



Environmentally Sound Management & Disposal of PCBs, and PCB Containing Equipment Project

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN [ESMP] FOR THE SHEDA POLYCHLORINATED BIPHENYLS ANALYTICAL LABORATORY



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TABLE OF CONTENTS

LIST OF FIGURES	8
LIST OF TABLES	9
ESMP PREPARATION TEAM	10
ABBREVIATIONS AND ACRONYMS	11
EXECUTIVE SUMMARY	13
BACKGROUND INFORMATION	13
NEED FOR ESMP	13
PROJECT DESCRIPTION	14
Project Activities	14
Project Wastes	16
BIOPHYSICAL AND SOCIAL CHARACTERISTICS OF THE ENVIRONMENT	17
PHYSICAL ENVIRONMENT	17
Climate and Meteorology	17
Ambient Air Quality	17
Noise 18	
Topography.....	18
Soil Quality and Land use.....	18
BIOLOGICAL ENVIRONMENT	18
Floral Diversity	18
Faunal Diversity	18
Plankton Diversity at Sheda	19
Alien/Invasive Species	19
Conservation Status of Flora and fauna Species	19
HUMAN ENVIRONMENT.....	19
General Characteristics.....	19
Socio Economic Status of Population Affected by the Project	21
STAKEHOLDER CONSULTATIONS.....	21
ENVIRONMENTAL AND SOCIAL IMPACTS.....	22
Air Quality	22
Noise 	23
Soil 	23
Water Resources.....	23
Terrestrial flora and Fauna	23
Occupational Health and Safety	24
Infrastructure.....	24
Employment and Economy.....	24
MITIGATION MEASURES.....	24

Air Quality	24
Noise	25
Soil	25
Occupation Health, Safety	25
Employment and Economy.....	25
ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN	26
Institutional Frameworks for Implementation	26
GRIEVANCE MECHANISMS	26
1.0 BACKGROUND INFORMATION	28
1.1 PROJECT BACKGROUND.....	28
1.2 THE NEED FOR ESMP.....	28
1.3 PROJECT DESCRIPTION.....	29
1.3.1 Project Activities.....	30
1.3.2 Project Wastes.....	33
1.4 ADMINISTRATIVE AND LEGAL FRAMEWORK	35
1.4.1 National Environmental Policy	36
1.4.2 National Energy Policy.....	36
1.4.3 National Land Policy	36
1.4.4 National Social Protection Policy.....	36
1.4.5 National Gender Policy.....	37
1.4.6 The Environmental Impact Assessment (EIA) Act Cap E12 LFN, 2004	37
1.4.7 Land Use Act of 1978.....	37
1.4.8 Electric Power Sector Reform Act No. 6, 2005.....	37
1.4.9 National Environmental Standards & Regulations Enforcement Agency (NESREA) Act, 2007.....	38
1.4.10 Other National Laws and Regulations	38
1.4.11 World Bank Environmental and Social Standards	39
CHAPTER TWO	40
2.0 BIOPHYSICAL AND SOCIAL ENVIRONMENT	40
2.1 GENERAL	40
2.2 PHYSICAL ENVIRONMENT	40
2.2.1 Climate and Meteorology.....	40
2.2.2 Ambient Air quality	41
2.2.3 Noise.....	41
2.2.4 Topography	41
2.2.5 Soil Quality and Land Use	42
2.3 BIOLOGICAL ENVIRONMENT.....	43
2.3.1 Floral Diversity.....	43
2.3.2 Faunal Diversity	43
2.3.3 Plankton Diversity at Sheda	43
2.3.4 Alien/Invasive Species	43
2.3.5 Conservation Status of Flora and fauna Species	43

2.4	HUMAN ENVIRONMENT	43
2.4.1	General Characteristics	43
2.4.2	Socio Economic Status of Population Affected by the Project.....	49
CHAPTER THREE		50
3.0	STAKEHOLDER CONSULTATIONS.....	50
3.1	REQUIREMENTS FOR STAKEHOLDER ENGAGEMENT	50
3.1.1	National Requirements	50
3.1.2	International Requirements	50
3.2	STAKEHOLDER'S ENGAGEMENT ACTIVITIES	51
3.3	FIRST ROUND CONSULTATIONS.....	53
3.4	SECOND ROUND CONSULTATIONS	54
3.5	THIRD ROUND CONSULTATIONS.....	55
4.0	ENVIRONMENTAL AND SOCIAL IMPACTS	59
4.1	INTRODUCTION.....	59
4.2	IMPACT ASSESSMENT METHODOLOGY	59
4.2.1	Nature/Type of impacts	60
4.2.2	Assessment of Significance	61
4.3	AIR QUALITY	63
4.3.1	Pre-Construction/Installation phase	63
4.3.2	Installation phase	64
4.3.3	Operational phase	64
4.3.4	Decommissioning phase.....	65
4.4	NOISE	65
4.4.1	Pre-Construction/Installation phase	65
4.4.2	Installation phase	66
4.4.3	Operational phase	66
4.4.4	Decommissioning phase.....	66
4.5	SOIL	66
4.5.1	Pre-Construction installation.....	66
4.5.2	Construction and Installation phase	66
4.5.3	Operational phase	67
4.5.4	Decommissioning phase.....	67
4.6	WATER RESOURCES	67
4.6.1	Construction Phase.....	67
4.6.2	Operation Phase	67
4.7	TERRESTRIAL FLORA AND FAUNA	67
4.7.1	Construction Phase.....	67
4.7.2	Operation Phase	68
4.8	OCCUPATION HEALTH, SAFETY	68
4.8.1	Pre-Construction/Installation phase	68

4.8.2	Installation phase	68
4.8.3	Operation phase.....	68
4.8.4	Decommissioning phase.....	69
4.9	LABOUR AND WORKING CONDITIONS.....	69
4.9.1	Pre-Construction/Installation phase	69
4.9.2	Installation phase	69
4.9.3	Operational phase	69
4.9.4	Decommissioning phase.....	69
4.10	INFRASTRUCTURE	69
4.10.1	Pre-Construction/Installation phase	69
4.10.2	Installation phase	69
4.10.3	Operation phase.....	69
4.10.4	Decommissioning phase.....	70
4.11	EMPLOYMENT AND ECONOMY	70
4.11.1	Pre-Construction/Installation phase	70
4.11.2	Installation phase	70
4.11.3	Operational phase	70
4.11.4	Decommissioning phase.....	70
4.12	SUMMARY OF IMPACTS	70
CHAPTER FIVE		74
5.0	MITIGATION MEASURES	74
5.1	INTRODUCTION.....	74
5.2	MITIGATION METHODOLOGY.....	74
5.2.1	Definition of Mitigation Measures	74
5.2.2	Assessing Residual Impacts	75
5.3	AIR QUALITY	75
5.3.1	Pre-Construction/Installation Phase	75
5.3.2	Installation phase	75
5.3.3	Operation Phase.....	75
5.3.4	Decommissioning phase.....	76
5.4	NOISE	76
5.4.1	Pre-Construction/Installation phase	76
5.4.2	Installation phase	76
5.4.3	Operational phase	76
5.4.4	Decommissioning phase.....	77
5.5	SOIL	77
5.5.1	Pre-Construction/Installation.....	77
5.5.2	Installation phase	77
5.5.3	Operational phase	77
5.5.4	Decommissioning phase.....	78
5.6	OCCUPATION HEALTH, SAFETY	78
5.6.1	Pre-Construction/Installation phase	78

5.6.2	Installation phase	78
5.6.3	Operation phase.....	78
5.6.4	Decommissioning Phase.....	79
5.7	LABOUR AND WORKING CONDITIONS.....	79
5.7.1	Pre-Construction/Installation phase	79
5.7.2	Installation phase	79
5.7.3	Operational phase	80
5.7.4	Decommissioning phase.....	80
5.8	INFRASTRUCTURE	80
5.8.1	Pre-Construction/Installation phase	80
5.8.2	Installation phase	80
5.8.3	Operation phase.....	80
5.8.4	Decommissioning phase.....	80
5.9	EMPLOYMENT AND ECONOMY	80
5.9.1	Pre-Construction/Installation phase	80
5.9.2	Installation phase	80
5.10	SUMMARY OF MITIGATION MEASURES	81
5.11	ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN	91
5.11.1	General	91
5.11.2	EMP Objective	92
5.11.3	Sustainable Management of PCB Analytical Laboratory.....	92
5.12	STANDARD OPERATING PROCEDURES (SOP).....	94
5.12.1	General Health and Safety Information	94
5.12.2	General Laboratory Rules	95
5.12.3	Special Handling Procedures and Storage Requirement.....	95
5.12.4	Spill and Incident Procedures.....	96
5.12.5	Waste Disposal	96
5.13	ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN	98
5.14	ENVIRONMENTAL AND SOCIAL MONITORING PLAN.....	112
CHAPTER SIX		114
6.0	INSTITUTIONAL FRAMEWORK FOR IMPLEMENTATION.....	114
6.1	PROJECT MANAGEMENT UNIT (PMU)	114
6.2	FEDERAL MINISTRY OF ENVIRONMENT	114
6.3	ABUJA ENVIRONMENTAL PROTECTION BOARD (AEPB).....	114
6.4	ABUJA GEOGRAPHIC INFORMATION SYSTEM (AGIS)	114
6.5	FCT DEPARTMENT OF DEVELOPMENT CONTROL	114
6.6	KWALI AREA COUNCIL.....	115
6.7	NGOS.....	115
6.8	CONTRACTORS.....	115

6.9	GRIEVANCE MECHANISMS.....	115
6.9.1	Customary Mediation.....	116
6.9.2	Regulatory Agencies.....	116
6.9.3	Courts of Law.....	116
CHAPTER SEVEN.....		117
7.0	PROJECT SCHEDULE AND BUDGET	117
7.1	IMPLEMENTATION SCHEDULE	117
7.2	ESMP IMPLEMENTATION BUDGET	119
ENVIRONMENTAL CLAUSES TO BE INSERTED IN EPC BIDS.....		121
ENVIRONMENTAL AND SOCIAL REQUIREMENTS		121
ENVIRONMENTAL ASPECTS IN THE SPECIAL REQUIREMENTS		121
BIBLIOGRAPHY		125

LIST OF FIGURES

Figure 1.1 Environmental and Social Management Methodology Used In the ESMP	29
Figure 2.1 Topographic map of the study area	42
Figure 2.2 Nigeria Age Structure by Sex	46
Figure 2.3 Gender and Age Group Distribution	46
Figure 2.4 Ruling Succession in Sheda	49
Figure 3.1 Meeting with Sheda Community Leaders.....	53
Figure 3.2 Second Round Stakeholders Meeting in Kwali LGA.....	54
Figure 3.3 Third Round Stakeholders Meeting in Dennis Hotel.....	57
Figure 3.4 Third Round Stakeholders Meeting in Dennis Hotel no 2.....	57
Figure 5.1 Interrelationship between Social and Environment Aspects of the ESMP.....	91
Figure 5.2 Organizational Structure of the Lab Management.....	93
Figure 6.1 Grievance Resolution Procedure	116

LIST OF TABLES

Table 1.1	Expected waste streams	34
Table 2.1	Respective Responsibilities for Tiers of Government.....	44
Table 3.1	Schedule for Stakeholders Consultations	52
Table 3.2	Outcome of Stakeholder Consultations (Round 2).....	55
Table 3.3	Outcome of Stakeholder Consultations (Round 3)	57
Table 4.1	Definition of Impacts	60
Table 4.2	Overall Significance Criteria for Environmental Impacts.....	62
Table 4.3	Explanation of terms used for likelihood of occurrence	63
Table 4.4	Summary of Potential Impacts during Pre-Construction/Installation Phase	71
Table 4.5	Summary of Potential Impacts during Construction and Installation Phase.....	72
Table 4.6	Summary of Potential Impacts during Operation and Maintenance	72
Table 4.7	Summary of Potential Impacts during Decommissioning	73
Table 5.1	Summary Of Mitigation Measures (Pre-Construction/ Installation Phase).....	81
Table 5.2	Summary of Mitigation Measures During Installation Phase.....	84
Table 5.3	Summary of Mitigation Measures During Operation and Maintenance.....	85
Table 5.4	Summary of Mitigation Measures During Decommissioning.....	88
Table 5.5	OUTLAY OF MAJOR STAKEHOLDERS AND EXPECTED RESPONSIBILITIES.....	92
Table 5.6	Responsibilities and reporting lines.....	93
Table 5.7	Management Plan for Pre-Construction/Installation Phase	98
Table 5.8	Management Plan (Construction Installation Phase).....	102
Table 5.9	Management Plan (operational phase).....	104
Table 5.10	Management Plan for Decommissioning Phase.....	108
Table 5.11	Monitoring Plan (Construction/Installational Phase)	112
Table 5.12	Monitoring Plan (Operational Phase).....	112
Table 7.1	ESMP Implementation Schedule	118
Table 7.2	Cost Estimates for Implementation of the ESMP	119

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ABBREVIATIONS AND ACRONYMS

AEPB	Abuja Environmental Protection Board
BOD	Biological oxygen demand
CCDI	Central Commission for Discipline Inspection
COD	Chemical Oxygen Demand
COPE	Care for the People
DRG	Diagnosis Related Group
EA	Environmental assessment
ECEC	Effective Cation Exchange Capacity
EIA	Environmental Impact Assessment
ELV	Elevation
ESM	Environmentally Sound Management
ESF	Environmental and Social Framework
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Standards
FAO	Food and Agriculture Organization
FEPA	Federal Environmental Protection Agency (defunct)
GEF	Global Environment facility
ICNIRP	International Commission on Non-Ionizing Radiation Protection
ILO	International Labour Organization
ITCZ	Inter-Tropical Convergence Zone
ITD	Inter-Tropical Discontinuity
IUCN	International Union for Conservation of Nature and National Resources
LAT	Latitude
LONG	Longitude
MSW	Municipal Solid Waste
NABDA	National Biotechnology Development Agency
NAFDAC	National Agency for Food and Drug Administration and Control
NESREA	Nigerian Environmental Standards and Regulations Enforcement Agency
NIMET	Nigerian Meteorological Agency
NIP	National Implementation Plan
OAAAT	Optimal Available and Achievable Technology
OEEP	Optimal Environmentally Friendly Practices
PBB	Polybrominated biphenyls
PCB	Polychlorinated biphenyls
PCD	Polychlorinated dibenzofurans
PCDD	Polychlorinated dibenzodioxins

PCTs	Polychlorinated terphenyls
PEN	PCB Elimination Network
PMU	Project Management Unit
POPs	Persistent Organic Pollutants
POPs	Persistent Organic Pollutants.
QHSE	Quality, Health, Safety, Environment
SIEP	Shell International Exploration and Production
SPL	Sound Pressure Level
SHESTCO	Sheda Science and Technology Complex
PMU	Third Country National
TER	Toxicity Equivalency Factors
TOMPs	Toxic Organic Micro Pollutants
ToR	Terms of Reference
UNDP	United Nation Development Programme
UNEP	United Nation Environment Programme
UNFCCC	United Framework Convention on Climate Changes
UNIDO	United Nation Industrial Development Organization
WB	World Bank
WHO	World Health Organization
PAP	Project Affected Persons
PPE	Personal Protective Equipment
ALARP	As Low As Reasonable Practicable

EXECUTIVE SUMMARY

BACKGROUND INFORMATION

Polychlorinated Biphenyls (PCBs) are among the most toxic Persistent Organic Pollutants (POPs) listed in the Stockholm Convention. PCBs have been used in almost all sectors of the Nigerian economy as coolants and insulating fluids in transformers and capacitors in electricity generation, transmission and distribution; in flexible coatings of electrical wiring and components. PCBs are seen as a threat to public health and the environment. The Stockholm Convention is a global treaty ratified by the international community and led by the United Nations Environment Programme (UNEP) that calls for the elimination and/or phasing out of 12 POPs, called the "*dirty dozen*". However, to neutralize this threat, Nigeria joined the global community in negotiating and ratifying the Stockholm Convention on POPs which obliges parties to eliminate the use of PCBs in equipment by 2015, and to make concerted efforts for disposing liquid PCBs and equipment through environmentally sound waste management practices as early as possible, but no later than 2028. Nigeria submitted its National Implementation Plan (NIP) in 2009 listing twenty-three areas of action as priorities for meeting its treaty obligations. The priorities included PCB inventory and treatment (priority number one) and PCB disposal options.

The Environmentally Sound Management (ESM) of PCB-Project Management Unit, in collaboration with the United Nations Development Programme (UNDP) plans to establish three PCBs Collection, Storage and Treatment Centres, otherwise known as PCBs Interim Storage Facilities (PCB-ISF) in Neke Uno in Enugu State, Epe in Lagos State, and Sheda Science and Technology Complex (SHESTCO) along Abuja-Lokoja Expressway. The facilities are to be used for the safe collection, storage and treatment of PCB oil and PCBs-contaminated equipment identified in the course of the national PCBs inventory in Nigeria.

An analytical laboratory that would serve the three centers shall be established within the SHESTCO facility in Sheda, Abuja. The proposed laboratory will perform the following activities:

- Receiving, handling and storage of PCB oil, PCB wastes and PCB contaminated materials;
- Chemical Analysis of liquid, solid and gas samples containing PCBs;
- Handling of liquids, solids and gases used as reagents, solvents and carrier elements in the analysis of solid, liquid and gaseous samples.
- Decontamination of minor chemical laboratory equipment containing PCBs components;

Dedicated laboratory equipment and instruments will be acquired and installed. The personnel carrying out these activities shall be properly trained to minimize risks of incidents or accident that negatively impact the environment and human health.

NEED FOR ESMP

The Environmental and Social Management Plan (ESMP) identifies specific objectives and the management measures to be implemented to ensure the optimal environmental and social sustainability of the PCB Analytical Laboratory Project. This will ensure health and safety of workers, adjacent communities, facilities being used, safeguard the environment and ensure compliance with applicable national laws and regulations.

The ESMP clearly attributes all roles, responsibilities, and intervention areas to adequately identify and manage negative impacts on workers, on communities and on the environment within the project area and in its surroundings. The ESMP includes a summary of environmental and social impacts, a description of management measures, specific management plans as well as a monitoring system for the environmental and social performance, in an objective of continuous adaptation and improvement.

PROJECT DESCRIPTION

The project involves installation of laboratory equipment, systems and machines employment/training of personnel, registration with relevant regulatory agencies and operation of the facility. Laboratory operations shall involve

- Receiving, handling and storage of PCB oil, PCB wastes and PCB contaminated materials;
- Temporal storage of PCB oil, PCB wastes and PCB contaminated materials,
- Analytical testing of PCB materials/chemical analysis of liquid, solid and gas samples containing PCBs;
- Handling of liquids, solids and gases used as reagents, solvents and carrier elements in the analysis of solid, liquid and gaseous samples.
- Decontamination of chemical laboratory equipment containing PCBs components;
- Handling of hazardous waste after analysis and treatments and
- Storage/disposal of treated PCB materials.

Project Activities

Pre-Construction/Installation activities

The Pre-Construction/Installation activity includes the engineering, procurement and construction, transportation of equipment and auxiliary components to the laboratory site in Sheda.

Installation Phase

This phase involves the construction works, installation of gas system, smoke/fire detecting system, water system, waste management system, Gas Liquid Chromatography (GLC) machine as well as the installation of libraries that will be used in the analytical and treatment processes of the Lab during the operational phase.

Operational Phase

Capacity building: Activities under this component include a comprehensive review of current hazardous waste management regulations, and the development and incorporation of the regulatory framework that will specifically address PCBs. The component will also address the issue of training and awareness (including stakeholders workshop), and will involve the preparation and dissemination of training materials including TV programmes/documentaries, posters and the production of brochures/pamphlets for the purpose of raising awareness on PCB issues.

Identification of PCB materials: Labelling of containers with the correct name and description of the contents is essential in order

- To correctly identify the material for purpose of recycling or recovery;
- To facilitate the correct emergency action in case of an accident;
- To ensure that the appropriate treatment and disposal methods are being used by the disposal contractor. Labelling of hazardous substances must be done according to SANS 10233.

Packaging: Prior to transportation it is advisable that the waste be packaged properly. SANS 10228 gives a full description of the various types of containers which can be used for the packaging and labelling of hazardous substances for transport purposes. This must be strictly followed.

Transportation of identified PCB materials: Hazardous waste generated at a particular site often requires transport to an approved treatment, storage, or disposal facility (TSDF). Because of potential threats to public safety and the environment, transport is given special attention by governmental agencies. In moving the contaminated equipment and its placement in storage before analysis, all due care shall be taken to prevent accidental release of PCBs to the environment.

Receiving/handling of PCB materials: This activity involves offloading, labelling and inventory, on arrival to site. All equipment having the potential of being contaminated with PCBs shall be labelled as soon as it has been offloaded.

Temporal storage of PCB oil and PCB contaminated materials and sampling: This facility holds the identified PCB waste oils and other materials temporally prior to analytical testing to determine which treatment regime to be adopted.

Analytical testing of PCB materials: Determination of presence and concentrations of PCB-contamination status of materials is by oil sampling analyses. This shall be carried out in the laboratory on receipt of contaminated equipment in the facility.

Treatment of PCB materials: It is advisable that the facility adopts retro filling method of equipment decontamination. This involves draining PCB-contaminated oil from a transformer and refilling it with a PCB-free insulating fluid.

Final storage of treated equipment: Decommissioned PCB-contaminated equipment or PCB-containing waste is transferred to an appropriate storage area /facility.

Decommissioning Phase

Hazardous Materials - Remove chemical, biological, and radiological agents prior to decommissioning. Numerous restrictions apply to the transfer of hazardous materials. Provisions of the EHS consultative assistance in the lawful transfer of these materials are stated in the Chapter one.

Removal of Stored Items - Remove all glassware, laboratory research apparatus, empty containers, and other equipment. Storage areas, cabinets, and fume hoods must be completely emptied prior to decommissioning.

Clean and Decontaminate – Clean and decontaminate all laboratory surfaces, including those in fume hoods, bio safety cabinets, and chemical storage areas. General cleaning and chemical decontamination can be accomplished by washing with warm, soapy water.

Inspection – Schedule decommission inspection with EHS and the Department representative is carried out. All deficiencies must be corrected before the laboratory can be certified as decommissioned.

Recordkeeping – Departmental office retains original Decommissioning Form, with one copy to the Lab Analyst, one copy to EHS, and one copy prominently posted in the decommissioned area.

Exceptions – In situations where it is impractical or unwarranted to remove all stored items, including chemicals, the department and Lab Analyst do agree to make exceptions to this requirement. Exceptions shall be documented on the exceptions page, signed by both parties, and posted with the Decommissioning Certification Form.

Project Wastes

The projected waste streams from the construction/installation, operational and decommissioning activities of the proposed laboratory facility are as follows;

- **Installation phase:** cartoons, nylons, electric cables, plastic pipes
- **Operation phase:** spent oil, gaseous emission, metal scrap, wires, wood, nylon/plastics, papers
- **Decommissioning phase:** spent oil, gaseous emission, machine parts, metal scrap, wires, wood, nylon/plastics, papers

The decomposable and organic components will be disposed at sites approved by AEPB by accredited waste management contractors. And the hazardous non-metallic components will be incinerated at the PCB treatment center, while the recyclable components will be decontaminated at the treatment center for reuse or recycle.

Health, Safety and Environmental Risk

Even with careful planning, there is a risk of a PCB spill that could lead to site, soil and/or water contamination and related costly remediation and liabilities during the decontamination process. If residual contamination in the decontaminated transformer is above 0.005% total PCB, then risk remains during the useful life of the transformer. The facility shall prepare a stand-alone job/site specific health, safety and environmental plan for such cases.

Electrical safety

There are significant health and safety risks associated with electricity while working with this equipment since most of the contaminated equipment are/is high voltage electrical equipment. PCB-contaminated equipment shall be disconnected from the electricity supply, and in the case of capacitors, fully discharged in accordance with the manufacturer's instructions, before moving it to storage or transport vehicle, commencing decontamination, or disposal activities.

Environmental considerations

The following environmental considerations are imperative

- Spill cleanup kits should be present in all areas containing PCBs;
- Should any spillage of PCBs occur, this must be contained with absorbent materials, which should be placed in steel drums for subsequent disposal;
- Drained transformers may be stored as is, or may be placed inside a large container (over-pack drum) or heavy plastic "wrap" if leakage is a concern;
- Equipment and drums should be securely strapped to the pallets prior to movement.

BIOPHYSICAL AND SOCIAL CHARACTERISTICS OF THE ENVIRONMENT

The prevailing ecological conditions of the environment within which the proposed project will be sited, as well as the socio-economic and health profiles of the affected settlements are presented in chapter two.

PHYSICAL ENVIRONMENT

Climate and Meteorology

The site in Sheda in the FCT is characterized by two distinct conditions of wet and dry seasons, while the wet season occurs between April and October with a brief break in August, and the dry season occurs between November and March.

Rainfall

The rainfall within the study area for the period measure, ranged from 10mm to 283mm while an annual mean of 162mm was obtained. Rainfall distribution was observed to be highest in the month of July and Sept and lowest in November to February.

Temperature

An average temperature of 25⁰c was obtained for the study area as recorded by the Nigerian Meteorological Agency (NIMET) with April and August having the highest and least temperature values respectively.

Sunlight

Data obtained from NIMET indicates an intense value for the site, with November and December having an average sunshine of 9h while months with least sunshine are July and August. The sunlight hours per day is seen to be lower (ranging between 5 and 6) between the month of June and September.

Wind Speed

Wind speed for the proposed study area was observed to be highest in the months of March and August while lowest was observed in the month of December and January.

Wind Direction

Data obtained from NIMET revealed that south westerly wind direction is prevalent in the study area throughout the year (NIMET, 1990-2018). However, during dry season, winds are distributed in all directions, but predominantly South-Southwest direction during the raining season.

Relative Humidity

Relative humidity was highest in the month of August with a maximum value of 85%. However, the lowest value was observed during November to January.

Ambient Air Quality

Suspended particle matter ranges between 0.18 and 0.19 mg/m³ during rainy season and 0.19 to 21mg/m³ during dry season. And both seasons are within the WHO/FMEnv regulatory limits.

Carbon monoxide (CO), Sulphur dioxide (SO₂), Hydrogen chloride (HCl) and Nitrogen dioxide (NO₂) were not detected in the area.

Noise

There is no activity on the site within 1km that could affect noise levels. The measured noise levels during rainy season ranged between 56.1 and 58 dBA and 55.1 and 60.1 dBA during the dry season.

Topography

The proposed site located in Sheda (Kwali Area Council), off the Abuja-Lokoja Highway falls within the north central of Nigeria. The topography in Sheda is mainly characterized by a gentle slope of about 20 towards the south western direction, belonging to the north central Nigerian Basement Complex. On the average the recorded average altitude of the area is 198m above sea level.

Soil Quality and Land use

The Kwali Area Council consists of gently undulating high plains developed on basement complex rocks that comprised of undifferentiated granite, migmatite and granite gneiss. Inselbergs of older granites and low hills of schists rise conspicuously above the plains (Ojanuga, 2006). A wide range of crops are grown within the area and consists of cassava, maize, millet, groundnut, sorghum and rice (Ojanuga, 2006). The soils were generally well drained and situated along level to nearly level slope (0 –2%).

Physical Properties: The content of sand ranged between 440 and 560 gkg-1 in the soils. The content mostly increased from surface to subsurface horizon, except at sampling point B where there was a decrease in sand content with increase in soil depth. Silt values ranged between 150 and 260 gkg-1 and there was no clear trend of silt distribution between surface and subsurface horizons

Chemical Properties: Soil pH ranged between 5.68 and 6.19 and rated as moderately to slightly acid (Soil Science Division Staff, 2017). The values of pH were found to be within optimum range of most nutrient availability for crop production.

BIOLOGICAL ENVIRONMENT

Floral Diversity

Sheda is a diverse site in terms of floral diversity). A total of 292 floral species were observed. Though, there was lot and active farming activities going on in the site, species under cultivation were found to include; *Panicumsumatrnse* (Little millet), *Zea mays* (Maize), *Sesamumindicum* (Sesame), Okra, Sorghum, Pepper, Groundnut, *Moringa*, Cassava, Sweet Potatoes and *Vignaunguiculate* (Beans).

Faunal Diversity

There were 19 different fauna species, though 17 were encountered in the demarcated area. *Turdusmerula* (Black bird) that usually fly in colony were the dominant species encountered. Though found on trees, but most likely under migration. Therefore 128 individuals were encountered when compared to Control site that recorded just 45 individual fauna. *Bos Taurus indicus* (cow) was observed to be grazing in the Control site and therefore recorded a highest distribution of 58%, which was followed by a stink bug 11%.

Plankton Diversity at Sheda

The site was unique with accessible upstream and downstream water bodies, which made the survey comprehensive for comparison. A total of 23 species of phytoplankton taxon was recorded during the survey. Though, *Spirogyra gracilis* recorded highest percentage distribution and the least recorded was *Oscillatorialimosa* 4.39%.

Alien/Invasive Species

Oryctolagus cuniculus and *Columba livia* were the only alien species censored in the area. On the other hand, no invasive species was recorded in the study area, as documented in the EIA report.

Conservation Status of Flora and fauna Species

Vitellariaparadoxa (Sheanut tree) was the only flora species of conservation interest in the study area. None was recorded for the fauna species.

HUMAN ENVIRONMENT

General Characteristics

Administrative Structure

Sheda is a town in Kwali Area Council in FCT. Kwali Area Council is headed by an Executive Chairman and supported by a vice Chairman. The Executive Chairman is sworn in by the Honourable Minister of FCT and he/she receives orders and is answerable to the Honourable Minister of FCT. Kwali has ten wards, with each of the wards having a Councillor each. The Councillors then choose among themselves their head, after they have been sworn in by the Executive Chairman. The chain of command is His Excellency, the President of Nigeria as the highest authority, followed by the Honourable Minister of FCT, then the Executive Chairman of Kwali Area Council and then the Councillors.

Federal Capital Territory (FCT) -Abuja

Abuja is the capital city of Nigeria, which was built mainly in the 1980s. It officially became Nigeria's capital on 12 December 1991, replacing Lagos. FCT is located in the North Central Nigeria. It occupies a land area of 7,753.9 km². The FCT has borders on the north with Kaduna State, on south-east with Nasarawa State, on the south-west by Kogi State and on the west by Niger state.

There are six Area Councils (Local Government Areas) -Abaji, Bwari, Gwagwalada, Kuje, Kwali and Municipal in the FCT. The Minister of the Federal Capital Territory is the administrative leader and is appointed by the President of Nigeria. The indigenous inhabitants of Abuja are the Gbagyi (Gwari) as the major language, Bassa, Gwandara, Gade, Ganagana, Koro etc. The Gwari people are the largest ethnic group in Abuja FCT and one of only few ethnic groups in Nigeria that have attempted to hold on tightly to their beliefs and traditions despite the rapid urbanization that has occurred on their land.

Demography

Population

Nigeria is the most populous country in Africa with a total population of 199,681,159 inhabitants in 2017, based on projections by the National Bureau for Statistics (NBS, 2017). This projection is based on the 2006 national population census using growth rates of 9.3% for FCT. The ages structure shows 16.1% are between 0-4 years, 14.3% (5-9 years), 22.1% (10-19 years), 25% (20-34 years, 16.1% (35-54 years), 3.2% (55-64 years) and 3.2% are 65 years and above (NBS, 2017). Similarly, the 2017 projected population for FCT is 3,911,492, with sex ratio for all States is 51% male and 49% female.

Education System and Literacy

Education in Nigeria is the shared responsibility of the federal, state and local governments. The Federal Ministry of Education plays a dominant role in regulating the education sector, engaging in policy formation and ensuring quality control. However, the federal government is more directly involved with tertiary education than it is with Secondary and Primary education, which is largely the responsibility of state (secondary). The Primary education is largely the responsibility of the Local Government.

Infant mortality and life expectancy

The survey published by NBS in 2015 showed that infant and under-five mortality rate has been declining steadily since 2004. For instance, infant mortality rate for Nigeria declined from 75 per 1,000 in 2008 to 61 per 1,000 live births in 2012 and down to 58 per 1,000 live births in 2014 (NBS, 2015). Infant mortality for the FCT is 40 per 1000. Life expectancy in the population of Nigeria was 56 years for females, 53 years for males, and 54 years for both females and males (NBS, 2013).

Migration

Migration has an important impact on demography in the FCT, which may have contributed significantly to the 9.3% population growth rate measured by the NBS. The FCT being a new city and administrative capital of Nigeria, experiences large influx of people, has been dubbed the fastest growing city in Africa.

Contentious Issues and Conflict Management

Contentious issues may arise in the study area due to perceived neglect, marginalization and/or appropriation of family, sub-group and/or communal benefits. Contentions may also arise out of perceived lopsided sharing of political patronage (positions, money, scholarship awards, development activities, etc), ceding or usurpation of communal rights to (by) stranger elements (in terms of job placements and contracts awards); usurpation of authority /infringement of rights/perpetuation of injustice (insults, thuggery/battery/or political opponent/bodily violation/forced abduction, and the likes. Any intentional or unintentional perceived misdemeanour may become contentious if not properly handled and quietly disposed of. The youth are always at the forefront of contentious issues and agitations for restoration of infringed benefits / rights.

Sheda Community

The community hosting the proposed laboratory are predominantly Gbagyi ethnic group. The community was founded on a river site populated with bamboo (known as Sheda in Gbagyi) after which it was named by Anize, the founder. Anize was the inaugural head (Etsu), reigning from 1875 to

1899. The throne was successively occupied by Etsu Zefu (1920 to 1933), Etsu Udu (1935 to 1944), Etsu Bwanba (1946 to 1968), Etsu Yeni (1969 to 1981) and Etsu Kizashi Landu (1983 to 2015).

Although the people of Sheda have been basically farmers they have, like other communities, been influenced by modern developments within, around and extended communities, leading to mixed occupations.

Socio Economic Status of Population Affected by the Project

Age groups <45-65 and <25-45 were 33% and 67%, respectively, made up of males only. All of them were married with one man to one wife.

Household sizes ranged between <1-10 and <11-20 are 39% and 45% respectively. The number of children ranged from <2-3, <1-3, <4-6 and <7-9 being 86%, 48%, 10% and 12% respectively constituted of 1.2:1 male: female ratio.

All the residents are educated to primary, secondary and university level with a distribution of 17%, 27% and 28% respectively. Average annual income bracket of individuals ranges from N1-249,999, N250,000-499,999, N500,000-1,499,999, N1,500,000-4,499,999 and N5,000,000 to above N10,000,000, and at 26%, 13%, 7%, 32% and 0%, respectively.

All adult residents live in their own houses. All the houses are bungalows. 75% have courtyards while 25% are single flats. In terms of specific and general infrastructures houses with pit toilets are 3.52%, toilets with water closet inside 5.63%, outside 4.23%, bathroom inside 4.23%, outside 5.63%, kitchen single outside 2.11%, shared outside 0.70%, kitchen inside 3.52%, fireplace inside 4.23%, fireplace outside 4.23%, electric cooker 1.41%, gas cooker 3.52%, kerosene stove 3.52%, freezer 3.52%, fridge 2.11%, GSM phone 5.63%, television 5.63%, radio/cassette player 2.82%, CD player 1.41%, satellite dish 1.41%, internet access 1.41%, video player 2.11%, air-conditioner 5.63%, fan 2.11%, car 8.45%, motor cycle 4.23% and bicycle 7.04%.

39% of the residents use the General Hospital, 16% patronize the Federal Medical Centre and the University Teaching Hospital, 10% patronize Dispensary, 3% patronize Pharmaceutical Chemist, 13% patronize Patent Medicine Store and 3% patronize Traditional Doctors/Herbs.

STAKEHOLDER CONSULTATIONS

Stakeholder engagement was based on the requirements of the national EIA Act as well as the World Bank's Environmental and Social Framework, 2016. The approach adopted is meeting with various stakeholder groups, which facilitated the informed participation of the stakeholders in the development of the ESMP.

Three rounds of consultations were conducted at key stages of the study. First stage is the environmental and social scoping (1st round), the presentation of results of ESIA for stakeholder input and validation (2nd round), and finally the presentation of measures in the ESMP for the analytical laboratory (3rd round). These meetings took place on the 25th October 2018, 5th March 2019 and 31st July 2019 respectively. In all the consultation rounds, presentation including maps and other illustration materials were first made, followed by comments and recommendations from stakeholders. Stakeholders such as traditional institutions, youths, relevant government agencies and NGOs were represented in all meetings. These include District Head of Sheda, representatives of the Etsu Kwali, Sheda Youths, Kwali Area Council, AEPB, NESREA,

Summary of the key comments by the stakeholders are as follows:

- The community expressed concern about the effect of the PCB on their health and requested that adequate measures should be put in place to protect them.
- requested employment for the youths during the construction stage of the project and after the project has commenced
- the community confirmed that SHESTCO paid compensation to their parents many years back but requested for additional compensation on the land.
- Are the necessary regulatory agencies involved in the building plan been contacted? The master plan should be checked to ensure the project can be situated in the proposed location.
- The oil should not be re-used as anti-termite because that cannot be considered as recycling/re-use instead it is as good as dumping the oil somewhere.
- AEPB has an approved site for waste recycling at industrial layout and the proponent should be consulted with AEPB to get a designated area for the disposal.
- AEPB should be a part of the monitoring team to ensure proper coordination.
- The air quality within the premises should be considered and air sensors should be installed to protect the safety of the workers
- The advantage of siting the project in an industrialized area is that the waste disposed might be useful to other industries located close to the project facility.
- Revegetation of the boundaries between the industries and the flood area should be considered.
- The labels should be in English language and the dialect of the community for proper communication.

ENVIRONMENTAL AND SOCIAL IMPACTS

The assessment of impacts passed through an interactive process involving the following four key elements:

1. Prediction of potential impacts and their magnitude (i.e., the consequences of the proposals on the natural and social environment);
2. Evaluation of the importance (or significance) of impacts taking the sensitivity of the environmental resources or human receptors into account;
3. Development of mitigation measures to avoid, reduce or manage the impacts or enhancement measures to increase positive impacts; and
4. Assessment of residual significant impacts after the application of mitigation and enhancement measures.

Air Quality

- **Pre-Construction/Installation phase:** Emissions from vehicles and equipment (SO_x, CO, NO_x, CO₂, PM). The overall Significance is predicted as Minor

- **Construction/Installation phase:** Installation of gas system, fire grid system and the GLC machine during the installation phase may give rise to flue gas. The overall Significance is predicted as minor.
- **Operational phase:** The movement of vehicles carrying PCB materials to the Lab will result in PM, SO_x, CO, NO_x, CO₂ emissions. Gas fumes may also be generated during analyses. The significance is predicted as Moderate.
- **Decommissioning phase:** decommissioning activities of gas system, fire grid system and the GLC machine may give emit fuel gas, in addition to emissions from vehicles and equipment (SO_x, CO, NO_x, CO₂, PM): significance is minor

Noise

- **Construction/Installation phase:** construction and installation activities are likely to temporarily increase background noise levels though minor significance.
- **Operational phase:** The operation of generator in case of power outage and installed machine during the operational phase is likely to raise the noise level to a minor significance.
- **Decommissioning phase:** decommissioning of machines and subsequent transportation of the dismantled materials is likely to raise the background noise level to a minor significance.

Soil

- **Construction and Installation phase:** Excavation for foundation and removal of vegetation as well as accidental oil/fuel spills from heavy construction machinery could contaminate soil, and the impact is **moderate**.
- **Operational phase:** Impacts from accidental spill of materials is likely to be minor.
- **Decommissioning phase:** Handling of hazardous wastes/materials could result in accidental spill on the soil. The impact is predicted to as Minor

Water Resources

- **Construction and Installation phase.** The closest water body to the site is a seasonal stream, about 1km from the site, which drains storm water from the site. Therefore, the impact on hydrogeology is considered to be minor.
- **Operational phase:** During operations phase, even a small amount of spill of PCB into open drainage system could result in significant impact on even the seasonal stream, particularly during rainy season.
- **Decommissioning phase:** same as construction

Terrestrial flora and Fauna

- **Construction and Installation phase** The Sheda site consists of sparse vegetation and a farmland, mostly of herbaceous vegetation, will experience fewer losses due to clearing. Hence, the impact significance is Minor.
- **Operational phase:** Noise generation during operation of the project is likely to affect the avifauna though with a minor significance.
- **Decommissioning phase:** same as construction

Occupational Health and Safety

- **Construction and Installation phase:** Accidents during construction works are likely to be minor based on the strict safety measures to be put in place.
- **Operational phase:** The laboratory analysts are likely to be exposed to chemicals during operations. This impact is predicted to be **Moderate**.
- **Decommissioning phase:** same as construction

Infrastructure

- **Construction and Installation phase:** Construction activities will require the use of roads, water and electricity as well as health care. The period for construction is expected to be less than 6 months, and considering size of the project, this impact is predicted to have negligible impact.
- **Operational phase:** The operational activities of the Lab will increase the electrical load of the area throughout the life span of the project. The impact is predicted as Moderate.
- **Decommissioning phase:** same as construction

Employment and Economy

- **Construction and Installation phase** short term construction jobs, particularly non-skilled will result in additional income for some community members, which is a positive impact.
- **Operational phase:** Operation of the lab would create employment and will reduce PCB contaminated materials and equipment in the country. The impact is Positive.
- **Decommissioning phase:** closure of the lab and decommissioning will result in loss of job which is a moderate significance.

MITIGATION MEASURES

Mitigation measures were developed to avoid, reduce, remedy or compensate for any negative impacts identified, and to create or enhance positive impacts. In this context, the term “mitigation measures” includes operational controls as well as management actions.

Impact prediction considers any mitigation, control and operational management measures that are part of the project design and project plan. A residual impact is the impact that is predicted to remain once mitigation measures have been designed into the intended activity.

Air Quality

The following measures shall be used to minimise impacts of emissions from vehicles and equipment engines. Therefore, the following mitigation measures are recommended.

