of shell generated from FFB being used in production process. | Evaluate the efficiency of shell utilisation as by-product for recycling/selling. | Operation period | Production |
|------------------------------------|---|---|---------------------------------|-------------------|
| Generation of Fibre | Fibre is typically by product of palm oil Plant. The generation of fibre indicates overall proportion of fibre generated from FFB being used in production process. | Evaluate the amount of fibre generated by the process. | Operation period Monthly | Production |
| Oil Loss in Fibre | Oil loss or gained in fibre represents or reflects the efficiency of separator system. | Control the pressure during screw pressing to get maximum oil from fibre. Vibrating screen should be in good condition Improve or correct production performance. | Operation period Daily, Monthly | Production EMT |
| Fibre recycle /Share of Fibre Sold | Excess fibre is typically generated during peak production periods. Due to an increase demand of biomass fuel, this excess amount can be sold. Saleable fibre indicates the utilisation of fibre as value-added by-product. Fibre is typically used as biomass fuel for boiler to produce steam to be used in the production process. | Evaluate the efficiency of fibre utilisation as by-product for recycling/selling. Evaluate the efficiency of fibre utilisation internally within a month (Amount of Fibre Used as Biomass Fuel (Internal). Realise the efficiency of fibre utilisation as biomass fuel at boiler daily (Amount of Fibre Used at Boiler). Develop optimum boiler design (Steam generation per the use of fibre reflects on optimum boiler design and operation and is important for energy efficiency of the palm oil Plant.). Estimate the volume of fibre being disposed offsite or given to others (Amount of Fibre being Disposed Offsite) | Operation period Monthly | Utility EMT |



8.4.4 MANAGEMENT PLAN FOR COMMUNITY AND OCCUPATIONAL HEALTH AND SAFETY

8.4.4.1 MANAGEMENT ROLES AND RESPONSIBILITIES

Kanabauk Palm Oil plant is a small scale producer and total workforce is only 37 including 17 daily wage workers.

The surrounding areas of the plant are covered with trees and plantations as a buffer zone between the Plant and nearby residential areas. In terms of community health and safety, the production processes do not use hazardous chemicals as well as the residental areas are considerably far from the Plant to have direct health and safety impacts such as noise pollution, air emission, odor emission and degradation of surface water quality.

Plant Manager oversees and ensure the production processes to control or mitigate the potential occupational health and safety hazards and associated risks. The relevant Managers and Supervisors closely manage the workers to perform the assigned tasks safely and healthy.

Workers are trained to handle the machine and equipment properly.

The plant management including the Plant Manager conducts regular environmental, health and safety inspections within the plant to maintain and improve environmental, health and safety performances.

8.4.4.2 EMERGENCY RESPONSE PLAN

In order to response potential accidents and emergency situation within the plant premises and nearby areas, the Plant forms an Emergency Response Team. The team memebrs are provided basic fire fighting training.

Energency fire water and fire extinguisher are provided within the factory. (Figure 8.1)

The team members shall have knowledge of or can be trained in responding to emergencies such as emergency plan, firefighting, precautions.

The **ERT** should be on call in case of safety problem that occurs during off-hours/ or Security shall contact the Township Fire Department immediately.



Table 8.7 Responsibilities of ERT

| Incident Controller | Commands and control the ERT to response to an |
|--------------------------|---|
| | emergency. Communicates with authorities eg. Police/Township Fire Department in the event of an emergency. Ensure emergency plan are reviewed regularly and ERT are appropriately trained and equipped to carry out their assigned task. Crowd control and monitor overall headcount at the Assembly Area. Initiate drill exercises and post exercise review with ERT |
| Dy- Incident | on an annual basis.Conduct head count of all staff, consultants and workers. |
| Controller | Conduct head count of all staff, consultants and workers.Consolidate the headcount list from wardens. |
| | Report evacuation status such as any missing person to the IC . |
| Member- Fire Fighters | To be trained in firefighting, and assist in firefighting at no personal risk. |
| Member- Wardens | Area combing, to ensure all staff and workers leave the workplace promptly during an evacuation. |
| | Direct staff and workers to the Assembly Area. |
| | Conduct headcount for their workers at the Assembly Area. |
| Member- | Successfully completed first aid training. To render first |
| First Aiders | aid to any injured during any emergency. |
| | Standby at the Assembly Area with first aid kit during a mass evacuation. |





Figure 8.1 Fire Extinguishers In and Around the Plant

8.5 TRAINING, AWARENESS AND COMPETENCY

Assistant Plant Manager will identify potential environmental, occupational health and safety risks and impacts associated with the production processes and implement training needs for the staff.

A training need is to be developed for each position to ensure all personnel receive appropriate training to enable them to competently perform their role.

Individual roles directly associated with significant safety and health risks and environmental impact will be reviewed by respective Manager and training needs identified. Plant Manager is responsible for providing necessary resources for training. The following training should be included in the training list.

- Environmental Monitoring Plan
- First Aiders and Basic Fire Fighting Training
- Basic Safety and Health Training
- In –House trade training



Table 8.8 General Training Program

| No. | Topic of Training | Frequency | Responsibility Party |
|-----|---|-------------------------|------------------------------------|
| 1 | Firefighting Training | Annually | Township Fire Departmt |
| 2 | First Aider Training | Once per Three Yearr | Towhship Red Cross Organization |
| 3 | Awareness Training for Personal Hygiene | As and When necessary | HSE Representative |
| 4 | Training for Handling Hazardous Material | As Required | Supervisor |
| 5 | Training for Electricital Handling and Safety | Quarterly | EMT Member/Electrician |
| 6 | Capacity Building Training | As Required | Supervisor |

8.6 EMERGENCY AND DISESTER PREPAREDNESS PLAN

Myanmar is prone to various natural hazards that include earthquakes, floods, cyclones, droughts, fires, tsunamis, some of which have the potential to impact large numbers of people.

Kanbauk Palm Oil Plant has planned, designed and constructed with fixed firefighting installations systematically. The Plant prepares an Emergency Response Plan in order to prevent consequences of fire, floods and earthquakes and collapse of building.

8.6.1 FIRE PREVENTION PLANS

Kanbauk Palm Oil Plant installs the Firefighting System and Equipment as follows:

Firefighting System and Equipment

- 1) Installation of fire extinguishers.
- 2) Fire alarm system is installed in the factory building as well as office rooms and staff housing.
- 3) Assembly point for emergency situation within the plant premise with clear marking.
- 4) Display access to emergency services.
- 5) Warning signs are displayed at strategic locations in the plant.



Emergency Contact List

Emergency Contact List consisting contact nos. of authorities, hospital, clinic, ERT personnel shall be prepared and displayed at the factory. The list shall be reviewed at least once a year or as and when there is change in personnel or change in contact number.

The contact no. for local authorities below shall be included in the list:

- Township Fire Department fires, explosions, spills, ambulance, structure collapse
- Police local emergencies, life threatening situation
- Nearest Hospital medical emergencies
- Local clinic or on-site doctor/nurse medical emergencies

Drills

The plant will develop annual fire drill and ensure all levels of staff participate in the drill. During a drill, workers and managers should leave the building, go to an assigned location (assembly area) and remain there until a signal is given to return to the plant. The following exercise shall be conducted at least once a year for the ERT or otherwise state:

• Fire drill

Training Program for Emergency Response Plan

Table 8.9 Training Program for Emergency Response Plan

| | Topic of Training | Frequency | Responsibility Party |
|-----|------------------------|-------------|------------------------|
| No. | | - , | |
| | Firefighting Training | Annually | Township Fire Departmt |
| 1 | | , | 1 |
| | First Aider Training | Once per | Towhship Red Cross |
| 2 | | Three Yearr | Organization |
| | | | 0 |
| | Awareness Training for | As and | HSE Representative |
| 3 | Personal Hygiene | When | |
| | | necessary | |
| | Training for Handling | As Required | Supervisor |
| 4 | Hazardous Material | _ | _ |





Figure 8.2 Warning Signage in and Around the Factory



8.7 EMPLOYEE WELFARE PLAN

Kanbauk Palm Oil provides social welfare sysems to the workers including social security, medical costs for sickness, acommodations and allowable leaves due to the Ministry of Labour's Acts and Regulations.

8.8 ENVIRONMENTAL MANAGEMENT PLAN AND BUDGET FOR DECOMMISSIONS PHASE

As a small- scaled plant that located within the dense plam oil plantations, it is unlikely to cause significant environmental impacts due to decommission activities. However, it is crucial to ensure to manage potential impacts during this phase.

The budget in environmental management and monitoring program is estimated to be **4,000,000 kyats** for operation phase.

The management of the Kanbauk Oil Plam factory ensures that if the Factory has insufficient funds to carry out the proposed environmental management plans for the decommission phase, the management of the factory will increase the effencieny of budget supports to achieve the environmental management goals.

Certain potential impacts may be

- Demolishing wastes, electrical cables, electronic device waste generation
- Noise generation from demolishing works
- Traffic movements from demolition.



