DRAFT ESIA REPORT

FOR

THE PROPOSED IEFCL-TRAIN3 PROJECT

AT

ELEME, RIVERS STATE, NIGERIA

BY

INDORAMA ELEME FERTILIZER & CHEMICALS LIMITED
ELEME, PORT HARCOURT, RIVERS STATE

SUBMITTED TO

African Development Bank (AfDB)

VOLUME II
ANNEXURES

JUNE 2023

Annexure 1.1

FEDERAL MINISTRY OF ENVIRONMENT

Environment House
Independence Way South, Central Business District, Abuja - FCT.
Tel: 09-2911 337 Email: ea@ead.gov.ng, www.ead.gov.ng

ENVIRONMENTAL ASSESSMENT DEPARTMENT

FMEnv/EA/EIA/6063/Vol.1/68
5th August, 2021

The Managing Director,
Indorama Eleme Fertilizer & Chemicals Limited,
Indorama Complex,
Eleme,
Rivers State.

RE: SUBMISSION OF ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REGISTRATION FORM AND TOR FOR THE PROPOSED "IEFCL-TRAIN3 PROJECT (AMMONIA AND UREA PLANT)"

Please refer to your letter ref: IEFCL-TR3/ENV/FMEnv/2021/01 dated 14th July, 2021 and the Ministry's letter ref: FMEnv/EA/EIA/6063/Vol.1/59 dated 23rd July, 2021 on the above subject.

2. Following the conclusion of the EIA Site Verification Exercise, the Ministry has placed the Project in Category One (1) with one (1) season baseline data gathering in line with International Best Practices. As a follow up to the Site Verification Exercise, you are required to conduct a Scoping Workshop involving relevant stakeholders in attendance. Also, regulators from the Federal Ministry of Environment and Rivers State Ministry of Environment shall participate as observers.

3. Furthermore, you are requested to submit to the Ministry, the report of the Scoping Workshop, including the project's revised Terms of Reference (TOR) incorporating significant issues raised at the Scoping Workshop and a detailed sampling frame for approval before proceeding to the next stage of the EIA process.

4. You may wish to contact the undersigned on GSM number 08037869670 or Mr. Ladula H. D. on 08020910889 for any further information.

5. Thank you for your cooperation.

Engr. Gomwalk, Celestine W. G
For: Honourable Minister

Annexure 1.2

FEDERAL MINISTRY OF ENVIRONMENT

Environment House
Independence Way South, Central Business District, Abuja - FCT.
Tel: 09-2911337 Email: ea@ead.gov.ng, www.ead.gov.ng

ENVIRONMENTAL ASSESSMENT DEPARTMENT

FMEnv/EA/EIA/6063/Vol.1/160
5th October, 2021

The Managing Director,
Indorama Eleme Fertilizer & Chemicals Limited,
Indorama Complex,
Eleme,
Rivers State.

RE: ENVIRONMENTAL IMPACT ASSESSMENT (EIA): SCOPING WORKSHOP FOR THE PROPOSED "IEFCL-TRAIN 3 PROJECT (AMMONIA AND UREA PLANT)"

Please refer to the Ministry's letter ref: FMEnv/EA/EIA/6063/Vol.1/68, dated 5th August, 2021 and your letter ref: IEFCL-TR3/ENV/FMEnv/2021/03, dated 10th September, 2021 on the above subject.

2. Following the evaluation of the revised Terms of Reference (ToR) and Scoping workshop report submitted, I am directed to inform you to proceed to the next stage of the EIA process in line with Best Practices.

3. In addition to the ToR and sampling frame submitted, I am further directed to inform you to include the use of Climate Smart Technology in the scope of the EIA study.

4. Please note that the data gathering and laboratory analysis exercises shall be witnessed by officials of the Ministry. The laboratory analysis of the samples must be carried out in a FMEnv accredited Laboratory. You are also to ensure full Quality Assurance/Quality Control (QA/QC) measures for the laboratory analysis in line with standard practices and notify the Ministry in good time to enable adequate participation in the exercise.

5. The following should be forwarded to the Federal Ministry of Environment before submission of the draft EIA report.

i. Evidence of accreditation of the Federal Ministry of Environment for the Laboratory where the sample analysis would be carried out.
ii. Chain of Custody for the samples collected
iii. Certificate of Analysis duly stamped and signed by the Laboratory Manager.
iv. Evidence of Laboratory analysis witnessing by the Federal Ministry of Environment.

6. Upon completion of the EIA studies, you are required to submit to the Ministry, Ten (10) hard and two (2) electronic copies of the draft EIA report and also email a copy to eia@ead.gov.ng

7. Thank you for your co-operation.

Engr. Gomwalk, Celestine W. G.
For: Honourable Minister

TERMS OF REFERENCE (TOR)

INCLUDING

SCOPE OF EIA STUDTIES

FOR

THE PROPOSED IEFCL-TRAIN3 PROJECT ELEME, RIVERS STATE

SUBMITTED TO

FEDERAL MINISTRY OF ENVIRONMENT HEADQUARTERS, MABUSHI, ABUJA, NIGERIA

BY

INDORAMA ELEME FERTILIZER & CHEMICALS LIMITED ELEME, RIVERS STATE, NIGERIA

SEPTEMBER 2021

TABLE OF CONTENT

1.0 TERM OF REFERENCE (TOR)

1.1 INTRODUCTION/BACKGROUND INFORMATION

Indorama Eleme Fertilizer & Chemicals Limited (Proponent) requires an Environmental Impact Assessment (EIA) of the proposed IEFCL-Train3 (Ammonia and Urea) Project. The Project will be located within precincts of the newly acquired 250 Hectares of Land in Eleme Local Government Area, Rivers State, Nigeria. The Land is bordering Existing Indorama Complex on East side. The Proponent wishes to ensure that the Project is carried out fully in-line with National and International legislative requirements, including World Bank/IFC standards and Indorama's HSE policy statements. These standards include a requirement to assess the Environmental, Social and Health impacts of any development, so that adequate control measures can be undertaken to mitigate negative effects and enhance positive impacts. The environmental assessment will be conducted prior to commencement of the development phases. For Environmental Impact Assessment (EIA) of the proposed Project, primary data by way of baseline data collection for the Physio-biological, Social and Health environmental components become necessary for the EIA process. The Federal Government of Nigeria developed an Environmental Impact Assessment Procedural Guidelines as blueprint to protect the environment from accelerated growth in the country. The aspirations of the Guideline are to ensure that possible and potential effects (positive and negative) of any developmental project are determined prior to commencement of the Project activities and mitigation measures shall be proffered/implement during Project execution.

1.2 PROPONENT

The proponent of the proposed Project is Indorama Eleme Fertilizer & Chemicals Limited, Eleme, Rivers State, Nigeria.

It is the proponent's intent to establish the Ammonia and Urea Plants, and required associated facilities, from the concept to design and to engineering, and construction in- line with the National Guidelines on manufacturing sector.

1.3 PROJECT DESCRIPTION

The proposed Project involves setting up of Ammonia and Urea Plant, which will use Natural Gas (NG) as raw material to manufacture Granular Urea. The proposed Project scope also covers the construction of associated facilities required for seamless operation. The proposed production capacity is 2300 MTPD of Ammonia and 4000 MTPD of Granular Urea.

Ammonia Plant

Natural gas is used as feed and fuel in Ammonia plant. The Carbon of hydrocarbon converts to Carbon Dioxide (CO_2) and goes to Urea Plant. Hydrogen from the hydrocarbon and Nitrogen from the added air are used to synthesis Ammonia which is fed to Urea Plant. Ammonia Plant process steps are illustrated below.

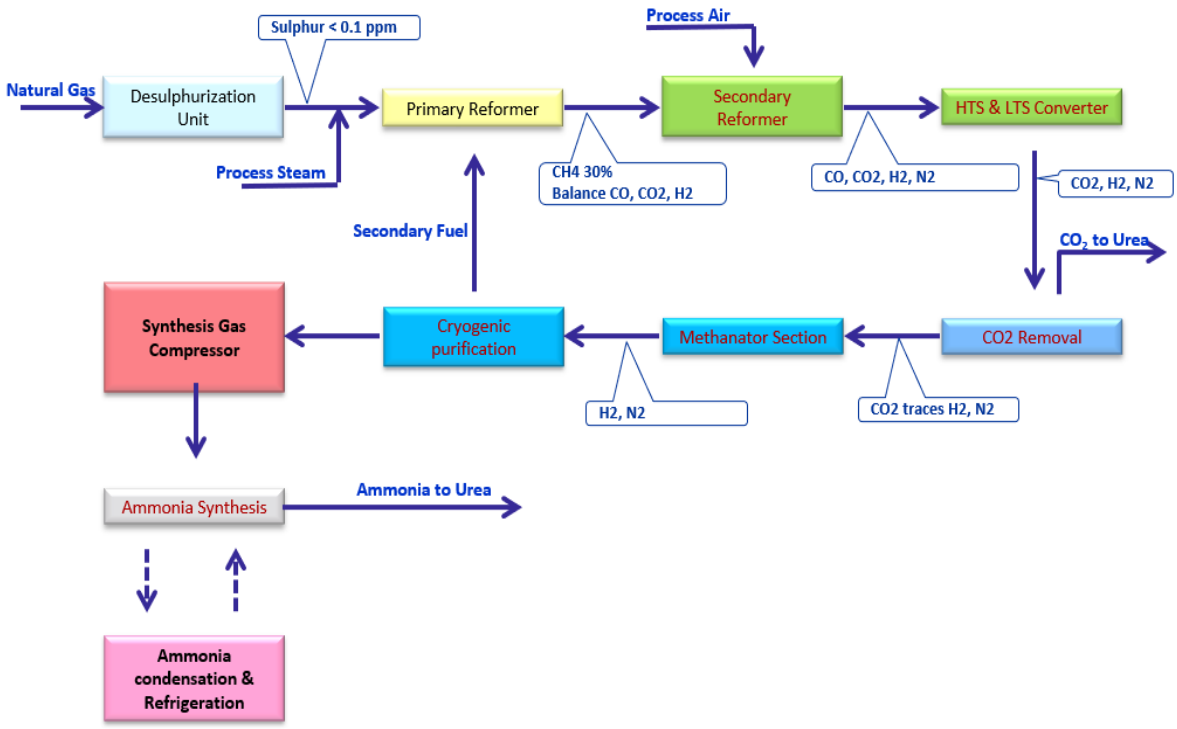

Figure 1: Ammonia Block flow diagram

Urea Plant

The Urea Plant will receive Ammonia and Carbon Dioxide from the Ammonia Plant and convert it into Urea Granule as schematically illustrated below.

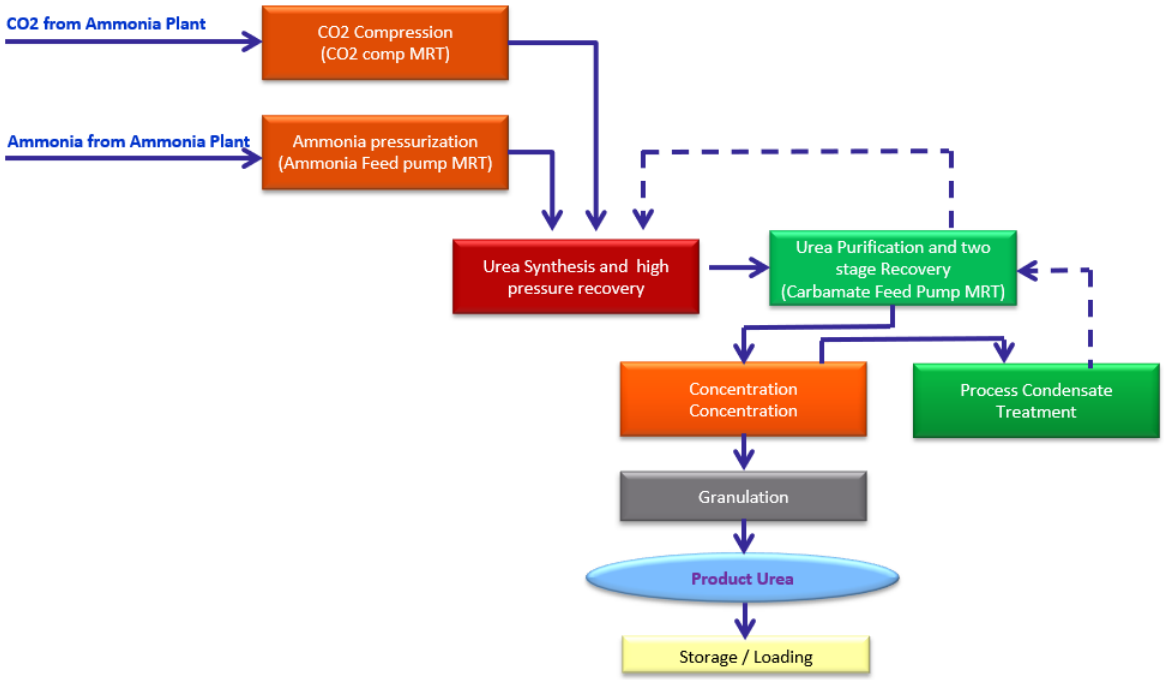

Figure 2: Urea Block flow diagram

1.4 PROJECT LOCATION

The Project, which is defined as the construction of Ammonia and Urea Plant, the main manufacturing facility, and the required associated facilities, will be sited within precincts of the newly acquired 250 Hectares of Land, which is adjacent to the existing Indorama Complex. Geographically, it is situated within North (Latitude) $4^{0}49'15'$, $4^{o}49'33''$, $4^{0}50'44''$, $4^{0}50'51''$ and East (Longitude) $7^{0}06'16''$, $7^{0}06'29''$,$7^{0}06'43''$, $7^{o}07'25''$ in Eleme Local Government Area, Rivers State, Nigeria.

Figure 3 illustrates project site; Figure 4 is the map of Eleme local Government area showing project site and figures 5 and 6 are administrative map of Rivers State showing position of Eleme LGA and Administrative map of Nigeria showing position of Rivers State respectively. A sampling map of the study area that will indicate geo-referenced sample stations will be attached, in the EIA Report.

