ENVIRONMENTAL AUDIT REPORT OF THE MAIN ESTATE INCLUDING OIL PALM PLANTATION & PALM OIL MILL AT OKOMU-UDO IN OVIA SOUTHWEST LOCAL GOVERNMENT AREA, EDO STATE, NIGERIA

SUBMITTED TO

NATIONAL ENVIRONMENTAL STANDARDS AND REGULATIONS ENFORCEMENT AGENCY (NESREA)

FEBRUARY 2025

Environmental Audit Report of the Main Estate including Oil Palm Plantation & Palm Oil Mill at Okomu-Udo in Ovia Southwest Local Government Area, Edo State, Nigeria

Submitted to:

National Environmental Standards and Regulations Enforcement Agency (NESREA)

Prepared by

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February 2025

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2. Environmental Studies
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Date of Issue : 06/10/2024

Expiry : 06/10/2025

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ACRONYMS AND ABBREVIATIONS

AAWUN	Agricultural and Allied Workers Union of Nigeria
AGO	Automotive Gas Oil
BOD	Biochemical Oxygen Demand
CBD	Convention on Biological Diversity
CO	Carbon monoxide
CO_2	Carbon dioxide
COD	Chemical Oxygen Demand
^oC	Degree Celsius
CFCs	Chlorofluorocarbons
CITES	Convention for prevention of International Trade in Endangered Species
CSR	Corporate Social Responsibility
DO	Dissolved Oxygen
DPR	Department of Petroleum Resources
EAuR	Environmental Audit Report
ECM	Environmental Compliance Monitoring
EFB	Empty Fruit Bunch
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
FDS	Foremost Development Services Limited
FFB	Fresh Fruit Bunch
FMEnv.	Federal Ministry of Environment
GHG	Green House Gas
Ha	Hectare
HSE	Health Safety and Environment
IEC	Informative, Educative and Communication
IFC	International Finance Corporation
IIBP	Industry International Best Practice
IPA	Impact Producing Activity
IPM	Integrated Pest Management
IPO	Initial Public Offer
ISO	International Organization for Standardization
Km	Kilometer
LCA	Life Cycle Analysis
LGA	Local Government Area
MT	Metric Tonne
NESREA	National Environmental Standards and Regulations Enforcement Agency
NO_x	Oxides of Nitrogen
OOPC	Okomu Oil Palm Company
PHI	Public Health Impact
PMS	Premium Motor Spirit
PPE	Personal Protection Equipment
SDS	Safety Data Sheet
SIA	Social Impact Assessment
SO_2	Sulphur dioxide
SPM	Suspended Particulate Matter
TSS	Total Suspended Solids
UNFCCC	United Nations Framework Convention on Climate Change
UNICEM	United Cement Manufacturing Co. Ltd
WHO	World Health Organization

ACKNOWLEDGEMENTS

We appreciate the time and patience expended by the management of the various departments of Okomu Oil Palm Company Plc providing us with the information and answering our probing questions. Without their contributions it would not have been possible to achieve comprehensive coverage of the areas and issues considered in this environmental management plan.

We are particularly grateful and appreciate the level of support and cooperation that we received from the following staff of the Company during the exercise.

Dr. Graham HEFER;	*Managing Director*
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Executive Summary

ES1 INTRODUCTION

The Okomu Oil Palm Company Plc (OOPC Plc) is a leading agricultural establishment in Nigeria. The company specializes in the establishment and maintenance of oil palm and rubber plantations and has been in operation for over 35years. The company has incorporated remarkably high environmental standards in its operations and is committed to continual improvement in its environmental management system.

The company mission is to be Nigeria's leading Agro business, through the efficient and effective management of our various plantations by a highly motivated workforce, working in harmony with our stakeholders, and continuously returning favourable results to our shareholders.

ES2 OVERVIEW OF THE FACILITY

The Okomu Oil Palm Company Plc (OOPC Plc) is an agricultural and food- processing company located at Okomu-Udo, Ovia Southwest Local Government Area, Edo State, Nigeria. The company specializes in plantation development and production of special palm oil, palm kernel oil and palm kernel cake. It started operation in 1976 as a Federal Government project and was privatized in 1990. The then Bendel State government granted the company a total concession of about 15,000 hectares within the Okomu forest reserve in 1978. About 15,580 hectares of the total concession at the main estate has been developed into oil palm and rubber plantations.

Okomu Oil Palm Company Plc has over 12,000 individual and institutional shareholders, both Nigerian (40%) and foreign (60%).

The company is located at Okomu-Udo, within the Okomu Forest Reserve in Ovia Southwest Local Government Area of Edo State, Nigeria. The company is accessible through a network of roads from Lagos and Benin City. It lies between latitude $5^0$07' and $5^0$25' N and longitude $6^0$18' and $6^0$26' E.

The palm oil mill processes FFB into Special Palm Oil (SPO) and Palm kernel (PK). The FFB after weighing in the weighbridge are carried in boogies, which feed them into Sterilizers and use of motorized conveyors for tilting sterilizers. The fruits are washed, threshed, and are then digested in the Digester. From the Digester, crude oil is extracted at the Press, leaving the cake. The cake line further processes the nuts and fibres. The nuts are cracked and separated into shells and kernels. The kernels are recovered and sent to the PKO plant, while the shells and fibres are fed into the boiler as fuel.

ES3 BASELINE ENVIRONMENTAL ASSESSMENT AND MANAGEMENT STUDY

The audit of the facility and the existing Environmental, Occupational Health, and Safety Management System was carried out using the combination of the IFC's Environmental, Health, and Safety Guidelines for "Perennial Plantation Crop Production" (IFC, March 30, 2016) and Vegetable Oil Production and Processing (IFC, February 12, 2015), the National Guidelines for Environmental Audit Report (EAR) in Nigeria, Nigeria Factories Act, CAP F1 LFN 2004 and Industry/Management Best Practices.

In addition to land use, extensive reserves of natural vegetation were established as riparian buffer zones along the streams that drain the plantation and occupy 959.47 ha, or 6.16% of the concession area for the Main estate. The buffer zone has been well maintained, and they provide important habitat for flora and fauna.

Soil conservation practices are well understood and implemented across the plantations . The roads appeared well constructed and maintained with appropriate drainage measures and sediment traps in place.

The company has put in place an incredibly good program for recycling palm oil mill factory waste nutrients in the field by means of EFB mulching. Also, the system for distributing EFB is professionally managed.

There is also a well-developed program for integrated pest management (IPM), but more tall trees should be retained at new development sites for attracting birds of prey. However, the approach to pesticides use is well controlled and consistent across the plantation estate.

The company's palm oil mill is well located and operated efficiently, with high throughput, oil extraction rates and good quality control of FFA.

The company maintains a list of statutory permits and certificates relevant to different operations and equipment in use. A good number of these permits and certificates have been obtained or revalidated. The level of performance of the company has been improved in this regard.

Environmental Issues:

The quality of the environment is high with good housekeeping at the offices and management/senior staff residences. However, the housekeeping and sanitation at some workplaces particularly labour line quarters would need considerable improvement. The basic information for the protection of the environment, and the basic education and consciousness for safety at workplaces have been established with a high sense of safety responsibility as demonstrated by workers across board.

The operations in oil palm plantation and other workplaces are fraught with hazards and pollution potential. However, the company has put in place several abatement measures including the provision of PPE to protect workers against workplace hazards

and pollution prevention. In similar vein, a number of provisions have been made for waste reuse, waste reduction and waste recycling. These provisions include the use of fibres and kernel shells to fuel the boiler, mulching with EFB, oil retention trays and oil separation pits.

The facilities for storage of potentially hazardous substances at some chemical stores were built without the benefit of design information on environmental protection measures, such as spill containment. However, routine environmental monitoring is undertaken to ensure that the treated palm oil mill effluent is of acceptable quality before it is discharged into the environment. So also, are surface water and groundwater are of acceptable quality as well.

Waste Management:

The waste management system is good. For solid waste, reasonable provisions have been made for collection, transportation, and disposal. An internal solid waste dumpsite has been established thus enabling the tracking of waste. In addition, the company has a valid permit from Edo State Ministry of Environment and Sustainability to operate the solid waste dumpsite/landfill within the estate.

Safety Issue:

Signage display level, relating to safety education and safety warnings at workplaces has improved. Although, there is a need for the procurement and display of more posters and safety related messages at workplaces.

Medical Statistic:

The clinic is functional. Malaria, non-industrial musculoskeletal problems, abdominal pains, Respiration Tract, and minor ailments such as bruises, cut, pains, etc., are the most prevalent illnesses. The preventive health education programme of the clinic needs some improvement with special emphasis on prevention of malaria.

ES4 AUDIT FINDINGS AND ITS EVALUATION

The results of laboratory analysis obtained during this audit show that the groundwater quality is good and free from pollution except for low pH thus making the water to be slightly acidic (4.40 – 7.85), which is below the FMEnv and WHO (2004) drinking water guideline of pH 6.5-8.5 except for Mill Complex with 7.85. However, the appropriate recommendation has been made for the correction of the pH of the groundwater. Also, the oil mill effluent monitoring well was sampled. The result shows that Turbidity, Colour, BOD and COD exceeded their respective limits.

The ambient air quality measurements undertaken during the audit revealed that the ambient air quality is good with the concentrations of gases and particulate matter monitored within the FMEnv. Limit.

The result has shown that parameters such as Suspended Particulate Matter (SPM) ranges between 152 - 316 µg/m^3; Carbon dioxide, 406 – 773ppm; Carbon monoxide, <1 - 3ppm;

Hydrocarbon, <0.1%; and Nitrogen dioxide, <0.01ppm which are within FMENv permissible limits of ambient, 10-20ppm, nil and 0.4-0.6ppm respectively except SPM which exceed the limit of 250 µg/m^3 at the Agric Office and Oil Mill Powerhouse.

The noise level conforms to the NESREA and FMEnv. limit of 90 dB (A) for 8-hour exposure at all locations except at the cracking section, palm kernel oil factory and oil mill powerhouse. The levels range from 51.8dB(A) – 101.4 dB(A).

The quality of the discharged effluent needs continuous monitoring to ensure its quality and safe discharge into the environment. However, the lagoon system for biological treatment of palm oil mill effluent needs improvement such as scooping the bottom layer of POME Lagoon.

ES5 IDENTIFICATION, QUANTIFICATION AND CHARACTERIZATION OF WASTE

The waste stream within the study area is generated from industrial, domestic and anthropogenic activities. Typical industrial waste data are collected from OOPC Plc- Main Estate that had very reliable waste management system and plans on ground. The waste typology is a representative of industrial waste generated within the palm oil mill factory operational area. Waste generated in this facility from oil mill process plants and services departments, are identified, characterized, collected, transported and disposed appropriately and in some cases, they are re-used or recycled.

An adequate drainage system is constructed around the facility according to the site conditions. Paved and concreted areas are sloped to allow for proper drainage. However, the final disposal point for all waste is through its own internal dumpsite. The company has a valid permit from the Edo State Ministry of Environment and Sustainability to operate the solid waste dumpsite.

ES6 IMPACT EVALUATION

Impact Qualification and Evaluation

Interaction between the different activities and the environmental receptors, identified through the audit data gathering, was carried out. Such interactions may result in negative or positive impacts. Based on the analysis of the data gathered, environmental conditions and the nature of the receiving environment, some aspects were found to be irrelevant to specific activities of this facility operation. These are identified as "scoped out impacts". Potential impacts were subject to a process of impact evaluation, based on the analysis of Okomu OPC Plc – Main Estate operations/activities, in order to determine the significance of the different impacts. The evaluation process considers the information acquired during the audit data gathering, and the professional judgment of the environmental audit team.

ES7 CONCLUSION AND RECOMMENDATIONS

The audit has revealed the high level of consciousness and awareness of the environment by the workers and has identified the need for continuously undertaking training and education of workers widely on related environmental, safety and health issues.

For all the observed limitations, non-conformances and poor performances, appropriate recommendations have been made for improvement. In order to bring to effect the recommendations arising from this audit therefore, robust environmental action plans (EAPs) has also been developed for the estate. It is recommended that the EAPs be diligently implemented.

CHAPTER ONE

INTRODUCTION

1.1 Overview of Background Information

The Okomu Oil Palm Company Plc (OOPC Plc) is a leading agricultural establishment in Nigeria. The company specializes in the establishment and maintenance of oil palm and rubber plantations and has been in operation for over 35years. The company has incorporated remarkably high environmental standards in its operations and is committed to continual improvement in its environmental management system.

The company commissioned Foremost Development Services Limited (independent environmental consultants) to carry out an Environmental Management Plan of its processes and operations covering its plantations and supplementary facilities. The objective is to determine and thereby provide regulatory bodies (such as NESREA and Edo State Ministry of Environment and Sustainability) with a clear indication of the overall environmental performance of the company for the period covered by this audit.

The audit involves the examination of operations, records, and data between ***2023 and 2024*** vis-à-vis conformance to state, national and international legislations, fieldwork inspections and interview of employees. In addition, some physical environmental factors were sampled, and the samples collected were later analyzed in the laboratory.

An overall assessment of the operations is then summarized in Chapter Seven (Summary of Audit Findings) and a robust prioritized Environmental Action Plans in Chapter Eight for the changes that have been recommended for improving the environmental, health and safety performance.

This report is structured to present the description of the facilities and processes, provide information on environmental planning approvals and mill operation, followed by analysis and facility audit in the sequence of topics listed in the IFC's Environmental, Health, and Safety Guidelines for "Perennial Plantation Crop Production" (IFC, March 30, 2016) and Vegetable Oil Production and Processing (IFC, February 12, 2015).

1.2 Mission Statement of Okomu Oil Palm Company Plc

Our Mission is:

To be Nigeria's leading Agro business, through the efficient and effective management of our various plantations by a highly motivated workforce, working in harmony with our stakeholders, and continuously returning favourable results to our shareholders.

Our Core Values

- Honesty
- Service
- Adherence to rules
- Recognition (Respect and Reward)

1.3 Aim and Objectives of EAR

1.3.1 Aim

The audit is aimed at assessing the environmental performance of the company, evaluating its compliance with environmental legislations and policies, and measuring its performance against its Environmental Management System.

1.3.2 Objectives

FDS is expected to establish at the end of the audit if:

(a) Operations at the factory is in compliance with Federal, State and Local Government Laws and regulations, in the management of noise level and all emission and solid/liquid waste discharge into the environment.
(b) Operations are carried out to have zero accident rate, guarantee safety and quality of products, safeguard the health and safety of employees and protect the public and the environment of the factory from injuries or health hazards and the company's assets from avoidable accidents or destruction.
(c) Potential liabilities resulting from its operation is identified, so as to effectively mitigate such liabilities.
(d) Adequate resources and systems are in place for dealing with environmental issues or problems when the need arises.
(e) Existing facilities to minimize environmental impact are adequate and cost effective or newer technologies should be employed.

1.4 Benefits

One of the major advantages derived from the factory's environmental audit is that it would provide an indication to company's management on how well the systems and equipment are performing, identify compliance problems and areas of risk, highlight the strengths and weakness of safety measures, and make recommendations on improvements.

Other benefits include:

- ❖ Facilitating comparison and interchange of information between operations in the factory.
- ❖ Increased employee awareness of environmental policies and responsibilities.
- ❖ Identifying potential cost – saving measures including those resulting from waste minimization.
- ❖ Evaluating training programmes and providing data to assist in training personnel.
- ❖ Providing information base for use in emergencies and evaluating the effectiveness of emergency response arrangements.
- ❖ Assuring an adequate, up to date environmental data base for internal management, awareness/decision making in relation to factory modification, and new factory proposals etc.
- ❖ Enabling management to give credit for good environmental performance
- ❖ Helping to assist relation with regulatory authorities by convincing them that complete and effective assessments are being undertaken and by informing them of the adopted procedure.
- ❖ Facilitating the objective of insurance coverage for environmental impairment.

1.5 Terms of Reference (TOR)/Scope of Audit

Terms of reference of the audit include to:

i. Ascertain the level of compliance of the facility operations with statutory/regulatory standards.
ii. Quantify of environmental components.
iii. Assess the socio-economic impact of the facility.
iv. Measure the health impact of the company's operations on the staff.
v. Assess the existing Environmental Management System and General Housekeeping of the facility.
vi. Evaluate the safety practices and measures put in place by the company.
vii. Proffer solution/mitigation measures to identified negative impacts.
viii. Prepare a statutory report for regulatory agencies based on the information gathered.

1.6 Review of Relevant Environmental Legislation

Some of the national legislations relevant to the project operations are listed below:

- Environmental Impact Assessment (EIA) Act, Cap E12 LFN 2004.
- National Guidelines and Standards for Environmental Pollution Control in Nigeria, 1991.
- The National Policy on Environment, 1989 (revised 2016).
- Harmful Waste (Special Criminal Provisions) Act of 1988.
- National Guidelines for Environmental Audit in Nigeria, 2011 (Revised, 2024).
- National Guidelines on Environmental Management System in Nigeria, 1999.
- National Environmental Standards and Regulations Enforcement Agency, (Establishment) Act No. 25, 2007.
- National Environmental (Food, Beverages and Tobacco Sector) Regulations, S.I. 33 of 2009.
- National Environmental Protection (Pollution Abatement in Industries and Facilities Generating Wastes), Regulations S.I.9 of 1991.
- National Environmental (Ozone Layer Protection) Regulations, S.I. 32 of 2009.
- National Environmental Protection (Management of Solid and Hazardous Wastes) Regulations, S.I.15 of 1991.
- National Environmental (Sanitation and Waste Control) Regulations, S.I.28 of 2009
- National Environmental (Noise Standards and Control) Regulations, S.I. 35 of 2009.
- National Environmental (Surface and Groundwater Quality Control) Regulations, S.I. 22 of 2011.
- National Environmental (Air Quality Control) Regulations, S.I. 64 of 2014.
- National Environmental (Control of Vehicular Emissions from Petrol and Diesel Engines) Regulations, S.I. 20 of 2011.
- Factories Act CAP F1 LFN 2004
- Land Use Act, CAP L5 LFN 2004

1.6.1 National Policy and Regulations

National Policy on Environment

The National Policy on Environment (revised 2016) provides for "a viable national mechanism for cooperation, co-ordination and regular consultation, as well as harmonious management of the policy formulation and implementation process which requires the establishment of effective institutions and linkages within and among the various tiers of government, federal, state and local governments".Prior to the launching of this policy, there was no unified co-ordination of activities of the 3-tiers of government responsible for the environment.

***Environmental Impact Assessment* (EIA Act CAP E12 LFN 2004)**

EIA act was promulgated in 1992. It makes environmental impact assessment (EIA) mandatory for all new major projects. Therefore, an EIA is requested by the Federal Ministry of Environment for the proposed project.

National Environmental Standards and Regulation Enforcement Agency (Establishment) Act No. 25, 2007

This is the embodiment of laws and regulations focused on the protection and sustainable development of the Environment and its natural resources via some of the relevant sections are listed below:

- **Section 7** provides authority to ensure compliance with environmental laws (local and international) and also deals with Environmental sanitation, pollution prevention and control through monitoring and regulatory measures.
- **Section 8 (1)(K)** empowers the Agency to make and review regulations on air and water quality, effluent limitations, control of harmful substances and other forms of environmental pollution and sanitation.
- **Section 27** prohibits, without lawful authority, the discharge of hazardous substances into the environment.

National Environmental (Food, Beverages and Tobacco Sector) Regulations, S. I. No. 33 of 2009

These provides to prevent and minimise pollution from all operations and ancillary activities of food, beverages, and tobacco sector to the Nigerian environment.

National Guidelines and Standards for Environmental Pollution Control in Nigeria 1991

This schedule deals with the control of industrial effluent discharge, gaseous emissions, and hazardous wastes, so also noise pollution control. This schedule established environmental guidelines and standards for the abatement and control of all forms of

pollution.

The proposed and/or project would therefore have to ensure that any discharges into the land, water and atmosphere are of acceptable quality to ensure that there are no legal repercussions under this schedule.

National Pollution Abatement in Industries and Facilities Generating Wastes Regulations S.I.9, 1991

This regulation requires every industry to install anti-pollution/pollution abatement equipment to treat effluent discharges and gaseous emissions to the standards and limits prescribed in Regulation S.I.8, 1991.

National Environmental (Control of Vehicular Emissions from Petrol and Diesel Engines) Regulations, S. I. No. 20 of 2011

The purpose of this Regulation is to safeguard the Nigerian environment against pollutants from vehicular emission**.**

Waste Management and Hazardous Wastes Regulations S.I.15

This regulation requires that all steps that are necessary must be taken for the effective management of solid and hazardous wastes in order to safeguard public health, also ensure that waste is collected, stored, transported, recycled, reused or disposed in an environmentally sound manner and promote safety standards in relation to such waste.

National Environmental (Sanitation and Waste Control) Regulations, 2009 (S.I.28)

The purpose of these regulations is the adoption of sustainable and environment friendly practices in environmental sanitation and waste management to minimize pollution. The provisions of the regulations state that a person in care, management or control of any industrial facility shall:

(a) Provide educational and pictorial signs to direct persons where they can drop waste.
(b) Provide receptacles for recyclable materials in appropriate and easily accessible locations.
(c) Keep the premises, drains and all public or private lands, street, lanes, walkways; beaches or docks within 5 meters of the boundary of the property free from litter always.
(d) Ensure that discarded materials are regularly collected and disposed of sanitarily.
(e) Ensure that recyclable materials are properly packed and neatly stacked.
(f) Ensure sorting and segregation of solid waste at source.

National Environmental (Surface and Groundwater Quality Control) Regulations, S. I. No. 22 of 2011

The purpose of this Regulation is to restore, enhance and preserve the physical, chemical and biological integrity of the nation's surface waters, and to maintain existing water uses.

National Environmental (Noise Standards and Control) Regulations, 2009 (S.I.35)

The purpose of these regulations is to ensure maintenance of a healthy environment for all people in Nigeria, the tranquility of their surroundings and their psychological well-being by regulating noise levels and generally, to elevate the standard of living of the people. The regulations among others state the permissible noise levels to which a person may be exposed; control and mitigation of noise; permits for noise emissions in excess of permissible levels; and enforcement.

National Environmental (Ozone Layer Protection) Regulations, 2009 (S.I.32)

These Regulations impose ban on any person to import, manufacture in part or in whole, install, offer for sale or buy new or refurbished facilities intended to be used for the production of any ozone-depleting substance (ODS), unless for the recovery and recycling of substances already in use. The Regulations state that no person shall release or permit the release into the atmosphere an ozone- depleting substance from an equipment or any part of an equipment; fire extinguishing equipment except during firefighting; a container used in the supply, recovery, recycling, reclamation, transportation, or storage of an ozone depleting substance.

The constitution of the Federal Republic of Nigeria (1999) as the national legal framework recognizes the importance of improving and protecting the environment. The related sections of the constitution are:

- **Section 20** makes it an objective of the Nigerian State to improve and protect the air, land, water, forest and wildlife of Nigeria.
- **Section 12** establishes, though impliedly, that international treaties (including environmental treaties) ratified by the National Assembly should be implemented as law in Nigeria.
- **Sections 33 and 34** which guarantee fundamental human rights to life and human dignity respectively, have also being argued to be linked to the need for a healthy and safe environment to give these rights effect.

Land Use Act, Cap L5 LFN 2004

The Nigerian Land Use Act 1978 was promulgated in March 1978. It vests all land in each state of the federation (except land already vested in the Federal Government or its agencies) in the Governor of the state. It makes the state Government the authority for allocating land in all urban areas for residential, agricultural commercial and other purposes while it confers similar powers regarding non-urban areas on the Local Government in such area. The Governor of a state can revokes a Right of occupancy (statutory customary) for overriding public interest.

Factories Act CAP F1 LFN 2004

The regulations for Health, Safety and Welfare are under this act. This act also requires that: Before any person occupies or uses as a factory any premises which were not so occupied at the commencement of this Decree, he shall apply for the registration of such premises by sending to the Director of Factory an application containing the particulars set out in Schedule 1 to this Decree.

Any person who has not been issued a certificate of registration as aforesaid occupies or uses as a factory any premises that have not been registered as a factory shall be guilty of an offence.

1.6.2 International Agreements and Protocols

Nigeria's commitments to global environmental agreements includes:

The Montreal Protocol, 1985: on substances that deplete the ozone layer and the promotion of the synthesis of new and environment-friendly products.

The Basel Convention, 1989: for the control of Trans-boundary Movement of Hazardous Wastes and Substances and their disposal.

The United Nations Framework Convention on Climate Change (UNFCCC), 1992): to stabilize atmospheric concentrations of greenhouse gases at levels that will prevent human activities from interfering dangerously with the global climate system.

The Convention for the Prevention of International Trade in Endangered Species, (CITES), 1973: regulates trading with/trade restrictions involving certain wild animals and plants whose numbers are considered to be endangered.

Convention on Biological Diversity (CBD), 1992: on the conservation of biodiversity; the sustainable use of its components; and the fair and equitable sharing of the resulting benefits.

International Financial Corporation (IFC) Performance Standards: international guidelines of IFC Performance Standards which include:

- **Performance Standard 1:** Assessment and Management of Environmental and Social Risks and Impacts
- **Performance Standard 2:** Labor and Working Conditions
- **Performance Standard 3:** Resource Efficiency and Pollution Prevention
- **Performance Standard 4:** Community Health, Safety and Security
- **Performance Standard 5:** Land Acquisition and Involuntary Resettlement
- **Performance Standard 6:** Biodiversity Conservation and Sustainable Management of Living Natural Resources
- **Performance Standard 7:** Indigenous People
- **Performance Standard 8:** Cultural Heritage

IFC- Environmental Health and Safety (EHS) Guidelines for Perennial Crop Production.

1.7 Approach and Methodology

The following steps were involved in the conduct and analysis of the findings of this audit:

(i) Pre-study activities included among others:

(a) Obtaining full management commitment
(b) Setting overall goals, objectives, scope and priorities
(c) Selecting audit team that ensured objectivity and professional competence
(d) Reviewing the following background information and operational information with facility Management:

i. Permits, license, Specific information on location, layout, organizational chart, products, production processes, flow charts, and specific wastes generated etc.
ii. History of environmental issues
iii. Environmental monitoring data (solid waste disposal, gaseous emission etc.).
iv. Infrastructure arrangements, energy, materials and human resources that would need to be provided for the factory.
v. Environmental pollution load, abatement measures, permits, licenses, treatment and disposal mechanisms.

- Photocopies of any of the items mentioned in (i)-(iv) were requested (where applicable) before commencement of studies.

(ii) On-Site Activities Included:

- Management brief by FDS on the scope and the audit approach.
- Inspection of every unit of operation of the factory, and findings recorded.
- Borehole, Surface water, waste water and air samples were taken for analysis.
- Measurement of air quality and noise level within and around the facility were carried out with automated, pre-calibrated equipment to obtain current data of the environment.
- Representative samples and measurements were taken according to standard analytical procedures for analysis and in accordance with the methods of the American Public Health Association (APHA) and the laboratory of the water pollution federation of the United States of America.
- The FME specifications Regulation S.1.8 and National Environmental (Food, Beverages and Tobacco Sector) Regulations, S. I. No. 33 of 2009 were used to assess the values of various parameters determined with the allowable limits.

(iii) Post Audit Activities Included:

- Discussion and evaluation of audit findings
- Preparation of the draft audit report
- Discussion of the draft report with management
- Issuance of final report
- Preparation of action plan based on findings and recommendations.

1.8 REPORT STRUCTURE

This report contains six chapters. The outline of the content of each chapter is presented below:

Chapter One: presents the Background Information, Aims and Objectives of Study, the Terms of Reference (TOR)/Scope, Legal and Administrative Framework, Audit Process, Report Structure and Study Approach and Methodology.

Chapter Two: dealt with the description of facility, HSE Organogram, process description and summary of ancillary operations of the company.

Chapter Three: details the baseline environmental assessment and Management study which includes description of the facility under study and the surrounding environment, Existing environmental management system, survey of compliance with environmental laws, regulations, and company policies

Chapter Four: details the audit findings are presented and cover areas such as: observations and evaluation of general housekeeping and safety practices; identification, quantification,

and characterization of waste; material balance, description of environmental effects related to operational activities and impact evaluation.

Chapter Five presents the Identification, Qualification and Characterization of Waste.

Chapter Six presents Impact Evaluation and Public Health Impact (PHI).

Chapter Seven presents Summary of Audit Findings.

Chapter Eight presents Remarks and Recommendation and also Environmental Action Plan (EAP).

1.9 Period of Audit

The audit exercise was undertaken from 10th December – 12th December 2024.

CHAPTER TWO

OVERVIEW OF THE FACILITY/DEVELOPMENT OR ACTIVITY UNDER AUDIT

2.1 Description of Facility

2.1.1 Company History

The Okomu Oil Palm Company Plc (OOPC Plc) is an agricultural and food- processing company located at Okomu-Udo, Ovia Southwest Local Government Area, Edo State, Nigeria. The company specializes in plantation development and production of special palm oil, palm kernel oil and palm kernel cake. It started operation in 1976 as a Federal Government project and was privatized in 1990. The then Bendel State government granted the company a total concession of about 15,000 hectares within the Okomu forest reserve in 1978. About 15,580 hectares of the total concession at the main estate has been developed into oil palm and rubber plantations.

Okomu Oil Palm Company Plc has over 12,000 individual and institutional shareholders, both Nigerian (40%) and foreign (60%).

2.1.2 Location and Access

The company is located at Okomu-Udo, within the Okomu Forest Reserve in Ovia Southwest Local Government Area of Edo State, Nigeria. The company is accessible through a network of roads from Lagos and Benin City. It lies between latitude $5^0$07’ and $5^0$25’ N and longitude $6^0$18’ and $6^0$26’ E.

Within the estate, there is over 600.04 km earth road network at Main and Extension One estates, ensuring that all the features and plantation field are easily accessible.