- Maintain and operate all vehicles and equipment engines in accordance with manufacturers recommendations;
- Cover properly, loose transportable materials and keep top layers moist;
- Use covered trucks for the transportation of materials that release dust emissions; and
- Speed limits on-site of 25km/hr on unhardened roads and surfaces;
- Use appropriate Personal Protective Equipment (PPE) during handling hazardous materials.

Noise

Noise impacts shall be reduced by applying the following measures

- Use of temporary noise barriers for equipment (e.g. sound proofing walls around stationary power generating sources);
- Avoidance of dropping materials from height, where practicable possible;
- Maintenance and operation of all vehicles and equipment in accordance with manufacturers recommendations;
- Informing all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration;
- Restricting noisy activities (activities that can be heard in nearby communities) to day-time working hours.
- Blowing of vehicle horns should be minimised.

Soil

The following mitigation measures shall be followed:

- Implementation of effective site drainage in and around the lab area to allow for the directed flow of liquids off site.
- Removal of all water accumulation within bounds using manually controlled positive lift pumps and gravity drains;
- Regular checking and maintenance of all plant and equipment to minimize the risk of fuel or lubricant leakages;
- Training of relevant staff in safe storage and handling practices, and rapid spill response and clean-up techniques;

Occupation Health, Safety

The following mitigation measures shall be applied:

- Maintenance and operation of all vehicles and equipment engines in accordance with manufacturer's recommendations;
- Enforcement of speed limits on-site to 25km/hr on unhardened roads and surfaces;
- Ensuring compliance on PPE usage;
- Training of workers and drivers on vital road signs;
- Switching off of all electrical appliances before accessing them for repairs to prevent electrocution;
- Wearing of PPE to avoid electrocution and other possible injuries.

Employment and Economy

To enhance the positive impact of opportunities for local businesses and entrepreneurs, the local content plan shall also facilitate identification and selection of qualified local and Nigerian companies to provide needed supplies and services. This plan shall include provisions for advance notice to local companies, along with selection criteria including health and safety, to allow them to prepare for upcoming opportunities.

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

This Environmental and Social Management plan (ESMP) outlines action plan for the effective implementation of the management measures for the identified impacts. It includes specific actions, responsibilities, timelines, parameters to be monitored, etc. Details on the following measures are also included in the ESMP.

- Training and Awareness: to ensure personnel have the competence to carry out their responsibilities
- Standard Operating Procedures (SOP), as a means of operational controls to ensure activities do not affect the environment adversely.
- General Laboratory Rules, containing basic rules that will ensure safety in and around the laboratory
- All workers are responsible for maintaining the laboratory in a clean, tidy, safe condition.
- Special handling procedures and storage requirement, which define requirements for handling chemicals, glass wares and other laboratory equipment
- Spill and incident management procedures

Institutional Frameworks for Implementation

Responsibilities, in the ESMP implementation and monitoring, are shared between multiple stakeholders, including concerned ministries, competent authorities, NGOs, the PMU and the contractors.

Project Management Unit (PMU): Responsibility to ensure responsible parties including contractors, consultants, etc. perform assigned responsibilities as well as compliance with extant laws and regulations.

Federal Ministry of Environment (FMEnv) and Abuja Environmental Protection Board (AEPB): They jointly ensure the mitigation measures are implemented and that they are effective. They conduct periodic monitoring and may review measures where they are found not to be effective.

NGOs: To provide independent advice and report on the implementation of the environmental and social management measures to enhance transparency and trust.

Contractors: Responsible for implementing measures during construction; and each contractor must hold all necessary licenses and permits before the work begins.

GRIEVANCE MECHANISMS

During implementation of the ESMP, it is possible that disputes/disagreements between the project developer and the PAPs will occur. There are great challenges associated with grievance redress especially in a project that has global interest such as PCB management.

A grievance procedure has been established, which followed the following steps;

Customary Mediation: Utilising community's internal mechanisms for resolution of disputes through the customary chiefdoms.

Regulatory Agencies: First level of escalation if grievance is not resolved through customary mediation. AEPB and FMEnv have the statutory responsibility for an oversight and monitoring the implementation of the ESMP. The agencies shall pronounce judgment on any environmental complaint or dispute reported to them based on regulatory requirements. At this stage if the aggrieved is still not satisfied with the settlement, he/she can then proceed to the official legal procedures.

Courts of Law: The judicial process in accordance with applicable laws will be followed and the law courts will pass binding judgment on the matter.

CHAPTER ONE

1.0 BACKGROUND INFORMATION

1.1 PROJECT BACKGROUND

Polychlorinated Biphenyls (PCBs) are among the most toxic Persistent Organic Pollutants (POPs) listed in the Stockholm Convention. PCBs have been used in almost all sectors of the Nigerian economy as coolants and insulating fluids in transformers and capacitors in electricity generation, transmission and distribution; in flexible coatings of electrical wiring and components. With this in mind, PCBs are seen as a threat to public health and the environment. The Stockholm Convention is a global treaty ratified by the international community and led by the United Nations Environment Programme (UNEP) that calls for the elimination and/or phasing out of 12 POPs, called the "*dirty dozen*". However, to neutralize this threat, Nigeria joined the global community in negotiating and ratifying the Stockholm Convention on POPs which obliges parties to eliminate the use of PCBs in equipment by 2015, and to make concerted efforts for disposing liquid PCBs and equipment through environmentally sound waste management practices as early as possible, but no later than 2028. Nigeria submitted its National Implementation Plan (NIP) in 2009 listing twenty-three areas of action as priorities for meeting its treaty obligations. The priorities included PCB inventory and treatment (priority number one) and PCB disposal options

The Environmentally Sound Management (ESM) of PCB-Project Management Unit, in collaboration with the United Nations Development Programme (UNDP) plans to establish three PCBs Collection, Storage and Treatment Centres, otherwise known as PCBs Interim Storage Facilities (PCB-ISF) in Neke Uno in Enugu State, Epe in Lagos State, and Sheda Science and Technology Complex (SHESTCO) along Abuja-Lokoja Expressway. The facilities are to be used for the safe collection, storage and treatment of PCB oil and PCBs-contaminated equipment identified in the course of the national PCBs inventory in Nigeria.

An analytical laboratory that would serve the three centers shall be established within the Sheda facility. The proposed laboratory will perform the following activities:

- Receiving, handling and storage of PCB oil, PCB wastes and PCB contaminated materials;
- Chemical Analysis of liquid, solid and gas samples containing PCBs;
- Handling of liquids, solids and gases used as reagents, solvents and carrier elements in the analysis of solid, liquid and gaseous samples.
- Decontamination of minor chemical laboratory equipment containing PCBs components;

Dedicated equipment and instruments will be acquired and installed. The personnel carrying out these activities shall be properly trained to minimize risks of incidents or accident that negatively impact the environment and human health.

1.2 THE NEED FOR ESMP

The Environmental and Social Management Plan (ESMP) identifies specific objectives and the management measures to be implemented to ensure the optimal environmental and social sustainability of the PCB Analytical Laboratory Project. This will ensure health and safety of workers

and adjacent communities, safeguard the environment and ensure compliance with applicable national laws and regulations.

The laboratory project's components are strongly linked with the conclusions from the environmental and social impact assessment study report of the PCBs Interim Storage Facilities. The ESMP encompasses the global methodology for the environmental and social management during the pre-construction/construction and the operational phases. It also comprises guidance in case of installations dismantlement (decommissioning). It clearly defines specific approaches that managers, employees and subcontractors should adopt. The ESMP combines the whole of the recommended management procedures as well as the specific plans prepared to avoid, enhance or mitigate the various anticipated risks and impacts, to the stakeholders' satisfaction.

The ESMP clearly attributes all roles, responsibilities, and intervention areas to adequately identify and manage negative impacts on workers, on communities and on the environment within the project area and in its surroundings. The ESMP includes a summary of environmental and social impacts, a description of management measures, specific management plans as well as a monitoring system for the environmental and social performance, in an objective of continuous adaptation and improvement.

The environmental clauses to be included in the bidding or work performance documents are presented in Appendix 2. They will ensure the optimization of environmental and socio-economic protection. They also deal with safety measures for hazard and risk prevention.

The ESMP was prepared following the method summarised in Figure 1. 1

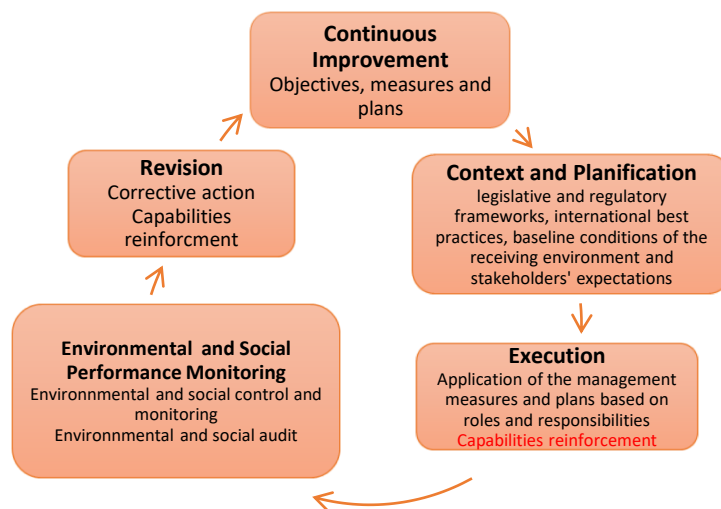


Figure 1.1 Environmental and Social Management Methodology Used In the ESMP

1.3 PROJECT DESCRIPTION

The project involves installation of lab equipment, systems and machines, employment/training of personnel, registration with relevant regulatory agencies and operation of the facility. Laboratory operations shall involve:

- receiving, handling and storage of PCB oil, PCB wastes and PCB contaminated materials;
- temporal storage of PCB oil, PCB wastes and PCB contaminated materials;

- analytical testing of PCB materials/chemical analysis of liquid, solid and gas samples containing PCBs;
- handling of liquids, solids and gases used as reagents, solvents and carrier elements in the analysis of solid, liquid and gaseous samples;
- decontamination of chemical laboratory equipment containing PCBs components;
- handling of hazardous waste after analysis and treatments and
- storage/disposal of treated PCB materials.

1.3.1 Project Activities

The project shall encompass three major stages; Pre installation, construction and installation, operation and decommissioning phases.

Pre-Construction/Installation activities

The Pre-Construction/Installation activity includes the purchase, transportation of equipment, installation of equipment and axillary components to the laboratory. Agilent Gas Liquid Chromatography model with after sale technical support services and buy back policy be enshrined in the purchase agreement.

Installation Phase

This phase involves the installation of gas system, smoke/fire detecting system, water system, waste management system, Gas Liquid Chromatography (GLC) machine as well as the installation of libraries that will be used in the analytical and treatment processes of the Lab during the operational phase. The installation of the GLC involves the purchase and unpacking of the machine, system configuration, electrical connections, relays, software installations, hardware installations, connections to the gas system, tuning and final installation of the analyser.

Operational Phase

Capacity building: Activities under this component include a comprehensive review of current hazardous waste management regulations, and the development and incorporation of the regulatory framework that will specifically address PCBs. The component will also address the issue of training and awareness (including stakeholders' workshop), and will involve the preparation and dissemination of training materials including TV programmes/documentaries, posters and the production of brochures/pamphlets for the purpose of raising awareness on PCB issues.

Identification of PCB materials: Labelling of containers with the correct name and description of the contents is essential in order

- to correctly identify the material for purpose of recycling or recovery;
- to facilitate the correct emergency action in case of an accident;
- to ensure that the appropriate treatment and disposal methods are being used by the disposal contractor. Labelling of hazardous substances must be done according to SANS 10233. Labelling is required for equipment on site and additional labelling is required if the equipment is being moved off site for treatment.

Packaging: Prior to transportation it is advisable that the waste be packaged properly. SANS 10228 gives a full description of the various types of containers which can be used for the packaging and labelling of hazardous substances for transport purposes. This must be strictly followed. For documentation purposes the following abbreviations are in use: DM= Metal drums, barrels, kegs DW= Wooden drums, barrels, kegs DF = Fibreboard or plastic drums, barrels, kegs; TP = Tanks portable; TT = Cargo tanks (tank trucks); TC = Tank cars; DT = Dump truck; CY = Cylinders; CM = Metal boxes, cartons, cases (including roll-offs); CW = Wooden boxes, cartons, cases; CF = Fibre or plastic boxes, cartons, cases; BA = Burlap, cloth, paper or plastic bags

Transportation of identified PCB materials: Hazardous waste generated at a particular site often requires transport to an approved treatment, storage, or disposal facility (TSDF). Because of potential threats to public safety and the environment, transport is given special attention by governmental agencies. In moving the contaminated equipment and its placement in storage before analysis, all due care shall be taken to prevent accidental release of PCBs to the environment. PCB-contaminated equipment or waste contaminated with more than 0.005% total PCBs are classified as “dangerous goods” for transport purposes by road.

Receiving/handling of PCB materials: This activity involves offloading, labelling and inventory, on arrival to site. All equipment having the potential of being contaminated with PCBs shall be labelled as soon as it has been offloaded. As earlier stated, labelling is required for equipment on site and additional labelling is required if the equipment is being moved off site for treatment. This process is mainly to provide immediate identification of PCB-contaminated equipment and PCB-containing wastes; alert personnel that the labeled equipment or waste requires special handling and disposal considerations; alert emergency services personnel to the presence of PCBs in the event of a spill, leakage or fire. All PCB wastes transported to the laboratory must be handled with care to prevent spillage and further contamination of the waste. This activity involves taking inventory as well as labelling the materials for proper documentation and management prior to temporal storage.

Temporal storage of PCB oil, PCB wastes and PCB contaminated materials: This facility holds the identified PCB waste oils and other materials temporally prior to analytical testing to determine which treatment regime to be adopted. The migration of leachate or spillage on the ground and groundwater aquifer around all temporary storage areas shall be prevented. A temporary storage site therefore requires a firm waterproof base that is protected from the ingress of storm water from surrounding areas. It must also have an effective drainage system to a waterproof spillage collection area, where any spillage can be recovered and suitably treated. This area must be clearly demarcated and should not be accessible to unauthorised persons.

Analytical testing of PCB materials: determination of presence and concentrations of PCB-contamination status of materials is by oil sampling analyses. This shall be carried out in the laboratory on receipt of contaminated equipment in the facility. The laboratory will be equipped with fumes cupboard and ventilation extractor fans to remove gases generated during analyses. Sensors will also be fitted to detect high levels of fumes and smoke.

Treatment of PCB materials: It is advisable the facility adopts retro filling method of equipment decontamination. This involves draining PCB-contaminated oil from a transformer and refilling it with a PCB-free insulating fluid. Pumping technique rather than simple gravity assisted draining is preferable as this will minimize residual PCB contamination. Once the transformer is drained, it needs to be re-filled with PCB-free insulating fluid.

Final storage of treated equipment: Decommissioned PCB-contaminated equipment or PCB-containing waste is transferred to an appropriate storage area /facility. Characteristics of a typical PCB storage area include

- fire protection unit and spill containment area.
- Provision of dedicated drums for solids and liquids containment.
- The need of the storage area to be located indoors. This is mainly to protect the PCB-contaminated equipment and/or waste PCB containers and prevents moisture from entering the curbing or sides of the floor surface underneath.

Handling of hazardous waste after analysis and treatments: PCB bulk product waste may be disposed of in a solid waste landfill but it must be permitted, licensed, or registered by a state as a municipal or non-municipal non-hazardous waste landfill.

PCB Remediation Waste may be disposed of either through performance-based disposal in an incinerator or chemical waste landfill, or a regulated decontamination procedure.

Under the Hazardous Waste Regulations, holders [or owners] of certain PCB-contaminated equipment must ensure the equipment is properly decontaminated or disposed of in an environmentally sound manner either immediately, or as appropriate, at the end of its useful life. Additionally, the holder [or the owner] of PCB-contaminated equipment containing an aggregate volume of more than 5 litres of PCB-contaminated material with a total PCB concentration greater than 50ppm PCB must notify the Environmental regulatory authorities of the equipment annually either in writing or via the PCB On-line Notification System and label the equipment and premises housing the equipment in accordance with the Regulations.

Decommissioning Phase

Hazardous Materials - Remove chemical, biological, and radiological agents prior to decommissioning. Numerous restrictions apply to the transfer of hazardous materials. Provisions of the EHS consultative assistance in the lawful transfer of these materials are stated herein.

- Chemicals – Coordinate chemical waste disposal with EHS at least 30 days prior to decommissioning. Unopened and uncontaminated chemicals can be returned to departmental stockrooms or redistributed among colleagues.
- Compressed Gas Cylinders – Transfer to willing recipient, return to vendor, or dispose of as chemical waste.
- Biological – Dispose of biological wastes, potentially infectious materials, and sharps according to EHS procedures. Liquids can be decontaminated and poured down the drain. Coordinate with EHS for guidance on non-routine materials destruction.
- Radioisotopes, x-ray machines, or instruments containing a radioactive source – Coordinate with EHS or departmental Radiation Safety Officer (RSO) for disposal of waste or transfer of usable materials or equipment to another authorized user. All equipment must be cleared by RSO before sending to Surplus Property.

Removal of Stored Items - Remove all glassware, laboratory research apparatus, empty containers, and other equipment. Storage areas, cabinets, and fume hoods must be completely emptied prior to decommissioning.

Clean and Decontaminate – Clean and decontaminate all laboratory surfaces, including those in fume hoods, bio safety cabinets, and chemical storage areas. General cleaning and chemical

decontamination can be accomplished by washing with warm, soapy water. Further decontamination may be necessary for:

- Biological – Areas that may have been exposed to spills can be decontaminated with 20% bleach solution or other suitable disinfectant.
- Radioisotopes – Surfaces must be decontaminated and removal of surface contamination must be documented with wipe tests. Contact the departmental Radiation Safety Officer to perform final survey and certify that laboratory can be released for unrestricted use.
- Equipment – Decontaminate all accessible surfaces.
- Bio safety Cabinets – Wipe down all accessible surfaces (including the spill pan) with a suitable disinfectant.

Inspection – Schedule decommission inspection with EHS and the Department representative. All deficiencies must be corrected before the laboratory can be certified as decommissioned. The Radiation Safety Officer will need to inspect the laboratory and certify that the lab can be free-released for non-radiological use before the full decommissioning certification document is issued by the Department.

Recordkeeping – Departmental office to retains original Decommissioning Form, with one copy to the Lab Analyst, one copy to EHS, and one copy prominently posted in the decommissioned area. Additional documentation may be required for special regulated hazards such as radioactive or biological materials.

Exceptions – In situations where it is impractical or unwarranted to remove all stored items, including chemicals, the department and Lab Analyst do agree to make exceptions to this requirement. Exceptions shall be documented on the exceptions page, signed by both parties, and posted with the Decommissioning Certification Form.

1.3.2 Project Wastes

The projected waste streams from the installation, operational and decommissioning activities of the proposed facility is presented in Table 1.1

Table1.1 Expected waste streams

Project Phase	Type of waste	Form of Waste	Source of Waste	Colour	Disposal company	Disposal method	Disposal location
Installation	Mixed	Cartoons, Nylons, Electric cables, Plastic pipes	Lab	Black, Brown, Grey, White and blue	Approved Waste Contractor	Reuse and Recycle	Approved Waste site
Operation	Hazardous	Spent oil	Lab	Brown/ Black	Approved Waste Contractor		Approved Waste site
		Gas		Colourless	To be contained and monitored. Not disposed		
	Mixed	Metal scrap, wires, wood, Nylon/plastics, papers			Approved Waste Contractor	Reuse and Recycle	Approved Waste site
Decommissioning	Hazardous	Spent oil	Lab	Brown/ Black	Approved Waste Contractor		
		Gas		Colourless	To be contained and monitored. Not disposed		
	Mixed	Machine parts, Metal scrap, wires, wood, Nylon/plastics, papers			Approved Waste Contractor	Reuse and Recycle	Approved Waste site

Health, Safety and Environmental Risk

Even with careful planning, there is a risk of a PCB spill that could lead to site, soil and/or water contamination and related costly remediation and liabilities during the decontamination process. If residual contamination in the decontaminated transformer is above 0.005% total PCB, then risk remains during the useful life of the transformer. The facility shall prepare a stand-alone job/site specific health, safety and environmental plan. Excerpt of such a Health, Safety and Environmental Plan in ensuring staff adherent include:

- all staff dealing with disposal and/or decontamination of PCB-contaminated equipment shall
 - ✓ have appropriate health and safety and operational training on dealing with chemical, physical and biological hazards associated with PCBs;
 - ✓ wear adequate protective clothing, i.e. one-piece chemical resistant suit, chemical resistant gloves, boots; and if deemed required face breathing mask;
- ensuring that the item of electrical equipment is not live; and where capacitors are involved, all capacitors shall be fully discharged in accordance with manufacturers recommendations;
- ensuring adequate ventilation in the area where the PCB-contaminated equipment is located;
- Personnel decontamination materials shall be present in all areas containing PCBs;
- Staff dealing with spills must take the following first-aid precautions:
 - ✓ if PCBs come into contact with the eyes, immediately irrigate the eyes with water for at least 15 minutes and obtain medical attention;
 - ✓ if PCBs come into contact with the skin, immediately remove any contaminated clothing and wash affected skin with soap and water;
 - ✓ if swallowed, wash out mouth several times with clean water, drink water, and obtain medical attention; and

- ✓ if inhaled, move to a fresh air zone and obtain medical attention.

Electrical safety

There are significant health and safety risks associated with electricity while working with this equipment since most of the contaminated equipment are/is high voltage electrical equipment. PCB-contaminated equipment shall be disconnected from the electricity supply, and in the case of capacitors, they shall be fully discharged in accordance with the manufacturer's instructions, before moving them to storage or transport vehicle, commencing decontamination, or disposal activities.

When working near electricity, Sheda PCB Laboratory shall ensure workers:

- Undertake a risk assessment for the planned work, and make sure the risk assessment covers electrical hazards;
- Always consult a competent person familiar with the electrical network before commencing work;
- Always ensure all equipment to be moved, or from which samples are to be taken, is disconnected/isolated from the electrical power supply before commencing work. In the case of capacitors, ensure not only that they are disconnected/isolated from the electrical power supply but also that they are fully discharged before commencing work;
- Take cognizance of electrical wires. These may be live overhead power lines, electrical wiring in a workplace, or cables buried under the ground;
- Are acquainted with an up-to-date map of the services in the area and use it;
- Ensure the work area has adequate lighting and ventilation.

Environmental considerations

The following environmental considerations are imperative:

- Spill cleanup kits should be present in all areas containing PCBs;
- Should any spillage of PCBs occur, this must be contained with absorbent materials, which should be placed in steel drums for subsequent disposal;
- Drained transformers may be stored as is, or may be placed inside a large container (over-pack drum) or heavy plastic "wrap" if leakage is a concern;
- Equipment and drums should be securely strapped to the pallets prior to movement.

1.4 ADMINISTRATIVE AND LEGAL FRAMEWORK

Section 20 of the constitution of Nigeria (1999), makes it an objective for the Nigerian State to improve and protect the air, land, water, forest and wildlife of Nigeria. And Section 12 establishes, though impliedly, that international treaties (including environmental treaties) ratified by the National Assembly should be implemented as law in Nigeria. Furthermore, Sections 33 and 34 which guarantee fundamental human rights to life and human dignity, respectively, have also been argued to be linked to the need for a healthy and safe environment to give these rights effect.

1.4.1 National Environmental Policy

The policy specifies guidelines for achieving sustainable development in fourteen vital sectors of the nation's economy, namely: Human Population; Land Use and Soil Conservation; Water Resources Management; Forestry, Wildlife and Protected Natural Areas; Marine and Coastal Area Resources; Sanitation and Waste Management; Toxic and Hazardous Substances; Mining and Mineral Resources; Agricultural Chemicals; Energy Production; Air Pollution; Noise in the Working Environment; Settlements; Recreational Spaces, Green Belts, Monuments, and Cultural Property.

1.4.2 National Energy Policy

The National Energy Policy seeks to ensure the development of the nation's energy resources, with diversified energy resources options, for the achievement of national energy security and an efficient energy delivery system with an optimal energy resource mix.

1.4.3 National Land Policy

The legal basis for land acquisition and resettlement in Nigeria is the Land Use Act of 1978, modified in 1990. According to the act, all land in Nigeria is vested in the Governor of each State, to be held in trust for the use and common benefit of all people.

The administration of urban land is directly under the control and management of the Governor; whereas non – urban land is under the control and management of the Local Government Area. The Governor has the right to grant statutory rights of occupancy to land. Local Government has the right to grant customary rights of occupancy.

The Land Act gives government the right to acquire land by revoking statutory and customary rights to land for the overriding public interest. In doing so, the act specifies that the state or local government should pay compensation to the current holder or occupier with equal value. The act also requires the state or local government to provide alternative land for affected people who will lose farmlands and alternative residential plots for people who will lose their house.

1.4.4 National Social Protection Policy

This policy was approved by the Federal Executive Council (FEC) in July 2017 to enhance social justice, equity and all-inclusive growth in the country. The framework seeks to achieve these using a transformative mechanism for mitigating poverty and unemployment in Nigeria. Specifically, the policy covers the following programmes among others:

- Social investment programmes including the Home Growth School Feeding programme; the N-Power programme, the Conditional Cash Transfer, Teach Nigeria, Free Tertiary Education, etc.;
- National Health Insurance Scheme;
- National Pension Commission, PenCom;
- National Primary Health Care;
- National Poverty Eradication Programme.

1.4.5 National Gender Policy

The key policy areas are focused around 5 critical areas – (i) Culture re-orientation and sensitisation, (ii) Promotion of women’s human rights, (iii) Promoting the empowerment of women and integrating gender within key sectors, (iv) Women’s political participation and engendered governance, and (v) Supporting institutional development

1.4.6 The Environmental Impact Assessment (EIA) Act Cap E12 LFN, 2004

The EIA Act makes it mandatory for any person, authority, corporate body private or public, to conduct EIA prior to the commencement of any new major development or expansion that may likely have significant effect on the environment. The Act sets the EIA objectives and the procedures for consideration of EIA of certain public or private projects.

This project is a major development, which is expected to have some impacts on the environment. Hence, full compliance with the EIA Act is required. The EIA guidelines (procedural and sectorial) issued by the FMEnv drives from this Act and the project proponents shall conduct their activities in conformance with these guidelines.

1.4.7 Land Use Act of 1978

The Land Use Act (Cap 202, 1990), now Cap L5 Laws of the Federation of Nigeria 2004, is one of the key legislations that has direct relevance to this project. Relevant sections of these laws that may relate to this project with respect to land ownership and property rights, resettlement and compensation are summarized in this section:

- The Act vests every parcel of Land, in every State of the Federation, in the Executive Governor of the State. He holds such parcels of land in trust for the people and government of the State.
- All land irrespective of the category belongs to the State while individuals only enjoy a right of occupancy as contained in the Certificate of Occupancy up to the limit of 99 years.
- The administration of the urban land is vested in the Governor, while rural land is vested in the Local Government Councils.
- The Local Government Councils may grant customary rights of Occupancy for residential and other purposes, up to a limit of 500 hectares for agricultural purposes and 5,000 for grazing except with the consent of the Governor.
- The State is required to establish an administrative system for the revocation of the rights of occupancy, and payment of compensation for the affected parties.
- The holder or occupier of such revoked land is to be entitled to the value of the unexhausted development as at the date of revocation.
- A set of guidelines was provided in the act on how to determine the amount of compensation.

1.4.8 Electric Power Sector Reform Act No. 6, 2005

The Act established the Nigerian Electricity Regulatory Commission (NERC) as an independent regulatory agency. NERC was inaugurated in October 2005, and is mandated to carry out:

- The monitoring and regulation of the electricity industry;
- Issuance of licenses to market participants, and

- Ensure compliance with market rules and operating guidelines.

This Act also deals with acquisition of land and access rights. Section 77 of the Act empowers the NERC to make a declaration that land is required by a license for purpose of generation or distribution of electricity. Section 77 (9) states: “where the President issues a notice under sub-section 6, the Governor shall in accordance with the provisions of section 28(4) of the Land Use Act, revoke the existing right of occupancy respecting the land and grant a certificate of occupancy in favour of the concerned licensee in respect of the land identified by the commission in such notice who shall be entitled to claim compensation in accordance with the provisions of the Land Use Act”.

1.4.9 National Environmental Standards & Regulations Enforcement Agency (NESREA) Act, 2007

Administered by the Ministry of Environment, the National Environment Standards and Regulations Enforcement Agency (NESREA) Act of 2007 repealed the Federal Environmental Protection Agency (FEPA) Act. It is the embodiment of laws and regulations focused on the protection and sustainable development of the environment and its natural resources.

This project will comply with NESREA regulations, including conducting ESIA, environmental audit every three years after commissioning, obtain permit before disposing hazardous wastes, etc.

1.4.10 Other National Laws and Regulations

Other National Laws relevant to the project includes the following;

- The Nigerian Urban and Regional Planning Act CAP N138, LFN 2004; contains requirements for development planning;
- NAFDAC Guidelines for Obtaining Permit to Import Industrial and Laboratory Chemicals;
- Harmful Waste (Special Criminal Provisions) ACT CAP H1, LFN 2004; prohibits dumping of harmful wastes within Nigeria;
- The Endangered Species Act, CAP E9, LFN 2004; protects endangered species;
- The Factories Act, 1987 (Factory Act cap 126, LFN, 1990); contains labour requirements, including occupational health, and similar matters;
- Labour Act - CAP. L1 L.F.N. 2004; specifies requirements relevant to labour issues, including wages, recruitment, discipline, employee welfare, employment of women and child labour.
- Wages Board and Industrial Council Act, 1974; established the National Wages Board and Area Minimum Wages Committee for States and for Joint Industrial Councils for particular industries, which determines minimum wages.
- Workers’ Compensation Act, 1987; provisions for the payment of compensation to workmen for injuries suffered in the course of their employment and compulsory insurance covers employees of all categories;
- National Environmental Regulations established by NESREA based on Section 34 of the NESREA Act, 2007. Those relevant to this project include Effluent Limitations, management of Solid and Hazardous Waste and Pollution Abatement in Industries Generating Wastes.
- Nigerian Industrial Standards requirements based on Standard Organisation of Nigeria (SON) regulations.

1.4.11 World Bank Environmental and Social Standards

The World Bank environmental and social framework (2016) contains ten (10) Environmental and Social Standards (ESS), which set out the mandatory requirements that apply to projects funded by the Bank or its agencies.

- ESS1: Assessment & Management of Environmental and Social Risks & impacts;
- ESS2: Labor and Working Conditions;
- ESS3: Resource Efficiency and Pollution Prevention and Management;
- ESS4: Community Health and Safety;
- ESS 5: Land Acquisition, Restrictions on Land Use & Involuntary Resettlement;
- ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;
- ESS7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities;
- ESS8: Cultural Heritage;
- ESS9: Financial Intermediaries, and
- ESS10: Stakeholder Engagement and Information Disclosure.

ESS1: Assessment & Management of Environmental and Social Risks & impacts as well as ESS10: stakeholder engagement and information disclosure apply to this laboratory project. Hence, the ESIA conducted for the storage and treatment facility also included this laboratory. ESS2: Labor and Working Conditions; and ESS4: Community Health and Safety shall apply.

CHAPTER TWO

2.0 BIOPHYSICAL AND SOCIAL ENVIRONMENT

2.1 GENERAL

The prevailing ecological conditions of the environment within which the proposed project will be sited, as well as the socio-economic and health profiles of the affected settlements are presented in this chapter. Components described include the physio-chemical environment (meteorology, geology, sediment/soil type and distribution, surface/groundwater characteristics), biological environment (location and distribution of benthos, plankton, fisheries, flora and fauna characteristics), as well as human (socio-economic and health conditions describing the demographic structure, culture, heritage sites, social and health status of the people and their environment), including outcomes of consultations held with stakeholders at the various sites.

The information presented in this chapter is extracted from the report of the EIA of PCB Collection, Storage and Treatment Centres at Sheda, Epe and Neke Uno. The laboratory for which this ESMP is prepared is located within Sheda Science and Technology Complex (SHESTCO) covered in the EIA. Hence, biophysical and social characteristics described here is based on the data specific to the Sheda Site. The data was collected within a 5km wide spatial boundary, as required by the EIA Procedural Guideline.

2.2 PHYSICAL ENVIRONMENT

2.2.1 Climate and Meteorology.

The study areas are characterised by two distinct conditions of wet and dry seasons, while the wet season occurs between April and October with a brief break in August, and the dry season occurs between November and March.

Rainfall

The rainfall within the study area for the period measured, ranged from 10mm to 283mm while an annual mean of 162mm was obtained. Rainfall distribution was observed to be highest in the month of July and Sept and lowest in November to February.

Temperature

An average temperature of 25⁰c was obtained for the study area as recorded by the Nigerian Meteorological Agency (NIMET) with April and August having the highest and least temperature values respectively.

Sunlight

Data obtained from NIMET indicates an intense value for the site, with November and December having an average sunshine of 9hrs while months with least sunshine are July and August. The sunlight per hour is seen to be lower (ranging between 5 and 6) between the month of June and September.

Wind Speed

Wind speed for the proposed study area was observed to be highest in the months of March and August while lowest was observed in the month of December and January.

Wind Direction

Data obtained from NIMET revealed that south westerly wind direction is prevalent in the study area throughout the year (NIMET, 1990-2018). However, during dry season, winds are distributed in all directions, but predominantly South-Southwest direction during the raining season.

Relative Humidity

Relative humidity was highest in the month of August with a maximum value of 85%. However, the lowest value was observed during November to January.

2.2.2 Ambient Air quality

Suspended particle matter is between 0.18 and 0.19 mg/m³ during rainy season and 0.19 to 21mg/m³ during dry season. And both seasons are within the WHO/FMEnv regulatory limits.

Carbon monoxide (CO), Sulphur dioxide (SO₂), Hydrogen chloride (HCl) and Nitrogen dioxide (NO₂) were not detected in the area. CO is a colourless, odourless and tasteless gas produced by the incomplete combustion of carbonaceous materials or fossil fuels. SO₂ is a colourless gas produced from biological decay and forest fire releases. It is also produced from the combustion of sulphur-containing fuels, smelting, manufacture of sulphuric acid and incineration of refuse and production of elemental sulphur. NO₂ is a member of the family of highly reactive gases called nitrogen oxides or oxides of nitrogen, which are formed during combustion processes. NO₂ results when fuel is combusted at high temperatures and occurs mainly from vehicle exhaust and stationary sources such as electric utilities and industrial boilers. HCl is a gas at room temperature. Solution of hydrogen chloride in water forms hydrochloric acid. It is irritating and corrosive to any tissue it contacts. Brief exposure to low levels causes throat irritation. Exposure to higher levels can even result in rapid breathing, narrowing of the bronchioles, blue colouring of the skin, accumulation of fluid in the lungs, and even death.

Hydrogen chloride is formed in the air during the burning of plastics. Other releases of hydrogen chloride into the atmosphere are however removed by rainfall, limiting the chances of exposure to high levels of this compound by breathing ambient air.

Carbon dioxide (CO₂) is the primary greenhouse gas emitted through human activities. The main human activity that emits CO₂ is the combustion of fossil fuels for energy and transportation. Certain industrial processes and land-use changes also emit CO₂. Levels of CO₂ recorded at the Sheda sites are 331 to 362 ppm for rainy season and 315 to 391 ppm for dry season. Concentration of Volatile Organic Carbons (VOCs) in the various study sites are 0.22-0.36 ppm during rainy season and 0.21-0.29 ppm during dry season.

2.2.3 Noise

There is no activity on the site within 1km that could affect noise levels. The measured noise levels during rainy season ranged between 56.1 and 58 dBA and 55.1 and 60.1 dBA during the dry season.

2.2.4 Topography

The proposed site located in Sheda, off the Abuja-Lokoja Highway falls within the north central of Nigeria. The topography in Sheda is mainly characterized by a gentle slope of about 2° towards the south western direction, belonging to the north central Nigerian Basement Complex. On the average, the recorded average altitude of the area is 198m above sea level as shown in the aerial view (Figure 2.1) using 2018 Digital globe-DE/BKG Version.

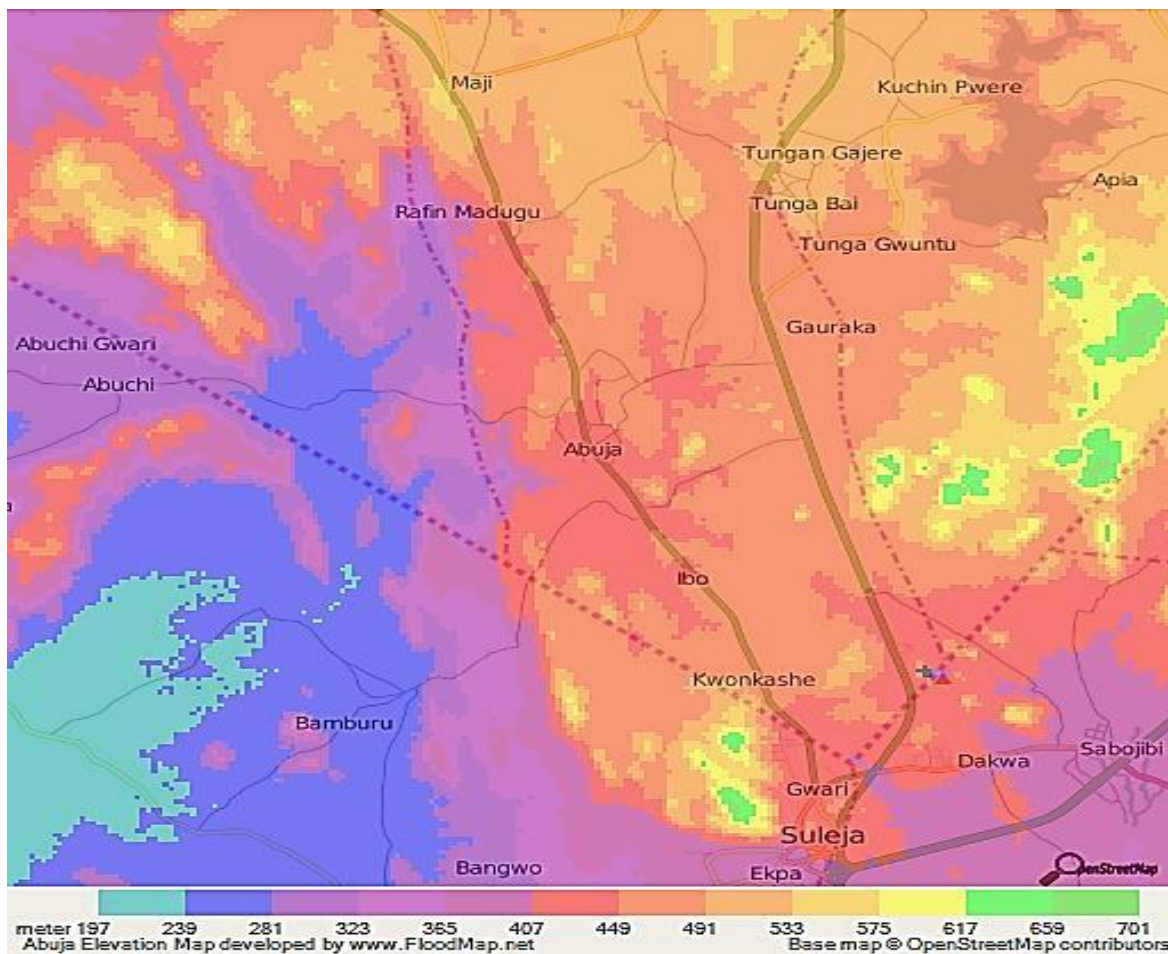


Figure 2.1 Topographic map of the study area

2.2.5 Soil Quality and Land Use

The site within Kwali Development Council consists of gently undulating high plains developed on basement complex rocks that comprised of undifferentiated granite, migmatite and granite gneiss. Inselbergs of older granites and low hills of schists rise conspicuously above the plains (Ojanuga, 2006). The climate of Sheda site is sub-humid with mean annual rainfall greater than 1016 mm, with rains substantially between April and October (150 –210 days), with ustic soil moisture regime. The mean annual temperature ranged between 25^o and 27^oC. Sheda area is situated within wooded savanna. A wide range of crops are grown within the area and consists of cassava, maize, millet, groundnut, sorghum and rice (Ojanuga, 2006). The soils were generally well drained and situated along level to nearly level slope (0 –2 %).

Physical Properties: The content of sand ranged between 440 and 560 gkg⁻¹ in the soils. The content mostly increased from surface to subsurface horizon, except at sampling point near the entrance where there was a decrease in sand content with increase in soil depth. Silt values ranged between 150 and 260 gkg⁻¹ and there was no clear trend of silt distribution between surface and subsurface horizons

Chemical Properties: Soil pH ranged between 5.68 and 6.19 and rated as moderately to slightly acid (Soil Science Division Staff, 2017). The values of pH were found to be within optimum range of most nutrient availability for crop production. Soil salinity and alkalinity are not anticipated within these soils as pH values were quite low.

2.3 BIOLOGICAL ENVIRONMENT

2.3.1 Floral Diversity

Sheda is a diverse site in terms of floral diversity. A total of 292 floral species were observed. Though, there was lot and active farming activities going on in the site, species under cultivation were found to include; *Panicumsumatrnse* (Little millet), *Zea mays* (Maize), *Sesamumindicum* (Sesame), Okra, Sorghum, Pepper, Groundnut, *Moringa*, Cassava, Sweet Potatoes and *Vignaunguiculate* (Beans). Research has suggested that urban forest and urban green areas could be another effective means of biodiversity conservation (Konijnendijk et al., 2006), in which this site could have been one of those.