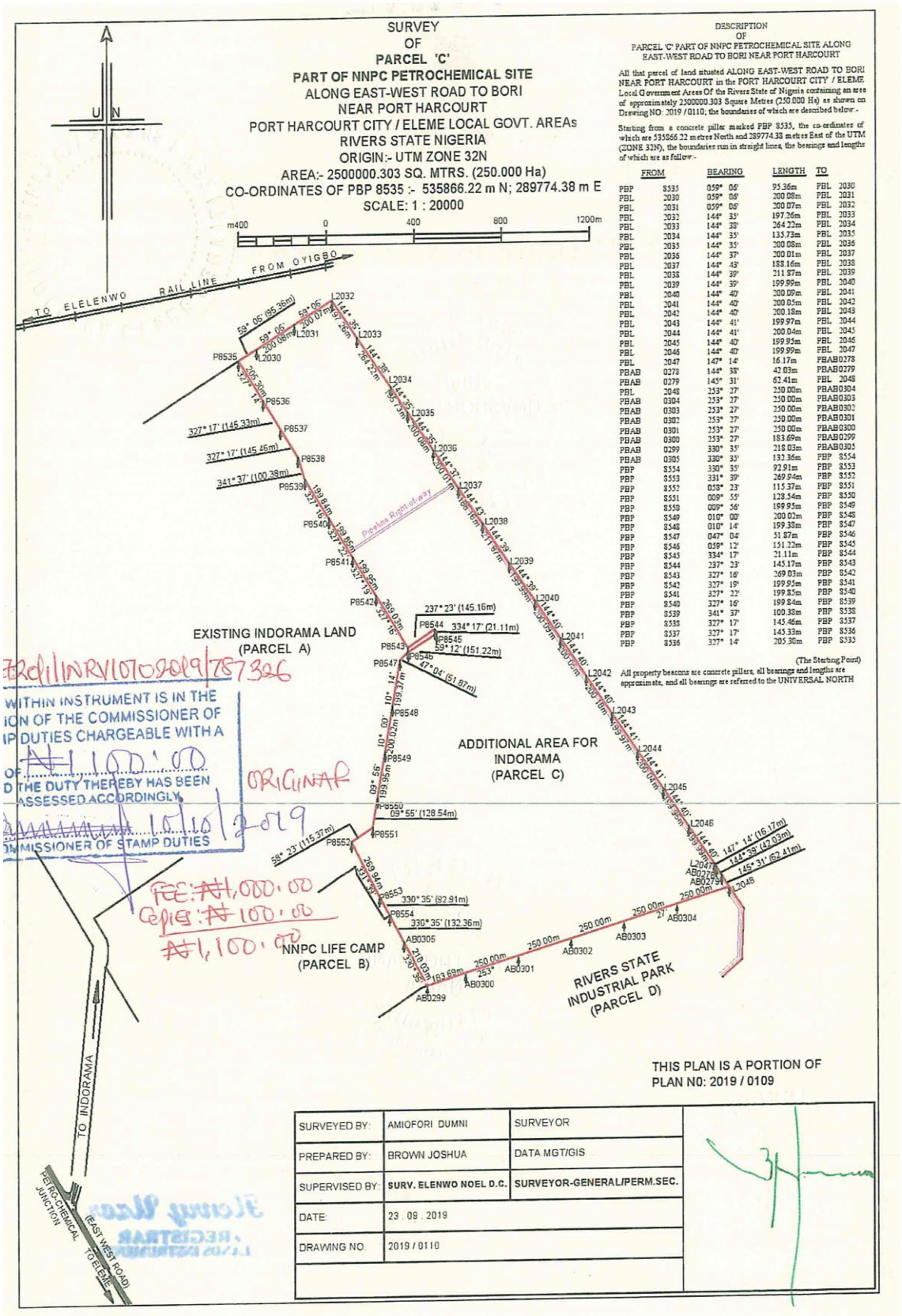

Figure 3: Project Site

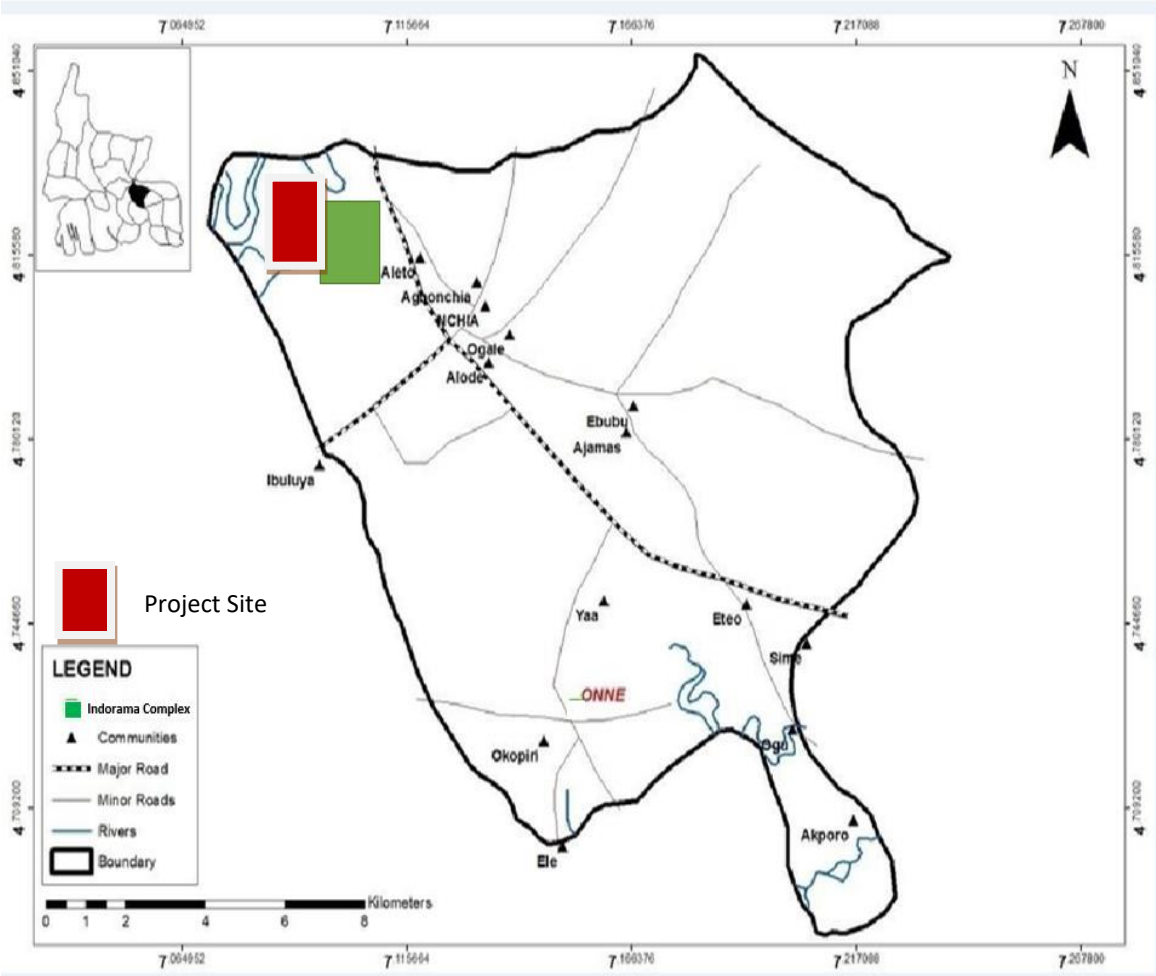

Figure 4: Map of Eleme LGA showing Proposed Project Location

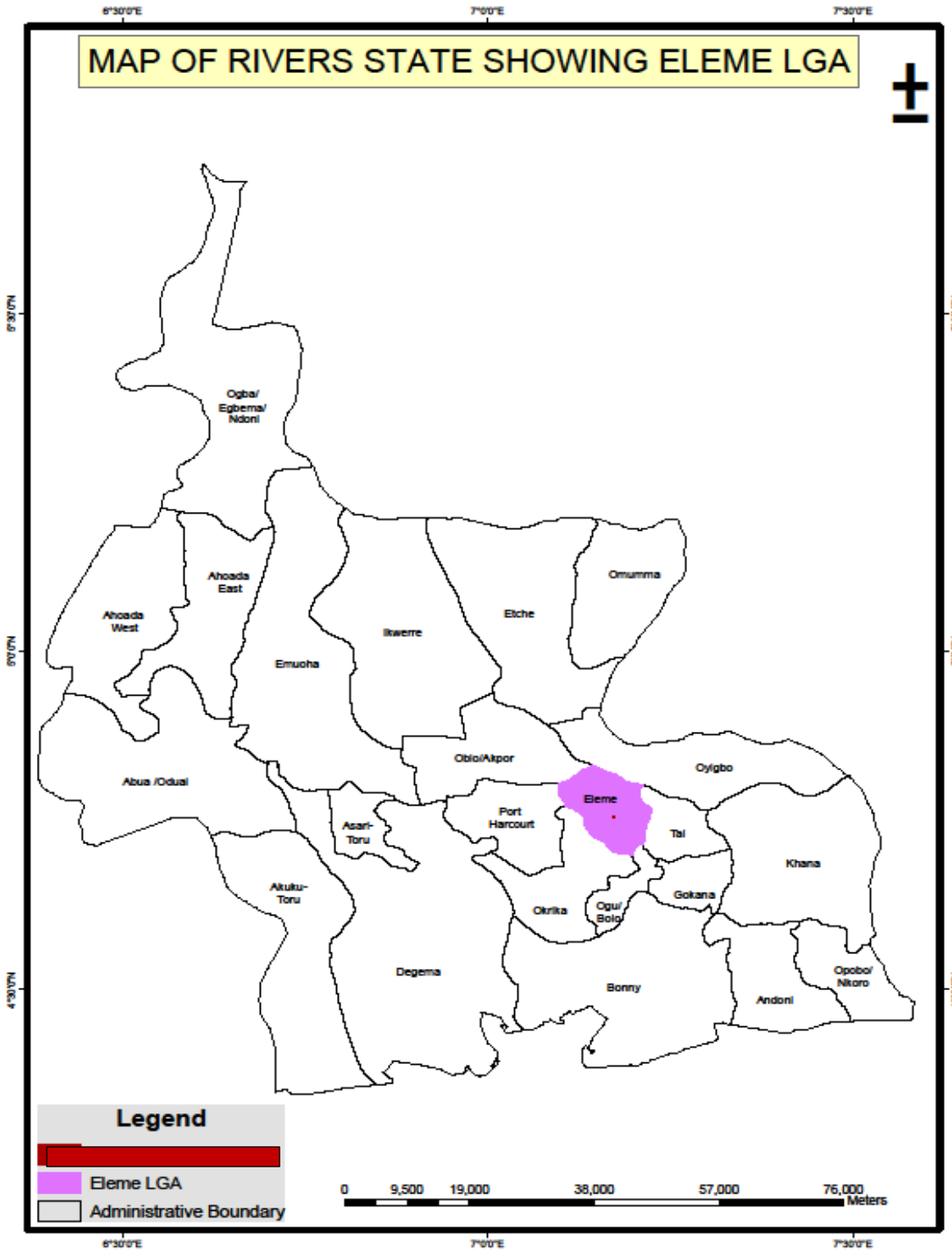

Figure 5: Map of Rivers State showing Eleme LGA

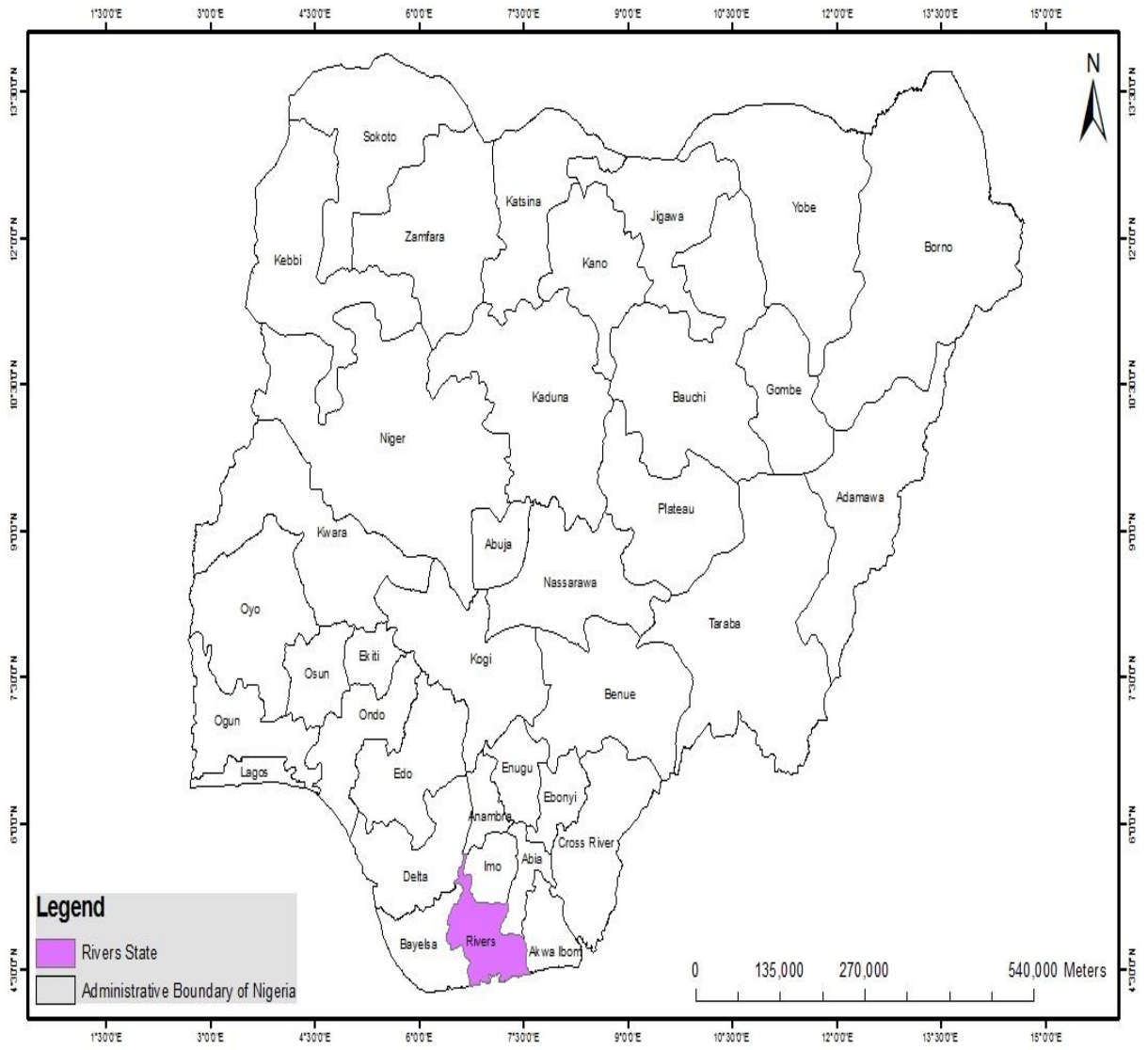

Figure 6: Map of Nigeria showing Rivers State

1.5 PROJECT REGULATORY FRAMEWORK (LEGAL AND ADMINISTRATIVE)

Several regulations exist to regulate developmental activities (oil and gas, manufacturing, mining, infrastructure, etc). These regulations are derived from International, National and State sources. The regulations from International and National sources are general in nature and applicable all over Nigeria, whilst the State regulations are specific and only applicable to project/activities within the State. Law and Regulations which control and regulate this Project will be reviewed and documented.

1.6 LEGAL BASIS FOR ENVIRONMENTAL PERMITTING

Environmental planning and permitting in Nigeria as are related to this Project is carried out through the provisions of environmental legislation.

Federal Regulations/Guidelines

- The Environmental Impact Assessment (EIA) Act CAP LFN E12, 2004
- EIA Procedural Guidelines, 1995, Federal Environmental Protection Agency (Now Federal Ministry of Environment), Nigeria
- EIA Sectoral Guidelines, Manufacturing Industry, 1995, Federal Environmental Protection Agency (Now Federal Ministry of Environment), Nigeria
- National Environmental Protection (Effluent limitations) Regulations (S.1.8), 1991
- National Environmental Protection (Pollution Abatement in Industries producing waste) Regulations (S.1.9), 1991
- National Environmental Protection (Management of Solid and Hazardous Wastes) Regulations (S.1.15), 1991
- National Environmental Standards and Regulation Enforcement Agency (NESREA) Act 25, 2007 and all its relevant Regulations
- Environmental Guidelines and Standards for the Petroleum Industry in Nigeria, Department of Petroleum Resources (DPR), (revised Ed.) 2018
- Mineral Oils Safety Regulations, Department of Petroleum Resources, 1997
- The Petroleum Act CAP P10, LFN 2004
- Factories Act CAP F1 LFN 2004
- Land use Act CAP L5 LFN 2004
- NSITF Employee's Compensation Act 2010

State Regulations

- Rivers State Noise (Control) Edict, No. 20, 1985
- Rivers State Environment and Development Planning Authority Edict, 1998
- Rivers State Forestry Law, 1998

- Rivers State Land Use (Environmental Degradation/Protection) Charge Law, 2005
- Rivers State Waste Management Law, 2012
- Rivers State Interim Guidelines and Standards on Environmental Pollution Control and management, 2013
- Rivers State Environmental Protection & Management Law, 2019, 15 Vol 55.

Relevant International Conventions, Guidelines and Standards

- International Union for Conservation of Nature and Natural Resources (IUCN) Guidelines, 1996
- United Nations Framework Convention on Climate Change (UNFCCC), Earth Summit, Rio de Janeiro, 1992 and Paris Agreement, 2015
- Convention on Biological Diversity (Rio Summit) 1992
- Basel Convention on the Control of Trans-Boundary Movements of Hazardous Wastes and their Disposal, 1989
- Montreal Protocol on Substances that Deplete the Ozone Layer, 1987
- United Nations 2030 Agenda for Sustainable Development Goals, UN Sustainable Development Summit, 2015
- World Bank Guidelines on Environmental Assessment, 1991
- The Equator Principles, 2020
- Environmental and Social Framework, World Bank Group (WBG) /International Finance Corporation (IFC), 2018
- Environmental and Social Review Procedures, WBG / IFC, 2012
- Environmental, Health and Safety (EHS) Guidelines, World Bank Group (WBG) /International Finance Corporation (IFC), 2007

2.0 PURPOSE OF THE EIA

The purpose of the EIA study is to determine the current environmental conditions of the area where the Project will be sited prior to the commencement of the Project activities. This is to:

- Identify the Physio-chemical and Biological indicators that would enable effective monitoring of change in the quality of the Project area environment and
- Provide a document that can be used in predicting and evaluating impacts of the proposed development on the environment.

2.1 SCOPE OF WORK

The scope of work shall include the following:

- Determination of the physiobiological, social baseline conditions of the study area.
- Conducting an assessment and identifying the effect of this Project on the existing environment.
- Advise on the mitigation of significant adverse effects of the Project developmental phases and accompanying operations.
- Propose an Environmental Management Plan (EMP) for continued monitoring of the environmental components during the life span of the project from the time of commissioning to decommissioning.
- Preparing an acceptable report and facilitate its approval by the appropriate regulatory agencies.

To achieve above scope of work, the field data gathering campaign would be used to characterize/complement existing data on the:

- Ambient air quality and Noise status of the environs.
- Baseline status of the Surface and Groundwater, Soil, Sediment, Vegetation, Wildlife and Aquatic ecosystem in the immediate vicinity of the Project.

- Baseline Socio-economic and Health conditions in the surrounding communities, with which Project will interact.
- Existing Waste Management practices in the area.

2.1.1 FIELDWORK ACTIVITIES

The activities to be performed in the field is summarized in Table 1 below.

Table 1: Field Activities

S/N	Environmental Components	No. of Sampling Stations	Description of Sampling Equipment/Instrument	No of samples
1	Ambient Air Quality	22+2 control	Digital In-situ measurement meters shall be used	24
2	Noise	22+2 control	Digital In-situ measurement meters shall be used	24
3	Soil	22+2 control	Samples will be collected at two depths namely Top-soil (0 – 15cm) and Sub-oil (15 – 30cm)	24
4	Meteorology	1	A weather station will be set up	1
5	Surface Water	4+2 control	Sampling will be done using grab sampler, homogenised, and shall be collected in plastic bottles for physiochemical parameters, glass bottle for heavy metals fixed with HNO_3, glass bottles for O&G/hydrocarbons fixed with H_2SO_4 and in-situ meter for in-situ measurements.	6
6	Sediment	4+2 control	Use of Eckman grab sampler	6
7	Treated Effluent Stream	4	Sampling will be done using plastic bottles for physiochemical parameters, Glass bottles for heavy metals fixed with HNO3 and in-situ meter for in-situ measurement	4

S/N	Environmental Components	No. of Sampling Stations	Description of Sampling Equipment/Instrument	No of samples
8	Stack Emission measurement	6	Using isokinetic sampling methodology and flue gas analyser for point source emission	6
9	Aquatic Biology	4+2 control	Water filtering, sediment sieving fisheries histology	6
10	Ground water	11+2 control	5 from existing borings and 3 from new borings at Project Site	13
11	Vegetation	8 Transect	2 points each of 2km and 4km radius & 4 transects	Use of transects
12	Wildlife	8 Transect	Hunters' interviews, animal droppings and other clues will be used	Use of transects
13	Socio-economics	6	Structured questionnaire administration,	6 Communities
14	Health Assessment	6	Survey at each community for portable water, waste disposal, health care system etc	6 Communities
15	Waste Management	Entire Project site including nearby settlements	Interviews, Questionnaire, visits to waste generation /disposal sites within 2km radius	--
16	Pollutant dispersal modelling	New Stacks	Using screening and AERMOD model	New Stacks

2.2 RECONNAISSANCE VISIT

Reconnaissance visits are carried out to prepare this scope of work. Visits provided the overview of existing infrastructure and status in the proposed Project environs, which is helpful in determination of sampling locations, preparation, and execution of this work plan.

3.0 PRE-MOBILIZATION ACTIVITIES

Several preparatory activities would be undertaken to assure the success of fieldwork. These activities are highlighted in the following subsections.

3.1 JOB HAZARD ANALYSIS

Job hazard analysis (JHA) shall be conducted before mobilisation for field activity and the JHA will be documented and communicated to all team members. The JHA document shall contain specific mitigation measures for each identified hazard.

3.2 PREPARATION OF SAMPLE CONTAINERS

All sample containers shall be prepared before mobilisation in accordance with Federal Ministry of Environment (FMEnv) and Department of Petroleum Resources (DPR) Control and Assurance procedures.

3.3 WORK PLANNING MEETING

At least one work planning meeting shall be conducted before the mobilisation date to provide ample opportunity for team members to understand their responsibilities, communication protocols, logistics arrangements etc. The JHA and mitigation measures designed for the identified hazards shall also be discussed during the meeting(s).

3.4 PRE-MOBILIZATION CHECKS

Pre-mobilisation checks/inspections (kick off meeting) shall be conducted by Proponent's QA/HSE officers to confirm that every necessary material and equipment needed for the field work is available and functional. During the checks, equipment calibration certificates, medical certificates and other evidence that demonstrate that materials, equipments, and personnel are ready for mobilisation shall be confirmed.

3.5 FIELD SAMPLING EQUIPMENT AND MATERIALS

Sampling equipments and materials that shall be used for this field data gathering campaign are listed in table 2 below.

Table 2: Field Data Collection Equipments/Materials

EQUIPMENTS/MATERIALS	USE
Digital Camera	Photographs
Plastic basins/trays	Collection of sediment samples
Sieve (0.5mm)	Sieving for benthic organism
WTW Multi-Meter	Measurement of samples pH / Conductivity /Salinity/ Temperature / Turbidity / Dissolved Oxygen
Coolers	Storage of Samples
GPS meter	Determination of coordinates/positioning
Soil colour chart	Description of sediment/soil
Hand Auger	Soil sampling
2L Plastic bottles	Collection of water for physio-chemistry
1L glass bottles	Collection of water for hydrocarbon
1L glass bottles	Collection of water for heavy metals
500ml plastic bottles	Collection of filtered water for Zoo/Phytoplankton
500ml plastic bottles	Collection of sieved sediment benthos
200ml glass bottles	Collection of water for microbiology
Sampling bags	Collection of sediment/soil samples for physico-chemistry/heavy metals
60ml plastic containers	Collection of sediment/ soil sample for microbiology
100ml glass containers	Collection of sediment/ soil sample for THC
PPEs (Coverall, Hard hat, Safety shoe, Eye goggle, etc)	Sampling activities, protection for field personnel
Marker/masking tapes	Identification of sample ID
Labels	Identification of sample
Notebook and biros	Data /information logging
Forms (daily project update form & incident/hazard form)	Quality control
Sulphuric acid	Preservation
Nitric acid	
10% formaldehyde	
Conductivity/pH/turbidity standards	Quality control
Particulate meter sampler	SPM, PM_{10}, $PM_{2.5}$ Measurement
Digital Sound level meter	Noise measurement
Potable Gas Analyser	Air quality measurement (SOx, NOx, CO, O_3, NH_3 etc.)

EQUIPMENTS/MATERIALS	USE
Anemometer	Wind speed and wind direction measurements
Flue Gas analyser	Stack emission monitoring (SOx, NOx, CO, O_2 etc.)
Iso-kinetic sampling train	PM analysis is stack emission
Disposal hand glove	For use when handling chemicals
25ml beaker/250ml beaker	In-situ analysis
100ml volumetric flask, pipette 10ml, 5ml	In-situ analysis
Distilled water	In-situ analysis/QC
Scoop and hand trowel	Soil/sediment sample collection
Eckman grab sampler	Collection of sediment samples
Water grab sampler	Collection of water samples
UPS	Power supply
First Aid box	Emergency treatment
Plankton net	Zoo/Phyto-plankton
Serviette	Tool cleaning

4.0 SAMPLING STRATEGY

To adequately cover the study area, the consultant shall carry out ambient air quality, noise, soil, groundwater, surface water, aquatic biology, sediment, vegetation, wildlife study at determined stations and SIA/HIA surveys in identified communities/settlements within the study area. The sampling stations will be geo-referenced.

4.1 SAMPLING LOCATIONS

In view of our knowledge of the study area it is known that all the communities and their lands in the proposed study region have similar settlement pattern, geologic, geomorphologic, hydrologic, and edaphic conditions. Therefore, homogenous features influenced the number of sampling points which are well spread in the communities. Table 3 below illustrates the environmental components to be studied in identified communities. We intend to locate sampling points within 250 Hectares of Land (Project Site), Existing Indorama Complex and in six (6) Project affected communities. Additional stations may be located depending on environmental realities on ground, during consultant's fieldwork.

Table 3: Environmental components to be studied within Host communities

S/N	Location of Sampling Stations	Environmental Components to be sampled									
		SW	AqB	GW	AR/N	MET	SL	VG	WLF	SIA	HIA
1	Project Site	-	-	√	√	√	√	√	√	-	-
2	Indorama Complex	-	-	√	√	√	√	√	-	-	-
3	Elelenwo	-	-	√	√	√	√	-	-	√	√
4	Akpajo	-	-	√	√	√	√	√	√	√	√
5	Aleto	√	√	√	√	√	√	√	√	√	√
6	Agbonchia	√	√	√	√	√	√	√	√	√	√
7	Nguru	-	-	√	√	√	√	√	√	√	√
8	Okerewa	-	-	√	√	√	√	√	√	√	√

Key:

SW = Surface Water
AqB = Aquatic Biology
GW = Ground Water

AR/N	=	Air/Noise
MET	=	Meteorology
SL	=	Soil
VG	=	Vegetation
WLF	=	Wildlife
SIA	=	Socio-economy
HIA	=	Health

4.1.1 AMBIENT AIR QUALITY & NOISE MONITORING / SOIL SAMPLING STATIONS

In this study, twenty-four (24) sampling stations are proposed for Ambient Air Quality & Noise Monitoring and Soil sampling. The proposed twelve (12) locations are within 2km radius and ten (10) within 2 to 4km radius from the centre of Project site. Two (2) controls stations are proposed, which are within 4 to 10km radius from the centre of Project site. The sampling locations and tentative coordinates are presented in below table 4. A sampling map showing locations and real-life coordinates of all sampling stations will be attached with EIA Report.