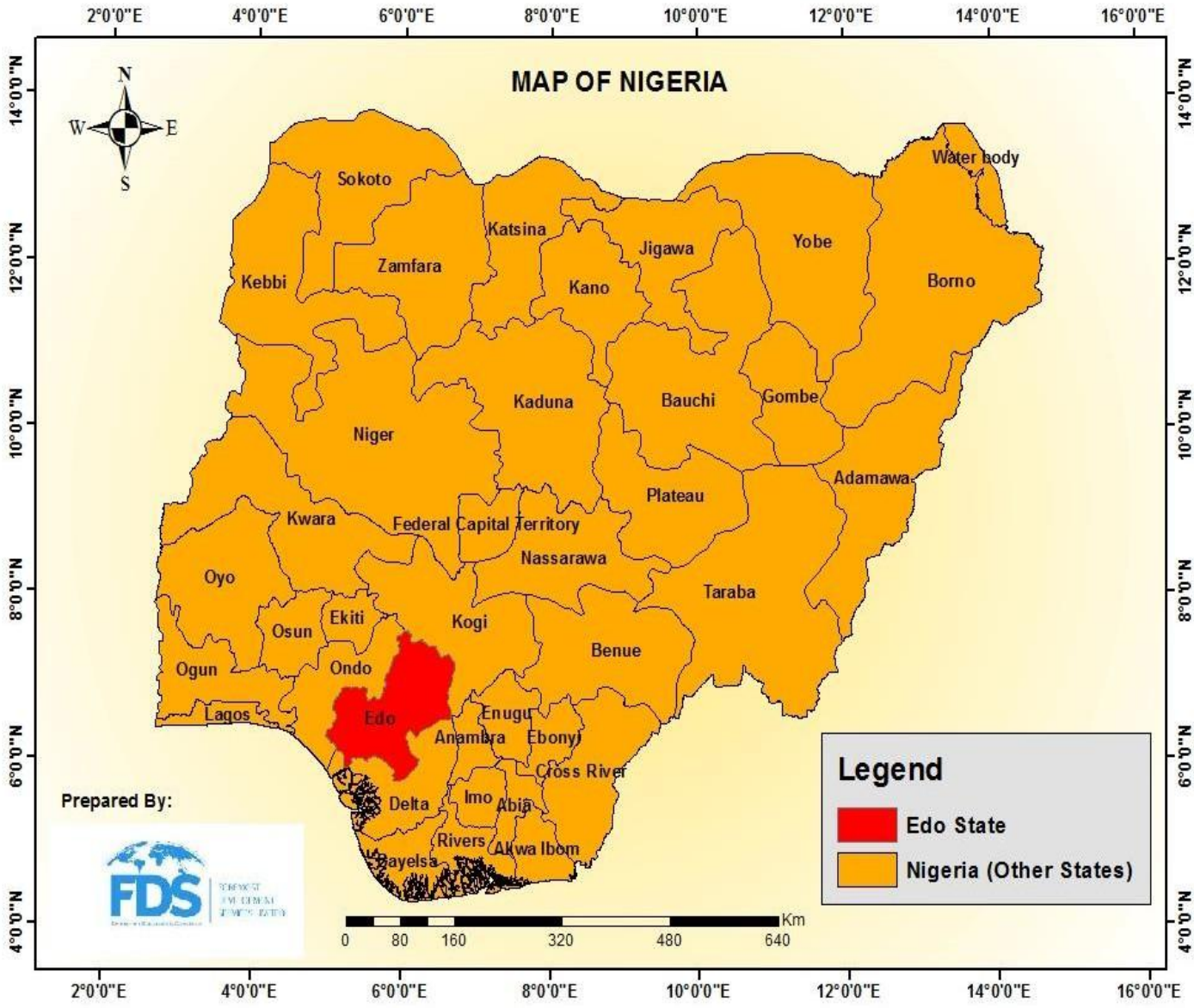


Figure 2.1: Map of Nigeria Indicating Edo State

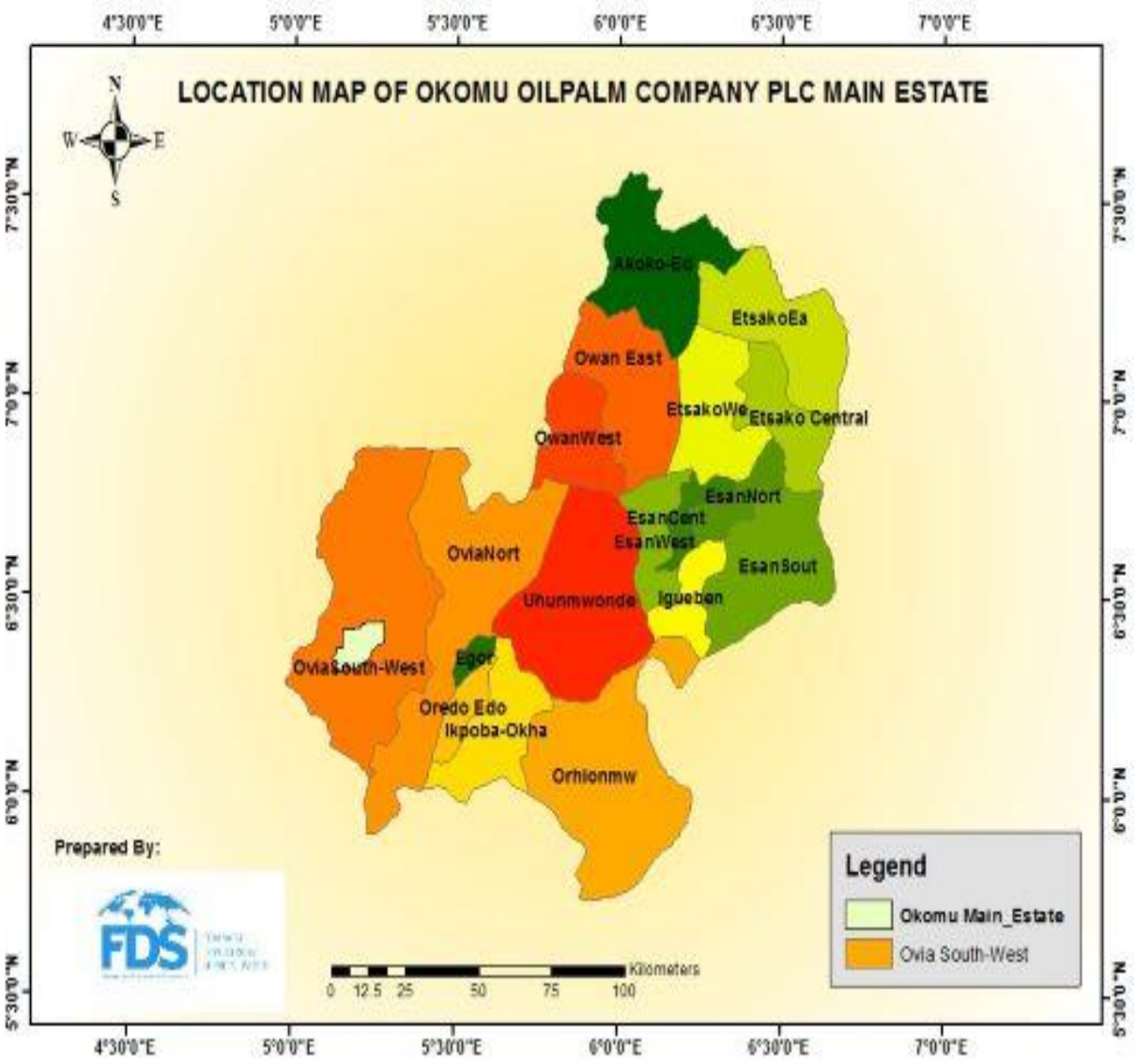


Figure 2.2: Map of Edo State Indicating Location of Okomu-OPC Plantation in Relation to Ovia Southwest LGA

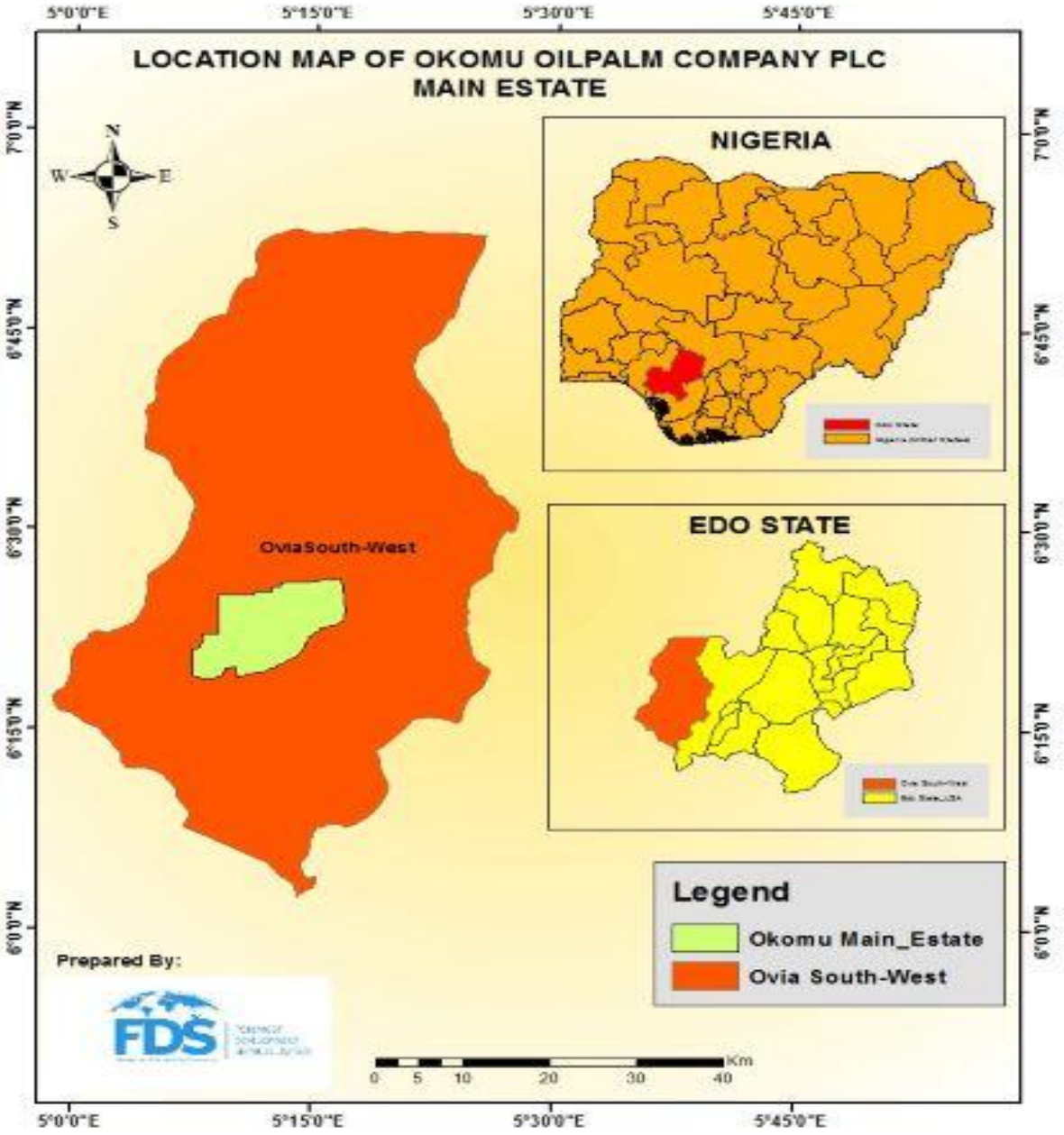


Figure 2.3: Location of Okomu-OPC Main Estate Plantation in Relation to Ovia Southwest LGA, Edo State and Nigeria.

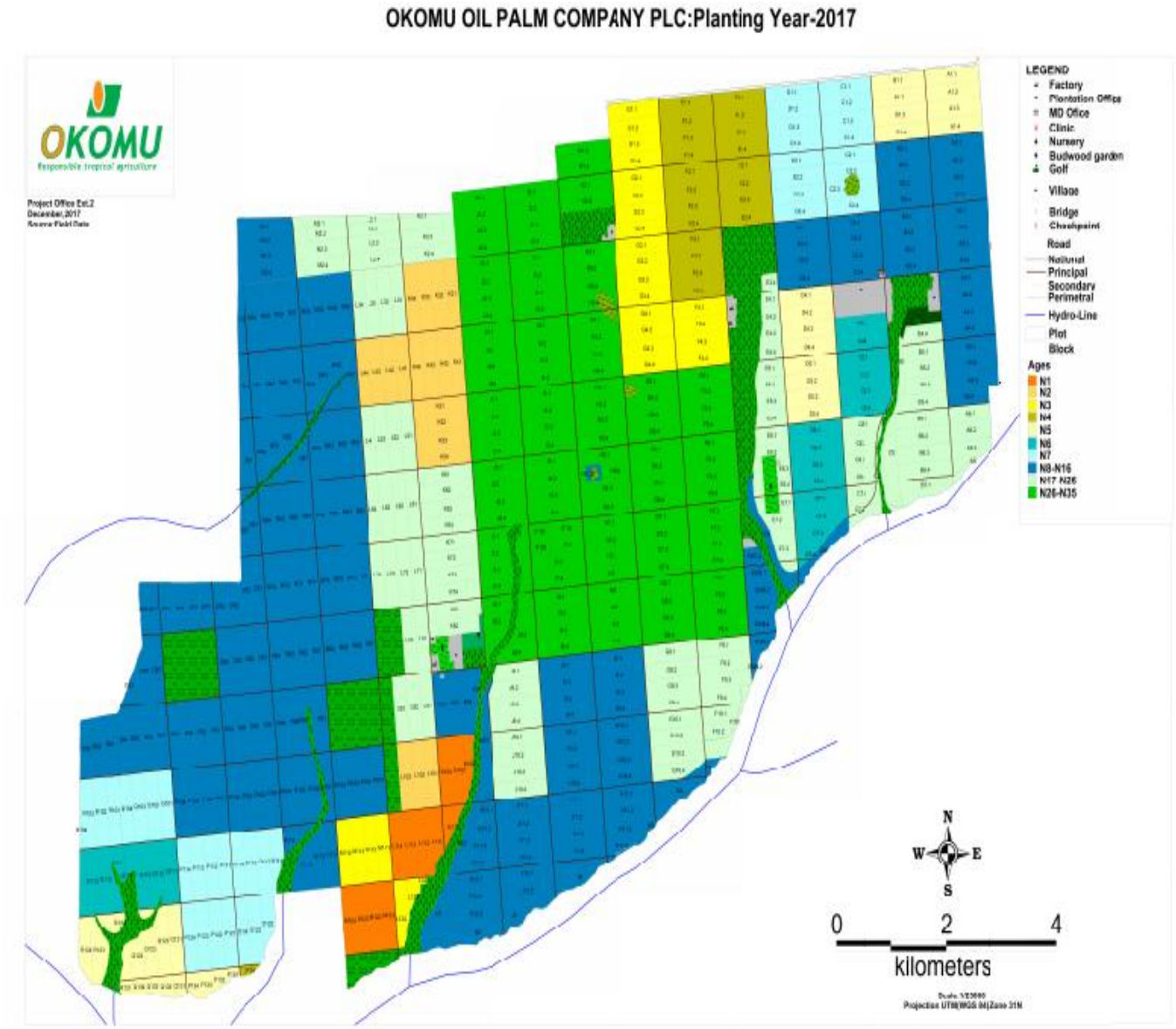


Figure 2.4: Main Estate Plantation Map

Source: Okomu OPC Plc HSE Department (December 2024)

2.2 Palm Nursery

The palm nursery is about 22.45 ha. It is for the raising and nurturing of young seedlings of oil palm prior to establishment in the field. The nursery is equipped with sprinkler irrigation facilities and five (5 Nos.) balloon-like (made with polyphenyl material) water storage facilities. Oil palm seedlings are raised in poly bags, until they are 11-15 months old when they are ready for transplanting in the field.

2.3 Oil Palm Plantation

The oil palm plantations comprise oil palm trees of different ages. The total oil palm plantation size is about 8,510.59 ha, with all matured area and 22.45 ha nursery. Plantation development started in 1979 with an initial planting of 148 ha and planting and replanting have progressed till 2017, thus giving the plantation age profile of 3-45 years.

2.3.1 Field Layout

The plantation is laid out in fields of 25 hectares each. The planting rows are aligned North-South to allow for optimum light interception. The NIFOR "Tenera" type of oil palm was solely planted initially, while the IRHO Tenera and other types dominated the latter plantings.

2.3.2 Plantation Up-keep

Oil palm up-keep operations include pruning, weeding, slashing and fertilizer application. Pruning is done manually, and the pruned fronds are laid down within the rows to conserve the soil. Avenue slashing is also done manually while ring weeding is done for individual palms either manually or by the application of herbicides.

Different formulations of fertilizer are used including NPK 15:15:15, 20:10:10, 12:12:17 + 2MgO (used in the nursery and for mature palms), Muriate of Potash (for mature palm), Borax (when there is Boron deficiency) and Kieserite (when there is Magnesium deficiency). Usually, fertilizer application is well guided and based on results of leaf analysis.

In addition, leguminous cover crop, Pueraria is planted to provide ground cover and supply Nitrogen to the soil. Insect pest control is by Integrated Pest Management techniques combining cultural, biological, mechanical, and physical methods. Although, no fungicides are used in the plantation, limited amounts are used in the nursery on prophylactic basis.

2.3.3 Harvesting

Malaysian knife mounted on a long pole is used in harvesting mature palms. Fresh Fruit Bunches (FFB) are collected and transported to the mill in trucks.

2.4 Land Use/Layout

The company operates two different plantations at the Main estate (Oil Palm and Rubber). The oil palm occupies total area of about 8,510.59 ha, while rubber occupies 5,549.37 ha (see Main estate plantation map in Figure 1.4 above).

Furthermore, the land use within Okomu OPC Main estate concession area is detailed in Table 2.1 below.

Table 2.1: Current Land Use

LANDUSE	**LOCATION (Ha)**
	Main Estate
Oil Palm:	
Mature Area	8488.14
Immature Area	Nil
Nurseries	22.45
Total Planted Area:	**8510.59**
Rubber:	
Mature Area	4340.2
Immature Area	1183.4
Nurseries	13.52
Budwood garden	12.25
Total Planted Area:	**5549.37**
Others:	
Housing/Office Area	82.13
Reserved Areas	959.47
Roads	426.57
Undeveloped Land	51.13
Total Estate Land Area (Approx.)	**15579.26**

Source: HSE Office, OOPC Plc (December 2024)

The estate is divided into work areas for good management. Within the estate is provided residential quarters for the management, senior staff, junior staff, and contractors. The facilities and infrastructure in the estate include a modern clinic, management club house, senior staff club house, guesthouse, road network, and powerhouse with generators for electricity supply. There are also boreholes with overhead tanks and ancillary facilities for pipe-borne water supply.

2.5 Organizational Structure

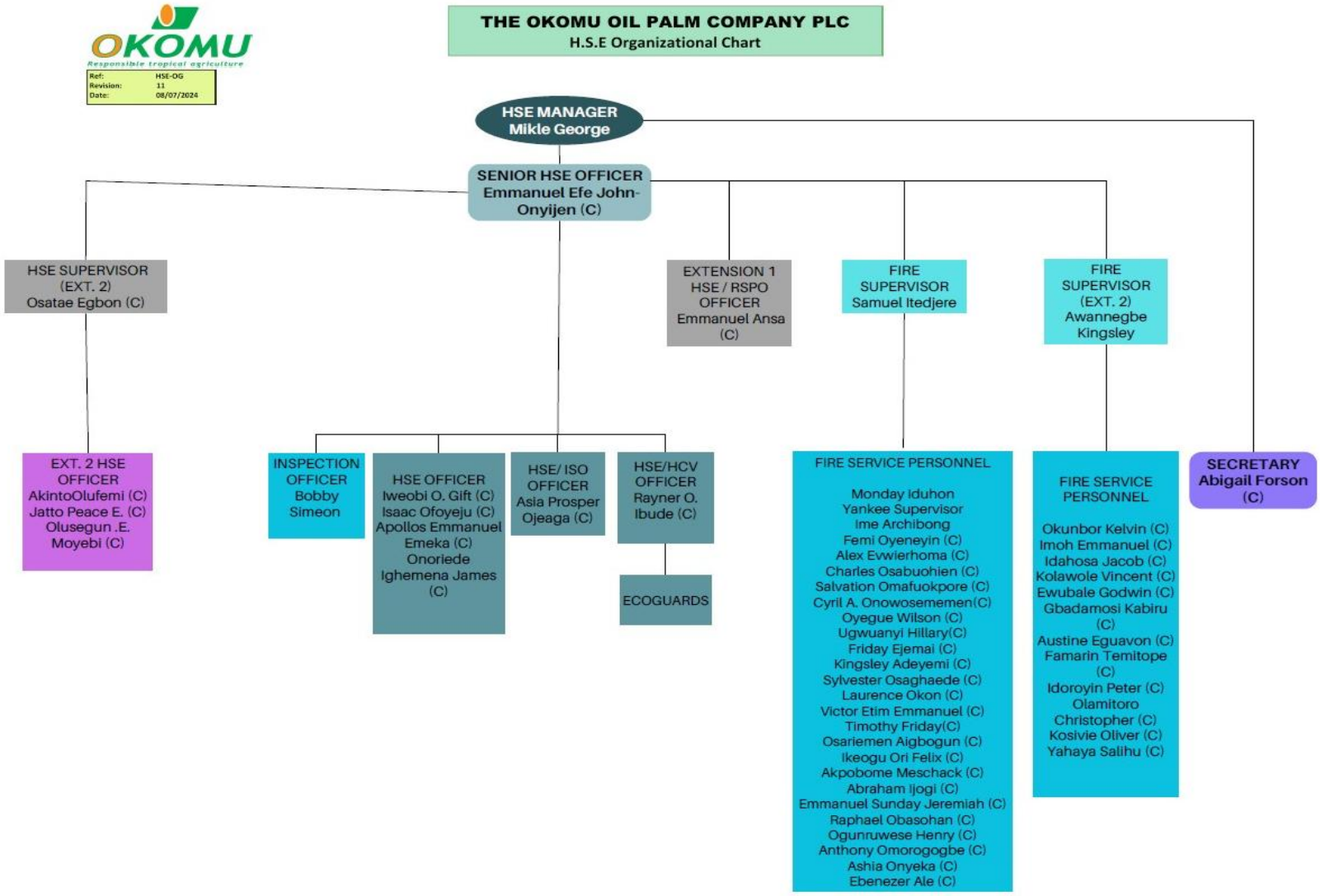


Figure 2.5: HSE Organogram

2.5.1 Work Force/Staff Strength

The total number of workforces in the main estate are over 7,000. Two Hundred and Ninety-Nine (299) are permanent staff, twenty-one (21) are Industrial Trainees, six (6) are Superintendent, thirty (30) are Managers, Three Hundred and Eighty-Five (385) are Project/Service Contractors) and Six Thousand, Seven Hundred and Eighteen (6,718) are Contractors. Table 2.2 highlight distribution of workforce in the company.

Table 2.2: Staff Distribution in OOPC Main Estate

Dept	Staff	Industrial trainees	Superintendents	Managers	Contractors	Other (Project/service contractors)
Palm/Oil mill	141	7	4	8	1129	89
Ruber/factory	41	0	1	3	4120	16
Others	117	14	1	19	1469	280
Total	**299**	**21**	**6**	**30**	**6718**	**385**

Source: OOPC Main Estate, December 2024

2.6 Processing

2.6.1 General Processes of Palm Oil Production

The palm oil mill processes FFB into Special Palm Oil (SPO) and Palm kernel (PK). The FFB after weighing in the weighbridge are carried in boogies, which feed them into Sterilizers and use of motorized conveyors for tilting sterilizers. The fruits are washed, threshed, and are then digested in the Digester. From the Digester, crude oil is extracted at the Press, leaving the cake. The cake line further processes the nuts and fibres. The nuts are cracked and separated into shells and kernels. The kernels are recovered and sent to the PKO plant, while the shells and fibres are fed into the boiler as fuel.

The crude oil is further decanted to produce purified Crude Palm Oil (CPO), which is stored in the storage tank, while the sludge is deposited in the sludge pit where it is further treated to recover more oil. The effluent is then released for anaerobic treatment before it is discharged into the effluent lagoon.

2.6.2 Palm Kernel Oil Processing

The palm kernel crushing plant processes palm kernel (PK) into palm kernel oil (PKO). The kernels undergo size reduction and are passed through the drying silo before going through the primary expeller to obtain the first palm kernel cake. The first palm kernel cake is taken through the second expeller to obtain the final Palm Kernel Cake (PKC) and Palm Kernel Oil (PKO). The PKC is dried and bagged, while the PKO passes through three separate vibrating screens to produce the purified Crude Palm Kernel Oil (CPKO). The CPKO is further filtered and stored in the CPKO storage tank.

2.7 Palm Oil Mill

The palm oil mill of 60 tons FFB/Hr processes fresh fruit bunches (FFB) harvested from the oil palm plantations. The mill comprises different sections processing FFB into special palm oil (SPO) and palm kernel oil (PKO) as illustrated in Figures 2.6 and 2.7.

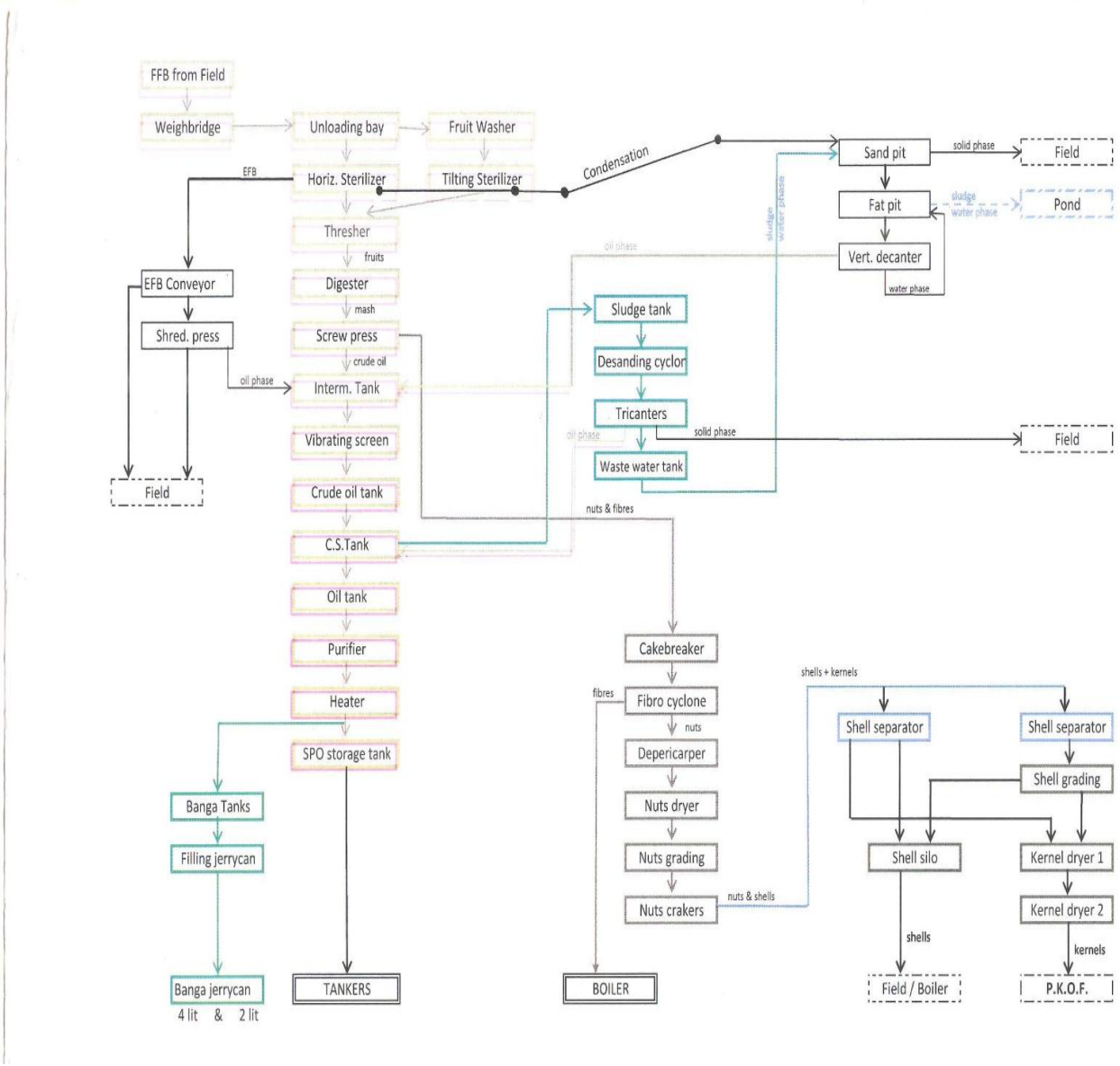


Figure 2.6: Flowchart for Extraction of Crude Palm Oil

Source: HSE Office, OOPC Plc (December 2024)

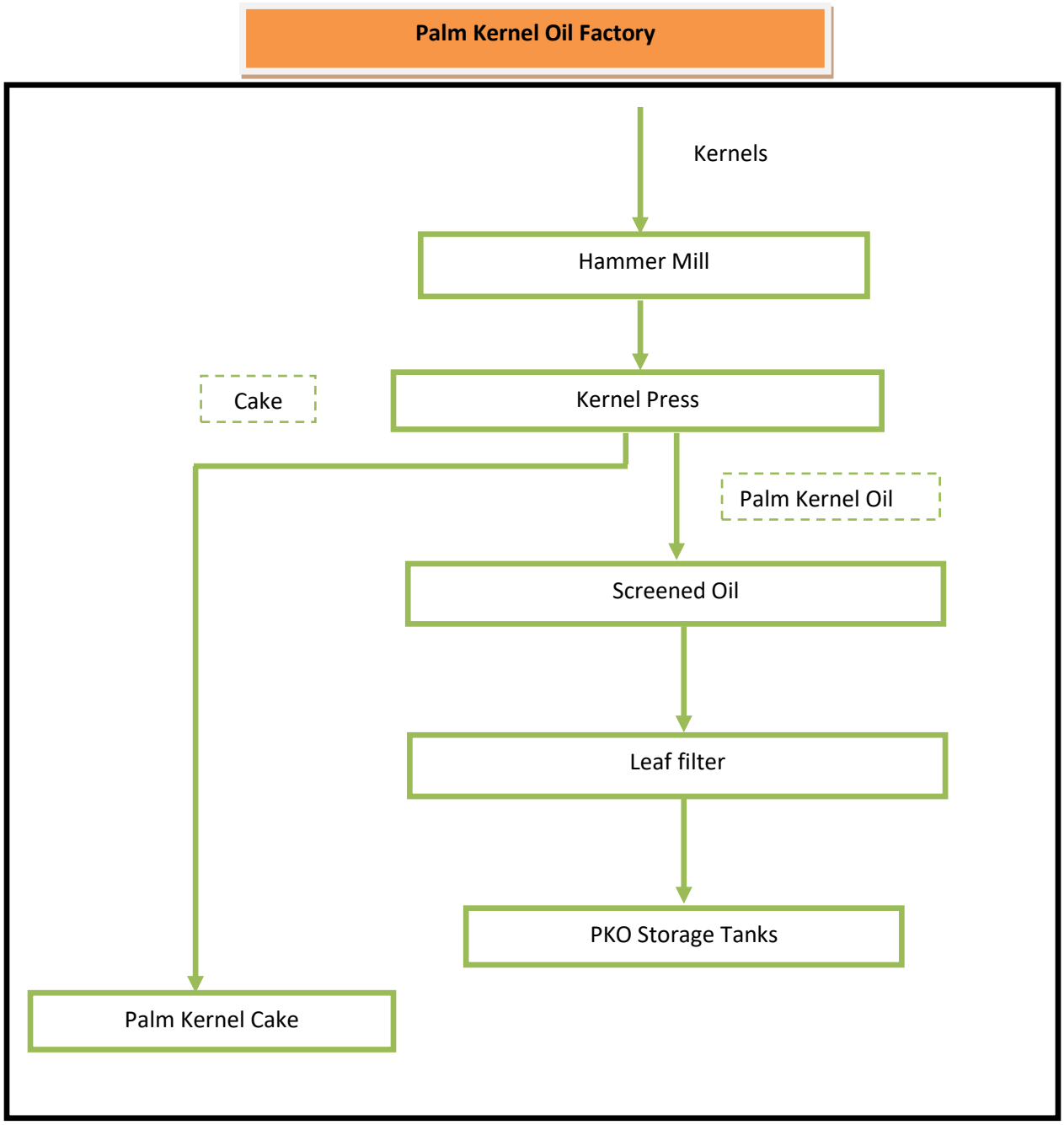


Figure 2.7: Flowchart for Palm Kernel Oil Factory

Source: HSE Office, OOPC Plc (December 2024)

The major products include SPO, PKO and PKC. The historical record of production is presented as follows:

Table 2.3: Products

Location	Products (Tonnage)	
	2023	2024
Oil mill	48,163	41,851

Source: HSE Office, OOPC Plc (December 2024)

2.8 Summary of Ancillary operations

The planting and production of oil palm requires infrastructure and back-up services such as road network, electricity supply, water supply, communications, fuel supply and storage services.

2.8.1 Electricity

At the estate, adequate electricity is supplied from the main powerhouse and other smaller generating units of varying ratings. The powerhouse is equipped with Nine (9 Nos.) heavy-duty industrial diesel engine mainly Perkins's generators and one (1 No.) each Siemens Turbine and Inverter as follows:

Table 2.4: Make, Model and Capacity of Electricity Generating Set

S/No	MAKE & MODEL & CAPACITY	FLEET NO.	LOCATION
1	PERKINS GEN SET – 1100kVA	GS-5792	Powerhouse
2	FGWP 13 PERKINS GENSET - 12.5 kVA	GS-5795A	Mirror Gate
3	PERKINS GEN SET – 1100kVA	GS-5792A	Powerhouse
4	PERKINS GENSET-1500kVA	GS-5798	Powerhouse
5	PERKINS GEN SET - 110 kVA	GS-5795B	Standby (Workshop)
6	PERKINS GEN SET – 500kVA	GS-5776	Management Quarters
7	FGWP 13 PERKINS GENSET	GS-5811	Mirror Gate
8	PERKINS GENSET-1650kVA	GS-5799	Powerhouse

Source: HSE Office, OOPC Plc (December 2024)

The electricity generated from the powerhouse is supplied to the offices and residences. In addition to the supplies from the powerhouse, electricity requirement of the mill and agric office is also supplied from a steam turbine of about 1900 kVA.

Table 2.5a: Electricity Consumption

ELECTRICITY CONSUMPTION				
S/N	**DEPT**	**2023**	**3% Reduction 2024 Target**	**2024 Consumption with Target Status**
1	OIL MILL	7,084,385	6,871,853.45	5,881,302
2	IITA	341,736	331,483.92	490,947
3	AGRIC OFFICE	49,655	48,165.35	45,457
4	L/LINE	876,651	850,351.47	752,145
5	N/BUILDING	905,100	877,947.00	917,725
6	MGT. QTRS.	684,254	663,726.38	602,142
7	ESTATE DEPT	44,106	42,782.82	38,900
8	W/SHOP	226,116	219,332.52	222,149
9	ADMIN/CLINIC/SCHOOLS	144,286	139,957.42	139,272
10	HSE/SECURITY/TRAINING HALL	52,451	50,877.47	43,765
11	BOREHOLE (ME)	52,261	50,693.17	49,100
12	STAFF CH	15,876	15,399.72	16,481
13	WORKSHOP UPS	632,159	613,194.23	468,288
TOTAL		**11,144,725**		

Source: HSE Office, OOPC Plc (December 2024)

Table 2.5b: Electricity Consumption Based on Supply Source (2024)

S/N	DEPT	BEDC	GENSET	TURBINE
1	OIL MILL	96,514	884,058	4,900,730
2	IITA	28,256	244,755	217,936
3	AGRIC OFFICE	338	16,979	28,140
4	L/LINE	103,417	433,563	215,165
5	N/BUILDING	125,621	521,765	270,339
6	MGT. QTRS.	73,265	336,985	191,892
7	ESTATE DEPT	5,052	21,495	12,353
8	W/SHOP	29,554	119,931	72,664
9	ADMIN/CLINIC/SCHOOLS	17,574	76,014	45,684
10	HSE/SECURITY/TRAINING HALL	6,000	24,281	13,484
11	BOREHOLE (ME)	6,432	26,752	15,916
12	STAFF CH	2,040	9,488	4,953
13	WORKSHOP UPS	55,841	251,695	160,752
Total		**549,904**	**2,967,761**	**6,150,008**

Source: HSE Office, OOPC Plc (December 2024)

2.8.2 Water Supply

The major sources of water on the estate are surface water and groundwater. There are three (3 Nos.) boreholes within the estate.

Table 2.6: Major Sources of Water on the Estate

Borehole Location	No.	Remarks
Management Quarters	2	Functional
Labour Line	2	Functional
IITA	1	Functional

Irrigation and process water is sourced from perennial surface water (Aguohen and Umosan Rivers) while potable water is sourced from groundwater. Potable water from boreholes is distributed through a network of pipes connected to storage tanks located at strategic locations within the estate.

Table 2.7a: Water Consumption

Location	2023	3% reduction 2024 target	2024 Consumption with Target Status
OIL MILL	228,658	**221,798**	194,237
MAIN ESTATE	30,426	**29,513**	16,453
MANAGEMENT QTRS	3,446	**3,343**	3,805
IITA	5,137	**4,983**	7,111
TOTAL	**267,667**	**259,637**	**221,606**

Source: HSE Office, OOPC Plc (December 2024)

2.7b Water Consumption (Oil Mill)

Location	Water Consumption (litres)			
	2023	2024		
		Water Consumption	Effluent Generated	Effluent Discharged
Oil Mill	228,658	194,237	207,520	207,520

Source: HSE Office, OOPC Plc (December 2024)

2.8.3 Communication

Communication in the estate is facilitated mainly by radio communication (Walkie-Talkie). There are also installations for direct Internet communication and the global system for mobile communication (GSM).

2.8.4 Fuel Supply

The major source of energy is petroleum fuel. A filling station is available for bulk storage and dispensing of AGO and PMS. An underground storage tank which services the filling station. The total fuel storage provision at the main estate includes 46,000 litres capacity underground tank for AGO, 42,000 litres and 31,650 litres underground tanks mainly for PMS.

Table 2.8: Fuel Storage

Type	Capacity	Qty	Type of Storage
AGO	46,000 Litres	1	Underground
PMS	42,000 Litres	1	Underground
	31,650 Litres	1	

Source: HSE Office, OOPC Plc (December 2024)

2.8.5 Fire Services

There is a fire station equipped to provide fire prevention and control services. The station is strategically located, adjacent to the filling station and proximal to the administration office for oil palm. During dry season, water bowser is attached to some vehicle as an emergency preparedness in event of fire within the estate and plantation.