2.3.2 Faunal Diversity

There were 19 different fauna species, though 17 were encountered in the Demarcated area. *Turdusmerula* (Black bird) that usually fly in colony were the dominant species encountered. Though found on trees, most likely under migration. Therefore 128 individuals were encountered when compared to Control site that recorded just 45 individual fauna. *Bos Taurus indicus* (cow) was observed to be grazing in the Control site and therefore recorded a highest distribution of 58%, which was followed by a stink bug 11%.

2.3.3 Plankton Diversity at Sheda

The site was unique with accessible Upstream and Downstream water bodies, which made the survey comprehensive for comparison. A total of 23 species of phytoplankton taxon was recorded during the survey. Though, *Spirogyra gracilis* recorded highest percentage distribution and the least recorded was *Oscillatorialimosa* 4.39%. Downstream was observed to be more abundant with individual distribution of species. Zooplankton species recorded 519 individuals belonging to 13 species and 3 groups namely Copepoda, Cladocera and Rotifera.

2.3.4 Alien/Invasive Species

Oryctolagusuniculus and *Columba livia* were the only alien species censored in the area. On the other hand, no invasive species was recorded in the study area, as documented in the EIA report.

2.3.5 Conservation Status of Flora and fauna Species

Vitellariaparadoxa (Sheanut tree) was the only flora species of conservation interest in the study area. None was recorded for the fauna species.

2.4 HUMAN ENVIRONMENT

2.4.1 General Characteristics

Administrative Structure

Nigeria practices the presidential system of government with three tiers of government; Federal, State and Local. At all the three levels, there are executive arm, legislative and judicial with separation of powers, checks and balances. The exception is that there are two legislative houses at Federal level – Senate and House of representatives, and there is no judicial arm at Local Government Level. (Chapter 1, Part 2 of the Constitution of the Federal Republic of Nigeria, 1999). There are 36 States and the

Federal Capital Territory (FCT), which functions like a department of the Federal Government headed by a Cabinet Minister.

There are 109 Senators, three elected from each of the 36 states and one from the FCT. The House of Representative members are 360 in total and the number from each State depends on certain demographical data. The FCT has 2 representatives in the House, while Nasarawa State is represented by 5 members, which is the least among the States. The highest is Kano and Lagos States with 24 representatives each.

The current distribution of responsibilities among the three tiers of Government is provided in the Second and Fourth Schedules of the 1999 Constitution. Table 2.1 provides the description of their respective responsibilities.

Table 2.1 **Respective Responsibilities for Tiers of Government**

Tier of government	Responsibilities
Federal only	Defence; Shipping; Federal trunk roads; Aviation; Railways; Posts telegraphs and telephones; Police and other security services; Regulation of labour, interstate commerce; telecommunications; Mines and minerals; Social Security; Insurance; National statistical system; National Parks; Guidelines for minimum education standards at all levels; Water resources affecting more than one state.
Federal-State (shared)	Antiquities and monuments; Electricity; Industrial, commercial and agricultural development; Scientific and technological research; Statistics and surveys; University, technological and post-primary education; Health and social welfare.
State-Local (shared)	Primary, adult and vocational education; Health services; Development of agriculture and non-mineral natural resources.
Local Government Area (LGA)	Economic planning and development; Cemeteries, burial grounds; Homes for the destitute and infirm; Markets; Sewage and refuse disposal; Roads, streets, street lighting, drains, other public facilities.

Hence, strictly speaking, the Constitution does not really provide the list of functions to be executed by the Federal Government of Nigeria and the states (as it does for the Local Government Councils), but only the subjects upon which they can legislate. However, these legislative lists form the guidelines for other legal decrees and sectoral policy reports that lay out the specific responsibilities of the different tiers of government. (Stuti Khemani, 2001).

The Local Government chairman and his/her councillors represent the executive arm of the local government area. The State Local Government Service Commission appoints and posts administrative secretaries, accountants and other auxiliary staff. Each LGA has eight key departments which are the central administration, finance, education, works, social welfare, health, agriculture and natural resources and information. Each of these is headed by an elected councillor.

Federal Capital Territory (FCT) -Abuja

Abuja is the capital city of Nigeria, which was built mainly in the 1980s. It officially became Nigeria's capital on 12 December 1991, replacing Lagos. FCT is located in the North Central Nigeria. It occupies a land area of 7,753.9 km². The FCT has borders on the north with Kaduna State, on south-east with Nasarawa State, on the south-west by Kogi State and on the west by Niger state.

There are six Area Councils (Local Government Areas) - Abaji, Bwari, Gwagwalada, Kuje, Kwali and Municipal in the FCT. The Minister of the Federal Capital Territory is the administrative leader and is appointed by the President of Nigeria. The indigenous inhabitants of Abuja are the Gbagyi (Gwari) as the major language, Bassa, Gwandara, Gade, Ganagana, Koro etc. The Gwari people are the largest ethnic group in Abuja FCT and one of only few ethnic groups in Nigeria that have attempted to hold on tightly to their beliefs and traditions despite the rapid urbanization that has occurred on their land.

Each of Area councils has an autonomous traditional ruler - the three councils affected by the project namely Abuja Municipal Area Council (AMAC), Kuje and Bwari has the Emir of Garki, Gomo of Kuje and Sarkin Bwari respectively, and they are all Gbagyis.

Gbagyi people are majorly farmers although they are also good in wood fetching, pottery, and blacksmith. Most of the lands of the Gbagyi people were taken up by the federal government in creation of the new federal capital in Abuja. They are adherents of Islam, Christianity and traditional religion. The two main festivals among the Gbagyi people are *Agbamaya* festival and the *Zhibaje*. The *Agbamaya* is a festival celebrated to welcome the coming of the rain during the rainy season while the *Zhibaje* festival is usually celebrated at Christmas.

With regard to socio-political structure, the Gbagyi historically practice a patrilineal kinship system. The lowest tier of authority is found in the extended family compound led by the oldest male. The compound consists of small huts and rectangular buildings. The *Osu* (king) is the highest tier of authority in a Gbagyi settlement and he is assisted by a group of elders.

Demography

Population

Nigeria is the most populous country in Africa with a total population of 199,681,159 inhabitants in 2017, based on projections by the National Bureau for Statistics (NBS, 2017). This projection is based on the 2006 national population census using growth rates of 9.3% for FCT. The ages structure shows 16.1% are between 0-4 years, 14.3% (5-9 years), 22.1% (10-19 years), 25% (20-34 years), 16.1% (35-54 years), 3.2% (55-64 years) and 3.2% are 65 years and above (NBS, 2017). Similarly, the 2017 projected population for FCT is 3,911,492, with sex ratio for all States including the FCT is 51% male and 49% female. These are shown in Figures 2.2 and 2.3.

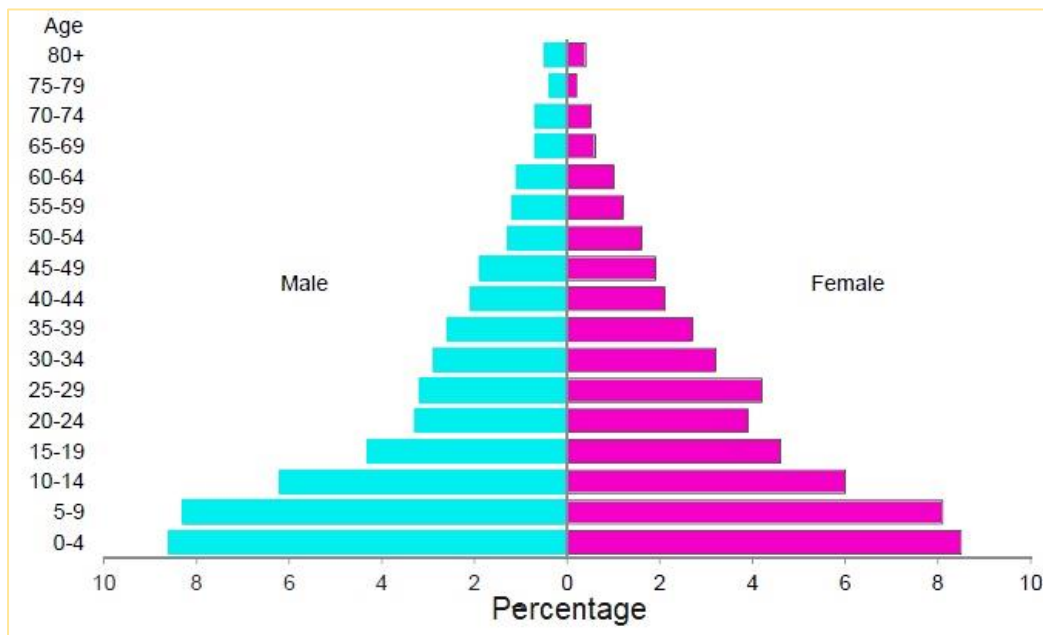


Figure 2.2 Nigeria Age Structure by Sex

Source: NDHS, 2013.

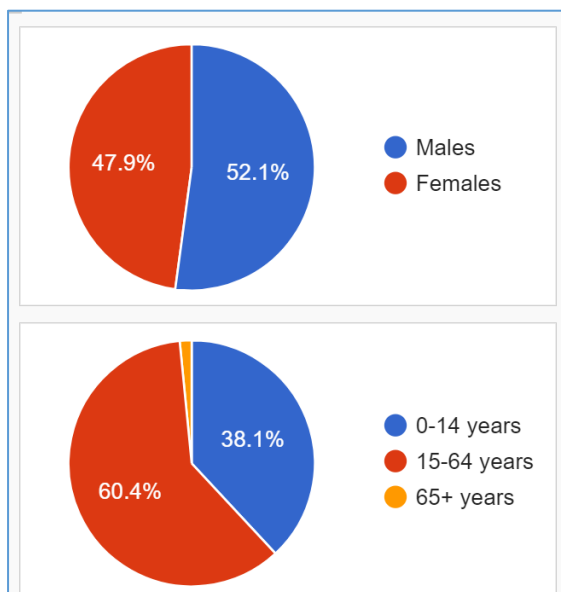


Figure 2.3 Gender and Age Group Distribution

Source: NBS, 2016.

Education System and Literacy

Education in Nigeria is the shared responsibility of the federal, state and local governments. The Federal Ministry of Education plays a dominant role in regulating the education sector, engaging in policy formation and ensuring quality control. However, the federal government is more directly involved with tertiary education than it is with the Secondary education, which is largely the responsibility of state (secondary). The Primary education is largely the responsibility of the Local Government.

According to the National Policy on Education (2004), basic education covers nine years of formal (compulsory) schooling consisting of six years of primary and three years of junior secondary. Just one-third of children who begin basic education currently proceed to senior secondary school. Post-basic education includes three years of senior secondary education in either an academic or technical stream. Continuing education options are provided through vocational and technical schools.

At the tertiary level, the system consists of a university sector and a non-university sector. The latter is composed of polytechnics, monotechnics and colleges of education. The tertiary sector, as a whole, offers opportunities for undergraduate, graduate, vocational and technical education. The academic year typically runs from September to July. Most universities use a semester system of 18 – 20 weeks. Others run from January to December, divided into 3 terms of 10 -12 weeks.

There are currently various government reforms and initiatives aimed at improving the Nigerian educational system. These include the upgrade of some polytechnics and colleges of education to the status of degree-awarding institutions, the approval and accreditation of more private universities, and the dissemination of better education-related data.

In the 2013 literacy status survey by the National Population Commission (NPC), it was determined by assessing the respondent's ability to read all or part of a sentence. Only women and men who had never been to school and those who had not completed a primary-level education were asked to read the cards (in the language they were most likely to be able to read). Those with a secondary education or higher were assumed to be literate.

National summary shows that 86 % of men are literate and 79% of women. The youths literacy levels in the FCT are 87.1% (men) and 77.1% women. The literacy levels among adults are slightly lower, 71.1% (men) and 62.4% (women) in the FCT (NPC, 2014).

Infant mortality and life expectancy

The surveys published by NBS in 2015 showed that infant and under-five mortality rate has been declining steadily since 2004. For instance, infant mortality rate for Nigeria declined from 75 per 1,000 in 2008 to 61 per 1,000 live births in 2012 and down to 58 per 1,000 live births in 2014 (NBS, 2015). Infant mortality for the FCT is 40 per 1000.

Life expectancy in the population of Nigeria was 56 years for females, 53 years for males, and 54 years for both females and males (NBS, 2013).

Migration

Migration has an important impact on demography in the FCT, which may have contributed significantly to the 9.3% population growth rate measured by the NBS. The FCT being a new city and administrative capital of Nigeria, experiences large influx of people, has been dubbed the fastest growing city in Africa.

Contentious Issues and Conflict Management

Contentious issues may arise in the study area due to perceived neglect, marginalization and/or appropriation of family, sub-group and/or communal benefits. Contentions may also arise out of perceived lopsided sharing of political patronage (positions, money, scholarship awards, development activities etc), ceding or usurpation of communal rights to (by) stranger elements (in terms of job placements and contracts awards); usurpation of authority /infringement of rights/perpetuation of injustice (insults, thuggery/battery/or political opponent/bodily violation/forced abduction, and the

likes. Any intentional or unintentional perceived misdemeanour may become contentious if not properly handled and quietly disposed of. The youth are always at the forefront of contentious issues and agitations for restoration of infringed benefits / rights.

Intra-communal tension may arise between the youth and community elders, when the youth perceive the elders are trying to infringe on their rights, while the elders may feel that the youth are attempting to undermine their constituted authority. When instances of this occur, the youth would mobilize themselves and move to the central meeting point in the community. From there, they either send representatives or move as a group to the house of a respected community elite or to the house of the offending party, to air their complaints. As a last resort and after exhausting these pseudo peaceful moves they may traverse the whole community, while chanting songs of protest.

When the youth are done, a higher authority – Emir-in-Council, as the case may be – would embark on fence-mending measure, in order to douse raised tensions. This it does, by inviting the leadership of the two antagonising parties to the negotiating table. Valiant attempts are made to ensure amicable solutions of the crisis. If the restored rights bordered on income generating activities, the relevant group (invariably the youth group) are expected to mobilize available resources within a 2-3 weeks' span and procure yams, goat and spirit drinks, for onward presentation to the elders, who in the prevailing spirit of forgiveness also accept such gifts and go further to pour libation and/or offer prayers to ward off or revert whatever curses that may have been uttered against the youth, when the imbroglio persisted. Only in very few cases do the youth embark on violent or destructive action and these arise when the elders remain recalcitrant, even after third party involvement, or as reprisal attacks for earlier unpremeditated attacks.

It is also pertinent to note that formal law enforcement agencies are rarely contacted to adjudicate on contentious communal issues. They are only called in when traditional conflict resolution mechanisms do not achieve desired effects. It may also be mentioned that law enforcement officials would rarely storm a community to arrest alleged offence perpetrators, without at least, informing the Community Head, either before or after an arrest is affected.

Sheda Community (Federal Capital Territory)

The community hosting the Sheda site is called Sheda Village, which are predominantly Gbagyi. The community was founded on a river site populated with bamboo (known as Sheda in Gbari) after which it was named by Anize, the founder. Anize was the inaugural head (Etsu), reigning from 1875 to 1899. The throne was successively occupied by Etsu Zefu (1920 to 1933), Etsu Udu (1935 to 1944), Etsu Bwanba (1946 to 1968), Etsu Yeni (1969 to 1981) and Etsu Kizashi Landu (1983 to 2015). This is represented pictorially in Figure 2.4. The succession vacuum arising from 2015 till date may be due to a tradition rooted disagreement between the Kishashi and Yeni ruling houses.

Although the people of Sheda have been basically farmers they have, like other communities, been influenced by modern developments within, around and extended communities, leading to mixed occupations.

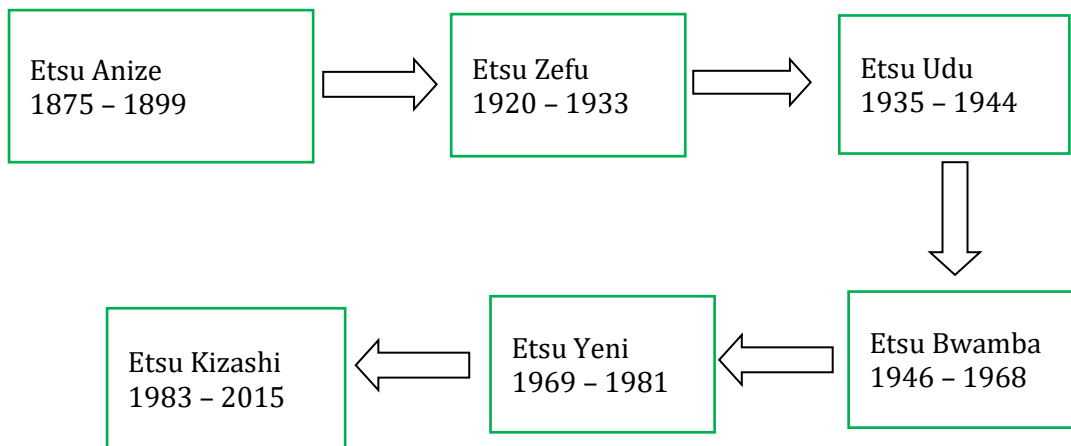


Figure 2.4 Ruling Succession in Sheda

2.4.2 Socio Economic Status of Population Affected by the Project

Age groups <25-45 and <45-65 were 33% and 67%, respectively of the population, made up of males only. All of them were married with one man to one wife.

Household sizes ranged between <1-10 and <11-20 are 39% and 45% respectively. The number of children ranged from <2-3, <1-3, <4-6 and <7-9 being 86%, 48%, 10% and 12% respectively constituted of 1.2:1 male: female ratio.

All the residents are educated to secondary, primary and university level with a distribution of 17%, 27% and 28% respectively.

Average annual income bracket of individuals ranges from N1-249,999, N250,000-499,999, N500,000-1,499,999, N1,500,000-4,499,999 and N5,000,000 to above N10,000,000, and at 26%, 13%, 7%, 32% and 0%, respectively.

All adult residents live in own houses. All the houses are bungalows. 75% have courtyards while 25% are single flats. In terms of specific and general infrastructures houses with pit toilets are 3.52%, toilets with water closet inside 5.63%, outside 4.23%, bathroom inside 4.23%, outside 5.63%, kitchen single outside 2.11%, shared outside 0.70%, kitchen inside 3.52%, fireplace inside 4.23%, fireplace outside 4.23%, electric cooker 1.41%, gas cooker 3.52%, kerosene stove 3.52%, freezer 3.52%, fridge 2.11%, GSM phone 5.63%, television 5.63%, radio/cassette player 2.82%, CD player 1.41%, satellite dish 1.41%, internet access 1.41%, video player 2.11%, air-conditioner 5.63%, fan 2.11%, car 8.45%, motor cycle 4.23% and bicycle 7.04%.

39% of the residents use the General Hospital, 16% patronize the Federal Medical Centre and the University Teaching Hospital, 10% patronize Dispensary, 3% patronize Pharmaceutical Chemist, 13% patronize Patent Medicine Store and 3% patronize Traditional Doctors/Herbs.

CHAPTER THREE

3.0 STAKEHOLDER CONSULTATIONS

This Section summarises the public information and consultation process that has accompanied the completion of the ESIA study for the PCB Collection, Treatment and Storage Project in the FCT as well plans for additional stakeholder meeting to discuss this ESMP. Relevant national and international requirements for stakeholder engagement and public disclosure are first briefly discussed. The main elements of the approach that facilitate the informed participation of the project's stakeholders in the development of the studies are then elaborated. Finally, the public information and consultation activities performed at the different stages of the studies, the organizations reached and the concerns, expectations and recommendations made by the latter are reported.

3.1 REQUIREMENTS FOR STAKEHOLDER ENGAGEMENT

3.1.1 National Requirements

- The Nigerian EIA Act requires public participation in the EIA process at the following stages:
- **Scoping:** Meeting with communities and other stakeholders to document their concerns and obtain their views about the project for consideration for inclusion in the scope of the study.
- **Public Display/Meeting:** Report is displayed by the regulatory authority (Federal Ministry of Environment - EIA Division) at designated public centers for general public to review and submit. The dates and venue for display is announced in newspapers and on local radio stations. Review panel also sits in public to present their comments and views about the project. Date and location for meeting is advertised in newspapers and radio.

3.1.2 International Requirements

World Bank's Requirements: The World Bank's Environmental and Social Framework 2016, sets out the World Bank's commitment to sustainable development, with the aim of ending extreme poverty and promoting shared prosperity. The framework established ten (10) Environmental and Social Standards as requirements for Borrowers. ESS 1: Assessment and Management of Environmental and Social Risks and Impacts, requires that ESIA process, which shall include consultations with the project-affected groups and local NGOs about the project's environmental aspects and their views are taken into account.

ESS 10: Stakeholder Engagement and Information Disclosure, sets out requirements for meaningful consultations, with emphasizes on the disclosure of relevant material in a timely manner and in a form and language that are understandable and accessible to the groups being consulted. For the initial consultation, it stipulates that a summary of the project's objectives, description, and potential impacts shall be disclosed. For consultation on the draft ESIA report, stakeholders need to be provided with a summary of the ESIA's conclusions. In addition, the proponent is expected to make the draft ESIA report available at a public place accessible to project-affected groups and local NGOs.

3.2 STAKEHOLDER'S ENGAGEMENT ACTIVITIES

The objectives, targeted stakeholder groups and a framework program for information and public consultation activities conducted are presented in Table 3.1.

In general, the consultation activities aim to:

- facilitate stakeholder engagement at key stages of the ESIA to influence and improve results, as well as increase the credibility of the process;
- ensure studies are compliant with national and international requirements, including those of the World Bank safeguard policies, on consultation and public disclosure of information for major development projects;
- support efforts of the PMU Office to establish long-lasting relationships with affected communities and other stakeholders.

Stakeholder groups targeted by the information and consultation program include the:

- Government agencies and other organisations with interest in the project;
- People directly affected by the project (within 5km radius of the site);
- Traditional authorities and leaders of communities affected;
- NGOs and community organisations.

The consultation program complies with World Bank and National EIA requirements and includes three rounds of consultations, which took place at key stages of the ESIA and ESMP development, where the contributions of stakeholders are likely to have a significant influence on the current analysis. First stage is the environmental and social scoping (1st round), and presentation of results of ESIA for stakeholder input and validation (2nd round), and the presentation of measures in the ESMP for the analytical lab to stakeholders for their input (3rd round) as shown in Table 3.1.

Table 3.1 Schedule for Stakeholders Consultations

ROUND	OBJECTIVES	TARGET GROUPS	PERIOD	VENUE	PARTICIPANTS
ROUND 1: Environmental and social scoping	<ul style="list-style-type: none"> • Inform community leaders and people directly affected about the project and ongoing studies; • Identify key issues, concerns and expectations associated with the project and the study area; • Complete stakeholders' list and validate the stakeholders' engagement activities; 	<ul style="list-style-type: none"> • Local government authorities ;(LGA). • Community leaders; • Affected people. 	25/10/2018	Sheda Youth Leader's Residence and Kwali Area Council Secretariat	12
ROUND 2: Consultation on the preliminary results of the ESIA	<ul style="list-style-type: none"> • Present, validate and improve the preliminary results of the EIA; • Ensure compliance of proposed measures with the requirements and expectations of the authorities; • Assess the project's social acceptability and the proposed measures. 	<ul style="list-style-type: none"> • Ministries and national agencies (federal and state); • Local government authorities (LGA); • Community leaders; • Affected people; • NGOs and civil society. 	05/03/2019	Kwali Area Council Secretariat	12
ROUND 3: Consultation on the ESMP of Analytical Laboratory, Sheda	<ul style="list-style-type: none"> • Present, validate and improve the measures in the ESMP; • Ensure compliance of proposed measures with the requirements and expectations of the authorities; • Assess the social acceptability the proposed project and the proposed management measures. 	<ul style="list-style-type: none"> • Ministries and national agencies (federal and state); • Local government authorities (LGA); • Traditional Institutions, Community leaders, Youths and Women Groups; • Affected people; • NGOs and civil society. 	31/07/2019	Dennis Hotel, Wuse 2, Abuja	22

3.3 FIRST ROUND CONSULTATIONS

This first round of stakeholder information and consultation undertaken during the development of the EIA, has served to present the project to stakeholders and obtain issues of concern to them, their expectations and recommendations to be considered for inclusion in the scope of the studies. The meetings were held on 25th October 2018, with meetings format consisted of a presentation of the project, followed by a question and answer (Q&A) period. The issues of concerns and recommendations made were considered in defining the scope of the study. The meetings involved traditional institutions, youths, the Kwali LGA and an NGO (Savannah Conservation). Attendance sheets, minutes of meetings are in [Appendix 2](#).



Figure 3.1 Meeting with Sheda Community Leaders

The main concerns and observations raised during the first round of stakeholder consultation are summarized as follows;

The community members.

- The community expressed concern about the effect of the PCB on their health and requested that adequate measures should be put in place to protect them.
- requested employment for the youths during the construction stage of the project and after the project has commenced.
- the community agreed that SHESTCO paid compensation to their parents many years back, but it was not adequate and requested for additional compensation on the land.

3.4 SECOND ROUND CONSULTATIONS

This second round of stakeholder information and consultation presented to the Stakeholders, the preliminary findings of the EIA for them to validate and improve the preliminary results of the EIA and ensure requirements and expectations of stakeholders have been adequately addressed. The meeting was held on March 5th 2019 at the conference hall of Kwari Area Council Secretariat in Kwali. The meeting format consisted of a presentation of the report, followed by comments and recommendations from stakeholders. Maps illustrating the location of the project were used as well. Attendance sheets and minutes of meetings are in Appendix 2.2.



Figure 3.2 Second Round Stakeholders Meeting in Kwali LGA

The main concerns and observations raised during the second round of stakeholder consultation are summarized as follows in Table 3.2;

Table 3.2 Outcome of Stakeholder Consultations (Round 2)

COMMENTS/RECOMMENDATIONS	MADE BY	RESPONSE(S)
The timing of the consultation meeting made it almost impossible for us to make any meaningful contribution because we weren't able to go through the Report.	AEPB	And participants were given the opportunity to study the reports and send additional comments within a week.
Your presentation did not address ways of detecting PCB contaminated site.	AEPB	PCB contaminated sites across the country will be determined during the national inventory survey.
What is the specific technology adopted for treatment of the PCB's.	AEPB	A number of options are being considered; the final choice depends on the recommendations of design team (see Section 3.3)
Have you gotten approval from Development Control?	AEPB	The Sheda Site is located within SHESTCO premises and the PMU is working on the approval.
Is the project Government or Privately managed for sustainability	AEPB	The project is being implemented by the Federal Ministry of Environment in collaboration with UNDP and funding from GEF.
There is need for wider consultations to include the Etsu Kwali and all district heads	Community	The District Head of Sheda who reports to the Etsu Kwali was represented at the meeting.
The National Standards on Hazardous & Pesticides Regulations 2014 should be included in the report	NESREA	This has been included in the report (see Section 1.2.3)

3.5 THIRD ROUND CONSULTATIONS

This third round of stakeholder information and consultation presented to the Stakeholders, summary of potential impacts, planned mitigation measures, planned environmental monitoring, responsibilities and authorities for implementation of mitigation measures and monitoring for stakeholders to validate and improve the draft ESMP and also ensure requirements and expectations of stakeholders have been adequately addressed.

The meeting was held on July 31st2019 at the hall of Dennis Hotel, Wuse 2, Abuja. The meeting format consisted of a presentation of the draft ESMP, followed by comments and recommendations from stakeholders. Attendance sheets and minutes of meetings are in Appendix 2.3.



Figure 3.3 Third Round Stakeholders Meeting in Dennis Hotel



Figure 3.4 Third Round Stakeholders Meeting in Dennis Hotel no. 2

The main concerns and observations raised during the third round of stakeholder consultation are in Table 3.3.

Table 3.3 Outcome of Stakeholder Consultations (Round 3)

COMMENTS/RECOMMENDATIONS	MADE BY	RESPONSE(S)
Are the necessary regulatory agencies involved in the building plan been contacted? The master plan should be checked to ensure the project can be situated in the proposed location.	Development Control	Development Control will be contacted for necessary approvals as well as other relevant regulatory bodies, as well as other regulatory bodies (See Sections 6.2 to 6.6).

COMMENTS/RECOMMENDATIONS	MADE BY	RESPONSE(S)
Representative of FMEnv should be present at the meetings.		The project belongs to the Federal Ministry of Environment, and they are represented at the meeting
The PCB oil should not be re-used as anti-termite because that cannot be considered as recycling/re-use instead it is as good as dumping the oil somewhere.	AEDC	All oils containing PCBs shall be collected, stored and treated strictly at the PCB-ISF centers, not allowed to be used for any purpose
<p>AEPB has an approved site for waste recycling at industrial layout and it is expected that the proponent should have consulted with AEPB to get a designated area for the disposal</p> <p>The monitoring plan was also observed to have limited the stakeholders to the Federal level which shouldn't be and he suggested that AEPB should be a part of the monitoring team to ensure proper coordination.</p> <p>The air quality within the premises should be considered and air sensors should be installed to protect the safety of the workers.</p> <p>The timeline/duration of the project should be indicated in the report.</p> <p>The advantage of siting the project in an industrialized area is that the waste disposed might be useful to other industries located close to the project facility.</p> <p>Revegetation of the boundaries between the industries and the flood area should be considered.</p>	AEPB	<p>Noted, and if that has to be done, the land will be given for free as the project belongs to Government.</p> <p>AEPB, NESREA and Kwali Area Council has been added to the monitoring team (See Tables 5.7 to 5.10)</p> <p>The lab is equipped with fumes cupboards and extractors as well as sensors. (See Section 1.3.1 -Analytical testing)</p> <p>The Project schedule is in the report (See Table 7.1).</p> <p>Sheda (SHESTCO) is an industrial Zone</p> <p>The community are already farming in the boundaries with no intention to leave.</p>
<p>AEPB should be involved in the monitoring plan as well as northern states regulatory bodies.</p> <p>Will disposal of solid wastes be included in the project?</p>	NESREA	<p>AEPB is included in the monitoring team (See Tables 5.7 to 5.10) .</p> <p>The Laboratory is only for PCB analysis</p>
Where does TCN come in as regards the project?	TCN	TCN is a major stakeholder because they own most of the transformers that has to do with PCB oils.
<p>The report and invitation to the stakeholders meeting should be sent in ample time</p> <p>The project unit of FMENV are not present and going forward no meeting will be held without their attendance</p>	NERC	<p>The invitation and reports were sent out over a week before the meeting. We will do better than this subsequently.</p> <p>Mr. Dauda of the project unit later came and apologized for coming late.</p>
The labels should be in English language and the dialect of the community for proper communication.	Savanna Conservation Forum	Noted, and will be considered

CHAPTER FOUR

4.0 ENVIRONMENTAL AND SOCIAL IMPACTS

4.1 INTRODUCTION

This chapter provides information on the assessment of the associated and potential environmental and social impacts from the proposed Project. The impacts from both short-term installation phase and the long-term operational phase and closure phase are being considered. A description of the assessment methodology used to assess the significance of impacts, taking into account impact magnitude and sensitivity of receptors and resources affected, is provided.

The assessment considered project activities in the following phases of the project development. The detailed description of the activities in each phase is provided in Chapter 1.

- Pre-Construction Phase;
- Construction and Installation Phase;
- Operation and Maintenance Phase;
- Decommissioning and Closure.

The following environmental indicators, receptors or resources affected by potential impacts were also considered:

- Biophysical Environment:
 - Air quality;
 - Noise;
- Human Environment;
 - Occupational health, safety;
 - Labour and working conditions;
- Infrastructure;
- Employment and economy.

For each of the above-mentioned environmental component, the associated potential impacts of Project activities are identified, and significance evaluated.

4.2 IMPACT ASSESSMENT METHODOLOGY

This section describes the overall approach used for the assessment of impacts. Topic-specific methodologies are described under each section of the impact assessment. In general, the assessment of impacts will pass through an iterative process involving the following four key elements:

- Prediction of potential impacts and their magnitude (i.e., the consequences of the proposals on the natural and social environment);
- Evaluation of the importance (or significance) of impacts taking the sensitivity of the environmental resources or human receptors into account;
- Development of mitigation measures to avoid, reduce or manage the impacts or enhancement measures to increase positive impacts; and

- Assessment of residual significant impacts after the application of mitigation and enhancement measures.

Where significant residual impacts remain, further options for mitigation may be considered and impacts re-assessed until they are as low as reasonably practicable for the Project.

4.2.1 Nature/Type of impacts

There are number of ways that impacts may be described and quantified. The definitions adopted for this ESIA are described in Table 4.1.

Table 4.1 Definition of Impacts

1	<p>NATURE OF IMPACT: An impact is essentially any change to a resource or receptor brought about by the presence of a project component or by the execution of a project related activity.</p> <p>Negative – an impact that is considered to represent an adverse change from the baseline or to introduce a new undesirable factor.</p> <p>Positive – an impact that is considered to represent an improvement to the baseline or to introduce a new desirable factor.</p>
2	<p>TYPE OF IMPACT:</p> <p>Direct (or primary) – impacts that result from the direct interaction between a planned project activity and the receiving environment.</p> <p>Secondary – impacts that result from the primary interaction between the Project and its environment as a result of subsequent interactions within the environment.</p> <p>Indirect – impacts that result from other activities that are encouraged to happen as a consequence of the Project.</p>
3	<p>TEMPORAL SCALE OF IMPACT:</p> <p>Temporary - impacts are predicted to be of short duration, reversible and intermittent/occasional in nature. The receptor will return to a previous state when the impact ceases or after a period of recovery.</p> <p>Short-term - impacts that are predicted to last only for a limited period (i.e., during a phase) but will cease on completion of the activity, or as a result of mitigation measures and natural recovery.</p> <p>Long-term - Impacts that will continue for the life of the project but cease when the project stops operating. These will include impacts that may be intermittent or repeated rather than continuous if they occur over an extended time period.</p>
4	<p>SPATIAL SCALE OF IMPACT:</p> <p>On-site – impacts that are limited to the Project site.</p> <p>Local - impacts that affect locally important environmental resources or are restricted to a single (local) administrative area or a single community. For this ESIA, local impacts are restricted to the Project site and adjacent areas.</p> <p>Regional - impacts that affect regionally important environmental resources or are experienced at a regional scale as determined by administrative boundaries (i.e. State).</p> <p>National - impacts that affect nationally important environmental resources; affect an area that is nationally important/protected; or have macro-economic consequences (i.e. Nigeria).</p> <p>International - impacts that affect internationally important resources such as areas protected by International Conventions.</p> <p>Trans-boundary - impacts that are experienced in one country as a result of activities in another.</p>

4.2.2 Assessment of Significance

There is no statutory definition of ‘significance’ and its determination is therefore necessarily partially subjective. For the purposes of this ESIA, the following definition of significance has been adopted:

“An impact is significant if, in isolation or in combination with other impacts, it should be taken into account in the decision-making process, including the identification of mitigation measures (by the Project) and consenting conditions (from Regulators and Stakeholders).”

Criteria for assessing the significance of impacts stem from the following key elements:

- Status of compliance with relevant Nigerian legislation, policies and plans and any relevant Nigerian or industry policies, standards or guidelines;
- The magnitude (including nature, scale and duration) of the change to the natural or socio-economic environment (e.g. an increase in noise, an increase in employment opportunities), expressed, wherever practicable, in quantitative terms. The magnitude of all impacts is viewed from the perspective of those affected by taking into account the likely perceived importance as understood through stakeholder engagement;
- The nature and sensitivity of the impact receptor (physical, biological, or human). Where the receptor is physical, the assessment considers the quality, sensitivity to change and importance of the receptor. For a human receptor, the sensitivity of the household, community or wider societal group is considered along with their ability to adapt to and manage the effects of the impact; and
- The likelihood (probability) that the identified impact will occur. This is estimated based upon experience and/or evidence that such an outcome has previously occurred.

For this assessment, significance has been defined based on five levels described as follows:

Positive impacts provide resources or receptors, most often people, with positive benefits. It is noted that concepts of equity need to be considered in assessing the overall positive nature of some impacts such as economic benefits, or opportunities for employment.

Negligible impacts (or Insignificant impacts) are where a resource or receptor (including people) will not be affected in any way by a particular activity or the predicted effect is deemed to be ‘negligible’ or ‘imperceptible’ or is indistinguishable from natural background variations.

An impact of minor significance (‘Minor impact’) is one where an effect will be experienced, but the impact magnitude is sufficiently small (with or without mitigation) and well within accepted standards, and/or the receptor is of low sensitivity/value.

An impact of moderate significance (‘Moderate impact’) is one within accepted limits and standards. Moderate impacts may cover a broad range, from a threshold below which the impact is minor, up to a level that might be just short of breaching a legal limit. Clearly to design an activity so that its effects only just avoid breaking a law and/or cause a major impact is not best practice. The emphasis for moderate impacts is therefore on demonstrating that the impact has been reduced to a level that is ALARP. This does not necessarily mean that ‘Moderate’ impacts have to be reduced to ‘Minor’ impacts, but that moderate impacts are being managed effectively and efficiently.

An impact of major significance (‘Major impact’) is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. An aim of ESIA is to get to a position where the Project does not have any major residual impacts, certainly not ones that would endure into the long-term or extend over a large area. However, for some aspects there may be major residual impacts after all practicable mitigation options have been exhausted (i.e. ALARP has been applied). It is then the function of regulators and stakeholders to weigh such negative factors against the positive ones such as employment, in coming to a decision on the Project.

For environmental impacts the significance criteria used is shown in Table 4.2

Table 4.2 Overall Significance Criteria for Environmental Impacts

Receptor sensitivity (or resource value)	Impact magnitude		
	Low	Medium	High
Low	Minor	Minor	Moderate
Medium	Minor	Moderate	Major
High	Moderate	Major	Major

For social impact assessment, the perceptions of stakeholders, expressed as opinions around certain issues, can be as important as actual impacts. Consequently, the concept of perception is explicitly brought into the evaluation of significance after an impact is evaluated. When an impact is of significant stakeholder concern, this may be cause to raise the significance rating. This prompts the formulation of more rigorous and appropriate mitigation measures which focus on the source of the impact and also address stakeholder perceptions. The risk of not addressing stakeholder perceptions is that reputational damage could arise, resulting in the loss of a 'social license to operate'.

Magnitude of Impact

The term 'magnitude' covers all the dimensions of the predicted impact to the natural and social environment, including:

- the nature of the change (what resource or receptor is affected and how);
- the spatial extent of the area impacted, or proportion of the population or community affected;
- its temporal extent (i.e. duration, frequency, reversibility); and
- Where relevant (accidental or unplanned events), the probability of the impact occurring.
- For biophysical impacts, the definitions for the spatial and temporal dimension of the magnitude of impacts used in this assessment were provided in Table 3.2. [How sure? Please check]
- For social impacts, the magnitude considers the perspective of those affected by taking into account the likely perceived importance of the impact, the ability of people to manage and adapt to change and the extent to which a human receptor gains or losses access to, or control over socio-economic resources (1 ???) resulting in a positive or negative effect on their well-being (a concept combining an individual's health, prosperity, their quality of life, and their satisfaction).

Sensitivity of resources and receptors

Sensitivities are defined as aspects of the natural or social environment which support and sustain people and nature. Once affected, their disruption could lead to a disturbance of the stability or the integrity of that environment.

- For ecological impacts, sensitivity can be assigned as low, medium or high based on the conservation importance of habitats and species. For habitats, these are based on naturalness, extent, rarity, fragility, diversity and importance as a community resource.
- For socio-economic impacts, the degree of sensitivity of a receptor is defined as ‘a stakeholder’s (or groups of stakeholders’) resilience or capacity to cope with sudden changes or economic shocks’. The sensitivity of a resource is based on its quality and value/importance, for example, by its local, regional, national or international designation, its importance to the local or wider community, or its economic value.

Likelihood

Terms used to define likelihood of occurrence of an impact are explained in Table 4.3

Table 4.3 Explanation of terms used for likelihood of occurrence

Definition of likelihood		
High probability	Refers to a very likely impact	Refers to very frequent impacts
Medium probability	Refers to a likely impact	Refers to occasional impacts
Low probability	Refers to a very unlikely impact	Refers to rare impacts
	As far as one-time events (e.g. air emissions) or slowly developing effects are concerned (e.g. impacts on local life style)	As far as possibly recurring impacts are concerned, such as accident or unplanned events (e.g. traffic accident, fire)

General impacts are those impacts that would be common to all the three sites. Site specific impacts are addressed later in this chapter.

4.3 AIR QUALITY

4.3.1 Pre-Construction/Installation phase

(a) Emissions from vehicles and equipment (SO_x, CO, NO_x, CO₂, PM): Movement of vehicles carrying installation equipment to the Lab will result in PM, SO_x, CO, NO_x, CO₂ emissions. It is noteworthy to mention that the quantity of emissions is dependent on the vehicle type and their conditions. Light-duty petrol vehicles not equipped with pollution control devices have the highest exhaust emissions during acceleration, followed by deceleration and idling cycles. Emissions from diesel-fuelled vehicles include particulate matter, NO_x, SO₂, CO and HC, the majority of which occurs from the exhaust. This impact is predicted to be **Direct, off-Site, Short Term, Low likelihood, Short Duration and Medium Probability**. **The overall Significance is predicted as Minor**

(b) The black smoke observed to emanate from poorly maintained diesel-fuelled vehicles is caused by oxygen deficiency during the fuel combustion. Particulate emissions from petrol-driven vehicles are usually negligible. Such emissions when they do occur would result from unburned lubricating oil, and ash-forming fuel and oil additives. This impact is predicted to be **Direct, off-Site, Short Term, Low likelihood, Short Duration and Medium Probability**. **The overall Significance is predicted as Minor**

(c) The dust emissions arising from the installation activities are as a result of vehicle movements and dust emissions have the potential to create impact on the close receptors due to the physical appearance, deposition on the roof of the residential buildings and creating nuisance for the

surrounding community. This dust can take the form of entrainment from the vehicle itself or due to dust blown from the back of the trucks during transportation of installation materials. This impact is predicted to be **Direct, off-Site, Short Term, Low likelihood, Short Duration and Medium Probability**. **The overall Significance is predicted as Minor**

4.3.2 Installation phase

Installation activities of gas system, fire grid system and the GLC machine during the installation phase may give rise to flue gas. Three chemically inert carrier gases are frequently used in the installation process. They are Helium, Argon or Carbon 11 oxide, choice of which is dependent on type of MSD employed. These types of leaks can result from a column not being installed in the expected inlet, a column not being connected to the expected detector, a broken column, broken or loose fittings, broken ferrules, cored septa, or tubing blockage amongst other possibilities. Exposure to small levels gas leaks during this phase can result in headache, dizziness and light headedness while high levels exposure could result in passing out, suffocation and even death. Gas leaks occur over a **Direct, Short Term, Low Probability, Short Duration, medium likelihood and an overall Minor Significance**.