Table 8.10 Environmental and Social Management Plan for Decommissioned Phase

| 1 | | Phase | I | Т |
|--|--|--|--|--|
| Environ- mental & Social Aspect | Impact | Actions on prevention | Time Frame | Responsible Person |
| Natural Envi | ronment | | , | <u> </u> |
| Air/ Dust | Chronic respiratory disease and eye complication | All vehicles used are inspected and done regular maintenance. Restriction of transport speed on roads. Installation of temporary cover. Set up dust barriers at strategic locations: Dust nets will be provided around the demolition area. Practice dust management techniques, including watering down dust. Provide PPE against dust (i.e. mask) | Through- out decommi- ssioning phase | Contractor Site Engineer technician |
| Noise | Long/short term noise nuisance and hearing loss | Schedule noisy activities during day time period. Ensure machinery is well maintained to reduce noise generating. Switching off installations and equipment when they are not used. Minimization of work during evening/night time. Provide PPE such as noise defenders, ear plugs and ear muffs to the workers in high noise area. | Through- out decommi- ssioning phase | Contractor Site Engineer technician |
| Water Environment Pollution | Contamination of surface and underground water sources | Ensure sewage system is functional during demolition to prevent pollution of nearby underground and surface water sources. Proper demolition of the sewage system to prevent pollution by contents into the environment and ground water. Ensure to collect and test the surface water from the nearby creeks, dikes, ponds and underground water from the tubewell quality | Through- out decommi- ssioning phase | Contractor Site Engineer technician Third party Labotary for water quality tests |
| Waste | | | | |



| Solid Waste | Pollution of water, air and soil | Enforce segregation of waste at the source to encourage reuse and recycling. To store waste temporary in containers, in case of large dimension it is possible to store wastes with waterproof cover. Disposal of solid waste in compliance with local government policy Usable infrastructures will be hand over to the township authorities for future community use. | Through- out decommi- ssioning phase | Contractor Site Engineer technician |
|---------------------------------------|---|---|--|--|
| Social Enviro | | | | |
| Interaction with Public | Safety | Informing of public on demolition process | Throughout decommissioning phase | Contractor Site Engineer |
| Health and S | afety | | | |
| Occupation al Health and Safety | Incidents and accidents leading to serious injury or fatalities | Placing at the site of information and warning signs and fences. Ensure provision of appropriate PPE for staff such as earmuffs for ear protection, helmets for head protection, dust masks for dust protection for all project works, goggles with good visibility for eye protection, overalls and dust coats to protect the skin, safety shoes for protection of the feet, gloves of different types according to specific works in relation to: puncture resistance; sharps resistance; cut resistance; flexibility; abrasion resistance; grip. | Through- out decommi- ssioning phase | Contractor Site Engineer technician |
| Emergency situations | Fires and explosions at the site | Storage of inflammable and explosive substance and materials at closed warehouses or fenced sites. Regular territory clearing. Availability of necessary means for fire prevention and provision of operative access to them. | | |



8.9 SUMMARY OF ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

Table 8.11 Environmental and Social Management Plan for Operation Phase

| Environ- | Table 8.11 Environmental and Social Management Plan for Operation Phase Environ- | | | | | |
|--------------------------------|---|---|----------------------------|-----------------------|--|--|
| mental & Social Aspect | Impact | Actions on prevention | Time Frame | Responsible Person | | |
| Natural Envi | ronment | | | | | |
| Global warming potential | Emission of gaseous substances | All vehicles used in the operation and factory are inspected and done regular maintenance. Check emission from old vehicles regularly and force ill maintained vehicles to service their automobile. All the heavy equipment and machinery shall be fitted with air pollution control devices that are operating correctly. Boiler and smoking units should be released through good engineering practiced-designed stacks. 100% of the EFB that is generated is used. Installing POME biogas capturing equipment (if applicable). | The whole operation period | ЕМТ | | |
| | Emission of dusts and particiculate matters | Maintain and clean roads properly. Replace roadside tree plantations lost to construction and encourage new afforestation projects. Provide PPE against dust (i.e. Mask) | The whole operation period | EMT | | |
| Acoustic impact | Noise exposure for the workers and people within the plant premises | Switching off installations and equipment when they are not used. Use of technologies of power units with low noise and vibration level. All equipment and machinery will be maintained to manufacturer's specifications to minimize unnecessary noise emission. Dense layered plantation to block the noise, or other measures like wooden noise barriers should be considered. Provide PPE such as noise defenders, ear plugs and ear muffs to the workers in high noise area. | The whole operation period | ЕМТ | | |



| Soil Environ | ment | | | | | |
|---------------------------------------|---|---|----------------------------|-----|--|--|
| Liquid Waste | Palm Oil Plant Effluent | Ensure to apply efficient treatment methods in the treatment process. | The whole operation period | EMT | | |
| Solid Waste | | | T | 1 | | |
| Palm Oil Plant Waste | Formation and allocation of waste | Use and maintenance in working order of modern technical equipment that allows minimizing formation of waste. | The whole operation period | ЕМТ | | |
| Domestic Waste | Littering/ polluting with solid waste | Awareness campaign for workers education on the waste segregated system. Improved notice sign and awareness display board (non-smoking, no-dumping signs). | The whole operation period | EMT | | |
| Hazardous Waste | Pollution of air, land, groundwater, and waterways. | Factories must determine the types and amounts of hazardous wastes resulting from production and business activities. Factories must treat, recycle, or dispose of all hazardous wastes they make by using a qualified hazardous waste contractor, whenever feasible. All hazardous wastes (including medical waste and used oil) must be handled in a way that minimizes the possibility of exposing workers and contaminating the environment (air, land or water). Workers who handle hazardous wastes should be trained to avoid personal injury, prevent spills and releases, and to make sure these wastes are disposed of safely. | The whole operation period | EMT | | |
| Ecological Re | Ecological Resources | | | | | |
| Change in terrestrial ecosystem | Impacts on biodiversity | Fauna and flora may be affected due to the project activities. Keep the enterprise premises green by planting trees and flowers. | The whole operation period | EMT | | |



| | | In order to avoid the loss of ecological valuable, plant species should be practiced conservation methods as long term conservation. Shaded plant cultivation had been provided near the boundary of the factory. | | |
|--------------------|---|---|----------------------------|-----|
| Social Envir | onment | | | |
| Social Sector | Population pressure | Regulate settlement growth with proper planning/zoning. Initiate community awareness and assistance programs. Put in place appropriate mechanisms for grievance resolution to settle disputes between new squatters and local communities | whole | ЕМТ |
| | Change in social behaviour | Facilitate awareness raising programmes to the communities about negative social behaviour like gambling, excess use of alcohol | | ЕМТ |
| | Impact on cultural and religious activities | No cultural heritage place is located near to the plant. Sponsoring and charitable contributions to the local community. | The whole operation period | ЕМТ |
| Socio- Economic | Impact on local economy | Providing support to local entrepreneurs. Promotion of cooperatives and linkage with bank and other financial institutions for setting up business enterprises in local region. | The whole operation period | EMT |
| | Crop production and use of fertilizers | Introducing the use of EFB, cake, ash as fertilizers or animal feed ingredient to the farmer. Promote improved agricultural practices. | The whole operation period | ЕМТ |



| | | Farmers will be more interested to increase agricultural production due to the practicing of fertilizer. | | |
|--|--|--|------------------------------|-----|
| | Employment opportunity to local people | Improvement of agricultural extension services. Involvement of local people including women and poor people, and providing life skill training for income generation activities and skill development. | whole operation period | ЕМТ |
| | Creation of additional workplaces | Informing of local population on existing vacancies. Maximum possible involvement of local labour force in view of qualifying requirements. | whole operation | ЕМТ |
| | Enhancement of technical skill | Providing skill enhancement training. Additional knowledge in waste management, material handling, and general application of environmental, health and social precautionary measures. Local people involved in the project will find easier to find jobs in similar nature of projects as a skilled labour. | operation period | ЕМТ |
| Health and S | afety | | _ | |
| Public Health and Safety | Quality of healthcare services | Fencing in risky areas. Provide adequate health care for workers and local people if applicable. | The whole operation period | ЕМТ |
| Awareness on HIV / AIDS and STD | Spread to the community | All workers will be adequately trained in basic sanitation and health care issues (e.g., how to avoid transmission of sexually transmitted diseases such as HIV / AIDS). | whole operation | EMT |
| Occupation Health and Safety | Dangerous and unhealthy working conditions | Provision of personnel with primary healthcare (organization of first aid post at the factory). Placing at the Plant site of information and warning signs and fences. Conformity of working places to OT requirements. | whole operation | ЕМТ |



| | Application of personal protective equipment. Ensure labour law and factory law are strictly followed. | | |
|--------------------|--|----------------------------|-----|
| Fire Prevention | Alarms and emergency lighting regularly tested by competent person. | The whole operation period | EMT |
| Electricity | Electrical installation and all equipment are inspected according to a planned schedule and staff report any concerns to shift manager who will take appropriate action. | The whole operation period | ЕМТ |