Table 4: Ambient Air Quality & Noise Monitoring / Soil Sampling Stations

Station	Location	Tentative GPS Coordinates	
		North (N)	East (E)
X1	West end of the Project site (New Plot)	4°50’42.20”	7°06’18.00”
X2	North End of the Project Site (New Plot)	4°50’48.80”	7°06’29.00”
X3	Between North & East End of the Project Site (New Plot)	4°50’08.60”	7°06’57.60”
X4	East End of the Project Site (New Plot)	4°49’30.00”	7°07’26.00”
X5	South End of the Project Site (New Plot)	4°49’16.80”	7°06’43.50”
X6	Centre of the Project Site (New Plot)	4°50’5.30”	7°06’49.70”
X7	Flare area of Indorama Complex	4°49’54.20”	7°06’37.00”
X8	ETP Area of Indorama Complex	4°49’32.20”	7°06’30.50”
X9	Down-wind of Urea Warehouse within Indorama Complex	4°50’25.20”	7°05’49.80”
X10	Vegetation area towards North of the Project Site (New Plot)	4°50’45.50”	7°07’35.80”
X11	IRC within Indorama Complex	4°50’10.70”	7°05’27.00”

Station	Location	Tentative GPS Coordinates	
		North (N)	East (E)
X12	Main gate of Indorama Complex (Close to East-West Expressway)	4°48’47.00”	7°05’52.00”
X13	Agbonchia Community	4°48’20.00”	7°07’31.60”
X14	Aleto Community	4°48’40.00”	7°06’09.80”
X15	Akpajo Community	4°49’44.50”	7°05’17.60”
X16	Elelenwo Community	4°50’15.00”	7°04’43.00”
X17	Steel Market	4°51’10.00”	7°05’01.60”
X18	Axis of Iriebe Market	4°51’45.00”	7°05’47.00”
X19	Axis of Iriebe area	4°52’09.00”	7°06’58.00”
X20	Between Edutex and farming settlement	4°50’14.50”	7°08’53.50”
X21	Nguru Community	4°48'14.65"	7° 07'13.96"
X22	Okerewa Community	4°48'22.77"	7° 06'26.71"
CX1	GSS - Oyigbo	4°52’43.00”	7°08’23.00”
CX2	Rumuokwurusi	4°50’23.00”	7°03’32.00”

In meteorology, the World Metrological (WMO) Standard for linear Projects is to use surface distance and latitudinal variance not greater than 150km to locate weather stations. Such data is normally augmented with long – term weather data from synoptic stations. In this study we have reduced the distance so that we capture climatological conditions in the communities and business centres within four (4) km radius of the Project.

4.1.2 SURFACE WATER / SEDIMENT / AQUATIC BIOLOGY SAMPLING STATIONS

In this study, six (6) sampling stations are proposed for Surface water & Sediment sampling and Aquatic biology study. The proposed four (4) locations are located on Okulu River which is within 4km radius from the centre of Project site. Two (2) controls stations are proposed, which are within 4 to 10km radius from the centre of Project site. The sampling locations and tentative coordinates are presented in below table 5.

A sampling map showing locations and real-life coordinates of all sampling stations will be attached with EIA Report.

Table 5: Surface water / Sediment / Aquatic Biology Sampling Stations

Station	Location	Tentative GPS Coordinates	
		North (N)	East (E)
SW1	Agbonchia stream (Near Road Bridge)	4°48'28.00"	7°05'26.00"
SW2	Agbonchia stream (Near Pipeline ROW)	4°48'27.00"	7°06'39.00"
SW3	Aleto stream (Near E-W Expressway Bridge)	4°48'26.00"	7°06'06.00"
SW4	Aleto stream (Near NNPC housing)	4°48'30.00"	7°05'24.00"
SWC1	Rumuokwurusi stream	4°50'24.00"	7°03'37.00"
SWC2	Imo River (Near Imo Gate)	4°53'14.00"	7°08'44.00"

4.1.3 GROUNDWATER SAMPLING STATIONS

In this study, eight (8) sampling stations are proposed for Groundwater study. The proposed three (3) locations are located within precincts of Project site and three (3) locations within 4km radius from the centre of Project site. Two (2) controls stations are proposed, which are within 4 to 10km radius from the centre of Project site. The sampling locations and tentative coordinates are presented in below table 6. A sampling map showing locations and real-life coordinates of all sampling stations will be attached with EIA Report.

Table 6: Groundwater Sampling Stations

Station	Location	Tentative GPS Coordinates	
		North (N)	East (E)
GW1	Within Indorama complex (In-front of Off-site control room)	4°50'04.50"	7°06'30.50"
GW2	Axis of Iriebe area	4°51'51.00"	7°06'47.00"
GW3	Agbonchia Community	4°48'12.00"	7°07'04.00"
GW4	Aleto Community	4°48'40.00"	7°06'09.80"
GW5	Akpajo Community	4°49'44.50"	7°05'17.60"
GW6	Elelenwo Community	4°50'15.00"	7°04'43.00"
GW7	Nguru Community	4°48'14.65"	7° 07'13.96"
GW8	Okerewa Community	4°48'22.77"	7° 06'26.71"
GW9	Within precincts of Project Site (New Plot)	within North (Latitude) $4^0$49'15', 4°49'33", $4^0$50'44", $4^0$50'51" and	
GW10			

GW11		East (Longitude) $7^0$06’16’’, $7^0$06’29”,$7^0$06’43”, 7°07’25”	
GWC1	Rumuokwurusi	4°50’31.00”	7°03’38.00”
GWC2	Ogale	4°47’54.00”	7°07’05.00”

4.1.4 TREATED EFFLUENT STREAM SAMPLING STATIONS

In this study, four (4) sampling stations are proposed for treated effluent stream study. The proposed four (4) sampling locations are ISBL treatment effluent pit of IEFCL-Train1 and IEFCL-Train2, Holding Pond and Retention Pond Sluice Gate. The sampling locations and coordinates are presented in below table 7. A sampling map showing locations and coordinates of all sampling stations will be attached with EIA Report.

Table 7: Treated Effluent Sampling Stations

Station	Location	GPS Coordinates	
		North (N)	East (E)
Eff1	IEFCL-Train1 ISBL Pit	4°50’22.33”	7°06’08.72”
Eff2	IEFCL-Train2 ISBL Pit	4°50’23.64”	7°06’08.71”
Eff3	Holding Pond	4°49’30.79”	7°06’23.60”
Eff4	Retention Pond Sluice Gate	4°49’25.73”	7°06’20.52”

4.1.5 STACK EMISSION MONITORING

In this study, six (6) sampling stations are proposed for stack emission monitoring. The proposed six (6) stack monitoring are of IEFCL-Train1 and IEFCL-Train2 operating plants. The sampling locations and coordinates are presented in below table 8. A sampling map showing locations and coordinates of all sampling stations will be attached with EIA Report.

Table 8: Stack Emission Monitoring Stations

Station	Location	GPS Coordinates	
		North (N)	East (E)
SE1	Primary Reformer - 1	4°50’55.52”	7°05’58.71”
SE2	Package Boiler - 1	4°50’63.44”	7°05’59.80”
SE3	Urea Granulator - 1	4°50’52.50”	7°05’56.42”
SE4	Primary Reformer – 2	4°50’17.40”	7°06’16.00”
SE5	Package Boiler – 2	4°50’21.20”	7°06’15.40”
SE6	Urea Granulator - 2	4°50’27.30”	7°06’10.70”

4.2 SUMMARY OF SAMPLE PONITS

The proposed total number of samples per environmental component are illustrated in below table 9.

Table 9: Total number of Sampling Stations

S/N	Environmental Sphere	No of Sample points
1	Ambient Air	24
2	Noise	24
3	Soil	24
4	Meteorology	1 met station
5	Surface Water	6
6	Sediment	6
7	Aquatic Biology	6
8	Groundwater	13
9	Treated Effluent Stream	4
10	Stack Emission Monitoring	6
11	Vegetation	8 Transect
12	Wildlife	8 Transect
13	Socio-economy	6
14	Health Assessment	6

4.3 ASSOCIATED AND POTENTIAL IMPACT ASSESSMENT

Associated and potential impact assessment of the proposed project will be carried out using internationally acceptable assessment methods. Arising from above, impacts will be categorized into qualitative and quantities criteria to bring out beneficial, negative, short term, long term, reversible, irreversible, cumulative etc impacts. These impacts will be ranked to see how low, medium, and highly sensitive the impacts are.

5.0 EIA STUDIES

5.1 POSITIONING AND PHOTOGRAPHING

All sample points shall be geo-referenced using a handheld GPS meter with WGS 84 geographic settings, while features of interest shall be recorded on digital photography.

5.2 METHODOLOGIES FOR EIA STUDIES

5.2.1 METEOROLOGY

In this study we intend to adopt the locational and community standard to carry out the met study. One met station will be located within the Indorama Complex to enable the collection of micro data over a 24-hour period. This will be augmented with data collected from synoptic stations/Indorama's continuous monitoring Met Station.

5.2.2 AMBIENT AIR QUALITY/NOISE MEASUREMENT

The ambient air quality parameters (SPM, PM10, PM2.5, NOx, SOx, CO, NH_3, O_3 and HC) shall be measured at twenty-four (24) designated stations using potable gas analysers and a mini-volume sampler. Ambient noise levels shall be measured at the same stations. Noise levels shall be measured using Digital sound level noise meter.

The ambient air quality parameter and Noise measurements shall be carried out in the field over a period of One (1) hour at each monitoring station and hourly average shall be recorded.

5.2.3 WATER SAMPLING

Surface water sampling shall be conducted on the Okulu (Aleto) River with the aid of appropriate grab water sampler. Okulu River is the only surface water body within 4km radius of the Project site. Two control samples shall be collected from the Imo River and Rumuokwurusi Stream, which are located within 5 to 10km radius of the Project site.

Groundwater samples shall be collected from thirteen (13) stations, one each from Indorama Complex, Iriebe axis, Agbonchia, Nguru, Okerewa, Aleto, Akpajo, Elelenwo; three (3) from the Project site and two (2) control samples from communities located at East & West side within 4 to 10km radius of the Project Site. This report shall be complemented with results from the geotechnics report.

Treated Effluent Stream samples shall be collected from four (4) stations. The proposed four (4) sampling locations are ISBL treatment effluent pit of IEFCL-Train1 and IEFCL-Train2, Holding Pond and Retention Pond Sluice Gate.

Generally, upon collection of water samples, in-situ measurement shall be carried out for conductivity, temperature, salinity, pH, dissolved oxygen, and turbidity. Samples shall afterwards be sub sampled into recommended bottles and preserved for transfer to laboratory for further analysis. The laboratory shall be FMEnv approved and will have the Proponent's approval.

5.2.4 SEDIMENT SAMPLING

Sediment samples shall be collected at the surface water sampling points with the aid of an Eckman grab sampler. Upon collection, samples shall be visually inspected and relevant physical information logged into the field notebook. Sub samples shall be collected and appropriately preserved for laboratory analysis.

Benthos – Samples for benthic macro-fauna characterization shall be sieved through a 0.5mm mesh and residue shall be transferred into plastic containers for storage. The study of the aquatic biology component of the Project area will aid in making scientific judgements on the productivity potentials of the aquatic ecosystems.

5.2.5 PLANKTON SAMPLING

Zoo and Phytoplankton samples shall also be collected at all surface water stations. The plankton net shall be towed along a horizontal path at the surface of water for

minimum 5 minutes and retrieve to deck for phytoplankton samples collection. Zooplankton sampling shall be accomplished by towing the net in a vertical position. Sampling of planktons shall be carried out in day light only.

Phytoplankton: Samples shall be collected using 250ml polyethylene bottles and preserved by addition of 5ml Lugol's solution. The bottles shall be pre-cleaned and rinsed with distilled water.

Zooplankton: Samples shall be collected using 250ml polyethylene bottles and preserved by the addition of 10% formalin. The bottles shall be pre-cleaned and rinsed with distilled water**.** All samples collected shall be identified in accordance with FMEnv identification procedure and shall be stored in sample coolers.

5.2.6 SOIL SAMPLING

Soil sampling stations shall be designated across the study area. Soil samples shall be collected with a hand auger at the depth of 0-15cm (Top-soil) & 15-30cm (Sub-soil). Minimum 1kg of soil sample shall be taken. Collected samples shall be properly homogenised and non-matrix particles removed before sub sampling into pre-cleaned containers for laboratory analysis.

After each use, the hand auger shall be cleaned by brush. All samples collected shall be identified in accordance with FMEnv identification procedure and shall be stored in sample coolers.

5.2.7 STACK EMISSION MONITORING

The isokinetic sampling method is used for sampling of particulate matter, where the gas was sucked isokinetically and particulate matter collected in pre-weight glass-microfiber thimble. The total particulate matter is gotten by the difference in weight of the thimble before and after collection over a known time. To analyze ammonia, standard acid is used as absorbent, the gas is passed on a fixed flow rate for a

particular time. The concentration was determined through a back titration with 0.2N-NaOH. The gas volume is normalized by temperature and pressure correction, and ammonia calculated in mg/Nm3. For analysis of Nitrogen Oxides (as NO_2) and Sulphur Oxides (as SO_2) Madur 21 Plus instrument or equivalent instrument is used and then the measured values in ppm are converted to mg/Nm3.

5.2.8 VEGETATION STUDIES

The Project area, which is localized around Akpajo-Aleto-Agbonchia lands is made up of mixed tropical rain forest of matured Rain Forest and Fresh water Rain Forest. The area has mainly secondary vegetation, farmlands, and fallow lands with small area of climax vegetation within four (4) km radius of the Project Site. The vegetation studies shall use standard ecological methods and will be based on quadrants. Photographs shall be used to document vegetation cover characteristics of the study area. Studies shall also involve interview with knowledgeable local people who will assist in the identification and valuation (economic, medicinal, cultural, etc) of plants species.

5.2.9 WILDLIFE STUDIES

Wildlife studies shall be carried out mainly through interviews with relevant people of nearby communities. The local markets shall also be surveyed to identify wildlife species that are on sale and obtain information on their occurrence in the area. Field activities would include inspection and observation of wildlife spoors, feeding and nesting ground, feathers nets, holes, etc.

5.2.10 HYDROGEOLOGY AND GEOPHYSICAL INVESTIGATIONS

The geology and hydrogeology will be described to include major drainage basins, developments, transportation systems, etc in the study area.

This will enhance ascertaining the relationship between surface and subsurface water bodies, flow directions, lithology, and stratigraphy of the underground layers. These will aid in determining the possibility of physical propagation of pollutants.

Two (2) types of ground water will be studied. Water of the upper unsaturated zone and true ground water flowing in the lower zone.

Water levels will be measured in all wells during sampling. Spot heights at each sampling point will be determined to aid in producing groundwater flow.

Lithology and water quality determinations will be logged to aid detailed interpretation of the resistivity data.

5.2.11 WASTE MANAGEMENT

A comprehensive study of waste generation sources, types and disposal practices shall be conducted within the study area. A waste management plan will be drawn, to determine if any cumulative impact is possible during construction and operation phase of the Project.

5.2.12 LAND USE

The existing land use pattern in the Local Government Area hosting the Project will be studied. This shall be related to the various land uses and zoning in the study area (residential, commercial, business, recreation, forest reserve etc).

5.2.13 SOCIO-ECONOMIC

Socio-economic assessment of the communities located within four (4) km radius of the Project site and other communities deemed fit shall be conducted. The team will therefore cover the six (6) villages, with them Project may interact. Our socio-economist shall survey the opinion of and obtain a profile of public attitude to the proposed Project. The data will be obtained using consultations, interviews, structured questionnaire, and statistics from various agencies. Targeted groups for information would include Local Government Officials, Chiefs, Farmers, Hunters, Traders, Women groups, Youth association, non-governmental organizations, and Institutions/Governments agencies with interest on environment. The authorities at various public institutions such as hospital, utility boards, schools, the police, etc. shall also constitute major and reliable information sources.

Public forum shall be organized by the Proponent for the two (2) ethnic communities within and close to the study area. Our socio-economist shall present an environmental and social profile of the planned development to the participants/stakeholders. Results of the forum shall be adequately documented and presented as a section in the EIA Report. The Elelenwo, Akpajo, Aleto, Agbonchia, Nguru, Okerewa communities and Indorama Complex shall be sampled.

A traffic survey will be conducted on the major highway which will feed the Project.

5.2.14 HEALTH ASSESSMENT

A survey of health institutions, patent medicine stores, trade-medical and traditional treatment facilities in the study area will be conducted. The survey will also document the various and common medical conditions in the area. Risk and Hazards of the Project which may impinge on health will be documented and suggestions shall be made to prevent such risk. The Elelenwo, Akpajo, Aleto, Agbonchia, Nguru, Okerewa communities and Indorama Complex shall be surveyed.

5.3 SAMPLE HANDLING, TRACKING AND TRANSPORTATION

Prior to sampling and storage, an indelible label shall be secured to the containers identifying each sample. The label shall contain the following information:

- Sample code
- Name of sampling personnel
- Location of the sampling site
- Date and time of sampling
- Type of sample and
- Type of preservative if any

All samples collected in the field shall be adequately sealed, labelled, and recorded in the field notebook. Collected sub-samples shall be preserved in accordance with standard work instruction.

Prior to departure from the field, inventory of the collected samples shall be logged, with sample IDs and all necessary information shall be recorded in the Chain of Custody forms.

Prior to departure from our Base, all samples shall be transferred to laboratory into well protected coolers fortified with ice cubes.

Upon arrival of samples in the laboratory, the information on the Chain of Custody shall be cross-checked to confirm appropriate and adequate recording. Physical counting of the samples shall also be done. Upon confirmation of correctness of all information and deliverables, the samples shall be received by laboratory and stored appropriately for analysis. All samples will be analysed in FMEnv approved laboratory.

The detailed sample handling procedures shall be adopted for study are presented in table 10 below.

Table 10: Sample Handling Protocol

Determination	Minimum sample vol.	Container	Preservative	Container pre-treatment
Water				
Temp., pH Conductivity, DO,	Measure on site, collect 2L sample for lab analysis	Plastic or glass bottles	Cool	Rinsed with distilled water
Heavy metals	1.0L	Glass bottles	Add conc. HNO_3 to pH <2	Rinsed with 1 + 1 HNO_3
Oil and Grease	1.0L	Wide mouth glass bottles	H_2SO_4 to pH <2, & Cool	Rinsed with solvent
Microbiology (HUF, HUB, etc)	200ml	Wide mouth glass bottles	Cool	Sterilized
TPH	1.0L	Glass bottles	Cool	Rinsed with solvent
Sediment / Soil				
Total Hydrocarbon content	100g	Plastic bags	Cool	Rinsed with solvent
Heavy metals	100g	Plastic bags	Cool	Rinsed with solvent
Microbiology (HUF, HUB, etc)	50g	Wide mouth glass bottles	Cool	Sterilized

5.4 ANALYSIS PARAMETERS

The sample matrices and the parameters to be analysed are listed in table 11 below. The Project will utilize the following laboratories located in Port Harcourt: (1) M/s Anal Concept Ltd (2) M/s Jawura Environmental Services Ltd. Both laboratories are accredited by FMEnv.