4.3.3 Operational phase

(a) Emission from vehicles: The movement of vehicles carrying PCB materials to the Lab for operation will result in PM, SO_x, CO, NO_x, CO₂ emissions. The quantity of emissions is dependent on the vehicle type and their conditions. Light-duty petrol vehicles not equipped with pollution control devices have the highest exhaust emissions during acceleration, followed by deceleration and idling cycles. Emissions from diesel-fuelled vehicles include particulate matter, NO_x, SO₂, CO and HC, the majority of which occurs from the exhaust. Particulates emitted from diesel vehicles consist of soot formed during combustion, heavy HC condensed or adsorbed on the soot and sulphates. This impact is predicted to be **Direct, Low Probability, Long Duration, High likelihood and an overall Moderate Significance**.

(b) Flue Gas: Operational activities such as packaging, temporal storage of PCB oil, PCB waste and PCB - contaminant materials, as well as storage/disposal of treated PCB materials. Exposure to small levels gas leaks during this phase can result in headache, dizziness and light headedness while high levels exposure could result in passing out, suffocation and even death. The impact is **Direct, Short Term, Medium Probability, Short Duration, medium likelihood and an overall Moderate Significance**.

(c) **Sample digestion, preparation and Analyses using GLC involves** six digestion procedures using nitric acid (HNO₃; 65%, P.A., Vetec 191; Sigma-Aldrich Ltd., São Paulo, SP, Brazil) and perchloric acid (HClO₄; 70%, P.A., ACS, Vetec 909; Sigma-Aldrich Ltd., Brazil) which is likely to result in accidental spills on workers which may lead to injuries like acid burns from the analytical chemicals as well as exposure of workers to high temperature during the digestion and analytical testing which is carried out during solid samples digestion in strong and hot acids. The impact is **Direct, Long Term, Medium Probability, Long Duration, medium likelihood and an overall Moderate Significance**.

(d) Retro filling and dismantling as treatment protocols

Spent oil reduces the efficiency of transformers and can be treated by retro filling (draining of spent oil and refilling with new oil). In cases where these treatment measures does not restore the transformer to its functional state, dismantling is inevitable and this would result in minor to severe injuries ranging from minor cuts, burns to severe cuts as the dismantling processes uses a Hack Saw to cut open the welded lids of transformers. This method is problematic since the hack saw produces

small amount of sparks. These sparks may lead to fire outbreak and is dangerous and should be eliminated. In addition to the sparks, the hacksaw is unstable. As it is used by the human, it is very shaky and also takes a long time of about 4 to 12 hours to cut open the transformer depending on the size. The other method used to cut the transformer is by using a weld. This is a risky process. A firefighting team has to fill the transformer with foam before the walls can be cut by weld. Once the cutting starts, the foam flows out through the open spaces and needs to be refilled. This is a costly process. The impact is **Direct, Long Term, Medium Probability, Long Duration, medium likelihood and an overall Moderate Significance.**

4.3.4 Decommissioning phase

(a) De Installation activities of gas system, fire grid system and the GLC machine may give rise to fuel gas. These types of leaks can result from a column not being properly de installed in the expected inlet, a column not being disconnected to the expected detector, a broken column, broken or loose fittings, broken ferrules, cored septa, or tubing blockage amongst other possibilities. Exposure to small levels gas leaks during this phase can result in headache, dizziness and light headedness while high levels exposure could result in passing out, suffocation and even death. Gas leaks occur over a **Direct, Short Term, Low Probability, Short Duration, medium likelihood and an overall Minor Significance.**

(b)Emissions from vehicles and equipment (SO_x, CO, NO_x, CO₂, PM): Movement of vehicles carrying the installation equipment to the Lab will result in PM, SO_x, CO, NO_x, CO₂ emissions. It is noteworthy to mention that the quantity of emissions is dependent on the vehicle type, amount and their conditions. Light-duty petrol vehicles not equipped with pollution control devices have the highest exhaust emissions during acceleration, followed by deceleration and idling cycles. Emissions from diesel-fuelled vehicles include particulate matter, NO_x, SO₂, CO and HC, the majority of which occurs from the exhaust. This impact is predicted to be **Direct, off-Site, Short Term, Low likelihood, Short Duration and Medium Probability. The overall Significance is predicted as Minor**

(c) The black smoke observed to emanate from poorly maintained diesel-fuelled vehicles is caused by oxygen deficiency during the fuel combustion or expansion phase. Particulate emissions from petrol-driven vehicles are usually negligible. Such emissions when they do occur would result from unburned lubricating oil, and ash-forming fuel and oil additives. This impact is predicted to be **Direct, off-Site, Short Term, Low likelihood, Short Duration and Medium Probability. The overall Significance is predicted as Minor**

(d) The dust emissions arising from the installation activities are as a result of vehicle movements. Dust emissions have the potential to create impact on the close receptors due to the physical appearance, deposition on the roof of the residential areas and creating nuisance for the surrounding community. This dust can take the form of entrainment from the vehicle itself or due to dust blown from the back of the trucks during transportation of installation materials. This impact is predicted to be **Direct, off-Site, Short Term, Low likelihood, Short Duration and Medium Probability. The overall Significance is predicted as Minor**

4.4 NOISE

4.4.1 Pre-Construction/Installation phase

During Pre-Construction/Installation phase activities such as transportation of materials and equipment for installation will produce noise. Traffic noise is one of the many environmental

background sounds; and when these background sound is higher than a certain threshold, adverse effect may occur, including damage to the sensitivity of human hearing, high blood pressure and hypertension. This impact is predicted as **Minor Significance**.

4.4.2 Installation phase

During the installation phase, installation activities such as installation of gas network system, water system, safety system, detectors, mounting and calibration of equipment, as well as the use of installation equipment and machinery are unlikely to lead to a temporary increase in noise level. Therefore, **the overall Significance is predicted as Negligible**.

4.4.3 Operational phase

The operation of generator in case of power outage and installed machine during the operational phase is likely to raise the noise level. This impact is predicted to be **Minor**.

4.4.4 Decommissioning phase

During decommissioning phase, activities like removal of stored materials, uninstallation of machines and subsequent transportation of the dismantled materials are likely to raise the background noise level. However, the impact is predicted as **Minor**.

4.5 SOIL

4.5.1 Pre-Construction installation

Impact in this phase is unlikely to occur.

4.5.2 Construction and Installation phase

(a) Impact on Soil Structure: During the construction of the building housing the laboratory, excavation for foundation and removal of vegetation are the main activities likely to affect soil structure and quality. At the site, the sparse vegetation within the footprint of the areas to be developed will be cleared to ground level.

Excavation works and removal of vegetation, especially on steep slopes, would render soils unstable and more vulnerable to erosion. Soil quality may also deteriorate as a result of removal of vegetation.

Considering the fact that only small areas are exposed with impact localised and duration is short, sensitivity of the receptor medium and its magnitude will be **Moderate**, during the construction period.

(b) Potential contamination of soil from inadvertent release of hazardous or contaminating material: Soils can be contaminated during the construction phase by accidental oil/fuel spills from heavy machinery either at storage yards or work sites. In the event of an accidental spill, the proportion of soil contamination will depend on the magnitude of these accidental events. Avoiding storage of materials within these areas as well as implementation of an Emergency Response Plan will help manage accidental spills properly. Considering the medium magnitude of this activity and medium receptor sensitivity, the impact is **moderate**.

4.5.3 Operational phase

During this phase, activity such as labelling, and packaging of hazardous materials may result in the accidental spill of spent oil on the soil. The impact is predicted to be **Minor**.

4.5.4 Decommissioning phase

During this phase, activity such as handling of hazardous waste and the uninstalation of gas and fire systems may result in accidental spill on the soil. The impact is predicted to as **Minor**

4.6 WATER RESOURCES

4.6.1 Construction Phase

The closest water body to the site is a seasonal stream, about 1km from the site, which drains storm water from the site. Construction spoils that are not properly managed, could be carried along with storm water particularly when it rains. Frequent evacuation of wastes to designated disposal sites could allow reducing impacts on water resources. Considering the distance of water courses from the sites, the hydrodynamics of these watercourse as well as water quality are not expected to be affected. Therefore, the impact on hydrogeology is considered to be **minor**.

4.6.2 Operation Phase

During operations phase, even a small amount of spill of PCB into water courses could be significant, because of its bioaccumulation ability, persistence in the environment, toxicity and carcinogenicity. PCBs are classified as both toxic chemicals and carcinogens for humans as well as other animals, with 12 of the 209 congeners considered dioxin-like. A further 9 are considered highly toxic, and 25 have been commonly identified bio-accumulated in milk or fish. Contamination of surface or groundwater will render the water non-usable for fishing and domestic purposes. There is no evidence yet to show PCBs being particularly phytotoxic (except for a slowing of growth at very high concentrations); however, this is an uptake route for aquatic organism. Aquatic life is especially prone to bioaccumulation, with the PCB concentrations increasing up the food chain.

Therefore, considering the level of toxicity, sensitivity of the receptor and its bioaccumulation ability, the significance of this impact is considered **High**.

4.7 TERRESTRIAL FLORA AND FAUNA

4.7.1 Construction Phase

The construction phase of the project will require clearing vegetation from the site. The Sheda site consisting of sparse vegetation and a farmland, mostly of herbaceous vegetation, will experience fewer losses due to clearing, but remains vulnerable to disturbances that could occur during the construction phase. The flora present on the sites does not include any species identified in the IUCN Red List of threatened species or in a national list (Isichei 2010). There are no known endemic species in the study area as well.

The footprint of the project is small; thus the magnitude of the impact is low. Furthermore, there are no sensitive ecosystem identified around the area, the receptor sensitivity is also low. Therefore, the impact significance is **Minor**

4.7.2 Operation Phase

Noise generation during operation of the project is likely to affect avifauna. The proposed project is located within the Sheda technology center. Hence, effects on birds may likely be cumulative. The significance of the potential impact on avifauna is **minor**, considering the low magnitude and localised area because laboratory analysis does not generate high noise.

4.8 OCCUPATION HEALTH, SAFETY

4.8.1 Pre-Construction/Installation phase

During this phase, transportation of installation materials and equipment may expose the driver and co-workers to increased risks of accident on public roads. However, the impact is predicted as **Minor**.

4.8.2 Installation phase

During installation, fragile glass or fused capillary columns, broken objects resulting in flying particles, falls have been known to occur. Electrical shock can also occur when equipment is not turned off during access panel removal. This impact is **predicted as Minor**.

4.8.3 Operation phase

(a) The operation of the PCB storage and treatment facility will likely contribute directly to occupational and health concerns to the workers. Possible injuries may range from minor cuts, electrocution, falls amongst others. Emissions from vehicles such as SO_x, CO, NO_x, CO₂, PM, may cause occupational health hazard. On the other hand, analytical testing may likely generate negative impacts during this phase as these activities induce breathing difficulties. Also, chemical analysis of liquid, solid and gas samples, mishandling of liquid, gas, and solid reagents may result in minor to severe skin injuries. This impact is predicted to be **Moderate**.

(b) Sample digestion, preparation and Analyses using GLC involves using nitric acid (HNO₃; 65%, P.A., Vetec 191; Sigma-Aldrich Ltd., São Paulo, SP, Brazil) and perchloric acid (HClO₄; 70%, P.A., ACS, Vetec 909; Sigma-Aldrich Ltd., Brazil) which is likely to result in accidental spills on workers leading to injuries (acid burns from the analytical chemicals as well as exposure of workers to high temperature during the digestion and analytical testing which is carried out during solid samples digestion in strong and hot acids). The impact is **predicted to have an overall Moderate Significance**.

(c) Retro filling and dismantling as treatment protocols: Spent oils are known to reduce the efficiency of transformers and can be treated by retro filling (draining of spent oil and refilling with new oil). In cases where these treatment measures does not restore the transformer to its functional state dismantling is inevitable and this would result in minor to severe injuries ranging from minor cuts, burns to severe cuts as the dismantling processes uses a Hack Saw to cut open the welded lids of transformers. This method is problematic since the hack saw produces small amount of sparks. These sparks may cause fire sparks and is dangerous and should be eliminated. In addition to the sparks, the hacksaw is unstable. As it is used by the human, it is very shaky and also takes a long time of about 4 to 12 hours to cut open the transformer depending on the size. The other method used to cut the transformer is by using a weld. This is a risky process. A firefighting team has to fill the transformer with foam before the walls can be cut by weld. Once the cutting starts, the foam flows out through the open spaces and needs to be refilled. This is a costly process. The impact is predicted to have an overall **Moderate Significance**.

4.8.4 Decommissioning phase

Decommissioning activities such as removal of storage materials, uninstallation of some equipment and other electrical will likely contribute to the operational health and safety concerns of the workers. Possible injuries may range from minor cuts, electrocution, falls amongst others. However, this impact is predicted as **Minor**.

4.9 LABOUR AND WORKING CONDITIONS

4.9.1 Pre-Construction/Installation phase

Risks amongst labour force, including minor incidents such as cuts and major incidents such as loss of life and exploitation of labour force are the likely impact that may arise from the pre installation activities. The impact is predicted as **Moderate**.

4.9.2 Installation phase

Risk of incidents amongst Labour force, including minor incidents such as cuts as well as Labour force exploitation and improper gas installation may cause dermatitis noise, vibration and other occupational health issues alongside flue gases such as SO_x, CO, NO_x CO₂. Wrong connection may also result in minor shocks to individuals. Impact is predicted as **Moderate**.

4.9.3 Operational phase

Activities of staff in the Lab may create, risk to health & safety amongst Labour force, including minor incidents such as cuts as well as Labour force exploitation. The impact is predicted as **Moderate**.

4.9.4 Decommissioning phase

Decommissioning activities are likely to generate same impact as in installation phase, and is rated **Minor**

4.10 INFRASTRUCTURE

4.10.1 Pre-Construction/Installation phase

Impacts here is unlikely

4.10.2 Installation phase

The construction activities will require certain infrastructures, such as roads, water and electricity as well as health care. The period for construction is expected to be less than 6 months, and considering the size of the project, this impact is predicted to have negligible impact.

4.10.3 Operation phase

The operational activities of the Lab will increase the electrical load of the area throughout the life span of the project. Also, possibility of electrocution resulting from some operational activities shall be mitigated by the use of PPE and careful handling of equipment and machines. The impact is predicted as **Moderate**.

4.10.4 Decommissioning phase

This impact is unlikely

4.11 EMPLOYMENT AND ECONOMY

4.11.1 Pre-Construction/Installation phase

The impact in this phase is positive as local labourers would be engaged to provide services.

4.11.2 Installation phase

Supply of laboratory reagents and installation materials would ensure more cash flow in circulation. The impact is positive.

4.11.3 Operational phase

Operation of the lab would create employment and will reduce PCB contaminated materials and equipment in the country. The impact is **Positive**.

4.11.4 Decommissioning phase

At the end of the project life cycle, local labour would be engaged in dismantling structures, thereby releasing money into circulation. Also, the availability of land for other purposes would enhance the economy. These impacts are Positive.

However, loss of job and its attendant consequences on firms supplying services would hurt the economy over a long duration with an overall Moderate significance.

4.12 SUMMARY OF IMPACTS

Tables 4.4, 4.5, 4.6 and 4.7 present the summary of various activities involved in the project development and the significant environmental and social impacts associated with each of them.

Table 4.4 Summary of Potential Impacts during Pre-Construction/Installation Phase

Indicator	Potential impact	Receptor	Significance
Air quality	Localized impairment of air quality by exhaust emissions from vehicles and equipment engines (SO ₂ , CO, NO _x , CO ₂ , PM), gas leakages during installing of gas systems.	Community members and other road users	Minor
	Black smoke observed to emanate from poorly maintained diesel-fuelled vehicles.	Community members and other road users	Minor
	Elevated dust levels in Lab area as a result of dust raised by vehicle movements, wind, and handling of dusty material.	Community members and other road users	Minor
Noise, and vibration	Nuisance noise and vibration from vehicular movements	Workers and people around the Lab area	Minor
Soil	Impact here is unlikely		Negligible
Water Resources	Impact unlikely	Sheda stream, which is an ephemeral stream.	Insignificant
Terrestrial flora/fauna	Impact unlikely	Vegetation, avifauna, wildlife	Insignificant
Occupation Health, Safety	Exposure of the driver and co-workers to increased risks accident as well as traffic safety incidents on public roads.	Contractor and other road users	Minor
Labour and working conditions	Exploitation of workers.	Labour force	Moderate
	Risk of health & safety incidents amongst Labour force, including minor incidents such as cuts and major incidents such as loss of life.	Labour force	
Infrastructure	Impact here is unlikely		Negligible
Employment and economy	Supply chain opportunities for Nigerian companies that can provide goods and services needed by the Lab people will be employed for the installation of lab materials.	Nigerian companies	Positive

Table 4.5 Summary of Potential Impacts during Construction and Installation Phase

Indicator	Potential impact	Receptor	Significance
Air quality	Fuel gas leakages	Contractors	Minor
Noise, and vibration	Impact here is unlikely		Negligible
Soil	Impact here is unlikely		Negligible
Water Resources	Construction spoils not properly managed could be carried along with storm water.	Sheda stream, which is an ephemeral stream	Minor
Terrestrial flora/fauna	Vegetation clearance and effects of noise on fauna.	Vegetation, avifauna, wildlife	Minor
Occupation Health, Safety	Potential injuries, electric shocks.	Contractors	Minor
Labour and working conditions	Exploitation of workers	Labour force	Moderate
	Risk of health & safety incidents amongst Labour force, including minor incidents such as cuts and major incidents such as loss of life.	Labour force	
Infrastructure	Increase in electrical load.	Power source	Negligible
Employment and economy	Supply chain opportunities for Nigerian companies that can provide goods and services needed by the Lab.	Nigerian companies	Positive

Table 4.6 Summary of Potential Impacts during Operation and Maintenance

Indicator	Potential impact	Receptor	Significance
Air quality	Gaseous and particulate emissions from stand by generators and other machines/equipment. Fuel gas, leakages can result from column not being uninstalled properly, this could result in dizziness, headache, passing out and possible death.	Workers and people around the Lab area.	Moderate
Noise, and vibration	Increased noise level.	Workers and people around the Lab area.	Minor
Soil	Accidental spill of spent oil on the soil	Soil around the Lab area.	Minor
Water Resources	Even small amounts of spill of PCB into water courses could be significant, because of its bioaccumulation ability, persistence in the environment, toxicity and carcinogenicity.	Sheda stream, which is an ephemeral stream.	High
Terrestrial Ecology	Noise generation during operation of the project is likely to affect avifauna.	Vegetation, avifauna, wildlife	Minor
Occupation Health, Safety	Potential injuries, electrocution and falls.	Workers	Moderate
Labour and working conditions	Exploitation of workers.	Labour force	Moderate
	Risk of health & safety incidents amongst Labour force, including minor incidents such as cuts and major incidents such as loss of life.		
Infrastructure	Increase in electrical load in the locality.	Power source	Moderate
Employment and economy	Employment opportunities for operational staff. The operational activities of the Lab will help keep the country clean and reduce the quantity of PCB contaminated	Nationals	Positive

Indicator	Potential impact	Receptor	Significance
	materials and equipment while engaging people in what to do by means of employment.		

Table 4.7 Summary of Potential Impacts during Decommissioning

Indicator	Potential impact	Receptor	Significance
Air quality	Fuel gas, leakages can result from column not being uninstalled properly, this could result in dizziness, headache, passing out and possible death.	Workers	Minor
Noise, and vibration	Increased noise level from decommissioning activity	Workers and people around the Lab area	Minor
Soil	Accidental spill on the soil	Surrounding soil	Minor
Water Resources	wastes not properly managed, could be carried along with storm water.	Sheda stream, which is an ephemeral stream	Minor
Terrestrial Ecology	Noise from activities effects fauna.	Vegetation, avifauna, wildlife	Minor
Occupation Health, Safety	Potential injuries may range from minor cuts, electrocution, falls amongst others	Contractors	Minor
Labour and working conditions	Exploitation of workers	Labour force	Minor
	Risk of health & safety incidents amongst labour force, including minor incidents such as cuts and major incidents such as loss of life	Labour force	Minor
Infrastructure	Impact is unlikely		Negligible
Employment and economy	At the end of the project life span an environment with reduced PCB waste load will be achieved. However, loss of job and its attendant consequences on firms supplying services would hurt the economy over a long duration.	Nigerian companies	Moderate

CHAPTER FIVE

5.0 MITIGATION MEASURES

5.1 INTRODUCTION

As presented in Section 1.3, the proposed PCB collection, storage and treatment has the potential to impact the various components of the biophysical, health and social environment of the project area. The identified negative impacts have been ranked variously as either minor or moderate. To preserve the environment, a number of steps have been taken to mitigate the significant, minor and moderate ranking negative impacts, as well as enhance those impacts identified as positive. The mitigation measures proffered for the predicted impacts of the proposed project activities took cognizance of the following requirements:

- Environmental laws and regulations in Nigeria, with emphasis on permissible limits for waste streams (FMEnv 1992);
- World Bank Requirements and other relevant international requirements;
- Best available Technology for sustainable Development;
- Feasibility of application of the proposed mitigation measures in Nigeria;
- View and concerns of stakeholders as expressed during extensive consultations carried out during the study.

The residual effects that may remain after the application of the impact mitigation measures have also been discussed for further reduction of residual impacts to as low level as possible.

5.2 MITIGATION METHODOLOGY

5.2.1 Definition of Mitigation Measures

Mitigation measures are developed to avoid, reduce, remedy or compensate for any negative impacts identified, and to create or enhance positive impacts. In this context, the term “mitigation measures” includes operational controls as well as management actions. These measures are often established through industry standards and may include:

- Changes to the design of the project during the design process (e.g. changing the development approach);
- Engineering controls and other physical measures applied (e.g. waste-water treatment facilities);
- Operational plans and procedures (e.g. waste management plans); and the provision of like-for-like replacement, compensation.

For impacts that are assessed to be of Major significance, a change in design or layout is usually required to avoid or reduce these. For impacts assessed to be of Moderate significance, specific mitigation measures such as engineering controls are usually required to reduce these impacts to ALARP levels. This approach takes into account the technical and financial feasibility of mitigation measures. Impacts assessed to be of Minor significance are usually managed through good industry

practice, operational plans and procedures. And Negligible impacts require no mitigation action, other than those already included in the project design.

In developing mitigation measures, the first focus is on measures that will prevent or minimize impacts through the design and management of the Project rather than on reinstatement and compensation measures.

5.2.2 Assessing Residual Impacts

Impact prediction considers any mitigation, control and operational management measures that are part of the project design and project plan. A residual impact is the impact that is predicted to remain once mitigation measures have been designed into the intended activity. The residual impacts are described in terms of their significance in accordance with the categories identified in Chapter 5.

Social, economic and biophysical impacts are inherently and inextricably interconnected. Change in any of these domains will lead to changes in the other domains. This section looks at how the local way of life might change as a result of the proposed project. Potential changes to local culture, livelihoods, health and well-being, personal and communal property rights are examined.

5.3 AIR QUALITY

5.3.1 Pre-Construction/Installation Phase

Regarding impacts of emissions from vehicles and equipment engines the following mitigation measures are recommended:

- Maintain and operate all vehicles and equipment engines in accordance with manufacturers recommendations;
- Cover properly loose transportable materials and keep top layers moist;
- Use covered trucks for the transportation of materials that release dust emissions; and
- Speed limits on-site of 25km/hr on unhardened roads and surfaces.

With the implementation of the aforementioned measures, the residual air quality impact is expected to be Negligible.

5.3.2 Installation phase

Proper installation procedures for machines and equipment should be followed.

Equipment and machines such as gas systems and fire extinguishers should be properly handled and installed to avoid leakage of gas.

Wearing of Personal Protective Equipment (PPE) will help mitigate the impacts associated with this phase. With the implementation of the aforementioned measures, the residual air quality impact is expected to be Negligible.

5.3.3 Operation Phase

The impact of the project on air quality arises from vehicular emissions and operations of standby power generator; and this can be mitigated by the use of generator, equipment and machine with low emission rate as well as the maintenance and operation of all vehicles and equipment engines in accordance with manufacturer's recommendations. These actions will reduce the impact to Minor.

5.3.4 Decommissioning phase

During site evacuation, the removal of chemicals during the decommissioning phase may likely generate impact in the air quality, the following mitigation measures are recommended:

Proper handling of chemicals, glass wares, waste systems and any other equipment or system to avoid gas leakages, will reduce the impact to Negligible level.

5.4 NOISE

5.4.1 Pre-Construction/Installation phase

Pre-Construction/Installation phase activities such as transportation of materials and equipment for installation, is predicted to produce noise. Adverse effects may occur, including damage to the sensitivity of human hearing, high blood pressure and hypertension. This impact can be mitigated to a Negligible significance by:

- Selection of 'low noise' equipment or methods;
- Use of temporary noise barriers for equipment (e.g. sound proofing walls around stationary power generating sources);
- Avoidance of dropping materials from height, where practicable possible;
- Avoidance of metal-to-metal contact on equipment;
- Maintenance and operation of all vehicles and equipment in accordance with manufacturers recommendations;
- Avoidance of mobile plant clustering near residences and other sensitive land uses;
- Informing all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as providing the contact details of the PMU Community Relation Officer;
- Restricting noisy activities (activities that can be heard in nearby communities) to daytime working hours.

5.4.2 Installation phase

Installation of gas network system, water system, safety system, smoke and gas detectors, mounting and calibration of equipment, as well as the use of installation equipment and machinery is unlikely to lead to a temporary increase in noise level. Therefore, the overall Significance is predicted as Negligible. However, if there is any increase in noise level the measures as outlined in the operation phase should be applied.

5.4.3 Operational phase

The operation of generators in cases of power outage is likely to raise the existing noise level. This impact can be mitigated to a Negligible significance by:

- Using generator and equipment with low noise production;
- Using temporary noise barriers for equipment (e.g. sound proofing walls around stationary power generating sources);
- Avoiding dropping materials from height, where practicable;
- Avoiding metal-to-metal contact on equipment;

- Maintaining and operate all vehicles and equipment in accordance with manufacturers recommendations;
- Avoiding mobile plant clustering near residences and other sensitive land uses;
- Ensuring the use of appropriate PPEs like the earmuff, during working time.
- Informing all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as providing the contact details of the PMU Community Relation Officer;
- Restricting noisy activities (activities that can be heard in nearby communities) to day-time working hours.

5.4.4 Decommissioning phase

During decommissioning phase, activities like removal of stored materials, uninstallation of machines and subsequent transportation of the dismantled materials is likely to raise the existing noise level. Same measures as in pre-construction/installation and operation phases shall be applied to mitigate the impacts.

5.5 SOIL

5.5.1 Pre-Construction/Installation

Impact in this phase is unlikely to occur and thus no mitigation measures are required.

5.5.2 Installation phase

Impact in this phase is unlikely to occur and thus requires no mitigation measures.

5.5.3 Operational phase

During this phase, activity such as labelling, and packaging of hazardous waste may result in the accidental spill of spent oil on the soil. The minor impact can be changed to a Negligible impact if proper handling and packaging is ensured during the operation phase alongside the following mitigation measures:

- Implementation of effective site drainage in and around the lab area to allow for the directed flow of liquids off site;
- Installation of oil/water separators and silt traps before effluent, leaves the site;
- Minimization of bare ground and stockpiles to avoid silt runoff;
- Bounding of areas where hazardous substances are stored (e.g. fuel, waste areas);
- Removal of all water accumulation within bunds using manually controlled positive lift pumps and gravity drains;
- Regular checking and maintenance of all plant and equipment to minimize the risk of fuel or lubricant leakages;
- Training of relevant staff in safe storage and handling practices, and rapid spill response and clean-up techniques;
- Provision of set-ups and apply procedure regarding dealing with contaminated soils;
- Development and implementation of a Waste Management Plan (as part of the ESMP) to ensure that waste is disposed of correctly.

5.5.4 Decommissioning phase

During this phase, activity such as handling of hazardous waste, and the uninstallation of gas systems, fire system may also result in accidental spill on the soil. The minor impact can be downgraded to a Negligible impact if

- proper handling and packaging is ensured during decommissioning;
- training of relevant staff in safe storage and handling practices;
- provision of relevant set-ups and application of procedures regarding dealing with contaminated soils;
- development and implementation of a Waste Management Plan (as part of the ESMP) to ensure that waste is disposed of correctly.

5.6 OCCUPATION HEALTH, SAFETY

5.6.1 Pre-Construction/Installation phase

During this phase, the transportation of installation materials and equipment may expose the driver and co-workers to increased risks of accident on public roads. The following mitigation measures are suggested:

- Maintenance and operation of all vehicles and equipment engines in accordance with manufacturer's recommendations;
- Enforcement of speed limits on-site to 25km/hr on unhardened roads and surfaces;
- Ensuring compliance on PPE usage;
- Training of workers and drivers on vital road signs.

With the implementation of the aforementioned measures, the residual air quality impact is expected to be Negligible.

5.6.2 Installation phase

Fragile glass or fused capillary columns, broken objects resulting in flying particles, falls has been known to occur during the activities of this phase. Electrical shock can also occur when equipment is not turned off during access panel removal. This impact can be reduced to a Negligible significance by applying the following mitigation measures;

- Fragile glass or fused capillary columns, broken objects resulting in flying particles, falls known to occur during the activity of this phase could be mitigated by proper handling of equipment and appliance;
- Switching off of all electrical appliances before accessing them for repairs to prevent electrocution;
- Wearing of PPE to avoid electrocution and other possible injuries.

5.6.3 Operation phase

The operation of the PCB storage and treatment facility will likely contribute directly to workers occupational and health safety. This impact can be reduced to a Minor significance by applying the following mitigation measures:

- Proper handling of equipment and appliance;
- Switching off of all electrical appliances;

- Wearing of appropriate PPE occupational injuries;
- Training of staffs on usage/handling of equipment.

5.6.4 Decommissioning Phase

Decommissioning activities such as removal of storage materials, uninstallation of some equipment and other electrical will likely contribute to the operational health and safety concerns. However, this impact can be mitigated by applying same measures as listed in the operational phase.

5.7 LABOUR AND WORKING CONDITIONS

5.7.1 Pre-Construction/Installation phase

Occupational injuries amongst labour force are the likely impact that may arise from the pre installation activities. Mitigation measures applicable to these impacts include:

- Development of transparent human resources policies and procedures for recruitment process, working conditions, terms of employment, wages, worker-employer relations, non-discrimination policy, monitoring, roles and responsibilities;
- Provision of reasonable, and if applicable negotiated, working terms and conditions;
- Provision of proper work place facilities for water/sanitation/rest rooms;
- If case of retrenchment, first viable alternatives are analyzed and then adverse impacts of retrenchment on workers are reduced as much as possible. A transparent retrenchment plan shall be prepared;
- Implementation of human resources policies in line with the Nigerian Labour Act and ILO Conventions by contractors and third parties on forced labour shall be kept to a negligible level;
- Security risks can be mitigated by preparing and implementing a security and emergency response plan in close cooperation with security apparatus to a negligible level;
- To prevent and respond effectively to occupational health & safety incidents, a project specific health and safety procedures needs to be developed and implemented, based on PMU's HSE guidelines, including provisions for training and certifications.

To prevent, reduce and manage occupational health & safety risks the following measures need to be implemented:

- ensure proper design, construction and installation of the equipment and associated facilities;
- train staff regularly and thoroughly in electrocution prevention and response;
- audit management of electrocution incidents;
- emergency prevention and management;
- provide and maintain first aid facilities at all places where electrocution risks exist and train staff to use these; and
- Provide and use personal protection equipment.

By applying these measures, the impact can be reduced to a Negligible.

5.7.2 Installation phase

Same measures applied as in Pre-Construction/Installation phase

5.7.3 Operational phase

To prevent the exploitation of the workforce, the workers should comply with the provisions in the Labour Act of Nigeria and the international ILO conventions. The following items apply specifically for this Project:

- Develop transparent human resources policies and procedures for recruitment process, working conditions, terms of employment wages, worker-employer relations, non-discrimination policy, monitoring, roles and responsibilities;
- Provide reasonable, and if applicable negotiated, working terms and conditions;
- Provide proper workplace facilities for water/sanitation/rest rooms;
- Other mitigation measures outlined for installation phase are applicable

5.7.4 Decommissioning phase

Decommissioning activities are likely to generate same impact as installation phase, and as such same measures apply to reduce the impact to a Negligible significance.

5.8 INFRASTRUCTURE

5.8.1 Pre-Construction/Installation phase

Requires no mitigation measures as impact is unlikely

5.8.2 Installation phase

No mitigation measure is applicable.

5.8.3 Operation phase

Mitigation measures for this impact include the use of a standby generator as well as the use of solar energy to reduce the dependency and minimize load on the national grid. With these measures, the impact is likely to reduce to minor.

5.8.4 Decommissioning phase

This impact is unlikely.

5.9 EMPLOYMENT AND ECONOMY

5.9.1 Pre-Construction/Installation phase

To enhance the positive impact of opportunities for local businesses and entrepreneurs, the local content plan shall also facilitate identification and selection of qualified local and Nigerian companies to provide needed supplies and services. This plan shall include provisions for advance notice to local companies, along with selection criteria including health and safety, to allow them to prepare for upcoming opportunities.

5.9.2 Installation phase

Same for installation, operational and decommissioning phases.

5.10 SUMMARY OF MITIGATION MEASURES

Tables 5.1, 5.2, 5.3 and 5.4 present the summary of mitigation measures on various activities involved in the project development and the significant environmental and social impacts associated with each of them.

Table 5.1 Summary Of Mitigation Measures (Pre-Construction/ Installation Phase)

Indicator	Potential impact	Receptor	Significance	Mitigation or enhancement measures	Significance (post-mitigation)
Air quality	Localized impairment of air quality by exhaust emissions from vehicles and equipment engines (SO ₂ , CO, NO _x , CO ₂ , PM), gas leakages during installing of gas systems.	Community members and other road users	Minor	<p>Maintain and operate all vehicles and equipment engines in accordance with manufacturers recommendations;</p> <p>Cover properly, loose transportable materials and keep top layers moist;</p> <p>Use covered trucks for the transportation of materials that release dust emissions; and</p> <p>Speed limits on-site of 25km/hr on unhardened roads and surfaces.</p>	Negligible
	black smoke observed to emanate from poorly maintained diesel-fuelled vehicles.	Community members and other road users	Minor		Negligible
	Elevated dust levels in Lab area as a result of dust raised by vehicle movements, wind, and handling of dusty material.	Community members and other road users	Minor		Negligible
Noise, and vibration	Nuisance noise and vibration from vehicular movements.	Workers and people around the Lab area.	Minor	<p>Select 'low noise' equipment or methods of work;</p> <p>Use temporary noise barriers for equipment (e.g. sound proofing walls around stationary power generating sources);</p> <p>Avoid dropping materials from height, where practicable;</p>	Negligible

Indicator	Potential impact	Receptor	Significance	Mitigation or enhancement measures	Significance (post-mitigation)
				<p>Avoid metal-to-metal contact on equipment;</p> <p>Maintain and operate all vehicles and equipment in accordance with manufacturers recommendations;</p> <p>Avoid mobile plant clustering near residences and other sensitive land uses;</p> <p>Ensure periods of respite are provided in the case of unavoidable maximum noise level events;</p> <p>Inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as providing the contact details of the PMU Community Relation Officer;</p> <p>Noisy activities (activities that can be heard in nearby communities) restricted to day-time working hours.</p>	
Soil	Impact here is unlikely.		Negligible		Negligible
Occupation Health, Safety	Exposure of the driver and co-workers to increased risks, accident as well as traffic safety incidents on public roads.	Contractor and other road users	Minor	<p>Maintain and operate all vehicles and equipment engines in accordance with manufacturer's recommendations;</p> <p>Training of workers and drivers on vital road signs;</p> <p>Put on PPE;</p> <p>Use covered trucks for the transportation of materials that release dust emissions; and</p> <p>Speed limits on-site of 25km/hr on unhardened roads and surfaces.</p>	Negligible
Labour and working conditions	Exploitation of workers	Labour force	Minor		Negligible
	Risk of health & safety incidents amongst labour force, including minor incidents such as cuts and major incidents such as loss of life.	Labour force	Minor	<p>Develop transparent human resources policies and procedures for recruitment process, working conditions, terms of employment wages, worker-employer relations, non-discrimination policy, monitoring, roles and responsibilities;</p> <p>Provide reasonable, and if applicable negotiated, working terms and conditions;</p> <p>Provide proper workplace facilities for water/sanitation/rest rooms;</p> <p>If case of retrenchment needs first viable alternatives are analysed and then adverse impacts of retrenchment on workers are reduced as much as possible. A transparent retrenchment plan will be prepared;</p>	Negligible

Indicator	Potential impact	Receptor	Significance	Mitigation or enhancement measures	Significance (post-mitigation)
				<p>If indeed the Contractor implements their human resources procedures in line with the Nigerian Labour Act and ILO Conventions and his held by these through their construction contract, the risk of exploitation of the labour force can be kept to a negligible level;</p> <p>Security risks can be mitigated by preparing and implementing a security and emergency response plan in close cooperation with security forces. If security measures are well implemented these risks can be reduced to a negligible level;</p> <p>To prevent and respond effectively to occupational health & safety incidents a project specific health and safety procedures needs to be developed and implemented, based on PMU’s HSE guidelines, including provisions for training and certifications to be followed by all workers including subcontractors, especially slip-trip and fall hazards. Consult with local health facilities to be prepared in case of incidents that need medical help;</p> <p>To prevent and manage occupational health & safety risks the following measures need to be implemented;</p> <p>ensure proper design, construction and installation of the plant and associated facilities;</p> <p>train staff regularly and thoroughly in prevention and response of electrocution incidents, monitor and keep record;</p> <p>special focus on slip-trip, fall from height and electrocution in maintenance and repair works;</p> <p>audit management of electrocution incidents;</p> <p>emergency prevention and management;</p> <p>provide and maintain first aid facilities at all places where electrocution risks exist and train staff to use these; and</p> <p>Provide and use personal protection equipment.</p>	
Infrastructure	Impact here is unlikely		Negligible		Negligible
Employment and economy	Supply chain opportunities for Nigerian companies that can provide goods and services needed by the Lab .	Nigerian companies	Positive	To enhance the positive impact of opportunities for local businesses and entrepreneurs the local content plan should also facilitate identification and selection of qualified local and Nigerian companies to provide needed supplies and services. This plan should include provisions for advance notice to local companies, along with selection criteria including health and safety, to allow them to prepare for upcoming opportunities.	Positive

Table 5.2 Summary of Mitigation Measures During Installation Phase

	Potential impact	Receptor	Significance	Mitigation or enhancement measures	Significance (post-mitigation)
Air quality	Fuel gas leakages.	Contractors	Minor	Proper installation procedures; Proper handling of installation equipment; Wearing of Personal Protective Equipment (PPE); will help mitigate the impacts associated with this phase from minor to Negligible.	Negligible
Noise, and vibration	Impact here is unlikely.		Negligible		Negligible
Soil	Impact here is unlikely.		Negligible		Negligible
Occupation Health, Safety	Potential injuries, electric shocks.	Workers	Minor	Proper handling of equipment and appliance; Switch off all electrical before accessing them for repairs; Wearing of PPE to avoid electrocution and other injuries.	Negligible
Labour and working conditions	Exploitation of workers.	Labour force	Minor	Develop transparent human resources policies and procedures for recruitment process, working conditions, terms of employment wages, worker-employer relations, non-discrimination policy, monitoring, roles and responsibilities; Provide reasonable, and if applicable negotiated, working terms and conditions; Provide proper work place facilities for water/sanitation/rest rooms; If case of retrenchment needs first viable alternatives are analysed and then adverse impacts of retrenchment on workers are reduced as much as possible. A transparent retrenchment plan will be prepared;	Negligible
	Risk of health & safety incidents amongst labour force, including minor incidents such as cuts and major incidents such as loss of life.	Labour force	Minor	If indeed the Contractor implements their human resources procedures in line with the Nigerian Labour Act and ILO Conventions and his held by these through their construction contract, the risk of exploitation of the labour force can be kept to a negligible level; Security risks can be mitigated by preparing and implementing a security and emergency response plan in close cooperation with security forces. If security measures are well implemented these risks can be reduced to a negligible level; To prevent and respond effectively to occupational health & safety incidents a project specific health and safety procedures needs to be developed and implemented, based on PMU's HSE guidelines, including provisions for training and certifications to be followed by all workers	