Plate 2.1: Fire Fighting Truck at Main estate

Plate 2.2: Water bowser attached to an Hilux

2.8.6 Roads

There is a network of earth roads of about 324.05 km connecting all workplaces and facilities at the main estate.

2.8.7 Stores

There are three (3 Nos.) stores on the estate for the storage of plantation tools, materials, agrochemicals, and fertilizer as presented in Table 2.9 below.

Table 2.9: Location of Stores on the Estate

S/N	STORES	LOCATION	CONTENTS
1	Main Store	Workshop, Main estate	General Merchandise (Plumbing, electrical, motor & heavy duty, stationery, PPEs, etc).
2	Oil Mill Store	Oil Mill	General Merchandise (Factory machines, spare parts, PPEs, etc).
3	Agric Store	Plantation/Agric office	Chemicals, PPEs, Agric. tools, fertilizers, and general plantation equipment

Source: HSE Office, OOPC Plc (December 2024)

CHAPTER THREE

3.0 BASELINE ENVIRONMENTAL ASSESSMENT AND MANAGEMENT STUDY

The audit of the facility and the existing Environmental, Occupational Health, and Safety Management System was carried out using the combination of the IFC's Environmental, Health, and Safety Guidelines for "Perennial Plantation Crop Production" (IFC, March 30, 2016) and Vegetable Oil Production and Processing (IFC, February 12, 2015), the National Guidelines for Environmental Audit Report (EAR) in Nigeria, Nigeria Factories Act, CAP F1 LFN 2004 and Industry/Management Best Practices.

3.1 General - Oil Palm Plantation Management

ISSUE	GUIDELINES	CURRENT PRACTICE	REMARKS
• **Soil Conservation**	Practice reduced and zero tillage (often known as "low till" or "n till") as well as direct seeding and planting, to minimize damage to soil structure, conserve soil organic matter, and reduce soil erosion.	Harrowing is done every 25 years with planting of cover crop.	This practice should always be adhered to when new planting commences.
	Minimize soil compaction, damage, or disturbance by using appropriate land preparation machinery at the right time of the year.	D8 machines are used instead of D9 dozer. In addition, heavy duty machines are not used when there is rainfall.	This practice should be sustained.
	Use cover crops such as, Crotalaria, Canavalia, Mucuna or Tephrosia; intercropping along contours with legumes such as *Cajanus*, *Sesbania*, *Lupinus*, *Tritolium*, and creating multi species shelterbelts, and/or windbreaks to reduce evapotranspiration and soil loss through water erosion.	Inter-rows are ploughed and cover crops such as *Pueraria plaseoloides* and Mucuna bracteata are broadcasted/ planted which grow vigorously and form a dense cover over the plantation (see Plate 3.1 below).	This practice should be sustained.

ISSUE	GUIDELINES	CURRENT PRACTICE	REMARKS
			
		Plate 3.1: Established Groundcover in Mature Palms	
	Replenish soil organic matter by recycling crop residues, compost, and manures	During harvesting and pruning operations, crop residues such as detached fronds are neatly packed in alternate rows which later decompose and restore the soil. So also, are empty fruit bunches (EFB) recycled in 500 hectares/annum. These later decompose and restore the soil nutrients.	Current practice should be sustained
	Implement earthworks when weather conditions pose the lowest risk of causing environmental damage	Roads are constructed and/or maintained with a durable surface to minimize erosion and these are usually done during dry season	Current practice should be sustained
	Employ erosion control management practices (e.g., contour and strip planting, terracing, discontinuous trenching, intercropping with trees, and grass barriers) in sloping areas.	Erosion prevention and control are implemented through contour/panel and terrace planting.	No Action Required
	Draw up mitigation plans for planting or harvest operations that must take place during unsuitable periods.	The group New Planting Procedure (NPP) is available to address this.	NPP is strictly being followed
	Use flow control wires and diversion canals to reduce erosion in areas with field drainage	There are some natural drains, and some constructed ones regularly maintained such as side/sedimentation pits. For the control of runoff especially on the plantation roads, sedimentation	No Action Required.

ISSUE	GUIDELINES	CURRENT PRACTICE	REMARKS
		pits are dug to reduce runoff and trap sediments in runoff water as could be found across the plantation field as depicted in Plate 3.2 below.	

Plate 3.2: Sedimentation and/or Side Pit on Roads

	Restrict the width of roads to the minimum that will provide the means for efficient and safe transport.	The width of road grading is usually 3m to 10m to avoid erosion and this is the usual practice across the plantation group.	Current practice should be sustained
• **Maintaining Soil Productivity**	Cultivate crops that are suited or adapted to the local climate and soil conditions and adopt good agronomic practices to optimize crop productivity	Okomu-OPC usually cultivates crops that are suitable for the area, climate, and soil. Good agricultural practices are practiced.	Current practice should be sustained
	Collect meteorological data on precipitation, evapotranspiration, temperature, photosynthetically active radiation, and use information to inform and guide agronomic and silviculture management techniques.	There are two (2Nos.) weather stations located at the Oil Palm Nursery and Management Quarters. The weather stations are equipped with rain gauge, wind vane, thermometers and piche-evaporimeter to collect data on rainfall, temperatures, and evaporation, respectively.	Current practice should be sustained
	Use soil maps and soil survey results to determine crop suitability and appropriate soil management practices	Soil maps are used, and soil survey done every 5-10 years.	Always ensure that soil survey is done for new plantation development.

ISSUE	GUIDELINES	CURRENT PRACTICE	REMARKS
• **Nutrient Management**	Develop and implement a soil monitoring and management plan that includes soil and terrain mapping and erosion risk identification.	This is done through identification of slopes with the aid of soil maps.	Current practice should be sustained
	Conduct regular surveys to monitor soil structure and chemistry in order to identify areas where remedial action is required.	Soil survey done every 5-10 years.	Current practice should be sustained
	Recycle and/or incorporate organic materials (e.g., crop residues, compost, and manures) to replenish soil organic matter and improve soil water-holding capacity.	Crop residues most especially palm fronds are retained in the field and empty fruit bunches (EFB) applied to the oil palm as manure as depicted in Plate 3.3 and Plate 3.4 below.	Current practice should be sustained

Plate 3.3: Palm Fronds Retained in the Field

Plate 3.4: EFB Applied in the Field as Manure

	Minimize the use of pesticides by implementing a pest and disease early warning system, by using biological pest and disease control methods, and by implementing control measures before outbreaks require large-scale control	The company has developed an integrated pesticide management programme that includes routine monitoring system every two months to observe pest attacks. The program provides for encouraging the use of birds as predators of oil palm pests and discourages the use of highly persistent and highly toxic pesticides.	Current practice should be sustained

ISSUE	GUIDELINES	CURRENT PRACTICE	REMARKS
	Use green manures, cover crops, or mulching techniques to maintain soil cover, reduce the loss of nutrients, replenish soil organic matter, and capture and/or conserve moisture	The main groundcover species are *Pueraria* and *Mucuna bracteata*, which grow vigorously and forms a dense cover over the plantation. Where gentle slopes occur within the plantation, the palms have been planted in rows aligned with the contours, which provides an additional soil conservation measure.	No Action Required.
	Incorporate nitrogen-fixing legume crop plants and cover crops in the cropping cycle.	The main groundcover species are *Pueraria* and *Mucuna bracteata*, which are rich in Nitrogen. They are also known as nitrogen-fixing leguminous crops.	Current practice should be sustained
	Draw up balanced fertilizer programs for each soil management unit based on the results of mapped fertility results, soil and leaf analysis, and crop assessment.	Leaf (Foliar) analysis is carried out such that fertilizer application is based on plant requirement.	Current practice should be sustained
	Time the application of crop nutrients to maximize uptake and minimize nutrient runoff.	Fertilizer application is at the beginning of the raining season and towards the end of raining season.	Current practice should be sustained.
	Establish and respect setbacks from watercourses—including appropriate buffer zones, strips, or other "no-treatment" areas along water sources, rivers, streams, ponds, lakes, and ditches—to act as a filter for potential nutrient runoff from the land.	Buffer zone of about 50m to 150m along River banks is created depending on the width of the river.	No Action Required
	Select and maintain fertilizer application equipment to ensure desired application rates are used and over broadcasting of solid fertilizers and overspraying liquid fertilizers are minimized.	Application is by manual and is measured by cup. Fertilizer applicators and agrochemical sprayers are under strict supervision. This is after receiving appropriate training on handling, storage, and transportation of hazardous substances.	Regularly give refresher training as at when due.

ISSUE	GUIDELINES	CURRENT PRACTICE	REMARKS
	Implement nutrient planning and documentation, which includes the use of a fertilizer logbook to record the following information: • Dates of purchase, dates of use, amount of fertilizer and nutrient used (kg/ha), purpose of use, and crop growth stage. • Weather conditions before, during, and after application. • Methods used to minimize nutrient loss (e.g., incorporation into the soil, split applications, irrigation after application).	Record of application is kept in a notebook and the monthly record manual at Plantation department. Record of purchase dates is also kept at oil palm plantation departments. Daily reports are made for the number of kilograms applied per tree and per field depending on the number of the palms alive.	Record keeping should be taken care of to meet with the reporting requirements of national and international sustainability standards (SON, ISO and RSPO).
	Provide farm operators with training in nutrient management following published principles and agricultural practice manual	Fertilizer rates are determined by fertilizer expert. Regular training conducted on hazardous substance/materials management	Intensify training on hazardous substance and hazardous waste management
	Ensure that all personnel are trained in and use appropriate management procedures for the storage, handling, and application of all types of fertilizers, including organic wastes	Appropriate PPE such as hand gloves, rain boots and raincoats are provided.	
	Personal Protective Equipment (PPE) should be used according to the Safety Data Sheets (SDSs) of the product or to a risk assessment of the fertilizer product. SDS should be available at each management unit.	Safety Data Sheets (SDSs) are available	Display SDS's of all chemicals and fertilizers.
• **Crop Residue and Solid Waste Management**	Recycle residues and other organic materials by leaving the materials on site or through composting (and spreading).	Organic materials are left in the plantation field as manure.	Current practice should be sustained.
	Consider the potential for harboring and spreading pests and diseases before implementing this practice.	Plantation department takes this factor greatly into consideration.	No Action Required

ISSUE	GUIDELINES	CURRENT PRACTICE	REMARKS
	Disperse (or mulch) large vegetative structures (e.g., trunks, branches), unless there are compelling habitat and biodiversity benefits identified in the Biodiversity Management Plan.	Done regularly with harvesting and pruning.	
	Consider using crop residues for other beneficial purposes, such as animal feed, bedding, or thatching, when leaving residues in the field is neither practical nor appropriate.	Crop residues are left in the field as organic manure	No Action Required
• **Water Management**	Determine rain or water irrigation requirements of the crop based on internationally recognized guidelines while recognizing seasonal variations and regional norms. When irrigation is practiced, develop an appropriate irrigation plan, and schedule, and monitor consumption and compare regularly with these targets.	Sprinkler and sumisansui irrigation system are used in all the nurseries. The quantity of the water need per palm is given without waste. Water use for irrigation is from groundwater sources which are pumped from boreholes to overhead storage tanks for distribution to the nursery.	Current practice should be sustained.
	Maximize the retention of rainwater through appropriate "rain harvesting" techniques, which may include: • Diverting water flow from roads and paths toward crops thus storing water in the soil and reducing the effect of short dry spells. • Storing runoff from rainy periods for use during dry spells by using tanks, ponds, cisterns, and earth dams. • Controlling weeds through the use of cover crops, mulching, or herbicides to encourage beneficial but low-water-use soil cover plants. • Maintain protective vegetation in canals and drainage systems to reduce	There are some natural drains, and some constructed ones regularly maintained such as side/sedimentation pits. For the control of runoff especially on the plantation roads, sedimentation pits are dug to trap runoff water and to also check and control erosion. The main groundcover species are *Pueraria* and *Mucuna bracteata*, which grow vigorously and forms a dense cover over the plantation.	No Action Required

ISSUE	GUIDELINES	CURRENT PRACTICE	REMARKS
	canal bank scouring and slow runoff.		
	When irrigation is used, implement irrigation water conservation techniques, such as: • Ensure regular maintenance of the irrigation system, as well as that of its associated channels and infrastructure. • Maintain a water management logbook that records time and quantity of rainfall evaporation and the, amount of irrigation applied, and soil moisture levels (%), in order to verify both that irrigation is being used according to crop need and to develop an understanding of long-term trends in water use. • Reduce evaporation by avoiding irrigation during periods when evaporation is elevated (e.g., in periods of higher temperatures, reduced humidity, or high winds). • Use trickle or drip irrigation techniques (if practical) or install "under canopy" rather than overhead sprinklers. • Reduce evapotranspiration by using shelterbelts and windbreaks. • Reduce seepage losses in supply channels by lining them or using closed pipes.	Regular maintenance of irrigation system is being practiced with a logbook to estimate water use. Irrigation is usually done in the morning and evening time.	No Action Required

ISSUE	GUIDELINES	CURRENT PRACTICE	REMARKS
	• Consider collecting runoff water (tail water) through catchments and pumps. • Employ a cutback furrow irrigation technique, slowing or stopping irrigation well before the water reaches the end of the furrow and discharges to the environment. • If herbicides are used, ensure they are applied at the appropriate time of year to control undesirable vegetation and reduce their water consumption most effectively.		
• **Pesticide Management**	**The following measures are recommended to prevent and control the contamination of water sources: Avoid over-irrigation, which may result in the leaching of nutrients and contaminants**.		
	Use harvesting methods (such as directional felling) or other appropriate measures to minimize the number of debris deposited in streams.	Harvesting is done manually with debris deposited in the plantation field.	No Action Required
	Establish and respect setbacks and buffer zones in riparian areas. Buffer widths should be based on the specific risk, land management regime, and slope of the area.	Buffer zone of about 50m to 150m along Riverbanks is created depending on the size of the river.	No Action Required
	Remove harvest debris from streams and consider the use of debris traps such as trash lines where possible.		
	Have you identified the main pest associated or affecting the crop?	The main insect pest is the leaf miner. The company monitors pest numbers in the plantations by carrying out checks monthly.	No Action Required

ISSUE	GUIDELINES	CURRENT PRACTICE	REMARKS
	Do you apply early warning mechanism for pest and disease i.e. (pest and disease forecasting technique).	There is phyto-sanitary team in place monitoring pest out-break monthly.	No Action Required
	What other control measures are in place other than dependency on pesticide use? In terms of biological control (birds, mites).	Use of pruning	No Action Required
	How do you store, handle, or apply pesticides?	Pesticides are stored in a safe storage area, separate from other products. Application is done only when necessary and with trained workers that are provided with adequate PPE. The storage is secure and well-ventilated which meet safety requirements such as spill containment and safety signage.	Chemical Pavillion should be commissioned for use.
	Is there a pest management plan (PMP) that includes procedures for procurement, storage, handling, and ultimate destruction of all outs of date stock?	There is no case of out-of-date stock. Pesticides are minimally used and at the appropriate time usually at the beginning and toward the end of raining season.	No Action Required
• **Pesticide Storage**	Do you store pesticides in a bonded container or in a sufficient space that will capture spill?	Pesticides are stored in sufficient space that can capture spill.	No Action Required
	Verify if store is set away from water sources, residential and built-up areas as well as livestock and food storage areas.	Chemical store is not near any water sources, residential, food and livestock.	No Action Requited
	Are there spill kits in place in case of accidental spillage?	Spill kits are provided at all hazardous substance storage area.	No Action Required
	Do you comply with storage instructions on the product label.	In full compliance with storage on product label.	
	How are spills cleaned?	Mop and collected back to the field	Appropriate spill kits are provided at the pesticide storage area.

ISSUE	GUIDELINES	CURRENT PRACTICE	REMARKS
	Do you have a register of all pesticide procured, records of when they were received, amount used and remaining in store.	Record available	
	Is there a SDS and is it appropriately located?	The company keeps an up-to-date inventory and safety data sheets (SDSs) are available.	Safety Data Sheets should be conspicuously displayed at the Agric Store.
• **Pesticide Handling**	Do operators read, understand, and follow product label instructions for mixing, safe application, and disposal?	Pesticide handlers receive instructions on daily basis before going to the field.	This practice should be sustained
	Are personnel trained for critical operations such as mixing, transfers, filling of tanks and application?	Besides being given on the job instructions, pesticides handlers have also received a formal training on health and safety considerations in pesticides handling and use. While pre-employment medical examination is mandatory for pesticides applicators as basis for employment. Moreso, periodic medical examinations are provided for them.	Organize a formal training on the hazards, precautions and procedures for safe storage, handling and use of all potentially harmful materials relevant to each employee's task and work area.
	Are appropriate PPE worn during handling and application e.g., gloves, overalls, and eye protection	Necessary precautions are taken on the issuance and handling of pesticides. All workers involved in the handling and use of pesticides are kitted with appropriate personal protective equipment. The PPE provided include protective clothing, hand gloves, eye goggles, caps, respirators, and boots. Washing facilities are also provided.	Enforce the use of appropriate PPE's when handling hazardous substance particularly agrochemicals
	Mixing and filling of pesticide tank should be set away from watercourse or drains and if it is on concrete, then water should be collected in a separate sump and disposed as hazardous waste.	Mixing of pesticide is usually done on bunded concrete tank.	Mixing should be confined to the pesticide mixing chamber. Hence, the chemical pavilion should be commissioned for use.

ISSUE	GUIDELINES	CURRENT PRACTICE	REMARKS
			
	Plate 3.5: Chemical pavilion with access control		
• **Pesticide Application**	How is application done?	Pesticides are usually applied using knapsack sprayers. Sometimes ULV application is done using ULV sprayers, following strictly manufacturers' technical instructions. Pesticide applicators receive special training in the use and application of pesticides.	No Action Required
	Do you do aerial application?	No aerial spraying is done	No Action Required
• **Pesticide Disposal**	How is un-used dilute pesticide, out of date, rinse water disposed?	The company only takes stock of what is required (agrochemicals) on annual basis. The company has not experienced any stock of outdated pesticides in recent time.	No Action Required
	How are empty containers, lids, and foil seals treated?	Waste packaging from fertilizer is well controlled throughout the plantation. Empty fertilizer bags are collected and re-used for loose fruit collection. Empty plastic and metal pesticides containers are usually returned to the store (secure) waiting for evacuation by suppliers.	Ensure that agrochemical containers are properly rinsed (triple) and residual water applied to the plantation field.
	Are there any agreements to how empty cans are taken off the plantation?	The company has reached an agreement with agrochemical suppliers to evacuate and return the empty containers to the manufacturers before the next supply.	No Action Required

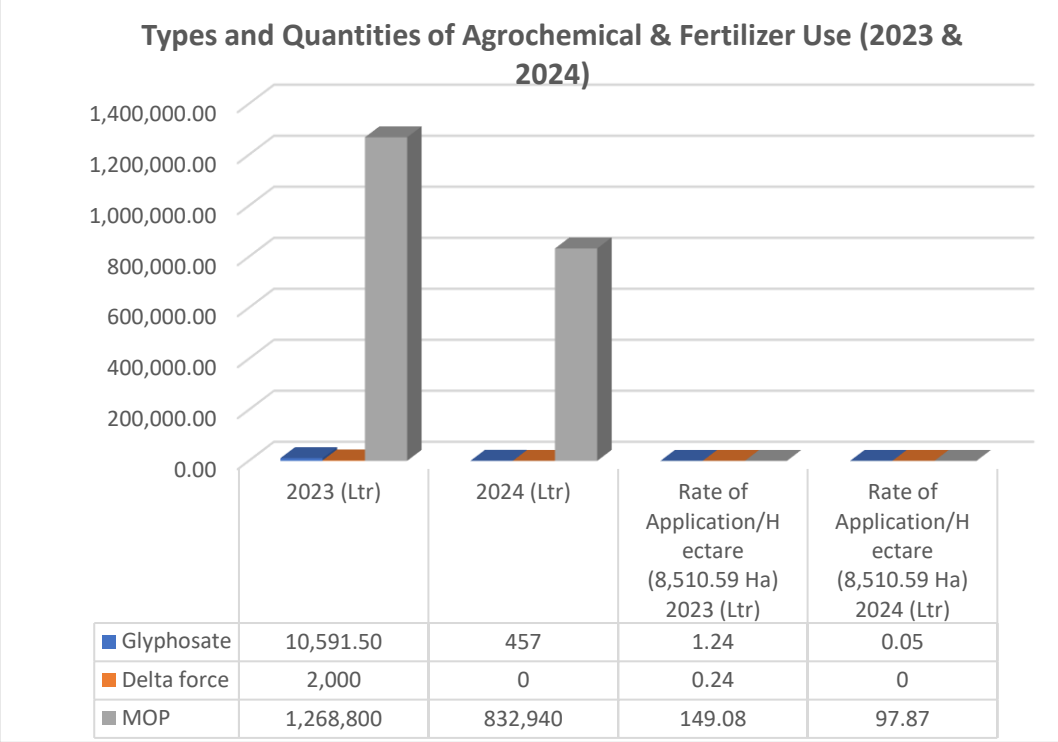
ISSUE	GUIDELINES	CURRENT PRACTICE	REMARKS

The types and quantities of agrochemical applied in plantation upkeep are presented in Table 3.1.

Table 3.1: Types and Quantities of Agrochemical & Fertilizer Use (2023 & 2024)

Types of Item	2023 (Ltr)	2024 (Ltr)	Rate of Application/ Hectare (8,510.59 Ha)	
			2023 (Ltr)	2024 (Ltr)
Glyphosate	10,591.50	457	1.24	0.05
Delta force	2,000	0	0.24	0
MOP	1,268,800	832,940	149.08	97.87

Source: HSE Office, OOPC Plc (December 2024)



• **Fertilizer**	How are fertilizers stored?	Fertilizers are stored in the fertilizer store on top of pallets. The store is well secured and always under lock.	
	Are fertilizers kept with pesticides and machinery? e.g., fuels, ignition, or heat source.	Fertilizers are kept separately from agrochemicals.	No Action Required.
	Are fertilizers purchased minimally and stored or purchased in large quantity even though there might not be immediate use for them?	Fertilizers are purchased minimally with usage based on first in, first out (FIFO) principle.	No Action Required.
	Is fertilizer requirement known and applied as at when due?	The rate of application appears economical in terms of quantity, timing, and methods. More	

ISSUE	GUIDELINES	CURRENT PRACTICE	REMARKS
		importantly, there has been no evidence of any harm to ground and surface water supplies as a result of fertilizer use.	
• **Energy Use**	Consider implementing training programs to make operators aware of energy efficiency practices when using machinery.	There is no programme in place to make operators aware of energy efficiency practices.	Create awareness (formal or informal) on energy efficiency practices such as an energy policy.

3.2 Palm Oil Processing Management

ISSUE	GUIDELINES	CURRENT PRACTICE	REMARKS
ENVIROMENT- ***solid waste and by-products*****.**	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).	The Company adopts best general industrial practices (GIP) for processing and product storage where 40% of oil is recovered from the effluent generated through the fat pits (3 Nos.).	No Action Required
	Collect residues from the raw material preparation phase for conditioning (drying) and processing (grinding) to yield by-products (e.g., animal feed).	Palm Kernel Cake (PKC) is produced as by-product.	Practice should be sustained
	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	Excess empty fruit bunches (EFB) and tricanter cake, sludge mixed with fibre are returned to the plantation field as fertilizer.	Practice should be sustained.
	Use waste and residues for energy generation in the project plant's boiler(s). Note, however, that relatively high atmospheric emissions (such as particulate emissions (PM)) are possible when burning crop residues, and potential fire risks (e.g., from combustible dust) may arise from handling, storing, and processing crop residues; as such, expert advice on fuel characteristics and boiler design should be solicited when planning to use biofuels in this manner.	EFB, Palm Kernel Shell and fiber are used as source of fuel in the boiler for steam generation. More so, about 25 cones are fixed in the boiler to filter ash and dust from the smoke generated before going out from the chimney.	Practice should be sustained.
	Use uncontaminated sludge and effluent from on-site wastewater treatment as fertilizer in agricultural applications or as a supplemental	The effluent from the mill is sent to an effluent lagoon for further treatment.	The treated wastewater should be channeled into

ISSUE	GUIDELINES	CURRENT PRACTICE	REMARKS
	boiler fuel. Recommendations for the management of EHS issues common to sludge and effluent are provided in the **General EHS Guidelines** and in the **Water and Sanitation EHS Guidelines**. Dispose of contaminated sludge from wastewater treatment at a sanitary landfill or by incineration. Incineration should only be conducted in permitted facilities operating under internationally recognized standards for pollution prevention and control		the plantation field for irrigation
Water Consumption and Management	Replace water-based conveyor systems by mechanical systems (augers or conveyors).	Mechanical conveyor system is used at the palm oil mill factory.	No Action Required
	Apply Cleaning-in-Place (CIP) procedures to help reduce chemical, water, and energy consumption in cleaning operations	Cleaning-in-Place procedure is done mostly.	No Action Required
	Recover and reuse condensate from heating processes	Condensate from turbine is returned to boiler while condensate from sterilizer is mixed with crude palm oil process water.	Practice should be sustained.
	Use dry cleanup techniques before rinsing floors.	Dry clean up technique is practiced	No Action Required
	Manually clean vessels before rinsing to remove solids for recovery or disposal	This is done	No Action Required
	Vegetable oil processing wastewater generated during oil washing and neutralization may have a high content of organic material and, subsequently, a high biochemical oxygen demand (BOD) and chemical oxygen demand (COD).	Retention trays are available in the palm oil mill to recover spilled palm oil.	No Action Required.
	Wastewater may also have a high content of suspended solids, organic nitrogen, and oil and fat, and may contain pesticide residues from the treatment of the raw materials. Recommended measures to reduce contaminant loading include the following: install spill collection trays to collect solids at appropriate places in the production line; use emulsion breaking techniques, (e.g., dissolved	Wastewater from the oil mill is first channeled to Fat Pits for palm oil recovery later channeled to the effluent lagoon for further treatment by natural/biological method.	Treated wastewater should be channeled into the plantation field for irrigation.

ISSUE	GUIDELINES	CURRENT PRACTICE	REMARKS
	air flotation (DAF)), to segregate high BOD and COD oils from wastewater		
	Use grids to cover drains in the production area to prevent solid wastes and concentrated liquids from entering the wastewater stream.	Grids and solid covers provided at the Fat Pits.	No Action Required
	Select disinfection chemicals to match the cleaning operation being applied on the process equipment to the type of problem. Caustics are typically used for polymerized fat, and acids are used for lime deposit acids.	NAFDAC approved solvents are being used for cleaning at palm oil mill.	No Action Required
PROCESS WASTEWATER TREATMENT			
	Techniques for treating industrial process wastewater in this sector include: grease traps, skimmers, or oil water separators for the removal of floatable solids; flow and load equalization; sedimentation for suspended solids reduction using clarifiers; biological treatment—typically anaerobic, followed by aerobic treatment—for the reduction of soluble organic matter (BOD); biological nutrient removal for reduction in nitrogen and phosphorus; chlorination of effluent when disinfection is required; and dewatering and disposal of residuals. In some instances, composting or land application of wastewater treatment residuals of acceptable quality may be possible. Additional engineering controls may be required to contain and neutralize nuisance odors.	Palm Oil Mill Effluent (POME) is sent to the effluent ponds from palm oil mill factory for anaerobic and aerobic treatment and/or natural/biological method. Results of laboratory analysis of POME is presented in Table 3.2 below.	

Table 3.2: Laboratory Analysis Results for Critical Effluent Parameters (Oil Palm)

Quality Parameter	Treated POME (2017 Audit)	Treated POME (2020 Audit)	Treated POME (2024 Audit)	FMENv. Limits for Land Application
pH	8.04	9.32	7.28	**6-9**
Total Suspended Solids (mg/l)	260	234	850	**-**
Biochemical Oxygen Demand (BOD) (mg/l)	320	126	755	**50**
Chemical Oxygen Demand (COD) (mg/l)	568	160	1162	**-**
Oil and Grease (mg/l)	5.0	15.7	15	**20**
Total Hydrocarbon (mg/l)	<0.01	<0.01	<0.01	**-**

ISSUE	GUIDELINES	CURRENT PRACTICE		REMARKS
Heavy Metals (mg/l)	<1.0	<1.0	<0.001	**<1.0**
Total Coliform Count (MNL/ml)	10	1.8 x 10^2	16	**Not Specified**

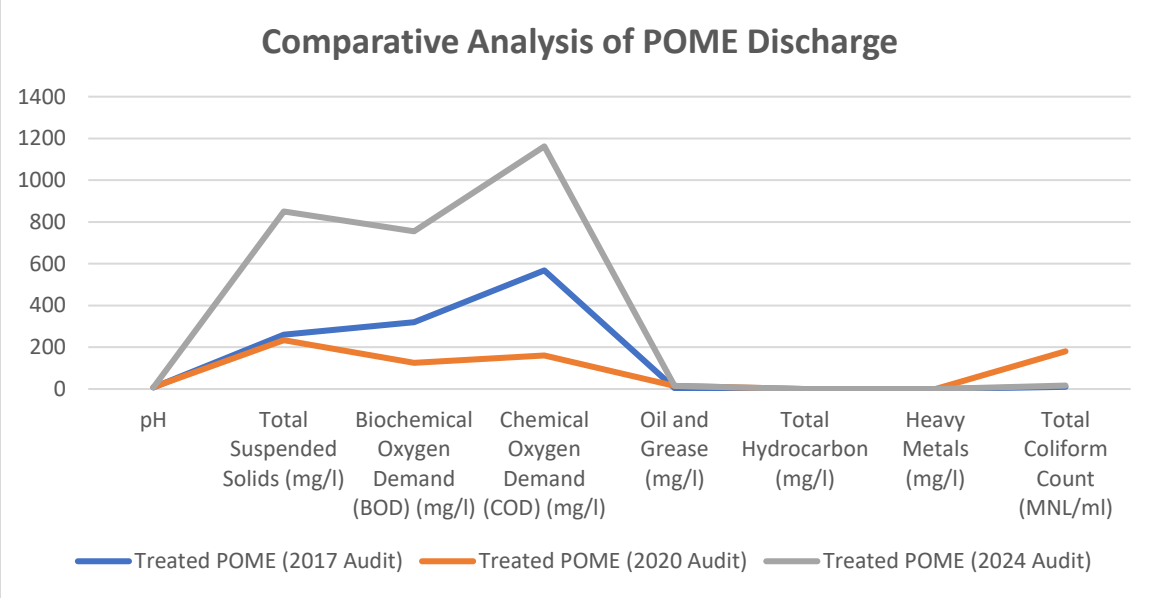


Figure 3.1: Comparative Analysis of Palm Oil Mill Effluent Discharge

The effluent sample does not conform to the general FMEnv effluent limits for industries due to its high Chemical Oxygen Demand and Biochemical Oxygen Demand as presented in Table 3.2. It is recommended that the effluent treatment system be maintained regularly for improved efficiency such as scooping the bottom layer of POME Lagoon.

ENERGY CONSUMPTION AND MANAGEMENT

Increase efficiency of air removal in sterilization vessels to improve heat transfer.	The conventional type of sterilizer has been upgraded to modern (tilted) type. The process is now fully automated whereby there is efficiency of air removal to improving heat transfer.	No Action Required
Identify and implement opportunities for process heat exchange, e.g., optimized oil-oil heat exchangers in continuous deodorization.	Not Applicable	No Action Required
Reduce stripping steam consumption by improving process efficiency, e.g., improve stripping tray design. Where possible, consider technologies such as dry ice condensing systems that significantly lower energy consumption.	Not Applicable	No Action Required

ISSUE	GUIDELINES	CURRENT PRACTICE	REMARKS
	Where feasible, use anaerobic digestion for wastewater treatment to capture methane for power production and use, a process that improves energy efficiency and reduces greenhouse gas emissions.	Open anaerobic treatment (not enclosed) is employed.	Adopt the technology to capture methane for power production i.e. biomethanation of the POME.
ATMOSPHERIC EMISSIONS (PARTICULATE MATTER & VOC)			
	Recommended management techniques include: Process improvements, for example: • Optimize recovery of solvents by distilling the oil from the extractor. • Back-vent to the solvent delivery tanks during bulk storage tank filling. • Improve exhaust air collection systems. • Implement leak prevention systems.	Solvent extraction is not used. However, the ambient air quality was determined in-situ during the audit for critical locations (see Appendix B). In general, the emission sources and air emission potential of oil mill complex and other critical work areas is presented in Table 3.3 below:	

Table 3.3: Emission Sources and Air Emission Potential

Sources	Location	Air Emission
Point Source	Powerhouse, Mill, Dumpsite	NOx, SO_2, CO, PM, VOCs, CH_4, dioxin
Fugitive	Nursery, earth roads, unpaved ground	PM, NOx, SOx, CO
Mobile Sources	Tractors, Machinery	NOx, SO_2, CO, PM, VOCs
Greenhouse Gases	Effluent Lagoon, Powerhouse, Mill, Dumpsite	CO, CO_2, CH_4,

Periodically monitor the emission levels of all the work areas.

The results of in-situ air quality determinations conducted on the facility show that the concentration of noxious gases was detected within the recommended range and therefore does not pose any threat to the environment. The particulate matter at all the monitored locations was also found to be below the FMEnv. Limits for 8-hour exposure except at the Oil Mill powerhouse and Agric Office which exceeded the limit.