Table 11: Analysis Parameters

Matrix	Parameters
Soil	Heavy metals (Mn, V, Ni, Cr, Fe, Pb, Cu, Zn, Hg, As) conductivity, pH, moisture content, sulphide, sulphate, nitrate, phosphate, Total petroleum hydrocarbon (TPH), particle size distribution (PSD) and microbiology (HB, HUB, HF, HUF), colour, porosity, permeability
Sediment	Benthic studies, pH, temperature, sulphide, sulphates, nitrates, phosphates, heavy metals (Mg, Ag, CO, Mn, V, Ni, Cr, Fe, Pb, Cu, Zn, Hg, As), TPH, TOC, Na, Ca, K and microbiology.
Surface water	Heavy metal (Mg, Ag, CO, Mn, V, Ni, Cr, Fe, Pb, Cu, Zn, Hg, As), pH, temperature, Total Hardness, sulphates, nitrates, phosphate, ammonia, urea, chloride, conductivity, dissolved oxygen, TSS, Turbidity, THC, Biochemical oxygen demand (BOD), Chemical oxygen Demand (COD), microbiology (coliform, total plate count, THB, THF), plankton studies
Hydrobiology	Plankton (Zoo and Phyto), Benthos, Fisheries, Population, Species, Family
Groundwater	Heavy metals (Mn, Mg, Cr, Fe, Cr, Fe, Pb, Cu, Zn, Hg, Ni, Cd, As), nitrate, silica, calcium, cyanide, Na, K, Sulphate, pH, general appearance, chloride, conductivity, turbidity, TDS, TSS, Total hardness, Microbiology (Total Coliform, Faecal Coliform, total Plate count), DO, BOD, COD, HUB, HUF, THB, THF
Treated Effluent	Heavy metals (Mn, Mg, Cr, Fe, Cr, Fe, Pb, Cu, Zn, Hg, Ni, Cd, As), nitrate, silica, calcium, cyanide, Na, K, Sulphate, pH, general appearance, chloride, conductivity, turbidity, TDS, TSS, Total hardness, DO, BOD, COD,
Air quality/Noise	Suspended Particulates Matter (SPM), PM_{10}, $PM_{2.5}$ gases (NOx, SO_x, VOC, CxHy, O_3, CO, NH_3) and noise
Stack Emission	Particulate Matter (PM), Ammonia, gases (NOx, SO_x, VOC, CxHy, CO_2, CO, O_2)

Matrix	Parameters
Vegetation and wildlife	Identification of rare/endanger/dominant species, species composition, relative abundance and diversity, pathological assessment, state of health
Socio-economics indices	Settlement pattern and income Population studies distribution and demography, employment status, commercial activities, occupation status of community, infrastructure, educational institution availability, culture, religion, tradition, tourism perception of communities, etc Traffic pattern/modes
Health Assessment	Medical health facilities status, major sources of receiving medical care, disease and epidemiology conditions risks and hazards of project.

5.5 LABORATORY ANALYSIS

The laboratory analytical methods to be used are presented in Table 12 below.

Table 12: Analysis Methods

Parameter	Analytical method
PHYSIOCHEMICAL	
pH	pH meter
Temperature, ^{o}C	APHA-2550-B
Electrical Conductivity, µS/cm	APHA-2510 A
Total Dissolved Solids, (TDS) mg/l	APHA-2540 C
Turbidity, NTU	ASTM D 1889
Total Suspended Solids (TSS) mg/l	APHA-2540 D
Total Hardness mg/l	APHA-2340 C
Alkalinity mg/l	APHA 2320-B
Chloride (Cl^-) mg/l	ASTM D512
Sulphate (SO_4^{2-}), mg/l	ASTM D 516
Nitrate (NO_3^-), mg/l	APHA-4500-N03-B
Phosphate (PO_4^{3-}), mg/l	ASTM D 515
Ammonium (NH_4^+), mg/l	APHA- 4500 F
Dissolved Oxygen (DO) mg/l	APHA- 4500-O-C
Biochemical Oxygen Demand (BOD), mg/l	APHA- 5210-B
Chemical Oxygen Demand (COD), mg/l	APHA- 5220-D
Oil & Grease mg/l	ASTM D3921

Parameter	Analytical method
METALS	
Total Iron, mg/l	ASTM D 1068
Calcium (Ca) mg/l	ASTM D511
Magnesium (Mg), mg/l,	ASTM D511
Zinc (Zn), mg/l	ASTM D 1691
Copper (Cu) mg/l	ASTM D1688
Manganese (Mn) mg/l	ASTM D858
Total Chromium (Cr) mg/l	ASTM D1687
Silver (Ag) mg/l	ASTM D3866
Lead {Pb} mg/l	ASTM D3559
Mercury {Hg} mg/l	ASTM D3223
Cadmium {Cd} mg/l	ASTM D3557
MICROBIOLOGY	
Total Coliform (cfu/100ml)	APHA 9222B
Faecal coliform (cfu/100ml)	APHA 9222B
Total plate count (cfu/ml)	APHA 9215C

6.0 PROJECT MANAGEMENT TEAM

The Project Director for this EIA study project is Mr. O.A Wai-Ogosu (Consultants Team Lead). He shall give approval to all activities/documentation made for this project before transmittance. He shall be responsible to the Proponent for all aspects of this field work/laboratory analysis and other associated activities. Regularly he will communicate project progress to Proponent through transmittance of letters/mails as stipulated in the clients request for proposal. The consultant's management team shall constantly sustain relevant information from the field through the field coordinator and shall update to him.

The key consultant personnel that shall be involved in the successful execution of this project is mentioned in below table 13.

Table 13: Consultant Project Management Team

S/N	PERSONNEL	COMPONENT/DUTIES
1	Engr. Olu Andah Wai-Ogosu	Environmental Management
2	Dr. David Edokpa	Air Quality /Noise/Climate/Meteorology
3	Solomon Nwachukwu	Soil
4	Prof. Erema Daka	Hydrobiology
5	Adewale A.	Water Chemistry
6	Raphael Offiong; Edwin Nwosu	Vegetation/Wildlife
7	Prof. T.K. Abam	Hydrogeology
8	O. Wai-Ogosu	Waste Management
9	Prof. Zabeey	Biodiversity
10	Iminabo - Austin	Social Impact Assessment
11	Iminabo - Austin	Health Impact Assessment

6.1 FIELD TEAM

The team members that would execute the fieldwork (and their responsibilities) are presented in table 14.

Table 14. Consultant Field Study Team and Responsibilities

Personnel	Designation	Responsibility
Mr. O. A. Wai-Ogosu	Project Manager	Fieldwork coordination, field observations and report writing
Adewale A.	Field Supervisor	HSE Officer /Equipments calibration / maintenance
Dr. Ed Nwosu	Ecologist	Wildlife / Vegetation
Solomon Nwachukwu	Soil Scientist	Soil
Iminabo - Austin	Socio-economist	Socio-economics survey
Dr B.O. Osaro	Occupational Health	Health Assessment
Adewale A.	Water Chemist	Surface water
Prof. T.K. Abam	Hydrogeologist	Ground water monitoring and Geotechnics
John Barikpoa, John Mbie	Technicians	Field sampling and data gathering
Samplers	Field samplers will be recruited from the communities	Field sampling and data gathering

6.2 FIELD COMMUNICATION PROCESS

The field work manager shall be responsible for decisions in the field. He will take the appropriate decision after consultation with their offices. All requests to the Proponent from the field shall be channelled through Proponent's field representative. During execution of the filed work, the relevant information to the field team shall be cascaded through daily morning briefing meetings and details shall be forwarded to consultant office by field work manager. The line of communication is represented in below flow chart.

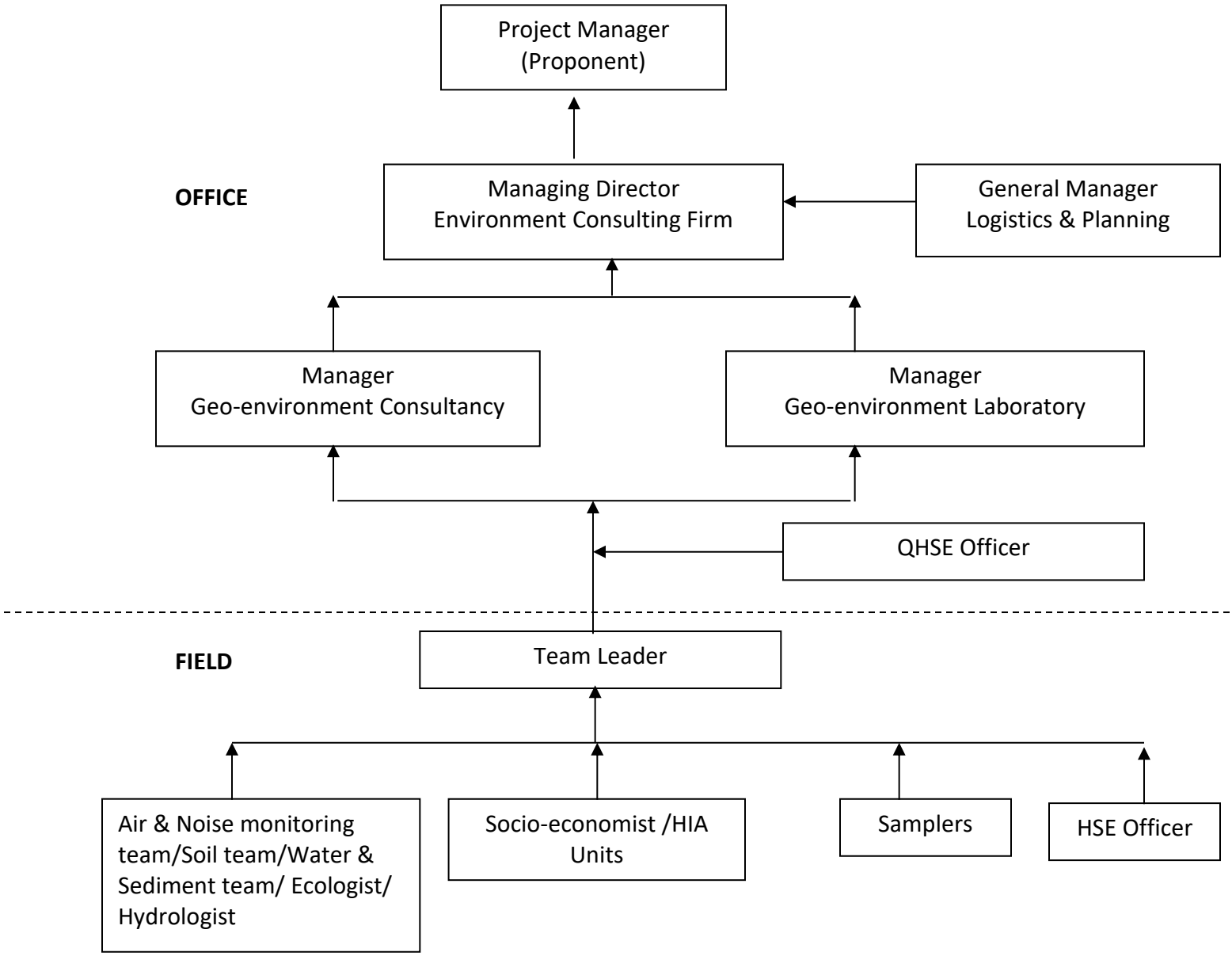

Figure 7: Communication Channel

6.3 LOGISTICS

The consultant shall be responsible for conveyance of materials and personnel from its Port Harcourt base to and from the field. The consultant shall also be responsible for the undamaged and safe delivery of the materials to the point of usage. The logistics arm of the consultant will ensure that all materials required for the effective execution of the fieldwork are delivered promptly at the point of need. Thereafter, the field sampling coordinators shall take charge of moving such equipment and material between sampling locations.

7.0 QHSE PLAN FOR FIELD ACTIVITIES

The QHSE activities/processes necessary for assuring the success of the fieldwork are outlined in this section. The implementation or use of these activities/processes are the responsibility of the indicated team members and shall be strictly supervised by the project manager/team leader in-line with the consultant's QHSE requirements. The project manager/team leader shall also maintain appropriate records of these activities throughout the fieldwork.

7.1 JOB HAZARD ANALYSIS

To ensure safe fieldwork execution, a comprehensive Job Hazard Analysis (JHA) shall be conducted before mobilisation for field activities and the JHA shall be documented and communicated to all team members during pre-mobilisation meeting. The JHA document shall contain specific mitigation measures for each identified hazard of fieldwork activities. During filed work, each day these JHAs shall be discussed/communicated to all team members in morning briefing meeting.

7.2 DAILY TOOLBOX MEETING

There shall be daily toolbox (planning and safety meetings) for all fieldwork days. The project manager/team leader shall conduct the meetings before commencement of each day's activities based on pre-prepared agenda. Issues that should form part of the agenda include JHA as related to day's activities, daily work targets, review of previous day's progress and matters arising. The records of these meetings shall be maintained by the project manager.

7.3 DAILY PROGRESS REPORTING

Each field sub-team shall be required to produce and submit a daily progress report to the Project manager/Team leader. The reports shall be made-out using standard forms to be provided by the Project manager/Team leader. However, if required, additional information can be provided on plain paper. Team members shall report any significant observation or threatening situation immediately to Project manager

/Team leader. The incident/accident report forms shall be used to report all incidents/accidents (including nears misses) and copies shall be submitted to Consultant's office.

7.4 DOCUMENTATION, HANDLING AND STORAGE OF SAMPLES

Project manager/Team leader shall be provided filed notebooks to all team members. The notebooks shall be used extensively to document all field findings and observations in systematic and professional manner. The field notebooks shall remain the property of the consultant documentation. The digital cameras shall be also be provided by the Consultant to capture live photographs.

7.5 CODE OF CONDUCT

The consulting company's policies and procedures shall be followed by every team member throughout the fieldwork activities. The Project manager/Team leader shall duly inform these policies/procedures to team members during pre-mobilisation meeting. If any team member is not clear on any issues, such person shall seek explanation or interpretation from the Project manager/Team leader or any other duly authorized representative of the consulting company.

7.6 EMERGENCY PROCEDURE

It is the responsibility of each team member to familiarise himself with the emergency procedures documented by covering every area and work. In addition, emergency response issues shall form part of the daily toolbox meetings. The overall responsibility lies with Project manager/Team leader/Field coordinator to ensure that all activities are carried out safely. However, on account of an emergency the following shall be maintained.

- All work must stop at once
- All equipment in use must be shut down
- All men shall be evacuated to a pre-determined "Muster Point"

- A roll call shall be taken for head counts
- No one shall be allowed to do work of any kind until notification is given for normalcy situation.

A team member at the instance of such emergency shall be required to give adequate details of incident and minimum shall provide the details like as victim and incident details. The team members shall also alert the consultant field coordinator and proponent representative for immediate action.

Where appropriate, first aid shall be administered to victim in the field before evacuation to the hospital, if required. Evacuation of victim in such circumstance shall be done professionally and promptly. The victim shall be carried to the Consultant's Retainership clinic, as mentioned in below table 15.

Table 15: Consultant's Retainership Clinic

Name	Address	Phone Number	Contact
Princess Medicals	Port Harcourt	09062859579	Dr. Ugochukwu Mr. A. Ajai

The field coordinator is responsible to inform such emergencies to the below listed (table 16) Consulting company's Top Management Team.

Table 16: Consultant's Emergency Contacts

NAME	DESIGNATION	CONTACT
O.A. Wai-Ogosu	Managing Director	08033384134
S. Nwachukwu	Supervisor Field service /Operations	08032906022
A. Adewale	General Manager, QHSE Division	08037203989

7.7 COMMUNITY RELATIONS PLAN

The consultant will ensure the safety, health, environment, and wellbeing of the communities in all areas of operation. This is aimed at securing social liaising and

effective partnering with communities and stakeholders to ensure safe and sustained field work execution.

Therefore, the consultant is committed to:

- Consulting with communities appropriately and adequately before commencement of filed work.
- Identifying and evaluating all potential social conflicts which may arise during field activities and shall take appropriate preventive measures before commencement of the filed work.
- Complying with understanding/agreements reached with communities and
- To minimise conflicts, the team members shall be adequately briefed on the norms and socio-cultural characteristics of the work area.
- The technicians/workers required for filed activities shall be hired from relevant communities.

8.0 DEMOBILISATION

Demobilisation from field shall be confirmed by the Project manager/Team leader upon completion of objectives and targets or in the face of unacceptable risk/hazard to the team. Demobilisation shall be preceded by an audit to determine that all field objectives/targets have been achieved or that the work which is no longer safe for the team shall be continue and shall be executed at appropriate time. The logistics of demobilisation shall be arranged by the Project manager/Team leader. All samples shall remain in the custody of the Consultant's laboratory personnel who shall ensure that the samples are handled and transported in-line with Consulting company's quality control requirements. Upon arrival at the Consultant office in Port Harcourt, custody of all samples shall be transferred to Laboratory manager.

8.1 EIA SCHEDULE

The EIA shall be conducted in accordance with FMEnv protocols. A tentative schedule is illustrated in below table 17.

Table 17: EIA Work Schedule

Description	**Duration (Weeks)**
Mobilisation and Demobilization	2 Weeks
Logistics and planning	1 Weeks
Literature Review	2 Weeks
Field data gathering (Two Seasons)	4 Weeks
Laboratory analysis of samples	4 Weeks
Preparation of Draft EIA Report	12 Weeks
Review of Draft EIA Report by the proponent	2 Weeks
Preparation of final Draft Report (on receipt of Proponent comments)	1 Weeks
Review of report by Regulatory Agencies & Public Display	6 Weeks
Panel review and Harmonized comments on the draft EIA Report	4 Weeks
Preparation of Final Report	2 Weeks
Gross Total	**40 Weeks**

- Adherence to these timeframes is subject to prompt provision of project technical information as may be requested from time to time.
- Progress Report shall be submitted in accordance with the EIA TOR and Contract Agreement throughout the duration of the project.

8.2 DELIVERABLES

I. Mobilisation/Field Report, 1 hard copy + Soft Copy : Proponent

II. Data Report, 2 hard copies + Soft Copy : Proponent

III. Draft EIA Report, 15 hard copies + Soft Copy : Proponent, FMEnv

IV. Final EIA Report Incorporating Comments, 10 hard copies + Soft Copy : Proponent, FMEnv

9. EIA REPORT FORMAT

The EIA report writing format shall follow the protocol mentioned in Environmental Impact Assessment – Procedural Guideline, 1995, Federal Environmental Protection Agency (Now Federal Ministry of Environment), as detailed below.

i. Title page

ii. Table of contents

   a. Chapters, their titles and pagination

   b. List of maps, illustrations, and figures

   c. List of tables

   d. List of acronyms and abbreviation

   e. List of EIA preparers

iii. **Executive Summary**

iv. Acknowledgement

v. **Chapter One** – Introduction - Background information, Administrative and Legal framework, Terms of reference, Declaration

vi. **Chapter Two** – Project Justification - Project Background, Project Objectives, need for the Project, Value of the project, envisage sustainability, alternatives considered (including no Project alternative), development options considered, site selection.

vii. **Chapter Three** – Project description - Type of project, scope, location, material input/output and by products, waste generation, technical layout and process, operation and maintenance, Project schedule.

viii. **Chapter Four** – Description of the physical and social environment - Study approach, literature review, baseline data acquisition method and QA/QC, geographical location, field data, climatic conditions, air quality assessments, noise level assessments, vegetation cover characteristics, potential land use and landscape patterns, ecologically sensitive areas, terrestrial fauna and wildlife, soil studies, aquatic studies including hydrobiology and fisheries, groundwater resources, socio-economic and health studies, prediction of

changes in the baseline condition without the development in place, consultation – identification of stakeholders, consultation with regulators, consultation with communities, community concerns and observations, and Participatory Rural Appraisal (PRA).

ix. **Chapter Five** – Associated and Potential Environmental Impacts - Scoping, Impact prediction methodology, significant positive and negative impact of the Project activities (site preparation, construction, transportation, impacts). Impacts on resource utilization, process impacts (operation) short/Long term effects, reversible/irreversible effects, cumulative effects, direct/indirect effects, adverse/beneficial effects, social effects, health effects, risk, and hazard assessment (HAZOP, HAZID, QRA) etc.

x. **Chapter Six** – Mitigation Measure and alternatives - control technology, compensation, alternative site, alternative technology, compliance with health and safety hazards requirements.

xi. **Chapter Seven** – Environmental Management and Community Development Plans - Guidelines for specific project activities, emergency response procedures, mitigation plan, costing of alternatives and budgets requirements, monitoring program (scope, parameters, frequency, location, methodology), auditing and inspection procedures, waste handling procedures, training program, roles, and responsibilities, decommissioning plan etc.

xii. **Chapter Eight** – Conclusion and Recommendations

xiii. Bibliography/Reference

xiv. Appendices

10. REGULATORY INTERFACE

Consulting company shall provide regulatory interface services to ensure that the EIA study meets regulatory requirements and approved timely. Regulatory interface will cover.

- Approval of EIA Terms of reference
- Participation of regulators in field data gathering exercise, laboratory analysis and stakeholder's forum
- Technical review of EIA reports with regulators.

PROCEEDINGS OF THE SCOPING WORKSHOP ORGANIZED FOR IEFCL-TRAIN3 & PDH-PP PROJECTS

DATE : 20th August 20210

VENUE : Swiss Spirit Hotel, Ken Saro Wiwa Road, Port Harcourt, Rivers State

PRESENTER : Engr. Andah Olu Wai-Ogosu (Consultant)

The workshop commenced at about 10:25 am with introduction of participants which include the following stakeholders:

1. Representatives of the Federal Minister of Environment
2. Representatives of the Ministry of Environment, Rivers State
3. Host communities
4. Eleme Fishing Association
5. Eleme Hunters Association
6. Eleme Youth Leaders
7. Eleme Women Leaders
8. Members of Project Advisory Committee (PAC)
9. The King of Eleme
10. Paramount Rulers of various Communities in Eleme
11. The Chairman, Eleme LGA
12. The Leader, Eleme Legislative Assembly
13. The Consultant to Indorama, Prof. Andah Olu-Wai Ogosu
14. The Indorama Team

Total 89 attendees in scoping workshop and the attendance sheet is appended as annexure 1.