Table 8.12 Summary of Environmental and Social Management Plan for Decommissioned Phase

| Environ- mental & Social Aspect | Impact | Actions on prevention | Time Frame | Responsible Person | | |
|--|-----------------------------------|--|--|--|--|--|
| Natural Envi | Natural Environment | | | | | |
| Air/ Dust | Occupational Health hazards | All vehicles used are inspected and done regular maintenance. Restriction of transport speed on roads. Installation of temporary cover. Set up dust barriers at strategic locations: Dust nets will be provided around the demolition area. Practice dust management techniques, including watering down dust. Provide PPE against dust (i.e. mask) | Through-out decommi- ssioning phase | Contractor Site Engineer technician | | |
| Noise | Hearing loss | Schedule noisy activities during day time period. Ensure machinery is well maintained to reduce noise generating. Switching off installations and equipment when they are not used. Minimization of work during evening/night time. Provide PPE such as noise defenders, ear plugs and ear muffs to the workers in high noise area. | Through-out decommi- ssioning phase | Contractor Site Engineer technician | | |



| Water Enviro | onment | | | |
|---------------------------------------|---|--|--|--|
| Water Pollution | Contamina- tion of underground water sources | Ensure sewage system is functional during demolition to prevent pollution of nearby underground and surface water sources. Proper demolition of the sewage system to prevent pollution by contents into the environment and ground water. Ensure to collect and test the surface water from the nearby creeks, dikes, ponds and underground water from the tubewell quality | Through-out decommi- ssioning phase | Contractor Site Engineer technician Third Party laboratory for water quality tests |
| Waste | | | | |
| Solid Waste | Pollution of water, air and soil | Enforce segregation of waste at the source to encourage reuse and recycling. To store waste temporary in containers, in case of large dimension it is possible to store wastes with waterproof cover. Disposal of solid waste in compliance with local government policy Usable infrastructures will be hand over to the township authorities for future community use. | Through-out decommi- ssioning phase | Contractor Site Engineer technician |
| Social Enviro | onment | | | |
| Interaction with Public | Safety | Informing of public on demolition process | Through-out phase | Contractor Site Engineer |
| Health and S | Safety | | | |
| Occupation al Health and Safety | Incidents and accidents leading to serious injury or fatalities | Placing at the site of information and warning signs and fences. Ensure provision of appropriate PPE for staff such as earmuffs for ear protection, helmets for head protection, dust masks for dust protection for all project works, goggles with good visibility for eye protection, overalls and dust coats to protect the skin, safety shoes for protection of the | Through-out decommissioning phase | Contractor Site Engineer technician |



| | | • gloves of different types according to specific works in relation to: puncture resistance; sharps resistance; cut resistance; flexibility; abrasion resistance; grip. | |
|-------------------------|----------------------------------|---|--|
| Emergency situations | Fires and explosions at the site | Storage of inflammable and explosive substance and materials at closed warehouses or fenced sites. Regular territory clearing. Availability of necessary means for fire prevention and provision of operative access to them. | |

8.10 ENVIRONMANTAL MONITORING PLAN

8.10.1 OBJECTIVES

The objective of environmental monitoring is to systematically collect environmental data and support information needed for evaluation of the environmental performance. The frequency and methods of data collection must ensure that the data obtained are reliable and meaningful, i.e. they will adequately reflect the project environmental performance. A proposed environmental monitoring program must be practical, relevant and cost effective.

Environmental monitoring is a very important aspect of environmental management during construction, operation and decommissions stages of the project to safeguard the environment. A chemical or process industry in general produces solid, liquid and gaseous wastes, which are discharged to the environment. The waste product may contain pollutants which may harm environment. It is the responsibility of the industries to prevent or minimize the discharges of waste products by adopting suitable control measures in the factory. The effectiveness of such measures is ascertained by systematic monitoring of discharges at factory level and at receiving level.



8.10.2 REGULATORY REQUIREMENT

a) Environmental Standards

Ministry of Natural Resources and Environmental Conservation - MONREC (former Ministry of Environmental Conservation and Forestry - MOECAF) issued National Environmental Quality (Emission) Guidelines, NEQGs, in December 2015 according to the provision of Paragraph (42), Sub-paragraph (b) of the Environmental Conservation Law (2012).

b) Governing Parameters

Table 8.13 Environmental and Social Monitoring Parameters

| | Table 0.13 Environmental and Social Monitoring Latameters | | | |
|-----|---|---|--|--|
| Sr. | Items | Parameters | | |
| 1 | Air Quality | SO2, NO2, CO, PM2.5, | | |
| | | PM10, dusts and O3 concentrations of National Emission guidelines, 2015 December | | |
| 2 | Noise | Acceptable noise levels of National Emission guidelines, 2015 December | | |
| 3 | Water Quality (factory use water, waste water) | WHO Drinking water Quality Guidelines pH, Colour, Turbidity, Hardness, Iron, Chloride, Conductivity, Salinity, TSS, BOD, COD, Temperature. | | |
| 4 | Waste | Waste recycle plan, removed from on-site at regular intervals. | | |
| 5 | Health and Safety | Medical kit box, fire evacuation, emergency plan, PPE. | | |
| 6 | Socio-economic situation | Job availability, providing skill enhancement training, CSR | | |

8.10.3 REPORTING MONITORING RESULTS

Environmental Parameters shall be monitored as proposed timelines by Kanbauk Plant personal or thirdparty consultant team. Monitoring results must be recorded in files to monitor the continual achievements. Monitoring will be carried out strictly as required by the related national regulations and the monitoring results of required parameters should be reported to local authorities and local ECD.



Report Supported Team is responsible for recording of the monitoring results in files, developing the monitoring report with related documents and to report submission to local Environmental Conservation Department (ECD), through the Kanbauk Palm Oil Plant.

8.10.4 ENVIRONMENTAL MONITORING PLAN FOR OPERATION PHASE

The environmental monitoring plan including monitoring items and locations in the operation is shown in Table 8.14. Monitoring for operation phase will be implemented by the project proponent.

Table 8.14 Proposed Environmental Monitoring Programmes – Operation Phase

| Environmental Issues | Monitoring Location | Point of Compliance | Monitoring and Reporting Frequency | Cost Estimate (USD) Per Year | Responsibility Party |
|-------------------------|---------------------------|--|---|---------------------------------------|---|
| | | Air Pollu | tion | | |
| Method and Analyses | | | | | |
| Parameters | • | PM2.5, PM10, dus | | | |
| Ambient Air Quality | Sterilizers | 14° 36′ 54.2″ N 98° 04′ 31.4″ E | Once a year | 1200 | EMT Team HSE |
| | Boiler Generator | 14° 36' 53.9" N 98° 04' 32.5" E 14° 36' 53.5" N 98° 04' 33.1" E | | | Representative External Consultant firm |
| | Wastewater Pond (1) | 14° 36' 50.6" N 98° 04' 36.4" E | | | |
| | Wastewater Pond (2) | 14° 36' 52.9" N 98° 04' 37.6" E | | | |
| | Site boundary | 14° 36' 56.3" N 98° 04' 30.2" E | | | |
| Vehicle exhaust | Within the plant compound | 14° 36' 49.9" N 98° 04' 32.7" E | Twice per year | 200 | Third Party Monitoring Firm |
| Noise | | | | | |
| Method and Analyses | -Measurement | of Noise using Noi | se Monitoring dev | vise | |



| | - Measurement | r Ambient Noise Q of noise exposure ance with noise mi | on workers at noi | sy machine | e and equipment |
|------------------------------|----------------------------------|---|--|--------------|---|
| Parameters Noise level dB(A) | Leq (dB(A)) Sterilizer Station | 14° 36' 53.6" N 98° 04' 31.3" E | Once a year | 100 | EMT Team HSE |
| | Clarification station | 14° 36′ 53.5″ N 98° 04′ 52.0″ E | | | Representative External Consultant firm |
| | Pressing and digestion | 14° 36′ 53.1" N 98° 04′ 32.2" E | | | Consultant IIIII |
| | Kernel Station | 14° 36′ 53.0″ N 98° 04′ 32.9″ E | | | |
| | Generator | 14° 36′ 53.5″ N 98° 04′ 33.1″ E | | | |
| | Near Officer/Staff Quarter | 14° 36' 49.2" N 98° 04' 33.6" E | | | |
| | Site boundary | 14° 36′ 56.3″ N 98° 04′ 30.2″ E | | | |
| | | Water Qu | ality | | |
| Method and Analyses | - Surface Water | ater samples and te r Quality from retai l Water Quality fro | ining pond | · | |
| | - Waste Water | Vater Quality from Quality from final I | POME pond | | Ü |
| Parameters | -Temperature, Total Alkalinit | ance with the wate pH, Colour, Condu y, Sodium, Calcium bonate, Carbonate, | nctivity, Total Diss n, Magnesium, Po | solved Solic | d, Total Hardness, |
| | | ygen, Biochemical I solids, Oil and Gr | | Chemical (| Oxygen Demand, |
| Surface Water Quality | Retaining Pond | 14° 36' 59.0" N 98° 04' 30.6" E (14.616397,98.075167) | Annual (Wet season, dry season) | 120 | EMT Team HSE Representative |
| Underground Water Quality | Factory Tube Well | 14° 36' 51.7" N 98° 04' 34.1" E (14.614365,98.076141) | Annual (Wet season, dry season) | | External Laboratory for water quality |
| Wastewater Quality | Drainage | 14° 36.926' N 98° 4.506' E | Biannual | 120 | tests |