	Potential impact	Receptor	Significance	Mitigation or enhancement measures	Significance (post-mitigation)
				<p>including subcontractors, especially slip-trip and fall hazards. Consult with local health facilities to be prepared in case of incidents that need medical help;</p> <p>To prevent and manage occupational health & safety risks the following measures need to be implemented; ensure proper design, construction and installation of the plant and associated facilities;</p> <p>train staff regularly and thoroughly in prevention and response of electrocution incidents, monitor and keep record;</p> <p>special focus on slip-trip, fall from height and electrocution in maintenance and repair works;</p> <p>audit management of electrocution incidents;</p> <p>emergency prevention and management;</p> <p>provide and maintain first aid facilities at all places where electrocution risks exist and train staff to use these; and</p> <p>Provide and use personal protection equipment.</p>	
Infrastructure	Impact is unlikely		Negligible		Negligible
Employment and economy	Supply chain opportunities for Nigerian companies that can provide goods and services needed by the Lab .	Nigerian companies	Positive	<p>To enhance the positive impact of employment opportunities for local residents a local content plan needs to be prepared to enhance the ability to locate local hires and Nigerian nationals. This plan should include provisions for hiring women and youth and for “equal pay for work of equal value”. A local hiring office (or offices) to be set-up for use by all contractors to advertise positions, receive applications, and provide guidance to applicants;</p> <p>To enhance the positive impact of opportunities for local businesses and entrepreneurs the local content plan should also facilitate identification and selection of qualified local and Nigerian companies to provide needed supplies and services. This plan should include provisions for advance notice to local companies, along with selection criteria including health and safety, to allow them to prepare for upcoming opportunities.</p>	Positive

Table 5.3 Summary of Mitigation Measures During Operation and Maintenance

Indicator	Potential impact	Receptor	Significance	Mitigation or enhancement measures	Significance (post-mitigation)
Air quality	Gaseous and particulate emissions from stand by generators and other machines/equipment.	Workers and people around the Lab area.	Moderate	The use of solar energy to augment power supply from the National Grid is suggested as well as the maintenance and operation of all vehicles, equipment, machines and all other engines in accordance with manufacturers recommendations	Minor
Noise, and vibration	Increased noise level	Workers and people around the Lab area.	Minor	<p>Select 'low noise' equipment or methods of work;</p> <p>Use temporary noise barriers for equipment (e.g. sound proofing walls around stationary power generating sources);</p> <p>Avoid dropping materials from height, where practicable;</p> <p>Avoid metal-to-metal contact on equipment;</p> <p>Maintain and operate all vehicles and equipment in accordance with manufacturers recommendations;</p> <p>Avoid mobile plant clustering near residences and other sensitive land uses;</p> <p>Ensure periods of respite are provided in the case of unavoidable maximum noise level events;</p> <p>Inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as providing the contact details of the PMU Community Relation Officer;</p> <p>Noisy activities (activities that can be heard in nearby communities) restricted to day-time working hours.</p>	Negligible
Soil	Accidental spill of spent oil on the soil.	Soil around the Lab area.	Minor	<p>Implement effective site drainage in and around the lab area to allow for the directed flow of liquids off site;</p> <p>Install oil/water separators and silt traps before effluent, leaves the site;</p> <p>Minimize bare ground and stockpiles to avoid silt runoff;</p> <p>Bounding of areas where hazardous substances are stored (e.g. fuel, waste areas);</p> <p>Remove all water accumulation within bunds using manually controlled positive lift pumps not gravity drains;</p> <p>Regular checking and maintenance of all plant and equipment to minimize the risk of fuel or lubricant leakages;</p>	Negligible

Indicator	Potential impact	Receptor	Significance	Mitigation or enhancement measures	Significance (post-mitigation)
				<p>Training of relevant staff in safe storage and handling practices, and rapid spill response and clean-up techniques;</p> <p>Set-up and apply procedure regarding dealing with contaminated soils;</p> <p>Development and implementation of a Waste Management Plan (as part of the ESMP) to ensure that waste is disposed of correctly.</p>	
Occupation Health, Safety	Potential injuries, electrocution and falls.	Workers .	Minor	<p>Proper handling of equipment and appliance;</p> <p>Switch off all electrical before accessing them for repairs;</p> <p>Wearing of PPE to avoid electrocution and other injuries;</p> <p>Training of staffs on usage/handling of such equipment.</p>	Negligible
Labour and working conditions	<p>Exploitation of workers</p> <p>Risk of health & safety incidents amongst labour force, including minor incidents such as cuts and major incidents such as loss of life.</p>	Labour force.	Moderate	<p>Develop transparent human resources policies and procedures for recruitment process, working conditions, terms of employment wages, worker-employer relations, non-discrimination policy, monitoring, roles and responsibilities;</p> <p>Provide reasonable, and if applicable negotiated, working terms and conditions;</p> <p>Provide proper workplace facilities for water/sanitation/rest rooms;</p> <p>In case of retrenchment a transparent retrenchment plan shall be applied;</p> <p>If indeed the Contractor implements their human resources procedures in line with the Nigerian Labour Act and ILO Conventions and his held by these through their construction contract, the risk of exploitation of the labour force can be kept to a negligible level.</p> <p>Security risks can be mitigated by preparing and implementing a security and emergency response plan in close cooperation with security forces. If security measures are well implemented these risks can be reduced to a negligible level.</p> <p>To prevent and respond effectively to occupational health & safety incidents a project specific health and safety procedures needs to be developed and implemented, based on PMU's HSE guidelines, including provisions for training and certifications to be followed by all workers including subcontractors, especially slip-trip and fall hazards. Consult with local health facilities to be prepared in case of incidents that need medical help.</p> <p>To prevent and manage occupational health & safety risks the following measures need to be implemented:</p> <p>ensure proper design, construction and installation of the plant and associated facilities;</p>	Minor

Indicator	Potential impact	Receptor	Significance	Mitigation or enhancement measures	Significance (post-mitigation)
				<p>train staff regularly and thoroughly in prevention and response of electrocution incidents, monitor and keep record;</p> <p>special focus on slip-trip, fall from height and electrocution in maintenance and repair works;</p> <p>audit management of electrocution incidents;</p> <p>emergency prevention and management;</p> <p>provide and maintain first aid facilities at all places where electrocution risks exist and train staff to use these; and</p> <p>Provide and use personal protection equipment.</p> <p>When all measures mentioned above are well implemented, the risk of occupational health & safety incidents can be kept to an acceptable level, to a minor level. However, these incidents cannot be prevented at all times.</p>	
Infrastructure	Impact is unlikely		Negligible		Negligible
Employment and economy	Employment opportunities for operational staff. The operational activities of the Lab will help keep the country clean and reduce the quantity of PCB contaminated materials and equipment while engaging people in what to do by means of employment	Nationals	Positive	<p>To enhance the positive impact of employment opportunities for local residents a local content plan needs to be prepared to enhance the ability to locate local hires and Nigerian nationals. This plan should include provisions for hiring women and youth and for “equal pay for work of equal value”;</p> <p>A local hiring office (or offices) to be set-up for use by all contractors to advertise positions, receive applications, and provide guidance to applicants;</p> <p>To enhance the positive impact of opportunities for local businesses and entrepreneurs the local content plan should also facilitate identification and selection of qualified local and Nigerian companies to provide needed supplies and services. This plan should include provisions for advance notice to local companies, along with selection criteria including health and safety, to allow them to prepare for upcoming opportunities.</p>	Positive

Table 5.4 Summary of Mitigation Measures During Decommissioning

Indicator	Potential impact	Receptor	Significance	Mitigation or enhancement measures	Significance (post-mitigation)
Air quality	Fuel gas, leakages can result from column not being uninstalled properly, this could result in dizziness, headache, passing out and possible death.	Workers	Minor	Proper handling of chemicals, glass wares, waste systems and any other equipment or system to avoid gas leakages during decommissioning activities.	Negligible
Noise, and vibration	Increased noise level from decommissioning activity.	Workers and people around the Lab area.	Minor	Select 'low noise' equipment or methods of work; Avoid dropping materials from height, where practicable; Avoid metal-to-metal contact on equipment; Maintain and operate all vehicles and equipment in accordance with manufacturers recommendations; Ensure periods of respite are provided in the case of unavoidable maximum noise level events; Inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as providing the contact details of the PMU Community Relation Officer; Noisy activities (activities that can be heard in nearby communities) restricted to day-time working hours.	Negligible
Soil	Accidental spill on the soil.	Surrounding soil.	Minor	Set-up and apply procedure regarding dealing with contaminated soils; Development and implementation of a Waste Management Plan (as part of the ESMP) to ensure that waste is disposed off correctly with little or no spill.	Negligible
Occupation Health, Safety	Potential injuries may range from minor cuts, electrocution, falls amongst others.	Contractors.	Minor	Proper handling of equipment and appliance; Switch off all electrical before uninstallation; Wear PPE to avoid electrocution and other injuries; Training of staffs on usage/handling of such equipment during these activities.	Negligible
Labour and working conditions	Exploitation of workers.	Labour force.	Minor	Provide reasonable, and if applicable negotiated, working terms and conditions; If case of retrenchment a transparent retrenchment plan will be prepared;	
	Risk of health & safety incidents amongst labour force, including minor incidents such as cuts and	Labour force.		If indeed the Contractor implements their human resources procedures in line with the Nigerian Labour Act and ILO Conventions and his held by these through their	

Indicator	Potential impact	Receptor	Significance	Mitigation or enhancement measures	Significance (post-mitigation)
	major incidents such as loss of life.			<p>construction contract, the risk of exploitation of the labour force can be kept to a negligible level;</p> <p>Security risks can be mitigated by preparing and implementing a security and emergency response plan in close cooperation with security forces. If security measures are well implemented these risks can be reduced to a negligible level;</p> <p>To prevent and respond effectively to occupational health & safety incidents a project specific health and safety procedures needs to be developed and implemented, based on PMU’s HSE guidelines, including provisions for training and certifications to be followed by all workers including subcontractors, especially slip-trip and fall hazards. Consult with local health facilities to be prepared in case of incidents that need medical help;</p> <p>To prevent and manage occupational health & safety risks the following measures need to be implemented:</p> <p>ensure proper design, construction and installation of the plant and associated facilities;</p> <p>train staff regularly and thoroughly in prevention and response of electrocution incidents, monitor and keep record;</p> <p>special focus on slip-trip, fall from height and electrocution in maintenance and repair works;</p> <p>audit management of electrocution incidents;</p> <p>emergency prevention and management;</p> <p>provide and maintain first aid facilities at all places where electrocution risks exist and train staff to use these; and</p> <p>Provide and use personal protection equipment.</p> <p>When all measures mentioned above are well implemented, the risk of occupational health & safety incidents can be kept to an acceptable level, to a minor level. However, these incidents cannot be prevented at all times.</p>	Negligible
Infrastructure	Impact is unlikely.		Negligible		Negligible
Employment and economy	Impact is unlikely.		Negligible		Negligible

5.11 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

5.11.1 General

An Environmental and Social Management Plan (ESMP) is essentially a management tool and standalone component of an ESIA that provides the assurance that the mitigation measures developed for the significant impacts of a proposed project are implemented and maintained throughout the project lifecycle. It therefore outlines management strategies for health, safety and environment stewardship in the proposed project implementation. This EMP would therefore ensure that all significant associated and potential impacts of the proposed project are either prevented or reduced to acceptable limits.

The Laboratory has set goals and strategies as part of this environmental management plan in order to achieve a conserved and healthy environment. The EMP will also provide the assurance that a reliable scheme has been put in place to monitor the interaction between the proposed cement plant project activities and the environment. This EMP document has been developed in accordance with the general requirements of World Bank Standards, ISO 14001 Environmental Management System (EMS), Equator Principles, as well as other national and international regulatory requirements.

This EMP contains among others the following key items:

- summary of potential impacts;
- planned mitigation measures;
- planned environmental monitoring;
- planned public consultation process;
- responsibilities and authorities for implementation of mitigation measures and monitoring requirements;
- Mechanisms for feedback and adjustment.

Figure 5.1 below indicates how the social and environmental management plans interrelate in an overarching ESMP



Figure 5.1 Interrelationship between Social and Environment aspects of the ESMP

5.11.2 EMP Objective

The EMP is designed to:

- ensure progressive reduction of the impacts of the project activities on the biophysical, socio-economic and health environment with the ultimate aim of eliminating them where possible;
- ensure that all mitigation and enhancement measures prescribed during the impact assessment process for eliminating or minimizing the adverse project impacts as well as optimally enhancing the beneficial impacts are fully implemented;
- provide feedback for continual improvement in environmental performance;
- Provide part of the basis and standards needed for overall planning, monitoring, auditing and review of environmental and socio-economic performance throughout the project life cycle, and
- Promote profit maximization without compromising with the goals of sustainable development.

These objectives shall be achieved by:

- Ensuring compliance with all stipulated legislation on protection of the environment and health, safety and environment policies;
- Integrating environmental issues fully into the project development and operational philosophies;
- Promoting environmental management awareness among workers;
- Rationalizing and streamlining existing environmental activities to add value to efficiency and effectiveness; and
- Ensuring that only environmentally sound procedures would be employed during the project.

5.11.3 Sustainable Management of PCB Analytical Laboratory

This section deals with outlines of structure required by technical services from Agilent or any other equipment producer firm to expand on their organizational structure to implement and manage environmental and social impacts and ensure sustainable development.

5.11.3.1 Responsibility and Accountability

The responsibilities and accountabilities of stakeholders in the implementation of the ESMP are shown in Table 5.5.

Table 5.5 Outlay of Major Stakeholders and Expected Responsibilities.

Stakeholder Agency	Responsibilities
Federal Ministry of Environment Abuja Environmental Protection Board	Oversight for implementing the ESMP
PMU for Environmentally Sound Management of PCB	Implementation of project components and overall responsibility and accountability for the ESMP
Print and electronic media	Public awareness
NGOs	Public awareness/Policy issues
National Environmental Standards Regulations Enforcement Agency	Capacity building, Legislative activities & Policy issues

5.11.3.2 Lab Organizational Structure

Figure 5.2 shows the general organizational structure for the Lab management.

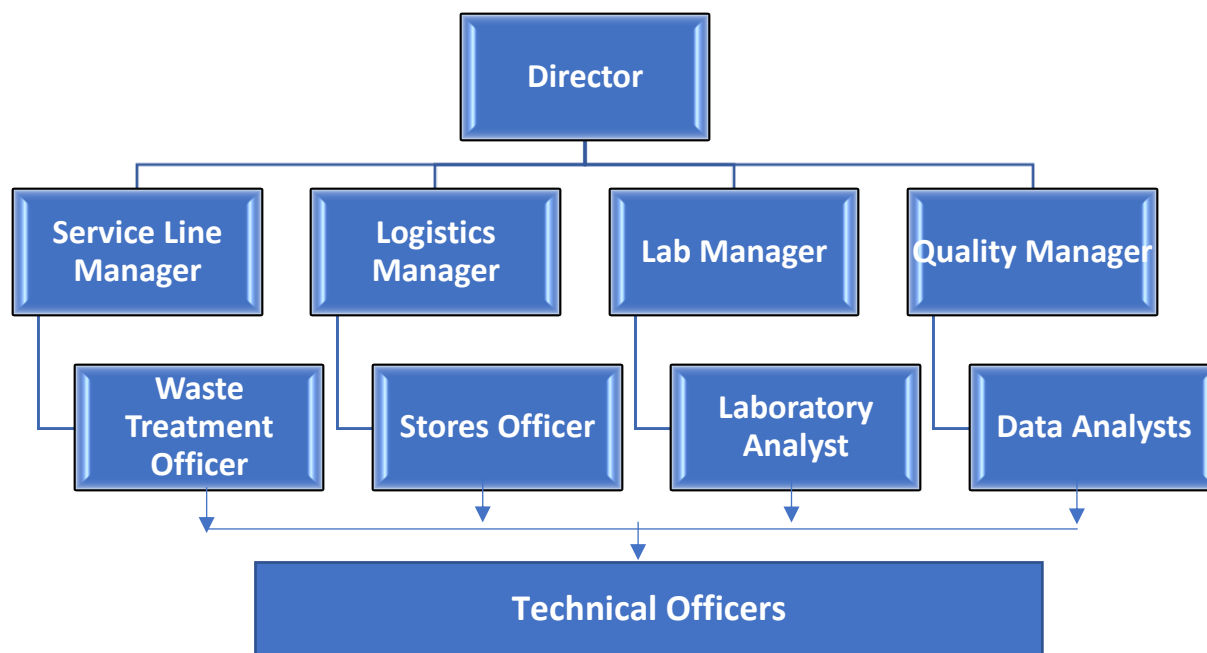


Figure 5.2 Provisional Organizational Structure of the Lab Management

5.11.3.3 Responsibilities and Reporting Lines of Key Staff

Responsibility for sustainability management, in particular, the implementation of the management system falls under the responsibilities of numerous levels and functions in the organization. Accountabilities, reporting lines and responsibilities of key staff members and governance bodies are indicated in Table 5.6.

Table 5.6 Responsibilities and reporting lines

Position	Accountable to	Responsibilities
Director		<ul style="list-style-type: none"> ▪ Approves policy and strategy related to sustainability; ▪ Provides oversight of sustainability management; ▪ Ensure the company takes a stakeholder approach to governance and decision making; ▪ Oversees the production and disclosure of a public annual report on sustainability performance to stakeholders; ▪ Ensure that the company’s risk strategy, policy and management incorporates sustainability issues, both positive and negative.
Service line , Quality assurance, Logistics and Senior Lab Managers	Director	<ul style="list-style-type: none"> ▪ Ensure sustainability is integrated into company management and decision-making processes such as management meetings and reporting, and risk management; ▪ Ensure sustainability is integrated into numerous operational functions such as operation and maintenance of the Lab, human resources, supply chain (including security), sustainable development, finance and legal; ▪ Allocate adequate human and financial resources to enable effective functioning and continual improvement of the Sustainability Management System; ▪ Establish and maintain a governance system to monitor performance of the Sustainable Development team;

Position	Accountable to	Responsibilities
		<ul style="list-style-type: none"> ▪ Attend stakeholder forums such as community meetings, as appropriate, to demonstrate senior management support.
Data Analysis Officer, Lab Officer, Storage Officer and Inventory Officer	Managers	<ul style="list-style-type: none"> ▪ Data capture in accordance with Safety monitoring program and analysis of results; ▪ Hold the technical officers and their teams in the Lab responsible for sustainability performance; ▪ Ensure sustainability is integrated into Lab management and decision-making processes such as management meetings and reporting, and risk management.
Technical officers, Waste treatment Officer	Managers/Senior officers	<ul style="list-style-type: none"> ▪ Plan and coordinate activities such as construction, information technology and engineering and ensures the Lab and facilities function efficiently; ▪ Waste management and treatment; ▪ Inspections/audits of safety requirements by employees.

5.11.3.4 Awareness Creation and Training

During the installation phase of the project, the following environmental awareness and trainings shall be conducted:

An induction briefing to every worker to be engaged in the project shall be provided to include:

- the proposed tasks for new workers;
- worker and safety consciousness;
- importance of the use of personal protective equipment and warning notices;
- personal hygiene and site sanitation issues;
- environmental protection concerns; and
- Hazard recognition and incident reporting.

5.12 STANDARD OPERATING PROCEDURES (SOP)

5.12.1 General Health and Safety Information

Eye protection, appropriate gloves, and laboratory coats are required in the laboratory when working with chemicals. Any additional or specific PPE must be worn where the risk assessment indicates the need. These should be removed **before** leaving the laboratory. Disposable gloves should not be re-used. Closed-toes shoes are required during work in the laboratory. Location of the following items shall be boldly displayed:

- First Aid Kit;
- Safety Shower;
- Eye Wash Stations;
- Chemical Response Spill Kits;
- Chemical Fume Hoods;
- Fire Extinguishers;
- Fire Alarms;
- Emergency Shut-off on Equipment;

- Location of Emergency Telephone numbers and telephones;
- Exit doors.

Safety Showers and Eyewashes should be within the work area for immediate emergency use, if required. Access should be checked at the beginning of each shift. A clear path must be maintained at all times.

5.12.2 General Laboratory Rules

All workers are responsible for maintaining the laboratory in a clean, tidy, safe condition.

1. Ensure spill cleanup.
2. Be responsible for the safe disposal of all chemicals, solvents, cultures, etc.
3. Food and drink must not be consumed in laboratories or be stored in laboratory refrigerators or freezers.
4. Eating, drinking, smoking, handling contact lenses, or applying cosmetics is not permitted in the laboratories.
5. Washing hands after handling chemical materials, after removing gloves and before leaving the laboratory is mandatory.
6. Mouth pipetting is forbidden. Mechanical pipettes are provided instead.
7. All procedures are to be performed carefully to minimize the creation of splashes or aerosols.
8. High risk work or analyses should only be performed during working hours when other members of staff are present. Working after hours should only be done if it is unavoidable and on SOP's for which risk assessments deem the risk to be low and manageable. The Supervisor is responsible for assessing the risk of work being carried out and the competency of the personnel.
9. Ensure documentation of malfunctioned parts or equipment
10. Discontinue usage of faulty piece of equipment and report it to the technical or laboratory analyst.
11. Hypodermic needles should never be re-capped or removed from syringes.
12. Place in sharps bin when done.
13. Study instruction manual and seek training by an experienced operator on first time usage or if in doubt.
14. Fume cabinets must not be used as storage areas.
15. Turn equipment off when not in use.
16. After finishing an experiment, or when taking a break or going home, clean up as follows:
17. Replace tops on solutions and return containers to appropriate places.
18. Replace lids on all pipette canisters.
19. Rinse and decontaminate all dirty glassware and place in trolley for wash up.
20. Turn off equipment.
21. Wipe down benches, close windows and doors, and turn off lights.

5.12.3 Special Handling Procedures and Storage Requirement

The following handling protocols are required

- Wash thoroughly after handling any contaminated material, chemical, or waste.
- All chemical containers must have a legible, firmly attached label showing the contents of the container. Labels on incoming containers of hazardous chemicals must not be removed or defaced. Any labels that are damaged must be immediately replaced with labels containing the same identification, warnings, and source information.
- A hazard review of new materials not previously used in the laboratory must be completed under the direction of the Technical Manager/Service Line Manager before actual handling of the material begins.
- Chemical substances (or by-products) developed in the laboratory are assumed to be hazardous in the absence of other information.
- Store all chemicals in a tightly closed, labelled container, and in a cool, dry, well-ventilated area. Segregate from incompatible materials. Secondary containers must be labelled clearly. Follow any substance-specific storage guidance provided in Safety Data Sheet documentation.
- Use small quantities whenever possible. Monitor your inventory closely to assure that you have tight control over your material.

5.12.4 Spill and Incident Procedures

Chemical Spill

Assess the extent of danger. Help contaminated or injured persons. Evacuate the spill area. Avoid breathing vapours. If possible, confine the spill to a small area using a spill kit or absorbent material. Keep others from entering contaminated area (e.g., use caution tape, barriers, etc.).

Small– During training, use appropriate personal protective equipment and clean-up materials for the chemical spilled. Double-bag spill waste in clear plastic bags, labels, and arrange for chemical waste pick-up.

Large–Notify others in areas of spill. Turn off ignition sources in area. Evacuate area and post doors to spill area. Remain on the scene, but at a safe distance, to receive and direct safety personnel when they arrive.

Chemical Spill on Body or Clothes– Remove clothing and rinse body thoroughly in emergency shower for at least 15 minutes. Seek medical attention. Notify supervisor immediately.

Chemical Splash into Eyes– Immediately rinse eyeball and inner surface of eyelid with water from the emergency eyewash station for 15 minutes by forcibly holding the eye.

5.12.5 Waste Disposal

All waste shall be disposed of through the EH&S Hazardous Waste Program. Staff dealing with hazardous waste disposal should have completed Hazardous Waste Management training.

General hazardous waste disposal guidelines:

- Affix an on-line hazardous waste tag using the Online Tag Program on all waste containers as soon as first drop of waste is added to the container.
- Store hazardous waste in closed containers, in secondary containment, and in a designated location. Do not let product enter drains. Discharge into the environment must be avoided.
- Waste must be under the control of the person generating and disposing of it.

- Dispose of routinely generated chemical waste within 90 days.

Prior Approval/Review Required

- All work with hazardous chemicals must be pre-approved by the Lab analyst and all training must be well documented. In addition, the following shall be completed:
- Document specific training on the techniques and processes to be used;
- Read and understand the relevant Safety Data Sheet;
- Demonstrate competence to perform the work;
- A review of SOP and re-approval is required when there are any changes to procedures, personnel, or equipment, or when an incident or near miss occurs.

PROTOCOL

All lab workers must review SOP and sign the associated training sheet. Lab workers are expected to obtain specific training on proper handling of chemicals and must understand the hazards. In addition, all workers must demonstrate competence to the Lab analyst or his designee by being able to: 1) identify the hazards and list any particularly hazardous handling techniques (use of a Schlenk line, rotary evaporation, canula transfer, extremes of pressure or temperature, etc.); 2) list the foreseeable emergency situations; 3) describe the proper response to the emergency situations, and 4) know the appropriate control measures to minimize the risks. When working in the lab, a laboratory worker must:

- not work alone;
- be cognizant of all of the SDS and safety information presented in this document;
- follow all related SOPs in the laboratory SOP bank (PPE, syringe techniques, waste disposal, etc. as appropriately modified by any specific information in the SDS information presented in this document);
- employ no more than the approved amounts of chemicals in any given reaction (larger quantities REQUIRE the approval of LA or designee), and
- Discuss all issues or concerns regarding chemicals with the LA prior to their use.

If there is an unusual or unexpected occurrence when using these materials or processes, the occurrence must be documented and discussed with the Lab manager/analyst and others who might be using the same chemical or process. Unusual or unexpected occurrences might include a fire, explosion, sudden rise or drop in temperature, increased rate of gas evolution, colour change, phase change, or separation into layers.

5.13 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

Table 5.7 Management Plan for Pre-Construction/Installation Phase

Indicator	Potential impact	Receptor	Mitigation or enhancement measures	Responsibility		
				Implementation	Supervision	Monitoring
Air quality	Localized impairment of air quality by exhaust emissions from vehicles and equipment engines (SO ₂ , CO, NO _x , CO ₂ , PM), gas leakages during installing of gas systems.	Community members and other road users.	<p>Maintain and operate all vehicles and equipment engines in accordance with manufacturers recommendations;</p> <p>Cover properly, loose transportable materials and keep top layers moist;</p> <p>Use covered trucks for the transportation of materials that release dust emissions; and</p> <p>Speed limits on-site of 25km/hr on unhardened roads and surfaces.</p>	Quality assurance Officer	(PMU)	FMEnv, NESREA
	black smoke observed to emanate from poorly maintained diesel-fuelled vehicles.	Community members and other road users.		Quality assurance Officer Lab analysts, Technical officers and Lab cleaners	(PMU)	FMEnv, NESREA
	Elevated dust levels in Lab area as a result of dust raised by vehicle movements, wind, and handling of dusty material.	Community members and other road users.		Quality assurance Officer Lab analysts, Technical officers and Lab cleaners	(PMU)	FMEnv, NESREA
Noise, and vibration	Nuisance noise and vibration from vehicular movements.	Workers and people around the Lab area.	<p>Select 'low noise' equipment or methods of work;</p> <p>Use temporary noise barriers for equipment (e.g. sound proofing walls around stationary power generating sources);</p> <p>Avoid dropping materials from height, where practicable;</p> <p>Avoid metal-to-metal contact on equipment;</p> <p>Maintain and operate all vehicles and equipment in accordance with manufacturers recommendations;</p>	Quality assurance Officer Lab analysts, Technical officers and Lab cleaners	(PMU)	FMEnv, NESREA

Indicator	Potential impact	Receptor	Mitigation or enhancement measures	Responsibility		
				Implementation	Supervision	Monitoring
			<p>Avoid mobile plant clustering near residences and other sensitive land uses;</p> <p>Ensure periods of respite are provided in the case of unavoidable maximum noise level events;</p> <p>Inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as providing the contact details of the PMU Community Relation Officer;</p> <p>Noisy activities (activities that can be heard in nearby communities) restricted to daytime working hours.</p>			
Soil	Impact here is unlikely					
Occupation Health, Safety	Exposure of the driver and co-workers to increased risks accident as well as traffic safety incidents on public roads.	Contractor and other road users.	<p>Maintain and operate all vehicles and equipment engines in accordance with manufacturer's recommendations;</p> <p>Cover properly, loose transportable materials and keep top layers moist;</p> <p>Use covered trucks for the transportation of materials that release dust emissions; and</p> <p>Speed limits on-site of 25km/hr on unhardened roads and surfaces.</p>	Lab analysts, Technical officers and Lab cleaners	(PMU)	FME _{nv} , NESREA
Labour and working conditions	Exploitation of workers.	Labour force		Service Line Manager, Quality Assurance Officer, Logistics Manager	(PMU)	FME _{nv} , NESREA
	Risk of health & safety incidents amongst labour force, including minor incidents such as cuts and major incidents such as loss of life.	Labour force	<p>Develop transparent human resources policies and procedures for recruitment process, working conditions, terms of employment wages, worker-employer relations, non-discrimination policy, monitoring, roles and responsibilities;</p> <p>Provide reasonable, and if applicable negotiated, working terms and conditions;</p>	Service Line Manager, Quality Assurance Officer, Logistics Manager	(PMU)	FME _{nv} , NESREA

Indicator	Potential impact	Receptor	Mitigation or enhancement measures	Responsibility		
				Implementation	Supervision	Monitoring
			<p>Provide proper work place facilities for water/sanitation/rest rooms;</p> <p>If case of retrenchment needs first viable alternatives are analyzed and then adverse impacts of retrenchment on workers are reduced as much as possible. A transparent retrenchment plan will be prepared;</p> <p>If indeed the Contractor implements their human resources procedures in line with the Nigerian Labour Act and ILO Conventions and his held by these through their construction contract, the risk of exploitation of the labour force can be kept to a negligible level.</p> <p>Security risks can be mitigated by preparing and implementing a security and emergency response plan in close cooperation with security forces. If security measures are well implemented these risks can be reduced to a negligible level.</p> <p>To prevent and respond effectively to occupational health & safety incidents a project specific health and safety procedures needs to be developed and implemented, based on PMU's HSE guidelines, including provisions for training and certifications to be followed by all workers including subcontractors, especially slip-trip and fall hazards. Consult with local health facilities to be prepared in case of incidents that need medical help.</p> <p>To prevent and manage occupational health & safety risks the following measures need to be implemented:</p> <p>ensure proper design, construction and installation of the plant and associated facilities;</p> <p>train staff regularly and thoroughly in prevention and response of electrocution incidents, monitor and keep record;</p>			

Indicator	Potential impact	Receptor	Mitigation or enhancement measures	Responsibility		
				Implementation	Supervision	Monitoring
			special focus on slip-trip, fall from height and electrocution in maintenance and repair works; audit management of electrocution incidents; emergency prevention and management; provide and maintain first aid facilities at all places where electrocution risks exist and train staff to use these; and Provide and use personal protection equipment.			
Infrastru cture	Impact here is unlikely					
Employment and economy	Supply chain opportunities for Nigerian companies that can provide goods and services needed by the Lab	Nigerian companies	Mitigation or enhancement measures	Service Line Manager, Quality Assurance Officer, Logistics Manager	(PMU)	FMEv, NESREA,

Table 5.8 Management Plan(Construction Installation Phase)

Indicator	Potential impact	Receptor	Mitigation or enhancement measures	Responsibility		
				Implementation	Supervision	Monitoring
Air quality	Fuel gas leakages	Contractors	Proper installation procedures; Proper handling of installation equipment; Wearing of Personal Protective Equipment (PPE); will help mitigate the impacts associated with this phase from minor to Negligible.	Lab analysts, Technical officers and Lab cleaners	(PMU)	FMEnv, NESREA, AEPB, KWALI LG
Noise, and vibration	Impact here is unlikely					FMEnv, NESREA, AEPB, KWALI LG
Soil	Impact here is unlikely					FMEnv, NESREA, AEPB, KWALI LG
Occupation Health, Safety	Potential injuries, electric shocks.	workers	Proper handling of equipment and appliance. Switch off all electrical before accessing them for repairs. Wearing of PPE to avoid electrocution and other injuries.	Quality Assurance Officer	(PMU)	FMEnv, NESREA, AEPB, KWALI LG
Labour and working conditions	Exploitation of workers.	Labour force	Develop transparent human resources policies and procedures for recruitment process, working conditions, terms of employment wages, worker-employer relations, non-discrimination policy, monitoring, roles and responsibilities; Provide reasonable, and if applicable negotiated, working terms and conditions;	Service Line Manager, Quality Assurance Officer, Logistics Manager	(PMU)	FMEnv, NESREA, AEPB, KWALI LG
	Risk of health & safety incidents amongst labour force, including minor incidents such as cuts and major incidents such as loss of life.	Labour force	Provide proper work place facilities for water/sanitation/rest rooms; If case of retrenchment needs first viable alternatives are analysed and then adverse impacts of retrenchment on workers are reduced as much as possible. A transparent retrenchment plan will be prepared; If indeed the Contractor implements their human resources procedures in line with the Nigerian Labour Act and ILO Conventions and his held by these through their construction contract, the risk of exploitation of the labour force can be kept to a negligible level;			FMEnv, NESREA, AEPB, KWALI LG

Indicator	Potential impact	Receptor	Mitigation or enhancement measures	Responsibility		
				Implementation	Supervision	Monitoring
			<p>Security risks can be mitigated by preparing and implementing a security and emergency response plan in close cooperation with security forces. If security measures are well implemented these risks can be reduced to a negligible level;</p> <p>To prevent and respond effectively to occupational health & safety incidents a project specific health and safety procedures needs to be developed and implemented, based on PMU's HSE guidelines, including provisions for training and certifications to be followed by all workers including subcontractors, especially slip-trip and fall hazards. Consult with local health facilities to be prepared in case of incidents that need medical help;</p> <p>To prevent and manage occupational health & safety risks the following measures need to be implemented:</p> <p>ensure proper design, construction and installation of the plant and associated facilities;</p> <p>train staff regularly and thoroughly in prevention and response of electrocution incidents, monitor and keep record;</p> <p>special focus on slip-trip, fall from height and electrocution in maintenance and repair works;</p> <p>audit management of electrocution incidents;</p> <p>emergency prevention and management;</p> <p>provide and maintain first aid facilities at all places where electrocution risks exist and train staff to use these; and</p> <p>Provide and use personal protection equipment.</p>			
Infrastructure	Increase in electrical load	Power source	The use of a stand by generator as well as the use of solar energy to reduce the dependency and minimize load on the national grid	Logistics Manager, Service Line Manager	(PMU)	FMEnv, NESREA, AEPB, KWALI LG
Employment and economy	Supply chain opportunities for Nigerian companies that can provide	Nigerian companies	<p>To enhance the positive impact of employment opportunities for local residents a local hiring office (or offices) to be set-up for use by all contractors to advertise positions, receive applications, and provide guidance to applicants.</p> <p>To enhance the positive impact of opportunities for local businesses and entrepreneurs the local content plan should also facilitate identification and</p>	Director, deputy director, Logistics Manager	(PMU)	FMEnv, NESREA, AEPB, KWALI LG

Indicator	Potential impact	Receptor	Mitigation or enhancement measures	Responsibility		
				Implementation	Supervision	Monitoring
	goods and services needed by the Lab		selection of qualified local and Nigerian companies to provide needed supplies and services. This plan should include provisions for advance notice to local companies, along with selection criteria including health and safety, to allow them to prepare for upcoming opportunities.			

Table 5.9 Management Plan(operational phase)

Indicator	Potential impact	Receptor	Mitigation or enhancement measures	Responsibilities		
				Implementation	Supervision	Monitoring
Air quality	Gaseous and particulate emissions from stand by generators and other machines/equipment.	Workers and people around the Lab area.	The use of solar energy to augment power supply from the National Grid is suggested as well as the maintenance and operation of all vehicles and equipment engines in accordance with manufacturers recommendations.	Quality assurance Officer, Lab Analysts, Technical officers and Lab cleaners	(PMU)	FMEEnv, NESREA, AEPB, KWALI LG
Noise, and vibration	Increased noise level	Workers and people around the Lab area	<p>Select 'low noise' equipment or methods of work;</p> <p>Use temporary noise barriers for equipment (e.g. sound proofing walls around stationary power generating sources);</p> <p>Avoid dropping materials from height, where practicable;</p> <p>Avoid metal-to-metal contact on equipment;</p> <p>Maintain and operate all vehicles and equipment in accordance with manufacturers recommendations;</p> <p>Avoid mobile plant clustering near residences and other sensitive land uses;</p> <p>Ensure periods of respite are provided in the case of unavoidable maximum noise level events;</p>	Lab analysts, Technical officers and Lab cleaners	(PMU)	FMEEnv, NESREA, AEPB, KWALI LG

Indicator	Potential impact	Receptor	Mitigation or enhancement measures	Responsibilities		
				Implementation	Supervision	Monitoring
			<p>Inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as providing the contact details of the PMU Community Relation Officer;</p> <p>Noisy activities (activities that can be heard in nearby communities) restricted to day-time working hours.</p>			
Soil	Accidental spill of spent oil on the soil	Soil around the Lab area	<p>Implement effective site drainage in and around the lab area to allow for the directed flow of liquids off site;</p> <p>Install oil/water separators and silt traps before effluent, leaves the site;</p> <p>Minimize bare ground and stockpiles to avoid silt runoff;</p> <p>Bounding of areas where hazardous substances are stored (e.g. fuel, waste areas);</p> <p>Remove all water accumulation within bunds using manually controlled positive lift pumps not gravity drains;</p> <p>Regular checking and maintenance of all plant and equipment to minimize the risk of fuel or lubricant leakages;</p> <p>Training of relevant staff in safe storage and handling practices, and rapid spill response and clean-up techniques;</p> <p>Set-up and apply procedure regarding dealing with contaminated soils;</p> <p>Development and implementation of a Waste Management Plan (as part of the ESMP) to ensure that waste is disposed of correctly.</p>	Lab analysts, Technical officers and Lab cleaners	(PMU)	FMEnv, NESREA, AEPB, KWALI LG
Occupation Health, Safety	Potential injuries, electrocution and falls	Workers	<p>Proper handling of equipment and appliance;</p> <p>Switch off all electrical before accessing them for repairs;</p> <p>Wearing of PPE to avoid electrocution and other injuries;</p> <p>Training of staffs on usage/handling of such equipment.</p>	Service Line Manager, Quality assurance Officer, Lab Analysts, Technical officers and Lab cleaners	(PMU)	FMEnv, NESREA, AEPB, KWALI LG

Indicator	Potential impact	Receptor	Mitigation or enhancement measures	Responsibilities		
				Implementation	Supervision	Monitoring
Labour and working conditions	Exploitation of workers	Labour force	<p>Develop transparent human resources policies and procedures for recruitment process, working conditions, terms of employment wages, worker-employer relations, non-discrimination policy, monitoring, roles and responsibilities;</p> <p>Provide reasonable, and if applicable negotiated, working terms and conditions;</p> <p>Provide proper work place facilities for water/sanitation/rest rooms;</p> <p>If case of retrenchment needs first viable alternatives are analysed and then adverse impacts of retrenchment on workers are reduced as much as possible. A transparent retrenchment plan will be prepared;</p> <p>If indeed the Contractor implements their human resources procedures in line with the Nigerian Labour Act and ILO Conventions and his held by these through their construction contract, the risk of exploitation of the labour force can be kept to a negligible level;</p>	Quality assurance Officer	(PMU)	FMEnv, NESREA, AEPB, KWALI LG
	Risk of health & safety incidents amongst labour force, including minor incidents such as cuts and major incidents such as loss of life		<p>Security risks can be mitigated by preparing and implementing a security and emergency response plan in close cooperation with security forces. If security measures are well implemented these risks can be reduced to a negligible level;</p> <p>To prevent and respond effectively to occupational health & safety incidents a project specific health and safety procedures needs to be developed and implemented, based on PMU's HSE guidelines, including provisions for training and certifications to be followed by all workers including subcontractors, especially slip-trip and fall hazards. Consult with local health facilities to be prepared in case of incidents that need medical help</p> <p>To prevent and manage occupational health & safety risks the following measures need to be implemented:</p> <p>ensure proper design, construction and installation of the plant and associated facilities;</p> <p>train staff regularly and thoroughly in prevention and response of electrocution incidents, monitor and keep record;</p>	Quality Assurance Officer		FMEnv, NESREA, AEPB, KWALI LG

Indicator	Potential impact	Receptor	Mitigation or enhancement measures	Responsibilities		
				Implementation	Supervision	Monitoring
			<p>special focus on slip-trip, fall from height and electrocution in maintenance and repair works;</p> <p>audit management of electrocution incidents;</p> <p>emergency prevention and management;</p> <p>provide and maintain first aid facilities at all places where electrocution risks exist and train staff to use these; and</p> <p>Provide and use personal protection equipment.</p> <p>When all measures mentioned above are well implemented, the risk of occupational health & safety incidents can be kept to an acceptable level, to a minor level. However, these incidents cannot be prevented at all times.</p>			
Infrastructure	Increase in electrical load in the locality	Power source	The use of a stand by generator as well as of solar energy to reduce the dependency and minimize load on the National Grid.	Service Line Manager, Quality Assurance Officer, Logistics Manager	(PMU)	FMEEnv, NESREA, AEPB, KWALI LG
Employment and economy	Employment opportunities for operational staff. The operational activities of the Lab will help keep the country clean and reduce the quantity of PCB contaminated materials and equipment while engaging people in what to do by means of employment.	Nationals	<p>To enhance the positive impact of employment opportunities for local residents a local content plan needs to be prepared to enhance the ability to locate local hires and Nigerian nationals. This plan should include provisions for hiring women and youth and for “equal pay for work of equal value”. A local hiring office (or offices) to be set-up for use by all contractors to advertise positions, receive applications, and provide guidance to applicants;</p> <p>To enhance the positive impact of opportunities for local businesses and entrepreneurs the local content plan should also facilitate identification and selection of qualified local and Nigerian companies to provide needed supplies and services. This plan should include provisions for advance notice to local companies, along with selection criteria including health and safety, to allow them to prepare for upcoming opportunities;</p>	Service Line Manager, Quality Assurance Officer, Logistics Manager	(PMU)	FMEEnv, NESREA, AEPB, KWALI LG