Presentation of Scope of the EIA on the proposed Projects

Indorama's Environmental Consultant first informed the participants about the Proponents and background of the projects before diligently reviewing the Scope of the EIA work which covered description of the project and the physiobiological content of the components of the environment of the study area. He claimed that the EIA study would cover 4km radius and six

(6) host communities. He also emphasized that the study would cover socio-economic variables, Occupational and normal Health Status of the project area, Transportation, and waste related issues, associated and potential (positive and negative) impacts of the proposed projects during construction and operations phases of the project implementation. He did not leave out the report format, deliverables and necessary management plans which will enhance the value of the projects not only on the community resources but also on the economy of the local, State and Federal Government. He closed by stating that the EIA study will be carried out with reference to National and International Environmental Regulations. The presentation made to stakeholders is appended as annexure 2.

QUESTIONS AND COMMENTS

1. **Engr. Fubara of FMEnv**

   Considering the huge traffic that will be generated from the Train-3 project, what are the implementation strategy to resolve the anticipated traffic problem, and the strategy for economic resettlement considering the likely impact of the operation on the people's source of livelihood.

2. **Hon. Dick Nwosu**

   Advised that refreshment be provided for participants of the workshop.

3. **Chief Emaa Jaka**. He asked for the implementation strategy for the huge traffic problem that will be created. He also observed that the anticipated overpopulation problem is not captured in the presentation. He also wished to know plans for ecological restoration following the effects that the project will have on the ecosystem.

   The presenter responded by saying that over-population is captured under what he described as social variables, which accounts for migrant workers and its management. He also emphasized that ecological related problems are duly treated under biodiversity plans.

   Mr. Kendrick Oluka, General Manager Community and Governance Affairs, the moderator of the workshop representing Indorama, also explained the plan put in

place by the company for traffic management. That a traffic management park is been developed supervised by Hon. Nwosu. Also, that severally the company has assisted the government in road rehabilitation to reduce bad spots on the road which is also responsible for heavy traffic on the road. Also, that the company has severally made presentations to both State and the Federal government on the state of the Eleme-Onne Road. He also directed attention to the Rivers State Government's plan to construct a link road (MTECH road) connecting the Airport, through Agbonchia to Onne. All these plans will help to ease traffic in the proposed project area.

4. **Mr. Joseph Ekehe representing Agbonchia**

   He commended the excellent presentation and Indorama as a responsible company. He expected to hear more on the dangers and environmental challenges associated with the project. He appealed that an environmental expert should be engaged to interface between the community and the company for better understanding of the benefits that will be derived from the projects.

   A respondent from the community reacted that they will not be need for another external environmental expert since their own son, the presenter, an expert in environmental studies is the one handling the projects. That, he will be consulted privately, whenever the need arises.

5. **Barrister Wordi**

   He complained on the non-implementation of the previous traffic management plans and that what is the guarantee that all the traffic management plans contained in the present EIA will be implemented. He advised the consultant to follow-up on the plans to ensure all that are stated in the report are implemented. He also suggested that an advanced copy of the presentation should be sent to stakeholders before the workshop for subsequent meetings to enable participants / non-professionals participate and flow along with the presenter.

6. **Rev. Oluji Joseph, representing Fishermen Association of Eleme**

   He expressed worry over the negative impact that harmful emissions have had on aquatic life, and wished to know the mitigation plans, alternative source of livelihood to fishermen if their fishing business is affected by the operation, and alternative source of drinking water for the people.

   The presenter reacted to most of the questions by drawing their attention to the purpose of the workshop for the day, which is to define the scope of the projects, and to get inputs that will enrich the study from the various stakeholders and not to be discussing hazards. And that in subsequent meetings other areas of concern will be addressed through direct interaction with the various groups.

7. **Elder Igolo, representing Hunters Association**

   He appealed that Indorama as part of their CSR should provide the following for the communities: potable drinking water, job opportunities, electricity, and pipeline surveillance contract. He also advised the company to roll out a robust environmental plan for the preservation of wide-life and biodiversity.

8. **Hon. Victor O. Goka**

   Commended the consultant and the company for always giving EIA lectures before commencing their projects. He also advised the company to take necessary precautions on the inherent environmental hazards associated with the projects. He also emphasized the need for regular meetings with relevant stakeholders so that they can make inputs as the study progresses. He praised Indorama for creating jobs and contracts for Eleme people and encouraged more investments from Indorama in Eleme to create more employment opportunities.

REACTIONS FROM THE HIGH TABLE

1. **Representative of the Federal Minister of Environment**

   He commended the excellent presentation. Emphasized the need for inclusion of the fishery issue raised in the study. He advised that sampling locations for air quality, soil and groundwater should be spread across all the communities in the

study area to avoid any issue coming from any community after the study have been carried out.

2. **Representative of the Rivers State Minister of Environment**

   He expressed confidence in the expertise of the consultant. He appealed for cooperation among the various stakeholders (community, company, and consultant). He advised that concerns raised in previous EIAs (implementation of environmental management plan) should be incorporated into the present EIA. He also emphasized on the need to incorporate safety and effluent discharge as key components in the EIA study. Worried about his observation during one of his visits to the facility on workers concept and poor safety behavior. He appreciated the cordial relationship between the company and the community, stressing that Indorama is a responsible company, and advised them to sustain the good relationship.

3. **The Honourable Chairman, Eleme Local Government Area**

   He appreciated all that are present at the workshop. Advised that if the impacts of previous plants on health, economy and other areas are high, they should consider relocating the current plant. He appealed that more of this kind of investments should be sited in the area because of its economic benefits. He encouraged the planting of trees now as a long-term plan to mitigate the impacts of the operation on the environment. The Chairman advocates for the establishment of an Environmental Trust Fund to foster development. Finally, he appreciated the efforts and expertise of the consultant and that his expertise will be needed by the community instead of hiring someone else.

4. **The Royal Majesty, the King of Eleme Kingdom-King Dr. Philip Obele**

   The king appreciated all for being present at the workshop. He stated that any place that is industrialized must always have problems of pollution and over-population. He encouraged all to expect that, but the challenges associated with it must be managed. What is most important is the development that comes with industrialization. He identified one source of traffic in the area as those coming

with their private trucks to present them for hire by those doing business in Indorama complex. He further assured every one of the environmental safety considerations incorporated into the design of the plants from inception, of which he was part of the team that carried out due diligence on the company in India. He advised the Eleme people to embrace Indorama with good heart as there are other people who might be interested in them to avert relocation to other areas and states hotly itching for development.

Conclusively, the scoping workshop went well, and stakeholders participated actively to enrich the Scope of the EIA study work. The stakeholder's inputs are incorporated in revised Scope of Work (SOW)/ Terms of Reference (TOR) for both the Projects.

EVENT PHOTOGRAPHS

INDORAMA ELEME FERTILIZER & CHEMICALS LIMITED, ELEME, RIVERS STATE, NIGERIA
&
INTEGRATED POLYCHEMICALS LIMITED, ELEME, RIVERS STATE, NIGERIA

ATTENDENCE SHEET

PROJECT	IEFCL-Train3 and PDH-PP PROJECTS
DATE & TIME	20TH AUGUST, 2021. 10 AM
VENUE	SWISS SPIRIT HOTELS & SUITES, NO. 79 STADIUM ROAD, PORT HARCOURT, RIVERS STATE.
TOPIC	SCOPING WORKSHOP

S/N	NAME	COMMUNITY/ ORAGNIZATION	PHONE NUMBER	EMAIL	SIGN
1.	Hon. Nwosu Nkoffa (JP)	Aleto PAC	08038748091		[signature]
2	Osarhuka Gedion Ngesie	Akpajo PAC	08037070505	osmolaka@gmail.com	[signature]
3	Emmanuel Obereobe	Aleto PAC	08036737878		[signature]
4	Woji, Victor T.	Nwaokochia PAC	08038897233		[signature]
5	Nwakama Nwafor	Akpakpan PAC	08104065296		[signature]
6	Chief (Hon) George Esaro	Agbonchia PAC	08184225544		[signature]
7	Hon. Osaro Sampson Yorgbe	Okerewa PAC	08064860580		[signature]
8	Philemon Oji Obele	Akpajo PAC	08032765807		[signature]
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12	H.H Emere Ejor Xavier	N. Jorg	07033 2230		[signature]
13	HRH. Joseph Ngeto	Agbonchia	08032665963		[signature]
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18	MRS ROSE OSAROLUM	Woman AGBONCHIA	07030981764		
19	MRS Florence Aji	Woman AGBONCHIA	08039686929		
20	Edith Osaramube	Woman AGBONCHIA	08135357[illegible]		
21	NNE J. Sagbe	Woman ALETO	07034259691		
22	BLESSING CYRUS	Woman OKEREWA	08189122[illegible]		
23	Olare Chinwi Amadi	Woman ALETO	09156096484		
24	NWIDAA N. MARTHA	(Youth) AKPAJO	08034409354		
25	Lucky N. Chima	Youth Akpajo	07046495109		
26	Osanlou Blessing	Youth Agbonchia	09072651240		
27	Okukpobe Amebeokan	(Youth) Agbonchia	08145434542		
28	Obari Kedee	(Youth) Aleto	08032953945	P.R.O	
29	OKUKPOBE MIRACLE	(Youth) AKPAJO	08035881812	Treasurer	
30	CHU OBARITOMI O	(Youth) AGBONCHIA	08134274537	V. President	
31	SOLOMON ORETE	(Youth) AKPAJO	08160[illegible]		
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41	Wisdom Nwaji	Aleto	08131937874		
42	Chief Emae Jaka	Akpajo	07062795211		
43	Johnson Gumbanwafor	Akpakpa	07068692505		
44	OSARO NWOLU YORGBA	PAC OKERENTA	08136687272		
45	ISAAC OLUKA E.	PAC PALACE	08033749089		
46	R.O. OKPARAJI ESQ	Agbonchia	08060318853		
47	Wilcoxhenry Chinnah	NWIKOHU	08032651672		
48	Joseph Ekee	Agbonchia	08038067118		
49	Tumii, DUMBARI K	RSMENV	08038731158		
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54	Comr, OJIMBA A. OBARI	OJIJ oyoola	08039525229		
55	MAGNUS ALVIN OSARONWAFOR	AKPAJO	09055881159		
56	Barinua Barikpoa	E&CS Ltd	08070442580		
57	Nachukwu Solomon	E&CS Ltd	0802906022		
58	Zorka Sunday	E&CS Ltd	07037993486		
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62	Andrew Ochuwa	Hunter Ch.	07039171425		
63	Chy CHRISTIAN	Host Comm	08060033735		
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75	SHOLOKA UCHU	ALSTO	09092155651		
76	Rt Hon. Chuma Daniel Jim	ALSTO	07066828717		
77	PRINCE OKEREKE	ALSTA	08037753397	ELEME YOUTH PRESIDENT	
78	HON: ISAAC O. CHY	AGBONCHIA	08036634112		
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85	Hon. Roberts Ogosu	Omne	07033656378	ogosumsbelse gmail.com	[signature]
86	HON. VICTOR O. GOKA	AKPAJO	08035588635	Councillor	[signature]
87	David AIKE	ALETO	08132493360		[signature]
88	PRADEEP EKKA	INDORAMA	–	–	[signature]
89	KENDRICK OLUKA	INDORAMA	–	–	[signature]

Annexure 1.3

FEDERAL MINISTRY OF ENVIRONMENT

Environment House
Independence Way South, Central Business District, Abuja - FCT.
Tel: 09-2911 337 Email:ea@ead.gov.ng, www.ead.gov.ng

ENVIRONMENTAL ASSESSMENT DEPARTMENT

FMENV/EA/EIA/6063/ Vol. 1/164
15th October, 2021

The Managing Director,
Indorama Eleme Fertilizer & Chemicals Limited,
Indorama Complex,
Eleme,
Rivers State.

RE: SUBMISSION OF ENVIRONMENTAL IMPACT ASSESSMENT (EIA): SCOPING WORKSHOP FOR THE PROPOSED IEFCL – TRAIN3 PROJECT (AMMONIA AND UREA PLANT)

Please refer to your letter dated 11th October, 2021 on the above subject.

2. I am directed to inform you that Mr. Gbolahan Temilorun (Senior Scientific Officer) has been nominated to participate in the field data gathering exercise and laboratory analysis witnessing.

3. I am further directed to request you to pay the sum of Two Hundred and Fifty Thousand Naira (₦250,000:00) only, being the travel and Duty Tour Allowance (DTA) for the participating officer.

4. Please kindly provide necessary logistics to ensure hitch free exercise. The officer can be reached on GSM number 08051691967. You may wish to contact the undersigned on GSM number 08037869670 for further clarification.

5. Thank you for your co-operation.

Engr. Gomwalk, Celestine W. G.
For: Honourable Minister

Annexure 1.4

FEDERAL MINISTRY OF ENVIRONMENT

Environment House
Independence Way South, Central Business District, Abuja - FCT.
Tel: 09-2911 337 Email:ea@ead.gov.ng, www.ead.gov.ng

ENVIRONMENTAL ASSESSMENT DEPARTMENT

FMENV/EA/EIA/6063/Vol. 1/190
3rd December, 2021.

The Managing Director,
Indorama Eleme Fertilizer & Chemicals Limited,
Indorama Complex,
Eleme,
Rivers State.

FEEDBACK OF THE WET SEASON BASELINE DATA GATHERING & LABORATORY ANALYSIS WITNESSING EXERCISES FOR THE ENVIRONMENTAL IMPACT ASSESSMENT OF THE PROPOSED IEFCL – TRAIN 3 PROJECT (AMMONIA AND UREA PLANT) AT ELEME, RIVERS STATE HELD ON THE 18TH - 21ST OCTOBER, 2021 BY INODRAMA ELEME FERTILIZER & CHEMICALS LIMITED

Please refer to the Data Gathering and Laboratory Analysis Exercises conducted for the above project which was witnessed by an official of the Ministry on the 18th – 21st October, 2021.

2. Following the conclusion of the Baseline Studies, I am directed to convey the Ministry's approval to proceed to the next stage of the EIA process.

3. The following should be forwarded to the Federal Ministry of Environment on or before submission of the Draft EIA Report;

i. Evidence of accreditation of the Federal Ministry of Environment for the Laboratory where the samples analysis would be carried out.
ii. Chain of custody
iii. Certificate of Analysis duly stamped and signed by the laboratory Manager.
iv. Evidence of Laboratory witnessing by the Federal Ministry of Environment.

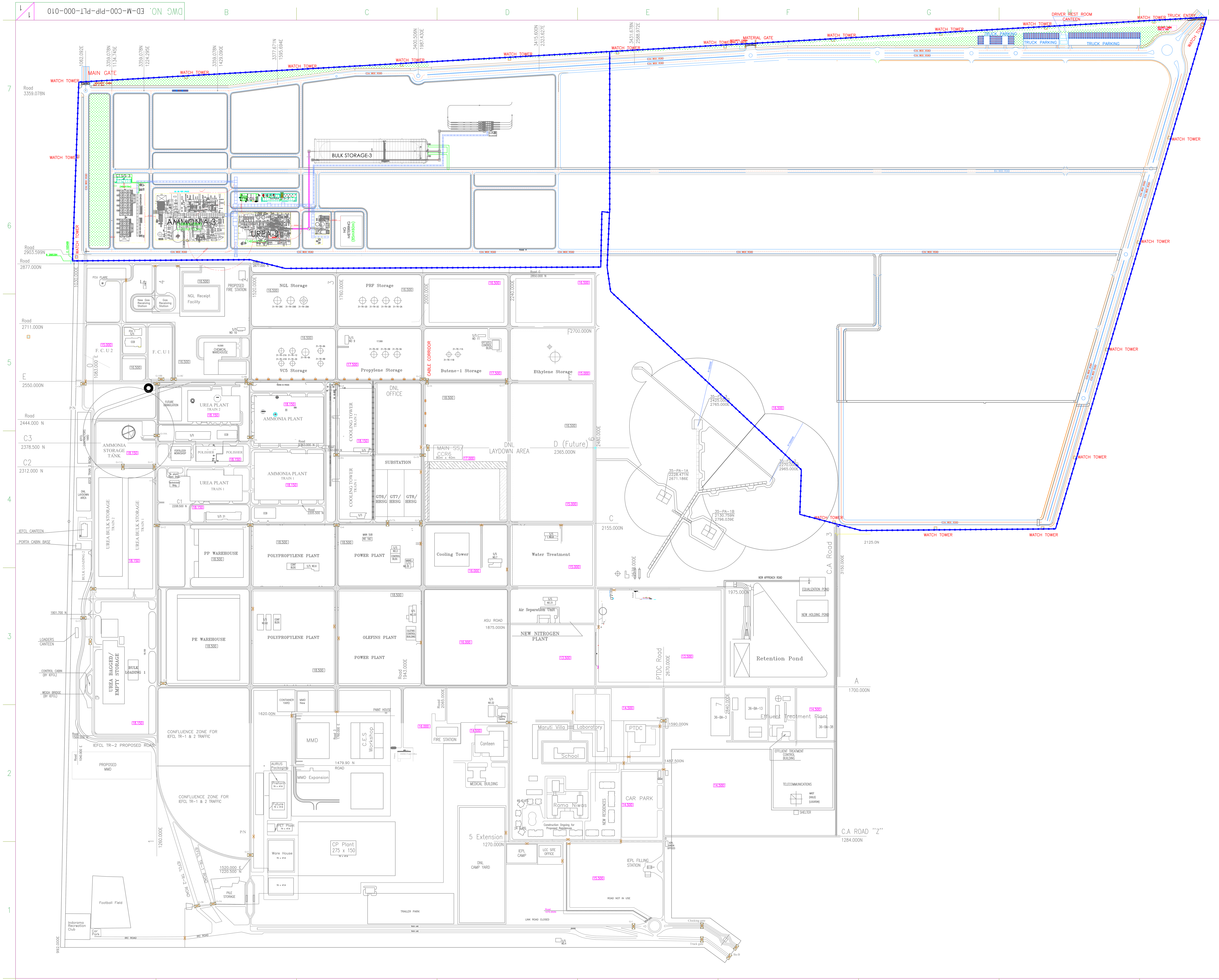
4. Consequently, you are to submit Ten (10) hard and Two (2) electronic copies of the Draft Environmental Impact Assessment (EIA) Report and also mail a copy to eia@ead.gov.ng.

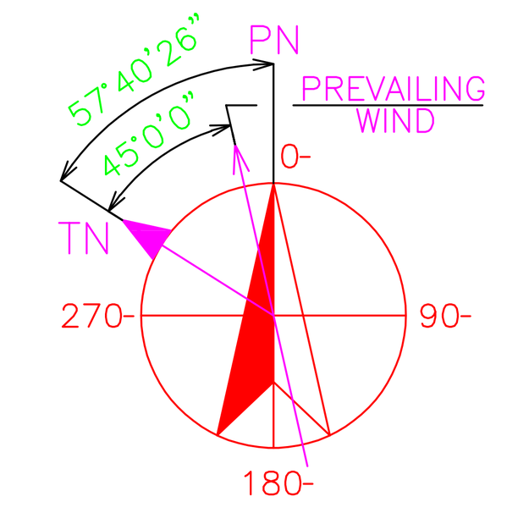
5. You may contact the undersigned on GSM number 08037869670 or Mr. Ladula H. D. on 08020910889 for further clarifications.