| | Final | 14° 36′ 51.5″ N | Biannual | | | | |
|--|--|---|---------------------|------------------|-------------------------|--|--|
| | Effluent Pond | 98° 04' 38.4" E | | | | | |
| | | | | | | | |
| | Solid Wa | aste generation fro | m Production Pro | ocess | | | |
| Method and | - Visual check a | and record amount | | | | | |
| Analyses | | on of around the p | • | | | | |
| | | Remove regularly non- hazardous waste to final disposal point | | | | | |
| Parameters | | Generation of waste, storage, recycling, transport and disposal | | | | | |
| | Ž | plan, removed fro | | | | | |
| EFB wastes | -Empty EFB dis | - | Monthly | No Extra Cost | Operation Department | | |
| | | (bag or ton of EFB) | | | _ | | |
| Non- Hazardous Waste | - The Plant compounds (Cleanliness) | | Daily | No Extra Cost | Production team | | |
| -Waste bags/bins | | Daily | No Extra Cost | | | | |
| | -Inspect waste (Visual check a amount) | - | Weekly | No Extra Cost | | | |
| Hazardous Waste | -Inspect potent workshop, mai | ial areas such as ntenance | Weekly | No Extra Cost | Production team | | |
| Spent/waste oils and solvent waste and etc.) | (Visual check a amount) | nd record | | | | | |
| Waste Disposal | -Normal Waste | 2 | Weekly | No Extra | Production team | | |
| | (Disposal po campus) | int in factory | | Cost | | | |
| | -Non-hazardou | ıs Waste | | | | | |
| | | a qualified facility | Monthly | 100 | Production team | | |
| | | Health and | Safety | | | | |
| Method and | -Inspection & t | esting of safety equ | iipments, fire figh | ting devices | | | |
| Analyses | - Statistic of acc | cidents and injuries | S | | | | |
| Parameters | - Medical kit bo | ox, fire evacuation, | emergency plan, | PPE, safety s | signs. | | |



| Working Condition | -Statistic of accidents, injuries and infectious diseases | Daily | No Extra Cost | Plant Manager Supervisor | |
|--------------------------------------|---|--|------------------|---------------------------------------|--|
| Safety Measures for Health Status | -Inspection of compliance with Occupational Health and Safety measure (eg. First Aid box) | Monthly inspection for health and safety at work place | 500 | Supervisor | |
| Fire Safety Measures | -Firefighting training and drill | Once a year | 500 | Supervisor | |
| Emergency Safety Measure | -Inspection of compliance with Occupational Health and Safety measure (eg. Fire extinguisher, signboard on safety, mask, glove) | Twice a year | 1000 | Plant Manager Supervisor | |
| Emergency Situation | Regular inspection and checking the operation activities and infrastructures | On going | No extra cost | Plant Manager Deputy Plant Manager | |
| Unacceptable Emission values | Reviews of the monitoring results regularly To find out the root causes of the nonconformity and take the corrective and preventative actions To review the layout and designs and amend the design accordingly | On going | No extra cost | Plant Manager Deputy Plant Manager HQ | |





Figure 8.3 Map of Air Quality Monitoring Points



Figure 8.4 Map of Noise Quality Monitoring Points





Figure 8.5 Map of Water Quality Sampling Points

8.10.4.1 EMERGENCY AND UNACCEPTABLE EMISSION SITUATION

a) Emergency Situation

If emergency situation or unacceptable emission values occur, the factory applies the following procedure:

Objective: The Emergency Response Preparedness (ERP) approach seeks to improve effectiveness by reducing both time and effort, enhancing predictability through establishing predefined roles, responsibilities and coordination mechanisms.

Prevention: Develop Emergency Response Plan, Fire Prevention Plan (Detailed in 8.6.1)

Protection: Supply FIRST AID KITS and emergency medical boxes, installs the Firefighting System and Equipment.



Preparation: Ensure that emergency supplies and equipment are on hand and ready for the on site emergency action team. Alarm system is ready in case of any emergency. Portable extinguishers are maintained in a fully charged and operable condition. Warning signs are displayed at strategic locations in the plant. Display emergency contact list, evacuation routes must be posted in each work area. The emergency contact list shall be reviewed at least once a year or as and when there is change in personnel or change in contact number.

Evacuation: Prepare site evacuation procedures and routes. Evacuation procedures should be developed which identify when and how evacuation takes place, if necessary signed routes may be required. Consideration should be given to the road network around the site.

Drill: Emergency evacuation drill is carried out if possible.

Management Team: Emergency Response Team (ERT) (Detailed in section 8.2 and Table.8.1),

Report to: Deputy Plant Manager, Plant Manager

Training: Any staff on the site must be clear on their roles and responsibilities in response to emergency warnings and situation. All personnel who work or are resident on site should be made aware of this plan and ensure that all workers know what to do in case of an emergency.

Documentation: Distribution the procedure to the team member as well as all staff.

b) Unacceptable Emission Values of Monitoring

Review: Reviews of the monitoring results regularly.

Analysis: To find out the root causes of the nonconformity and take the corrective and preventative actions.

Action: To review the layout and designs and amend the design accordingly.

Management Team: Environmental Management Team (EMT) (Detailed in section 8.2 and Table.8.2). The responsibilities of EMT are to ensure to control and mitigate potential impacts from the manufacturing.



Report to: Deputy Plant Manager, Plant Manager and Top Management. Reporting to top management on the key performances and monitoring of environmental and social issues for review.

Documentation: Record of the monitoring results in files. Develop the monitoring report with related documents.

8.10.5 ENVIRONMENTAL MONITORING PLAN FOR DECOMMISSIONING PHASE

The environmental monitoring plan including monitoring items and locations in the decommissioning phases is shown in Table 8.15. Monitoring for the decommissioning phase will be implemented by project proponent and the contractors.

Table 8.15 Proposed Environmental Monitoring Programmes – Decommissioning Phase

| 1 Hase | | | | | |
|--|---|---|------------------------------------|-----------------------------|--|
| Environmental Issues | Monitoring Location and Indicator | Monitoring and Reporting Frequency | Cost Estimate (USD) Per Year | Responsibility Party | |
| Air Pollution | | | | | |
| Ambient air quality | Suitable points on site | Once after the decommissioning activities | 500 | Site Engineer Contractor | |
| Noise | | | | | |
| Noise level dB(A) | Sensitive spots | Monthly | 1000 | Site Engineer Contractor | |
| Water Quality | | | | | |
| Solid Waste | | | | | |
| Demolition debris including concrete, metal, drywall, wood, glass, adhesives, sealants and fasteners | Disposal sites | Weekly | 500 | Site Engineer Contractor | |
| Emergency Situation | Regular inspection and | On going | No extra cost | Plant Manager | |



| checking demolition activities | the | Deputy Manager Contractor's management Supervisors | |
|--------------------------------------|-----|--|--|
| | | Supervisors | |

8.11 COMPLAINTS AND GRIEVANCE MECHANISM

In order to support the participation of PAP and other stakeholders in project monitoring, Kanbauk CPOP develops a Complaints and Grievances Mechanism (CGM) related to environmental and social issues arising during all phases of the project's implementation (pre-construction; construction; operation; closure and decommissioning; and rehabilitation and restoration).

A grievance redress mechanism has been prepared for the Project with the aim to allow affected communities and individuals to raise complaints to implementing entities in regards to the preparation and implementation of the projects.

A grievance mechanism is understood as an institution or process through which stakeholders are able to raise concerns, grievances and legitimate complaints. A grievance mechanism should be able to deal effectively with complaints from communities, or others filing a complaint on their behalf.

Process steps for grievance management should include grievance management procedure, receiving and recording of grievances/ complaints, reviewing and investigating grievances, assessing and resolving grievances/ complaints and monitoring, reporting, and evaluating a grievance mechanism.

8.11.1 GRIEVANCE MANAGEMENT TEAM

To support the implementation of the Grievance Management mechanism, a grievance support structure and a grievance management system are required.

Kanbauk CPOP establishes a complaints and grievance management team to address any concerns raised by government agencies or any member of the public, as well as dealing with workers' grievances.



Grievance Management Team

GMT shall comprise:

a) Factory Manager - Team Leader
 b) Community Liaison Officers - Team Member
 c) Relevant Heads of Department - Team Member
 d) Trained Staff - Team Member

e) Village administrators/representatives – Community Representative

8.11.2 GRIEVANCE MECHANISM PROCEDURE

When a grievance/ complaint is received, the mechanism for dealing with it will be as follows:

- Grievance received;
- Grievance recorded in the Grievance/complaints Register;
- For an immediate action to satisfy the complaint, the complainant will be informed of corrective action;
- Implement corrective action, record the date and close case;
- For a long corrective action, the complainant will be informed of proposed action; and
- Implement corrective action, record the date and close case.

8.11.3 RECORDING THE COMPLAINT

Recording grievance/complaints will include the followings:

- A Grievance/ Complaints Register will be established so complaints can be tracked by the plant; and
- Record information about the complaint, e.g. when it was raised and by whom (complainant);



Table 8.16 Grievance/ complaints Register

The Complaints Register ensures that each complaint has an individual number and that the tracking and recording of follow-up actions is undertaken. The Register will include the following information:

- Complaint registration number.
- Date complaint received.
- Brief summary of complaint.
- Complainant details (name, address, other contact information).
- Company's response / corrective action.
- Date of response sent to complainant.
- Follow up actions required.
- Final resolution.

8.11.4 REVIEWING AND INVESTIGATING GRIEVANCES

Procedures for reviewing and investigating grievances include:

- Interview with the complainant in order to understand the issue raised;
- Information may need to be verified or further investigated through another source;
- All complaints received shall be acknowledged in writing within a specified time period (no greater than two weeks) and where appropriate, verbal responses may also be given, and will be documented in the Register (e.g. complainant may initial the Grievance/Complaint Register entry);
- As not all complaints can be readily resolved, the initial response may be a summary of what is planned and when it is likely to occur;
- For issues and/or corrective actions that take longer to address, or where the complainant(s) are not satisfied and additional activities are required, the project will keep complainant(s) informed of progress; and
- Once a complaint has been addressed, Kanbauk CPOP will communicate the resolution of the issue to the complainant, and will coordinate any further communications that may be necessary.