ISSUE	GUIDELINES	CURRENT PRACTICE	REMARKS
RECOMMENDED TECHNIQUES TO MANAGE DUST AND ODOR			
	Ensure proper maintenance of cleaning, screening, and crushing equipment—including in any ventilation and air handling systems—to reduce emissions of fugitive dust and avoid the use of compressed air or steam for cleaning.	Cyclones are used to remove fiber dust from air coming from nut/fibre separation systems. Compressed air is not used for cleaning.	
GREEN HOUSE GAS EMISSIONS			
	The high nutrient loading of wastewater can be a source of methane (CH_4) when treated or disposed of anaerobically. It can also be a source of nitrous oxide (N_2O) emissions associated with the degradation of nitrogen components in the wastewater (e.g., urea, nitrate, and protein). Recommended measures to prevent and control non-fossil-fuel-related GHG emissions include: • Avoid open anaerobic conditions for wastewater treatment by ensuring a regular program of operational maintenance in the wastewater treatment system. • Consider biological methods of wastewater treatment, such as anaerobic digestion and methane capture; 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.	A biological method of wastewater treatment is being used where open anaerobic wastewater treatment is employed.	Biological methods of wastewater treatment, such as anaerobic digestion and methane capture should be considered.
OCCUPATIONAL HEALTH AND SAFETY			
PHYSICAL HAZARDS	Physical hazards in vegetable oil production and processing facilities are similar to those present in other industry sectors and include the potential for falls caused by slippery floors and stairs; injuries caused by unprotected machinery or moving parts; hazards associated with potential collisions with internal transport, such as trucks; and accidental contact with conveyor systems, such as those used in crushing plants and in the removal of spent earth. The **General EHS Guidelines** provide guidance on the prevention and control of physical hazards.	The risk assessment of the Oil mill factory gives a guideline for the prevention and control of physical hazard. However, some of the operations involve both single and multiple exposures to physical hazards with potential for accident or injury or illness due to repetitive exposure to mechanical action or work activity. The most	

common physical hazards derived from palm oil processing are presented in Table 3.4 below.

Table 3.4: Physical Hazards Associated with Palm Oil Processing

Workplace	Physical Hazards Sources
Mill	Rotating & Moving Equipment, Noise, Vibration, Electrical, Hot Work, Working Environment Temp, Ergonomics, Working Heights, Floors, Stairs.
Workshop	Rotating & Moving Equipment, Noise, Vibration, Electrical, Welding Work, Working Environment Temp, Ergonomics, Eye Hazards,
Stores	Working Environment Temp, Illumination, Eye Hazards.
Offices	Working Environment Temp, Ergonomics, Illumination.
Transport	Industrial Vehicles & Site Traffic

CONFINED SPACE ENTRY

Grain silos present a significant risk of death from asphyxia. Extremely toxic nitrogen oxides begin to accumulate in the head space of the silo within hours of its filling. Tank cars may also represent asphyxia risks if, for example, a tanker is flushed with nitrogen prior to loading. Recommendations for the management of occupational health and safety (OHS) risks associated with confined spaces are provided in the **General EHS Guidelines**

The relevant confined spaces include boiler fire chamber, process and product storage tanks and sterilizers. Details of the procedure for working in confined spaces are provided in working in confined space procedure (GP26).

CHEMICAL HAZARD

Operators in vegetable oil facilities may be exposed to hazardous substances, including inhalation of hexane or other solvents used for extraction; inhalation of toxic chemicals (e.g., sodium methylate can cause burns on the skin and lung tissue if inhaled); eye or skin exposure to acids or bases; inhalation of dust from the transportation of raw materials (e.g., seeds and beans to the crushing plant); inhalation of dust from meal treatment and shipment; inhalation of dust from bleaching earth, filter aid, and nickel catalyst; and inhalation of aflatoxins present in

Physical extraction is used instead of chemical extraction. The only place where chemicals are used is in the quality control laboratory and adequate provision is made for filters masks. However, some of the operations in the plantation and Oil mill factory involve the use of chemicals and hazardous

ISSUE	GUIDELINES	CURRENT PRACTICE	REMARKS
	raw materials. Additional recommendations include; • In oil extraction areas, ensure that there is adequate air circulation to reduce the concentration of solvents.	substances with potential for accident, injury, or illness due to repetitive exposure to these chemical uses. The most common chemical hazards derived from palm oil processing is presented in Table 3.5 below.	

Table 3.5: Chemical Hazards Associated with Palm Oil Processing

Workplace	Chemical Hazards Sources
Laboratory	Air Quality, Fire & Explosion, Corrosive, Oxidizing & Reactive Chemicals.
Mill	Air Quality, Fire & Explosion.
Workshop	Air Quality, Fire & Explosion, Corrosive.
Stores	Air Quality, Fire & Explosion, Corrosive, Oxidizing & Reactive Chemicals.

	Provide ventilation, especially at workstations devoted to raw-material handling, milling, handling of bleaching earth, and use of solvents	The ambient temperature is normal for open space workstations because oil mill factory is of open design. On the other hand, in-door temperatures are controlled artificially to make for worker's comfort.	No Action Required
ELECTRICAL HAZARDS			
	Risks of fire and explosion occur at different stages of vegetable oil production and processing and can lead to loss of property, as well as possible injury or fatalities among project workers. General fire safety management should be handled according to the **General EHS Guidelines**. Sector-specific risks are related to the combustibility of vegetable oil and the high volumes of combustible dust present both in grain and oil-seeds handling and in storage facilities. The control and removal of this dust and the control or removal of potential ignition sources are key to eliminating the explosion hazard. The storage of grains and seeds	Dust is removed from air through cyclones and housekeeping is done to keep environment dust-free. However, provisions are made for firefighting equipment including fire hose reels, fire truck, fire extinguishers, sand buckets, and stand-by water tankers.	No Action Required

ISSUE	GUIDELINES	CURRENT PRACTICE	REMARKS
	represents a combustion risk, owing to the potential for self-heating and ignition. Silo safety for these products, as well as for oil storage, is critical. Vegetable oil facilities also present the risk of explosions resulting from the volatilization of solvent dissolved in the oil (e.g., hexane), along with the risk of fire from spent bleaching earth with a high iodine-value oil, high ambient temperature, and high circulation-draft of air.		
COMBUSTIBLE DUST AND SILO SAFETY			
	Use recognized international standards in design and operation.	See confined space entry above.	
	• Classify areas according to respective hazard classes following practices and requirements found in recognized international standards and deploy intrinsically safe electrical circuits and anti-explosion electrical devices (including lighting).		No Action Required
	Ensure that emergency plans and procedures are developed and understood by staff. Install suitable detection equipment in silos, such as temperature sensor cables and gas detectors. Spark/heat detectors should be connected to an extinguishing system installed in transport systems (belt conveyors, dust extraction systems, etc.) to reduce the risk of ignition. Establish a suitable extinguishing operation (e.g., water, foam, inert gas, powder) based on the silo construction and bulk material stored. The silo should be prepared with connections or openings suitable for the planned method and silo construction, e.g., pipe systems and connections should be located at the top of the silo wall if the roof is not considered sufficiently strong to withstand an explosion	There is an emergency plan and procedure that is well understood by all workers. In addition, smoke detectors are available at key location.	
PROCESSING RISK			
	Ensure regular and proper maintenance of equipment to avoid leaks.	Maintenance is done regularly	
	Establish procedures for startup, shutdown, and maintenance, and train personnel to identify air leaks and react to the outbreak of fires	This is in practice such as log-out-tag-out (LOTO)	No Action Requires
NOISE			

ISSUE	GUIDELINES	CURRENT PRACTICE	REMARKS
	Operators in palm oil plants are also exposed to noise from internal transport, conveyors, boilers, pumps, fans, and various steam and air leaks. The **General EHS Guidelines** provide guidance on the prevention and control of noise impacts.	Ear mufflers and plugs are provided in high noise areas with warning signs conspicuously pasted in critical work areas.	No Action Requires
COMMUNITY HEALTH AND SAFETY			
	Community health and safety impacts during the operation phase of palm oil processing are common to most industry sectors—including those related to traffic safety during transport of raw materials and finished products—and are discussed in the **General EHS Guidelines**. Industry-specific issues that could affect the community or the public at large may include the potential presence of pathogens and contaminants in processed oil (e.g., pesticide residues).	Process water is monitored for contamination. Pesticide residue test is also carried out on product. There is a comprehensive transport policy.	No Action Required
FOOD SAFETY IMPACT AND MANAGEMENT			
	Food safety is an industry-specific risk relevant to palm oil processing. For example, a product recall caused by contaminated or adulterated products found in commerce that is attributable to a specific company can damage a viable business. If a company can trace its products back to specific lot numbers, then a recall is a matter of removing all non-conforming products associated with the specific lot numbers. With a food safety management system in place, the company can protect itself against product adulteration, contamination, and the impacts of product recalls. Palm oil processing should therefore be performed according to internationally recognized food safety standards consistent with the principles of Hazard Analysis Critical Control Points (HACCP), Food and Agriculture Organization (FAO)/World Health Organization (WHO) *Codex Alimentarius, and ISO 22000*	Traceability and Recall systems available (Non-Conformity of ISO 9001-QMS). Food Safety Systems are also in place.	No Action Required

ISSUE	GUIDELINES	CURRENT PRACTICE	REMARKS
	Recommended product safety principles include:		
	• Fully institutionalize HACCP prerequisites, including sanitation, good management practices, implementation of integrated pest and vector management programs, and maximization control through mechanical means (e.g., traps and mesh on doors and windows), chemical control, allergen control, and the establishment of a customer complaints mechanism.	This is in place and it is fully operational	No Action Required
	• All personnel should receive training to ensure they are aware of potential microbiological contamination and growth during processing, material handling, storage, and maintenance (e.g., salmonella contamination	Training is conducted regularly for all workers	
	• Food grade-quality fresh bleaching earth should be used for processing food and feed-grade products to avoid risks to public health from food and feed contamination	Not Applicable	

3.3 EXISTING ENVIRONMENTAL MANAGEMENT SYSTEM

The International Standard Organisation (ISO) 14001 defines an Environmental Management System (EMS) as that of a company's overall management arrangement that includes the organizational structure, planning activities, responsibilities, practices, procedure, process and resources for development, implementing, reviewing, achieving and maintaining the environmental policy of the company.

In evaluating the EMS, the under listed ISO 14001- 2015 requirements were audited:

- ❖ Health, Safety and Environmental Policy
- ❖ Organizational Structure for Implementing EMS
- ❖ Environmental Unit/Committee
- ❖ Environmental Aspects and Impacts
- ❖ Environmental Objectives and Targets
- ❖ Environmental Training and Awareness Programme
- ❖ Housekeeping Culture
- ❖ Waste Reduction Strategy

❖ Environmental Management Plan (EMP)

3.3.1 Organizational Structure for Implementing EMS

The company has put in place an effective Environmental Management system (EMS) to ensure consistent functioning of the estate. The EMS includes the following:

- An Environmental management committee.
- Environmental Monitoring.
- Personnel Training.
- Regular Environmental audits and Correction measures.
- Documentation–Standards Operation Procedures, Environmental Management Plan and other records

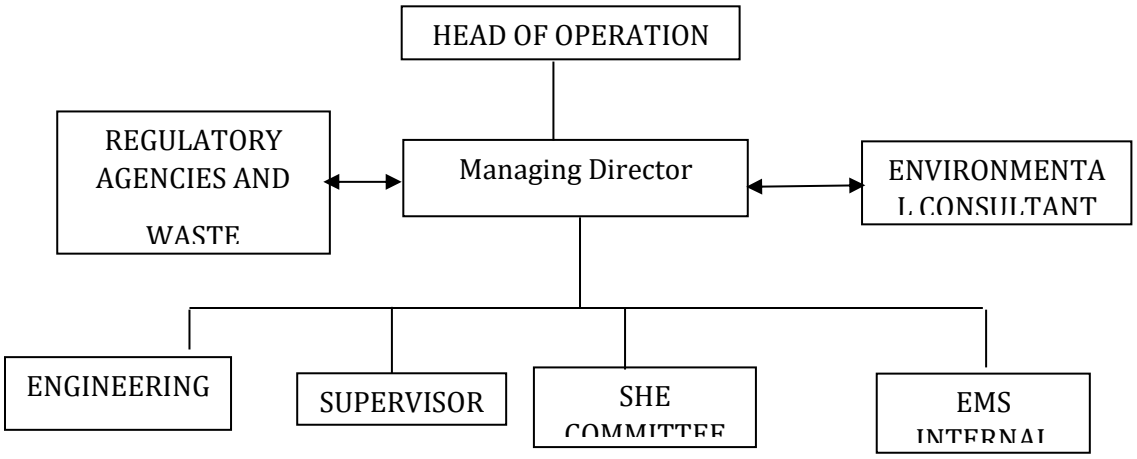


Fig. 3.2: Organogram for EMS Implementation

3.3.2 Health, Safety and Environment (HSE Department/HSE Committee)

Apart from having an Environmental Management Plan, the company also has a permanent organizational set up charged with the task of ensuring its effective implementation of mitigation measures and to conduct environmental monitoring. The major duties and responsibilities of HSE department with HSE Committee are as given below:

- To implement the environmental management plan.
- To assure regulatory compliance with all relevant rules and regulations.
- To ensure regular operation and maintenance of pollution control devices.
- To minimize environmental impact of operations as by strict adherence to the EMP.
- To initiate environmental monitoring as per approved schedule.
- Review and interpretation of monitored results and corrective measures in case monitored results are above the specified limit.
- Maintain documentation of good environmental practices and applicable

environmental laws for reference.

- Maintain environmental related records.
- Coordination with regulatory agencies and external consultants
- Maintenance of log of public complaints and the action taken.

3.3.3 Sanitation and Housekeeping

Issues	Indicator	Current Practice/Status	Comments
Sanitation	Health, Safety and Environment (HSE) department in place	The Company has established and is operating a full fledge HSE department. Housekeeping and Sanitation is good.	Conformed This practice should be sustained
Housekeeping		Housekeeping was good across board but fair at Labour Line Quarters.	Housekeeping at Labour Line Quarters should be improved on.

3.3.4 Environmental Sustainability and Planning

Issues	Indicator	Current Practice/Status	Comments
Institutional workplace environment policy	Institutional environmental sustainability policy	A formal Environmental and other Policies duly signed by the Managing Director is available.	Conformed to national environmental legislation
Structures to address environmental issues	Environmental committee	Environmental Committee in place (see Figure 2.1).	The committee should be empowered by continuous training that will enable it overseeing environmental responsibility on the estate.
Strategic plan and Service Charter	Commitments	Yes	Conformed to legislation
Compliance with the Environmental Impact Assessment and Environmental Audit	Bi-annual environmental audit reports for Edo State and every 3 years for NESREA, EIA reports for new projects, EMPs	The Company is up to date in the environmental audit of its facility and processes. Previous Environmental Audit Report was submitted to the Federal Controller office in Benin and Edo State Ministry of Environment and Sustainability.	An EIA is not critical because the plantation was acquired before the EIA act. Environmental Audit (EAu) is required in this regard

3.3.5 Pollution Control

Issues	Indicator	Current Practice/Status	Comments
Water Pollution & Control Measures	Initiatives to prevent, protect and monitor water sources.	Quarterly laboratory analysis of all water sources is in place.	The result of laboratory analysis obtained during this audit show that the groundwater quality is good and free from pollution except pH (4.40 – 7.85), which was slightly acidic and below the FMEnv and WHO (2004) drinking water guideline of pH 6.5-8.5 except at the mill complex. Sample was also collected from surface water for laboratory analysis. The result shows that the pH of surface water was slightly acidic (5.02 – 5.81) which was below the limit. All other parameters conform to FMEnv and WHO standard. Also, the oil mill effluent monitoring well was sampled. The result shows that Turbidity, Colour, BOD and COD exceeded their respective limits. See full laboratory analyses results of borehole water, surface stream and effluent monitoring well samples in Appendix A.
Air Pollution & Control Measures	Initiatives to reduce Air pollution	Quarterly monitoring of source and ambient air quality has been put in place.	The measurements carried out at the facilities during the environmental audit show that the Concentrations of the gases are within the FMEnv Limit except particulate matter. The result has shown that parameters such as Suspended Particulate Matter (SPM) ranges between 152 - 316 µg/m^3; Carbon dioxide, 406 – 773ppm; Carbon monoxide, <1 - 3ppm; Hydrocarbon, <0.1%; and Nitrogen dioxide, <0.01ppm which are within FMENv permissible limits of ambient, 10-20ppm, nil and 0.4-0.6ppm respectively except SPM which exceed the limit of 250 µg/m^3 at the Agric Office and Oil Mill Powerhouse. The full results and methodology are presented in Appendix B.
Noise Pollution & Control Measures	Initiatives to reduce Noise	Soundproofing of generators and provision of ear protective device.	The noise level conforms to the NESREA and FMEnv. limit of 90 dB (A) for 8-hour exposure at all the location. The levels range from 51.8dB(A) – 101.4 dB(A). (See Appendix B).
Fuel Storage	Pollution prevention measure	There are two (2Nos.) surface tanks at the filling station for fuel storage to store petroleum product (PMS & AGO) with	The service station at the Main Powerhouse should be concretized.

Issues	Indicator	Current Practice/Status	Comments
		containment to control soil pollution.	
Powerhouse	Appropriate designs for primary and secondary containments	There are designs for primary and secondary containments.	The Mill powerhouse generator exhaust pipe should be directed vertically to aid proper dispersion and reduced local concentration.
General Pollution Control Measure	Pollution Abatement Provisions	***In-House Pollution Monitoring*** The HSE department undertakes pollution monitoring as part of its oversight functions.	Conformed This practice should be sustained
		Potential for Accidental Spill Control/Management The potential for accidental spills does exist and there are adequate measures in place to control accidental spill across board.	A number of pollution abatement measures have been put in place which include. • Provision of oil retention trays • Construction of containment bunds around hazardous substances • Provision of enough waste bins
		On-site/Off-Site Contingency Plan There is a formal Emergency Response/Contingency Action Plans manual in place. The manual has taken into account both on-site and off-site emergency response and contingency plans for environmental sensitive activities and operations.	
		Pollution Complaints No complaints relating to pollution have been received from the host communities in recent time.	No Action Required

3.3.6 Waste Management

There is a comprehensive and detailed waste management plans in place which covers description of activities and waste handling up to waste disposal. The wide range of waste found on the estate is classified into solid waste, liquid waste and gaseous emissions.

Issues	Indicator	Current Practice/Status	Comments
Solid Waste Handling	Initiatives to segregate, reducing, reusing, and recycling of waste	***Storage:*** At all the points of waste generation, waste bins/drums are provided for the immediate storage of different solid waste (see Plate 3.6 below). ***Collection and Transfer:*** Containers are located at designated places to collect wastes. Wastes from the storage bins and drums are emptied into the waste collection containers, waiting for transfer to the dumpsite. ***Disposal:*** The solid waste collected is transported by means of a tractor and disposed at the solid waste dumpsite. (See plate 3.7).	The current practice of solid waste handling is good but needs improvement. **Red** - Household Waste Only **Green** - Plastic & Cellophane only **Blue** - Aluminium Only **Black** - Glass & Broken Bottles Only **Yellow** – E-waste Only
	 **Plate 3.6: Colour Coded Bins for Solid Waste Storage**		
Liquid Waste Handling	Appropriate designs to collect wastewater and storm water	***Domestic Wastewater:*** Domestic liquid waste is channeled into soak away pits attached to every building at residences and offices. ***Storm water:*** Rainstorm water is collected and channeled out into the plantation. ***Septic Systems*** Domestic sanitary sewage is channeled into septic systems attached to residential buildings and offices. The septic systems are good in terms of their locations and construction.	This practice of liquid waste handling and management is good and should be sustained.
Gaseous Waste Management	Better maintenance of heavy machinery and equipment.	Maintenance of heavy machinery and equipment is done as contained in the maintenance schedule.	No Action Required

3.3.7 Waste Management Interventions

Issues	Indicator	Current Practice/Status	Comments
Waste Segregation	Initiatives to segregate, reducing, reusing, and recycling of waste	Most waste generated on the estate is organic in nature which is recycled in the field. Sorting is also done at the point of waste generation for domestic solid waste and at the solid waste dumpsite (see Plate 3.6 above and Plate 3.7 below).	The current practice of waste recycling in the plantation field is good and should be sustained. However, more efforts should be geared toward waste reduction and waste reuse to accomplish the 3R's principle of waste management (Reduce, Reuse and Recycle)
Waste Reduction			
Waste Reuse			
Waste Recycling			
Waste Generation	Modes of waste handling (generation, transportation and disposal)	Solid waste generated are collected in colour coded bins and transported by bucket mounted tractor to the solid waste dumpsite.	The mode of waste transportation is good but can still be improved upon by avoiding flight tipping as much as practically possible.
Waste Disposal	Government Approved Solid Waste Dumpsite	The Company operates an in-house solid waste dumpsite which is compartmentalized for different waste stream including domestic solid waste (see Plate 3.7 below).	The Company has a valid permit from Edo State Ministry of Environment and Sustainability to operate the in-house solid waste dumpsite.

Issues	Indicator	Current Practice/Status	Comments
	  **Plate 3.7: Edo State Ministry of Environment and Sustainability Approved Dumpsite**		

3.3.8 Climate Change (Adaptation & Mitigation)

Issues	Indicator	Current Practice/Status	Comments
Energy Saving Initiatives	Initiatives to Conserve energy	Petroleum hydrocarbon is the main source of energy on the estate. The record of fuel and lubricant consumption has been kept.	This is good and commendable but target needs to be set for reduction.

Table 3.6: Fuel & Lubricant Consumption in 2023 & 2024

ITEM	2023	2024
Petrol	555,851.61	560,155.12
Diesel	2,354,134.42	2,812,138.87
Lubricant	11,177	12,125

Source: HSE Department, OOPC Plc (December 2024)

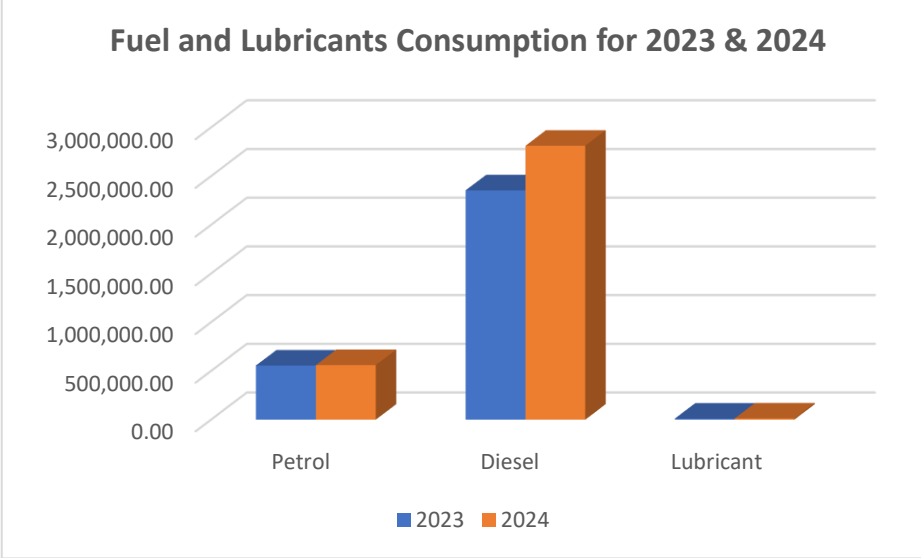
<table>
<tr><th>Issues</th><th>Indicator</th><th>Current Practice/Status</th><th>Comments</th></tr>
<tr><td></td><td colspan="2"> 

Figure 3.3: Fuel and Lubricants Consumption in 2023 & 2024</td><td></td></tr>
<tr><td>Soil Conservation</td><td>Initiatives to reduce evapotranspiration and soil loss through water erosion, which may include:
Use flow control wires and diversion canals to reduce erosion in areas with field drainage.</td><td>There are some natural drains and some constructed ones maintained regularly such as side/sedimentation pits. For the control of runoff especially on the plantation roads, sedimentation pits are dug to reduce runoff and trap sediments in runoff water as could be found across the plantation field.</td><td>Some of the rainwater retention initiatives being adopted by the plantation estate is commendable.</td></tr>
<tr><td>Measures to Control Greenhouse Gases</td><td>Sources of on-farm GHG emissions and establishment of a GHG management plan that includes methods of mitigating emissions and a monitoring program.
Initiatives to reduce fossil energy use by adopting</td><td>The emission sources and air emission potential of the plantation estate are presented in Table 3.7 below.
Table 3.7: Emission Sources on the Plantation Estate
<table>
<tr><th>Sources</th><th>Location</th><th>Air Emission</th></tr>
<tr><td>Point Source</td><td>Powerhouse, dumpsite, effluent lagoon</td><td>NOx, SO_2, CO, CO_2 Particulate Matter, VOCs, H_2S, CH_4, Dioxin</td></tr>
<tr><td>Fugitive</td><td>Earth roads, unpaved ground</td><td>PM, NOx, SOx, CO</td></tr>
<tr><td>Mobile Sources</td><td>Tractors, Machinery</td><td>NOx, SO_2, CO, VOCs and Particulate Matter,</td></tr>
<tr><td>Greenhouse Gases</td><td>Tractors, Machinery</td><td>CO, CO_2, CH_4,</td></tr>
</table>
However, the ambient air quality was recently determined in-situ for critical locations during this audit as presented in Appendix B.</td><td></td></tr>
</table>

Issues	Indicator	Current Practice/Status	Comments
	energy-efficient production and management practices.	No programme in place yet.	Management should consider switching to other source of energy for their farm machineries.

3.3.9 Promoting Environmental Protection through Partnerships with Stakeholders

Issues	Indicator	Current Practice/Status	Comments
Environmental projects and activities undertaken through partnerships with stakeholders	Projects and activities undertaken jointly. MoUs Joint management plans	There are environmental projects and activities that have been undertaken jointly with stakeholders particularly an MoU with ONP and projects done by OOPC Plc for the host communities (CSR).	This is Good and Commendable.
Corporate Social Responsibility (CSR) on Environment	CSR initiatives in place	The company has a 'Host Community Policy' and has undertaken a number of community development projects to demonstrate its spirit of partnership and goodwill to the host communities. Some of the CSR undertaken in 2023 and 2024 are; • Road maintenance • Educational support such as stipends to teachers and scholarship awards. • Electricity Project (Provision and installation of power Generating set) • Women empowerment • Construction and upgrading of schools and community town halls. • Provision and repair of semi-industrial boreholes.	This practice is good and does conform to best management practices.
Partnerships with FMEnv on Monitoring and inspections to ensure compliance with environment legislation	Areas of partnerships with FMEnv. on Monitoring and inspections to ensure compliance with environment legislation	There is a partnership in place with both State and Federal ministry of environment especially in the area of environmental compliance monitoring.	This practice should be sustained

3.3.10 Environmental and Ecological Enhancements

Issues	Indicator	Current Practice/Status	Comments
Wetlands, River banks, lakeshores, and seashore management	Rehabilitation initiatives	Not applicable.	No Action Required
Conservation of biological diversity and Environmental significant areas	Conservation initiatives	Conservation areas known as HCVs (959.47 hectares)	Good and commendable

		have been established within the estate.	
Environmental restoration	Degraded lands secured, restored and conserved	No degraded lands on the estate.	Good

3.3.11 Environmental Education and Awareness

Issues	Indicator	Current Practice/Status	Comments
Behaviour changes towards the environment	Proof of positive behaviour change	Safety committee being coordinated by HSE department is charged with the responsibility of creating awareness on the plantation estate.	There is great environmental awareness among the workers and communities. This was apparent during the audit exercise.
Participation in environmental events with communities and schools	Evidence of Participation in environmental events.	HSE week is conducted every year (annually) on the estate.	Include Occupational Health and Environment in the awareness campaign with schools and communities engaged in the implementation
Sensitization of staff and public on Environmental sustainability relevant to the institutional mandate.	Sensitized staff on environmental sustainability through IEC materials	There are information, Education, and Communication (IEC) board on environment, occupational health and safety on the estate.	This is commendable and should be sustained.
Recognition of environmental champions	Evidence of appreciation of environmental sustainability champions	Environmental sustainability champions are been awarded	This is commendable and should be sustained.

3.3.12 Health & Safety Issues

3.3.12.1 Health Issues

Issues	Indicator	Current Practice/Status	Comments
Occupational Illnesses	Analysis of Occupational Illnesses Analysis of Industrial Accidents and Fatalities	Occupational illnesses are documented on daily basis and also analyzed. So also, are records of industrial incidents/near misses and comparative statistical analysis available for accidents, incidents and fatalities.	This practice is good and commendable.
Health Screening & Monitoring	Accidents and Diseases Monitoring	The plantation estate operates on-site medical services for workers. Both on-site and off-site accidents	Pre-employment medical examinations are conducted for workers that handle

		records are kept and also reported to the appropriate regulatory authorities.	hazardous substances such as agrochemical sprayers. Periodic monitoring of their health is also carried out (every 6 months).

RECORD OF ILLNESS FOR OOPC MAIN ESTATE (2023)

AILMENT/Diseases	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	TOTAL (AVG)
GIT/ABDOMINAL PROBLEMS	104	142	102	133	147	155	124	130	137	134	165	151	1624
MALARIA	618	888	784	840	1011	986	915	966	921	892	990	857	10668
BACTERIA	94	104	79	108	93	80	102	97	109	94	125	116	1201
VIRAL INFECTION	2	2	3	2	2	1	2	3	0	3	7	0	27
FUNGAL INFECTIONS	1	21	8	12	12	11	10	5	14	9	21	9	133
SKIN INFECTION	26	50	39	34	47	42	39	0	37	41	52	59	466
EYE PROBLEM	34	40	41	52	49	37	45	0	68	159	91	78	694
EAR PROBLEM	7	10	5	13	11	6	7	0	5	15	10	17	106
WORKPLACE INJURIES	5	6	6	3	7	6	7	6	3	6	6	8	69
HOME ACCIDENTS/INJURY	25	30	24	53	30	36	20	0	27	26	45	45	361
ROAD TRANSPORT ACCIDENT (RTA)	3	3	3	5	2	4	2	0	1	4	6	2	35
NON-INDUSTRIAL MUSCULOSKELETAL PROBLEMS	187	339	314	296	302	291	282	1	318	362	462	383	3537
DENTAL DISEASES	16	18	16	11	12	13	6	1	18	16	21	12	160
HYPERTENSIVE DIESEASES	0	7	2	5	1	1	5	0	3	2	0	2	28
DIABETES	2	3	1	0	0	0	0	0	1	1	2	1	11
SURGICAL PATIENTS	6	6	10	10	5	5	7	0	1	1	4	8	63
RESPIRATORY PROBLEMS	85	105	115	85	85	85	67	0	87	102	115	104	1035
OTHERS	20	36	14	32	21	21	34	7	43	50	60	68	406

Plate 3.8a: Medical Records of Illness for year 2023 (Jan- Dec).

RECORD OF ILLNESS FOR OOPC MAIN ESTATE (2024)

AILMENT/Diseases	JANUARY	FEBRUAR	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	TOTAL (AVG)
GIT/ABDOMINAL PROBLEMS	179	229	253	275	229	252	269	174	246	2106
MALARIA	876	983	919	99	932	1172	1608	1609	1506	9704
BACTERIA	119	138	159	200	199	207	229	166	245	1662
VIRAL INFECTION	5	16	46	31	12	3	4	5	0	122
FUNGAL INFECTIONS	10	14	12	15	22	24	25	22	22	166
SKIN INFECTION	60	73	66	75	115	71	75	223	223	981
EYE PROBLEM	49	52	67	61	52	48	67	79	79	554
EAR PROBLEM	10	12	24	25	24	13	16	19	19	162
WORKPLACE INJURIES	11	9	12	7	9	5	4	2	2	61
HOME ACCIDENTS/INJURY	47	38	58	100	77	86	102	84	84	676
ROAD TRANSPORT ACCIDENT (RTA)	3	3	13	13	7	3	8	7	7	64
NON-INDUSTRIAL MUSCULOSKELETAL PROBLEMS	432	461	0	0	571	735	646	756	756	4357
DENTAL DISEASES	16	16	18	16	19	20	14	19	19	157
HYPERTENSIVE DISEASES	0	3	3	0	2	2	5	2	2	19
DIABETES	0	0	0	2	0	0	1	0	0	3
SURGICAL PATIENTS	3	4	8	14	13	2	19	9	9	81
RESPIRATORY PROBLEMS	175	202	119	113	104	159	153	178	178	1381
OTHERS	51	102	85	100	89	130	81	20	20	678

Plate 3.8b: Medical Records of Illness for year 2024 (Jan- Sept).

3.3.12.2 Safety Issues

Some of the operations in the plantation field, palm oil mill, stores, workshop and office involve both single and multiple exposures to physical hazards with potential for accident or

injury or illness due to repetitive exposure to mechanical action or work activity as presented below.

Issues	Indicator	Current Practice/Status	Comments
Occupational Hazards	Physical Hazards	Appropriate personal protective equipment (PPE) is provided.	This is good and commendable.
	Chemical Hazards	Adequate provisions are put in place such as appropriate personal protective equipment (PPE) provided for workers.	
	Biological hazards	There are no activities or processes that require the use of biological agents and there have been no reported health cases that are linked to suspected presence of biological agents at workplaces.	
	Radiological Hazards	There are no activities involving occupational and/or natural exposure to ionizing radiation.	
Risk Assessment	Initiatives to conduct a comprehensive risk assessment	Risk assessment and analysis for all jobs and tasks have been conducted in recent time.	This is good and commendable.
Work Procedures	Initiatives to document work procedure	Work procedures were said to be documented for every job and task but were neither displayed nor sighted during the audit.	This is good but need to be improved on.
PPE	Commitment	As part of the prevention and control measures for the identified hazards, some PPE have been provided for workers. The PPE issued to workers appear adequate. The level of use of PPE by workers is high. The enforcement level by management is high and proper use of PPE has been communicated to workers. Some of the PPE provided to workers include helmet, aprons (overall), safety boots, eye googles, hand gloves, ear muffs and nose masks etc.	The level of compliance to PPE usage is remarkably high and should be sustained.
Safety Education	Initiatives on safety Education	Safety education is evident on the plantation estate	The level of safety education is good but need to be improved on.
Signage	Initiatives to Signage Production especially traffic safety	There is several signage on the estate and are strategically posted.	
Fire Drills	HSE department in place	There is a full-fledged HSE department in place and there are records to show that fire drills have been conducted in recent time.	This should be sustained
Fire Safety (Prevention & Control Measures)	Risk of Fire and Explosion	All the office has fire detectors for fire surveillance. Stand-by water tankers and fire extinguishers are the provisions made for firefighting on the estate.	This should be sustained

Issues	Indicator	Current Practice/Status	Comments
	Initiatives on Fire Fighting Equipment Systems	There is a security patrol team for fire detection and control. The provision for fire control/fighting include: • Trained fire fighters • Fire extinguishers • Sand buckets • Fire hydrants • Stand-by Water Tankers • Fire Fighting Procedure	This should be sustained
	Initiatives on Emergency Response Plan for Fire	There is Emergency Response Procedure in place so also is emergency response plan for fire for all facilities (see Appendix C).	This should be sustained

Plate 3.9: Samples of Safety Signages within the Estate

3.4 Conformance to Legislation Issues

3.4.1 Environmental, Health and Safety Laws and Regulations

Issues	Indicator	Current Practice/Status	Comments
Establishment of HSE Department	HSE department in place	There is a full-fledged HSE department in place.	Conformed to national environmental legislation
Submissions to Regulatory Bodies	Commitment	The status of submissions to regulatory bodies is summarized in Table 3.8 below.	