6. Thank you for your cooperation.

Engr. Gomwalk, Celestine W. G.
For: Honourable Minister

Annexure 3.1





REFERENCE DRAWINGS

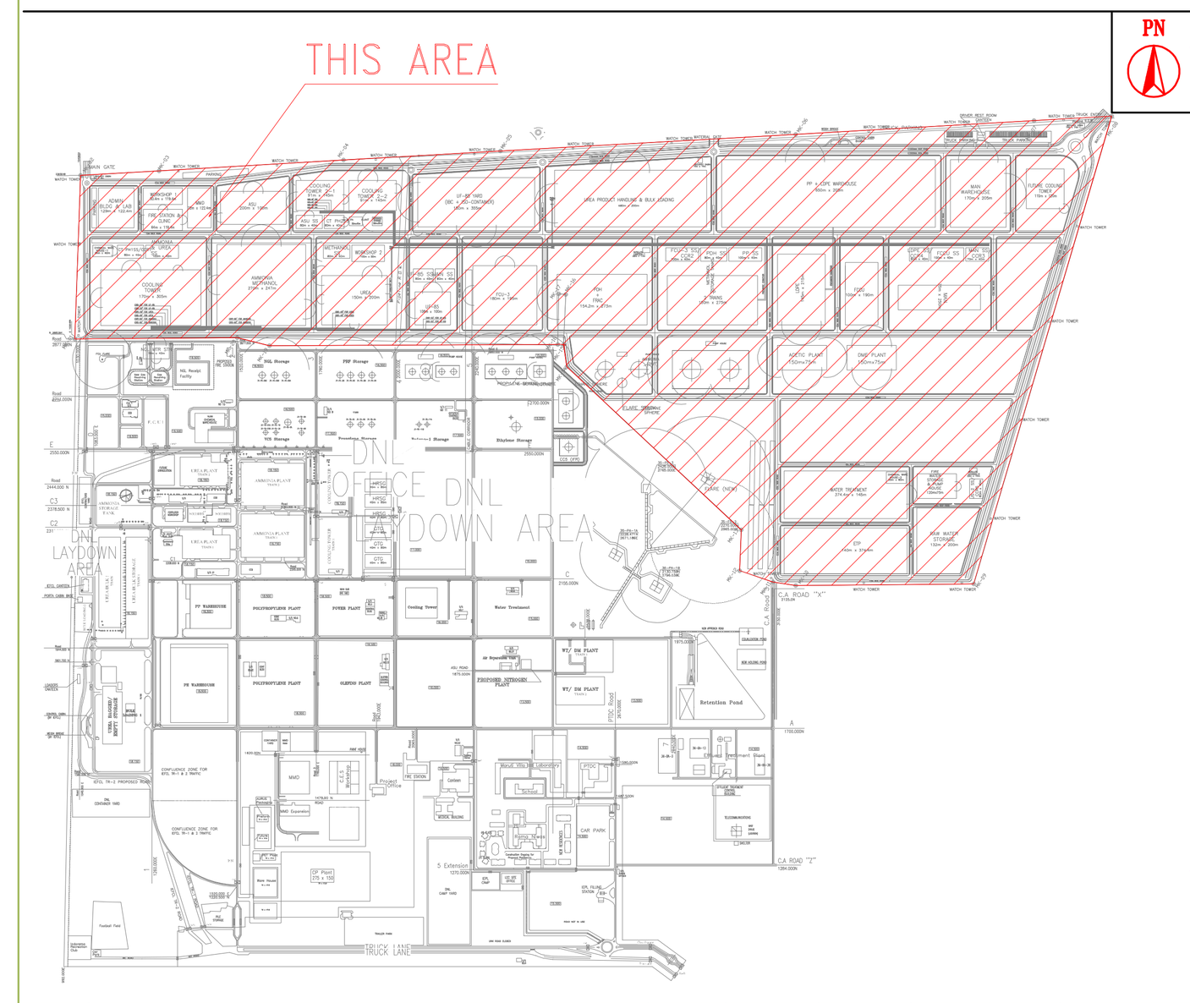
DRAWING NO.	TITLE
–	CONCEPTUAL MASTER PLAN

NOTES

1) ALL DIMENSIONS ARE IN MILLIMETERS & CO-ORDINATES ARE IN METERS.

LEGENDS

KEY PLAN



REV.	DESCRIPTION	DRWN	CHKD	APVD	AUTH	ISSUE	DATE
	FOR REVIEW TO IEFCL						

IEFCL-3 PROJECT
PROPOSED FERTILIZER AND PETROCHEMICALS COMPLEX

INDORAMA ELEME FERTILIZER & CHEMICALS LIMITED, NIGERIA

TOYO ENGINEERING INDIA PVT LTD.
MUMBAI INDIA

ABBR. FOR ISSUE: C=CLIENT, L=LICENSOR, S=SITE, V=VENDOR

SECURITY LEVEL: 2

ISSUE MARK: 5

TEIPL WORK NO.: XXXX | ACCOUNT: | CLIENT'S ORDER NO.:

17/FEB/2023

OVERALL PLOT PLAN FOR
PROPOSED FERTILIZER AND PETROCHEMICALS COMPLEX 1/1

SCALE 1:3500 | DWG NO. ED-M-C00-PIP-PLT-000-010

DWG(A0)

Annexure 4.1

GHG Assessment

Summary

	Actual Yearly weighted Average (TJ/Year)	Emission Factor (tCO2/TJ)	GHG emissions (tCO2/year)	Percent Contribution (%)	Remarks
Reformer Fuel (NG)	3337		187233	27	
Process off gas to fuel	1288		72241	10	The unconverted Hydrocarbon in the feed being routed to the Primary reformer as off gas fuel
Process steam from Boiler	2662		149346	22	
Power generation (Inhouse)	4666		261790	38	
Flare	313		17545	3	Estimated based on actual NG flow over the year
Total CO2 Emission			688156	100	
Basis					
Fuel type	**EF (tCO2/TJ)**	**NCV (TJ/Gg)**			
Natural Gas	56.1	48			
Reference: IPCC-2006, Volume II, Chapter-2, Chapter-3					
Reference: Table 1.2 https://www.ipcc.ch/meetings/session25/doc4a4b/vol2.pdf					

GHG Calculation based on actual data (Operating IEFCL-Train1, 2021)

Production data	Unit	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Products.....Urea	MT	*114,948*	*101,500*	*121,520*	*117,060*	*116,808*	*113,670*	*120,714*	*111,662*	*115,860*	*107,787*	*103,890*	*115,227*	
Intermediate Products.....Ammonia	MT	*65,455*	*58,554*	*68,071*	*64,776*	*58,388*	*60,672*	*64,501*	*60,934*	*62,010*	*57,150*	*37,761*	*36,180*	
Feedstock NG														
	MT	35059	31843	36924	36127	37595	36382	38758	37498	35904	33916	23969	23757	
Chemical composition of carbon compound	%	99.8%	99.8%	99.8%	98.4%	93.8%	93.8%	93.9%	91.8%	92.2%	93.1%	92.8%	94.0%	
Carbon content in each compound	%	74.0%	73.9%	73.9%	74.3%	72.8%	72.6%	72.7%	72.0%	72.1%	72.7%	72.5%	73.1%	
Total carbon in the feedstocks	MT	25,879	23,483	27,230	26,396	25,688	24,791	26,470	24,792	23,862	22,946	16,133	16,323	
Process off gases -fuel														
	MT	**29209**	**26878**	**24757**	**32735**	**33019**	**33278**	**35344**	**32881**	**29113**	**26676**	**18957**	**16304**	
Chemical composition of carbon compound	%	9.5%	9.2%	11.1%	9..9%	9.9%	9.9%	10.1%	7.2%	6.2%	6.5%	7.2%	7.9%	
Carbon content in each compound	%	6.2%	6.0%	6.8%	6.2%	6.2%	6.2%	6.2%	4.3%	5.1%	5.5%	4.0%	7.0%	
CO2 emission (a)	tCO2	6,638	5,888	6,189	7,438	7,467	7,526	8,063	5,211	5,481	5,350	2,807	4,184	72,241
Fuel Combustion-Reformer														
Natural gas	SCM	8,902,279	7,658,402	8,691,130	7,852,041	7,091,002	6,495,582	7,079,994	8,407,620	9,553,739	8,949,312	6,030,846	6,870,007	
CO2 emission (b)	tCO2	17,393	14,883	16,832	15,117	14,400	12,941	14,186	17,164	19,291	18,418	12,390	14,218	187,233
Fuel Combustion - boiler														
Natural Gas	SCM	6,537,611	5,476,863	6,207,378	6,138,330	6,327,463	6,221,388	6,587,647	6,698,725	6,603,658	7,242,108	5,099,853	5,438,675	
CO2 emission (c)	tCO2	12,773	10,643	12,021	11,817	12,850	12,395	13,199	13,676	13,334	14,905	10,477	11,256	149,346
Inhouse power generation														
Power	kWh	28870300	26146400	29037700	22286400	28498300	27138000	29068700	29053200	28575000	28206900	22470000	23870000	
Efficiency of GTG	%	26.19%	27.55%	26.71%	25.63%	24.34%	24.60%	24.72%	24.36%	25.32%	24.28%	21.11%	24.95%	
Equivalent energy of fuel	GJ	396841	341685	391387	313075	421543	397109	423265	429340	406308	418291	383252	344399	
CO2 emission(d)	tCO2	22263	19169	21957	17564	23649	22278	23745	24086	22794	23466	21500	19321	261,790
NG to flare														
Flow	SCM	744000	672000	744000	720000	744000	720000	744000	744000	720000	744000	720000	744000	
CO2 emission(e)	tCO2	1453.6	1305.9	1440.9	1386.1	1510.9	1434.4	1490.7	1518.9	1453.8	1531.2	1479.1	1539.8	17,545
NCV-Natural Gas	kJ/SCM	34,827	34,641	34,521	34,317	36,200	35,513	35,715	36,391	35,993	36,685	36,620	36,892	
Total CO2 emission (a+b+c+d+e)	**tCO2**	**60,521**	**51,889**	**58,439**	**53,322**	**59,877**	**56,573**	**60,683**	**61,656**	**62,353**	**63,670**	**48,653**	**50,519**	**688,156**

MW	Kg/Kmol	17	17	16.9	16.6	18.5	18.1	18.2	19.02	18.7	18.91	18.91	18.81	Total
NG Feed	MT	35059	31843	36924	36127	37595	36382	38758	37498	35904	33916	23969	23757	
Equivalent (TJ)	TJ	1695	1531	1780	1762	1736	1684	1794	1693	1630	1552	1095	1099	19051
Reformer Fuel(TJ)	TJ	310	265	300	269	257	231	253	306	344	328	221	253	3337
Steam(TJ)	TJ	228	190	214	211	229	221	235	244	238	266	187	201	2662
Power (TJ)	TJ	397	342	391	313	422	397	423	429	406	418	383	344	4666

Basis

Fuel type	EF (tCO2/TJ)	NCV (TJ/Gg)
Natural Gas	56.1	48
kWh	3,600	kJ

GHG Calculation as per PFD

NG Feed	64575	Nm3/hr		Normal Case		
NG Fuel	13340	Nm3/hr		MW Of NG	17.8	
NG Boiler	3920	Nm3/hr		LHV	9103	Kcal/nm3
NG Power	13765	Nm3/hr		HHV	10003	Kcal/nm3
NG Flare	1350	Nm3/hr		SG Of NG	0.6	
Total NG	96950	Nm3/hr		C N0.	1.1	
Equivalent CO2	209	T/hr		Heat rate	3300.0	Kcal/Kwh
Urea Production	167	T/hr				
Equivalent CO2	122.22	T/hr				
CO2 emission	87.17	T/Hr				
	697	TPA				

Annexure 4.2

Wet season Baseline Air Quality of Project Area

Station Code	Sampling Location	GPS Coordinates		Monitoring Date	Monitoring Duration	Remark or Field Observation, if any
		North (N)	East (E)			
AQ1	West end of the Project site (New Plot)	N4º 50'42.7''	E007o 06' 33.8"	18/10/21	10	Proposed Project with vegetation
AQ2	North End of the Project Site (New Plot)	N4o 50'38.9''	E007o 06' 37.3"	19/10/21	10	Proposed Project with vegetation
AQ3	Between North & East End of the Project Site (New Plot)	N4o 50'40.9''	E007o 06' 33.5"	20/10/21	10	Proposed Project with vegetation
AQ4	East End of the Project Site (New Plot)	N4o 50'17.0''	E007o 06' 32.8"	21/10/21	11	Proposed Project with vegetation
AQ5	South End of the Project Site (New Plot)	N4o 50'21.2''	E007o 06' 41.0"	22/10/21	11	Proposed Project with vegetation
AQ6	Centre of the Project Site (New Plot)	N4o 50'25.0''	E007o 06' 46.3"	23/10/21	10	Proposed Project with vegetation
AQ7	Flare area of Indorama Complex	N4o 50'09.3''	E007o 06' 35.3"	24/10/21	18	Indorama complex with Industrial activity observed
AQ8	ETP Area of Indorama Complex	N4o 49'32.1''	E007o 06' 26.8"	25/10/21	17	Indorama complex with Industrial activity observed
AQ9	Down-wind of Urea Warehouse within Indorama Complex	N4o 50'11.5''	E007o 05' 29.3"	26/10/21	20	Indorama complex with Industrial activity observed
AQ10	Vegetation area towards North of the Project Site (New Plot)	N4o 49'32.1''	E007o 07' 25.6"	27/10/21	9	Proposed Project with vegetation
AQ11	IRC within Indorama Complex	N4o 50'09.1''	E007o 05' 25.9"	28/10/21	19	West corner of Indorama complex with no industrial activity
AQ12	Main gate of Indorama Complex (Close to East-West Expressway)	N4o 48'46.4''	E007o 05' 51.9"	29/10/21	18	Close to the Express way with major vehicular movement

Station Code	Sampling Location	GPS Coordinates		Monitoring Date	Monitoring Duration	Remark or Field Observation, if any
		North (N)	East (E)			
AQ13	Agbonchia Community	N4o 48'48.7''	E007o 07' 29.8"	30/10/21	12	Minimal vehicular movement observed
AQ14	Aleto Community	N4o 48'20.1''	E007o 06' 19.9"	01/11/21	13	Minimal vehicular movement observed
AQ15	Akpajo Community	N4o 49'01.8''	E007o 05' 39.2"	02/11/21	12	Minimal vehicular movement observed
AQ16	Elelenwo Community	N4o 51'02.7''	E007o 04' 47.7"	03/11/21	14	Closed to road, Minimal vehicular movement observed
AQ17	Steel Market	N4o 51'46.8''	E007o 05' 32.1"	04/11/21	9	Market environment, burning of waste heap observed
AQ18	Axis of Iriebe Market	N4o 52'15.2''	E007o 06' 38.6"	05/11/21	11	Borrow pit waste dump observed
AQ19	Axis of Iriebe area	N4o 50'11.5''	E007o 05' 29.3"	07/11/21	12	Close to the road with minimal vehicular movement
AQ20	Near Okra Market Iriebe	N4o 50'36.1''	E007o 07' 29.6"	08/11/21	8	Waste heap observed
AQ21	Nguru Community	N4o 48'17.4''	E007o 07'07.4"	09/11/21	13	Minimal vehicular movement observed within the community
AQ22	Okerewa Community	N4o 48'17.8''	E007o 07' 06.7"	10/11/21	14	Minimal vehicular movement observed within the community
AQC1	GSS - Oyigbo	N4o 52'38.9''	E007o 07' 19.0"	11/11/21	13	Vehicular movement observed
AQC2	Rumukrushi	N4o 50'23.1''	E007o 03' 32.6"	12/11/21	15	Close to the road with major Vehicular movement observed

AQ1 New Project Site N4o 50’42.7’’ E007o 06’ 33.8”														
Time	**SO2**	**NO2**	**CO**	**O3**	**CxHy**	**VOC**	**NH3**	**SPM**	**PM10**	**PM2.5**	**WIND SPD**	**WIND DIR**	**TEMP**	**REL HM**
9:00	0.00	22.57	0.00	0.00	1.31	6.38	0.70	39.00	23.00	13.00	1.3	SSE	27.4	74.5
10:00	5.24	26.33	2.29	0.00	0.00	3.19	0.00	34.00	21.00	11.00	1.8	ENE	29.3	75.4
11:00	5.24	22.57	2.29	0.00	1.31	0.00	0.00	35.00	21.00	11.00	1.8	SSE	29.3	75.4
12:00	0.00	22.57	0.00	3.93	0.65	0.00	1.39	33.00	18.00	10.00	1.3	SSE	27.4	74.5
13:00	0.00	26.33	2.29	7.85	0.00	3.19	0.00	37.00	21.00	11.00	1.8	SE	29.3	75.4
14:00	0.00	28.22	4.58	3.93	3.27	0.00	0.00	35.00	20.00	10.00	2.1	SS	27.8	74.9
15:00	5.24	28.22	4.58	3.93	3.27	0.00	0.00	34.00	20.00	10.00	2.1	SS	27.8	74.9
16:00	0.00	22.57	0.00	0.00	2.62	6.38	0.70	39.00	23.00	13.00	1.3	SE	27.4	74.5
17:00	5.24	26.33	2.29	0.00	0.00	3.19	0.00	34.00	21.00	11.00	1.8	ENE	29.3	75.4
18:00	5.24	22.57	2.29	0.00	1.31	0.00	0.00	36.00	21.00	11.00	1.8	SSE	29.3	75.4
Avg	**2.62**	**24.83**	**2.06**	**1.96**	**1.37**	**2.23**	**0.28**	**35.60**	**20.90**	**11.10**	**1.7**		**28.4**	**75.0**

AQ2 New Project site N4o 50’38.9’’ E007o 06’ 37.3”														
Time	**SO2**	**NO2**	**CO**	**O3**	**CxHy**	**VOC**	**NH3**	**SPM**	**PM10**	**PM2.5**	**WIND SPD**	**WIND DIR**	**TEMP**	**REL HM**
9:00	0.00	26.33	2.29	0.00	0.00	3.19	0.00	25.00	21.00	11.00	1.8	ENE	29.3	75.4
10:00	5.24	22.57	2.29	0.00	0.00	0.00	0.00	36.00	21.00	11.00	1.8	SSE	29.3	75.4
11:00	0.00	22.57	0.00	3.93	0.00	0.00	0.00	32.00	18.00	10.00	1.3	SSE	27.4	74.5
12:00	0.00	26.33	2.29	7.85	0.00	3.19	0.00	33.00	21.00	11.00	1.8	SE	29.3	75.4
13:00	5.24	28.22	4.58	3.93	3.27	0.00	0.00	32.00	20.00	10.00	2.1	SS	27.8	74.9
14:00	0.00	22.57	0.00	0.00	2.62	6.38	0.00	39.00	23.00	13.00	1.3	SSE	27.4	74.5
15:00	0.00	22.57	2.29	0.00	0.00	3.19	0.00	36.00	22.00	10.00	1.8	SSE	29.3	72.5
16:00	5.24	30.10	0.00	0.00	0.00	0.00	0.00	35.00	21.00	10.00	1.8	SSE	29.3	75.4
17:00	5.24	26.33	0.00	0.00	1.31	3.19	0.00	36.00	21.00	11.00	1.8	NNE	29.3	70.5
18:00	0.00	22.57	0.00	3.93	0.00	0.00	0.00	31.00	18.00	10.00	1.3	SE	27.4	74.5
Avg	**2.09**	**25.02**	**1.37**	**1.96**	**0.72**	**1.91**	**0.00**	**33.50**	**20.60**	**10.70**	**1.7**		**28.6**	**74.3**

AQ3 New Project Site N4o 50’40.9’’ E007o 06’ 33.5”														
Time	**SO2**	**NO2**	**CO**	**O3**	**CxHy**	**VOC**	**NH3**	**SPM**	**PM10**	**PM2.5**	**WIND SPD**	**WIND DIR**	**TEMP**	**REL HM**
9:00	0.00	26.33	2.29	3.93	0.00	0.00	0.00	31.00	18.00	10.00	1.3	SSE	27.4	71.4
10:00	0.00	24.45	0.00	0.00	0.00	0.00	0.00	34.00	21.00	9.00	1.8	SE	29.3	70.5
11:00	0.00	28.22	4.58	3.93	3.27	0.00	1.39	33.00	20.00	10.00	1.2	S	30.1	69.8
12:00	0.00	22.57	0.00	3.93	0.00	0.00	0.00	36.00	22.00	11.00	1.7	NE	28.4	70.3
13:00	5.24	24.45	2.29	0.00	0.00	0.00	0.00	40.00	28.00	10.00	1.2	SSE	30.4	71.4
14:00	5.24	22.57	2.29	0.00	0.00	0.00	0.00	39.00	28.00	9.00	1.2	ENE	30.4	69.7
15:00	5.24	24.45	2.29	0.00	0.00	0.00	1.39	41.00	28.00	10.00	1.2	SSE	30.4	71.4
16:00	0.00	30.10	0.00	3.93	0.00	6.38	1.39	35.00	22.00	12.00	1.7	ENE	29.4	67.8
17:00	0.00	22.57	0.00	0.00	2.62	0.00	0.00	39.00	23.00	13.00	1.3	SE	27.4	74.5
18:00	0.00	22.57	2.29	0.00	0.00	3.19	0.00	36.00	22.00	10.00	1.8	SE	29.3	72.5
Avg	**1.57**	**24.83**	**1.60**	**1.57**	**0.59**	**0.96**	**0.42**	**36.40**	**23.20**	**10.40**	**1.4**		**29.3**	**70.9**