8.11.5 ASSESSING AND RESOLVING GRIEVANCE

Procedures for assessing and resolving grievances/ complaints are:

- Kanbauk CPOP Factory together with the complainant, as well as with local authority representatives will explore through discussion or negotiation, possible remedies that will resolve the issue;
- The company will utilize relevant managers to help resolve complaints; and
- Where complaints do not require corrective action (e.g. where complaint is not directly relevant to Project or where complaint is already the subject of another process) the initial acknowledgement of the complaint will incorporate the response/resolution to the complainant.

A grievance mechanism will be adopted as presented in following figure which outlines the key steps to be taken in the grievance management procedure.

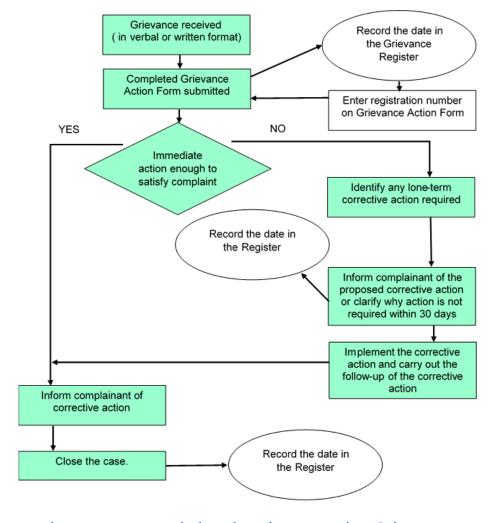


Figure 8.6 Proposed Flowchart for Processing Grievances



8.11.6 MONITORING, REPORTING AND EVALUATING GRIEVANCE MECHANISM

Monitoring, reporting and evaluating a grievance mechanism of complaints will include:

- Review of the number and status of grievance/ complaints and any outstanding issues to be addressed;
- Reports on grievance/ complaints monitoring will be produced and sent to the Senior Manager; and
- The effectiveness of the complaints process should be evaluated, e.g. every 1 to 2 years during operations.



8.12 ENVIRONMENTAL COMMITMENT

မြန်မာ့စီးပွားရေးဦးပိုင်အများနှင့်သက်ဆိုင်သောကုမ္ပဏီလီမိတက် ကံပေါက်ဆီအုန်းစက်ရုံ

ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီရင်ခံစာကို Green Environmental, Health, Safety & Social Consultancy Company Limited မှ ရေးဆွဲထားပြီး အစီရင်ခံစာတွင် ပါရှိ သော အကြောင်းအရာများသည် မှန်ကန်တိကျခိုင်မာပြီး ပြည့်စုံပါသည်။ သဘာဝသယံ ဧာတနှင့် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနနှင့် ဒေသဆိုင်ရာအစိုးရများမှ ချမှတ် ထားသော ဥပဒေ၊ နည်းဥပဒေ၊ လုပ်ထုံးလုပ်နည်းများကို တိကျစွာလိုက်နာမည် ဖြစ် ကြောင်း ကတိကဝတ်ပြုပါသည်။ ကံပေါက်စားအုန်းဆီကြမ်းစက်ရုံသည် ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှုအစီရင်ခံစာပါ ကတိကဝတ်များ၊ ပတ်ဝန်းကျင်ထိခိုက်မှုလျော့ချရေး လုပ်ငန်း များနှင့် အစီအစဉ်များကို အပြည့်အဝ အစဉ်အမြဲ လိုက်နာဆောင်ရွက်မည်ဖြစ်ပါသည်။

လုပ်ငန်းလည်ပတ် ဆောင်ရွက်နေသည့်ကာလအတွင်း အတည်ပြုထားသည့် ပတ် ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်အား တိုးတက်နေသည့် နည်းပညာများ၊ စနစ်များနှင့် လုပ် ငန်းလိုအပ်ချက်ပေါ်မူတည်၍ ပိုမိုကောင်းမွန်သည့် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် ဖြစ်စေရန်အတွက် ပြင်ဆင်ဖြည့်စွက်ရန် ညွှန်ကြားချက်များရှိလာပါက တင်ပြအတည်ပြု ချက်ရယူ၍ ပြင်ဆင်ဆောင်ရွက်မည်ဖြစ်ပါသည်။

စက်ရုံလုပ်ငန်းပြီးစီး၍ စီမံကိန်းပိတ်သိမ်းချိန်တွင် လူမှုဝန်းကျင်အား ထိခိုက်မှု မဖြစ်စေရန်နှင့် ထိခိုက်မှုများရှိလာပါက ထိခိုက်မှုအနည်းဆုံးဖြစ်စေရေး အစီအမံများ ချ မှတ်ဆောင်ရွက်မည်ဖြစ်ပါသည်။

လေးစားစွာဖြင့်
သြား က်ရှိများ ၁ ၆ ပါပါ လေးစုန်သတ်နှင့် မှန်နိုင်သက္ခရင်းပိုင်တက်

KANBAUK CRUDE PALM OIL PLANT





GREEN ENVIRONMENTAL, HEALTH, SAFETY & SOCIAL CONSULTANCY CO., LTD

ကံပေါက်စာအုန်းဆီကြမ်းစက်ရုံ၏ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် Environmental Management Plan (EMP) အား သယံဇာတ နှင့် သဘာဝ ပတ်ဝန်းကျင် ထိန်း သိမ်းရေး ဝန်ကြီးဌာန မှ ထုတ်ပြန်ထားသော ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ၊ နည်းဥပဒေများ နှင့် ကိုက်ညီအောင် ရေးဆွဲထားပါသည်။ ပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန် ချက်များ (၂၀၁၅) ကို အဓိက အခြေခံပြီး အခြားလိုက်နာ ဆောင်ရွက်ရမည့် သက်ဆိုင်ရာ ဥပဒေ၊ နည်းဥပဒေများ နှင့် ဆက်စပ်ကျင့်သုံးနိုင်ရေး ရေးသားပြုစု တင်ပြထားပါသည်။

ဤပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ်တွင် စီမံကိန်းနှင့် ပတ်သက်သော အချက်အလက်များ နှင့် စီမံကိန်းအကောင်အထည် ဖော်ဆောင် ရွက်မည့်ဒေသ၏ လက်ရှိ ပတ်ဝန်း ကျင် အခြေအနေများကို စီမံခန့်ခွဲမှုအစီအစဉ် ရေးဆွဲသော အဖွဲ့၏ အတွေ့အကြုံအပေါ် အခြေခံ သော သုံးသပ်ချက်များနှင့် ပေါင်းစပ်ပြီး ပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှုဖြစ်ပေါ် စေနိုင်သော အကြောင်း အရာများ နှင့် ကုစားနိုင်မည့် နည်းလမ်းများကို ရေးဆွဲဖော်ပြထားပါ သည်။

အစီရင်ခံစာပါ အချက်အလက်များမှာ အဖွဲ့တွင်ပါဝင်သော ပညာရှင်များမှ မြေပြင်တွင် ကွင်းဆင်း လေ့လာပြီး ပတ်ဝန်းကျင် ဆန်းစစ်ခြင်း ပြုလုပ်ရန် လုပ်ငန်းတာဝန်များ နှင့် အညီ ကဏ္ဍအလိုက် တာဝန်ယူပြုစုရေးဆွဲထားခြင်း ဖြစ်ပါ၍ အစီရင်ခံစာတွင် ပါဝင်သော အချက် အလက် များမှာ ပြည့်စုံ မှန်ကန် မှု ရှိပါသည်။

Signature:

Catherine Soe Soe Aung Managing Director Green EHSS Consultancy Co., Ltd.



9. CONCLUSION

Kanbauk Palm Oil is considered as a small-scaled palm oil producer. The production processes are run with only 20 permanent staff and 17 daily wages workers. The plant's average operation days per year is 128 days. Maintenance activities, cleaning activities and other nonoperational tasks are performed during remaining half of the year.

A few potential environmental impacts are identified in this Environmental Management Plan (EMP) report. The Plant uses organic by-products such as kenel fibres and broken kenels are used as fuels for the boiler and sterilization process. The liquid oils from the sludge are recollected from the sludge pit and reused. The remaining liquids are treated with sedimentation process within the ponds. Final treated liquids are reused as water source for the surrounding plantation.

In general, small or zero quantity of liquid were accumulated in the ponds in the dry season.

Baseline monitoring of ambient air quality, underground water quality, soil pH, demonstrated that all monitoring results are within the National Emission Standards and acceptable levels. Noise levels from some machines exceeded the acceptable level.

In accordance with the assessment data, the impacts on ambient air quality, surface water and underground water quality, soil quality, occupational health and safety hazards and risks to the workers and community, traffic congestion and odor emission were identified and evaluated as medium to low impacts.

During public consultation, residents near the Plant were concerned about workers' safety and waste disposals associated with the plant operation. The local villagers showed their interests in career opportunities at the Plant.

In terms of ecological impacts associated with the Plant, the dense plam oil plantations and trees surround the plant. It is unlikely to be affected to existing biodiversity due to the Plant processing activities.