Table 5.10 Management Plan for Decommissioning Phase

Indicator	Potential impact	Receptor	Mitigation or enhancement measures	Responsibilities		
				Implementation	Supervision	Monitoring
Air quality	Fuel gas, leakages can result from column not being uninstalled properly, this could result in dizziness, headache, passing out and possible death	Workers	Proper handling of chemicals, glass wares, waste systems and any other equipment or system to avoid gas leakages.	Quality assurance Officer, Lab Analysts, Technical officers and Lab cleaners	(PMU)	FMEnv, NESREA, AEPB, KWALI LG
Noise, and vibration	Increased noise level from decommissioning activity	Workers and people around the Lab area	<p>Select 'low noise' equipment or methods of work;</p> <p>Use temporary noise barriers for equipment (e.g. sound proofing walls around stationary power generating sources);</p> <p>Avoid dropping materials from height, where practicable;</p> <p>Avoid metal-to-metal contact on equipment;</p> <p>Maintain and operate all vehicles and equipment in accordance with manufacturers recommendations;</p> <p>Avoid mobile plant clustering near residences and other sensitive land uses;</p> <p>Ensure periods of respite are provided in the case of unavoidable maximum noise level events;</p> <p>Inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as providing the contact details of the PMU Community Relation Officer;</p> <p>Noisy activities (activities that can be heard in nearby communities) restricted to day-time working hours.</p>	Lab analysts, Technical officers and Lab cleaners	(PMU)	FMEnv, NESREA, AEPB, KWALI LG
Soil	Accidental spill on the soil	Surrounding soil	<p>Set-up and apply procedure regarding dealing with contaminated soils;</p> <p>Development and implementation of a Waste Management Plan (as part of the ESMP) to ensure that waste is disposed of correctly.</p>	Lab analysts, Technical officers and Lab cleaners	(PMU)	FMEnv, NESREA, AEPB, KWALI LG

Indicator	Potential impact	Receptor	Mitigation or enhancement measures	Responsibilities		
				Implementation	Supervision	Monitoring
Occupation Health, Safety	Potential injuries may range from minor cuts, electrocution, falls amongst others	Contractors	<p>Proper handling of equipment and appliance;</p> <p>Switch off all electrical before accessing them for repairs;</p> <p>Wearing of PPE to avoid electrocution and other injuries;</p> <p>Training of staffs on usage/handling of such equipment.</p>	Service Line Manager, Quality assurance Officer, Lab Analysts, Technical officers and Lab cleaners	(PMU)	FMEEnv, NESREA, AEPB, KWALI LG
Labour and working conditions	Exploitation of workers	Labour force	<p>Develop transparent human resources policies and procedures for recruitment process, working conditions, terms of employment wages, worker-employer relations, non-discrimination policy, monitoring, roles and responsibilities;</p> <p>Provide reasonable, and if applicable negotiated, working terms and conditions;</p> <p>Provide proper work place facilities for water/sanitation/rest rooms;</p> <p>If case of retrenchment needs first viable alternatives are analyzed and then adverse impacts of retrenchment on workers are reduced as much as possible. A transparent retrenchment plan will be prepared;</p> <p>If indeed the Contractor implements their human resources procedures in line with the Nigerian Labour Act and ILO Conventions and his held by these through their construction contract, the risk of exploitation of the labour force can be kept to a negligible level;</p> <p>Security risks can be mitigated by preparing and implementing a security and emergency response plan in close cooperation with security forces. If security measures are well implemented these risks can be reduced to a negligible level;</p> <p>To prevent and respond effectively to occupational health & safety incidents a project specific health and safety procedures needs to be developed and implemented, based on PMU's HSE guidelines, including provisions for training and certifications to be followed by all workers including subcontractors, especially slip-trip and fall hazards. Consult with</p>	Quality assurance Officer Quality Assurance Officer	(PMU)	FMEEnv, NESREA, AEPB, KWALI LG
	Risk of health & safety incidents amongst labour force, including minor incidents such as cuts and major incidents such as loss of life.	Labour force				

Indicator	Potential impact	Receptor	Mitigation or enhancement measures	Responsibilities		
				Implementation	Supervision	Monitoring
			<p>local health facilities to be prepared in case of incidents that need medical help;</p> <p>To prevent and manage occupational health & safety risks the following measures need to be implemented:</p> <p>ensure proper design, construction and installation of the plant and associated facilities;</p> <p>train staff regularly and thoroughly in prevention and response of electrocution incidents, monitor and keep record;</p> <p>special focus on slip-trip, fall from height and electrocution in maintenance and repair works;</p> <p>audit management of electrocution incidents;</p> <p>emergency prevention and management;</p> <p>provide and maintain first aid facilities at all places where electrocution risks exist and train staff to use these; and</p> <p>Provide and use personal protection equipment.</p> <p>When all measures mentioned above are well implemented, the risk of occupational health & safety incidents can be kept to an acceptable level, to a minor level. However, these incidents cannot be prevented at all times.</p>			
Infrastructure	Impact is unlikely			Service Line Manager, Quality Assurance Officer, Logistics Manager	(PMU)	FMEEnv, NESREA, AEPB, KWALI LG
Employment and economy	At the end of the project life span an environment with reduced PCB waste load will be achieved.	Nigerian companies	To enhance the positive impact of employment opportunities for local residents a local content plan needs to be prepared to enhance the ability to locate local hires and Nigerian nationals. This plan should include provisions for hiring women and youth and for "equal pay for work of equal value". A local hiring office (or offices) to be set-up for use by all	Service Line Manager, Quality Assurance	(PMU)	FMEEnv, NESREA, AEPB, KWALI LG

Indicator	Potential impact	Receptor	Mitigation or enhancement measures	Responsibilities		
				Implementation	Supervision	Monitoring
			<p>contractors to advertise positions, receive applications, and provide guidance to applicants.</p> <p>To enhance the positive impact of opportunities for local businesses and entrepreneurs the local content plan should also facilitate identification and selection of qualified local and Nigerian companies to provide needed supplies and services. This plan should include provisions for advance notice to local companies, along with selection criteria including health and safety, to allow them to prepare for upcoming opportunities</p>	Officer, Logistics Manager		

5.14 ENVIRONMENTAL AND SOCIAL MONITORING PLAN

Table 5.11 Monitoring Plan (Construction/Installational Phase)

Component	Parameters to be Monitored	Method	Standards/Targets	Location	Frequency	Responsibility	Cost Estimates (NGN)
Air quality	SO ₂ , NO _x , CO, VOC, PM	Visual inspection of access roads; verification of equipment and machinery records; Ambient air quality measurements.	Avoid significant degradation of baseline conditions. WHO and National ambient air quality standards (FMENV)	Project site	Daily	Project Management Unit (PMU)	1,500,000
Noise	Noise Levels,	Noise level measurements	Avoid significant degradation of baseline conditions. WHO and FMENV noise standards	Project site	Daily	PMU	2,000,000
Soils integrity	Visual signs of contamination Status of drainages, bund walls, stockpiles, etc	Visual inspection of Lab area	Avoid the use of erosive processes or control them; Reduce soil compaction; Avoid soil profile structure destruction; Avoid any soil contaminations.	Project site	weekly	PMU	Included in PMU's administrative cost
Employment and economy	Proportion of employees from local community ; materials procured from local community; made in Nigeria materials used.	Inspect employee records; Random interview with workers ; Inspection of procurement records; Interview with suppliers and vendors;	Semi-skilled and non-skilled labour employed from local community if required. Made in Nigeria products are utilized, except where not available.	Project facility	As required	PMU	Included in PMU's administrative cost

Table 5.12 Monitoring Plan (Operational Phase)

Component	Parameters to be Monitored	Method	Standards/Targets	Location	Frequency	Responsibility	Cost Estimates (NGN)
Air quality	SO ₂ , NO _x , CO, VOC, PM	Visual inspection of access roads; verification of equipment and machinery records Ambient air quality measurements.	Avoid significant degradation of baseline conditions. WHO and National ambient air quality standards (FMENV).	Project site	Quarterly	Project Management Unit (PMU)	8,000,000/ year
Noise	Noise Levels,	Noise level measurements.	Avoid significant degradation of baseline conditions. WHO and FMENV noise standards	Project site	Daily	PMU	19,200,000/ year
Soils integrity	Visual signs of contamination Status of drainages, bund walls, stockpiles, etc	Visual inspection of Lab area	Avoid the use of erosive processes or control them; Reduce soil compaction Avoid soil profile structure destruction; Avoid any soil contaminations.	Project site	weekly	PMU	10,800,000/ year
Employment and economy	Proportion of employees from local community materials procured from local community made in Nigeria materials used.	Inspect employee records; Random interview with workers ; Inspection of procurement records; Interview with suppliers and vendors;	Semi-skilled and non-skilled labour employed from local community if required; Made in Nigeria products are utilized, except where not available.	Project facility	As required	PMU	Included in PMU's administrative cost

CHAPTER SIX

6.0 INSTITUTIONAL FRAMEWORK FOR IMPLEMENTATION

Responsibilities, in the ESMP implementation and monitoring, are shared between multiple stakeholders, including concerned ministries, competent authorities, the PMU and the contractors.

6.1 PROJECT MANAGEMENT UNIT (PMU)

Responsibility for the effective implementation of the ESMP lies on the PMU for PCB. It has the responsibility to ensure responsible parties including contractors, consultants, etc. perform assigned responsibilities as well as compliance with extant laws and regulations.

Furthermore, the PMU shall ensure:

- Provision of information on activities and consultations with the people affected by the project and other stakeholders;
- Production of monitoring reports required by regulators and other agencies, such as FMEEnv, AEPB, and NESREA;
- Supervise contractors in charge of the laboratory construction and equipment installation, and ensure their activities comply with requirements in this ESMP;
- Liaise and coordinate with other agencies with responsibilities in this ESMP to ensure adequate performance of assigned tasks.

6.2 FEDERAL MINISTRY OF ENVIRONMENT

The Federal Ministry of Environment through Environmental Assessment Department is responsible for the overall environmental policy of the Country. It has the responsibility for ESIA implementation and approval, in accordance with the EIA Act. It has developed certain guidelines and regulations to protect the environment and promote sustainable development. It will monitor the implementation of mitigation measures, when the project commences. And they can issue directives to the project on specific actions related to the environment in the project area. The Ministry normally involves the states and sometimes local governments in this responsibility depending on the specific activity.

6.3 ABUJA ENVIRONMENTAL PROTECTION BOARD (AEPB)

AEPB is responsible for all environmental affairs in the FCT, including maintaining a conducive environment for the overall wellbeing of the people and its biodiversity.

6.4 ABUJA GEOGRAPHIC INFORMATION SYSTEM (AGIS)

AGIS is responsible for the issuance of certificate of occupancy (C of O) for the land. It is understood that the land designated for the laboratory is within the premises of the SHESTCO. The PMU shall confirm before commencement of work, if it needs a separate C of O.

6.5 FCT DEPARTMENT OF DEVELOPMENT CONTROL

Responsible for the physical planning of the FCT and ensure control such that developments are done in accordance with the master plan.

6.6 KWALI AREA COUNCIL

The project is located in Kwali Area Council. Therefore the area council shall be involved in the ESIA approval process. According to the EIA act, the LGAs will have representatives.

6.7 NGOS

To enhance transparency and trust, the existing PMU engagements with NGOs should be strengthened and extended to cover the entire life cycle of the project. The NGOs shall provide independent advice and report on the implementation of the environmental and social management measures. The NGOs shall be those recognized and credible environmental and or Human Right advocacy group, with presence in the project area.

This outside look will ensure that proper procedures and processes are followed, and that grievances of people affected are well taken care of and treated with fairness. This mode of supervision will give good results in terms of reduction of grievances in particular.

6.8 CONTRACTORS

Each contractor shall appoint a qualified environmental officer who, after approval by the PMU will be responsible for daily management on-site and for the respect of management measures from the ESMP. This Officer will report regularly to a designated specialist of the PMU during the entire construction period.

Contractors must hold all necessary licenses and permits before the work begins. It will befall on them to provide the PMU with all the required legal documents, including the signed agreements with owners, authorizations for borrow pits and for temporary storage sites, etc.

6.9 GRIEVANCE MECHANISMS

During implementation of the ESMP, it is possible that disputes/disagreements between the project developer and the project affected people (PAPs) will occur. There are great challenges associated with grievance redress especially in a project that has global interest such as PCB management.

A grievance procedure based on community grievance resolution channels, regulatory agencies and finally the law courts for resolution of the disputes and complaints should be followed. Figure 6.1 illustrates the procedure for grievance resolution.

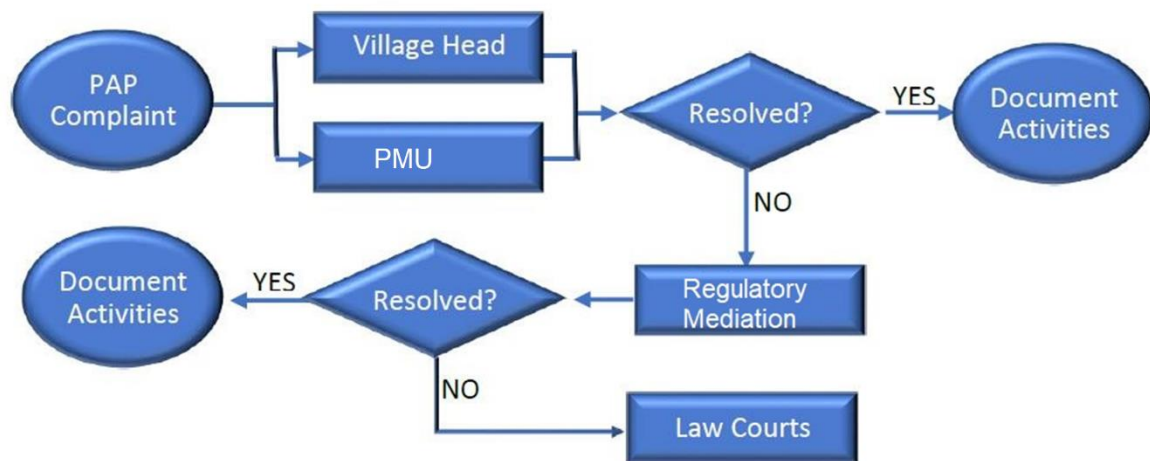


Figure 6.1 Grievance Resolution Procedure

6.9.1 Customary Mediation

The communities affected by this project have internal mechanisms for resolution of disputes through the customary chiefdoms. Such customary avenues should provide a first culturally and amicable grievance procedure that will facilitate formal and/or informal grievance resolution.

Complaints should first be lodged verbally or in writing through the customary chief, who in turn will invite the PMU. The PMU and the customary chiefs and other council in chief will try to resolve the issues amicably. If the complaint cannot be resolved at this level, or if the plaintiff is not satisfied with the settlement proposed, the matter should be reported to the regulatory agencies.

6.9.2 Regulatory Agencies

Abuja Environmental Protection Board (AEPB) and the Federal Ministry of Environment have the statutory responsibility for an oversight and monitoring the implementation of the ESMP. The agencies shall pronounce judgement on any environmental complaint or dispute reported to them based on regulatory requirements. At this stage if the plaintiff is still not satisfied with the settlement, he/she can then proceed to the official legal procedures.

6.9.3 Courts of Law

The judicial process in accordance with applicable laws will be followed and the law courts will pass binding judgment on the matter.

CHAPTER SEVEN

7.0 PROJECT SCHEDULE AND BUDGET

7.1 IMPLEMENTATION SCHEDULE

On top of being a reference source in the management of environmental project impacts, the ESMP is also a guide for the rolling-out of various steps and procedures that are necessary for its sound implementation. The following provides an overview of the logical key steps necessary to ensure the efficiency of the ESMP, avoid doubling efforts and making sure that information is shared among all key parties in the project.

The construction phase is characterized, in regard to the ESMP, by the clearing of vegetation, excavation for foundations, civil works and equipment installation. Also, and in parallel with these activities, is the implementation of the ESMP and its monitoring. The responsibilities for the ESMP implementation, supervision, and monitoring, are clearly defined (Chapters 4 and 5). In the first year of the operation phase, some ESMP measures will be implemented associated to impacts arisen during the construction phase, as the monitoring of vegetative state for revegetated areas and well-being of resettled households. More generally, during the operation phase, a lot of efforts will be devoted to the monitoring of the project performance according to environmental and social indicators. The Schedule is in Table 7.1.

Table 7.1 ESMP Implementation Schedule

Activities		Months Before Project Start						Year 1												Year 2											
		1	2	3	4	5	6	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Preparatory activities for pre-construction phase (6 months)																															
0,1	Completion of inventory	x	x	x	x	x	x																								
0,2	Implementation of training program	x		x		x																									
0,3	Stakeholder information and awareness		x	x			x			x						x						x									
0,4	Land acquisition certificates			x																											
Phase 1: Engineering, Procurement and construction (12 months)																															
1.1	Mitigation and improvement measures implementation							x	x	x	x	x	x	x	x	x	x	x	x												
1.2	Implementation of waste management plan							x	x	x	x	x	x	x	x	x	x	x	x												
1.3	Implementation of emergency measures plan							x	x	x	x	x	x	x	x	x	x	x	x												
1.4	Implementation of environmental monitoring program								x	x	x	x	x	x	x	x	x	x													
1.5	Restoration of sites									x	x				x	x															
1.6	Achievement of community support activities											x	x						x	x											
1.7	Compliance monitoring reports												x							x											
Phase 2: Commissioning and demobilisation (3 months)																															
2.1	Implementation of mitigation and improvement measures																				x	x	x								
2.2	Environmental monitoring program implementation																				x	x									
Phase 3: Operation phase (9 months)																															
3.1	Implementation of mitigation and improvement measures																					x	x	x	x	x	x	x	x		
3.2	Vegetation management plan																					x	x	x	x	x	x	x	x		
3.3	Waste management plan																					x	x	x	x	x	x	x	x		
3.4	Emergency measures plan																					x	x	x	x	x	x	x	x		
3.5	Implementation of environmental monitoring program																					x	x	x	x	x	x	x	x		
3.6	Environmental and social audits																						X								
3.7	ESMP update																												x		

7.2 ESMP IMPLEMENTATION BUDGET

Most costs associated with the implementation of mitigation measures and improvement cannot be specified at this stage of the study. Many of these measures are to be under the responsibility of the contractor(s) who will build the laboratory. Therefore, those costs will be integrated with other construction costs. It should be mentioned that the present ESMP imperatively needs to be appended to the construction tender documents to be published to ensure that those costs are placed under the responsibility of the project contractor(s).

In addition, since the implementation of certain measures will be under PMU responsibility, part of the operational budget, to be applied to the application of E&S measures is not known at this point. Contractors are expected to avail themselves with the nature of the site as well as mitigations actions specified as in this ESMP and provide the cost in their bids.

Table 7.2 shows a summary of the main costs estimate for the implementation of plans, programs and some management measures.

Table 7.2 Cost Estimates for Implementation of the ESMP

S/N	DESCRIPTION	COST ESTIMATES (NGN)	RESPONSIBILITY
1	Community consultations and awareness programme during construction phase.	1,400,000.00	PMU
2	Provision for compensation of community assets destroyed during construction.	500,000.00	Consultant
3	Implementation of sediment run-off controls close to stream banks.	200,000.00	Contractor
4	Install siltation traps within the drainage design to collect silt and sediments ensuring that they do not end up in adjacent aquatic areas.	250,000.00	Contractor
5	Erosion control structures on steep slopes and in soft or erodible material and Laydown areas/Marshalling yards are designed to include erosion control.	100,000.00	Contractor
6	Reclaim as practicable topography of excavated or compacted upland areas upon completion of activities.	150,000.00	Contractor
7	Use of appropriate personal protective equipment (PPE) e.g. rubber hand gloves, hard hats, safety boots, etc. by all personnel on site	300,000.00	Contractor
8	Provision of adequate culverts to maintain natural drainage channels as much as practicable.	120,000.00	Contractor
9	Provide seedlings to the community as part of livelihood restoration for trees cleared.	100,000.00	PMU
10	Waste management at base camp.	50,000.00	Contractor
11	Establish bundwall and catchment pits around fuel storage areas as well as maintaining absorbents on the site for clean up.	150,000.00	Contractor
12	Monthly Impact Mitigation monitoring sampling and analyses/report during construction for 2 years including FMEnv oversight exercises.	3,600,000.00	Consultant
13	PMU Monitoring of ESMP implementation (logistics cost).	576,000.00	PMU
14	Provision for conducting environmental audit, 6 months after commissioning.	6,500,000.00	Consultant
15	Biannual compliance monitoring sampling and analyses/report during operation for 5 years including FMEnv oversight exercises.	4,000,000.00	Consultant
	TOTAL	17,996,000.00	

APPENDICES

Appendix 1 Pictures of Consultation

Appendix 2 Minutes of meeting and Attendance

ENVIRONMENTAL CLAUSES TO BE INSERTED IN EPC BIDS

The purpose of the present clauses is to help those in charge of producing bidding or work contracts for the construction of the laboratory and installation of equipment (Bids, Special Requirements or Technical Requirements), to enable them to incorporate into these documents provisions for integrating environmental and socio-economic protection into the overall project. The clauses also deal with safety measures for hazard and risk prevention.

The clauses are applicable to all project activities which could be a source of negative environmental and social impacts. It however remains that not all possible cases can be foreseen and that the proposed clauses must serve as guidelines and in no way replace the recommendations set forth in the environmental impact assessment and the suggestions made by neighbouring populations.

ENVIRONMENTAL AND SOCIAL REQUIREMENTS

ENVIRONMENTAL AND SOCIAL ASPECTS IN THE BIDS

In his bid, the bidder shall propose:

- an activity implementation plan;
- measures that will be taken to protect the environment;
- rehabilitation work and a methodological presentation, describing how negative effects will be avoided and unavoidable effects minimized.

In addition, the contractors shall present, along with their bid, the implementation plans, essentially inspired from the measures recommended in the environmental and social management plan (ESMP), Emergency respond plan for environmentally sound management of PCBs, and Sites' Hygiene, Health and Safety Plan (HHSP).

ENVIRONMENTAL ASPECTS IN THE SPECIAL REQUIREMENTS

General Requirements

The contractor shall follow and apply the existing environmental laws and regulations in force in Nigeria. In everyday worksite operations, the contractor must take all appropriate measures to minimize environmental damage, by applying the contract specifications and ensuring that its personnel and those of its sub-contractors and agents/representatives also follow and apply them.

Implementation Program

Within sixty days from notification of the awarding of the contract, the contractor shall establish and submit, for approval to the PMU, a final detailed Environmental and Social Management Plan (EPP and HHSP), which will include the following:

- an organizational chart of management staff with clear identification of the person(s) responsible for the project's environmental and social management;
- an environmental and social management plan for the worksite including:
 - ✓ a worksite waste management plan (type of waste expected, collection method, storage method and location, disposal method and location, etc.);
 - ✓ a water management plan (supply method and source, flow used, discharge, etc.), the treatment system planned for worksite wastewater, the discharge location and the planned controls, etc;
 - ✓ a general description of methods proposed by the contractor to reduce the impacts of each work phase on the physical and biological environment;
 - ✓ a general description of measures proposed by the contractor to improve the positive socio-economic impacts and avoid negative impacts.

Contractor's Plans

Throughout the execution of the contract, the Contractor establishes and submits for approval by the PMU the following documents:

One month before setting up the base camps/worksites and storage areas:

- land location to be used;
- the list of agreements reached with current owners and users of these areas and proof that these users have been able to find similar spots to pursue their activities;
- a detailed report on the state of the various sites;
- evidence of consultations with community leaders where these base camps, work sites and storage areas are to be established;
- a general plan indicating the various worksite areas, the planned layout and a description of planned development;
- a detailed site environmental protection plan for the base camp, prior to its construction;
- the amended waste management plan;
- the description of planned measures to avoid and fight pollution and accidents such as soil, groundwater and surface water pollution, bush and other fires, worksite accidents, etc.;
- the description of a planned sanitary infrastructure and its organization;
- the list of planned measures to ensure the supply of food and drinks for workers,

- measures planned to promote the purchase of local products within the project area, except for game;
- the redevelopment plan for areas at the end of the work;
- the worksite regulation articles regarding the respect of the environment, waste, actions planned in case of accident, requirements in terms of vehicle driving, vehicle repair and maintenance;
- source of electricity supply and other forms of energy to the base camps and work sites.

One month before the tree felling phase:

- a felling plan and the planned use of felled trees, with the objective of minimizing felling as much as possible;
- a work plan involving competent technical services in charge of this aspect.

Monthly:

- a report on the safety level of the worksite and the measures implemented to maintain a high level of safety;
- a report on preventive measures put in place at worksites.

At the end of the work:

- a map of the power transmission line route illustrating the work carried out with indications of any environmental improvements implemented.

Worksite Safety

The Contractor shall be subject to the specific hygiene and safety schemes defined by the regulations in force in Nigeria. The Contractor will organize a standard and emergency medical service at the base camp, adapted to the size of its staff. Further, his team shall include a safety coordinator who will ensure maximum safety at the worksite and at the base camp, both for workers and for the population and other persons in contact with the worksite.

Safeguarding of Surrounding Properties

The contractor shall, under the control of the PMU or its appointed representative, clean and eliminate at his expense any form of pollution resulting from activities, and compensate those having suffered the effects of this pollution.

Traffic Impediments

The contractor shall maintain traffic and access to neighbours at all times throughout the work. The concerned neighbours are those whose habitat existed before the contract notification. Night time activity at the worksites will be subject to authorization from PMU.

If the contractor has received authorization or an order to work during the night, it will be with the commitment that it will be carried out so as not to disturb surrounding inhabitants and

establishments. For instance, noise emanating from the site shall not exceed the regulatory limits at the nearest receptor location.

The lighting used must be approved by the PMU. The contractor will ensure that no trenches or excavated areas remain open at night, between 6 pm and 6 am, without adequate barrier and signage approved by the PMU.

The contractor shall impose a speed limit for all of its vehicles travelling on public roads, in the corridor and in the right-of-way.

Work Register

The work register shall contain data on any deficiencies or incidents, having had a significant incidence on the environment or an accident or incident with the population and the specific corrective measures.

Warranty Obligations

The contractor for the present contract is required to carry out routine maintenance of the completed works, throughout the project's warranty period, as well as correct any negative impacts noted.

Environmental aspects, such as, vegetation regrowth, restoration of watercourse flows and hydraulic regimes, and return of agricultural land to cultivation, are also covered by this one-year warranty.

Sanctions and Penalties

In application of the provisions of the special conditions of contract, non-compliance with environmental and social clauses is grounds for sanctions and/or penalties. Moreover, a company that is guilty of repeatedly ignoring the environmental clauses could be subject to more severe sanctions up to its losing (for a five-year period) its right to bid.

Penalties imposed by regulatory agencies as a result of acts of omission or commission by the Contractor shall be fully borne by the contractor. And the PMU reserves the right to deduct from the Contractors payments to settle any fines imposed as a result of this and cost of remedial actions needed.

Work Acceptance (provisional acceptance – final acceptance)

As per the contractual provisions, non-compliance with the present clauses during the project, the refusal to sign the minutes of the provisional or final work acceptance, will lead to the deficiency guarantee being blocked. The implementation of each environmental measure shall be the subject of a partial acceptance. The Contractor's obligations last until the final acceptance of the work which will only occur after all the environmental improvement work included in the contract has been completed, and after regrowth of the vegetation and/or plantings have been confirmed.

Notification

Any infraction of the prescriptions duly reported to the company by the supervisor, must be corrected.

Any repeating of work or additional work deriving from non-compliance with the clauses will be at the expense of the contractor.

BIBLIOGRAPHY

- Ababo W. T., Gereslassie, T., X.Yan, and Wang, Y.,(2018). Determination of Heavy Metal Concentrations and Their Potential Sources in Selected Plants: **Xanthium strumarium** L. (Asteraceae), **Ficus exasperata** Vahl (Moraceae), **Persicaria attenuata** (R.Br) Sojak (Polygonaceae), and **Kanahia laniflora** (Forssk.) R.Br. (Asclepiadaceae) from Awash River Basin, Ethiopia. *Biological Trace Element Research*. pp 1–12
- Abdulsalam N.N, Ologe O. (2013). The use Of Resistivity Profiling Method In Grounwater Investigaton of a typical Basement Complex: A Case Study Of L.E. A Primary School-Dagiri In Gwagwalada Area Northcentral Nigeria. *Rep Opinion* 2013;5(5) :48-53]. (ISSN: 1553-9873). <http://www.sciencepub.net/report.7>
- Adeigbe, O.C. and Salufu, A.E. (2010): Geology and petroleum potential of Campano-Maastrichtian sediments in the Anambra Basin, southeastern Nigeria, *NAPE Bulletin*, 22(1): 13-19.
- Adelana, S. M. A., Olasehinde, P. I., Vrbka, P.; Edet, A. G. & Goni, I. B. (2008). An overview of the Geology and Hydrogeology of Nigeria. In: S. M. A. Adelana and A. M. Mc Donald (Eds.), *Applied groundwater studies in Africa*. IAH Selected papers in Hydrogeology, Vol. 13. Leiden, Netherlands. CRC Press/Balkema.
- Agagu, O.K, Fayose EA, Paters SW (1991). Stratigraphy and Sedimentation in the senonian Anambra basin of Eastern Nigeria. *J. Min. Geol.* 2:25-35.
- Ajao E. A (1989): The influence of domestic and industrial effluent on population of sessile and benthic organisms in Lagos Lagoon. –Ph. D Thesis, Univ. Ibadan, 411pp.
- Akande, S.O, Ojo OJ, Adekeye OA, Egenhoff SO, Obaje NG, Erdtmann BD. (2011). Stratigraphic evolution and petroleum potential of middle cretaceous sediments in the lower and middle Benue trough, Nigeria: Insights from new source rock facies evaluation. *Petroleum Technology Development Journal*. 2011; 1:74-106.
- Alloway, B.J. (1995). Bioavailability of elements in soil. In Alloway, B.J. (ed.). *Heavy metals in soils*. 2nd Edition. Blackie Academic Professional, London. 347 – 372.
- Amadi, U.M.P and Amadi, P.A (1990). Saltwater migration in the coastal aquifers of Southern Nigeria. *J. Mining Geol.* 26(1), pp35-44 .
- Anonymous, (2018). Copper and Soil – How Copper Affects Plants <https://www.gardeningknowhow.com/garden-how-to/soil-fertilizers/copper-for-the-garden.htm>
- APHA, AWWA, WEF. (2012). Standard Methods for exa-mination of water and wastewater. 22nd ed. Washington: American Public Health Association; 2012, 1360 pp. ISBN 978-087553-013-0
- APHA. (1992). Compendium of Methods for the Microbiological Examination of Foods, 3rded. American Public Health Association, Washington, DC.
- APHA/AWWA/WEF (2012). Standard method 2130: turbidity. Standard methods for the examination of water and wastewater, 22nd edition. Washington, DC: American Public Health Association, American Water Works Association and Water Environment Federation.
- Babafemi E.M, Bamidele O.E,Sangodiji E.E (2016). Mapping Of Structural Features in Basement Complex Part of Southwestern Nigeria Using Integrated Geophysical Methods. *International Journal of Science and Technology* Volume 5 No. 5,May, 2016, pp 218-227
- Balogun. B (2000) Monitoring and Assessing Drinking water quality In: Lagos State Water Corporation In- House Training for Chemist 19th – 21st Dec. 2000 p. 1-32.

- Barbour, M.G., J.H. Burk, and W.D. Pitts. (1987). *Terrestrial Plant Ecology*. Chapter 9: Method of sampling the plant community. Menlo Park, CA: Benjamin/Cummings Publishing Co.
- Barnett, H.L. and Hunter, B.B. (1987) *Illustrated Genera of Imperfect Fungi*. Macmillan Publishing Co., New York, and Collier Macmillan, London.
- Bellinger, E. G. and Sigeo, D. C. (2010). *Freshwater Algae: Identification and Use as Bioindicators*. John Wiley and Sons, Ltd. Pp.140-250.
- Bellinger, V. and D. C. Sigeo (2010). *Freshwater Algae: Identification and Use as Bioindicators*. Article in *Journal of Applied Phycology* 25(4).DOI: [10.1007/s10811-012-9926-x](https://doi.org/10.1007/s10811-012-9926-x)
- Billman, H. G. (1992). Offshore stratigraphy and paleontology of Dahomey (Benin) Embayment. *Nigerian Association of Petroleum Explorationists Bulletin*, v. 70, no. 02, p. 121- 130.
- Bonnie, L. G. (2019). Certified Urban Agriculturist <https://www.gardeningknowhow.com/garden-how-to/soil-fertilizers/sodium-in-plants.htm>
- Botes, L. (2003). *Phytoplankton Identification Catalogue ñ Saldanha Bay, South Africa, April 2001*. GloBallast Monograph Series No. 7. IMO London
- Brevik, K.; Sweetman, A.; Pacyna, J.; Jones, K. (2002). "Towards a global historical emission inventory for selected PCB congeners — a mass balance approach: 1. Global production and consumption". *The Science of the Total Environment*. **290** (1–3): 181–98. [Bibcode:2002ScTEn.290..181B. doi:10.1016/S0048-9697\(01\)01075-0. PMID 12083709.](https://doi.org/10.1016/S0048-9697(01)01075-0)
- Burke, K.; MacGregor, D. S. and Cameron, N. R. (2003). In Arthur, T.J., MacGregor, D. S. and Cameron, N. R. (Edited), *Petroleum Geology of Africa: New Themes and Developing Technologies*. Geological Society, London, Special Publications, v. 207, p. 21-60
- Canter, L.W and Hill, L.G (1977): *Handbook of Variables for Environmental Impact Assessment*. Ann Arbor Science Publishers Inc, ANN ARBOUR. Mich. 48106
- Caughley, G. (1977). *Analysis of Vertebrate Populations*. Wiley, London.
- Chindo, I. Y., Karu, K., Ziyok, I. and Amanki, E. D. (2013). Physicochemical Analysis of Ground Water of Selected Areas of Dass and Ganjuwa Local Government Areas, Bauchi State, Nigeria. *World Journal of Analytical Chemistry*, 1(4):73-79.
- Choudhory, R., Rawrani, P. and Vishwakarma M. (2011). Comparative study of Drinking Water Quality Parameters of three Manmade Reservoirs i.e. Kolar, Kaliasote and Kerwa Dam. *Curr. World Environ.*, 6(1), 145-149.
- Colborn, Theo; Dumanoski, Dianne; and Myers, John Peterson. (1996). *Our Stolen Future*. New York: Dutton
- Community Conservation and Development Initiatives (CCDI), (2001). *Air Pollution and Industrialization in Nigeria*. Ecology and Development Series Number 01
- Consumer Factsheet on Polychlorinated Biphenyls (PDF)*. National Primary Drinking Water Regulations. U.S. Environmental Protection Agency. May 14, 2009
- Cox, G. (1990). *Laboratory manual. of general ecology* 6th Ed. Dubuque, Iowa: William C. Brown;
- Cruickshank, R., Duguid, J. P., Mamion, R. P., Swain, R. S. (1976). *Medical Microbiology*. Vol II, London: Churchill, Livingstone, pp. 46
- Dada, S. S. (2006). Proterozoic evolution of Nigeria. In: Oshin, O. (ed.). *The Basement Complex of Nigeria and its mineral resources*. Ibadan, Nigeria, Akin Jinad & Co.
- Daily, G. C.; Söderqvist, T; A. Sara; Kenneth, A., D, Partha; Ehrlich, P. R.; F, Carl; Jansson, A; J, Bengt-Owe (2000). "The Value of Nature and the Nature of Value". *Science*. 289 (5478): 395–396.
- Domsch, K.H.; Gams, W.; Anderson, T.-H. (1980). *Compendium of soil fungi*. Academic Press, London 1:1-860

- Eka, O. U., Fogathy, M. N. (1972). Descriptive studies on a Streptomyces Species part 1. Description and some properties of the microorganisms. West African Journal Biology Applied Chemistry, 3(5), 11-17
- El-Shahawi, M.S., Hamza, A., Bashammakhb, A.S., Al-Saggaf, W.T. (2010). An overview on the accumulation, distribution, transformations, toxicity and analytical methods for the monitoring of persistent organic pollutants. Talanta. 80, 1587–1597. doi:10.1016/j.talanta.2009.09.055.
- Ene, A., Bosneaga, A. and Georgescu, L. (2010). Determination of heavy metal in soil using XRF techniques. Rommania Journal of Physics (7-8):815-820.
- Enwezor, W. O., Udo, E.J., Usoroh, N.J., Ayotade, K.A., Adepetu, J.A., Chude, V.O. and Udegbe, C.E. (1989). Fertilizer use and management practices for crops in Nigeria. Series No 2 Federal Ministry of Agric.Water Resources and Rural Development. Lagos. 163 PP.
- EPA (2002). "Method 1106.1: Enterococci in Water by Membrane Filtration Using membrane-Enterococcus-Esculin Iron Agar (mE-EIA)." Document no. EPA 821-R-02-021.
- EPA (2003). Guidelines on the Management of Lead Contamination in Home Maintenance, Renovation and Demolition Practices: A Guide for Councils. NSW Environment Protection Authority, Sydney 59–61.
- Erickson, M. D. and R.G Kaley (2010). "Applications of polychlorinated biphenyls". Environmental Science and Pollution Research. 18 (2): 135–151. doi:10.1007/s11356-010-0392-1
- Eze, S. and Hilary, M. (2008). Evaluation of Heavy Metals Pollution of Soils Around the Derelict Enyigba Mines and Their Sources. International Journal of Applied Environmental Science 13(3):4.
- Ezeigbo, H.I, Ozioko DC (1997). Towards efficient rural-water supply to Nsukka area and environs. Proc., 2nd NISWASA-Symposium Lagos
- Ezekiel, A.K., Samuel, A.O., Asaolu, S.S. and Irenosen, O.G. (2013). Determination of Heavy Metals in Soil Sample of Selected Sawmills in Ekiti State, Nigeria.
- Fakayode, S. O. (2005). Impact Assessment of Industrial Effluent on Water Quality of the Receiving Alaro River in Ibadan, Nigeria. AjeamRagee, 10:1-13.
- FAO (2006). Guidelines for soil description. Fourth edition. Food and Agriculture Organization of the United Nations, Rome, Italy. 97 pp.
- FAO (2009). Fisheries and Aquaculture in our Changing Climate Policy brief of the FAO for the UNFCCC COP-15 in Copenhagen, December 2009.
- Fatoki, O.S. (2003). Lead, Calcium and Zinc Accumulation in Soil and Vegetation among some Selected Major Roads of Eastern Cape. International Journal of Environmental Studies 6(2):199-204.
- Federal Office for the Environment (FOEN), 2011, Indicator Water temperature of surface waters, Department of the Environment, Transport, Energy and Communications, www.bafu.admin.ch
- GF (2019) Ground Water, The Groundwater Foundation is operated by the National Ground Water Association. <https://www.groundwater.org/get-informed/basics/whatis.html>
- Govil,P.K., Sorlie, J.E., Murthy,N.N., Sujatha,D., Reddy,G.L.N., Rudolph-Lund,K., Krishna,A.K. and Rama-Mohau,K. (2008). Soil Contamination of Heavy Metals in the Katedan Industrial Development Area, Hyderabad, India. Environmental Monitoring and Assessment 140:313-323.
- Goyer, R.A. (1990). Transplacental transport of lead. Conference on Advances in Lead Research: Implications for Environmental Health. Environmental Health Perspective 89:101–106.
- Gray J. R. (2005). Conductivity Analyzers and Their Application, In Environmental Instrumentation and Analysis Handbook. John Wiley and Sons, Inc., Hoboken, NJ, USA, 491-510.
- Greig-Smith, P. (1964). Quantitative Plant Ecology. London: Butterworths; 1964.

- Haack, R.C.; Sundararaman, P.; Diedjomahor, J.O.; Xiao, H.; Gant, N.J.; May, E.D. and Kelsch, K. 2000. Niger Delta petroleum systems, Nigeria, in Mello, M.R., and Katz, B.J., (Edited), Petroleum systems of South Atlantic margins. American Association of Petroleum Geologists, Memoir 73, p. 213–231.
- Hanaa, E., A. Eweida, and Azza, F. (2000). Heavy Metals in Drinking Water and Their Environmental Impact of Human Health.
- Hardalo, C. and Edberg, S. C. (1997). "Pseudomonas aeruginosa: Assessment of risk from drinking water. *Critical Reviews in Microbiology*. 23:47-75
- Hlavay, J and G. G. Guilbault (1978). Detection of hydrogen chloride gas in ambient air with a coated piezoelectric quartz crystal. *Anal. Chem.*, 1978, 50 (7), pp 965–967
- Holt, J.G., N.R. Krieg, P.H.A. Sneath, J.T. Stanley and S.T. Williams (1994). *Bergey's Manual of Determinative Bacteriology* (9th ed.), Williams & Wilkins, Co., Baltimore
- Hötzel G and R. Croome (1999). **A Phytoplankton Methods Manual for Australian Freshwaters**, LWRRDC Occasional Paper 22/99. ISSN 1320-0992 ISBN 0642 267715. Editing and layout: Green Words & Images, Canberra Printing: October 1999
- <https://weather-nga.com/en/Nigeria> accessed on 17th January 2019
- Husain, K.Z. (1992). Wildlife preservation in Bangladesh. *Wildlife Newsletter*, Pp. 5-10. Wildlife Society of Bangladesh No. 4.
- Hutzinger, Otto; Safe, Stephen; and Zitko, V. (1983). *The Chemistry of PCBs*. Melbourne, FL: Krieger IFC, (2017). Environmental, Health, and Safety (EHS) Guidelines General Ehs Guidelines: Environmental Energy Conservation.
- International Finance Corporation (IFC)/World Bank Environmental, Health, and Safety (EHS) Guidelines for Construction and Decommissioning (2007 <http://en.wikipedia.org/wiki/Geology> <viewed: 09/11/2010>).
- Intergovernmental Panel on Climate Change Good Practice Guidance for Land Use Change and Forestry (2003) by J Penman
- IUCN (2015). *Guidelines for the application of IUCN Red List of Ecosystems Categories and Criteria*, Version 1.0. Bland, L.M., Keith, D.A., Murray, N.J., and Rodríguez, J.P. (eds.). Gland, Switzerland: IUCN. ix + 93 Pp.
- Janse van Vuuren, S., Taylor, J., Gerber, A. and Van Ginkel, C. (2006). *Easy identification of the Most common freshwater algae*. A guide for the identification of microscopic algae in South African freshwaters. ISBN 0-621-35471-6
- Jha D K, Sharma G D and Mishra R.R. (1992). *Soil microbial population numbers and enzyme activities in relation to altitude and forest degradation; Soil Biol. Biochem.* 24 761–767
- Jiang, Y., Zhuang, Q. L. and Liang, W. J. (2007) "Soil Organic Carbon Pool and Its Affecting Factors in Farm Land Ecosystem," *Chinese Journal of Ecology*, Vol. 26, No. 2, pp. 278-285.
- Joan G. Ehrenfeld (2010). "Ecosystem Consequences of Biological Invasions", *Annual Review of Ecology, Evolution, and Systematics*, 41: 59–80.
- John, A. W 1987: PCB's and the environment. Boca Raton; Fl: CRC press
- Kabata-Pendias, A. (2011). *Trace elements in soils and plants*. Taylor and Francis Group LLC. Fourth Edition. CRV. Press, Boca Raton, Florida. 505pp.
- Keke, U. N., Arimoro, F. O., Ayanwale, A. V. and Aliyu, S. M. (2015). Physicochemical parameters and Heavy metals content of surface water in downstream Kaduna River, Zungeru, Niger State, Nigeria. *Applied Science Research Journal*, 3(2): 46-57.
- Kuhawari M. Y., Mirza, M. A., Leghari, S. M., and Arain, R. (2009). Limnological study of Baghsar Lake District Bimber, Azad Kashmir. *Pak J Bot* 41(4):1903–1915.