Table 3.8: Status of Submissions to Regulatory Bodies

Requirement	Status	
	Submitted	Available but Not Submitted
Environmental Audit Report	X	
SDS	X	
Emergency Response Plans	X	
Contingency Action Plans	X	

	Record of Fire Drills	X		
	Accidents, Incidents and Near Misses	X		
	Accident Investigation Reports	X		
	Environmental and other Policies	X		

3.4.2 Environmental, Health & Safety Permits

Issues	Indicator	Current Practice/Status	Comments
Environmental and Other Policies	Commitment	The Company has well written and articulated environmental and other policies, duly signed by the Managing Director.	Good and Commendable
Permits/Licenses/ Approvals	Initiatives to Obtain applicable Permits/License/ Approvals	The Company has obtained some permits, licenses and approvals to cover certain processes and operations. However, quite a number of permits remain outstanding as presented in Table 3.9 below	

Table 3.9: Permits and Licenses Obtained

OPERATIONS/PROCESSES	Requirement (Permit/License/ Approval)	Status: Obtained/Not Obtained	Date Obtained	Expiry Date
Solid Waste Dumpsite	Permit	Expired	Processing certificate	
Storage of Petroleum Products	License	Obtained	2024	March 2027
Discharge Outfall (Effluent Ponds and Lagoon)	Permit	Obtained	2022	December 2024
Food Handlers Test	Certificate	Obtained	2024	January 2025
Clinic	License	Obtained	December 2023	December 2024
Factory Registration	Certificate	Paid, Awaiting Certificate	June 2023	June 2025
Fire Safety	Certificate	Obtained	2024	August 2026
Registration of Product with NAFDAC where applicable	Certificate	Expired	Awaiting renewal	

Verification of Weights and Measures	Certificate	Obtained	Awaiting certificate	August 2025
Lifting, hoisting, and pressure equipment	Certificate	Obtained	February 2024	February 2025
Pressure Testing of Fuel Storage Tanks	Certificate	Obtained	February 2021	February 2026
EAu Permits: a. Main Estate Facility	Permit	Currently awaiting certificate		

3.5 Community and Industrial Relations

Issues	Indicator	Current Practice/Status	Comments
Employment	Initiative	The company employs workers including expatriates and Nigerians at management, senior and junior cadres. Both genders are employed.	Good and Commendable.
Child Labour	Initiatives to prepare Child Labour Policy	The company does not give employment to underage workers at all cadre and there is a policy document in place which forbids child labour.	Good and Commendable.
Employment Opportunities	Commitment	The company does not discriminate in its employment policy. However, priority is given to employing suitably qualified workers from the host communities.	Good and Commendable.
Welfare	Commitment	The Company operates with due respect to the Nigerian Industrial Labour laws. The workers have freedom to belong and participate in labour union activities and workers belong to the Agricultural and Allied Workers Union of Nigeria (AAWUN). This allows for collective bargaining, honesty and communication in both directions. The Company offers competitive wages and welfare packages (salaries plus allowances and bonuses) for all categories of staff as stipulated by RSPO Guidelines.	Conformed to national environmental legislation.

3.6 Statutory Compliance Status of OOPC Main Estate with The Factories ACT CAP 126 LFN, CAP F1 LFN 2004

REFERENCE	REQUIREMENS	COMPLIANCE STATUS	REMARKS
Part II Health			
1a	Daily removal of dirt and refuse from floors, benches of workrooms, staircases and passages	C	
1b	Cleaning of the floor of every workroom at least once every week	C	
1c	Whitewashing /colour washing or washing with hot water and soap of all inside walls, partitions, all ceilings or top of rooms, all walls, sides and tops of passages and staircases at least once in every twelve months or the repainting of re-varnishing of same at least once in every period of five years.	C	
2_1	Avoidance of overcrowding while work is going on so as not to cause risk or injury to the health of the persons employed therein.	C	
2_2	Provision of at least a space of 400 cubic feet for every person employed in order to avoid overcrowding	C	
2_3	Workroom not less than 9ft height, measured from the floor to the lowest point of the ceiling or roofing material.	C	
3_1	Securing and maintaining the circulation of fresh air in each workroom/adequate ventilation	C	

REFERENCE	REQUIREMENS	COMPLIANCE STATUS	REMARKS
4	Provision and maintenance of sufficient and suitable lighting whether natural or artificial in every part of a factory in which persons are working	C	
5	Provision and maintenance of separate sanitary convenience for each sex	C	
Part III Safety (General Provisions)			
6	Securely fenced fly wheel or every moving part of any prime mover or every part of any electric generator, motor or rotary converter unless otherwise not necessary.	C	
7	Provision and maintenance of efficient devices or appliances in every workroom by which the power can promptly be cut off.	C	
8	Provision of an efficient starting and stopping appliance or control for every power-driven machine	C	
9	Protective device for an operator of a dangerous machinery during examination, lubrication or adjustment who should be a male, 18 years and above and has been sufficiently trained, with another person instructed on the steps to be taken in case of emergency standing by.	C	
10	Securely covered or fenced fixed vessel, structure, sump or pit of which the edge is level with or less than 91cm above the ground and which contains any scalding, corrosive or poisonous liquid with a warning notice in English and any other Nigerian language displayed there-on.	C	
11	No traversing part of any self-acting machine and no material carried thereon shall be allowed into a space where persons are or pass through except when the machine is stopped with the traversing part on the outward run.	C	
12	No person shall be employed at any process or machine liable to cause bodily injury without sufficient training or under adequate supervision by a person who has a thorough knowledge and experience.	C	
13	Maintenance and thorough examination, at least once in every six months of every hoist or lift which shall be of good mechanical construction, sound material and adequate strength	C	
14	Indication of safe working load(s) on every lifting machine except a jib crane which shall have either an automatic indicator or a table indication safe working load.	C	
15	No overloading of any lifting machine beyond the safe working load as indicated except for the purpose of a test.	C	

REFERENCE	REQUIREMENS	COMPLIANCE STATUS	REMARKS
16	Register of chains, ropes or lifting tackle and other lifting machines kept in the company.	C	
17	Safe means of access and safe place of employment.	C	
18	Provision of an adequate means of egress for person entering or working inside any chamber, tank, vat, pit or other confined place and the notification of the Director of factories before the commencement of work & provision of suitable breathing and reviving apparatus.	C	
19	Taking of adequate precautions with respect to explosive or inflammable dust, gas, vapour or substance.	C	
20	Every stream boiler shall be of good construction, sound materials, adequate strength and free from patent defect and shall have suitable safety valve, stop value, stream pressure gauge, and at least one water gauge. Also, all precautionary steps shall be taken before repairs or maintenance.	C	
21	Thorough examination of every stream boiler and all its fitting and attachment at least once in every 14 months and also after extensive repairs	C	
22	No new stream boiler shall be taken into use in a factory unless a certificate has been obtained from an authorized boiler inspector and a copy of the report sent to the inspector of the district.	C	
23	Every stream receiver and stream containers shall be of good construction, sound materials, and adequate strength and free from patent defect and shall be properly maintained.	C	
24	For every air receiver with the same conditions as applicable to every stream receiver.	C	
25	Prevention of fire by installation of fire-detecting devices for alerting occupants and suitable means of extinguishing fires.	C	Adequate number of fire extinguishers are positioned at strategic points.
26	Highly inflammable substance kept in a fire-resisting store or in a safe place outside any building and free from means of escape (exit).	C	
27	Employment of adequately trained fire fighters.	C	
28	Provision of emergency fire exists, which shall be properly maintained, from obstruction and easily accessible.	C	
29	All emergency exist shall be open outwards except in the case of sliding door.	NFC	

REFERENCE	REQUIREMENS	COMPLIANCE STATUS	REMARKS
30	Enclosure of every hoist way or lift way inside a building with fire-resisting materials including the doors and the top only by some materials easily broken by fire or be provided with a vent at the top.	NA	
31	Conspicuously marked notice on all emergency exists painted in red/green letters of an adequate size and in English and appropriate Nigeria Languages.	C	
32	Effective steps to ensure that all employed persons are familiar with emergency exists and routine to be followed in case of fire.	C	
Part IV Welfare			
33	Provision and maintenance of an adequate supply of drinking water at suitable points and accessible to all employed persons	C	
34	Provision and maintenance of an adequate and suitable facilities for washing which shall be conveniently accessible.	C	
35	Provision of adequate and suitable accommodation for clothing not worn during working hours (cloak room and lockers).	C	
36	Provision and maintenance of a readily accessible first-aid box or cupboard of the prescribed standard for every one hundred and fifty persons.	C	
Part V Special provisions			
37	Provision of exhaust appliances for fumes, dust or other impurity likely to be injurious or offensive to be employed persons and the provision of personal protective equipment for employed persons	C	
38	No partaking of food or drink in any room where any poisonous or injurious substance giving rise to dust or fume is present	C	
Part VI Notification			
39	Notification of the inspector of factories of the district by the occupier of the factory of any accident which either causes loss of life or disability to any person for more than 3 days	C	

Note: C=Complied with, NC= Not complied with; NFC=Not fully complied, NA=Not applicable.

Table 3.10: Statutory Compliance Status

Regulation S.I.8 of 1991	Remedial Action	Status

SI	INSTALLATION OF ANTI-POLLUTION EQUIPMENT	**C**
S2$_2$	STORM/EFFLUENT MONITORING	**C**
S3,	TREATMENT OF EFFLUENT AND SEWAGE	**C**
S3$_2$	MONITORING RESULTS TO NESREA	**C**
EN.P	ENVIRONMENTAL POLICY	**C**
SH.P	SAFETY AND HEALTH POLICY & EMERGENCY RESPONSE MEASURES	**C**

Regulation S.1.9 of 1991	**Remedial Action**				
SI	RELEASE OF HAZARDOUS ORTOXIC SUBSTANCE INTO THE AIR, LAND OR WATER	**C**	**S10**	STORAGE TREATMENT AND TRANSPORTATION OF HARMFUL TOXIC WASTE	**NA**
S2a	POLLUTION MONITORING UNIT	**C**	**S11**	GENERATOR'S LIABILITY	**C**
S2b/c	POLLUTION CONTROL / ACCREDITED CONSULTANT	**C**	**SB**	STRATEGIES FOR WASTE REDUCTION	**C**
S3	RESULT SENT TO NESREA, FMEnv QUARTERLY	**C**	**S15,**	DISCHARGE OF EFFLUENT BEYOND PERMISSIBLE LIMIT	**C**
S4	UNUSUAL DISCHARGE	**NA**	**S15$_2$**	OIL DISCHARGE IN ANY FORM	**C**
S5a	LIST OF CHEMICALS TO FME	**C**	**SI5$_3$**	DISCHARGE PERMIT	**C**
S5b	CHEMICAL STORAGE	**C**	**SI6**	SOLID WASTE DISPOSAL IN MUNICIPAL LANDFILL	**C**
S5c	WHERE CHEMICAL OBTAINED	**C**	**S17**	RELEASE OF GAS MATTER	**NA**
S7	CONTINGENCY/EMERGENCY RESPONSE PLAN	**C**	**S18**	AESTHETIC/SANITARY CONDITION	**C**
S8,	MACHINERY COMBATING POLLUTION	**C**	**S19**	SAFETY OF WORKERS	**C**
ss,	POLLUTION RESPONSE EQUIPMENT	**C**	**S21**	ENVIRONMENTAL AUDIT REPORT (EAR)	**C**

Note: ***C- complied, NA- Not Applicable, NFC- Not Fully Complied***

CHAPTER FOUR

4.0 AUDIT FINDINGS AND ITS EVALUATION

4.1 INTRODUCTION

The audit findings as well as evaluation of impacts of Okomu OPC Plc Main Estate on the environment are presented in this chapter. This section presents evaluation of housekeeping practise in the facility, waste management, material balance, description of environmental effects and impact evaluation.

4.2 Inspection of Factory Units

4.2.1 Workshop

There is a main workshop comprising different functional units or sections including Lathe Machine, Light vehicle, Tractor, Electrical, Changan, Lorry, Vulcanizer, Mechanical and Welding sections. These units undertake mechanical works, civil repairs, and maintenance works. The workshop is equipped with lifting and hoisting equipment of different capacities between 1.5-5tons.

Plate 4.1: Picture Showing the Facility Workshop

4.2.2 Mill Workshop

The mill workshop is located within the mill premises to provide repairs and maintenance services for the mill operations.

4.2.3 Mill Laboratory

The mill laboratory undertakes process and product quality monitoring. It is fitted with equipment including electric ovens, electronic sand bath, centrifuge machine, pH meter, desiccators, scale or balance, a fume cupboard, an emergency shower and other quality control equipment for process efficiency and quality monitoring. The laboratory is located adjacent to the mill.

4.2.4 Weather Station

There are two (2Nos.) weather stations located at the Management quarters and palm nursery. The weather stations are equipped with rain gauge, thermometers and piche-evaporimeter to collect data on rainfall, temperatures, and sunshine.

Plate 4.2: Weather Station at the Palm Nursery

4.2.5 Guesthouse

There is a guesthouse providing on-site accommodation and catering services for official guests and visitors to the estate.

4.2.6 Clinic

A modern clinic is located behind the administration block to provide medical services to workers and their families. It handles observation/monitoring and treatment of minor ailments. The medical staff includes one (1No.) resident doctor, eight (8Nos.) nursing officers, three (3Nos.) pharmacy attendants, four (4Nos.) clinic attendants, three (3Nos.) card attendants and four (4Nos.) ambulance drivers. The company has retainer agreement with five (5Nos.) medical centers, all in Benin City as follows:

- Ihenyen Hospital (*General Medicine)*
- Total Health Care Hospital (*Surgery and General Medicine)*
- Gift Medical Centre (*Obstetrics/Gynecology & General Medicine)*
- Mayo Eye Clinic (*Ophthalmology/Eye)*
- Astriel Medicare (*General Medicine)*

The clinic has one (1 No.) ambulance at the main estate on stand-by for emergencies. As at the time of this audit the clinical practices and housekeep was satisfactory.

Plate 4.3: Main Estate Clinic Showing the Standby Ambulance

4.2.7 Office Accommodation

A number of buildings provide office accommodation for administration, technical and other support staff.

4.2.8 Residences

Accommodation is provided for workers and their families on the estate. Different types of residential accommodation are available for junior staff, intermediate and management staff.

4.2.9 Recreation

The provisions that are available for recreation on the estate include a football field, tennis court, staff club, management clubhouse, multipurpose court and a golf course.

4.2.10 Transportation

Two categories of vehicles are provided for transportation namely light vehicles fleet and heavy-duty fleet. The light vehicles fleet comprises salon cars, 4-Wheel Drive jeeps, and mini-buses. The Administration department controls them. The agric department controls the heavy-duty fleet comprising Lorries, trailers, tractors, and buses.

There are also within the heavy-duty fleet, tippers (7tons and 10tons) and Fixed Bodies. The fixed bodies are long articulated carriers, with capacity of 150 persons, used for mass transportation of workers into and out of the main estate. Lorries with capacity of about 100 persons are also used to transport workers.

Plate 4.4: Picture Showing Some Light Vehicles and Heavy-Duty Truck Used within the Estate

4.2.11 Schools

There are two schools named Okomu Primary School and Okomu Staff School both located beside each other at the Main estate. The former is Government owned while the latter is owned and run by the company. The company provides accommodation for teachers in the Government owned school and also maintains the school. There are a total of 490 student and 6 teachers employed by state government at Okomu primary school while Okomu staff school have 487 students and 19 teachers all employed by the company. Both schools have 6 classroom each.

4.2.12 Police Post

There are police posts located at the estate's entrance gate and at other locations, providing security services for the estate.

4.2.13 Livestock Pens

The livestock pens are located within the Boy's quarter's premises south of the "management quarters". The pens accommodate a number of domesticated animal species. The pens are very well confined with chain-link fence wire. As at the time of the audit animals present include Cattle, sheep, goats, and pigs.

Plate 4.5: Picture Showing Animals at the Pen within the Estate

4.3 Description of Environmental Effects Related to Operational Activities

The Environmental effects of Okomu OPC Plc - Main Estate were evaluated by collecting samples and carrying out measurements followed by detailed analysis. The description as well as methodology used is as follows:

4.3.1 Methodology for Sample Collection

In-situ determination of the gases was carried out using portable gas analyzers. The ambient air was monitored using LAND Duo multi-gas emission analyzer and Industrial Scientific iTX 5 to determine the concentration of carbon monoxide (CO), Sulphur dioxide (SO_2), oxygen, ammonia and hydrogen sulphide (H_2S), Nitrogen oxides, NO_2/NOx. Handheld Aerosol Monitor Model 1055 was used for the measurement of Suspended Particulate Matter, while Quest Model 2500 Sound Level Meter was used to measure the noise level. Only the maximum results obtained were presented.

4.3.2 Sampling Locations

Monitoring of ambient air quality, noise level assessment and water analysis was carried out at geo-referenced locations.

The sampling locations were within the spatial boundaries of the estate. The sampling points with their coordinates are presented in Table 4.1.

Table 4.1: Co-ordinate Points of Sampling Locations

Sample Points	Location	Coordinates		Environmental Component Monitored
Borehole Water				
Point 1	Management Quarters (OKM_{MQ})	N06^{0}24’ 364”	E005^{0}16’251”	Groundwater Quality
Point 2	Labour Line Quarters (OKM_{LL})	N06^{0}24’ 387”	E005^{0}15’756”	Groundwater Quality
Point 3	IITA Quarters (OKM_{IITA})	N06^{0}24’ 49.3”	E005^{0}12’57.4”	Groundwater Quality
Point 4	New Building (OKM_{NB})	N06^{0}24’ 38.7”	E005^{0}15’756”	Groundwater Quality
Point 5	Mill Complex (OKM_{MC})	N06^{0}24’ 19.9”	E005^{0}14’11.0”	Groundwater Quality
Monitoring Wells				
Point 6	Palm Oil Mill Effluent (POME) Monitoring Well (OKM_{MEMW})	N06^{0}24’ 06.3”	E005^{0}12’51.4”	Groundwater Monitoring
Wastewater/Effluent				
Point 7	Palm Oil Mill Effluent – Treated (OKM $_{PMT}$)	N06^{0}24’16.3”	E005^{0}12’46.8”	Wastewater/Effluent
Point 8	Palm Oil Mill Effluent – Raw (OKM $_{PMR}$)	N06^{0}24.20.7’	E005^{0}14.07.6”’	Wastewater/Effluent
Surface Water				
Point 9	Okomu River Inlet - OKM_1 (Control)	N06^{0}23’14.6’’	E005^{0}16’47.2”	Surface River Quality
Point 10	Management Quarters Stream Outlet (OKM_3)	N06^{0}22’48.3’’	E005^{0}15’43.6”	Surface River Quality
Point 11	Oil Mill Stream Outlet (OKM_5)	N06^{0}22’34.9”	E005^{0}14’20.3”	Surface River Quality
Point 12	Palm-Rubber Boundary stream Outlet (OKM_7)	N06^{0}20’18.5”	E005^{0}11’27.2”	Surface River Quality
Air Quality & Noise Measurements				
Point 13	Main Powerhouse (1100 kVA, 1500 kVA & 1650kVA)	N06024.462’	E005015.653’	Air Quality & Noise
Point 14	Oil Mill Powerhouse 500kVA	N06^{0}24.314’	E005^{0}14.128’	Air Quality & Noise
Point 15	Oil Mill	N06^{0}24.314’	E005^{0}14.128’	Air Quality & Noise
Point 16	Palm Kernel Oil Factory	-	-	Air Quality & Noise
Point 17	Agric Office	N06^{0}24’10.3”	E005^{0}14’06.5”	Air Quality & Noise
Point 18	IITA	N06^{0}24’84.7”	E005^{0}12’848”	Air Quality & Noise
Point 19	Management Quarters (Control)	N06^{0}24’ 364”	E005^{0}16’251”	Air Quality & Noise

Source: Okomu OPC Plc Main Estate Environmental Audit (December 2024)

4.4 Result and Discussion

4.4.1 Air Quality Measurement

Air Quality, is an indication of the healthiness of the air based on the quantity of polluting gases and particulates (liquid droplets or tiny solid particles suspended in air) it contains. Air is considered safe when it contains no harmful chemicals and only low levels of other chemicals that become harmful in higher concentrations to humans, other animals, plants, or their ecosystems. The small amount of emissions released from Okomu OPC Plc - Main Estate pose no health or environmental risk to nearby communities. The air quality values recorded during the exercise were within regulatory limits except for Suspended Particulate matter in some locations sampled. The air quality measurement of Okomu OPC Plc - Main Estate facility is seen in Table 4.2a whereas Table 4.2b Noise level measurements.

Table 4.2a: Result of the Air Quality Monitoring (2024)

Location	*Main Powerhouse (1100, 1500 & 1650kVA)*	*Oil Mill Powerhouse 500kVA*	*Management Quarters*	Oil Mill	Palm Kernel Oil Factory	Agric Office	IITA	FMEnv. Limit
Coordinate	N06^{0}24.462’	N06^{0}24.314’	N06^{0}24’ 364”	N06^{0}24.314’’		N06^{0}24’10.3”	N06^{0}24’84.7”	
	E005^{0}15.653’	E005^{0}14.128’	E005^{0}16’251”	E005^{0}14.128’		E005^{0}14’06.5”	E005^{0}12’848”	
Elevation (m)				72		58		
Noise, dB(A)	89.1	101.4	82.9	51.8	83.9	99.8	54.7	**90**
Humidity (%)	48.80	68.37	66.12	52.75	67.98	69.23	51.09	**Ambient**
Temperature (^{0}C)	20.33	24.63	24.15	21.48	24.21	24.08	20.01	**Ambient**
SPM (µg/m^3)	233	316	187	152	242	257	210	**250**
Carbon monoxide, ppm	2	1	2	1	1	3	<1	**10-20**
Carbon dioxide, ppm	406	773	483	407	466	414	425	**-**
Hydrogen sulphide, ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**-**
Hydrocarbon, %	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**-**
Oxygen, %	20.9	20.9	20.9	20.9	20.9	20.9	20.9	**21.0**
Sulphur dioxide, ppm	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**0.01**
Nitrogen dioxide, ppm	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**0.04 – 0.06**
TVOC, mg/m^3	0.018	0.014	0.015	0.010	0.010	0.008	0.015	**-**

Source: Environmental Laboratories Limited, at *Apaola Street, off Aladelola St. Ikosi-Ketu, Lagos State*

***(EAuR 2024):* IPAN:00155**

Table 4.2b: Noise Level Measurements at OOPC Plc (Main Estate)

S/N	Location	Result, dB(A)
1	Clarification	86.1
2	Old boiler	76.5
3	Cloak Room	62.7
4	Ramp	59.5
5	Weighbridge	59.8
6	Laboratory/Office	63.9
7	Cracking Section	100.3
8	Palm Kernel Oil Factory	99.8
9	*Oill Mill Powerhouse (500kVA)/Turbine*	101.4
10	Mill Workshop office	57.7
11	Mill Workshop	79.3
12	Weighbridge 1/Gate	49.9
13	Agric office	54.7
14	Boiler 3 (New Mill)	88.2
15	Boiler 1/2 (Old Mill)	87.0
16	New Clarification Section	76.9
17	Kernel Plant (New Mill)	89.5
18	Kernel Plant (Old Mill)	86.2
19	Sterilizer area (Old Mill)	76.9
20	Sterilizer area (New Mill)	78.3
21	IITA Quarters	52.3
22	New Turbine	86.8
23	Old Turbine	88.3
24	Powerhouse Office	79.8
25	Banga Packaging	71.0
26	Machinery Section	73.7
27	Nearest Residential Block (Admin Office Area)	51.3
28	Powerhouse office (Admin Office Area)	48.3
29	Dispensing Station (Admin Office Area)	51.0
30	Security Post (Admin Office Area)	56.6
31	Welding Unit (Admin Office Area)	47.1
32	Gas Depot (Admin Office Area)	47.7
FMEnv. 8-hr. exposure Limit		**90 dB**
NESREA 8hr. exposure Limit		**85 dB(A)**

***Source: (EAuR 2024 – In-Situ Measurements);* IPAN:00155**

4.4.2 Water Analysis Determination

The groundwater, surface water, effluent and monitoring well at Okomu OPC Plc - Main Estate was collected for analysis. Table 4.3 – 4.6 shows result of water samples monitored respectively.

Table 4.3: Laboratory Analysis Result of Groundwater Samples

Parameter/Unit	Method APHA 2022	OKM$_{LL}$	OKM$_{MC}$	OKM$_{MQ}$	OKM$_{NB}$	OKM$_{IITA}$	NIS554: 2015
Appearance	Visual	Clear and colourless					**Clear and Colourless**
Odour	Sensory	Unobjectionable					**Unobjectionable**
pH @ 25.0^{o}C	4500-HB	4.70	7.85	4.71	4.55	4.40	**6.5 – 8.5**
Temperature, ^{o}C	2550 -B	29.1	31.9	28.7	32.4	28.7	**Ambient**
Conductivity, µS/cm	2500-B	20	14	16	18	24	**1000**
Total Dissolved solids, mg/L	2120-C	10	7	8	9	12	**500**
Total Suspended Solids, mg/L	2130-B	<1	<1	5	1	3	**-**
Total Solids, mg/L	2540-D	10	7	13	10	15	**-**
Colour, Pt-Co	2540-C	<0.1	<0.1	10	<0.1	5.0	**15**
Turbidity, NTU	2540B	<0.01	<0.01	<0.01	5	1.25	**5**
Total Hardness, mg/L	2340-C	3	<1	2	3	3	**150**
Total Alkalinity, mg/L	2320-B	4	4	8	4	4	**-**
Total acidity, mg/L	2310-B	50	50	20	50	60	**-**
Calcium, mg/L	3500-B	0.8	<0.1	0.8	0.8	1.2	**-**
Magnesium, mg/L	3500-B	0.24	<0.01	<0.01	0.24	<0.01	**20**
Chloride, mg/L	4500-B	2.0	3.0	3.0	2.0	6.0	**250**
Nitrate, mg/L	4500-NO_3^-E	<0.01	<0.01	<0.01	<0.01	<0.01	**50**
Nitrite, mg/L	4500-NO_2^-B	<0.01	<0.01	<0.01	<0.01	<0.01	**0.2**
Sulphate, mg/L	4500-SO_4-E	3.6	2.0	1.0	3.0	<0.1	**100**
Phosphate, mg/L	4500-E	<0.01	<0.01	<0.01	<0.01	<0.01	**-**
Iron (total), mg/L	3500-B	<0.01	<0.01	<0.01	<0.01	<0.01	**0.3**
Fluoride, mg/L	4500-F^-C	<0.1	<0.1	<0.1	<0.1	<0.1	**1.5**
Lead, mg/L	3500 –Pb-B	<0.001	<0.001	<0.001	<0.001	<0.001	**0.01**
Arsenic, mg/L	3500 –As-B	<0.001	<0.001	<0.001	<0.001	<0.001	**0.01**
Manganese, mg/L	3500 –Mn-B	<0.001	<0.001	<0.001	<0.001	<0.001	**0.2**
Copper, mg/L	3500 –Cu-B	<0.001	<0.001	<0.001	<0.001	<0.001	**1.0**
Cadmium, mg/L	3500 –Cd-B	<0.001	<0.001	<0.001	<0.001	<0.001	**0. 03**
Hydrogen Sulphide, mg/L	4500-S^{2-}H	<0.01	<0.01	<0.01	<0.01	<0.01	**0.05**
Total coliform count, CFU/100 mL	9225-D	0	0	1	2	0	**10**
Faecal coliform, E.coli),	9222-D	0	0	0	0	0	**0**
Salmonella/Shigella sp.,	9260-E	0	0	0	0	0	**0**
Staphylococcus sp. ,	AOAC 995.12	0	0	0	0	0	**0**
Pseudomonas aureus,	9213-E	0	0	0	0	0	**0**
Total plate count,	9215-B	4	2	8	5	5	**10^2**

Source: Environmental Laboratories Limited, at *Apaola Street, off Aladelola St. Ikosi-Ketu, Lagos State (EAuR 2024):* IPAN:00155

Table 4.4: Laboratory Analysis Result of Surface Water Samples

PARAMETER/UNIT	METHOD, APHA 2022	OKM1	OKM3	OKM5	OKM7	NIS554: 2015
Appearance	Visual	Clear & Colourless				**Clear & Colourless**
Odour	Sensory	Unobjectionable				**Unobjectionable**
pH @ 25ºC	4500-B	5.81	5.50	5.30	5.02	**6-9**
Temperature, ºC	2550-B	27.5	27.6	27.1	29.4	**Ambient**
Conductivity, µS/cm	2510-B	34	28	18	12	**2000**
Total Dissolved solids, mg/L	2540-D	17	14	9	6	**1000**
Colour, Pt-Co	2120-C	3	2	2	1	**7.0**
Turbidity, NTU	2130-B	<0.01	<0.01	<0.01	<0.01	**10**
Total Suspended Solids, mg/L	2540-C	<1	<1	<1	<1	**30**
Total Solids, mg/L	2540-B	17	14	9	6	**-**
Total Hardness, mg/L	2340-C	8	4	3	2	**-**
Total Alkalinity, mg/L	2320-B	8	8	4	4	**-**
Total acidity, mg/L	2310-B	40	30	20	30	**-**
Calcium, mg/L as Ca	3500-B	1.6	0.8	<0.1	<0.1	**-**
Magnesium, mg/L as Mg	3500-B	0.97	0.48	0.73	0.48	**-**
Salinity as Chloride, mg/L	4500-B	5.0	6.0	3.0	3.0	**200**
Nitrate, mg/L	4500-NO_3^-B	<0.01	<0.01	<0.01	<0.01	**50**
Nitrite, mg/L	4500-NO_2^-B	<0.01	<0.01	<0.01	<0.01	**0.3**
Sulphate, mg/L	4500-E	<0.1	<0.1	<0.1	<0.1	**250**
Phosphate, mg/L	4500-C	0.07	0.04	0.05	0.01	**-**
Iron (total), mg/L	3500-B	<0.01	0.05	0.01	<0.01	**20**
Lead, mg/L	3500 -Pb-B	<0.001	<0.001	<0.001	<0.001	**<1.0**
Copper, mg/L	3500 -Cu-B	<0.001	<0.001	<0.001	<0.001	**<1.0**
Manganese, mg/L	3500 -Mn-B	<0.001	<0.001	<0.001	<0.001	**0.10**
Cadmium, mg/L	3500 -Cd-B	<0.001	<0.001	<0.001	<0.001	**<1.0**
Nickel, mg/L	3500 -Ni-B	<0.001	<0.001	<0.001	<0.001	**<1.0**
Cobalt, mg/L	3500 -Co-B	<0.001	<0.001	<0.001	<0.001	**<1.0**
Arsenic, mg/L	3500 -As-B	<0.001	<0.001	<0.001	<0.001	**<1.0**
Chemical oxygen demand, mg/L	5220-D	4.2	3.6	5.8	4.5	**80**
Biochemical oxygen demand, mg/L	5210-B	<0.1	<0.1	2.5	1.8	**30**
Dissolved Oxygen, mg/L	4500-G	6.0	7.4	6.8	7.6	**>2.0**
Total Hydrocarbon, mg/L	Spectrophotometry	<0.1	<0.1	<0.1	<0.1	**-**
Pesticides, mg/L	Screening	<0.01	<0.01	<0.01	<0.01	**-**
Total coliform count, MPN/mL	APHA 9225-D	6	5	11	14	**10^2**
Faecal coliform (E.coli), CFU/mL	APHA 9222-D	0	0	0	0	**-**
Total plate count, CFU/mL	APHA 9215-B	108	80	112	130	**10^4**

Source: Environmental Laboratories Limited, at *Apaola Street, off Aladelola St. Ikosi-Ketu, Lagos State (EAuR 2024):* IPAN:00155

Table 4.5: Laboratory Analysis Result of Monitoring Well Sample

PARAMETER/UNIT	METHOD APHA 2022	OKM_{MEMW}	NIS554: 2015
Appearance	Visual	Light brown with particles	Clear & colourless
Odour	Sensory	Objectionable	Unobjectionable
pH @ 25ºC	4500-HB	6.62	6-9
Temperature, ºC	2550B	30.4	Ambient
Conductivity, µS/cm	2510-B	184	2000
Total dissolved solids, mg/L	2540-D	92	1000
Colour, Pt-Co	2120-C	40.0	7.0
Turbidity, NTU	2130-B	11	10
Total Suspended Solids, mg/L	2540-C	30	30
Total solids, mg/L	2540B	122	-
Total Hardness, mg/L	2340-C	12	-
Total Alkalinity, mg/L	2320-B	64	-
Total acidity, mg/L	2310-B	70	-
Calcium, mg/L as Ca	3500-B	4.8	-
Magnesium, mg/L as Mg	3500-B	<0.01	-
Chloride, mg/L	4500-B	14.0	200
Nitrate, mg/L	4500-NO_3^--E	1.94	50
Nitrite, mg/L	4500-NO_2^--B	<0.01	0.3
Sulphate, mg/L	4500-SO_4-E	<0.1	250
Phosphate, mg/L	4500-E	0.10	-
Dissolved oxygen, mg/L	4500-OC	7.4	>2.0
Chemical oxygen demand, mg/L	5220-D	186	80
Biochemical oxygen demand, mg/L	5210-B	113	30
Iron (total), mg/L	3500-B	0.21	10
Lead, mg/L	3500 -Pb-B	<0.001	<1.0
Copper, mg/L	3500 -Cu-B	<0.001	<1.0
Manganese, mg/L	3500 -Mn-B	<0.001	0.10
Cadmium, mg/L	3500 -Cd-B	<0.001	<1.0
Nickel, mg/L	3500 -Ni-B	<0.001	<1.0
Cobalt, mg/L	3500 -Co-B	<0.001	<1.0
Arsenic, mg/L	3500 -As-B	<0.001	<1.0
Oil & grease, mg/L	5520-B	<0.1	10
Total Hydrocarbon, mg/L	6200-C	<0.01	<0.01
Total coliform count, MPN/100 mL	9225-D	30	10^2
Faecal coliform (E.coli), CFU/100mL	9222-D	0	-
Total plate count, CFU/mL	9215-B	3.2×10^3	10^4

Source: Environmental Laboratories Limited, at *Apaola Street, off Aladelola St. Ikosi-Ketu, Lagos State (EAuR 2024):* IPAN:00155

Table 4.6: Laboratory Analysis Result of Effluent Samples

PARAMETER/UNIT	METHOD APHA, 2022	OKM_{PMR}	OKM_{PMT}	NESREA Limit (Land Application)
Appearance	Visual	Dark brown with particles		
Odour	Sensory	Objectionable		Unobjectionable
pH @ 25°C	4500-HB	3.97	7.28	5.5 - 9
Temperature, °C	2550B	30.0	30.0	-
Conductivity, µS/cm	2510-B	10,660	3450	-
Colour, Pt-Co (apparent)	2120-C	1150	1200	-
Turbidity, NTU	2130-B	400	300	-
Total dissolved solids, mg/L	2540-D	5320	1720	2100
Total suspended solids, mg/L	2540-C	450	850	30
Total solids, mg/L	2540B	5770	2570	-
Total Hardness, mg/L	2340-C	400	600	-
Total Alkalinity, mg/L	2320-B	<1	1040	-
Total acidity, mg/L	2310-B	5600	200	-
Calcium, mg/L as Ca	3500-B	96	80	-
Magnesium, mg/L Mg	3500-B	38.88	3.8	
Chloride mg/L	4500-B	1360	380	600
Nitrate, mg/L	4500-NO_3^--E	3.6	2.8	-
Nitrite, mg/L	4500-NO_2^--B	0.65	0.19	-
Sulphate, mg/L	4500-SO_4-E	70.0	50.0	1000
Phosphate, mg/L	4500-E	3.02	3.44	-
Iron (total), mg/L	3500-B	1.21	0.97	20
Lead, mg/L	3500-Pb-B	<0.001	<0.001	<1.0
Copper, mg/L	3500-Cu-B	<0.001	<0.001	<1.0
Manganese, mg/L	3500-Mn-B	<0.001	<0.001	0.10
Cadmium, mg/L	3500 -Cd-B	<0.001	<0.001	<1.0
Nickel, mg/L	3500-Ni-B	<0.001	<0.001	<1.0
Cobalt, mg/L	3500 -Co-B	<0.001	<0.001	<1.0
Arsenic, mg/L	3500-As-B	<0.001	<0.001	<1.0
Oil & grease, mg/L	5520-B	320	15	30
Total Hydrocarbon, mg/L	6200-C	<0.01	<0.01	-
Dissolved oxygen, mg/L	4500-OC	1.2	1.6	>2.0
Chemical oxygen demand, mg/L	5220-D	2596	1162	-
Biochemical oxygen demand, mg/L	5210-B	1584	755	500
Total coliform count, MPN/100 mL	9225-D	35	16	-
Faecal coliform (E.coli), CFU/mL	9222-D	0	0	-
Total plate count, CFU/mL	9215-B	1.36×10^4	4.0×10^3	-

Source: Environmental Laboratories Limited, at *Apaola Street, off Aladelola St. Ikosi-Ketu, Lagos State (EAuR 2024):* IPAN:00155

4.5 Impact Analysis of Air & Water investigations

4.5.1 Noise Impact Evaluation

Noise cannot be exempted in facilities; however, it can be reasonably managed and abated in accordance with regulations. At Okomu OPC Plc - Main Estate, thirty-two (32) locations were taken for noise measurement and twenty-nine (29) locations were within the 90dB (A) 8 hours exposure limit of National Environmental Standards and Regulations Enforcement Agency (NESREA). Observed critical area of noise pollution was abated using appropriate Personal Protective Equipment (PPE).