AQ4 New project site N4o 50’17.0’’ E007o 06’ 32.8”														
Time	**SO2**	**NO2**	**CO**	**O3**	**CxHy**	**VOC**	**NH3**	**SPM**	**PM10**	**PM2.5**	**WIND SPD**	**WIND DIR**	**TEMP**	**REL HM**
9:00	5.24	22.57	0.00	0.00	0.00	0.00	0.00	35.00	21.00	11.00	1.6	ENE	33.7	70.2
10:00	0.00	22.57	0.00	0.00	0.00	0.00	0.00	38.00	24.00	11.00	1.6	ENE	33.7	71.3
11:00	0.00	22.57	2.29	0.00	0.00	0.00	0.00	36.00	23.00	11.00	1.6	NNE	33.7	67.9
12:00	0.00	20.69	2.29	0.00	6.54	6.38	0.00	37.00	20.00	13.00	1.5	ENE	30.4	69.9
13:00	0.00	20.69	2.29	3.93	0.00	6.38	0.00	40.00	24.00	13.00	1.5	NE	30.4	69.9
14:00	5.24	18.81	0.00	0.00	0.00	3.19	0.00	36.00	22.00	11.00	1.5	ENE	29.6	72.7
15:00	0.00	22.57	0.00	0.00	0.00	0.00	0.00	37.00	21.00	11.00	1.6	ENE	33.7	67.9
16:00	5.24	26.33	0.00	7.85	0.00	3.19	1.39	39.00	23.00	13.00	0.7	ENE	27.4	76.4
17:00	0.00	22.57	2.29	0.00	0.00	3.19	0.00	34.00	19.00	12.00	2.6	SE	29.5	72.5
18:00	0.00	18.81	0.00	0.00	0.00	0.00	0.00	41.00	20.00	17.00	1.4	SW	31.8	70.5
19:00	0.00	30.10	0.00	3.93	3.27	0.00	0.00	39.00	23.00	12.00	1.6	NE	31.6	73.6
Avg	**1.43**	**22.57**	**0.83**	**1.43**	**0.89**	**2.03**	**0.13**	**37.45**	**21.82**	**12.27**	**1.6**		**31.4**	**71.2**

AQ5 New project site N4o 50’21.2’’ E007o 06’ 41.0”														
Time	**SO2**	**NO2**	**CO**	**O3**	**CxHy**	**VOC**	**NH3**	**SPM**	**PM10**	**PM2.5**	**WIND SPD**	**WIND DIR**	**TEMP**	**REL HM**
9:00	0.00	20.69	2.29	0.00	0.00	6.38	0.00	34.00	20.00	8.00	1.2	ENE	29.8	70.6
10:00	5.24	20.69	2.29	3.93	0.00	6.38	0.00	39.00	24.00	11.00	1.5	NE	28.9	70.4
11:00	0.00	16.93	0.00	0.00	0.00	3.19	0.00	38.00	22.00	11.00	1.2	NE	29.6	72.7
12:00	0.00	22.57	0.00	0.00	0.00	0.00	0.00	34.00	21.00	10.00	1.6	NE	33.7	67.9
13:00	0.00	22.57	2.29	3.93	0.00	0.00	0.00	37.00	22.00	11.00	1.7	NE	28.4	70.3
14:00	0.00	20.69	2.29	0.00	0.00	0.00	0.00	43.00	28.00	10.00	1.0	SSE	30.4	71.4
15:00	5.24	22.57	2.29	0.00	0.00	0.00	0.00	42.00	28.00	9.00	1.2	ENE	30.4	69.7
16:00	5.24	15.05	2.29	0.00	0.00	0.00	1.39	43.00	28.00	10.00	1.0	SSE	30.4	69.8
17:00	0.00	22.57	0.00	3.93	0.00	0.00	0.00	35.00	18.00	10.00	1.3	SE	30.1	68.7
18:00	0.00	18.81	2.29	7.85	0.00	3.19	0.00	37.00	21.00	11.00	1.8	SE	30.4	69.6
19:00	5.24	20.69	0.00	3.93	3.27	0.00	0.00	34.00	20.00	10.00	2.1	S	30.4	70.4
Avg	**1.90**	**20.35**	**1.46**	**2.14**	**0.30**	**1.74**	**0.13**	**37.82**	**22.91**	**10.09**	**1.4**		**30.2**	**70.1**

AQ6 New project site N4o 50’25.0’’ E007o 06’ 46.3”														
Time	**SO2**	**NO2**	**CO**	**O3**	**CxHy**	**VOC**	**NH3**	**SPM**	**PM10**	**PM2.5**	**WIND SPD**	**WIND DIR**	**TEMP**	**REL HM**
9:00	0.00	26.33	0.000	0.000	6.540	0.000	0.000	31.000	18.000	10.000	1.0	NE	30.1	67.8
10:00	0.00	30.10	0.000	0.000	0.000	0.000	0.000	36.000	19.000	11.000	1.5	ENE	30.1	70.6
11:00	7.85	28.22	2.290	3.926	0.654	6.380	0.000	39.000	20.000	14.000	1.8	SSE	30.6	69.9
12:00	0.00	28.22	2.290	3.926	0.000	0.000	0.000	36.000	19.000	14.000	1.8	SE	30.6	69.9
13:00	0.00	22.57	4.580	3.926	3.924	0.000	1.390	33.000	20.000	11.000	1.2	SSE	27.4	76.4
14:00	0.00	24.45	4.580	3.926	3.924	0.000	1.390	35.000	21.000	12.000	1.1	S	27.4	76.4
15:00	5.24	18.81	0.000	0.000	0.000	0.000	0.000	36.000	20.000	13.000	1.4	NNE	28.6	72.2
16:00	2.62	20.69	0.000	9.815	6.540	6.380	3.475	37.000	21.000	14.000	0.8	SE	31.2	71.2
17:00	0.00	30.10	4.580	3.926	3.924	0.000	0.000	34.000	21.000	12.000	1.8	S	30.4	69.4
18:00	0.00	18.81	0.000	5.889	0.000	0.000	0.000	31.000	18.000	10.000	1.3	SE	30.1	68.7
Avg	**1.57**	**24.83**	**1.83**	**3.53**	**2.55**	**1.28**	**0.63**	**34.80**	**19.70**	**12.10**	**1.4**		**29.7**	**71.3**

AQ7 Flare Area N4o 50’09.3’’ E007o 06’ 35.3”														
Time	**SO2**	**NO2**	**CO**	**O3**	**CxHy**	**VOC**	**NH3**	**SPM**	**PM10**	**PM2.5**	**WIND SPD**	**WIND DIR**	**TEMP**	**REL HM**
9:00	0.00	30.10	0.00	0.00	0.00	0.00	0.00	41.00	25.00	13.00	1.5	ENE	30.1	67.8
10:00	5.24	26.33	0.00	0.00	0.00	0.00	0.00	38.00	23.00	10.00	1.0	NE	30.1	67.8
11:00	0.00	30.10	0.00	0.00	3.92	0.00	0.00	33.00	19.00	11.00	1.5	ENE	30.1	70.6
12:00	0.00	28.22	2.29	3.93	0.00	6.38	0.00	35.00	21.00	10.00	1.8	SSE	30.6	69.9
13:00	0.00	28.22	2.29	3.93	0.00	0.00	0.00	36.00	21.00	11.00	1.8	SE	30.6	69.9
14:00	0.00	31.98	2.29	3.93	3.92	6.38	0.00	32.00	22.00	8.00	1.8	SE	30.6	69.3
15:00	5.24	30.10	0.00	0.00	0.00	0.00	0.00	39.00	24.00	12.00	1.2	SSE	30.2	69.3
16:00	0.00	30.10	0.00	0.00	0.00	0.00	0.00	36.00	19.00	13.00	1.5	NE	30.1	70.6
17:00	0.00	20.69	0.00	0.00	0.00	0.00	0.00	38.00	25.00	10.00	1.5	ENE	30.1	70.6
18:00	0.00	30.10	0.00	0.00	0.00	0.00	0.00	34.00	19.00	11.00	1.5	SSE	30.1	70.6
19:00	0.00	30.10	0.00	0.00	0.00	0.00	0.00	36.00	19.00	11.00	1.5	ENE	30.1	70.6
20:00	7.85	28.22	2.29	3.93	0.65	6.38	2.78	33.00	21.00	10.00	1.8	SSE	30.6	69.9
21:00	0.00	30.10	0.00	0.00	6.54	0.00	0.00	35.00	19.00	13.00	1.5	ENE	30.1	70.6
22:00	7.85	28.22	2.29	3.93	0.65	6.38	2.78	32.00	21.00	10.00	1.8	SSE	30.6	69.9
23:00	0.00	22.57	4.58	3.93	3.92	0.00	1.39	33.00	20.00	11.00	1.2	SSE	27.4	76.4
0:00	0.00	24.45	4.58	3.93	0.00	0.00	1.39	32.00	21.00	10.00	1.1	S	27.4	76.4
1:00	5.24	18.81	0.00	0.00	0.00	0.00	0.00	36.00	20.00	13.00	1.4	NNE	28.6	72.2
2:00	2.62	20.69	0.00	9.82	6.54	6.38	3.48	42.00	26.00	14.00	0.8	SE	31.2	71.2
Avg	**1.89**	**27.17**	**1.15**	**2.07**	**1.45**	**1.77**	**0.66**	**35.61**	**21.39**	**11.17**	**1.5**		**29.9**	**70.8**

AQ8 ETP N4o 49’32.1’’ E007o 06’ 26.8”														
Time	**SO2**	**NO2**	**CO**	**O3**	**CxHy**	**VOC**	**NH3**	**SPM**	**PM10**	**PM2.5**	**WIND SPD**	**WIND DIR**	**TEMP**	**REL HM**
9:00	0.00	24.45	3.44	0.00	6.54	9.57	0.00	32.00	19.00	11.00	1.3	NE	30.9	70.5
10:00	0.00	30.10	5.73	0.00	6.54	9.57	0.00	39.00	23.00	12.00	1.3	NNE	29.8	69.8
11:00	0.00	18.81	5.73	0.00	6.54	0.00	0.00	41.00	23.00	12.00	1.3	NNE	30.9	70.5
12:00	7.85	22.57	0.00	0.00	0.00	0.00	0.00	36.00	21.00	11.00	1.4	ENE	29.8	71.2
13:00	0.00	30.10	0.00	3.93	0.00	0.00	1.39	35.00	20.00	10.00	1.4	ENE	31.2	68.9
14:00	7.85	22.57	0.00	0.00	0.00	0.00	0.00	35.00	21.00	11.00	1.4	ENE	29.9	70.1
15:00	0.00	20.69	2.29	0.00	6.54	6.38	1.39	38.00	20.00	12.00	1.2	S	29.8	69.6
16:00	5.24	22.57	0.00	0.00	6.54	0.00	0.00	35.00	22.00	10.00	1.4	SSE	30.4	70.4
17:00	5.24	22.57	5.73	3.93	6.54	0.00	0.00	39.00	21.00	15.00	1.4	SSE	30.4	69.4
18:00	0.00	30.10	0.00	0.00	0.00	0.00	0.00	36.00	23.00	10.00	1.2	SE	29.8	70.3
19:00	0.00	20.69	0.00	0.00	0.00	0.00	0.00	32.00	20.00	10.00	1.2	SE	29.8	69.3
20:00	5.24	26.33	0.00	0.00	6.54	9.57	0.00	33.00	21.00	11.00	1.9	NNE	31.9	68.2
21:00	0.00	30.10	0.00	3.93	3.92	0.00	0.00	30.00	19.00	10.00	1.8	S	27.4	72.1
22:00	0.00	24.45	4.58	3.93	3.92	0.00	1.39	35.00	21.00	12.00	1.8	S	29.8	70.3
23:00	5.24	24.45	0.00	0.00	0.00	0.00	0.00	32.00	20.00	11.00	1.4	NNE	28.6	70.6
0:00	5.24	24.45	0.00	0.00	0.00	0.00	0.00	35.00	21.00	12.00	1.4	NNE	30.2	69.3
1:00	0.00	20.69	0.00	0.00	0.00	0.00	0.00	36.00	23.00	12.00	1.2	SE	30.7	69.3
Avg	**2.46**	**24.45**	**1.62**	**0.92**	**3.15**	**2.06**	**0.25**	**35.24**	**21.06**	**11.29**	**1.4**		**30.1**	**70.0**

AQ9 Urea Warehouse N4o 50’11.5’’ E007o 05’ 29.3”														
Time	**SO2**	**NO2**	**CO**	**O3**	**CxHy**	**VOC**	**NH3**	**SPM**	**PM10**	**PM2.5**	**WIND SPD**	**WIND DIR**	**TEMP**	**REL HM**
9:00	0.00	22.57	2.29	0.00	0.00	3.19	0.00	37.00	22.00	10.00	1.2	SSE	29.3	75.4
10:00	5.24	18.81	2.29	0.00	1.31	3.19	0.00	36.00	21.00	11.00	1.8	SE	29.3	75.4
11:00	5.24	26.33	2.29	0.00	1.31	3.19	0.00	35.00	21.00	11.00	1.4	SE	29.3	75.4
12:00	0.00	22.57	0.00	3.93	0.00	0.00	1.39	32.00	18.00	10.00	1.3	SE	27.4	74.5
13:00	5.24	26.33	2.29	0.00	1.31	3.19	0.00	34.00	21.00	11.00	1.8	SE	29.3	70.3
14:00	0.00	22.57	0.00	3.93	0.00	0.00	0.00	31.00	18.00	10.00	1.3	SE	30.2	69.8
15:00	0.00	24.45	0.00	0.00	0.00	3.19	0.00	37.00	21.00	14.00	1.8	SE	31.3	68.7
16:00	0.00	26.33	0.00	3.93	0.00	6.38	1.39	32.00	20.00	9.00	1.5	SSE	29.4	76.4
17:00	0.00	31.98	0.00	3.93	0.00	6.38	0.00	36.00	21.00	11.00	1.7	SSE	29.3	73.5
18:00	0.00	26.33	0.00	3.93	0.00	6.38	0.00	35.00	22.00	11.00	1.3	SSE	28.4	76.4
19:00	5.24	24.45	0.00	0.00	6.54	0.00	0.00	34.00	20.00	10.00	1.2	SSE	30.4	71.4
20:00	5.24	24.45	0.00	0.00	6.54	0.00	1.39	36.00	20.00	12.00	1.2	SSE	30.4	71.4
21:00	0.00	30.10	0.00	3.93	6.54	6.38	1.39	35.00	22.00	12.00	1.7	ENE	29.4	73.4
22:00	5.24	20.69	0.00	0.00	0.00	6.38	6.95	35.00	22.00	10.00	1.2	SSE	30.6	70.2
23:00	5.24	30.10	0.00	0.00	1.31	0.00	0.00	37.00	21.00	10.00	1.8	SE	30.3	75.4
0:00	5.24	26.33	0.00	0.00	1.31	3.19	0.00	34.00	21.00	11.00	1.4	NNE	30.3	70.5
1:00	0.00	22.57	0.00	3.93	0.00	0.00	0.00	29.00	18.00	10.00	1.3	SE	30.4	74.5
2:00	0.00	26.33	2.29	3.93	0.00	0.00	0.00	30.00	18.00	10.00	1.6	SSE	30.4	69.8
3:00	0.00	24.45	0.00	0.00	0.00	3.19	1.39	36.00	21.00	14.00	1.8	SE	29.3	70.3
4:00	0.00	26.33	0.00	5.89	0.00	6.38	0.00	35.00	22.00	11.00	1.7	SS	30.4	76.4
Avg	**2.09**	**25.21**	**0.57**	**1.86**	**1.31**	**3.03**	**0.70**	**34.30**	**20.50**	**10.90**	**1.5**		**29.8**	**73.0**

AQ10 New project site N4o 49’32.1’’ E007o 07’ 25.6”														
Time	**SO2**	**NO2**	**CO**	**O3**	**CxHy**	**VOC**	**NH3**	**SPM**	**PM10**	**PM2.5**	**WIND SPD**	**WIND DIR**	**TEMP**	**REL HM**
9:00	0.00	30.10	0.00	3.93	0.00	0.00	1.39	35.00	20.00	10.00	1.4	ENE	31.2	68.9
10:00	5.24	22.57	0.00	0.00	0.00	0.00	0.00	36.00	21.00	11.00	1.4	ENE	29.9	70.1
11:00	0.00	20.69	2.29	0.00	6.54	6.38	1.39	34.00	20.00	12.00	1.2	S	29.8	69.6
12:00	0.00	22.57	0.00	0.00	6.54	0.00	0.00	35.00	22.00	10.00	1.4	SSE	30.4	70.4
13:00	0.00	22.57	4.58	3.93	3.92	0.00	1.39	36.00	20.00	11.00	1.2	SSE	27.4	76.4
14:00	0.00	24.45	0.00	3.93	3.92	0.00	1.39	36.00	21.00	12.00	1.1	S	27.4	76.4
15:00	5.24	18.81	0.00	0.00	0.00	0.00	0.00	35.00	20.00	13.00	1.4	NNE	28.6	72.2
16:00	5.24	26.33	2.29	0.00	1.31	3.19	0.00	34.00	21.00	11.00	1.8	SE	29.3	70.3
17:00	0.00	22.57	0.00	3.93	0.00	0.00	0.00	33.00	18.00	10.00	1.3	SE	30.2	69.8
Avg	**1.75**	**23.41**	**1.02**	**1.74**	**2.47**	**1.06**	**0.62**	**34.89**	**20.33**	**11.11**	**1.4**		**29.4**	**71.6**

AQ11 IRC N4o 50’09.1’’ E007o 05’ 25.9”														
Time	**SO2**	**NO2**	**CO**	**O3**	**CxHy**	**VOC**	**NH3**	**SPM**	**PM10**	**PM2.5**	**WIND SPD**	**WIND DIR**	**TEMP**	**REL HM**
9:00	0.00	26.33	0.00	0.00	0.00	6.38	0.00	36.00	22.00	12.00	1.2	NE	30.1	67.8
10:00	0.00	26.33	0.00	0.00	6.54	6.38	0.00	34.00	20.00	11.00	1.8	NE	30.1	67.8
11:00	0.00	26.33	0.00	0.00	0.00	6.38	0.00	39.00	23.00	12.00	1.2	NE	31.1	67.8
12:00	5.24	24.45	4.58	0.00	0.00	0.00	0.00	35.00	19.00	12.00	1.6	ENE	28.6	72.6
13:00	5.24	24.45	0.00	0.00	6.54	0.00	0.00	32.00	19.00	10.00	1.3	ENE	31.6	70.1
14:00	0.00	24.45	4.58	0.00	0.00	0.00	8.34	34.00	19.00	12.00	1.2	NE	30.4	70.2
15:00	0.00	20.69	0.00	0.00	0.00	0.00	0.00	39.00	25.00	10.00	1.5	ENE	30.1	70.6
16:00	0.00	30.10	0.00	0.00	0.00	0.00	0.00	34.00	19.00	11.00	1.5	SSE	30.1	70.6
17:00	0.00	30.10	0.00	0.00	6.54	0.00	0.00	33.00	19.00	11.00	1.5	ENE	30.1	70.6
18:00	7.85	28.22	2.29	3.93	0.65	6.38	2.78	39.00	21.00	14.00	1.8	SSE	30.6	69.9
19:00	0.00	30.10	0.00	0.00	6.54	0.00	0.00	36.00	19.00	13.00	1.5	ENE	30.1	70.6
20:00	0.00	26.33	0.00	3.93	0.00	6.38	0.00	38.00	22.00	11.00	1.7	SSE	28.4	68.9
21:00	0.00	22.57	2.29	3.93	0.00	6.38	0.00	35.00	22.00	11.00	1.2	NE	28.4	70.3
22:00	0.00	24.45	0.00	0.00	6.54	0.00	1.39	39.00	28.00	10.00	1.3	SSE	30.4	71.4
23:00	5.24	22.57	0.00	0.00	6.54	0.00	1.39	39.00	28.00	11.00	1.2	ENE	30.4	69.7
0:00	0.00	30.10	0.00	3.93	3.92	0.00	0.00	31.00	19.00	10.00	1.8	S	27.4	72.1
1:00	0.00	24.45	4.58	3.93	3.92	0.00	1.39	34.00	21.00	12.00	1.2	S	29.8	70.3
2:00	0.00	24.45	0.00	0.00	0.00	0.00	0.00	35.00	20.00	13.00	1.3	NNE	28.6	70.6
3:00	5.24	24.45	0.00	0.00	0.00	0.00	0.00	34.00	21.00	12.00	1.4	NNE	30.2	69.3
Avg	**1.52**	**25.84**	**0.96**	**1.03**	**2.51**	**2.01**	**0.80**	**35.58**	**21.37**	**11.47**	**1.4**		**29.8**	**70.1**