The factory practices informing of local population on existing vacancies. Local people involved in the project will find easier to find jobs in similar nature of projects as a skilled labour. It is expected to accept and to be employed in the project's activities



with high hopes for improvement in neighborhood would bring higher living standard and education status.

The factory arranges the house for staff from other regions in the factory premise. Workers are provided necessary PPE and primary healthcare. Information and warning signs are placing at the plant site for occupational safey. The factory provides skill enhancement training. Employment conditions meets national laws and international standards.

And the factory is surrounded by fencing. Taking precautions to avoid being the victim of crime is as simple as the installing fencing around the factory. In order to support the participation of PAP and other stakeholders in project monitoring, Kanbauk CPOP develops a Complaints and Grievances Mechanism (CGM) related to environmental and social issues arising during all phases of the project's implementation. Thus, potential for conflict between people of different backgrounds and cultural beliefs are low.

Establishment of Kanbauk factory may lead the introducing the use of EFB, cake, ash as fertilizers or animal feed ingredient to the farmer in the region. The Kanbauk Palm Oil factory has contributed both financially and providing other supports in the social activities such as cash and material donations, assisting in road renovation and religious ceremonies. Sponsoring and charitable contributions to the local community are considered positive impact. According to the aforementioned factors, the significance assigned to the social impacts for the operation phase are considered to be low and the social outcomes of the factory are expected to be positive by creating employment opportunity.

The provision of effective environmental management and monitoring plans by the Plant will mitigate the potential environmental and social impacts. It is crucial to make sure that mitigation and monitoring measures are undertaken as defined in this EMP report.

It can be concluded that the exiting control measures are likely to be adequate; however, it is required to monitor the impacts continuously and obtain the stakeholder feedbacks as necessarily.



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18.



11. **APPENDIX**

APPENDIX A SURFACE AND UNDERGROUND WATER **QUALITY TESTS RESULTS**



MYANMAR WATER ENGINEERING & PRODUCTS CO., LTD.

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WATER ANALYSIS RESULT FORM

Analysis Ref. No: WR330719

: GREEN EHSS Co., Ltd.

Receiving Date: 08.07.2019

Source of Water: Service Water

Client Address

: Kanpauk Palam Oil Factory, Yebyu Tsp.

Analysis Date : 10.07.2019

| Parameters | Sample Result | WHO Standard |
|---|---------------------------------|--------------|
| Temperature | | |
| рН | 7 | 6.5 - 8.5 |
| Colour | Slightly Turbid | Clear |
| Conductivity | 20.31 micro S / cm | |
| Total Dissolved Solid | 13 mg/l | < 250 |
| Total Hardness | 10 mg /l as CaCO ₃ | <16 |
| Total Alkalinity | 10 mg /l as CaCO ₃ | <250 |
| Sodium (as Na ⁺) | - | - |
| Calcium (as Ca ⁺⁺) | 2.4 mg /l as CaCO ₃ | <8 |
| Magnesium (as Mg ⁺⁺) | 0.95 mg /l as CaCO ₃ | <8 |
| Potassium (as K ⁺) | | - |
| ron (as Fe ⁺⁺) | 0.6 mg /I | <0.3 |
| Chloride (as Cl ⁻) | 5 mg /l | <250 |
| Sulphate (as SO ₄ ⁼) | | - |
| Bicarbonate (as HCO ₃ ⁻) | 10 mg /l as CaCO ₃ | <250 |
| Carbonate (as CO ₃ [*]) | ND mg /I | <250 |
| Hydroxide (as OH ⁻) | mg /l | <100 |
| Remarks | HIGH IRON CON | TENT |

Analysis By: Thi Dar Soe

Approved By: Win Kalaya

Kolaja





MYANMAR WATER ENGINEERING & PRODUCTS CO., LTD.

OFF:

NO.(15), THUMINGALAR LANE 1, THUMINGALAR HOUSING ESTATE.

THINGANGYUN Tsp. YANGON.

PHONE: 571694, 8564547, 573532 FAX : 573532

E mail. : mwepmyanmar@gmail.com

WATER ANALYSIS RESULT FORM

Analysis Ref. No: WR320719

Source of Water:

Underground Water

Client

: GREEN EHSS Co., Ltd.

Receiving Date: 08.07.2019

Address

: Kanpauk Palam Oil Factory, Yebyu Tsp.

Analysis Date : 10.07.2019

| Parameters | Sample Result | WHO Standard |
|---|---------------------------------|--------------|
| Temperature | erature | |
| рН | 7 | 6.5 - 8.5 |
| Colour | Clear | Clear |
| Conductivity | 18.75 micro S / cm | |
| Total Dissolved Solid | 12 mg/l | < 250 |
| Total Hardness | 10 mg /l as CaCO ₃ | <16 |
| Total Alkalinity | 10 mg /l as CaCO ₃ | <250 |
| Sodium (as Na ⁺) | - | - |
| Calcium (as Ca ⁺⁺) | 2.4 mg /l as CaCO ₃ | <8 |
| Magnesium (as Mg ⁺⁺) | 0.95 mg /l as CaCO ₃ | <8 |
| Potassium (as K ⁺) | | - |
| Iron (as Fe ⁺⁺) | 0.1 mg /I | <0.3 |
| Chloride (as Cl ⁻) | 5 mg /l | <250 |
| Sulphate (as SO ₄ ⁼) | | - |
| Bicarbonate (as HCO ₃ ⁻) | 10 mg /l as CaCO ₃ | <250 |
| Carbonate (as CO ₃ ⁼) | ND mg /I | <250 |
| Hydroxide (as OH ⁻) | mg /l | <100 |
| Remarks | CHEMICALLY PO | TABLE |

Analysis By: Thi Dar Soe

Approved By: Win Kalaya



APPENDIX B FINAL EFFLUENT AND DRAINAGE WATER **QUALITY TESTS RESULTS**

Advanced Medical & Diagnostics Trading Ltd.

Yangon Office: No. 20-A Ywar Lae Lane, Za-North Ward, Thingangyun Tsp, Yangon

01 571656, 01 565797, 09 73176248, 09 73112672

Mandalay Office: No. MA 28, 59th street, Bt. 41st and 42nd street, Ye' Mon Taung

Ward, Ma Har Aung Myay Tsp, Mandalay

Website & Email: www.amdmyanmar.com & amd@amdmyanmar.com

WATER & WASTE WATER TREATMENT DIVISION

GREEN EHSS Consultancy Co., Ltd.

Attention To

No.172, Building C-2 A, 11th Floor, Room (A/1112)

Botahtaung Township, Yangon.

: Kanpauk Palm Oil Factory, Yebyu Township Source of Water

Analysis : Waste Water Test

Date Attended to Lab : 8.7.2019

| Sr. | Item | Waste Water Pond | Waste Water Drain | YCDC Target range |
|-----|---|---------------------|----------------------|-----------------------------|
| 1. | Dissolved Oxygen (DO) | 0.8 | 0.9 | > 1 ppm |
| 2. | Biochemical Oxygen Demand (BOD ₅) (5days at 20°C) (mg/L) | 45.0 | 55.4 | 20-60 ppm |
| 3. | Chemical Oxygen Demand (COD) (Adaptation of the USEPA 410.4 approved method) (mg/L) | 24 | 10 | < 200 ppm |
| 4. | pH effluent water | 6.77 | 6.58 | 6 <ph<9.6< td=""></ph<9.6<> |
| 5. | Suspended solids (SS) | 54 | 49 | < 500 ppm |
| 6. | Nitrate (NO ₃ -N) | 0.0 | 0.0 | N/A |
| 7. | Oil and Grease | 8 | 10 | N/A |

Remarks:

: Results valid for the received sample only.

Win Pyae Pyae Aung Laboratory In-Charge

Water Treatment Division

Amd Trading Co.,Ltd



APPENDIX C ECD COMMENT RESPONSE TABLE

တနင်္သာရီတိုင်းဒေသကြီး၊ ရေဖြူမြို့နယ်၊ ကန်ဘောက်ဒေသရှိ ဂန့်ဂေါ်တောင် ကျေးရွာ ရှိ Kanbauk Crude Palm Oil Plant မှ စာအုန်းဆီကြမ်းထုတ်လုပ်ခြင်း လုပ်ငန်းအတွက် ပြန်လည်ဖြည့်စွက် တင်ပြလာသော ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစ၌ (Environmental Management Plan – EMP) အစီရင်ခံစာ အပေါ် စိစစ်တွေ့ ရှိချက်များ နှင့် သုံးသပ်အကြံပြုချက်များ ကို ဖြေရှင်းချက်