- Kogbe, C. A. (1989). The cretaceous and Paleogene sediments of southern Nigeria. In Kogbe, C.A. (ed). *Geology of Nigeria*. 2nd Edition. Rockview Nigeria Limited, Jos. 1989;273-286.
- Konijnendijk, C. C., R.M. Ricard, A. Kenney, and T. B. Randrup (2006). "Defining urban forestry—a comparative perspective of North America and Europe," *Urban Forestry & Urban Greening*, vol. 4, no. 3-4, pp. 93–103.
- Krebs, C. J. (1989). *Ecological Methodology*. Harper and Collins, New York.
- Liang, J., Chen, C., Song, Z., Han, Y. and Liang, Z. (2011). Assessment of Heavy Metal Pollution in Soil and Plants from Dunhua Sewage Irrigation Area. *International Journal of Electrochemical Science* 6:5314-5324.
- Longe, E.O; Malomo, S and Olorunniwo, M.A (1987). Hydrogeology of Lagos metropolis. *Journal of African Earth Sciences*, Vol. 6, pp 163 – 174.
- MA (2005). *Ecosystems and Human Well-Being: Synthesis*. Millennium Ecosystem Assessment (MA) Island Press, Washington. 155pp.
- Mausbach M J and Seybold C A (1998). *Assessment of soil quality; in Soil quality and agricultural sustainability* (ed.) R Lal (Chelsea: Ann Arbor Press) Pp 33–43
- Mezgebe, k. and Gebrekidan, A., Hadera, A. and Weldegebriel, Y. (2015). Assessment of Physico-Chemical Parameters of Tsaeda Agam River n Mekelle City, Tigray, Ethiopia. *Bull. Chem. Soc. Ethiop.*, 29(3), 377-385.
- Murat, R.C. (1970). Stratigraphy and paleogeography of the cretaceous and lower tertiary in Southern Nigeria. In Dessauvage, T.T.J. and Whiteman, A.J.(eds.) *African Geology*. University of Ibadan
- National Resources Board (NRB) minutes (2001) - Wisconsin Department of Natural Resources <https://dnr.wi.gov/about/nrb/2005/08-05-NRB-minutes.pdf>
- NESREA. (2007). *Environmental Affairs Law Revised 2007*. National Environmental Standards and Regulations Enforcement Agency. 23(4):885 – 919.
- NGSA (2004). *Geological map of Nigeria*. The Nigeria Geological Survey Agency (NGSA). Published by the Authority of the Federal Republic of Nigeria.
- NIMET (2009), Nigerian Meteorological Agency
- NOM-127-SSA1-1994. Water quality. Official Mexican Standard for processes of purifying drinking water for human consumption. Amendment to the Official Mexican Standard NOM- 127- SSA1 - 1994, Environmental Health. Water for human use and consumption.
- NRB (2001). Biodiversity of Nigeria. First National Biodiversity Report July 2001. Pp.12-20
- Nwachukwu, S.O. (1972). The tectonic evolution of the southern portion of the Benue trough. *Geological Magazine*. 1972;109(5):411- 419Press, Ibadan, Nigeria. 1970;251-256.
- Nwajide C. S, (1990) Cretaceous sedimentation and paleogeography of the central Benue trough. In: *The Benue Trough structure and evolution* (Ed. C. O. Ofoegbu), Braunschweig and Wiesbaden, Germany, Virweg and Sohne Verlag. 1990;19-38.
- Nwajide, C. S. (2005) Anambra Basin of Nigeria: Synoptic Basin Analysis as a Basis for Evaluating its Hydrocarbon Prospectivity, In C. O. Okogbue, Ed., *Hydrocarbon Potentials of the Anambra Basin: Geology, Geochemistry and Geohistory Perspectives*, Great AP Express Publisher Limited, Nsukka, 2005, pp. 83-110.
- Nwajide, C.S. and Reijers, T.J.A. (1996). Geology of the southern Benue trough, sedimentary geology and sequence stratigraphy of the Afikpo Basin, SPDC Publication pp133- 148.
- Obaje, N. G. (2009). Geology and mineral resources of Nigeria. In S., Brooklyn, H. S. N., Neugebauer, H. J., Bonn, J. R., & Gottingen, K. S. (Eds.), *lecture notes in Earth sciences*. Bhattacharji. <http://dx.doi.org/10.1007/978-3-540-92685-6>

- Obaje, N.G (2009). *Geology and Mineral Resources of Nigeria*, London: Springer Dordrecht Heidelberg. Pg 5
- Obi, G.C., Okogbue, C.O., Nwajide, C.S. Evolution of the Enugu Cuesta: A tectonically driven erosional process. *Global Journal of Pure Applied Sciences*. 2001; 7:321–330.
- Ofomata, G.E.K (1980). Landforms on the Nsukka Plateau of Eastern Nigeria. *Nig. Geol.* 1(10):3-9
- Oguntoyinbo, J.S. and Derek, H.F. (1987). *The Climatology of West Africa*. London: Hutchinson Education
- Ojanuga, A.G. (2006). *Agroecological zones of Nigeria Manual*. Berding, F. And Chude, V.O. National Special Programme for Food Security (NSPFS) and FAO. 124 pp.
- Ojea, E. (2010). Classifying Ecosystem Services for Economic Valuation: the case of forest water services. BIOECON Conference, Venice 27–28 September 2010
- Ojoh, K.A., (1990). Southern part of the Benue Trough (Nigeria) Cretaceous stratigraphy, Basin Analysis, Paleo-oceanography and Geodynamic Evolution in the Equatorial domain of the South Atlantic: *NAPE Bulletin Vol, 7. P. 131-152.*
- Okunola, O.J., Uzairu, A. and Ndukwe, G. (2007). Levels of Trace Metals in Soils and Vegetation Along Major Roads in Metropolitan City of Kaduna, Nigeria. 6:1703-1709.
- Olade, M.A., (1975). Evolution of Nigeria Benue trough (Aulacogen) a tectonic model. *Geol. Mag.* 112(6), 572-582
- Olorunfemi, M. O., and Fasuyi, S. A., (1993). Aquifer types and the geoelectric/ hydrogeological characteristics of part of the central basement terrain of Nigeria. *Journal African Earth Science*, 16, 309– 317.
- Omatsola, M.E and Adegoke, O.S (1981). Tectonic Evolution and Cretaceous Stratigraphy of the Dahomey basin. *Journal Min. & Geology*, 18 (1), 130 -137.
- Onuoha, K.O. (1999). Structural features of Nigeria's coastal margin: an assessment based on age data from wells. *Journal of African Earth Sciences*, v. 29/ 03, p. 485-499.
- Pankhurst, C. E, Doube B M and Gupta V V S R (1997). *Biological indicators of soil health* Wallingford, UK: CAB International
- Papafilippaki, A. K., Kotti, M. E. and Stavroulakis, G. G. (2008). Seasonal Variations in Dissolved Heavy Metals in the Keritis River, Chania, Greece. *GlobalNEST Int. J.*, 10:320.
- Perry, R (2003). *A Guide to the Marine Plankton of southern California*, 3rd Edition. © 2003 Robert Perry. - UCLA Ocean Globe & Malibu High School
- Phogat, V. K., Tomar, V. S. and Dahiya, R. (2015). Soil Physical Properties. In book: *Soil Science: An Introduction*. Edition: First Publisher: Indian Society of Soil Science. Editors: Rattan R.K., Katyal J.C., Dwivedi B.S., Sarkar A.K., Bhattachatyya Tapan, Tarafdar J.C., Kukal S.S. Available from: https://www.researchgate.net/publication/297737054_Soil_Physical_Properties[accessed Jan 13 2019].
- Pivnenko, K.; Olsson, M. E.; Götze, R.; Eriksson, E.; Astrup, T. F. (2016). *"Quantification of chemical contaminants in the paper and board fractions of municipal solid waste"*. *Waste Management*. **51**: 43–54. doi:10.1016/j.wasman.2016.03.008
- Porta, M.; Zumeta, E. (2002). *"Implementing the Stockholm Treaty on Persistent Organic Pollutants"*. *Occupational and Environmental Medicine*. **59**: 651–2. doi:10.1136/oem.59.10.651. PMC 1740221. PMID 12356922
- Rahaman, M. A. & Lancelot, J. R. (1984). Continental crustal evolution in S.W.Nigeria: constraints from U-Pb dating of Pre Pan African gneisses. *Report de Centre geophysique de Montpellier*.
- Rattray, J.E and Jones, M (2007). Essential Elements of Questionnaire Design and Development. Literature Review in *Journal of Clinical Nursing* 16(2):234-43. DOI: 10.1111/j.1365-2702.2006.01573.x

- Richard, A. (2017). *The Thomson Ecology Handbook: A practical guide to wildlife legislation for project managers*. Kindle Edition, Publisher: Harriman House Pp.2-20
- Ritter L; Solomon KR; Forget J; Stemeroff M; O'Leary C.(2007). "Persistent organic pollutants" (PDF). *United Nations Environment Programme. Archived from the original (PDF) on 2007-09-26. Retrieved 2018-11-18*.
- Robert, I. (2004). "A neutral terminology to define 'invasive species'", *Diversity and Distributions*, 10, 135–141.
- Robertson, Larry W., and Hansen, Larry G., eds. (2001). *PCBs: Recent Advances in Environmental Toxicology and Health Effects*. Lexington: The University Press of Kentucky.
- Sampathkumar P, and Ananthan G (2007) Phytoplankton. In: *Coastal Biodiversity in Mangrove Ecosystems*, UNU-INWEH-UNESCO- International Training Course Manual. 205-212
- Sampathkumar, P. and Ananthan, G. (1990). *Phytoplankton Centre of Advanced Study in Marine Biology Annamalai University*. Pp.310
- Schorr, U., Distler, A. and Sharma, A. M.. (1996). Effect of sodium chloride- and sodium bicarbonate-rich mineral water on blood pressure and metabolic parameters in elderly normotensive individuals: a randomized double-blind crossover trial. *J. Hyperten*, 14(1):131-5
- Shell International Exploration and Production (SIEP), (1995). *Environmental Quality Standards – Air (Doc. EP 95 – 0375)*.
- Shrinivasa Rao B and Venkateswaralu P, (2000). *Physicochemical Analysis of Selected Groundwater Samples*, *Indian J Environ Prot.*, 20 (3):161.
- Soil Science Division Staff. (2017). *Soil Survey Manual*. Agric. Handbook. No 18. U.S. Gov. Print. Office. Washington, DC. 639 pp.
- Strahan, R. (1995). *Mammals of Australia*. Australian Museum/Reed Books, Sydney.
- Stuti, K. (2001), *Fiscal Federalism and Service Delivery in Nigeria: The Role of States and Local Governments*, prepared for the Nigerian PER Steering Committee, July 2001, page 4.
- Swanson, T. (1997). *Global Action for Biodiversity*. Earthscan, London
- Tennessee Valley Authority (TVA). (1995). *Clean Water Initiative: Volunteer Stream Monitoring Methods Manual, Field Test Draft*, TVA: Chattanooga, USA. Trough, Nigeria. *Journal of African Earth Sciences*, Elsevier. 2014; 100:179-190.
- Todd, D.K., 1959. *Ground Water Hydrology*. Willey, London, pp: 185.
- Ukaegbu, V.U. and I.O. Akpabio. 2009. "Geology and Stratigraphy Northeast of Afikpo Basin, Lower Benue Trough, Nigeria". *Pacific Journal of Science and Technology*. 10(1):518-527
- UNEP Chemicals (1999). *Guidelines for the Identification of PCBs and Materials Containing PCBs (PDF)*. *United Nations Environment Programme. p. 40. Archived from the original (PDF) on 2008-04-14. Retrieved 2018-11-07*
- UNICEF (2008). *Water, Sanitation and Hygiene Annual Report 2008*. 52pages
- USEPA (2008). *Analytical methods approved for compliance monitoring under the long term 2 enhanced surface water treatment rule*. Washington, DC: US Environmental Protection Agency.
- Waid, John. (1987). *PCBs and the Environment*. Boca Raton, FL: CRC Press.
- Wanga, J., Li, A., Wanga, Q., Zhou, Y., Fua, L. and Li, Y. (2010). Assessment of the manganese content of the drinking water source in Yancheng, China. *J. Hazard. Mater.* 182:259–265.
- Whiteman, A. 1982. *Nigeria: Its Petroleum Geology, Resources and Potentials*. Vol. 1 & 2.
- WHO 1993 *Guidelines for Drinking-Water Quality, Volume 1, Recommendations*. Second edition. World Health Organization, Geneva, 130.
- WHO, (2008). *Drinking-water Quality 3rd edition*.

- WHO, (2008). Turbidity measurement: the importance of measuring turbidity: Fact sheet 2.33. Geneva: World Health.
- World Health Organization. (1998). "Report on waterborne disease cases." Geneva. 1:55.
- World Health Organization. (2003). "Guidelines for drinking water quality." 3rd edition. Geneva, Switzerland.
- World Health Organization. (2004). "International standards for drinking water." Geneva.
- world resources Institute (WRI) (1992-93). Guide to global environment by world resources institute in collaboration with the united nations environment programme and the united nations development programme - march 1992
- WRI (1992). Global Biodiversity Strategy: Guidelines for action to save, study, and use earth's biotic wealth sustainably and equitably. WRI (World Resources Institute)., IUCN, and UNEP.
- Yamaguchi, E. and Gould, A. (2007). *Phytoplankton Identification Guide*. The University of Georgia Marine Education Center and Aquarium. [Http://www.marex.uga.edu/aquarium](http://www.marex.uga.edu/aquarium). Dateretrieved 23/11/2018.
- Yusuf, A.A., Abdu, N. and Tanimu, B. (2011). Assessment of lead contamination of farmlands in Abare village, Zamfara State. Proceedings of the 45th Annual Conference of the Agricultural Society of Nigeria. pp. 487-491.

PICTURES FROM FIRST ROUND CONSULTATION IN SHEDA, FCT



PICTURES FROM SECOND ROUND CONSULTATION IN SHEDA, FCT



PICTURES FROM THIRD ROUND CONSULTATION IN SHEDA, FCT



APPENDIX 2: CONSULTATIONS

Appendix 2.1: First Round Consultations

MINUTES OF MEETING

Meeting with Sala Community on the Proposed PCBs Collection, Storage and Treatment Centres in Sala, Epe Lagos.

Environmental Impact Assessment Studies

Venue: Baale of Sala Community's House

Date: October 22nd 2018

Participants: See Attached Register of Signature.

1. Introduction

The people present introduced themselves, one after the other.

2. Welcome Address

Welcome Address was done by the Baale of the Community and said they are aware of the project by the Federal Government in their community and the land has already been acquired by the Federal Ministry of Environment.

3. Presentation of the Project

The selected PCBs site for Lagos State is located on Latitude 06.62809ON and Longitude 3.92080OE in Shala Village in Epe Local Government Area (LGA) of the state. The site is at the outskirts of Epe Township. It is about 80 kilometres from Alausa and accessed by driving along the Ikorodu-Epe road towards Epe town. The site is presently a virgin land.

The slides presented during the meeting is attached, which included the description of the projection, the need and benefits of the project as well as environmental and social effects associated with the project and the mitigation measures.

4. Feedback from stakeholders

Issues, concerns and expectations raised

The Baale spoke on behalf other members of the community and he said "We heard that PCB affect health so what are you going to do about it because we cannot endanger members of our community because the Federal Government wants to build a center in our community".

The community also confirmed that the land has been acquired by Federal Ministry of Environment.

Response to addressing issues raised above

The PCB material is very hazardous but measures will be taken to mitigate against any possible effect of the collection, storage and treatment of the PCB materials in your community, this is the essence of this EIA study. The base of the storage and treatment facility will be fortified with concrete to prevent sippage of materials into the ground. Use of PPE will be strictly adhered to also amongst others.

Prepared by Olatayo Olasehinde 22/10/2018

Sala, Lagos

EIA towards the Design of Poly Chlorinated Biphenyls (PCB) Collection, Storage and Treatment Centres Attendance Sheet

Communities

S/N	NAME	COMMUNITY	POSITION/DESIGNATION	PHONE NO/E-MAIL	SIGNATURE	DATE
01	Brale	Sala	Brale	08037233663	[Signature]	22/10/18
02	Sakinu Balogun	Sala	Community member	08109444185	[Signature]	22/10/18
03	Adajeni Ojemade	Sala	Community member	08186919372	[Signature]	22/10/18
04	Alata Kazeem	Sala	Community member	08160236276	[Signature]	22-10-18
05	Tosin Ogundeko	Sala	Community member	08109065708507	[Signature]	22-10-18
06	Azeez Mannam	Sala	Community member	08102204622	[Signature]	22-10-18
07	Johnson Obiodo	Sala	Youth Leader		[Signature]	22-10-18
08	Adefilis Adetisi	Sala	Community member	N/A	[Signature]	22-10-18
09	Olabode Olagunju	Sala	Community member	08155248872	[Signature]	22-10-18
10	Obitayo Obesidi	EEMS Limited	POE	08035900691	[Signature]	22-10-18

MINUTES OF MEETING

Meeting with Neke Uno Community on the EIA of Proposed PCBs Collection, Storage and Treatment Centres in Neke Uno, Enugu.

Environmental Impact Assessment Studies

Venue: Chief of Neke-Uno Community's House

Date: October 23rd 2018

Participants: See Attached Register of Signature.

1. Introduction

The people present are Chief of Neke-Uno, Chairman of the Community, Secretary of the Community, Treasurer, Chairman Lands, P.R.O, Deputy Chairman of Lands, Deputy Chairman of Power and EEMS staff and Experts.

2. Opening Prayer was said by Chairman of the Community.
Closing Prayer was said by Deputy Chairman Power of the Community.

3. Welcome Address

Welcome Address was done by the Chairman of the Community and said they are aware of the project by the Federal Government in their community and the land has already been acquired by the Federal Ministry of Environment.

4. Presentation of the Project and EIA

Polychlorinated Biphenyls (PCBs) are among the most toxic Persistent Organic Pollutants (POPs) listed in the Stockholm Convention. PCBs have been used in almost all sectors of the Nigerian economy as coolants and insulating fluids in transformers and capacitors in electricity generation, transmission and distribution, in flexible coatings of electrical wiring and components. With this in mind, PCBs are seen as a threat to public health and the environment. The Stockholm Convention is a global treaty ratified by the international community and led by the United Nations Environment Programme (UNEP) that calls for the elimination and/or phasing out of 12 POPs, called the "*dirty dozen*". However, to neutralize this threat, Nigeria joined the global community in negotiating and ratifying the Stockholm Convention on POPs which obliges parties to eliminate the use of PCBs in equipment by 2015, and to make concerted efforts for disposing liquid PCBs and equipment through environmentally sound waste management practices as early as possible, but no later than 2028. Nigeria submitted its National Implementation Plan (NIP) in 2009 listing twenty-three areas of action as

priorities for meeting its treaty obligations. The priorities included PCB inventory and treatment (priority number one) and PCB disposal options.

The Environmentally Sound Management (ESM) of PCB-Project Management Unit, in collaboration with the United Nations Development Programme (UNDP) plans to establish three PCBs Collection, Storage and Treatment Centers, otherwise known as PCBs Interim Storage Facilities (PCB-ISF) in Neke Uno in Enugu State, Epe in Lagos State, and Sheda Science and Technology Complex (SHESTCO) along Abuja-Lokoja Expressway. The facilities are to be used for the safe collection, storage and treatment of PCB oil and PCBs-contaminated equipment identified in the course of the national PCBs inventory in Nigeria.

The selected PCBs management site for Enugu State is located on Latitude 6.65768 and Longitude 7.54436 in Neke Uno, in Enugu East LGA of the state. It could be accessed by road through Akpakpanike area (Nike Lake Resort Area) and it is about 20km from Nike Lake Resort. The site is located about 300m from a very good access road.

5. Feedback from stakeholders

Issues, concerns and expectations raised

- I. We are scared of the health of our community members because we are very healthy here and our land is very fertile. We heard that the materials called PCB are very harmful and we are wondering why you chose our community to dump the materials
- II. What of jobs for our youths in the community?
- III. We want school in our community and roads.
- IV. The agreement for the custody of the land was made with the last Chief of the community who is now late and there are some traditional rites to be done on the land before construction can take place.

Response to addressing issues raised above

- i. The PCB material is very hazardous but measures will be taken to mitigate against any possible effect of the collection, storage and treatment of the PCB materials, this is the essence of this EIA study. The base of the storage and treatment facility will be fortified with concrete to prevent sippage of materials into the ground. Use of PPE will be strictly adhered to also.

- ii. Priority will be given to skilled and unskilled labour from the community during the construction and operation stage.
- iii. The Federal Ministry of Environment will consider the CSR they can provide to the community.
- iv. We will report that to the Federal Ministry of Environment.

Prepared by Olatayo Olasehinde 23/10/2018

Neke Uwo, Enugu

EIA towards the Design of Poly Chlorinated Biphenyls (PCB) Collection, Storage and Treatment Centres

Attendance Sheet

Communities

S/N	NAME	COMMUNITY	POSITION/DESIGNATION	PHONE NO/E-MAIL	SIGNATURE	DATE
01	MR Dennis Odoh	Neke uwo	Chairman Town	070 82289083	[Signature]	23/10/2018
02	MR Alfred Ugwu	Neke uwo nke See		080 54746640	[Signature]	23/10/2018
03	Chief Kenneth Afo	Neke Uwo nke	Treasurer	07031120143	[Signature]	23/10/2018
04	MR Odoh Fidelis Afo	Neke Uwo nke	Chairman	0806295794	[Signature]	23/10/2018
05	HORN MR MOSES	Ugwu 20 NEKE UWO NKE ENUGU	sect LAND	08102763840	[Signature]	23/10/2018
06	Chief GABRIEL Afo	Neke Uwo nke	Chief Afo	08109448150	[Signature]	23/10/2018
07	Ugwu James Hechum	Neke uwo nke	Chairman Land nke	07034696444	[Signature]	23/10/18
08	Chief Alloy Ogbu	Neke Uwo nke	P. Rep	08156111172	[Signature]	23-10-2018
09	Ik. Ogbu	Neke Uwo nke	Deputy Chairman of land	0803944837	[Signature]	23/10/18
10	Sylvester Amannan	Neke Uwo nke	Deputy Chairman	0803746255	[Signature]	23/10/2018

(NICE UND, ^{Amugu})

EIA towards the Design of Poly Chlorinated Biphenyls (PCB) Collection, Storage and Treatment Centres

Attendance Sheet

Communities

S/N	NAME	COMMUNITY	POSITION/DESIGNATION	PHONE NO/E-MAIL	SIGNATURE	DATE
01	Isiah Emmanuel	EEMS Limited	Guest house	08066227074		
02	Emmanuel Blecyn O	"	Market Dev. Officer	08094206008		23/10/18
03	Dr Lemuel Musa	"	Soil Expert	08037054411		23/10/18
04	Simon Aude	"	Field Assistant	08174636640		23/10/18
05	Dr. Ibrahim M. Magami	"	Ecology & Hydrobiology	08036399147		23/10/18
06	Abubakar M. M. M.	"	town	08035598192		
07	Olutayo Olasehinde	"	Air quality/POE	08035900671		23-10-18
08						
09						
10						

MINUTES OF MEETING

Meeting with Sheda Community on the Proposed PCBs Collection, Storage and Treatment Centres in Sheda, Abuja.

Environmental Impact Assessment Studies

Venue: Secretary of Sheda Community's House

Date: October 25th 2018

Participants: See Attached Register of Signature.

1. Introduction

The people present are Secretary of SHEDA village, Youth leader and EEMS staff and Experts.

2. Opening Prayer was said by Olatayo Olasehinde of EEMS Limited
Closing Prayer was said by Youth Leader

3. Welcome Address

Welcome Address was done by the Secretary of SHEDA village and he was happy that we came to meet with them in the community because they have never been consulted as a community before embarking on any project in the area. He also told us that they just lost the Chief of the village some weeks before we came and they are yet to choose another Chief in the community.

4. Presentation of the Project and EIA

Polychlorinated Biphenyls (PCBs) are among the most toxic Persistent Organic Pollutants (POPs) listed in the Stockholm Convention. PCBs have been used in almost all sectors of the Nigerian economy as coolants and insulating fluids in transformers and capacitors in electricity generation, transmission and distribution, in flexible coatings of electrical wiring and components. With this in mind, PCBs are seen as a threat to public health and the environment. The Stockholm Convention is a global treaty ratified by the international community and led by the United Nations Environment Programme (UNEP) that calls for the elimination and/or phasing out of 12 POPs, called the "*dirty dozen*". However, to neutralize this threat, Nigeria joined the global community in negotiating and ratifying the Stockholm Convention on POPs which obliges parties to eliminate the use of PCBs in equipment by 2015, and to make concerted efforts for disposing liquid PCBs and equipment through environmentally sound waste management practices as early as possible, but no later than 2028. Nigeria submitted its National Implementation Plan (NIP) in 2009 listing twenty-three areas of action as

priorities for meeting its treaty obligations. The priorities included PCB inventory and treatment (priority number one) and PCB disposal options.

The Environmentally Sound Management (ESM) of PCB-Project Management Unit, in collaboration with the United Nations Development Programme (UNDP) plans to establish three PCBs Collection, Storage and Treatment Centers, otherwise known as PCBs Interim Storage Facilities (PCB-ISF) in Neke Uno in Enugu State, Epe in Lagos State, and Sheda Science and Technology Complex (SHESTCO) along Abuja-Lokoja Expressway. The facilities are to be used for the safe collection, storage and treatment of PCB oil and PCBs-contaminated equipment identified in the course of the national PCBs inventory in Nigeria.

The selected PCBs ISF site for Abuja is located on Latitude 8.84844 and Longitude 7.04119 in Sheda Science and Technology Complex (SHESTCO), Sheda, Abuja, Nigeria, a Parastatal under the Federal Ministry of Science and Technology, established by Act Cap S5 (Formerly Decree No.95 of 1993), having its permanent head office at Km 32 Abuja - Lokoja Expressway, Sheda, FCT. The site is presently a virgin land.

5. Feedback from stakeholders

Issues, concerns and expectations raised

- I. Will our people (SHEDA community) be gainfully employed during the construction stage of the project and after the project has commenced.

Response to addressing issues raised above

- i. Priority will be given to both skilled and unskilled labour from the community.

Sheda, FCT

EIA towards the Design of Poly Chlorinated Biphenyls (PCB) Collection, Storage and Treatment

Centres

Attendance Sheet

Communities

S/N	NAME	COMMUNITY	POSITION/DESIGNATION	PHONE NO/E-MAIL	SIGNATURE	DATE
01	Inch Emmanuel	EEMS Limited	Executive	08066227074	[Signature]	25-10-18
02	Emmanuel Btecyo A.	"	Market Development officer	08094206008	[Signature]	25-10-18
03	SIMON Aude	"	Field officer	05174636040	[Signature]	25/10/18
04	BITRUS GUAMA	BIG SHEDA	SCOT Village	08128351119	[Signature]	25/10/18
05	Ishaku Ibrahim	"	youth leader	08068040116	[Signature]	"
06	Olatayo Okechinde	EEMS Limited	POE	08035500691	[Signature]	25-10-2018
07	Ibrahim Salim	Sheda	Farmer	09081961325	[Signature]	25-10-2018
08	Bilitigin Shimb	Big-Sheda	Women leader	_____	[Signature]	25-10-2018
09	John Andrew	Sheda	Trader	08055026632	[Signature]	25-10-2018
10						

Appendix 2.2: Second Round Consultations

PROPOSED PCBS COLLECTION STORAGE AND TREATMENT CENTRE IN SALA

Environmental Impact Assessment Studies

Minutes of Second Round Stakeholders' Meeting

Venue: Conference Room, MSquare Hotel, 34B Fani Kayode Street, GRA, Ikeja

Date: March 7th 2019

Participants: See Attached Register of Signature.

1. Introduction

The meeting was called in fulfilment of the first interactive stakeholders' engagement on the proposed PCBs collection, storage and treatment centre in Sala, Epe Local Government. Accordingly, officers from Epe Local Government; Ejinrin Local Development Area; Sala Community; Federal Ministry of Environment, Lagos Office; NESREA, Lagos Office; Lagos State Ministry of Environment; LASEPA; Ikeja Electricity Distribution Company and NGO, Steering Committee PCB Project. All the organisations were represented except the Epe Local Government and Ejinrin Local Development Area. Engineering and Environmental Managements Services Limited presented her report in power points and questions and answers session was incorporated.

Generally, the meeting was highly interactive and successful.

2. Commencement of Meeting

The meeting started at 10.45 am, to accommodate arrival of critical number of attendants. Engineering and Environmental Managements Services Limited welcomed participants to the meeting and presented the essence of the call. This was followed with call for prayer which was said by Mrs Rasheedat Jimoh.

3. Presentation of the Project and EIA

The presentation lasted about an hour, which covered the following areas

- Project Background
- Project Description
- Environmental and Social Aspects
- Sources of Impacts
- Key Issues Identified
- Impacts and Management Measures

A copy of the presentation is attached

4. Feedback from Stakeholders

Issues, concerns and expectations raised

Comment/recommendation	Made by	Response
<ol style="list-style-type: none"> 1. Would the entire allocated land for the project be cleared? 2. Are there provisions to power some of the equipment designated for deployment in the course of the project with renewable sources? 3. What is the capacity of the bunker and the PCB storage tank? 4. There may be need to further address the reluctance of local cement manufacturers in the management of PCBs in Nigeria in order to safe foreign exchange flight 5. There is need to address security and in inter/intra transportation system of PCBs wastes 6. What are some of the measures to prevent accidental pollution of the lagoon and underground water in the area? 7. Would the storage area ground/floor be lined? 8. What is the average number of skilled/unskilled staff to be employed? 	FMENV, Lagos	<ol style="list-style-type: none"> 1. only portion land need for development will be cleared 2. this recommendation to use solar energy will be forwarded to the PMU 3. Capacity will be determined after inventory is completed in all the States 4. Cement kiln is very effective in the destruction of PCB, we recommend that PMU to continue to explore this option. 5. There is going to be traffic management plan as well as security management plan 6. The key measure is to isolate all storage and processing areas from storm water drainage. 7. Impervious materials will be used to line the storage areas to prevent seepage into the soil. 8. Number labour requirements will be determined at the final design stage.
<ol style="list-style-type: none"> 1. Would there be a decommissioning plan? 2. Salah community has no knowledge of acquisition of the land allocated for the project 3. Expressed deep concerns about potential negative impacts on the health of the Sala people 4. In what forms would the PCBs be received into the Sala system when established – solid, liquid or whole equipment such as transformer? 5. Has a scenario of a/some communities refusing passage of the waste been considered? 	Sala legal officer	<ol style="list-style-type: none"> 1. Decommissioning plan will be included in the EIA report. 2. The land acquisition documents will be shared with the community for their knowledge. 3. The Stockholm convention and subsequent progress made, provided clear guidelines on safeguarding public health. 4. Liquids -oils retrieved as well as contaminated equipment. 5. There is always reason adduced for the refusal, the issues are resolvable
There is need to expand extant stakeholders	Lagos State Ministry of Environment	Lagos State Ministry of Environment was requested to recommend stakeholders to be invited subsequently

<ul style="list-style-type: none">• How would the ultimate wastes from treatment of PCBs be managed?• What about management of other associated wastes, eg metals, plastics, etc?	LASEPA	No residual waste containing PCB above the safe limit of 50mm will remain
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5. Closure of Meeting

The meeting was closed with a unanimous decision by all, after exhaustive deliberation, with a prayer by Mrs Agbenla, at 1.40 pm.

EIA towards the Design of Poly Chlorinated Biphenyls (PCB) Collection, Storage and Treatment Centres



CONSULTATION ATTENDANCE LIST

INSTITUTIONS

S/N	NAME	COMMUNITY/ ORGANISATION	DESIGNATION	PHONE NO	SIGNATURE	DATE
01	Engr. A.A. Oyewole	Federal Minns of Environment	Deputy Director (HWM Division)	07067986535		07-03-2019
02	AGBENLA-O.O(MRS)	FMENV LAGOS	FCE, LAGOS	08024619012		07/03/2019
03	ADAMS, A.O. (MRS.)	LAGOS STATE MIN OF THE ENVIRONMENT	Chief Scientific Officer	08029072731		07/03/19
04	Jimoh Rasheed k. (Mrs)	Lagos state MOE	Principal Scientific Officer	05036323623		07/3/19
05	Dusgun Oguntans	Ikeja Electric	Q&A Team Lead	08182894687		07/03/2019
06	NOSA AIGBEDION	NESREA	COORDINATOR	07063438777		07/03/19
07	AJOB F. DAVID	NESREA	Supervise officer	07063336305		07/03/19
08	Ogunwumi Jimoh O	LAGOS STATE EPE SOLICITOR TO	BARLE CI SALA	09032378116 09051340874		07/03/2019
09	OMDIAYO OMDSEHIN	SALA COMMUNITY	-	08033076514		07/3/19
10	Chief Ogunsanjo E.A.	LAGOS STATE EPE	Head Kula SALA	08036956074		07/03/19

EIA towards the Design of Poly Chlorinated Biphenyls (PCB) Collection, Storage and Treatment Centres



EEMS Limited

ISO 9001:2015 Certified Organisation

CONSULTATION ATTENDANCE LIST

INSTITUTIONS

S/N	NAME	COMMUNITY/ ORGANISATION	DESIGNATION	PHONE NO	SIGNATURE	DATE
01	Olawapojumo Esther	LASEPA	Scientific Officer	08052433627		07/03/2019
02	Engr. Chike Chikwendu	Centre for Energy & Env. Sus	Ex. Director	08023188059		7/3/19
03	Prof. Sam Adedira	EEMS	Chair.	08052439504		7/3/19
04	Engr. Mamoud Asubabo	EEMS	CEO	08099027755		7/3/19
05						
06						
07						
08						
09						
10						

Community

email address (in caps)

1. AGBENLA-O-O (MRS)

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5. OLUSSAGUN OGUNTONA

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8. OLUWAPOJUWO ESTHER (MRS)

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9. ENGR. A.A. OYEWOLE

~~OLUWAPOJUWOESTHER@gmail.com~~

10. ENGR. CHIKE CHIKWENDU

oyewole_asaolu@yahoo.com

c.chikwendu@hotmail.com



GEF



**ENVIRONMENTALLY SOUND MANAGEMENT AND
DISPOSAL OF POLYCHLORINATED BIPHENYLS (PCBs)
(FEDERAL MINISTRY OF ENVIRONMENT)**

PCB/EC/003/VOL.II/81

1st March, 2019

The Baale of Sala Community,
Lagos.

**INVITATION TO STAKEHOLDERS MEETING FOR THE EVALUATION AND ENDORSEMENT OF
DRAFT ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT OF POLYCHLORINATED
BIPHENYLS (PCBs) COLLECTION, STORAGE AND TREATMENT CENTRES.**

The Project Monitoring Unit of Environmentally Sound Management and Disposal of PCBs Project being executed by the Federal Ministry of Environment and implemented by UNDP mandated EEMS Limited to conduct Environmental Impact Assessment (EIA) towards the design of Polychlorinated Biphenyls (PCBs) collection, storage and treatment centers in Abuja, Enugu and Lagos States.

2. As part of consultations with key institutional stakeholders, you are kindly requested to attend a meeting for the evaluation and endorsement of the draft EIA report which is scheduled as follows:

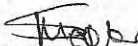
**Venue: Msquare Hotel, 34B,
Remi Fani kayoed Street,
Ikeja, GRA.**

Date: Thursday 7th March, 2019

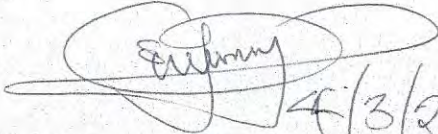
Time: 10.00a.m

3. If you need more information please contact the Project Coordinator on 08059649475.

4. Thank you.


**S. U. Mojekwu (Mrs)
Project Coordinator**

Original Copy received by me
Ogunniyi Jimoh Olusegun
Baale of Sala


4/3/2019



**ENVIRONMENTALY SOUND MANAGEMENT AND
DISPOSAL OF POLYCHLORINATED BIPHENYLS (PCBs)
(FEDERAL MINISTRY OF ENVIRONMENT)**

PCB/EC/003/VOL.II/79

Managing Director/CEO,
Ikeja Electricity Distribution Company,
Lagos:



Attention: Mr. Olusegun Oguntona

**INVITATION TO STAKEHOLDERS MEETING FOR THE EVALUATION AND ENDORSEMENT OF
DRAFT ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT OF POLYCHLORINATED
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Remi Fani kayoed Street,
Ikeja, GRA.

Date: Thursday 7th March, 2019

Time: 10.00a.m

3. If you need more information please contact the Project Coordinator on 08059649475.

4. Thank you.


S. U. Mojekwu (Mrs)
Project Coordinator



GEF



**ENVIRONMENTALLY SOUND MANAGEMENT AND
DISPOSAL OF POLYCHLORINATED BIPHENYLS (PCBs)
(FEDERAL MINISTRY OF ENVIRONMENT)**

PCB/EC/003/VOL.II/77

PERMANENT SECRETARY
General Manager,
Lagos State Ministry of Environment,
Lagos.

OFFICE OF THE PERMANENT SECRETARY
LAGOS STATE MINISTRY OF THE ENVIRONMENT

1st March, 2019

- 4 MAR 2019

RECEIVED

**INVITATION TO STAKEHOLDERS MEETING FOR THE EVALUATION AND ENDORSEMENT OF
DRAFT ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT OF POLYCHLORINATED
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Time: 10.00a.m

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4. Thank you.


S. U. Mojekwu (Mrs)
Project Coordinator

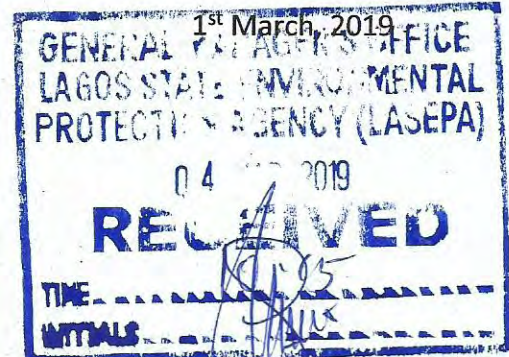


**ENVIRONMENTALLY SOUND MANAGEMENT AND
DISPOSAL OF POLYCHLORINATED BIPHENYLS (PCBs)
(FEDERAL MINISTRY OF ENVIRONMENT)**

PCB/EC/003/VOL.II/76

General Manager/CEO,
Lagos State Environmental Protection Agency,
Lagos.

Attention: Mr. Jaguna Ganiyu Adebayo



**INVITATION TO STAKEHOLDERS MEETING FOR THE EVALUATION AND ENDORSEMENT OF
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Time: 10.00a.m

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4. Thank you.


**S. U Mojekwu (Mrs)
Project Coordinator**



GEF



**ENVIRONMENTALLY SOUND MANAGEMENT AND
DISPOSAL OF POLYCHLORINATED BIPHENYLS (PCBs)
(FEDERAL MINISTRY OF ENVIRONMENT)**

PCB/EC/003/VOL.II/78

1st March, 2019

The Zonal Director,
NESREA Field Office,
Lagos.

**INVITATION TO STAKEHOLDERS MEETING FOR THE EVALUATION AND ENDORSEMENT OF
DRAFT ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT OF POLYCHLORINATED
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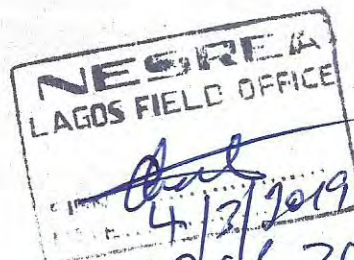
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Remi Fani kayoed Street,
Ikeja, GRA.

Date: Thursday 7th March, 2019

Time: 10.00a.m



07063438777

3. If you need more information please contact the Project Coordinator on 08059649475.

4. Thank you.

S. U Mojekwu (Mrs)
Project Coordinator



GEF



**ENVIRONMENTALY SOUND MANAGEMENT AND
DISPOSAL OF POLYCHLORINATED BIPHENYLS (PCBs)
(FEDERAL MINISTRY OF ENVIRONMENT)**

PCB/EC/003/VOL.II/80

1st March, 2019

The Chairman,
Epe Local Government Area,
Lagos.