Noise is considered as a form of pollution when its sound intensity is significantly high, or higher than stipulated regulatory limits. Sound intensities are measured in decibels (dB). For example, the intensity at the threshold of hearing is 0 dB, the intensity of whispering is typically about 10dB, and the intensity of rustling leaves reaches almost 20dB. Sound intensities are arranged on a logarithmic scale, which means that an increase of 10dB corresponds to an increase in intensity by a factor of 10. Thus, rustling leaves are about 10 times louder than whispering.

Continuous exposure to noise pollution can cause hearing loss, stress, high blood pressure, sleep loss, distraction, and lost productivity. Solutions to noise pollution include adding insulation and sound-proofing to doors, walls, and ceilings; using ear protection, particularly in industrial working areas; planting vegetation to absorb and screen out noise pollution; and zoning urban areas to maintain a separation between residential areas and zones of excessive noise.

In the event of any critical noise impact, workers and staff within this area are expected to make use of ear muffs during operational hours.

4.5.2 Air Quality Evaluation

Air quality assessment is crucial in all facilities. It is important that air quality be closely monitored at Okomu OPC Plc - Main Estate in order to meet regulatory standards. One of the greatest challenges caused by air pollution is climate change resulting in global warming which is an increase in the earth's temperatures due to the build-up of certain atmospheric gases such as carbon dioxide, methane, water vapor etc.

There was no major air pollutant concern in Okomu OPC Plc - Main Estate except Suspended Particulate Matter (SPM) which exceeded its 250 $\mu g/m^3$ NESREA Limit at the Agric Office and Oil Mill Powerhouse.

4.5.3 Water Quality Evaluation

For the groundwater samples, laboratory results revealed that the pH of the samples ranges from 4.40 – 7.85. All samples pH were slightly acidic which was below the limit (6.5 – 8.5) except at the mill complex while other parameters were within their respective limits.

Surface water samples laboratory results revealed that the pH of the samples ranges from 5.02 – 5.81. All samples pH were slightly acidic which was below the limit (6.5 – 8.5) while other parameters were within their respective limits.

Monitoring well sample laboratory result revealed that the pH (6.62) was within the limit (6.5 – 8.5), appearance was light brown with particles and odor objectionable. Turbidity, COD and BOD exceeded their respective limits while other parameters were within their respective limits.

Evaluation of the Performance of the Effluent Lagoon

The Water Treatment would be evaluated for possible operational improvement. As part of the Good Manufacturing Practice (GMP) the company have an effluent lagoon to treat the raw effluent to desired quality characteristics prior to discharge and reuse on the plantation.
In evaluating the performance of the effluent lagoon, data from ten quality variables namely: Conductivity (Cond), pH, Total Suspended Solids (TSS), Total Dissolved Solids (TDS), Total Hardness (TH), Chloride (Cl), Iron (Fe), Sulphate (SO_4), Chemical Oxygen Demand (COD) and Biochemical Oxygen Demand (BOD) were obtained to determine the operational efficiency.

$$\text{Actual Removal (\%)} = \frac{\text{(Raw water load – Treated water load) x 100}}{\text{Raw water load}}$$

Table 4.7: Summary of Data Showing Operational Efficiencies of the Effluent Lagoon

Parameters	Raw Water (mg/l)	Treated Water (mg/l)	Removal %	NESREA Limit (Land Application)	Remark
Conductivity	10,660	3,450	67.63	-	Very Good
pH	3.97	7.28	Adjusted and within the limit	5.5 – 9	Excellent
Total Suspended Solids	450	850	Increased and not within the limit	30	Not Satisfactory
Total Dissolved Solids	5,320	1,720	67.67	2,100	Very Good
Total Hardness	400	600	Increased and not within the limit	-	Not Satisfactory
Chloride (Cl)	1,360	380	72.06	600	Very Good
Sulphate (SO_4)	70	50	28.57	1000	Good
Iron	1.21	0.97	19.83	20	Good
Chemical oxygen demand, mg/L	2,596	1,162	55.24	-	Good
Biochemical oxygen demand, mg/L	1,584	755	52.34	500	Good

The effluent lagoon removal efficiencies in Table 4.7 showed a linear progressive performance and most of the results were within the acceptable limits.

4.6 Comparison of the Previous and Current Result

The environmental indices compared in this audit are the result gotten from the previous report (2020) and the result gotten in this year (2024). The gaseous emissions, noise levels as well as water quality (groundwater and effluent) were all compared.

Table 4.8: Comparison of Noise Level Measurement for 2020 and 2024

S/N	Location	Noise Value dB(A)	
		2020	2024
1	Clarification	-	86.1
2	Old boiler	87.5	76.5
3	Cloak Room	70.8	62.7
4	Ramp	70.1	59.5
5	Weighbridge	68.4	59.8
6	Laboratory/Office	71.8	63.9
7	Cracking Section	98.8	100.3
8	Palm Kernel Oil Factory	85.9	99.8
9	*Oill Mill Powerhouse (500kVA)/Turbine*	-	101.4
10	Mill Workshop office	-	57.7
11	Mill Workshop	75.2	79.3
12	Weighbridge 1/Gate	-	49.9
13	Agric office	-	54.7
14	Boiler 3 (New Mill)	-	88.2
15	Boiler 1/2 (Old Mill)	-	87.0
16	New Clarification Section	-	76.9
17	Kernel Plant (New Mill)	-	89.5
18	Kernel Plant (Old Mill)	-	86.2
19	Sterilizer area (Old Mill)	90.2	76.9
20	Sterilizer area (New Mill)	-	78.3
21	IITA Quarters	-	52.3
22	New Turbine	-	86.8
23	Old Turbine	-	88.3
24	Powerhouse Office	-	79.8
25	Banga Packaging	-	71.0
26	Machinery Section	-	73.7
27	Nearest Residential Block (Admin Office Area)	80.9	51.3
28	Powerhouse office (Admin Office Area)	80.1	48.3
29	Dispensing Station (Admin Office Area)	87.4	51.0
30	Security Post (Admin Office Area)	63.2	56.6
31	Welding Unit (Admin Office Area)	88.8	47.1
32	Gas Depot (Admin Office Area)	76.6	47.7
FMEnv. 8-hr. exposure Limit		**90 dB**	
NESREA 8hr. exposure Limit		**90 dB**	

Source: Okomu OPC Plc – Main Estate EAuR 2020 and 2024

Discussion

The previous and current results of the noise level at Okomu OPC Plc – Main Estate showed difference in values, most locations within the facility recorded lower noise level in the current audit (2024) compared to the previous audit (2020). However, all the sections were within the FMEnv. and NESREA Limit of 90 dB(A) for 8 Hours exposure except at the cracking section, palm kernel oil factory and oil mill powerhouse/turbine.

Table 4.9: Comparison of Gaseous Parameter Measurement for 2020 and 2024

S/N	SECTIONS	MEASURED PARAMETERS											
		SPM (µg/m^3)		CO (ppm)		CO_2 (ppm)		NO_2 (ppm)		SO_2 (ppm)		TVOC (mg/m^3)	
		2020	2024	2020	2024	2020	2024	2020	2024	2020	2024	2020	2024
1	Main Powerhouse (1100, 1500 &1650kVA)	120	233	<1.0	2	600	406	<0.01	<0.01	<0.01	<0.01	<0.01	0.018
2	Oil Mill Powerhouse 500kVA	140	316	<1.0	1	560	773	<0.01	<0.01	<0.01	<0.01	<0.01	0.014
3	Mgt. Quarters	120	187	<1.0	2	360	483	<0.01	<0.01	<0.01	<0.01	<0.01	0.015
4	Oil Mill	-	152	-	1	-	407	-	<0.01	-	<0.01	-	0.010
5	PKO Factory	-	242	-	1	-	466	-	<0.01	-	<0.01	-	0.010
6	Agric Office	-	257	-	3	-	414	-	<0.01	-	<0.01	-	0.008
7	IITA	-	210	-	<1	-	425	-	<0.01	-	<0.01	-	0.015
FMEnv. Limit		**250**		**10 - 20**		**-**		**0.04 – 0.06**		**0.01**		**-**	
National Environmental (Air Quality Control) regulation, S.I. 64 of 2014, Schedule V(30min Exposure)		**250**		**-**		**-**		**0.20**		**0.18**		**-**	

Source: Okomu OPC Plc – Main Estate EAuR, 2020 and 2024

Discussion

The table above shows the comparison of the previous audit (2020) and the current audit (2024) result of the gaseous emission. From Table 4.9, it was observed that the results were within the regulatory limit for both the previous audit and current EMP except the Suspended Particulate Matter (SPM) that exceeded the limit in few locations sampled during the current audit. Also, it was observed that result for SPM, CO, CO_2, and TVOC were higher during this current audit (2024) that the previous audit done in 2021.

Table 4.10a: Comparison of Groundwater Laboratory Analytical Result 2020 and 2024

Parameter/Unit	Method APHA 2022	OKM$_{LL}$		OKM$_{MQ}$		NIS554: 2015
		2020	2024	2020	2024	
Appearance	Visual	Clear and colourless		Clear and colourless		**Clear and Colourless**
pH @ 25.0^{o}C	4500-HB	5.63	4.70	5.55	4.71	**6.5 – 8.5**
Temperature, ^{o}C	2550 -B	28.8	29.1	26.8	28.7	**Ambient**
Conductivity, µS/cm	2500-B	16.76	20	19.46	16	**1000**
Total Dissolved solids, mg/L	2120-C	8.38	10	9.73	8	**500**
Total Suspended Solids, mg/L	2130-B	1	<1	1	5	**-**
Total Solids, mg/L	2540-D	9.4	10	10.7	13	**-**
Colour, Pt-Co	2540-C	3	<0.1	3	10	**15**
Turbidity, NTU	2540B	0.2	<0.01	0.2	<0.01	**5**
Total Hardness, mg/L	2340-C	4	3	4	2	**150**
Total Alkalinity, mg/L	2320-B	10	4	20	8	**-**
Total acidity, mg/L	2310-B	40	50	20	20	**-**
Calcium, mg/L	3500-B	1	0.8	1	0.8	**-**
Magnesium, mg/L	3500-B	0.37	0.24	0.37	<0.01	**20**
Chloride, mg/L	4500-B	1.7	2.0	1.8	3.0	**250**
Nitrate, mg/L	4500-NO_3^-E	0.1	<0.01	<0.1	<0.01	**50**
Nitrite, mg/L	4500-NO_2^-B	<0.01	<0.01	<0.01	<0.01	**0.2**
Sulphate, mg/L	4500-SO_4-E	1.5	3.6	1.6	1.0	**100**
Phosphate, mg/L	4500-E	0.02	<0.01	0.03	<0.01	**-**
Iron (total), mg/L	3500-B	0.02	<0.01	<0.01	<0.01	**0.3**
Fluoride, mg/L	4500-F$^-$C	<0.1	<0.1	<0.1	<0.1	**1.5**
Lead, mg/L	3500 –Pb-B	<0.001	<0.001	<0.001	<0.001	**0.01**
Arsenic, mg/L	3500 –As-B	<0.001	<0.001	<0.001	<0.001	**0.01**
Manganese, mg/L	3500 –Mn-B	<0.001	<0.001	<0.001	<0.001	**0.2**
Copper, mg/L	3500 –Cu-B	<0.001	<0.001	<0.001	<0.001	**1.0**
Cadmium, mg/L	3500 –Cd-B	<0.001	<0.001	<0.001	<0.001	**0. 03**
Hydrogen Sulphide, mg/L	4500-S^{2-}H	<0.01	<0.01	<0.01	<0.01	**0.05**
Total coliform count, CFU/100 mL	9225-D	0	0	0	1	**10**
Faecal coliform, E.coli),	9222-D	0	0	0	0	**0**
Salmonella/Shigella sp.,	9260-E	0	0	0	0	**0**
Staphylococcus sp. ,	AOAC 995.12	0	0	0	0	**0**
Pseudomonas aureus,	9213-E	0	0	0	0	**0**
Total plate count,	9215-B	0	4	32	8	**10^2**

Source: Okomu OPC Plc – Main Estate EAuR, 2020 and 2024

Table 4.10b: Comparison of Groundwater Laboratory Analytical Result 2020 and 2024 (Cont'd)

Parameter/Unit	Method APHA 2022	OKM_{IITA}		OKM_{MC}		NIS554: 2015
		2020	2024	2020	2024	
Appearance	Visual	Colourless with Particles	Clear and colourless	Colourless with Particles	Clear and colourless	**Clear and Colourless**
pH @ 25.0°C	4500-HB	5.78	4.40	7.07	7.85	**6.5 – 8.5**
Temperature, °C	2550 -B	26.8	28.7	28.6	31.9	**Ambient**
Conductivity, µS/cm	2500-B	24.9	24	16.74	14	**1000**
Total Dissolved solids, mg/L	2120-C	12.3	12	8.36	7	**500**
Total Suspended Solids, mg/L	2130-B	5	3	6	<1	**-**
Total Solids, mg/L	2540-D	17.3	15	14.4	7	**-**
Colour, Pt-Co	2540-C	1	5.0	2	<0.1	**15**
Turbidity, NTU	2540B	0.2	1.25	3	<0.01	**5**
Total Hardness, mg/L	2340-C	7.4	3	7.3	<1	**150**
Total Alkalinity, mg/L	2320-B	20	4	20	4	**-**
Total acidity, mg/L	2310-B	20	60	20	50	**-**
Calcium, mg/L	3500-B	1.6	1.2	1.6	<0.1	**-**
Magnesium, mg/L	3500-B	0.8	<0.01	0.8	<0.01	**20**
Chloride, mg/L	4500-B	1.8	6.0	1.8	3.0	**250**
Nitrate, mg/L	4500-NO_3^-E	0.1	<0.01	0.2	<0.01	**50**
Nitrite, mg/L	4500-NO_2^-B	<0.01	<0.01	<0.01	<0.01	**0.2**
Sulphate, mg/L	4500-SO_4-E	1.5	<0.1	1.2	2.0	**100**
Phosphate, mg/L	4500-E	<0.01	<0.01	0.2	<0.01	**-**
Iron (total), mg/L	3500-B	<0.01	<0.01	0.02	<0.01	**0.3**
Fluoride, mg/L	4500-F^-C	<0.1	<0.1	<0.1	<0.1	**1.5**
Lead, mg/L	3500 –Pb-B	<0.001	<0.001	<0.001	<0.001	**0.01**
Arsenic, mg/L	3500 –As-B	<0.001	<0.001	<0.001	<0.001	**0.01**
Manganese, mg/L	3500 –Mn-B	<0.001	<0.001	<0.001	<0.001	**0.2**
Copper, mg/L	3500 –Cu-B	<0.001	<0.001	<0.001	<0.001	**1.0**
Cadmium, mg/L	3500 –Cd-B	<0.001	<0.001	<0.001	<0.001	**0. 03**
Hydrogen Sulphide, mg/L	4500-S^{2-}H	<0.01	<0.01	<0.01	<0.01	**0.05**
Total coliform count, CFU/100 mL	9225-D	0	0	0	0	**10**
Faecal coliform, E.coli),	9222-D	0	0	0	0	**0**
Salmonella/Shigella sp.,	9260-E	0	0	0	0	**0**
Staphylococcus sp. ,	AOAC 995.12	0	0	0	0	**0**
Pseudomonas aureus,	9213-E	0	0	0	0	**0**
Total plate count,	9215-B	21	5	0	2	**10^2**

Source: Okomu OPC Plc – Main Estate EAuR, 2020 and 2024

Discussion

The previous and current results of the groundwater quality at Okomu OPC Plc – Main Estate showed difference in values, some parameter recorded higher values in the current audit (2024) compared to the previous audit (2020) and vice versa. Values obtained during the previous audit (2020) and the current audit (2024) were in conformity to the stipulated limit of NIS 554: 2015 for drinking water except pH which was (slightly acidic) below the limit in all locations except at the Mill Complex (OKM_{MC}).

Table 4.11: Part Laboratory Result of Critical Effluent Parameters Compared

Quality Parameter	Treated POME (2017 Audit)	Treated POME (2020 Audit)	Treated POME (2024 Audit)	NESREA Limits for Land Application
pH	8.04	9.32	7.28	5.5 - 9
Total Suspended Solids (mg/l)	260	234	850	**30**
Biochemical Oxygen Demand (BOD) (mg/l)	320	126	755	**500**
Chemical Oxygen Demand (COD) (mg/l)	568	160	1162	**-**
Oil and Grease (mg/l)	5.0	15.7	15	**30**
Total Hydrocarbon (mg/l)	<0.01	<0.01	<0.01	**-**
Heavy Metals (mg/l)	<1.0	<1.0	<0.001	**<1.0**
Total Coliform Count (MNL/ml)	10	1.8×10^2	16	**Not Specified**

Source: Okomu OPC Plc – Main Estate EAuR, 2017, 2020 and 2024

Discussion

The previous and current results of the critical effluent parameters at Okomu OPC Plc – Main Estate showed difference in values, some parameter recorded higher values in the current audit (2024) compared to the previous audit (2020) such as TSS, BOD and COD. Values obtained during the previous audit (2020) and the current audit (2024) were in conformity to the stipulated FMEnv. limits for land application except BOD and TSS.

4.7 Life Cycle Analysis

Life cycle analysis (LCA) is a method used to evaluate the environmental impact of a product through its life cycle encompassing extraction and processing of the raw materials, manufacturing, distribution, use, recycling, and final disposal.

Since a comprehensive analysis is impossible, we decided, explicitly or implicitly considered to use the techniques of Life-cycle assessment to assess all environmental impacts associated with all the stages of Okomu OPC Plc – Main estate from plantation maintenance through harvesting, FFB processing, waste generation, and disposal or recycling. These techniques help avoid a narrow outlook on environmental concerns by assisting in:

- Compiling an inventory of relevant energy and material inputs and environmental releases;
- Evaluating the potential impacts associated with identified inputs and releases; interpreting the results to help make a more informed decision.

4.8 Material Input, Output and Balance

Table 4.14 contains materials that are used on the plantation estate. The unit of the materials is well inserted. They are merely in liters (Ltrs), kilograms (kgs) and metric tons (MT) such as the output. For understanding, the materials have been entered in columns, from 1 to 5 in addition to the one identified as unit. Column 1 means materials available in the store, column 2 connotes materials required for the year. Column 3 is the material that is being ordered to make up for the required one. The difference between column 2 and 5 is the stock difference (balance- column 4) which were not used on the plantation estate. Column 5 indicates material taken from the store and used on the plantation field. Column 6 is the FFB output.

Table 4.12: Material Balance at Okomu OPC Plc – Main Estate

Material	Material Control						
		(1)	(2)	(3)	(4)	(5)	(6)
	Unit	**Stock (Current)**	**Required**	**Order**	**Stock Difference (Physical Use- Required)**	**Physical Use (Stock Current + Order)**	**Output**
Agrochemicals	**Liters**	0	457	457	0	457	
Fertilizer	**kg**	0	832,940	832,940	0	832,940	
FFB	**137,629 Tons Processed**						**41,851 Tons**
AGO	**Liters**	0	2,812,138.87	2,812,138.87	0	2,812,138.87	
PMS	**Liters**	0	560,155.12	560,155.12	0	560,155.12	
Lubricants	**Liters**	0	12,125.00	12,125.00	0	12,125.00	
Palm Oil Mill Water Usage	**m^3**						**194,237**
POME Generated	**m^3**						
POME Discharged	**m^3**						**207,520**

Source: HSE Department, OOPC Plc (2024)

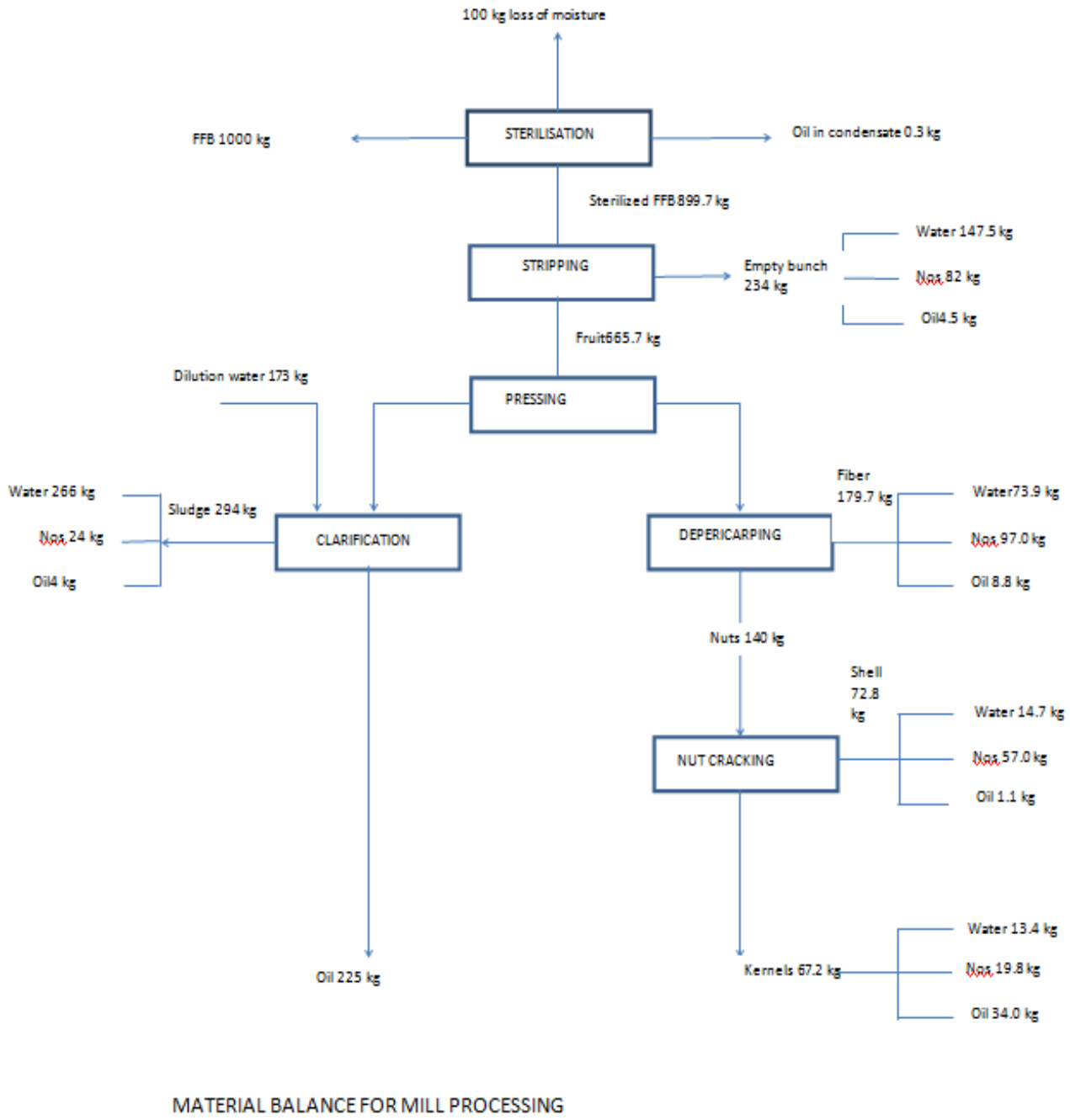


Figure 4.1: Material Balance for the Palm Oil Mill Processes

CHAPTER FIVE

Identification, Quantification and Characterization of Waste

5.1 Waste Management

There is a detailed and well-articulated waste management plans to cover description of activities and waste handling by the company. More so, the company's waste management practices were observed during this audit and its present environmental management system (EMS) was ascertained.

5.1.1 Waste Classification

The wide range of waste generated on the estate is classified into solid waste, liquid waste and gaseous emissions.

5.1.2 Waste Generation and Sources

The largest amount of solid waste is generated from the plantation field which is mostly organic in nature, but the residential area will generate the liquid waste, while the bulk of the gaseous emission will come from the powerhouse and effluent lagoon. The waste profile is presented in Table 5.1.

5.1.3 Solid Waste Handling

Storage: At all the points of waste generation, color coded waste bins are provided for the immediate storage of solid waste. Sorting and segregation of solid waste start from the point of generation.

Collection and Transfer: Waste collection and transfer include the provision of a truck to collect and transport the collected waste to the solid waste dumpsite. The company has a valid permit from Edo State Ministry of Environment and Sustainability to operate the solid waste dumpsite.

Disposal: The solid waste collected is transported and disposed of at the approved solid waste dumpsite.

5.1.4 Liquid Waste Handling

Wastewater: Wastewater (domestic) is channeled into soak-away pits of varying dimension attached to every building. The dimension of the soak-away depends on the size of the building.

Storm water: Rainstorm water is collected in channels and led into natural drainage lines and vegetation.

Table 5.1: Waste Profile of Okomu OPC Plc – Main Estate

Project Phase	Waste Characterization		
	Solid	**Liquid**	**Gaseous**
Land Preparation	• Soil and vegetation • Shrubs • Food Waste • Spoilt farm equipment • Organic materials	• Engine oil • Spent oil	• Fugitive Dust • Suspended Particulate • Carbon dioxide • Carbon monoxide • Greenhouse Gases
Planting	• Dust • Polythene bags • Food Waste • Paper	• Spent Oil	• Fugitive Dust • Suspended Particulate • Carbon dioxide • Carbon monoxide • Greenhouse Gases
Field Maintenance	• Dust • Agrochemical containers • Fertilizer bags • Used drums and buckets	• Wastewater • Spent Oil	• Fugitive Dust • Suspended Particulate • Carbon dioxide • Carbon monoxide
Harvesting	• Papers/plastics/glass • Scrap office equipment • Spout • Used drums and buckets	• Wastewater • Spent Oil	• Carbon dioxide • Carbon monoxide • Fumes
Offices	• Papers • Hardware and scraps • Plastics • Metals	• Wastewater	• Carbon dioxide
Stores	• Papers, • Plastics • Nylon • Wood • Hand gloves & Nose masks	• Wastewater	• Carbon dioxide • Chemical fumes • Fumes/Vapour
Powerhouse	• Plastics • Empty cans • Electric cables	• Wastewater • Spilled Oil • Spent Oil	• Suspended Particulate • Carbon dioxide • Carbon monoxide • Greenhouse Gases

Source: HSE Department, OOPC Plc (2024)

5.1.5 Waste Re-use/Recycling

As much as possible, waste is minimized and a place is designated for keeping all reusable/recyclable waste such as scrap metals, while essentially organic waste is recycled in the plantation field and spent oil sold to accredited vendors for reuse/recycling.

5.1.6 Waste Manifest and Tracking

A manifest system has been established.

5.1.7 Waste Treatment

Waste treatment on the estate is as presented in Table 5.2 below:

Table 5.2: Okomu OPC Plc - Main Estate Waste Treatment System

Types of Waste	Management System
Domestic Waste	Composting at the Approved Solid Waste Dumpsite within the estate
Medical Waste	Incinerated in the Boiler at the Palm Oil Mill
e-waste	Evacuated by selling to accredited vendors in Edo State
Hazardous waste mainly empty agrochemical containers	Evacuated by agrochemical suppliers as part of the contract agreement
Batteries	Sold to accredited vendors
Metal Scraps	Sold to accredited vendors
Spent Oil	Sold to accredited vendors

CHAPTER SIX

Impact Evaluation

6.1 Introduction

The primary intention of this Environmental Audit Report is to systematically identify, analyze and evaluate the impacts of oil palm plantation and palm oil mill at Okomu OPC Plc – Main Estate and also, develop an environmental action plan to correct the environmental effects of activities of the estate.

In this section of the report therefore, we present concise information on the current impacts that have been so identified, which have been classified into environmental and social impacts.

This chapter presents an overview of the impact assessment methodology as well as results of impacts identified followed by detailed qualitative and quantitative impact analyses with respect to groundwater, surface river, noise measurements and air quality using national and international acceptable methodology.

6.2 Significant Negative Impacts

In this section, only activity-receptor relationships resulting in impact significance are presented and discussed. In the analysis, the environmental receptors are considered collectively as they relate to facility operations.

6.2.1 Evaluation of Identified Impacts of Plantation Operation

6.2.1.1 Weeding

In mature oil palm plantation, unwanted weeds are removed from the ground cover by manual clearing with cutlass. There is then the problem of disposal of removed weeds which are therefore allowed to gradually decay or rot. Many invertebrate faunae may be killed during or after weeding. Weeding removes the cover for wildlife such as amphibians, snakes and small mammals. Predator birds such as the black kites and owls increase in numbers in recently weeded plantations to locate exposed and moving prey.

6.2.1.2 Herbicides, Fungicides and Insecticides Application.

The estate uses agrochemicals to control weeds and pests. However, the possibility of carriage of residue from the plantation field to any surface water is extremely remote. An Integrated Pest Management system is used i.e Monitoring stage (plots are been visited with list of pests against the threshold) when it reaches its threshold control method such as physical methods (picking, destroying of lavae). At this stage, if the physical method does not work the biological method is used (light trapping) before

the use of chemical method if needed. Therefore, chemical method is the last method used when all other method is not working which in most times rare.

6.2.1.3 Fertilizer Application

In order to increase productivity of oil palm fruit bunches per unit area, fertilizers are applied at various stages. At the nursery, in each bag of soils, fertilizers are applied such as NPK, borax, potash, sulphate of ammonia. Ashes of burnt kernel shells from boiler furnace are also applied as fertilizers. Not all nutrients added to the soil as fertilizers are taken up by the growing palm. Residues (NO_3, PO_4) may remain in the soil and end up in surface waters through storm water runoffs or be leached out of the soil and enter groundwater. High nitrate level in drinking water sources cause health risks particularly in children. It reacts with haemoglobin causing methemoglobinemia which impairs respiratory gases transport. Nitrites and nitrates can form nitrosamines, which are carcinogenic, mutagenic and teratogenic (Odiete, 1999). At Okomu OPC Plc, the ashes from the boiler furnace and palm kernel cake make excellent fertilizers and are applied widely throughout the entire plantation. Therefore, the possibility of high levels of nitrite and nitrates in groundwater is very remote.

6.2.1.4 Palm Oil Mill Effluent (POME)Disposal

The discharge of the raw and untreated POME to the open land area although undesirable, has beneficial impact on the adjoining soils.

a.) ***Soil Nutrient Enrichment:*** the recent study has revealed that the levels of both essential macro and micronutrient elements needed for plant growth and development were increased following the open discharge of the POME in the soil. Specifically, there were notable increases in the levels of exchangeable cations of potassium and magnesium, and corresponding elevation in the values of available phosphorus, organic carbon and total nitrogen content of the soils containing POME. Also, the amount of iron, zinc, manganese, and copper increase in these soils. Proper and effective management of the soils could lead to increase in crop yield and productivity.

b.) ***Hydrocarbon and Oil/Grease Contaminants:*** The increase in the amount of these contaminants in the soil could have adverse effect in the functionality and productivity capacity of the soils. Relatively high levels of THC and Oil/Grease in the soil receiving POME can reduce the microbial activity of the soil, thereby making potentially available nutrients unavailable for plant uptake.