| စဉ် | ပြန်လည်ပြင်ဆင်ဖြည့်စွက်တင်ပြရန်အချက်များ | ပြန်ကြားချက် | |
|-------------|---|--|--|
| OII | အတိုကောက်စာလုံးနှင့်အဓိပ္ပါယ်ဖွင့်ဆိုချက်များ | | |
| | အထူးသဘောထားမှတ်ချက်ပေးရန်မရှိပါ။ | - | |
| JII | အစီရင်ခံစာအကျဉ်းချုပ် | | |
| | အစီရင်ခံစာတွင် လိုက်နာဆောင်ရွက်မည့် ဥပဒေ၊ နည်းဥပဒေ၊ အက်ဥပဒေ စသည်ဖြင့် ဖော်ပြရာတွင် လက်ရှိအတည်ပြု ထုတ်ပြန်ထားသည့် ဥပဒေ၊ နည်းဥပဒေ၊ အက်ဥပဒေ တို့၏ အမည်နာမများအား မှန်ကန်တိကျစွာ ထည့် သွင်းဖော်ပြရန် | အခန်း ၁ ခေါင်းစဥ် ၂.၁ စာမျက်နှာ ၃၆, ၃၇ တို့ တွင်ပြင်ဆင်ဖော်ပြထားပါသည်။ | |
| 2 II | နိဒါန်း | | |
| (က) | -လုပ်ငန်း၏လက်ရှိဆောင်ရွက်နေသည့် နည်းပညာ၊ ပတ်ဝန်းကျင် လူမှုရေး ဆိုင်ရာ လေ့လာမှုများမှ အဓိကတွေ့ရှိချက်များအား ထည့်သွင်း ဖော်ပြရန်၊ | ခေါင်းစဥ်ခွဲ ၂.၂ စာမျက်နှာ ၅၃, ၅၄ တို့တွင်ဖော်ပြထားပါသည်။ | |



| | -လုပ်ငန်းလုပ်ကိုင်သူ ပုဂ္ဂိုလ်/ အဖွဲ့အစည်း၏ အချက် အလက်များ ပြည့်စုံစွာ ထည့်သွင်း ဖော်ပြရန် | ခေါင်းစဥ်ခွဲ ၂.၃ စာမျက်နှာ ၅၅ တွင်ဖော်ပြထားပါသည်။ |
|-----|---|--|
| 9II | မူဝါဒ ဥပဒေနှင့် မူဘောင်များနှင့် ဖွဲ့ စည်းမှုဆိုင်ရာများ | |
| (m) | -အောက်ဖော်ပြပါတည်ဆဲ ဥပဒေ နည်းဥပဒေ များ၊ လုပ်ထုံးလုပ်နည်းများ၊ စံချိန်စံညွှန်းများနှင့် နိုင်ငံတကာ စည်းကမ်းသတ်မှတ်ချက် များကို ဖော်ပြရန် လိုပါသည်- | ခေါင်းစဥ်ခွဲ ၃.၃ စာမျက်နှာ ၉၃,၉၄ တွင်ဖော်ပြထားပါသည်။ |
| ၅။ | လုပ်ငန်း၏အကြောင်းအရာဖော်ပြချက် | |
| | -စီမံကိန်းလုပ်ငန်း၏ ရည်ရွယ်ချက်များနှင့် ပက်သက်၍ ထည့်သွင်းဖော်ပြ ရန် | ခေါင်းစဥ်ခွဲ ၄.၁ စာမျက်နှာ ၉၇ တွင်ဖော်ပြထားပါသည်။ |



| | ကုန်ကြမ်းပစ္စည်းများ အားသိုလှောင်ထားသည့် အခြေအနေ၊ ထုတ်လုပ်မှု လုပ် ငန်းစဥ် အဆင့်ဆင့် နှင့် ပက်သက်၍ ရှင်းလင်းချက် ပုံစံကားချပ် တွင် ပြည့်စုံ မှန်ကန်စွာ ထည့်သွင်းဖော်ပြရန် | ခေါင်းစဥ်ခွဲ ၄.၄ စာမျက်နှာ ၁၁၀ တွင် Figure 4.12 ဖြင့်ကုန်ကြမ်း လှောင်မှု ကိုဖော်ပြထားပါသည်။ |
|-----|---|---|
| | | ခေါင်းစဥ်ခွဲ ၄.၆ စာမျက်နှာ ၁၂၀, ၁၂၁တွင် Figure 4.32, Figure 4.33 တွင် ထုတ်လုပ်မှု လုပ် ငန်းစဥ် ပုံစံကားချပ် ကိုဖော်ပြထားပါသည်။ |
| | အခြားထွက်ကုန်အမျိုးအစား (By-product) ၏(နေ့အလိုက်/လအလိုက်/ နှစ်အလိုက်)ထွက်ရှိမှု ပမာဏနှင့် တစ်နှစ်အတွက် generator (၃)လုံး၏ စွမ်းအင် (လောင်စာဆီ) လိုအပ်ချက် ပမာဏ တို့အား ထည့်သွင်းဖော်ပြရန် | ခေါင်းစဥ်ခွဲ ၄.၇, ခေါင်းစဥ်ခွဲ ၄.၈ စာမျက်နှာ ၁၂၅, ၁၂၆ Table 4.6 တွင် အခြားထွက်ကုန်အမျိုးအစား ဖော်ပြထားပါသည်။ |
| | | ခေါင်းစဥ်ခွဲ ၄.၁၀.၁ စာမျက်နှာ ၁၂၉ တွင် စွမ်းအင် လိုအပ်ချက် ကို ဖော်ပြ ထား ပါသည်။ |
| | -စွန့်ပစ်ရေ (wastewater) ထွက်ရှိမှု ပမာဏ နှင့် စီမံခန့်ခွဲမှုစနစ်၊ ရေမြောင်း စနစ် (Drainage system) အခြေအနေတို့ကို ပိုမို ပြည့်စုံစွာ ထည့်သွင်း ဖော်ပြရန် | ခေါင်းစဥ်ခွဲ ၄.၁၁.၂, ခေါင်းစဥ်ခွဲ ၄.၁၁.၂.၁ စာမျက်နှာ ၁၃၄,၁၃၅ တွင် စွန့်ပစ်ရေ ဖော်ပြထားပါသည်။ |
| | | ခေါင်းစဥ်ခွဲ ၄.၁၀.၃ စာမျက်နှာ ၁၃၁, ၁၃၂ Figure 4.46 ဖြင့် Drainage system ဖော်ပြထားပါသည်။ |
| | -အစီရင်ခံစာတွင် အဓိကစွန့်ထုတ်အခိုးအငွေ့၊ အမှုန်အမျိုးအစား နှင့် စီမံခန့်ခွဲ မှုစနစ်များအား ထည့်သွင်းဖော်ပြရန် | ခေါင်းစဥ်ခွဲ ၄.၁၂ စာမျက်နှာ ၁၃၉,၁၄၀, ၁၄၁ တွင်ဖော်ပြထားပါသည်။ |
| GII | လက်ရှိသဘာဝပတ်ဝန်းကျင်နှင့် လူမှုပတ်ဝန်းကျင် အကြောင်းအရာ ဖော်ပြချက် | |
| | -ဆန်းစစ်ခြင်းပြုလုပ်မည့် တည်နေရာ နှင့် ပက်သက်၍ တည်နေရာ ဖော်ပြသည့် ကိုဩဒိနိတ် အမှတ်များ/ အညွှန်းများ ထည့်သွင်းဖော်ပြရန် | ခေါင်းစဥ်ခွဲ ၅.၂ စာမျက်နှာ ၁၄၃ တွင် ကိုဩဒိနိတ် အမှတ်ကိုလည်းကောင်း၊ ၁၄၅, ၁၄၇ Figure 5.1, Figure 5.3 တွင်လည်း ဖော်ပြထားပါသည်။ |



| | အနံ့ထွက်ရှိမှု နှင့်ပက်သက်၍ စုစည်းအနံ့၊ ပျံ့လွင့်အနံ့တို့အား စီမံကိန်းလုပ်ငန်း၏ အနံ့ထွက်ရှိသော လုပ်ငန်းစဥ် အခန်းကဏအလိုက် တိုင်းတာ စစ်ဆေးဖော်ပြရန် | ခေါင်းစဥ်ခွဲ ၅.၄.၈ စာမျက်နှာ ၁၇၀ မှ ၁၇၂ အထိတွင်ဖော်ပြထားပါသည်။ |
|----------|---|--|
| | Treatment pond များမှ အနံ့ဆိုးများ ထွက်ရှိမှုရှိပါက ထည့်သွင်းဖော်ပြရန် | အနံ့ဆိုးများ ထွက်ရှိမှုမရှိပါ |
| | ဆူညံသံထွက်ရှိမှုတွင် Drum Stripper, Crude Oil Tank တို့နှင့်ပက်သက်၍ ဆူညံသံလျော့ချ/ ထိန်းချုပ်သွားမည့် လုပ်ငန်းစဥ် များထည့်သွင်းဖော်ပြရန် | ခေါင်းစဥ်ခွဲ ၅.၄.၆ စာမျက်နှာ ၁၆၈ တွင်ဖော်ပြထားပါသည်။ |
| ମା ପା | ပတ်ဝန်းကျင်အပေါ်သက်ရောက်မှုများနှင့် လျော့နည်းစေရေးလုပ်ငန်းများ | |
| | -ထုတ်လုပ်မှု လုပ်ငန်းစဥ် အဆင့်အလိုိက် ရေထု၊ လေထု၊ မြေထု ထဲသို့ ထွက်ရှိသော ညစ်ညမ်းမပစ္စည်းများ (pollutants) စွန့်ပစ်ပစ္စည်းများ (waste) နှင့် အခြားထုတ်လွှတ် အရာဝထ္ထုများအား ပြည့်စုံစွာ ဆန်းစစ် ဖော်ပြရန် | ခေါင်းစဉ့်ခွဲ ၆.၅ စာမျက်နှာ ၂၀၂ ,၂၀၃ Table 6.7, တွင် ဖော်ပြထားပြီး ခေါင်းစဉ့်ခွဲ ၆.၅.၁, ၆.၅.၂, ၆.၅.၃, ၆.၅.၄ စာမျက်နှာ ၂၀၃ - ၂၁၄ တို့ တွင် ဖြည့်စွက်ဖော်ပြထားပါသည်။ |
| | ပတ်ဝန်းကျင်ထိခိုက်မှဒ နှင့် လျှော့ချရေးဆိုင်ရာ ကိစ္စများ အတွက် International Finance Corporation (IFC) World Bank Group ၏ Agribusiness, Food Production, Chemicals, Forestry, General Manufacturing, Infrastructure စသည့် ကဏ္ဍတို့အတွက် ထုတ်ပြန်ထားသည့် လမ်းညွှန်ချက်များ အား သက်ဆိုင်ရာ ကဏ္ဍအလိုက် ထည့်သွင်းဖော်ပြရန် | ဖော်ပြထားပြီး |