**INVITATION TO STAKEHOLDERS MEETING FOR THE EVALUATION AND ENDORSEMENT OF
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Time: 10.00a.m

3. If you need more information please contact the Project Coordinator on 08059649475.
4. Thank you.


S. U Mojekwu (Mrs)
Project Coordinator



GEF



**ENVIRONMENTALLY SOUND MANAGEMENT AND
DISPOSAL OF POLYCHLORINATED BIPHENYLS (PCBs)
(FEDERAL MINISTRY OF ENVIRONMENT)**

PCB/EC/003/VOL.II/75

1st March, 2019

Zonal Controller,
Federal Ministry of Environment,
Lagos.

**INVITATION TO STAKEHOLDERS MEETING FOR THE EVALUATION AND ENDORSEMENT OF
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3. If you need more information please contact the Project Coordinator on 08059649475.

4. Thank you.


S. U. Mojekwu (Mrs)
Project Coordinator

Controller
08024619012
Mrs Agbenke



MINUTES OF MEETING

Meeting with Sheda Community on the Proposed PCBs Collection, Storage and Treatment Centres in Sheda, Abuja.

Environmental Impact Assessment Studies

Venue: Kwali Area Council Conference Room

Date: March 6th 2019

Participants: See Attached Register of Signature.

1. Introduction

The people present are Representative of SHETSCO, Secretary of Big Sheda Village, Youth Leader of Big Sheda Village, Women Leader of Big Sheda Village, Representatives of NESREA, Representatives of AEPB, Representatives of PIU unit of ESM and EEMS staff.

2. Opening Prayer was said by Tolulope Ojih .
Closing Prayer was said by Olatayo Olasehinde.

3. Welcome Address

Welcome Address was done by Olatayo Olasehinde and he apologized for not being able to secure a generator to power the projector for the presentation. However, he said printed copies of the presentation will be distributed to ensure followership on the presentation.

4. Presentation of the Project and EIA

Polychlorinated Biphenyls (PCBs) are among the most toxic Persistent Organic Pollutants (POPs) listed in the Stockholm Convention. PCBs have been used in almost all sectors of the Nigerian economy as coolants and insulating fluids in transformers and capacitors in electricity generation, transmission and distribution, in flexible coatings of electrical wiring and components. With this in mind, PCBs are seen as a threat to public health and the environment. The Stockholm Convention is a global treaty ratified by the international community and led by the United Nations Environment Programme (UNEP) that calls for the elimination and/or phasing out of 12 POPs, called the "*dirty dozen*". However, to neutralize this threat, Nigeria joined the global community in negotiating and ratifying the Stockholm Convention on POPs which obliges parties to eliminate the use of PCBs in equipment by 2015, and to make concerted efforts for disposing liquid PCBs and equipment through environmentally sound waste management practices as early as possible, but no later than 2028. Nigeria submitted its National Implementation Plan (NIP) in 2009 listing twenty-three areas of action as

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The selected PCBs ISF site for Abuja is located on Latitude 8.84844 and Longitude 7.04119 in Sheda Science and Technology Complex (SHESTCO), Sheda, Abuja, Nigeria, a Parastatal under the Federal Ministry of Science and Technology, established by Act Cap S5 (Formerly Decree No.95 of 1993), having its permanent head office at Km 32 Abuja - Lokoja Expressway, Sheda, FCT. The site is presently a virgin land.

5. Feedback from stakeholders

Issues, concerns and expectations raised

Comment/recommendation	Made by	Response
1. The timing of the consultation meeting made it almost impossible for us to make any meaningful contribution because we weren't able to go through the Report.	AEPB	We will give at least two weeks prior notice next time
2. Your presentation did not address ways of detecting PCB contaminated site and how do you ensure the safety of the communities that this PCB material will pass through before reaching the collection center.	AEPB	PCB actually lives with all of us from Transformers on the street to electronic gadgets in our homes. What is most important is not having leakages from these transformers as that's only when it becomes very dangerous. A safety guideline was developed in December last year to cater for the safe movement of PCB from states to the collection centers

3. What is the specific technology adopted for treatment of the PCB's and is the Best Available Technology applied to treatment of PCB's or is it just an average technology out there	AEPB	The Best Available Technology will be deployed for treatment of the PCB
4. Have you gotten approval from Development Control?	AEPB	We will consult with Development Control for Approval of the site and report back
5. Is the project Government or Privately managed for sustainability	AEPB	The project is Government funded but will eventually have private input in its management and will be supported by UNDP and GEF
6. There is need for wider consultations to include the Etsu Kwali and all district heads	ALL	We will extend consultations to the ETSU of Kwali
7. The National Standards on Hazardous & Pesticides Regulations 2014 and the National Standards on Construction Sector Regulations 2011 should be consulted and included in the report	NESREA	It will be included in the report
8. Our people are farmers and we will need to know the effect of PCB on our farms and also, we need you to sensitize our people properly because we are just eager for development, we need to know the disadvantages also.	Community Secretary	We will sensitize the people very well.

EIA towards the Design of Poly Chlorinated Biphenyls (PCB) Collection, Storage and Treatment Centres

Attendance Sheet

Communities

S/N	NAME	COMMUNITY	POSITION/DESIGNATION	PHONE NO/E-MAIL	SIGNATURE	DATE
01	BITAUS Gureyia	BIG SHEJA	SCET	08128351119	<i>[Signature]</i>	5/3/2019
02	Shahy Ibrahim	BIG SHEJA -Joub	Joint Lead	081959000198	<i>[Signature]</i>	5/3/19
03	RAFAKATU Zakintaha	BIG SHEJA	DOMESTIC-WE	090957131157	<i>[Signature]</i>	5/3/2019
04	Friday Ukpang	NESREA	SSO	08067852272	<i>[Signature]</i>	5/3/19
05	Josephine Jambura	NESREA	Assistant Officer Officer (Desk Officer)	08034708174	<i>[Signature]</i>	5/3/19
06	Olugbenga Akoyemi	AEPB	DD (PRS)	08035925763	<i>[Signature]</i>	5/3/19
07	Rebecca Mamwa	AEPB	AD (Environment monitoring)	08033407091	R.M	5/3/19
08	Ikohoff Pius	SHESTCO	CT./Lab Tech	08057969285	<i>[Signature]</i>	5/3/19
09	Ishechumeni Amuma	EEMS		07018555222	<i>[Signature]</i>	5/3/19
10	Obitayo Osechete	EEMS Limited	Environmental Services Mgr	0835200671	<i>[Signature]</i>	5/2/19

EIA towards the Design of Poly Chlorinated Biphenyls (PCB) Collection, Storage and Treatment Centres

Attendance Sheet



S/N	NAME	COMMUNITY	POSITION/DESIGNATION	PHONE NO/E-MAIL	SIGNATURE	DATE
01	Akumefule Qunta		M&E OFFICE PCB Project office	swinta@yahoo.ca 08035678989		05/03/19
02	Ogunbaye Tolulope Grace	Ebrows	Environmental officer	07033915796		05/03/19
03						
04						
05						
06						
07						
08						
09						
10						



**ENVIRONMENTALY SOUND MANAGEMENT AND
DISPOSAL OF POLYCHLORINATED BIPHENYLS (PCBs)
(FEDERAL MINISTRY OF ENVIRONMENT)**

PCB/EC/003/VOL.II/72

The Managing Director/CEO,
Abuja Electricity Distribution Company (AEDC),
Abuja.

Attention: Mr. Tony Uneze



1st March, 2019

**INVITATION TO STAKEHOLDERS MEETING FOR THE EVALUATION AND ENDORSEMENT OF
DRAFT ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT OF POLYCHLORINATED
BIPHENYLS (PCBs) COLLECTION, STORAGE AND TREATMENT CENTRES.**

The Project Monitoring Unit of Environmentally Sound Management and Disposal of PCBs Project being executed by the Federal Ministry of Environment and implemented by UNDP mandated EEMS Limited to conduct Environmental Impact Assessment (EIA) towards the design of Polychlorinated Biphenyls (PCBs) collection, storage and treatment centers in Abuja, Enugu and Lagos States.

2. As part of consultations with key institutional stakeholders, you are kindly requested to attend a meeting for the evaluation and endorsement of the draft EIA report which is scheduled as follows:

Venue: Conference Hall Kwali Area Council, Kwali

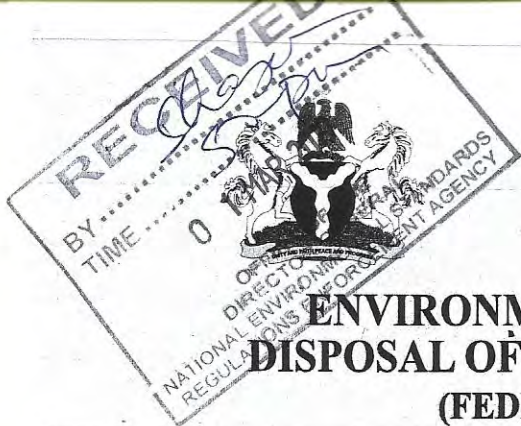
Date: Tuesday 5th March, 2019

Time: 10.00a.m

3. If you need more information please contact the Project Coordinator on 08059649475.

4. Thank you.


S. U. Mojekwu (Mrs)
Project Coordinator



**ENVIRONMENTALLY SOUND MANAGEMENT AND
DISPOSAL OF POLYCHLORINATED BIPHENYLS (PCBs)
(FEDERAL MINISTRY OF ENVIRONMENT)**

PCB/EC/003/VOL.II/71

1st March, 2019

The Director General/CEO,
National Environmental Standards and Regulation Enforcement Agency (NESREA),
4 Oro Ago Street, Garki II,
Abuja.

Attention: Mrs. Josephine Ogunbameru

**INVITATION TO STAKEHOLDERS MEETING FOR THE EVALUATION AND ENDORSEMENT OF
DRAFT ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT OF POLYCHLORINATED
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S. U Mejekwu (Mrs)
Project Coordinator



**ENVIRONMENTALLY SOUND MANAGEMENT AND
DISPOSAL OF POLYCHLORINATED BIPHENYLS (PCBs)
(FEDERAL MINISTRY OF ENVIRONMENT)**

PCB/EC/003/VOL.II/69

1st March, 2019

The Director,
Environmental Assessment Dept.
Federal Ministry of Environment,
Abuja.



**INVITATION TO STAKEHOLDERS MEETING FOR THE EVALUATION AND ENDORSEMENT OF
DRAFT ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT OF POLYCHLORINATED
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S. U. Mojekwu (Mrs)
Project Coordinator



GEF



Empowered lives.
Resilient nations.

**ENVIRONMENTALLY SOUND MANAGEMENT AND
DISPOSAL OF POLYCHLORINATED BIPHENYLS (PCBs)
(FEDERAL MINISTRY OF ENVIRONMENT)**

PCB/EC/003/VOL.II/70

The Director,
Abuja Environmental Protection Board,
Plot 776, Independence Avenue,
Central Business District, Abuja.



1st March, 2019

10:30am

**INVITATION TO STAKEHOLDERS MEETING FOR THE EVALUATION AND ENDORSEMENT OF
DRAFT ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT OF POLYCHLORINATED
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Venue: Conference Hall Kwali Area Council, Kwali

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Time: 10.00a.m

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4. Thank you.


S. U. Mojekwu (Mrs)
Project Coordinator

GROUP CONSULTED: Institutional Stakeholders
Date and time of the meeting: 18 th March, 2019. 10:00am
Meeting location: Blue Island Hotel, Enugu state.
Participants: See attached attendance list
Agenda: <ol style="list-style-type: none"> 1. Opening prayers 2. Introductions 3. Presentation of the Project and EIA 4. Feedback from stakeholders 5. Response to comments/round up 6. Refreshment 7. Vote of thanks 8. Closing prayers 9. Departure

No.	Summary of discussions:
1.	Organisations represented: <ol style="list-style-type: none"> i. Centre for Environmental Management and Control (CEMAC), University of Nigeria Enugu campus ii. Neighbourhood Environment Watch (NEW Foundation) iii. NESREA iv. Host Community (Neke Uno, Nike)
2.	Opening prayer was said by Mr. Owo-Onu Onyekachi (Host community) at 12:00pm. While closing prayer was said by Emmanuel Eneh at 3:04pm.

3

Project Presentation:

Polychlorinated Biphenyls (PCBs) are among the most toxic Persistent Organic Pollutants (POPs) listed in the Stockholm Convention. PCBs have been used in almost all sectors of the Nigerian economy as coolants and insulating fluids in transformers and capacitors in electricity generation, transmission and distribution, in flexible coatings of electrical wiring and components. With this in mind, PCBs are seen as a threat to public health and the environment. The Stockholm Convention is a global treaty ratified by the international community and led by the United Nations Environment Programme (UNEP) that calls for the elimination and/or phasing out of 12 POPs, called the "dirty dozen". However, to neutralize this threat, Nigeria joined the global community in negotiating and ratifying the Stockholm Convention on POPs which obliges parties to eliminate the use of PCBs in equipment by 2015, and to make concerted efforts for disposing liquid PCBs and equipment through environmentally sound waste management practices as early as possible, but no later than 2028. Nigeria submitted its National Implementation Plan (NIP) in 2009 listing twenty-three areas of action as priorities for meeting its treaty obligations. The priorities included PCB inventory and treatment (priority number one) and PCB disposal options. The centres are known as PCBs Interim Storage Facilities (PCB-ISF) in Neke Uno in Enugu State, Epe in Lagos State, and Sheda Science and Technology Complex (SHESTCO) along Abuja-Lokoja Expressway.

The proposed Enugu-PCB project site is located in Neke Uno community, Enugu east LGA with geographical location of Latitude 6.65768 and Longitude 7.54436. It is a flat terrain and is easily accessible through Nike lake road, having a total land area of 16,904 m² with required land documentation. For now, a mobile treatment plant will be used for Neke Uno and Epe depending on demand while the Sheda facility will have a treatment plant. There are various methods applied by several countries in an attempt to reduce the concentration of PCB that eventually ends-up in the ecosystem but we will be making use of Hazardous-waste incineration because it is cost-effective and environmental friendly. Two season baseline data gathering was performed using a 5km spatial boundary for the study. Rainy season data gathering was performed between 22nd to 29th October, 2018 while the dry season was performed from 6th to 12th January, 2019. All parameters (Air, Soil, Groundwater and Surface water) analysed were within FMEV Limits. The Biophysical and Human Environment were used as receptors affected by potential impacts and mitigative measures recommended.

4	Feedback from stakeholders
4.1	<p>Mr. Okezie Kelechukwu of Neighbourhood Environment Watch Foundation hailed the presentation but asked</p> <ul style="list-style-type: none"> • What will be the source of water for the project or are we depending on the community water supply, because if we are depending on the community water supply it can lead to conflict between the Host Community and Project Management unit. • That the life span of the project was not captured in the presentation. • During the 1st consultation with the host communities, where they major stakeholders present, like the youth leader, women Leader and chiefs? • Since is a FMEnv Project, is it a money making project or just for common interest of the public? • Is the scope of the project only for Nigerians alone or will other countries benefit from it?
4.2	<p>Mr. Okoro Chukwuemeka of Health for the society, justice and peace Initiative asked,</p> <ul style="list-style-type: none"> • what are the measures to ensure that during operational phase of the project, the surface and groundwater will not be contaminated maybe as a result of leakage or spills during storage and transportation of the PCBs to the centre?
4.3	<p>Mr. Aladu Obinna of NESREA hailed the presentation but asked</p> <ul style="list-style-type: none"> • In the presentation, you didn't mention any Emergency responds plan for the project in case of Emergency most especially health issues. He suggested that is necessary we add Emergency responds plan for the project. • He also suggested that the timeline base for environmental Audit and Periodic monitoring of soil, air and water should be included in the report and assign duties to project staffs. • Were the host community properly sensitized with respect to the project activities and its impacts?
4.4	<p>Mr. Ugwu Alfred of Neke Uno requested</p> <ul style="list-style-type: none"> • that is necessary to Invite the Igwe of Nike Community during the next stakeholders meeting. • that if the proposed project will be threat to their health and the community, that they are willingly to offer another alternative site that is very very far from their community settlement.

	<ul style="list-style-type: none"> • he also asked, what are the measures put in place to ensure that their community expectations such as the Community Social Responsibility (CSR) are fully implemented and not just mere promises?
4.5	<p>Mrs. Udeh Ebere of NESREA suggested that</p> <ul style="list-style-type: none"> • we should include Enugu state ministry of Environment, Enugu state waste Management Authority, Enugu state ministry of Lands and Enugu state capital territory development control as part of the institutional stakeholders and invite them to the next meeting. • the CSR to be given to the community should be with respect to scale of preference. She requested FMEnv to consider an equipped health centre as the best for the CSR because of the project-related health impacts to the community. • Deforestation and Afforestation Plan should be included in the report.
5	Responds to Comments
5.1	<p>Mr. Emmanuel Eneh of EEMS responded that</p> <ul style="list-style-type: none"> • We will not depend on the community source of water, there is provision for water supply source within the proposed project site. • Noted, the Life span of the project will be captured in the report/presentation. • Yes, we meet with the youth chairman, chiefs and women leader during our 1st consultation with the host community. • The proposed project is for the interest of the public with the aim of protecting Nigeria’s environment and the health of all Nigerians by minimizing the risks posed by the use, discharge and storage of PCB by the year 2028. • For now, is for Collection, storage and treatment of PCB within Nigeria alone.
5.2	<p>Mr. Emmanuel Eneh of EEMS responded that we will</p> <ul style="list-style-type: none"> • Install oil/water separators • Regular checking and maintenance of all plant and equipment to minimize the risk of fuel or lubricant leakages. • Development and implementation of a Waste Management Plan (as part of the ESMP) to ensure that waste is disposed of correctly. • Training of relevant staff in safe storage and handling practices, and rapid spill response and clean-up techniques. • Set-up and apply procedure regarding dealing with contaminated soils. • Spread sheet underneath the structures prior to start any painting activity • Bunding of areas where hazardous substances are stored (eg fuel, waste areas).

<p>5.3</p>	<p>Mr. Emmanuel Eneh of EEMS responded</p> <ul style="list-style-type: none"> • Noted, we will add Emergency responds plan for the proposed project in the report. • Timeline base for environmental Audit and Periodic monitoring of soil, air and water shall be included in the report. • Yes, the host community was properly sensitized with respect to the project activities and its impacts.
<p>5.4</p>	<ul style="list-style-type: none"> • Mr. Emmanuel Eneh of EEMS responded that we will Invite the Igwe of Nike Community during the next stakeholders meeting. • Mr. Aladu Obinna of NESREA assured the host community that there is no cause for alarm if only we can implement all the migitative measures that have been highlighted in the presentation. • Mr. Aladu Obinna of NESREA also assured them that once the CSR have been approved by FMEnv, that it will get to them.
<p>5.5</p>	<p>Mr. Emmanuel Eneh of EEMS responded that</p> <ul style="list-style-type: none"> • Enugu state Ministry of Environment and Enugu state waste Management Authority are aware of this meeting; I have the copies of their acknowledged letter of invitation to this meeting but I don't know why there didn't show up. Enugu state ministry of Lands and Enugu state capital territory development control as part of the institutional stakeholders will be invite to the next stakeholders meeting. • Noted, we will request FMEnv to consider an equipped health centre as the best for the CSR because of the project-related health impacts to the community. • Deforestation and Afforestation Plan will be included in the report.
<p>6</p>	<p>Closing prayer by Mr. Emmanuel Eneh at 3.04pm</p>

EIA towards the Design of Poly Chlorinated Biphenyls (PCB) Collection, Storage and Treatment Centres



EEMS Limited

ISO 9001:2015 Certified Organisation

CONSULTATION ATTENDANCE LIST

INSTITUTIONS

S/N	NAME	COMMUNITY/ ORGANISATION	DESIGNATION	PHONE NO	SIGNATURE	DATE
01	EWOH John Chukwuemeka	Centre for Environmental Management and Control University of Nig. Enugu Campus	TECHNOLOGIST	08030958634 ewohjohn@gmail.com	<i>[Signature]</i>	18/03/19
02	Alady Obinwa c	NESREA	Principal Sc. Officer	08036695813 macnich22@gmail.com	<i>[Signature]</i>	18/03/19
03	Okazi, Kelechi K	Neighbourhood Environment Watch Foundation	Executive Director	08063360120/ okazi2kelly@gmail.com	<i>[Signature]</i>	18/03/19
04	OKORO CHUKWUMEM EKA	HEALTH FOR THE SOCIETY JUSTICE & PEACE INITIATIVE	PROGRAM OFFICER	0803612936 organissokoro@gmail.com	<i>[Signature]</i>	18/03/19
05	Ugwu Alfred	See Power Nkeke and Attorney Nkeke	See Power of Attorney Nkeke and Nike	08054746660	<i>[Signature]</i>	18/03/19
06	Ugwuoso Moses	see Land Nkeke	Member Iyakuwu Development Centre Enugu East L.G.A	08102763846 08102763846	<i>[Signature]</i>	18/03/19
07	Ogbodo Fidelis	Youth Chairman	Nkeke and Nike	07035216157	<i>[Signature]</i>	18/03/19
08	Udoet EBERE	NESREA	Principal Sc. Officer	08062678235	<i>[Signature]</i>	18/03/19
09	Dwo-onu Onyebachi	Nkeke and Community	Youth	08109136485	<i>[Signature]</i>	18/03/19
10	Uba Nnanwuba	Nkeke and Community	Youth	08064075344	<i>[Signature]</i>	18/03/19

U. Emmanuel Ineh EEMS Rep. ————— 08066227074 *[Signature]* 18/3/2019



**ENVIRONMENTALLY SOUND MANAGEMENT AND
DISPOSAL OF POLYCHLORINATED BIPHENYLS (PCBs)
(FEDERAL MINISTRY OF ENVIRONMENT)**

PCB/EC/003/VOL.II/83

12th March, 2019

New Foundation (NGO)
Enugu, Enugu State.

**INVITATION TO STAKEHOLDERS MEETING FOR THE EVALUATION AND ENDORSEMENT OF
DRAFT ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT OF POLYCHLORINATED
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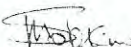
Venue: Blue Island Hotel and Suites, No 12 Bisalla Road,
Independence Layout, Enugu.


Time: 10.00a.m

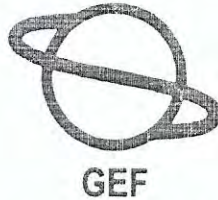
Date: 18th March, 2019

3. If you need more information please contact the Project Coordinator on 08059649475.

4. Thank you.


S. U. Mojekwu (Mrs)
Project Coordinator


08063360120
14/03/2019



**ENVIRONMENTALLY SOUND MANAGEMENT AND
DISPOSAL OF POLYCHLORINATED BIPHENYLS (PCBs)
(FEDERAL MINISTRY OF ENVIRONMENT)**

PCB/EC/003/VOL.II/88

12th March, 2019

Honourable Commissioner,
Enugu State Ministry of Environment,
Enugu, Enugu State.



**INVITATION TO STAKEHOLDERS MEETING FOR THE EVALUATION AND ENDORSEMENT OF
DRAFT ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT OF POLYCHLORINATED
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Time: 10.00a.m

Date: 18th March, 2019

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4. Thank you.


S. U Mojekwu (Mrs)
Project Coordinator



**ENVIRONMENTALLY SOUND MANAGEMENT AND
DISPOSAL OF POLYCHLORINATED BIPHENYLS (PCBs)
(FEDERAL MINISTRY OF ENVIRONMENT)**

PCB/EC/003/VOL.II/86

12th March, 2019

The Chairman,
Enugu State Waste Management Board,
Enugu, Enugu State.


**INVITATION TO STAKEHOLDERS MEETING FOR THE EVALUATION AND ENDORSEMENT OF
DRAFT ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT OF POLYCHLORINATED
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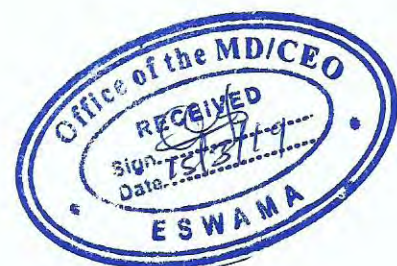
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S. U. Mojekwu (Mrs)
Project Coordinator





**ENVIRONMENTALLY SOUND MANAGEMENT AND
DISPOSAL OF POLYCHLORINATED BIPHENYLS (PCBs)
(FEDERAL MINISTRY OF ENVIRONMENT)**

PCB/EC/003/VOL.II/85

12th March, 2019

The Chairman,
Enugu East Local Government,
Enugu, Enugu State


**INVITATION TO STAKEHOLDERS MEETING FOR THE EVALUATION AND ENDORSEMENT OF
DRAFT ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT OF POLYCHLORINATED
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S. U. Mojekwu (Mrs)
Project Coordinator


07059195146
14-3-2019



**ENVIRONMENTALLY SOUND MANAGEMENT AND
DISPOSAL OF POLYCHLORINATED BIPHENYLS (PCBs)
(FEDERAL MINISTRY OF ENVIRONMENT)**

PCB/EC/003/VOL.II/87

12th March, 2019

State Coordinator,
The Zonal Director,
National Environmental Standards and Regulatory Enforcement Agency (NESREA),
Enugu, Enugu State.

**INVITATION TO STAKEHOLDERS MEETING FOR THE EVALUATION AND ENDORSEMENT OF
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S. U Mejekwu
S. U Mejekwu (Mrs)
Project Coordinator





**ENVIRONMENTALLY SOUND MANAGEMENT AND
DISPOSAL OF POLYCHLORINATED BIPHENYLS (PCBs)
(FEDERAL MINISTRY OF ENVIRONMENT)**

PCB/EC/003/VOL.II/82

12th March, 2019

The Director,
Centre for Environmental Management and Control (CEMAC),
Enugu, Enugu State.

**INVITATION TO STAKEHOLDERS MEETING FOR THE EVALUATION AND ENDORSEMENT OF
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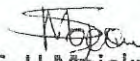
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Independence Layout, Enugu.

Time: 10.00a.m

Date: 18th March, 2019

3. If you need more information please contact the Project Coordinator on 08059649475.

4. Thank you.


S. U. Mojekwu (Mrs)
Project Coordinator

Copy collected by
John
08030958634
14/3/2019

APPENDIX 2.3: Third Round Consultations

GROUP CONSULTED: Institutional Stakeholders
Date and time of the meeting: 31 st July, 2019. 10:40am
Meeting location: Dennis Hotel, FCT Abuja.
Participants: See attached attendance list
Agenda: <ol style="list-style-type: none"> 1. Opening prayers 2. Safety briefing 3. Introductions 4. Presentation of the Project 5. Feedback from stakeholders 6. Response to comments/round up 7. Refreshment 8. Vote of thanks 9. Closing prayers 10. Departure

No.	Summary of discussions:
1.	Organisations represented: <ol style="list-style-type: none"> i. AEPB ii. NESREA iii. TCN iv. Federal Ministry of Power v. FCDA vi. NERC vii. Savannah Conservation viii. SHESTCO
2.	Opening prayer was said by Mr. Abimbola Afolabi (EEMS) at 10:45am While closing prayer was said by Mr. Olatayo Olasehinde at 02:20pm.

Project Presentation**PROJECT LOCATION****PROPOSED SHEDA SITE**

- Located on Latitude 8.84844 and Longitude 7.04119 in Sheda Science and Technology Complex (SHESTCO), Sheda, Abuja, Nigeria.
- It can be accessed by road through the Abuja - Lokoja Expressway, Sheda, FCT.
- The total land take for the Sheda Site is about 33,000 m²

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

- An environmental and Social Management plan (ESMP) is essentially a management tool and standalone component of an ESIA that provides the assurance that the mitigation measures developed for the significant impacts of a proposed project are implemented and maintained throughout the project lifecycle. It therefore outlines management strategies for health, safety and environment stewardship in the proposed project implementation. This EMP would therefore ensure that all significant associated and potential impacts of the proposed project are either prevented or reduced to acceptable limits.
- This EMP contains among others the following key items:
 - summary of potential impacts;
 - planned mitigation measures;
 - planned environmental monitoring;
 - planned public consultation process;
 - responsibilities and authorities for implementation of mitigation measures and monitoring requirements;
 - Mechanisms for feedback and adjustment.

ESMP OBJECTIVE

- Ensure progressive reduction of the impacts of the project activities on the biophysical, socio-economic and health environment with the ultimate aim of eliminating them where possible; ensure that all mitigation and enhancement measures prescribed during the impact assessment process for eliminating or

minimizing the adverse project impacts as well as optimally enhancing the beneficial impacts are fully implemented;

- Provide feedback for continual improvement in environmental performance; and
- Provide part of the basis and standards needed for overall planning, monitoring, auditing and review of environmental and socio-economic performance throughout the project life cycle.
- Promote profit maximization without compromising with the goals of sustainable development.

COMMENTS/RECOMMENDATIONS	MADE BY	RESPONSE(S)
Sheda Site in the FCT		
<p>Are the necessary regulatory agencies involved in the building plan been contacted? The master plan should be checked to ensure the project can be situated in the proposed location.</p> <p>Representative of FMEnv should be present at the meetings.</p>	Development Control	<p>Not contacting the Development Control was an over site and that will be amended. All necessary regulatory body will be contacted.</p> <p>The project belongs to the Federal Ministry of Environment</p>
<p>The oil should not be re-used as anti-termite because that cannot be considered as recycling/re-use instead it is as good as dumping the oil somewhere.</p>	AEDC	We will use the vendor buy-back policy
<p>AEPB has an approved site for waste recycling at industrial layout and it is expected that the proponent should have consulted with AEPB to get a designated area for the disposal</p> <p>The monitoring plan was also observed to have limited the stakeholders to the Federal level which shouldn't be, and he suggested that AEPB should be a part of the monitoring team to ensure proper coordination.</p> <p>The air quality within the premises should be considered and air sensors should be installed to protect the safety of the workers</p> <p>The timeline/duration of the project should be indicated in the report.</p> <p>The advantage of siting the project in an industrialized areas that the waste disposed might be useful to other industries located close to the project facility.</p> <p>Revegetation of the boundaries between the industries and the flood area should be considered.</p>	AEPB	<p>Noted, and if that has to be done, the land will be given for free as the project belongs to Government.</p> <p>Noted, going forward the state level and local government level will be involved.</p> <p>Noted, and it will be put into consideration.</p> <p>The timeline and duration of the project is dependent on the outcome of the inventory.</p> <p>Noted</p> <p>Villagers are already farming in the boundaries with no intention to leave.</p>

COMMENTS/RECOMMENDATIONS	MADE BY	RESPONSE(S)
<p>AEPB should be involved in the monitoring plan as well as northern states regulatory bodies.</p> <p>Will disposal of solid wastes be included in the project?</p>	NESREA	<p>Noted, going forward the state level and local government level will be involved.</p> <p>During the construction stage solid wastes will be included and they shall be properly disposed</p>
<p>Where does TCN come in as regards the project?</p>	TCN	<p>TCN is a major stakeholder because they own most of the transformers that has to do with PCB oils</p>
<p>The report and invitation to the stakeholders meeting should be sent in ample time</p> <p>The project unit of FMENv are not present and going forward no meeting will be held without their attendance</p>	NERC	<p>The invitation and reports were sent out early enough, for proper communication, emails will be sent to the people attentioned so as to inform them in case of any delay from their organization.</p> <p>Mr Dauda of the project unit later came and apologized for coming late.</p>
<p>The labels should be in English language and the dialect of the community for proper communication.</p>	Savanna Conservation Forum	<p>Noted, and will be considered</p>

Closing Prayer by Olatayo Olasehinde at 2:20pm.

**Environmental and Social Management Plan (ESMP) For the Sheda Poly Chlorinated Biphenyls (PCBs)
Analytical Laboratory In Shestco, Sheda**



EEMS Limited

ISO 9001:2015 Certified Organisation

CONSULTATION ATTENDANCE LIST

INSTITUTIONS

S/N	NAME	COMMUNITY/ ORGANISATION	DESIGNATION	PHONE NO	SIGNATURE	DATE
01	Oluvbenga Adeyemi	AEPB	Director	08035925763		31/7/19
02	JOSAPHINE OGUNBAMORU	NESREA	Assistant Chief Scientific Officer	08034708174		31/7/19
03	Friday Ukpang	NESREA	Senior Scientific Officer	08067852272		31/7/19
04	Anazodo Chisom. N.	Fed. min of power	Admin officer II	08113066217		31/7/19.
05	Catherine E. Odepofo	✓	PSW O	08055084719		✓
06	Thompson, H	Dev. authority	Chief Town Planner for DDC	087037041979		31/7/19
07	Olubunmi Paulson	AEDC	Manager Procurement	08089580072		31/7/19
08	Idris Idris Aminu	NERC	Manager ITU	08025533554		31/7/19
09	Aderuga Oluyemi	AEPB	Divisional Head (MPC)	08099779526		31/7/19
10	Kaveem, A. O	TCN	Env. aff.	08098550740		31/7/19

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Analytical Laboratory In Shestco, Sheda**



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CONSULTATION ATTENDANCE LIST

INSTITUTIONS

S/N	NAME	COMMUNITY/ ORGANISATION	DESIGNATION	PHONE NO	SIGNATURE	DATE
01	SMITH Rufus	SEVANK CONSTRUCTION	Environmental Officer	0206530524	[Signature]	31/07/19
02	Obigwa Patricia A.	SHESTCO	RESEARCH FELLOW	08036855875	[Signature]	31/07/19
03	Mrs. Comfort Salco	TCN	TCN	081657732 53	[Signature]	✓
04	Oloma A. Kwachukwa		TCN		[Signature]	✓
05	DAUDA MUSA	PCB-PMU	TO	08036866283	[Signature]	✓
06	SIKIRU Adigun	NESREA	A.S.C	08065608123	[Signature]	✓
07	Ike Umunna	EEMS	IP	6818655644	[Signature]	✓
08	Afolabi Abimbola	EEMS	Corper	07039879443	[Signature]	✓
09	Oladipepo Momijane	fed. min of power	A. D 1	08112578911	[Signature]	✓
10	Kalu Kemepuna	AEPB	Admin officer	87031596778	[Signature]	✓

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Analytical Laboratory In Shestco, Sheda**



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ISO 9001:2015 Certified Organisation

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S/N	NAME	COMMUNITY/ ORGANISATION	DESIGNATION	PHONE NO	SIGNATURE	DATE
01	Tohelohe Grace Ojuh	EEMS	ED2/HSE C.	0703390596	<i>[Signature]</i>	31/07/2019
02	Obatayo Oshole	EEMS	Environmental Services Manager	08155700671	<i>[Signature]</i>	31-07/2019
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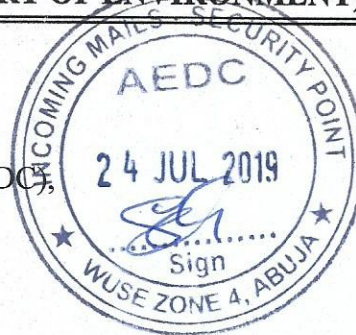


**ENVIRONMENTALLY SOUND MANAGEMENT AND
DISPOSAL OF POLYCHLORINATED BIPHENYLS (PCBs)
(FEDERAL MINISTRY OF ENVIRONMENT)**

PCB/EC/003/VOL.III/134

18th July, 2019.

The Managing Director/CEO,
Abuja Electricity Distribution Company (AEDC),
Abuja.



Attention: Mr. Tony Uneze

**INVITATION TO STAKEHOLDERS MEETING FOR THE ENVIRONMENTAL AND
SOCIAL MANAGEMENT PLAN OF POLYCHLORINATED BIPHENYLS (PCBs)
ANALYTICAL LABORATORY IN SHESTCO, SHEDA.**

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2. As part of consultations with key institutional stakeholders, you are kindly requested to send a representative to attend a meeting where the ESMP will be discussed. The comments and recommendations of stakeholders will be addressed in the final ESMP.

3. The meeting is scheduled as follows:

Venue: Dennis Hotel, 910, Ndjamena Crescent, Wuse II, Abuja.
Date: Wednesday, July 31, 2019
Time: 10:00am

4. For further clarifications please call Project Coordinator: 08059649475.

5. Thank you.


Mrs. Stella Mojekwu
Project Coordinator



**ENVIRONMENTALLY SOUND MANAGEMENT AND
DISPOSAL OF POLYCHLORINATED BIPHENYLS (PCBs)
(FEDERAL MINISTRY OF ENVIRONMENT)**

PCB/EC/003/VOL.III/135

18th July, 2019

The Chairman,
Nigerian Electricity Regulatory Commission,
Plot 1387 Cadastral Zone A00,
Central Business District (CBD),
Abuja.



Attention: Idris Idris A.

**INVITATION TO STAKEHOLDERS MEETING FOR THE ENVIRONMENTAL AND
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Mrs. Stella Mojekwu
Project Coordinator

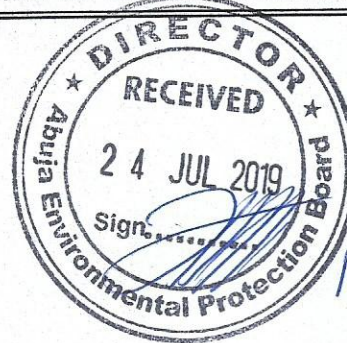


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DISPOSAL OF POLYCHLORINATED BIPHENYLS (PCBs)
(FEDERAL MINISTRY OF ENVIRONMENT)**

PCB/EC/003/VOL.III/136

18th July, 2019

The Director,
Abuja Environmental Protection Board,
Plot 776, Independence Avenue,
Central Business District,
Abuja.



**INVITATION TO STAKEHOLDERS MEETING FOR THE ENVIRONMENTAL AND
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DISPOSAL OF POLYCHLORINATED BIPHENYLS (PCBs)
(FEDERAL MINISTRY OF ENVIRONMENT)**

PCB/EC/003/VOL.III/131

18th July, 2019

The Permanent Secretary,
Federal Ministry of Power, Works & Housing,
Power House, Plot 14, Zambezi Crescent, Maitama,
Abuja.

Attention: Catherine E. Okpoko



**INVITATION TO STAKEHOLDERS MEETING FOR THE ENVIRONMENTAL AND
SOCIAL MANAGEMENT PLAN OF POLYCHLORINATED BIPHENYLS (PCBs)
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Project Coordinator



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(FEDERAL MINISTRY OF ENVIRONMENT)**

PCB/EC/003/VOL.III/133

18th July, 2019

The Managing Director/CEO,
Transmission Company of Nigeria (TCN),
Maitama, Abuja.




Attention: General Manager, Health Safety & Environment

**INVITATION TO STAKEHOLDERS MEETING FOR THE ENVIRONMENTAL AND
SOCIAL MANAGEMENT PLAN OF POLYCHLORINATED BIPHENYLS (PCBs)
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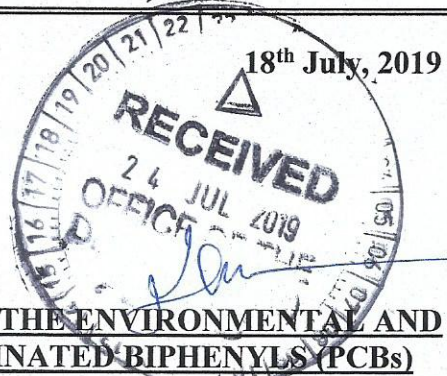

Mrs. Stella Mojekwu
Project Coordinator



**ENVIRONMENTALLY SOUND MANAGEMENT AND
DISPOSAL OF POLYCHLORINATED BIPHENYLS (PCBs)
(FEDERAL MINISTRY OF ENVIRONMENT)**

PCB/EC/003/VOL.III/137

The Director,
FCT Department of Development Control,
Abuja.



**INVITATION TO STAKEHOLDERS MEETING FOR THE ENVIRONMENTAL AND
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Mrs. Stella Mojekwu
Project Coordinator



**ENVIRONMENTALLY SOUND MANAGEMENT AND
DISPOSAL OF POLYCHLORINATED BIPHENYLS (PCBs)
(FEDERAL MINISTRY OF ENVIRONMENT)**

PCB/EC/003/VOL.III/138

18th July, 2019.

The Director-General/CEO,
Sheda Science & Technology Complex (SHESTCO),
10Km from Gwagwalada on Abuja – Lokoja Road,
Sheda, FCT.

Attention: Patrick Obigwa

**INVITATION TO STAKEHOLDERS MEETING FOR THE ENVIRONMENTAL AND
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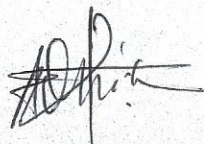
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Time: 10:00am

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5. Thank you.


Mrs. Stella Mojekwu
Project Coordinator

Original collected by me: Mr Obigwa Patrick A.

 24/07/2019

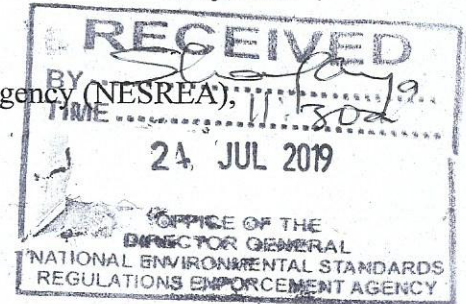


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DISPOSAL OF POLYCHLORINATED BIPHENYLS (PCBs)
(FEDERAL MINISTRY OF ENVIRONMENT)**

PCB/EC/003/VOL.III/130

18th July, 2019

The Director General/CEO,
National Environmental Standards and Regulation Enforcement Agency (NESREA),
4 Oro Ago Street, Garki II,
Abuja.



Attention: Mrs. Josephine Ogunbameru

**INVITATION TO STAKEHOLDERS MEETING FOR THE ENVIRONMENTAL AND
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