6.2.1.5 Transportation of Fresh Fruit Bunches

During harvesting, fronds are pruned. This helps to give easy access to the ripe fruit bunches as well as keep the oil palm stem clean of hanging dead and decaying leaves. The fronds are left on the ground to add organic matter to the soil. The pruning of fronds, harvesting and collection of fruit bunches are activities which provide employment for more workers.

6.2.1.6 Decommissioning and Abandonment

- Permanent and casual workers will be laid off resulting in loss of employment and income, although severance payment will also be made to permanent workers. But this can itself give rise to strained relations between workers/community and the company.
- The plantation will no longer be regularly and properly maintained including no weeding, no pest control, no maintenance of roads and tracks, no pruning of palm fronts. There will be great economic loss to the company and shareholders and the nation. The plantation will become densely populated by weeds, pests and many invertebrates' fauna and small to medium size wildlife.
- The land area might need to be restored back to its original state and this includes felling the palm trees as well as planting trees. This will portend a great economic loss to the company in addition to the already incurred losses.
- Removal of equipment and ancillary facilities such as chemicals, ploughs, tractors, harrows, trucks and other farm machinery will generate excessive noise and also a potential for accident.
- Return of land area to State Government which can generate conflicts between the affected communities and the local authority.

6.2.2 Significant Impact Producing Activities

The significant impact producing activities (IPA_S) are as follow:

- Weeding in young plantation and manual removal of unwanted weeds with cutlass in mature planting.
- Fertilizer Application; In Okomu OPC Plc, mainly ash from boiler is applied. Also, other chemical fertilizer application may affect groundwater as a result of runoffs and leaching.
- Pruning, harvesting and collection of fruit bunches.
- Use of diesel machinery and powered generators for electricity generation.
- Transportation of Fresh Fruit Bunches (FFBs) from the fields to the palm oil mill for processing.

- Laying off workers/Severance Payment
- Lack of care of plantation

6.2.3 Cumulative Impacts

Cumulative impacts are changes to the environment that are caused by an activity in combination with other past, present and future human activities. (GSI, 2003). The concept of cumulative effects is an important one. It holds that, while impacts may be small individually, the overall impact of all environmental changes affecting the receptors taken together can be significant. When a resource is nearing its tolerance threshold, a small change can push it over. The objective of the cumulative impact assessment is to identify those environmental and/or socio-economic aspects that may not on their own constitute a significant impact but when combined with impacts from past, present or reasonably foreseeable future activities associated with this and/or other projects, result in a larger and more significant impact[s].

- **Project Specific Cumulative Effects' Assessment**
  This section evaluates the cumulative effects of the individual impacts evaluated in the preceding sections.

- ***Land Based Traffic***
  It is envisioned that land-based traffic will also increase as a result of the estate operations and activities. Land based traffic is eminent to allow the FFB that are harvested in the plantation to be transported for processing at the palm oil mill. However, the operations at the estate have a negligible impact on traffic after considering all measures put in place by the management to mitigate the problem. No additional cumulative transportation impacts have been identified in recent time.

- ***Public Services***
  There is no impact to public services under the present operations of the estate. The operations and activities of the estate have not introduced any additional long-term population or employment into the area, and thus, have not resulted in any additional demand for police or fire services or the need for new or altered facilities. No damage to roadways has been recorded except which would be considered normal wear and tear and it is basically within the company's land concession. Therefore, the operation of the estate has resulted in negligible impact on public utilities.

- ***Employment Opportunities***
  There have been some beneficial impacts that are cumulative that are in the employment sector. The plantation estate has employed enormous number of workers – all Nigerian. Positive cumulative social benefits include gainful employment and tax being paid to government coffer.

6.2.4 Known Overall Impacts of Large Oil Palm Cultivation and Management

These include:

- Loss of resources of lowland rainforest and land for indigenous people
- Transformation of the forest into a monoculture farm
- Many insects and insect pests flourish in oil palm plantation due to absence of natural enemies.
- Loss/disappearance/displacement of many wildlife species.
- Employment and income generation will be enhanced.
- Pollution of the soil and groundwater by pesticides and excessive use of fertilizers.
- Buildup of dry and decaying fronds and other organic matter under plantation posing a fire hazard.
- Rapid spread of unwanted weeds.

6.3 Public Health Impact (PHI) of Okomu OPC Plc Main Estate Operations

The public health impact assessment of the estate is a rapid appraisal of the likely health impacts the estate operation might have on the totality of the environment. The assessment will consist simply of a summary table and a conclusion. The summary table shall list the intermediate factors and their likely impacts with minimal qualification.

6.3.1 Identifying Intermediate Factors that Impact on Health

Many operations that are not intended to affect health directly have indirect effects on health and wellbeing, often these indirect effects have not been recognized. Operation may affect things such as employment, income, air quality or housing which in turn affect health. These factors which are not health indicators but do influence health are referred to as intermediate factors. (They may also be called determinants of health).

Some of the identified intermediate factors of the estate activities and/or operations are:

- Air Quality
- Water Quality and Hydrology
- Noise and Vibration
- Health and Safety
- Traffic and transport
- Waste Management
- Workers' Welfare
- Social cohesion
- Corporate Image

Table 6.1: Summary of Public Health Impacts of Okomu OPC Plc – Main Estate Operations

Intermediate Factor	Affected Group	Health Impact	Mitigation measures put in place
Air quality Dust and gaseous emissions from land preparation and vehicular emission leading to high suspended particulates in the atmosphere.	All	- Allergy - Eye irritation - Nose irritation - Respiratory Tract Infections	- Low-emission/high efficiency engines are used. - Regular maintenance of vehicles to ensure optimal performance - Movement of men and materials are properly coordinated to optimize vehicle use and resultant emissions. - Dust and particulate barriers are used during operation. - No burning on site (i.e. zero burning).
Noise and vibration Noise emissions generated by heavy duty vehicles and workers activities	All	- Hearing impairment, hypertension, annoyance, sleep disturbance of site workers. - Hand-Arm Vibration Syndrome (HAVS)	- Noise attenuation measures such as acoustic mufflers are fixed on large engines and equipment; - Hearing protection is provided and usage enforced for workers on site. - Plantation operations are carried out during daytime only.
Water Quality and Hydrology Increased receiving water body turbidity from runoff and from the plantation.	All	- Illnesses including Typhoid, Cholera, Dysentery, Hepatitis	- Adequate buffer zones between surface water and planting areas have been established. - Re-fueling and maintenance of heavy construction vehicles at the site are done at specified areas and temporary storage of oily waste. - Nutrients (such as fertilizer and soil conditioner) application is minimally done.
Solid Waste - Solid waste constituting aesthetic nuisance - Sewage nuisance	All	Improper solid waste handling can lead to the following: - Creating conditions favourable to the survival and growth of microbial pathogens	Waste is contained and removed regularly.

Table 6.1: Summary of Public Health Impacts of Okomu OPC Plc – Main Estate Operations

Intermediate Factor	Affected Group	Health Impact	Mitigation measures put in place
		- Causing infectious and chronic diseases especially the waste workers.	
Hostility Land acquisition and take-over conflicts between the communities and the company.	Workers and communities	- Youth restiveness - Persistence conflicts between community and company - Hostages	- Grievance and conflict resolution mechanism has been instituted. - Company employs as much local labour as possible.
Waste Management - Accumulated waste could lead to contamination of soil/groundwater and breeding grounds for vectors and rodents	All	Health hazards associated with poor waste management include: - Skin and blood infections resulting from direct contact with waste. - Different diseases such as intestinal infections that result from poor waste management. - Genetic mutilation - Reduction in aquatic food supply - Disruption of food chain	- **Okomu OPC Plc** has a waste management plan and waste storage bins at designated areas for collection of waste to solid waste dumpsite.
Sewage - Faecal aesthetic issues for the project area. - Spillage of septic liquor	Workers	- Cholera - Dysentery - Infectious and chronic diseases	- Onsite toilets are made available for use
Socio-economics - Promiscuity - Sexual harassment - Youth Militancy - Unemployment - Grievances	All	- Sexually transmitted diseases (STDs) - HIV/AIDS - Population explosion	**Okomu OPC Plc** has been operating cordially with the host communities through regular engagement with the communities.

Table 6.1: Summary of Public Health Impacts of Okomu OPC Plc – Main Estate Operations			
Intermediate Factor	**Affected Group**	**Health Impact**	**Mitigation measures put in place**
Workers' Welfare Especially when workers leave the organization and/or layoff.	Workers	- Depression - Hypertension - Workers' restiveness	**Okomu OPC Plc** always ensures that workers receive their full benefits when leaving the organization.
Corporate Image The negative corporate image arising from day-to-day activities of the organization,	Company/All	- Annoyance - Depression	**Okomu OPC Plc** always ensures that its day-to-day activities and operations do not portray bad image about the organization to the general public and therefore has been operating according to the best industry standards and practice.

*** Note: "All" in the Affected Group Column means, "Totality of the Environment" including Flora and Fauna and Humans.**

6.3.2 Conclusion

The main negative impacts are health and safety. However, mitigation measures have been put in place for health and safety through the provision of appropriate PPE. Similarly, there is a buffer zone (50-250m) between planting areas and surface water body with minimal application of fertilizer and agrochemicals to avoid eutrophication.

As a result of the above provisions and measures, the net public health impact of the estate operations is positive.

6.4 Socio-economic and Social Impact Analysis

A quick appraisal on socio-economic of the twelve (12) communities, namely; Agbado, Ajebamidele, Awuri, Gbelebu, Inikorogha, Madagbayo, Makilolo, Maroghionba, Mallim, Obagie, Safarogbo and Udo, four (4) camps, namely, Obazuwa, Taye, Thousand Odoola, and Utesi was carried out in December 2020 taking cognizance of the comprehensive Social Impact Analysis (SIA) that was carried out in 2018. It appears that the operations of the company have overall positive social impact on the host community. However, the company places utmost attention to the interest of the host community in its corporate social responsibility which is based on community requests.

CHAPTER SEVEN

CONCLUSION

7.1 Summary of Audit Findings and Recommendation

Focal Area	Audit Area	Indicators	Status	Recommendation for Improvement
1. Environmental Sustainability Planning.	Institutional workplace environment policy	Institutional environmental sustainability policy	Environmental and/or any other policies duly signed by Managing Director are in place	Always operate according to the policies of the company.
	Structures to address environmental issues	Environmental committee in place	Environmental committee is in existence which cut across all department.	No Action Required
	Strategic plan and Service Charter	Commitments	There are many charters developed by Socfin Group (Parent Company) such as Aid Charter.	Develop more charter to include special role for women in Host Community DevelopmentAgenda.
	Compliance with the Environmental Impact Assessment and Environmental Audit	Environmental audit reports for existing projects. EIA reports for new projects, Environmental Management Plans (EMPs)	The company has been in existence before the enactment of EIA Act of 1992. Environmental audit reports have been regularly submitted to both Federal Controller's office and Edo State Ministry of Environment and Sustainability in Benin City.	No Action Required
	Housekeeping and Sanitation	Health, Safety and Environment (HSE) department in place	Housekeeping is good at workplaces but needs improvement.	No Action Required
2. Pollution Control	Water Pollution & Control Measures	Initiatives to prevent, protect and monitor water sources.	The results of laboratory analysis show the groundwater quality is good and free from pollution at all sources. The values are within FMEnv and WHO standard for groundwater except pH which was acidic with value ranging from 4.40 to 7.85.	The pH of borehole water should be raised to acceptable standards for drinking water (6.5-8.5) as recommended by WHO/FMEnv.

Focal Area	Audit Area	Indicators	Status	Recommendation for Improvement
			While Treated Effluent result showed elevated concentration of COD, BOD, TSS and turbidity.	Conduct periodic water quality monitoring on groundwater and surface water within the estate. Scoop the sludge of the POME Lagoon to improve efficiency of the effluent treatment system.
	Waste Management Interventions	Initiatives to segregate, reducing, reusing, and recycling of waste	Most waste generated on the estate is organic in nature which is recycled in the field. More so, sorting is done at the point of waste generation and at the solid waste dumpsite.	Ensure there is access control at the solid waste dumpsite.
		Modes of waste handling (generation, transportation and disposal)	Solid waste generated are collected in colour coded bins and transported by bucket mounted tractor to solid waste dumpsite.	Ensure waste manifest is up to date.
	Air pollution control measures	Initiatives to reduce Air pollution	The ambient air quality was determined in-situ during the audit for critical locations and the result show that the concentrations of gases and particulate matter monitored were within the FMEnv. Limit.	Sustain the quarterly air quality monitoring on the estate.
	Noise pollution control	Initiatives to reduce Noise pollution	Maintenance is regularly done on all the machinery	Carry out a periodic noise measurement on all noise generating equipment before and after maintenance.
3. Climate change	Climate change adaptation and mitigation	Energy saving initiatives	Energy consumption trends was established and target to achieve efficient energy use was set and target achieved but not across board.	Provide an effective plan to achieve the set target. Such as Energy Policy, staff education /awareness, use of alternative source of energy. Set a long-term goal with short term monitoring target. For example, OOPC plans to reduce energy consumption by 30% by the year 2030 with at least 7.5% yearly reduction till 2030.

Focal Area	Audit Area	Indicators	Status	Recommendation for Improvement
		Rain water harvesting	Conservation plot and sediment trap pits serve this purpose as a water retention medium	No Action Required
		Measures to control greenhouse gases	The mature palm trees serve as carbon sink on the estate considering the vast mass of the estate.	No Action Required
4. Promoting Environmental protection and conservation through partnerships with stakeholders	Environmental projects and activities undertaken through partnership with stakeholders	Projects and activities undertaken jointly, MoUs Joint management plans	The estate has yet to participate in any environmental project and activities through partnership with any stakeholders except CSR to Host Communities.	It is desirable to develop a MoU with the host communities.
	Corporate social responsibility (CSR) on environment	CSR initiatives in place	CSR is done based on Host Community request every year where social commitments and obligations to the host communities are done.	Need based assessment should be done to know what the communities need.
	Partnerships with FMENv on Monitoring and inspections to ensure compliance with environment legislation	Areas of partnerships with FMEnv on Monitoring and inspections to ensure compliance with environment legislation	There is a partnership with FMEnv and Edo State Ministry of Environment and Sustainability in environmental compliance monitoring. A quarterly environmental monitoring exercise is carried out and report submitted to both Federal and Edo State Ministry of Environment and Sustainability.	This practice should be sustained
5. Environmental Ecological Enhancement	Wetlands, River banks, lakeshores, and seashore management	Rehabilitation initiatives	No wetland and surface river are planted.	This practice should be sustained.
	Conservation of biological diversity and Environmental significant areas	Conservation initiatives	Conservation Area (959.47 Hectares) has been established within the plantation field. The company security apparatus in conjunction with an HSE officer/Eco-guards designated to protect the	This practice should be sustained

Focal Area	Audit Area	Indicators	Status	Recommendation for Improvement
			conservation areas against internal and external threats.	
	Environmental restoration	Degraded lands secured, restored and conserved	No degraded lands on the estate.	No Action Required
6. Training	Workers' Refresher Training	Workers' Competence	The company has established an in-house training structure with documented curriculum that can be reviewed regularly across most workplaces	This practice should be sustained.
7. Education and Awareness	Behaviour changes towards the environment Participation in environmental events with communities and schools	Proof of positive behaviour change Evidence of Participation in environmental events	Workers are aware of their environmental responsibilities. None	Conduct regular training on HSE for workers. Organise annual Health, Safety and Environment (HSE) week or day to create awareness among workers.
	Sensitization of staff and public on Environmental sustainability relevant to the institutional mandate	Sensitized staff on environmental sustainability through Informative, Educative and Communication (IEC) materials	There are many Informative, Educative, and Communication (IEC) Material on site.	Prepare more environmental signage and posters at critical work areas to sensitize workers on environmental protection as a collective responsibility.
	Recognition of environmental champions	Evidence of appreciation of environmental sustainability champions	Co-sponsoring many environmental activities in the state especially the World Environmental Day.	Always partner and associate with bodies concern with environmental related issues such as workshop, symposium and conference.
	Compliance with safety rules within the plantation	Evidence of compliance with safety and traffic laws	The company has speed limit and traffic safety sign	Educate workers on the importance of signage especially the message, interpretation and compliance.

CHAPTER EIGHT

REMARKS AND RECOMMENDATIONS

8.1 Recommendation

This audit was carried out to determine the level of compliance of the company to regulatory standards as well as evaluating existing Environmental Management System in the company. This was done to ensure continuous improvement. The Audit revealed the company's level of compliance, environmental and safety practices; and the management's commitment to implementing sound environmental practices.

In view of the information and observation available in the previous sections of this Environmental Audit Report, it is hereby recommended as follows:

- The aesthetic and sanitary conditions of the palm oil mill were highly commendable and should be sustained.
- The use of Personal Protective Equipment (PPE) provided for workers was highly commendable and should be sustained.
- Organize more HSE drills and trainings for staff on the aspect of health, safety, and environment.
- Organise annual HSE Week where lectures would be delivered by external experts on HSE issues.
- Routine checks and maintenance of process operations and equipment for continual improvement.
- Regular servicing of production machines, equipment, and generators to reduce potential pollution that may emanate from the machine's emission.
- Fumigation the factory premises consistently on quarterly basis with Integrated Pest control and management system is highly commendable and to be sustained.
- OOPC Plc to further improve in her energy consumption by considering switching to cleaner fuel engine such as the use of Biogas for electricity generation.
- Overhead sprinkler firefighting system should be installed in the Chemical/fertilizer store.
- Produce and erect safety warnings at and along palm oil mill effluent (POME) Lagoon.
- Monitor on monthly basis the effluent quality from POME lagoon
- Forbid workers from taking underage children to help them in plantation work.
- Ensure functionality and continuous servicing of the installed fire alarm system and other fire-fighting devices.

- ❖ Maintain the effluent treatment system regularly for improved efficiency such as scooping the bottom layer (sludge) of POME Lagoon.
- ❖ Ensure continuous good housekeeping of the factory to be sustained.
- ❖ Construction of a concrete floor at the filling station beside the powerhouse at the workshop area.
- ❖ Generator exhaust pipe at the mill should be stacked upwards.
- ❖ Workers at the Generator room to always use wear ear plugs provided.
- ❖ Establish energy conservation policy for all workplace.
- ❖ The use of appropriate PPEs by workers in every section should be enforced and monitored by the management.
- ❖ Display more safety posters in the facility both indoor and outdoor.
- ❖ Improve on metal scrap management.
- ❖ Conduct periodic medical examination for all pesticide handlers.
- ❖ Ensure all gangways in and out are clearly marked and cleared of obstructions.
- ❖ The Fire Assembly/Muster Point should be cleared of all obstacles.
- ❖ Emergency Routes to Muster Point(s) to be displayed within the facility for rapid response to emergencies cases.

8.2 Environmental Monitoring Programme

An environmental monitoring programme is required to set out the means to determine whether or not the project operates in line with the environmental quality standards established by the FMEnv. For this project, the monitoring programme covers a number of parameters including meteorology, ambient air quality, surface water quality, groundwater quality, effluent quality and noise levels. The monitoring programme is scheduled in Table 8.1 below.

Table 8.1: Proposed Schedule of Environmental Monitoring

Parameter	Variables	Period
Meteorology	Rainfall, temperatures and relative humidity, Wind Speed and Wind direction, Sunshine Hours	Daily
Surface water quality	pH, Sediment load, NO_3, Heavy metals, Oil and Grease	Quarterly
Groundwater quality	pH, BOD, COD, microbiology	Quarterly
Ambient Air Quality	CO_2, CO, NO_x, SO_x, VOC, Particulates	Quarterly
Noise Levels	Noise generating Facilities	Quarterly
Health	Occupational diseases and/or medical statistics	6 Months

References

1. IFC – Draft EHS General Guidelines for Perennial Crop Production (March 2016)
2. World Bank Environmental Health and Safety Guidelines (Pesticide Handling and Application, and Occupational Health and Safety).
3. Federal Ministry of Environment (Regulatory Checklist for Ministerial Environmental Compliance Monitoring and Enforcement).
4. Federal Ministry of Environment List of Banned Pesticides and Chemicals
5. National Guidelines for Environmental Audit Report (EAuR) in Nigeria.
6. Environmental Compliance Monitoring (ECM) Report of 2024
7. Okomu OPC Plc – Main Estate Environmental Audit Report (2021)
8. RSPO – Principles Guidance and Criteria (November 2018).

8.3 Revised Environmental Action Plans – 2024 (EAPs)

ISSUE/RECOMMENDATION	PRIORITY	FORMER TARGET	REMARKS	
			STATUS	NEW TARGET
Compliance with Legislation and Best Management Practices				
Submit all records relating to the environment to Regulatory Bodies	High	Continuous	Continuous	Continuous
Review and update status of Permits, Certificates, Licenses, etc.	High	Continuous	Continuous	Continuous
Waste Management System				
Ensure that there is no mix-up of hazardous and/or empty agrochemical containers with general/domestic	High	Continuous	Continuous	Continuous
Replace all damaged waste storage bins across board.	High	Continuous	Continuous	Continuous
Housekeeping and Sanitation				
Eliminate all unauthorized refuse dumps at workplaces and residences.	High	Continuous	Continuous	Continuous
Prepare Emergency Response/Contingency Plan for damaged septic tanks.	High	September 2021	Not Done	
Improve on metal scrap management	High	Continuous	Continuous	Continuous
Plantation Management				
Periodically evaluate plantation water consumption rate	High	Periodically	Continuous	Periodically
Health:				
Intensify Health Education Program	High	Continuous	Continuous	Always
Conduct periodic medical examination for all Pesticide Handlers	High			Every 6 Months

ISSUE/RECOMMENDATION	PRIORITY	FORMER TARGET	REMARKS	
			STATUS	NEW TARGET
Conduct Periodic food handlers test for staff at the canteen	High	December 2021		Every 6 Months
Provide changing room for staff club house workers	High		Not Done	June 2025
Palm Oil Mill Factory Operating/Monitoring Standards				
Set targets for reducing Palm Oil mill factory water consumption	High	Continuous	Continuous	Continuous
Pollution:				
Conduct routine monitoring of water sources to sustain quality of drinking water	High	Always	Continuous	Every Quarter
Conduct routine monitoring of noise levels and air quality at critical workplaces	High	Always	Continuous	Every Quarter
Generator exhaust pipe at the oil mill should be stacked upwards	High			September 2025
Construction of a concrete floor at the filling station beside the powerhouse in the workshop area	High			February 2026
Stop channeling sanitary wastewater into public drains at block 59, 2024.	High			Immediately
Wastewater Treatment				
Monitor on a monthly basis the effluent quality from POME lagoon.	High	Monthly		Monthly
Scoop the sludge of the POME Lagoon to improve efficiency	High			As Soon As Possible
Consider using POME to produce green energy (biogas) for electricity generation	High			As Soon As Possible
Energy:				
Establish energy conservation policy for all workplace	Medium	December 2021	Not Done	September 2025

ISSUE/RECOMMENDATION	PRIORITY	FORMER TARGET	REMARKS	
			STATUS	NEW TARGET
Workplace Safety:				
Promote safety education in enforcing the use of PPE	High	Always	Continuous	Always
Provide maintenance ladder and safety provisions for communication masts.	High	Always	Continuous	Always
Document and review decisions, actions and feedback on safety issues	High	Always	Continuous	Always
Training Communication and Reporting:				
Establish and document curriculum for formal in-house training	High	July 2022	Done	Always
Run induction courses to cover General Safety, First Aid and Company Policies	Medium	Always	Continuous	Always
Community Development				
Ensure records are maintained on all communications with the public, especially local communities.	High	Always	Continuous	Always
Industrial Labour Relation				
Forbid workers from taking underage children to help them in plantation work.	High	Continuous	Continuous	Continuous
Signage				
Produce and erect safety warnings at and along POME Lagoon.	High	July 2021		
Constantly maintain all the muster points and should be devoid of any obstruction	High	Continuous	Continuous	Continuously

APPENDIX A – WATER QUALITY LABORATORY RESULTS

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Analyst's Certificate

[Institute of Public Analysts of Nigeria Decree 100 of 1992]

№: 24111916

Name of Sample:	Groundwater	**Project 1**: Main Estate	
Client:	Foremost Development Services Limited, Akute.		
	For: OKOMU Oil Palm Company PLC, Benin City, Edo State.		
Submission Date:	19 November, 2024	**Lab No.**: EL/W/2411/38131-38132, 38134-38138, 38149	

Methodology:

Samples of groundwater collected from all locations were analyzed using Standard methods for the examination of water and wastewater (APHA 24th Edition 2022). The parameters examined are as contained in the result Table.

Sampling Locations

S/N	Code	Sample Location/Site	Coordinates	
1.	OKM_{LL}	Labour Line Quarters	N06°24' 387"	E005°15'756"
2.	OKM_{MC}	Mill Complex	N06°24' 19.9"	E005°14'11.0"
3.	OKM_{MQ}	Management Quarters	N06°24' 364"	E005°16'251"
4.	OKM_{NB}	New Building	N06°24' 387"	E005°15'756"
5.	OKM_{RQ}	Rubber Estate Quarters	N06°21' 30.0"	E005°11'18.0"
6.	OKM_{RTW}	Okomu Rubber Factory Treated Water	N06°21' 25.9"	E005°11'05.0"
7.	OKM_{IITA}	IITA Quarters	N06°24' 49.3"	E005°12'57.4"
8.	OKM_{EXTQ}	Extension One Quarters	N06°22' 22.2"	E005° 22'53.2

Result of Analysis

The result of on-site measurements and laboratory analyses carried out on the groundwater samples collected from Main Estate Quarters while in the same condition as submitted to us is presented in Table 1:

Comment

i. pH of most of the samples differs from the limit;
ii. All other physico-chemical and microbiological parameters are within the Standard.

I, the undersigned Public Analyst, OYEDIRAN, L.O. (IPAN NO. 00155®), make this certification, as witnessed my hand this 25th day of November, 2024.

Parameter/Unit	Method APHA 2022	OKM_{LL}	OKM_{MC}	OKM_{MQ}	OKM_{NB}	NIS554: 2015
Appearance		Clear and colourless				
Odour		Unobjectionable				Unobjectionable
pH @ 25.0°C	4500-HB	4.70	7.85	4.71	4.55	
Temperature, °C	2550 -B	29.1	31.9	28.7	32.4	Ambient
Conductivity, µS/cm	2500-B	20	14	16	18	1000
Total Dissolved solids, mg/L	2120-C	10	7	8	9	500
Total Suspended Solids, mg/L	2130-B	<1	<1	5	1	-
Total Solids, mg/L	2540-D	10	7	13	10	-
Colour, Pt-Co	2540-C	<0.1	<0.1	10	<0.1	15
Turbidity, NTU	2540B	<0.01	<0.01	<0.01	5	5
Total Hardness, mg/L	2340-C	3	<1	2	3	150
Total Alkalinity, mg/L	2320-B	4	4	8	4	-
Total acidity, mg/L	2310-B	50	50	20	50	-
Calcium, mg/L	3500-B	0.8	<0.1	0.8	0.8	-
Magnesium, mg/L	3500-B	0.24	<0.01	<0.01	0.24	20
Chloride, mg/L	4500-B	2.0	3.0	3.0	2.0	250
Nitrate, mg/L	4500-NO_3-E	<0.01	<0.01	<0.01	<0.01	50
Nitrite, mg/L	4500-NO_2-B	<0.01	<0.01	<0.01	<0.01	0.2
Sulphate, mg/L	4500-SO_4-E	3.6	2.0	1.0	3.0	100
Phosphate, mg/L	4500-E	<0.01	<0.01	<0.01	<0.01	-
Iron (total), mg/L	3500-B	<0.01	<0.01	<0.01	<0.01	0.3
Fluoride, mg/L	4500-F-C	<0.1	<0.1	<0.1	<0.1	1.5
Lead, mg/L	3500 –Pb-B	<0.001	<0.001	<0.001	<0.001	0.01
Arsenic, mg/L	3500 –As-B	<0.001	<0.001	<0.001	<0.001	0.01
Manganese, mg/L	3500 –Mn-B	<0.001	<0.001	<0.001	<0.001	0.2
Copper, mg/L	3500 –Cu-B	<0.001	<0.001	<0.001	<0.001	1.0
Cadmium, mg/L	3500 –Cd-B	<0.001	<0.001	<0.001	<0.001	0. 03
Hydrogen Sulphide, mg/L	4500-S^{2-}H	<0.01	<0.01	<0.01	<0.01	0.05
Total coliform count, CFU/100 m	9225-D	0	0	1	2	10
Faecal coliform, E.coli),	9222-D	0	0	0	0	0
Salmonella/Shigella sp.,	9260-E	0	0	0	0	0
Staphylococcus sp.,	AOAC 995.12	0	0	0	0	0
Pseudomonas aureus,	9213-E	0	0	0	0	0
Total plate count,	9215-B	4	2	8	5	10^2

Table 1: Result of analysis of groundwater samples from Project 1 site ctd

Parameter/Unit	Method APHA 2022	OKM_{RQ}	OKM_{RTW}	OKM_{RTA}	NIS554: 2015
Appearance		Clear and colourless			
Odour		Unobjectionable			
pH @ 25.0°C	4500-HB	4.81	6.01	4.40	6.5-8.5
Temperature, °C	2550 -B	28.2	30.6	28.7	Ambient
Conductivity, µS/cm	2500-B	24	8	24	1000
Total Dissolved solids, mg/L	2120-C	12	4	12	500
Total Suspended Solids, mg/L	2130-B	2	<1	3	-
Total Solids, mg/L	2540-D	14	4	15	-
Colour, Pt-Co	2540-C	7.0	<0.1	5.0	15
Turbidity, NTU	2540B	<0.01	<0.01	1.25	5
Total Hardness, mg/L	2340-C	4	<0.1	3	150
Total Alkalinity, mg/L	2320-B	4	4	4	-
Total acidity, mg/L	2310-B	70	20	60	-
Calcium, mg/L	3500-B	1.2	<0.01	1.2	-
Magnesium, mg/L	3500-B	0.24	<0.01	<0.01	20
Chloride, mg/L	4500-B	5.0	2.0	6.0	250
Nitrate, mg/L	4500-NO_3-E	<0.01	<0.01	<0.01	50
Nitrite, mg/L	4500-NO_2-B	<0.01	<0.01	<0.01	0.2
Sulphate, mg/L	4500-SO_4-E	<0.1	<0.1	<0.1	100
Phosphate, mg/L	4500-E	<0.01	<0.01	<0.01	-
Iron (total), mg/L	3500-B	<0.01	<0.01	<0.01	0.3
Fluoride, mg/L	4500-F-C	<0.1	<0.1	<0.1	1.5
Lead, mg/L	3500 –Pb-B	<0.001	<0.001	<0.001	0.01
Arsenic, mg/L	3500 –As-B	<0.001	<0.001	<0.001	0.01
Manganese, mg/L	3500 –Mn-B	<0.001	<0.001	<0.001	0.2
Copper, mg/L	3500 –Cu-B	<0.001	<0.001	<0.001	1.0
Cadmium, mg/L	3500 –Cd-B	<0.001	<0.001	<0.001	0. 03
Hydrogen Sulphide, mg/L	4500-S^2H	<0.01	<0.01	<0.01	0.05
Total coliform count, CFU/100 mL	9225-D	0	0	0	10
Faecal coliform, E.coli),	9222-D	0	0	0	0
Salmonella/Shigella sp.,	9260-E	0	0	0	0
Staphylococcus sp.,	AOAC 995.12	0	0	0	0
Pseudomonas aureus,	9213-E	0	0	0	0
Total plate count,	9215-B	6	4	5	10^2

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Analyst's Certificate

№:2411918

[Institute of Public Analysts of Nigeria Decree 100 of 1992]

Name of Sample:	Surface Water	**Project 1:** Main Estate	
Client:	Foremost Development Services Limited, Akute. For OKOMU Nig. Plc Benin City, Edo State.		
Submission date:	19 November, 2024	**Lab No.:** EL/W/2411/38133, 38139-38142	

A. Methodology:

Samples of surface water collected from all locations were analyzed using Standard methods for the examination of water and wastewater (APHA 24th Edition 2022). The parameters examined are as contained in the result Table.

B. Sampling Locations

S/N	Code	Location	Coordinate	
1.	OKM_1	Okomu River Inlet	N06°23.14.6"	E005°16.47.2"
2.	OKM_3	Mgt Quarter stream Outlet	N06°22.48.3"	E005°15.43.6"
3.	OKM_5	Oil Mill Stream (outlet)	N06°22'34.9"	E005°14'20.3"
4.	OKM_7	Palm-Rubber boundary stream Outlet	N06°20.18.5"	E005°11.27.2"
5.	OKM_{GB}	Gboleuba Creek	N06°18.59.6'	E005° 23.25.2" 10m

C. Result of Analysis

The result of on-site measurements and laboratory analyses carried out on the surface water samples collected from the estate while in the same condition as submitted to us is presented in Table 1.

D. Comment:

a) pH of all the samples differs from the limit;
b) All other physico-chemical and microbiological parameters are within the Standard.

I, the undersigned Public Analyst, OYEDIRAN, L.O. (IPAN NO. 00155®), make this certification, as witnessed my hand this 27th day of November, 2024.