| ରା। | ဒေသခံပြည်သူများနှင့် တိုင်ပင်ဆွေးနွေးခြင်း နှင့် ဖွံ့ဖြိုးရေး အစီအစဥ် | | | |
|-----|---|--|--|--|
| | အစီရင်ခံစာတွင် ဒေသခံများ၊ ဌာနဆိုင်ရာ အဖွဲ့ အစည်းများ၊ အစိုးရမဟုတ် သော အဖွဲ့ အစည်းများ နှင့် တွေ့ ဆုံဆွေးနွေးခြင်း၊ သတင်းအချက်အလက် ထုတ်ပြန်ခြင်းတို့ကို လိုအပ်ချက် နှင့် အညီ အချိန်အခါအလိုက် ဆောင်ရွက် သွားမည့် အစီအစဥ်ကို ထည့်သွင်းဖော်ပြရန် | ခေါင်းစဥ်ခွဲ ဂု.၆ ၊ စာမျက်နှာ ၂၄၄, ၂၄၅ တွင် ဖော်ပြထားပါသည်။ | | |
| | အစီရင်ခံစာတွင် တက်ရောက်သည့် ဌာနဆိုင်ရာ အဖွဲ့အစည်းများ၊ အစိုးရမဟုတ် သော အဖွဲ့အစည်းများ၏ ပုဂ္ဂိုလ် တစ်ဦးချင်း စီအလိုက် အမည် ရာထူး လက်မှတ် ကိုယ်စားပြုဒေသ ဌာန အဖွဲ့အစည်း များထည့်သွင်း ဖော်ပြရန် | • ခေါင်းစဥ်ခွဲ ၇.၃.၃ စာမျက်နှာ ၂၃၅-၂၃၈ Table 7.2. 7.3 တွင် အစည်းအဝေး တက်ရောက် သည့် သူများလက်မှတ် ထိုးထားသည့် စာရင်းကို ဖော်ပြထားပါသည်။ | | |
| | စီမံကိန်းလုပ်ငန်းကြောင့် ထိခိုခံစားရသည့် ဒေသခံပြည်သူတို့ အတွက် ဒေသ ဖွံ့ဖြိုးရေး ဆောင်ရွက်ပေးမည့် အစိအစဥ် နှင့် အသုံးပြုမည့် ရန်ပုံငွေလျာထား ချက် တို့အား ထည့်သွင်းဖော်ပြရန် | ခေါင်းစဥ်ခွဲ ဂု.ဂု စာမျက်နှာ ၂၄၆-၂၄၆ တွင် ဖော်ပြထားပါသည်။ | | |
| GII | ပတ်ဝန်းကျင်နှင့် လူမူရေးဆိုင်ရာ စီမံခန့်ခွဲမှုအစီအစဉ် | | | |
| | ဖြစ်ပေါ်လာနိုင်သော ပတ်ဝန်းကျင်နှင့် လူမှုရေးဆိုင်ရာ ထိခိုက်နိုင်မှုများ နှင့် ပက်သက်၍ ထည့်သွင်းဖော်ပြရန် | • အခန်း ၈ စာမျက်နှာ ၂၄၇ ပထမ နှင့် ဒုတိယစာပိုဒ် တွင်ဖော်ပြထားပါသည်။ | | |
| | ပတ်ဝန်းကျင် အရည်အသွေး စောင့်ကြပ်ကြည့်ရှု တိုင်းတာမည့် အစီအစဥ်နှင့် ပက်သက်၍ စောင့်ကြပ်ကြည့်ရှု တိုင်းတာသွားမည့် သတ်မှတ်နေရာ (မြေပုံ အညွှန်း နှင့် တကွ) အကြိမ်အရေအတွက် နှင့် ဓါတ်ခွဲခန်းဆိုင်ရာ အချက်အလက် များထည့်သွင်းဖော်ပြရန် | • ခေါင်းစဥ်ခွဲ ၈.၁၀.၄ စာမျက်နှာ ၂၇၄-၂၇၇ Table 8.14, စာမျက်နှာ ၂၇၈-၂၇၉ Figure 8.3, Figure 8.4, Figure 8.5 တို့တွင်ဖော်ပြထားပါသည်။ | | |



| | စောင့်ကြပ်ကြည့်ရှုရေး အစီအစဥ်တွင် မတော်တဆမှု ဖြစ်ပွားပါက သို့မဟုတ် အရည်အသွေး စံနှုန်းများ မကိုက်ညီတော့ပါက သင့်လျော်သော စီမံခန့်ခွဲရေး လုပ်ငန်းများ ကို တတ်နိုင်သမျှ ဆောင်ရွက်နိုင်စေရန် အတွက် ဒီဇိုင်းရေးဆွဲ ပြီး ထည့်သွင်းဖော်ပြရန် | • ခေါင်းစဥ်ခွဲ ၈.၁၀.၄.၁ စာမျက်နှာ ၂၇၉-၂၈၀ တွင်ဖော်ပြထားပါသည်။ |
|------|---|---|
| | အစီရင်ခံစာတွင် မကျေနပ်ချက်များ နှင့် နစ်နာမှုများကို စီမံခန့်ခွဲ ဖြေရှင်းဆောင် ရွက်မည့် နည်းလမ်း ကို ထည့်သွင်းဖော်ပြရန် | • ခေါင်းစဥ်ခွဲ ၈.၁.၁ စာမျက်နှာ ၂၈၂-၂၈၆ တွင်ဖော်ပြထားပါသည်။ |
| | အစီရင်ခံစာရေးသားပြုစုသူမှ အစိရင်ခံစာသည် ပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း အပါအဝင် သက်ဆိုင်ရာ ဥပဒေများကို တိကျစွာလိုက်နာ၍ ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဥ်ကို ရေးဆွဲထားပါကြောင်း ကတိကဝတ်အားထည့်သွင်းဖော်ပြရန် | ခေါင်းစဥ်ခွဲ ၈.၁၂ စာမျက်နှာ ၂၈၇ နှင့် ၂၈၈ တွင် ဖြည့်စွက် ဖော်ပြ ထားပါသည်။ |
| OOII | နိဂုံးနှင့် သုံးသပ်ချက် | |
| | အစီရင်ခံစာတွင် လုပ်ငန်းကို လူမှုရေးဆိုင်ရာ ထိခိုက်မှု အနည်းဆုံး ဖြစ်စေရန် လည်ပတ် ဆောင်ရွက်နိုင်မည့် အကြောင်းအရာများ နှင့် ပက်သက်၍ ထည့်သွင်း ဖော်ပြရန် | • အခန်း ၉ စာမျက်နှာ ၂၈၉ နောက်ဆုံးစာပိုဒ်, ၂၈၀ ပထမ ၄ပိုဒ် တို့တွင် ဖော်ပြ ထားပါသည်။ |
| SOII | အထွေထွေ | |
| | ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံး လုပ်နည်း အပိုဒ် ၁၀၈ အရ ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဥ် ၏ ဧယားပါ အတိုင်း စောင့်ကြပ် ကြည့် ရှုမှု အစီရင်ခံစာကို ဝန်ကြီးဌာနသို့ (၆) လတစ်ကြိမ် တင်ပြရန် | - |



လူမှုရေး ဆိုင်ရာ စီမံခန့်ခွဲမှု) အခန်းကဏ္ဍတွင့် ထည့်သွင်းဖော်ပြရန် -ပြန်လည်ရေးဆွဲမည့် EMP အစီရင်ခံစာတွင် ယခု ပေးပို့သော အကြံပြုချက် • Appendix C စာမျက်နှာ ၂၉၆-၃၀၂ တွင်ဖော်ပြထားပါသည်။ တစ်ခုချင်းစီအလိုက် ဖြေရှင်း ချက် များကို အစီရင်ခံစာ၏ မည်သည့် အပိုင်းမည်သည့် စာမျက်နှာ တွင် ရေးသားထားသည်ကို ဖော်ပြသည့် (Comment Response Table) ကို ဖော်ပြပေးရန်။

- ကတိကဝတ်ဆိုင်ရာ ဖော်ပြချက်များအား အစီရင်ခံစာ (ပတ်ဝန်းကျင် နှင့် 🕨 ကတိကဝတ်ကို ခေါင်းစဥ်ခွဲ ၈.၁၂ စာမျက်နှာ ၂၈၇ နှင့် ၂၈၈ တွင် ဖြည့်စွက် ဖော်ပြ ထားပါသည်။



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