Table 1: Result of analysis of surface water samples

PARAMETER/UNIT	METHOD, APHA 2022	OKM_1	OKM_3	OKM_5	OKM_7	FMEnv.
Appearance	Visual	Clear & Colourless				Clear & Colourless
Odour	Sensory	Unobjectionable				Unobjectionable
pH @ 25°C	4500-B	5.81	5.50	5.30	5.02	6-9
Temperature, °C	2550-B	27.5	27.6	27.1	29.4	Ambient
Conductivity, µS/cm	2510-B	34	28	18	12	2000
Total Dissolved solids, mg/L	2540-D	17	14	9	6	1000
Colour, Pt-Co	2120-C	3	2	2	1	7.0
Turbidity, NTU	2130-B	<0.01	<0.01	<0.01	<0.01	10
Total Suspended Solids, mg/L	2540-C	<1	<1	<1	<1	30
Total Solids, mg/L	2540-B	17	14	9	6	-
Total Hardness, mg/L	2340-C	8	4	3	2	-
Total Alkalinity, mg/L	2320-B	8	8	4	4	-
Total acidity, mg/L	2310-B	40	30	20	30	-
Calcium, mg/L as Ca	3500-B	1.6	0.8	<0.1	<0.1	-
Magnesium, mg/L as Mg	3500-B	0.97	0.48	0.73	0.48	-
Salinity as Chloride, mg/L	4500-B	5.0	6.0	3.0	3.0	200
Nitrate, mg/L	4500-NO_3^-B	<0.01	<0.01	<0.01	<0.01	50
Nitrite, mg/L	4500-NO_2^-B	<0.01	<0.01	<0.01	<0.01	0.3
Sulphate, mg/L	4500-E	<0.1	<0.1	<0.1	<0.1	250
Phosphate, mg/L	4500-C	0.07	0.04	0.05	0.01	-
Iron (total), mg/L	3500-B	<0.01	0.05	0.01	<0.01	20
Lead, mg/L	3500 -Pb-B	<0.001	<0.001	<0.001	<0.001	<1.0
Copper, mg/L	3500 -Cu-B	<0.001	<0.001	<0.001	<0.001	<1.0
Manganese, mg/L	3500 -Mn-B	<0.001	<0.001	<0.001	<0.001	0.10
Cadmium, mg/L	3500 -Cd-B	<0.001	<0.001	<0.001	<0.001	<1.0
Nickel, mg/L	3500 -Ni-B	<0.001	<0.001	<0.001	<0.001	<1.0
Cobalt, mg/L	3500 -Co-B	<0.001	<0.001	<0.001	<0.001	<1.0
Arsenic, mg/L	3500 -As-B	<0.001	<0.001	<0.001	<0.001	<1.0
Chemical oxygen demand, mg/L	5220-D	4.2	3.6	5.8	4.5	80
Biochemical oxygen demand, mg/L	5210-B	<0.1	<0.1	2.5	1.8	30
Dissolved Oxygen, mg/L	4500-G	6.0	7.4	6.8	7.6	>2.0
Total Hydrocarbon, mg/L	Spectrophotometry	<0.1	<0.1	<0.1	<0.1	-
Pesticides, mg/L	Screening	<0.01	<0.01	<0.01	<0.01	-
Total coliform count, MPN/mL	APHA 9225-D	6	5	11	14	10^2
Faecal coliform (E.coli), CFU/mL	APHA 9222-D	0	0	0	0	-
Total plate count, CFU/mL	APHA 9215-B	108	80	112	130	10^4

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Analyst's Certificate

№:2411928

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Name of Sample:	Effluent Monitoring well	**Project:** Main Estate
Client:	Foremost Development Services Limited, Akute, Lagos state.	
	For: OKOMU Oil Palm Company PLC, Benin City, Edo State.	
Submission Date:	19 November, 2024	**Lab No.:** EL/W/2411/38143, 38147

Methodology:

Samples of water collected from the monitoring wells were analyzed using Standard methods for the examination of water and wastewater (APHA, 24th Edition 2022). The parameters examined are as contained in the result Table.

Sampling Location

S/N	Code	Description of Location	Coordinates	
			N	E
1	OKM_{REMW}	Rubber Effluent Monitoring Well	N06°21.377'	E005°11.298'
2	OKM_{MEMW}	Mill Effluent Monitoring Well	N06°24' 06.3"	E005°12'51.4"

Result of Analysis

The result of analysis conducted on the samples is presented in Table 1.

Comment

Based on the results of analyses conducted on the samples, the appearance, colour, turbidity of Mill Effluent Monitoring Well differ from the Standard. The COD and BOD of both samples differ from their limits. All other parameters are however within their respective limits.

I, the undersigned Public Analyst, OYEDIRAN, L.O. (IPAN NO. 00155), make this certification, as witnessed my hand this 27th day of November, 2024.

Table 1: Result of Analysis of water from the monitoring wells

PARAMETER/UNIT	METHOD APHA 2022	OKM_{MEMW}	OKM_{REMW}	FMEnv Limit
Appearance	Visual	Light brown with particles	Colourless with tiny Particles	Clear & colourless
Odour	Sensory	Objectionable		Unobjectionable
pH @ 25°C	4500-HB	6.62	7.17	6-9
Temperature, °C	2550B	30.4	30.5	Ambient
Conductivity, µS/cm	2510-B	184	86	2000
Total dissolved solids, mg/L	2540-D	92	43	1000
Colour, Pt-Co	2120-C	40.0	8.0	7.0
Turbidity, NTU	2130-B	11	<1	10
Total Suspended Solids, mg/L	2540-C	30	1	30
Total solids, mg/L	2540B	122	44	-
Total Hardness, mg/L	2340-C	12	8	-
Total Alkalinity, mg/L	2320-B	64	24	-
Total acidity, mg/L	2310-B	70	50	-
Calcium, mg/L as Ca	3500-B	4.8	3.2	-
Magnesium, mg/L as Mg	3500-B	<0.01	<0.01	-
Chloride, mg/L	4500-B	14.0	8.0	200
Nitrate, mg/L	4500-NO_3^--E	1.94	0.86	50
Nitrite, mg/L	4500-NO_2^--B	<0.01	<0.01	0.3
Sulphate, mg/L	4500-SO_4-E	<0.1	<0.1	250
Phosphate, mg/L	4500-E	0.10	0.08	-
Dissolved oxygen, mg/L	4500-OC	7.4	7.5	>2.0
Chemical oxygen demand, mg/L	5220-D	186	125	80
Biochemical oxygen demand, mg/L	5210-B	113	81	30
Iron (total), mg/L	3500-B	0.21	0.14	10
Lead, mg/L	3500 -Pb-B	<0.001	<0.001	<1.0
Copper, mg/L	3500 -Cu-B	<0.001	<0.001	<1.0
Manganese, mg/L	3500 -Mn-B	<0.001	<0.001	0.10
Cadmium, mg/L	3500 -Cd-B	<0.001	<0.001	<1.0
Nickel, mg/L	3500 -Ni-B	<0.001	<0.001	<1.0
Cobalt, mg/L	3500 -Co-B	<0.001	<0.001	<1.0
Arsenic, mg/L	3500 -As-B	<0.001	<0.001	<1.0
Oil & grease, mg/L	5520-B	<0.1	<0.1	10
Total Hydrocarbon, mg/L	6200-C	<0.01	<0.01	<0.01
Total coliform count, MPN/100 mL	9225-D	30	36	10^2
Faecal coliform (E.coli), CFU/100mL	9222-D	0	0	-
Total plate count, CFU/mL	9215-B	3.2×10^3	1.23×10^3	10^4

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Analyst's Certificate

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№:24111928

Name of Sample:	Effluent samples	**Project 1:**	Main Estate
Client:	Foremost Development Services Limited For: OKOMU Nig. Plc Benin City, Edo State.		
Submission Date:	19 November, 2024	**Lab No.:**	EL/W/2411/38144 – 38146, 38148

Methodology

Samples of effluents collected from the site were analyzed using Standard methods for the examination of water and wastewater (APHA 24th Edition, 2022). The parameters examined are as contained in the result Table.

Sampling Locations

S/N	Sample ID	Sample description	Coordinate	
1.	OKM_{PMR}	Palm Oil Mill Effluent – Raw	N06°24.20.7'	E005°14.07.6"
2.	OKM_{PMT}	Palm Oil Mill Effluent - Treated	N06°24'16.3"	E005°12'46.8"
3.	OKM_{RER}	Rubber Effluent – Raw	N06°21'22.9"	E005°11'04.3"
4.	OKM_{RET}	Rubber Effluent – Treated	N06°21'21.4"	E005°11'09.7"

Result of Analysis

The result of analysis conducted on the sample is presented in Table 1.

Comments:

The results of analyses conducted on the samples show that:

a) pH of OKM_{PMR} differs from the limit
b) The appearance, colour, turbidity, suspended solids, COD, BOD and some other parameters differ from their respective limits.

I, the undersigned Public Analyst, OYEDIRAN, L.O. (IPAN NO. 00155*), make this certification, as witnessed my hand this 27th day of November 2024.

Table 1: Result of Analysis of effluent samples

PARAMETER/UNIT	METHOD APHA, 2022	OKM_{PWR}	OKM_{PWT}	OKM_{RER}	OKM_{RET}	FMEnv/ NESREA Limit (Land Application)
Appearance	Visual	Dark brown with particles		Light brown with particles		
Odour	Sensory	Objectionable				Unobjectionable
pH @ 25°C	4500-HB	3.97	7.28	6.70	6.79	6 – 9/5.5 - 9
Temperature, °C	2550B	30.0	30.0	30.0	30.0	<40/-
Conductivity, µS/cm	2510-B	10,660	3450	440	768	-
Colour, Pt-Co (apparent)	2120-C	1150	1200	160	350	-
Turbidity, NTU	2130-B	400	300	38	95	-
Total dissolved solids, mg/L	2540-D	5320	1720	220	384	2000/2100
Total suspended solids, mg/L	2540-C	450	850	30	90	25/30
Total solids, mg/L	2540B	5770	2570	250	474	-
Total Hardness, mg/L	2340-C	400	600	20	28	-
Total Alkalinity, mg/L	2320-B	<1	1040	156	140	-
Total acidity, mg/L	2310-B	5600	200	120	200	-
Calcium, mg/L as Ca	3500-B	96	80	1.6	9.6	-
Magnesium, mg/L Mg	3500-B	38.88	3.8	<0.01	0.97	
Chloride mg/L	4500-B	1360	380	8	6	600/600
Nitrate, mg/L	4500-NO_3-E	3.6	2.8	1.22	0.87	-
Nitrite, mg/L	4500-NO_2-B	0.65	0.19	0.35	0.04	-
Sulphate, mg/L	4500-SO_4-E	70.0	50.0	20.0	10.0	1000/1000
Phosphate, mg/L	4500-E	3.02	3.44	1.84	0.90	10/-
Iron (total), mg/L	3500-B	1.21	0.97	0.18	0.13	20
Lead, mg/L	3500-Pb-B	<0.001	<0.001	<0.001	<0.001	<1.0
Copper, mg/L	3500-Cu-B	<0.001	<0.001	<0.001	<0.001	<1.0
Manganese, mg/L	3500-Mn-B	<0.001	<0.001	<0.001	<0.001	0.10
Cadmium, mg/L	3500 -Cd-B	<0.001	<0.001	<0.001	<0.001	<1.0
Nickel, mg/L	3500-Ni-B	<0.001	<0.001	<0.001	<0.001	<1.0
Cobalt, mg/L	3500 -Co-B	<0.001	<0.001	<0.001	<0.001	<1.0
Arsenic, mg/L	3500-As-B	<0.001	<0.001	<0.001	<0.001	<1.0
Oil & grease, mg/L	5520-B	320	15	4	<1	20/30
Total Hydrocarbon, mg/L	6200-C	<0.01	<0.01	<0.01	<0.01	-
Dissolved oxygen, mg/L	4500-OC	1.2	1.6	5.0	6.8	>2.0
Chemical oxygen demand, mg/L	5220-D	2596	1162	185	108	-
Biochemical oxygen demand, mg/L	5210-B	1584	755	120	70	50/500
Total coliform count, MPN/100 mL	9225-D	35	16	20	24	500/-
Faecal coliform (E.coli), CFU/mL	9222-D	0	0	0	0	-
Total plate count, CFU/mL	9215-B	1.36×10^4	4.0×10^3	3.2×10^3	2.56×10^3	-

APPENDIX B – AIR QUALITY AND NOISE LEVEL RESULTS

ENVIRONMENTAL
Laboratories Ltd
(Environmental Consultants & Public Analysts)

28 Apaola Street, Off Aladelola St.
Ikosi-Ketu, Lagos.
Tel.: 08052059768
Email: info@environlabsng.com
www.environlabsng.com

Analyst's Certificate

№: 2411131

[Institute of Public Analysts of Nigeria Decree 100 of 1992]

Name of Sample	MAIN ESTATE Air quality	Project: 1
Client	Foremost Development Services Limited For: OKOMU Oil Palm Company PLC, Benin City, Edo State.	
Sampling Date	13 November 2024	Quarter: 4th

Methodology:

Sampling and measurement of ambient air quality and noise level were carried out using portable analyzers. Gaseous components of the air were monitored using combination of gas monitors (Industrial Scientific iTX and 7-in-1 air quality monitor) to measure the concentration of carbon monoxide (CO), Sulphur dioxide (SO_2), hydrogen sulphide (H_2S), nitrogen dioxide (NO_2), Total volatile organic compounds and carbon dioxide (CO_2). Handheld Aerosol Monitor PPM1055 was used for the measurement of suspended particulate matter while noise level was determined using digital sound level meter within and around the facility.

Result

The result of on-site measurements carried out on the ambient air at the facility is presented in Table 1. Table 2 contains the result of noise level assessment at critical locations.

Comments

Based on the result of air and noise quality measurements conducted around the facility,

- The concentration of gases fell within the Standard at all the locations;
- The particulate matter exceeded the limit at some of the locations;
- The noise level fell within the limit at most of the locations.

I, the undersigned Public Analyst, OYEDIRAN, L.O. (IPAN NO. 00155*), make this certification, as witnessed my hand this 14th day of November 2024.

Table 1: Result of air quality measurement and noise level within the Main Estate.

Location	*Main Powerhouse (1100, 1500 & 1650kVA)*	*Oil Mill Powerhouse 500kVA*	*Management Quarters*	Oil Mill	Palm Kernel Oil Factory	Agric Office	IITA	*Rubber Factory Hall*	Rubber Quarters	Rubber Powerhouse	FMEnv. Limit
Coordinate	N06°24.462'	N06°24.314'	N06°24' 364"	N06°24.314''		N06°24'10.3"	N06°24'84.7"	N06°21'25.4"	N06°21' 30.0"	N06°21' 23.8"	
	E005°15.653'	E005°14.128'	E005°16'251"	E005°14.128'		E005°14'06.5"	E005°12'848"	E005°11'04.6"	E005°11'18.0"	E005°11'07.3"	
Elevation (m)				72		58				55	
Noise, dB(A)	89.1	101.4	82.9	51.8	83.9	99.8	54.7	52.3	71.0	70.3	90
Humidity (%)	48.80	68.37	66.12	52.75	67.98	69.23	51.09	54.46	69.49	65.75	250
Temperature (°C)	20.33	24.63	24.15	21.48	24.21	24.08	20.01	20.49	24.82	23.85	Ambient
SPM (µg/m³)	233	316	187	152	242	257	210	247	351	184	Ambient
Carbon monoxide, ppm	2	1	2	1	1	3	<1	1	1	1	10-20
Carbon dioxide, ppm	406	773	483	407	466	414	425	407	413	446	-
Hydrogen sulphide, ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-
Hydrocarbon, %	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-
Oxygen, %	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9	21.0
Sulphur dioxide, ppm	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Nitrogen dioxide, ppm	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.04 – 0.06
TVOC, mg/m³	0.018	0.014	0.015	0.010	0.010	0.008	0.015	0.010	0.014	0.006	

TVOC = Total Volatile organic compounds; SPM = Suspended particulate matter.

Table 2- Result of noise quality assessment at the Main Estate

S/N	ADMIN OFFICE AREA	Noise Level, dB(A)
a.	Nearest Residential Block	51.3
b.	Powerhouse office	48.3
c.	Dispensing Station	51.0
d.	Security Post	56.6
e.	Welding Unit	47.1
f.	Gas Depot	47.7
NESREA Standard (8-hour)		**85**

S/N	RUBBER FACTORY	Noise Level, dB(A)
i.	Rubber factory hall	82.9
ii.	Slab Cutter	85.0
iii.	Pre-breaker	86.5
iv.	Pelletizer	81.4
v.	Dryer	84.8
vi.	Bailing Section	80.5
vii.	Boiler	71.6
viii.	Workshop	57.1
ix.	Admin office	49.7
x.	Rubber Factory Office Maintenance	74.8
NESREA Standard (8-hour)		**85**

LOCATION	Noise level, dBA
Clarification	86.1
Old boiler	76.5
Cloak Room	62.7
Ramp	59.5
Weighbridge	59.8
Laboratory/Office	63.9
Cracking Section	100.3
Palm Kernel Oil Factory	99.8
Oill Mill Powerhouse (500kVA)/Turbine	101.4
Mill Workshop office	57.7
Mill Workshop	79.3
Ramp	59.5
Weighbridge 1/Gate	49.9
Weighbridge 2	59.8
Laboratory/Office area	63.9
Agric office	54.7
Boiler 3 (New Mill)	88.2
Boiler 1/2 (Old Mill)	87.0
New Clarification Section	76.9
Kernel Plant (New Mill)	89.5
Kernel Plant (Old Mill)	86.2
Sterilizer area (Old Mill)	76.9
Sterilizer area (New Mill)	78.3
IITA Quarters	52.3
New Turbine	86.8
Old Turbine	88.3
Powerhouse Office	79.8
Banga Packaging	71.0
Machinery Section	73.7

APPENDIX C – POLICIES

OKOMU Responsible tropical agriculture	Document title **OKOMU OIL PALM COMPANY PLC**	Revision: 2
		Date: 06/04/2021
	ENVIRONMENTAL POLICY	Page 1 of 1

1.0 **Policy Statement**

Okomu Oil Palm Company (OOPC) recognizes the value, importance and necessity of sustainably managing its operations such that the present needs of society are met without compromising the ability of future generations to meet their own needs and enjoy the same resources we have today.

2.0 **Scope**

This policy applies to all employees contractors (including temporary contractors and third party staff) of OOPC.

3.0 **Guidelines**

OOPC is committed to minimizing the environmental impact of its operations and in implementing this policy will:

- Comply with all applicable environmental management laws and obligations; and other environmental requirements to which OOPC Subscribes.
- Implement and maintain an Environmental Management System across its global operations, conforming to the requirements of ISO 14001, as well as other relevant external certifications criteria and OOPC Standard Operating Procedures and Best Practices.
- Achieve continuous environmental improvement with objectives and targets so as to minimize our environmental footprint.
- Minimize or prevent land, air and water pollution through reduced use of chemical resource conservation, waste reduction, recycling and reuse and proper waste disposal in every area of activity.
- Prevent soil erosion and degradation through adoption of best practice in agricultural management.
- Minimize impacts on biodiversity across all aspects of our operations.
- Communicate and promote this Environmental Policy with the aim of ensuring that both employees (at all levels and functions of the organization) and business partners (including suppliers, contractors, joint venture partners and smallholders) are aware of the environmental impacts of OOPC activities as well as their individual obligations.
- Educate and train employees on environmental aspects, impacts, risks and opportunities peculiar to their jobs and related issues; and encourage their participation and cooperation to minimize adverse impact and protect the environment.
- Support our joint venture partners and smallholders to adopt and implement our environmental commitments.
- Periodically review this Environmental Policy to ensure it remains relevant and applicable to our business.
- Implementation of our GHG Emission Reduction Policy.
- HSE Manager shall ensure this policy is implemented

4.0 **Record of Approval**

Task	Name/signature	Job title	Date
Approved by	**Dr. Graham Hefer**	**Managing Director**	21 MAY 2021

MANAGING DIRECTOR OOPC DR. G. HEFER

1.0 **Policy Statement**

Okomu Oil Palm Company is committed to providing a safe and healthy working environment for our workers and stakeholders. We believe that all incidents and occupational illnesses are preventable, and we will work relentlessly to improve our safety performance towards zero incidents.

This requires us to work towards ensuring that we take all practicable steps to protect people involved in OOPC operations from harm. Our goal is to send everyone home safely every day.

2.0 **Scope**

This policy applies to all employees contractors (including temporary contractors and third party staff) of OOPC.

3.0 **Guidelines**

This policy can be done by:

- The ongoing implementation of our Integrated Management System Policy.
- Development and implementation of Minimum Standards for Safety, Environment and Process Safety.
- Ongoing development of the global IMS reporting platform and the continued development of an open reporting culture, which includes but not limited to protection of workers from reprisals when reporting incidents, hazards, risks and opportunities.
- Seeking continuous improvement to health and safety performance through setting annual objectives, targets, KPIs and focus areas, measurement of progress against our goals and communication to our stakeholders.
- Running an internal audit program and expanding existing audit programs.
- Commitment to provide safe and healthy working conditions for the prevention of work-related injury and ill health and which is appropriate to the purpose, size and context of OOPC, and to the specific nature of its OH&S risks and OH&S opportunities, while engaging our people to build and maintain a safe workplace.
- Development and delivery of training and education material to improve workers skills and awareness of IMS requirements and practices.
- Adhering to workers' complaints, and giving workers the ability to remove themselves from work situations that they consider present an imminent and serious danger to their life or health (with verifiable evidence, such as a certified medical practitioner's report), as well as the arrangement for protecting them from undue consequences for doing so.
- Complying with all local and national legislations, and other requirements.
- Investigate all incidents to the root cause and make Corrective and Preventive Action Plans to avoid reoccurrence.
- Commitment to eliminate hazards and reduce OH&S risks through conducting periodical risk assessments and job hazard analysis to discover what is likely to harm employees.
- Regular monitoring of PPE compliance.
- Commitment to consultation and participation of workers.
- Commitment to recognize potential emergencies situations such as sudden catastrophes like, fire, chemical spill, security threat, electric shock, medical situations and flood; developing a plan, GP 12 to address with them. These emergencies are caused by Human error and Natural forces.

This policy is to be read in conjunction with the:

- Hazard Identification and Assessment of Risk and Opportunity – GP 08
- Environmental Policy
- Incident and Hazard Reporting- GP18
- Safe Work Permit- GP20
- Boiler Room Operation- GP29 & GP 51 (Oil mill and Rubber factory)
- Emergency Preparedness and Response- GP12

4.0 **Responsibility**

- The HSE Manager shall ensure implementation and monitoring of this policy.

5.0 **Record of Approval**

Task	Name/signature	Job title	Date
Approved by	**Dr. Graham Hefer**	**Managing Director**	

MANAGING DIRECTOR OOPC 13 JUL DR. G. HEFER

1.0 **Policy Statement**

Training and development make OOPC a more effective organization. In pursuance of Employee's development and performance, the company shall continually strive through training and developmental programmes to update the skills and competencies of staff, as identified and deemed necessary within budgetary constraints.

As a general rule, employees cannot reject nomination to any training that he/she has been so nominated for. Failure to attend a training program, when nominated, will be classified as a dereliction of duty and will, accordingly, be treated as such.

2.0 **Objective**

The objective of the company's policy on training and development is to redress behavioural and skills deficiencies inherent in employees as a prelude to improvement in the employee's job performance.

3.0 **Scope**

This policy is applicable to the company's Board, audit committee members, all company staff, contract staff, contractors, and third party contractors of OOPC.

4.0 **Definition**

Training and Development: Is any activity designed to help individuals become more effective at their work place by improving, updating or refining their knowledge and skills, in areas where a problem has been identified. It encompasses a range of activities, for example, involvement in various projects, attendance of training courses, conferences or seminars, visit to other institutions, work shadowing, formal studying, coaching and monitoring.

5.0 **Types of Training**

5.1 Inplant – where the problem is pervasive i.e. it cuts across many employees involved in a specific activity or in the company, then the company will address such a problem with inplant training

5.2 External – where the identified problem to be addressed through training is peculiar to very few employees involved in action, or where it is impossible to hold a specific training within the company's premises due to non availability of training instruments or trainers, such training will then be held outside the company premises.

6.0 **Guidelines**

- OOPC is committed through its performance review process and introduction of new concepts, to the creation of training and development opportunities for all employees, and will work to ensure equality of opportunities across all training and development activities.
- OOPC's approach to the provision of training and development is to consider the developmental needs that have been identified, and how these needs should be met.
- All request for training must be document on training request form.
- Equal opportunities to access training will be given to all employees, and this shall be monitored specifically via the implementation of OOPC's Equal opportunity and no discrimination policy.
- Employees are sent a training invitation by the HR, after they have been nominated for training by their HOD.
- OOPC will monitor and evaluate training and developmental activities of all participants, including asking feedback from participants on the value and effectiveness of the training they undertake so as to continually assess and improve the training process. All staff, contractors and third parties are expected to participate in the evaluation of their training and development.
- Training shall be funded by OOPC.
- The Head of Human Resource Department will endeavor to ensure that training is delivered only by people who are competent and qualified to do so.
- Individual training records will be kept securely and centrally in each staff member's file in the Human Resources Department of the company.
- The Human Resource Department will be responsible for the production of an annual Staff Training & Development Programme, which will be based on a review of both the individual staff training needs and that of staff team training needs.
- This policy will be communicated to all company staff, contract staff, the company's Board, audit committee members, contractors and third parties(as per OOPC communication procedure GP[illegible])

7.0 **Record of Approval**

Task	Name/signature	Job title	Date
Approved by	Dr. Graham Hefer	Managing Director	2

MANAGING DIRECTOR OOPC DR. G. HEFER

1.0 **Objective**

OOPC does not condone the use of any child labour in any form whatsoever, by any person, company or institution, as defined in the International Labour Organization's Convention on Child Labour, and in the Nigerian Labour Act.

2.0 **Scope**

This policy is applicable to all employment processes in OOPC, contractors, and third party contract workers, or any company and/or institution that do business with OOPC.

3.0 **Definitions**

Child Labour: is defined as the employment of a child in business or industry in violation of Nigerian Federal statutes prohibiting the employment of children under a specified age. The Nigerian Labour Act 2004, as amended, classifies a child as a 'young person' under the age of fifteen (15) years.

4.0 **Guidelines**

- OOPC shall always comply with all relevant and applicable National labour regulations and principles relating to the protection, welfare, health and safety of children. In this regard, the company recognizes the negative effect of Child labour, which can persist to affect children during their life time, to include the following;
  - lack of schooling, and opportunity for higher education for older children, results in missing educational and higher qualifications, respectively, and higher skills thus perpetuating their life in poverty;
  - general child injuries and abuses like cuts, burns and lacerations, fractures and tiredness;
  - children might be exposed to sexual abuse, particularly sexual exploitation of girls by adults, rape, early sex and unwanted pregnancy, abortion, Sexually Transmitted Diseases (STDs) and HIV/AIDS, drugs and alcoholism
  - physical abuse that involve corporal punishment, emotional maltreatment such as blaming, belittling, verbal attacks, rejection, humiliation and bad remarks.
  - emotional neglect such as deprivation of family love and affection, resulting in loneliness, and hopelessness,
  - physical neglect like lack of adequate provision of food, clothing, shelter and medical treatment.
  - competition of children with adult workers leads to depressing wages and salaries.
- Therefore, no person deemed to be a child, as defined herein, shall be employed on any OOPC sites of operations.
- Furthermore, OOPC shall ensure that all contractors, companies and or organizations of any kind engaged by OOPC on the premises strictly abide by this policy.
- OOPC shall comply with the Child's Rights Act of Nigeria (2003), as amended, to ensure the protection of all children against all forms of abuse, and the Employment Rights Act of Nigeria (2004), as amended, which prohibits the employment of any persons aged below 16. OOPC also, subscribes to the Education Act (2004) of Nigeria, as amended, which provides for compulsory education of all children up to the age 15. Article 3 of International Labour Organization (ILO) Minimum Age Convention 1973 (No. 138), states that the minimum age for admission to any type of employment or work which by its nature or the circumstances in which it is carried out is likely to jeopardise the health, safety or morals of young persons shall not be less than 18 years. **Therefore, due to the various stipulations between Nigeria Labour law and ILO, the minimum age for employment in OOPC is 18.**
- If a worker below 18 is found to be working, the activity the worker is carrying out will be stopped, the worker will be sent home and the contractor whom the worker works for will face appropriate disciplinary action.
- If employment is temporary, such as an educational internship, apprenticeship etc. OOPC may, at its sole discretion consider such employment that in some cases involve young persons between the ages of 15 years and 18 years.
- A suspected under age worker is required to present affidavit of aged declaration done in a court of law or birth certificate for age verification.
- HR Department shall ensure proper implementation and monitoring of this policy.
- This policy will be communicated to all workers, staff, contractors, third parties, visitors and suppliers, or anyone who does business with OOPC (as per OOPC communication procedure GP10).

5.0 **Record of Approval**

Task	Name/signature	Job title	Date
Approved by	**Dr. Graham Hefer**	**Managing Director**	

MANAGING DIRECTOR
OOPC
28 JUN 2024
DR. G. HEFER

1.0 **Policy Statement**

Okomu Oil Palm Company (OOPC) adheres to a strict zero burning policy, which is enforced by all means, agriculturally, economically and/or socially (see Clause 6.0 for Policy Exception). This is in line with OOPC's commitment to following environmentally friendly practices and is also in accordance with Socfin's Responsible Management policy and sustainability principles.

2.0 **Objective**

This policy is aimed towards combating air pollution and is a pledge by the company to actively assist government's efforts to reduce greenhouse gas (GHG) emissions that have become a major factor in global climate changes.

3.0 **Scope**

This policy is applicable to all stakeholders actively engaged in OOPC's land clearing and preparation processes for all new developments as well as future replanting.

4.0 **Definition**

Zero burning: a method of land clearing whereby the tree stand is felled, shredded, stacked and/or left in situ to decompose naturally.

5.0 **Guidelines**

OOPC is committed to:

- Complying with all international and national legislation and RSPO national interpretations.
- A ban on the use of fire in land clearing (see Clause 6.0 for Policy Exception).
- Implementing the zero-burning policy on new plantings or replanting of oil palm/rubber.
- The provision of forest and fire management plans such as Fire Management Meetings & Fire Surveillance.
- Safeguarding OOPC's plantations against fire risks using fire hazard monitoring and management processes such as daily patrols during dry seasons/briefings and maintaining a competent firefighting team that is equipped with up-to-date fire-fighting equipment and proper skills through regular trainings and fire drills.
- Strictly applying this policy to waste management where all felled palms/rubber are left for biomass reuse.
- Continually channeling resources towards the prevention, management and suppression of fires from both inside and outside of the company's plantations.
- Communicating this policy to both employees and contractors, highlighting that any non-compliance may result in termination of employment or contracts. Efforts will be made to communicate this policy to the surrounding communities/farmers.

5.1 **Mechanical Clearing**

The following steps are to be taken to ensure proper implementation of this policy.

- Trees are to be directionally felled and stacked using excavators and/or bulldozers.
- The felled trees are stacked between the rows of re-plantings on flat or undulating terrain. On hilly areas, they are spread out evenly on the lips of planting terraces which will be opened when the slopes are above 6°.

The management and staff shall be trained and made aware that the zero burn policy should be adhered to.

The Palm Agriculture Coordinator, Rubber Agriculture Coordinator and HSE Manager shall implement and monitor this policy.

6.0 **Policy Exception**

OOPC will consider burning only as a last resort for the control of diseases such as Fomes in rubber. In such cases, burning will be limited to root disease infected or susceptible areas. Pictorial evidence (prior to burning) of the infections and/or presence of predisposing factors such as heaps of vulnerable soft wood biomass will be collected to substantiate the need for minimal burning. Organic matter will be retained on the ground as much as possible. In the case of a change in land use, such as the replanting of rubber to oil palm and with due consideration to clause 4.5.4 of the Guidelines for Implementation of ASEAN Policy on Zero Burning, 2003, the incidence of rodents, pests like *Oryctes* and pathogens like *Ganoderma* will be checked. If there is any need for use of fire, a decision will be taken by all the management staff, responsible for implementing this policy, after weighing the pros and cons with sufficient documentation.

7.0 **Record of Approval**

Task	Name/signature	Job title	Date
Approved by	**Dr. Graham Hefer**	**Managing Director**	

MANAGING DIRECTOR
OOPC
2 OCT 2017
DR. G. HEFER

1.0 **Policy Statement**

Okomu Oil Palm Company PLC (OOPC) embraces Corporate Social Responsibility (CSR) and will actively look for opportunities to improve our working environment and contribute to the wellbeing of the communities in which we operate. Our corporate social responsibility approach is driven by our values and mission with the objective to create and promote behavior that generates value to all interested stakeholders in the context of a socially responsible culture that is reflected in the development of a sustainable tropical oil palm company.

The following policies contribute to our corporate social responsibility commitment: Bursary Policy, Code of Ethics Policy, Environmental Policy, Human Rights Policy and Workplace Health and Safety Policy.

2.0 **Scope**

This policy is applicable for all activities and projects aimed at the environment, human rights, economic, stakeholder engagement (and philanthropy, during pandemics or environmental disasters) and is implemented for all stakeholders, especially neighboring communities and our employees.

3.0 **Definition**

CSR is a continuing commitment by business to behave ethically and to contribute to economic development while improving the quality of life of the workforce and their families as well as of the local community and society

4.0 **Guidelines**

OOPC commits to:

- Operate ethically in an environmentally sustainable way and to include concern for societal, environmental, legal, cultural, and organizational diversity, as well as differences in economic conditions, in all our activities and decision making.
- Execute our mission through developing strong relationships with communities, workers, partners, organizations and individuals which are conducted with integrity and courtesy, and by ensuring that we honour our commitments.
- Comply with all applicable international & national laws and legislation. Where no legislation exists, OOPC will seek to adhere to best management practices, subscribed sustainability certifications and applicable principles of ISO 26000:2010 viz: Accountability, Transparency, Ethical behavior, Respect for stakeholder interests, Respect for the rule of law, Respect for international norms of behavior and Respect for human rights.
- Establish a CSR strategy embedded in the CSR Procedure (See GP 35) taking into account the perspectives and interests of stakeholders, priority areas, timeline for implementation, responsible staff/committee/partners, their roles and process for reviewing and assuring outcomes of the CSR of OOPC.
- Respect our staff and actively promote their welfare, engagement and empowerment.
- Clearly train and sensitize all interested stakeholders on the CSR strategies.
- Measuring, reporting and improving our CSR performance by setting applicable targets, developing and implementing specific environmental and social policies and procedures based on each CSR thematic areas.
- Communicating this CSR policy, strategies, mechanisms, objectives, actions and performance transparently to all interested stakeholders.
- Periodically review and evaluate the social, economic and environmental impacts of our CSR projects.
- Reviewing this policy annually, or following significant changes to our business practices, to ensure that our commitment to environmental responsibility, the communities, and our ethical policies are addressing current issues and are as proactive as possible.

The Managing Director will have ultimate responsibility for CSR management within the Company and will be responsible for the provision of advice and guidance on all CSR matters.

5.0 **Record of Approval**

Task	Name/signature	Job title	Date
Approved by	Dr. Graham Hefer	Managing Director