AQ12 Indorama Main Gate N4o 48’46.4’’ E007o 05’ 51.9”														
Time	**SO2**	**NO2**	**CO**	**O3**	**CxHy**	**VOC**	**NH3**	**SPM**	**PM10**	**PM2.5**	**WIND SPD**	**WIND DIR**	**TEMP**	**REL HM**
9:00	0.00	28.22	3.44	7.85	0.00	6.38	0.00	44.00	28.00	12.00	1.3	SSE	30.1	68.6
10:00	0.00	28.22	2.29	7.85	0.00	6.38	0.00	37.00	20.00	12.00	2.5	SSE	28.4	76.6
11:00	7.85	35.74	0.00	9.82	3.92	0.00	0.00	35.00	21.00	11.00	2.6	NNE	29.4	71.6
12:00	0.00	28.22	2.29	7.85	0.00	6.38	6.95	34.00	20.00	12.00	3.5	SSE	28.4	76.6
13:00	7.85	33.86	0.00	9.82	3.92	0.00	0.00	37.00	21.00	11.00	2.3	NNE	29.4	71.6
14:00	7.85	31.98	0.00	9.82	3.92	0.00	0.00	35.00	21.00	9.00	2.6	NNE	30.4	69.8
15:00	7.85	30.10	3.44	9.82	6.54	0.00	0.00	43.00	29.00	10.00	2.0	NNE	31.2	70.2
16:00	0.00	31.98	2.29	0.00	0.00	6.38	0.00	37.00	22.00	10.00	1.2	SSE	30.4	68.6
17:00	0.00	28.22	2.29	7.85	0.00	6.38	6.95	36.00	20.00	12.00	3.5	SSE	28.4	76.6
18:00	7.85	39.50	0.00	9.82	3.92	0.00	0.00	39.00	21.00	14.00	2.6	NNE	29.4	71.6
19:00	5.24	30.10	5.73	0.00	13.08	6.38	0.00	34.00	20.00	12.00	1.6	SE	30.7	68.1
20:00	0.00	28.22	2.29	7.85	0.00	6.38	6.95	36.00	20.00	12.00	3.5	SSE	28.4	76.6
21:00	7.85	18.81	0.00	9.82	3.92	0.00	0.00	34.00	21.00	11.00	2.6	NNE	29.4	71.6
22:00	0.00	31.98	3.44	9.82	6.54	0.00	6.95	35.00	21.00	12.00	1.3	NNE	29.4	71.6
23:00	0.00	33.86	2.29	0.00	0.00	6.38	0.00	39.00	22.00	16.00	1.2	SSE	28.4	74.6
0:00	0.00	20.69	0.00	0.00	0.00	0.00	0.00	38.00	25.00	10.00	1.5	ENE	30.1	70.6
1:00	0.00	22.57	0.00	0.00	0.00	0.00	0.00	32.00	19.00	11.00	1.5	SSE	30.4	70.6
2:00	0.00	33.86	0.00	0.00	6.54	0.00	0.00	31.00	19.00	11.00	1.5	ENE	30.1	70.6
Avg	**2.91**	**29.78**	**1.65**	**6.00**	**2.91**	**2.84**	**1.54**	**36.44**	**21.67**	**11.56**	**2.2**		**29.6**	**72.0**

AQ13 Agbonchia N4o 48’48.7’’ E007o 07’ 29.8”														
Time	**SO2**	**NO2**	**CO**	**O3**	**CxHy**	**VOC**	**NH3**	**SPM**	**PM10**	**PM2.5**	**WIND SPD**	**WIND DIR**	**TEMP**	**REL HM**
9:00	0.00	22.57	0.00	0.00	0.00	0.00	0.00	34.00	20.00	11.00	1.6	ENE	29.8	71.3
10:00	5.24	22.57	0.00	0.00	0.00	0.00	0.00	39.00	23.00	11.00	1.6	NNE	29.6	67.9
11:00	0.00	20.69	2.29	0.00	6.54	6.38	0.00	35.00	20.00	10.00	1.5	ENE	30.4	69.9
12:00	5.24	22.57	0.00	0.00	0.00	0.00	0.00	36.00	21.00	11.00	1.6	NNE	33.7	67.9
13:00	0.00	20.69	2.29	3.93	6.54	6.38	0.00	38.00	20.00	13.00	1.5	ENE	30.4	69.9
14:00	0.00	26.33	0.00	3.93	6.54	6.38	0.00	35.00	20.00	10.00	1.5	ENE	31.2	69.9
15:00	0.00	20.69	0.00	5.89	0.00	0.00	0.00	38.00	21.00	11.00	1.4	SW	30.8	70.5
16:00	0.00	22.57	2.29	0.00	0.00	3.19	0.00	34.00	19.00	12.00	2.6	SE	29.5	72.5
17:00	0.00	22.57	2.29	0.00	0.00	3.19	0.00	38.00	21.00	11.00	2.6	SE	29.5	70.5
18:00	0.00	31.98	0.00	0.00	0.00	0.00	0.00	33.00	20.00	11.00	1.4	SW	31.8	70.5
19:00	0.00	31.98	0.00	0.00	0.00	0.00	0.00	34.00	20.00	12.00	1.4	SW	31.8	70.5
20:00	0.00	30.10	0.00	3.93	3.27	0.00	0.00	37.00	23.00	12.00	1.6	NE	31.6	69.8
Avg	**0.87**	**24.61**	**0.76**	**1.47**	**1.91**	**2.13**	**0.00**	**35.92**	**20.67**	**11.25**	**1.7**		**30.8**	**70.1**

AQ14 Aleto N4o 48’20.1’’ E007o 06’ 19.9”														
Time	**SO2**	**NO2**	**CO**	**O3**	**CxHy**	**VOC**	**NH3**	**SPM**	**PM10**	**PM2.5**	**WIND SPD**	**WIND DIR**	**TEMP**	**REL HM**
9:00	5.24	31.98	0.00	0.00	6.54	3.19	8.34	34.00	19.00	10.00	1.6	ENE	28.6	72.6
10:00	0.00	22.57	0.00	7.85	0.00	6.38	0.00	39.00	23.00	12.00	1.8	NE	31.1	67.8
11:00	0.00	26.33	0.00	0.00	0.00	6.38	0.00	40.00	23.00	11.00	1.8	NE	31.1	67.8
12:00	5.24	24.45	4.58	0.00	6.54	0.00	8.34	35.00	19.00	12.00	1.6	ENE	28.6	72.6
13:00	5.24	24.45	0.00	0.00	6.54	0.00	8.34	34.00	21.00	10.00	1.6	ENE	28.6	72.2
14:00	0.00	31.98	2.29	0.00	6.54	3.19	8.34	38.00	19.00	12.00	1.6	ENE	28.6	72.6
15:00	0.00	26.33	0.00	7.85	0.00	6.38	0.00	39.00	20.00	12.00	1.8	NE	30.1	67.8
16:00	0.00	30.10	0.00	0.00	6.54	0.00	0.70	37.00	21.00	11.00	1.5	ENE	30.1	70.6
17:00	0.00	30.10	0.00	0.00	6.54	0.00	0.00	34.00	19.00	12.00	1.5	ENE	30.1	71.6
18:00	0.00	30.10	0.00	0.00	6.54	0.00	0.00	36.00	19.00	11.00	1.5	ENE	30.1	70.6
19:00	0.00	28.22	2.29	3.93	0.65	6.38	2.78	39.00	21.00	12.00	1.8	SSE	30.6	69.9
20:00	0.00	28.22	2.29	3.93	0.65	6.38	2.78	34.00	21.00	11.00	1.8	SSE	30.6	70.2
21:00	0.00	31.98	2.29	3.93	0.65	6.38	1.39	35.00	20.00	12.00	1.8	SSE	30.6	69.3
Avg	**1.21**	**28.22**	**1.06**	**2.11**	**3.67**	**3.44**	**3.15**	**36.46**	**20.38**	**11.38**	**1.7**		**29.9**	**70.4**

AQ15 Akpajo N4o 49'01.8'' E007o 05' 39.2"														
Time	**SO2**	**NO2**	**CO**	**O3**	**CxHy**	**VOC**	**NH3**	**SPM**	**PM10**	**PM2.5**	**WIND SPD**	**WIND DIR**	**TEMP**	**REL HM**
9:00	0.00	22.57	0.00	0.00	0.00	6.38	0.00	40.00	25.00	12.00	1.8	NE	29.8	70.8
10:00	0.00	26.33	0.00	0.00	0.00	6.38	0.00	39.00	25.00	11.00	1.8	NE	30.1	70.9
11:00	0.00	24.45	0.00	0.00	0.00	6.38	0.00	41.00	23.00	12.00	1.8	NE	31.1	71.8
12:00	5.24	22.57	4.58	0.00	6.54	0.00	2.78	36.00	19.00	12.00	1.6	ENE	28.6	72.6
13:00	5.24	24.45	0.00	0.00	0.00	0.00	0.00	34.00	19.00	10.00	1.3	ENE	31.6	70.1
14:00	0.00	20.69	0.00	0.00	0.00	0.00	0.00	39.00	25.00	10.00	1.5	ENE	30.1	70.6
15:00	0.00	30.10	0.00	0.00	6.54	0.00	0.00	35.00	19.00	11.00	1.5	SSE	30.1	70.6
16:00	0.00	26.33	0.00	0.00	6.54	0.00	0.00	34.00	19.00	11.00	1.5	ENE	30.1	70.6
17:00	7.85	28.22	2.29	3.93	0.00	6.38	2.78	38.00	21.00	14.00	1.8	SSE	30.6	69.9
18:00	0.00	30.10	0.00	0.00	0.00	0.00	0.00	34.00	19.00	13.00	1.5	ENE	30.1	69.7
19:00	5.24	24.45	0.00	0.00	6.54	0.00	0.00	31.00	19.00	10.00	1.3	ENE	31.6	70.1
20:00	0.00	18.81	0.00	0.00	6.54	0.00	0.00	32.00	20.00	10.00	1.5	ENE	30.1	39.5
Avg	**1.96**	**24.92**	**0.57**	**0.33**	**2.73**	**2.13**	**0.46**	**36.08**	**21.08**	**11.33**	**1.6**		**30.3**	**68.1**

AQ16 Elelenwo N4o 51'02.7'' E007o 04' 47.7"														
Time	**SO2**	**NO2**	**CO**	**O3**	**CxHy**	**VOC**	**NH3**	**SPM**	**PM10**	**PM2.5**	**WIND SPD**	**WIND DIR**	**TEMP**	**REL HM**
9:00	0.00	26.33	0.00	3.93	0.00	6.38	0.00	36.00	22.00	10.00	0.8	SE	28.8	71.2
10:00	0.00	24.45	4.58	3.93	3.92	0.00	0.00	37.00	21.00	12.00	1.8	NNE	29.7	76.4
11:00	0.00	24.45	4.58	3.93	3.92	0.00	0.00	39.00	21.00	12.00	1.2	S	29.8	70.3
12:00	5.24	24.45	0.00	0.00	0.00	0.00	0.00	35.00	20.00	13.00	1.4	NNE	28.6	70.6
13:00	5.24	18.81	0.00	0.00	0.00	0.00	0.00	34.00	20.00	13.00	1.4	NNE	28.6	72.2
14:00	0.00	20.69	0.00	9.82	6.54	6.38	0.00	39.00	26.00	12.00	0.8	SE	31.2	71.2
15:00	0.00	20.69	0.00	0.00	6.54	6.38	1.39	38.00	20.00	12.00	1.2	S	29.8	69.6
16:00	0.00	22.57	5.73	3.93	6.54	0.00	0.00	39.00	21.00	11.00	1.4	SSE	30.4	69.4
17:00	5.24	22.57	5.73	3.93	6.54	0.00	0.00	35.00	21.00	12.00	1.4	SSE	30.4	70.4
18:00	0.00	30.10	0.00	0.00	0.00	0.00	0.00	34.00	23.00	10.00	1.2	SE	29.8	71.3
19:00	0.00	30.10	0.00	0.00	0.00	0.00	0.00	37.00	23.00	10.00	1.2	SE	30.8	69.8
20:00	5.24	16.93	2.29	0.00	0.00	0.00	0.00	35.00	19.00	11.00	1.9	NE	32.9	68.2
21:00	0.00	18.81	5.73	0.00	6.54	0.00	0.00	37.00	23.00	12.00	1.3	NNE	30.9	70.5
22:00	0.00	22.57	2.29	0.00	6.54	0.00	0.00	36.00	23.00	12.00	1.3	NNE	30.9	70.5
Avg	**1.50**	**23.11**	**2.21**	**2.10**	**3.36**	**1.37**	**0.10**	**36.50**	**21.64**	**11.57**	**1.3**		**30.2**	**70.8**

AQ17 Steel Market N4o 51'46.8'' E007o 05' 32.1"														
Time	**SO2**	**NO2**	**CO**	**O3**	**CxHy**	**VOC**	**NH3**	**SPM**	**PM10**	**PM2.5**	**WIND SPD**	**WIND DIR**	**TEMP**	**REL HM**
9:00	0.00	30.10	0.00	0.00	0.00	0.00	0.00	36.00	21.00	10.00	1.4	ENE	31.2	69.2
10:00	0.00	28.22	0.00	0.00	6.54	0.00	0.00	35.00	20.00	12.00	1.3	NE	30.9	70.5
11:00	5.24	35.74	5.73	3.93	6.54	0.00	0.00	41.00	21.00	15.00	1.4	SSE	30.4	70.4
12:00	0.00	30.10	0.00	0.00	0.00	0.00	0.00	44.00	23.00	16.00	1.2	SE	29.8	71.3
13:00	0.00	30.10	0.00	0.00	0.00	0.00	0.00	40.00	23.00	16.00	1.2	SE	29.8	70.3
14:00	0.00	22.57	0.00	0.00	0.00	0.00	0.00	36.00	21.00	11.00	1.4	ENE	31.2	68.2
15:00	0.00	22.57	2.29	0.00	6.54	0.00	0.00	38.00	23.00	12.00	1.3	NNE	30.9	70.5
16:00	0.00	22.57	0.00	0.00	0.00	0.00	0.00	35.00	21.00	11.00	1.4	ENE	31.2	71.2
17:00	5.24	30.10	0.00	0.00	0.00	0.00	0.00	39.00	25.00	12.00	1.4	SSE	31.2	69.2
Avg	**1.16**	**28.01**	**0.89**	**0.44**	**2.18**	**0.00**	**0.00**	**38.22**	**22.00**	**12.78**	**1.3**		**30.7**	**70.1**

AQ18 Iriebe Market N4o 52'15.2'' E007o 06' 38.6"														
Time	**SO2**	**NO2**	**CO**	**O3**	**CxHy**	**VOC**	**NH3**	**SPM**	**PM10**	**PM2.5**	**WIND SPD**	**WIND DIR**	**TEMP**	**REL HM**
9:00	0.00	24.45	0.00	3.93	0.00	0.00	1.39	35.00	21.00	12.00	1.8	S	29.4	76.4
10:00	0.00	22.57	4.58	3.93	0.00	0.00	1.39	35.00	20.00	11.00	1.2	SSE	30.4	73.6
11:00	0.00	24.45	4.58	3.93	3.92	0.00	1.39	36.00	21.00	12.00	1.1	S	27.4	76.4
12:00	5.24	28.22	0.00	0.00	0.00	0.00	0.00	37.00	20.00	13.00	1.4	NNE	28.6	72.2
13:00	2.62	39.50	0.00	9.82	6.54	6.38	3.48	42.00	26.00	14.00	0.8	SE	31.2	71.2
14:00	0.00	35.74	0.00	3.93	0.00	6.38	0.00	35.00	22.00	11.00	1.7	NE	28.4	70.3
15:00	0.00	26.33	0.00	3.93	0.00	6.38	0.00	34.00	22.00	11.00	1.7	SSE	28.4	76.4
16:00	5.24	24.45	4.58	0.00	6.54	0.00	1.39	39.00	28.00	10.00	1.2	SSE	30.4	71.4
17:00	0.00	31.98	0.00	0.00	0.00	0.00	0.00	38.00	20.00	13.00	1.4	NNE	28.6	72.2
18:00	0.00	20.69	0.00	9.82	6.54	6.38	0.00	43.00	26.00	12.00	0.8	SE	31.2	71.2
19:00	0.00	20.69	2.29	0.00	6.54	6.38	1.39	37.00	20.00	12.00	1.2	S	29.8	69.6
Avg	**1.19**	**27.19**	**1.46**	**3.57**	**2.73**	**2.90**	**0.95**	**37.36**	**22.36**	**11.91**	**1.3**		**29.4**	**72.8**

AQ19 Iriebe N4o 50'11.5'' E007o 05' 29.3"														
Time	**SO2**	**NO2**	**CO**	**O3**	**CxHy**	**VOC**	**NH3**	**SPM**	**PM10**	**PM2.5**	**WIND SPD**	**WIND DIR**	**TEMP**	**REL HM**
9:00	0.00	22.57	0.00	0.00	0.00	0.00	0.00	43.00	23.00	16.00	1.2	SE	29.8	71.3
10:00	0.00	18.81	0.00	0.00	0.00	0.00	0.00	44.00	23.00	16.00	1.2	SSE	29.8	70.3
11:00	0.00	22.57	0.00	0.00	0.00	0.00	0.00	37.00	21.00	11.00	1.4	NE	31.2	68.2
12:00	0.00	20.69	4.58	3.93	6.54	0.00	0.00	38.00	21.00	11.00	1.4	SSE	30.4	69.4
13:00	5.24	22.57	5.73	3.93	6.54	0.00	0.00	36.00	21.00	12.00	1.4	SSE	30.4	70.4
14:00	0.00	24.45	0.00	0.00	0.00	0.00	0.00	37.00	23.00	10.00	1.2	SE	29.8	71.3
15:00	0.00	20.69	2.29	0.00	6.54	6.38	0.00	35.00	20.00	10.00	1.5	NE	30.4	69.9
16:00	5.24	24.45	0.00	0.00	6.54	0.00	0.00	34.00	19.00	10.00	1.3	ENE	31.6	70.1
17:00	0.00	22.57	4.58	0.00	0.00	0.00	8.34	35.00	19.00	12.00	1.2	NE	30.4	70.2
18:00	0.00	20.69	0.00	0.00	0.00	0.00	0.00	38.00	25.00	10.00	1.5	ENE	30.1	70.6
19:00	0.00	24.45	0.00	0.00	0.00	0.00	0.00	34.00	19.00	11.00	1.5	SSE	30.1	70.6
20:00	0.00	18.81	0.00	0.00	6.54	0.00	0.00	32.00	19.00	11.00	1.5	ENE	30.1	70.6
Avg	**0.87**	**21.95**	**1.43**	**0.65**	**2.73**	**0.53**	**0.70**	**36.92**	**21.08**	**11.67**	**1.4**		**30.3**	**70.2**

AQ20 Near Okra Market Iriebe N4o 50'36.1'' E007o 07' 29.6"														
Time	**SO2**	**NO2**	**CO**	**O3**	**CxHy**	**VOC**	**NH3**	**SPM**	**PM10**	**PM2.5**	**WIND SPD**	**WIND DIR**	**TEMP**	**REL HM**
9:00	2.62	20.69	0.00	5.89	0.00	6.38	0.00	45.00	26.00	13.00	1.7	SE	28.9	71.2
10:00	0.00	22.57	2.29	3.93	0.00	6.38	0.00	38.00	22.00	11.00	1.6	NE	28.4	70.3
11:00	0.00	26.33	0.00	3.93	0.00	6.38	0.00	39.00	22.00	11.00	1.4	SE	28.4	76.4
12:00	0.00	26.33	2.29	0.00	6.54	0.00	0.00	42.00	28.00	10.00	1.2	SSE	30.4	71.4
13:00	5.24	24.45	0.00	0.00	0.00	0.00	0.00	38.00	21.00	10.00	1.6	NE	28.6	72.2
14:00	0.00	31.98	2.29	0.00	0.00	3.19	0.00	36.00	19.00	12.00	1.6	ENE	28.6	72.6
15:00	0.00	26.33	0.00	7.85	0.00	6.38	0.00	35.00	20.00	12.00	1.8	NE	30.1	67.8
16:00	0.00	30.10	2.29	0.00	6.54	0.00	0.70	38.00	21.00	11.00	1.5	ENE	30.1	70.6
Avg	**0.98**	**26.10**	**1.15**	**2.70**	**1.64**	**3.59**	**0.09**	**38.88**	**22.38**	**11.25**	**1.6**		**29.2**	**71.6**

AQ21 Njuru Community N4o 48'17.4'' E007o 07'07.4"														
Time	**SO2**	**NO2**	**CO**	**O3**	**CxHy**	**VOC**	**NH3**	**SPM**	**PM10**	**PM2.5**	**WIND SPD**	**WIND DIR**	**TEMP**	**REL HM**
9:00	0.00	24.45	0.00	3.93	0.00	0.00	0.00	36.00	21.00	12.00	1.2	S	29.8	70.3
10:00	0.00	24.45	0.00	0.00	0.00	0.00	0.00	34.00	20.00	10.00	1.4	NE	28.6	70.6
11:00	5.24	18.81	2.29	0.00	0.00	0.00	0.00	35.00	20.00	13.00	1.4	SSE	28.6	72.2
12:00	0.00	20.69	0.00	9.82	0.00	6.38	0.00	39.00	26.00	12.00	0.8	SE	31.2	71.2
13:00	5.24	24.45	4.58	0.00	0.00	0.00	8.34	38.00	19.00	12.00	1.6	SSE	28.6	72.6
14:00	5.24	24.45	0.00	0.00	6.54	0.00	8.34	35.00	21.00	10.00	1.6	SSE	28.6	72.2
15:00	0.00	31.98	2.29	0.00	6.54	6.38	8.34	39.00	19.00	12.00	1.6	ENE	28.6	72.6
16:00	0.00	26.33	0.00	7.85	0.00	6.38	0.00	35.00	20.00	12.00	1.8	NE	30.1	67.8
17:00	0.00	24.45	0.00	0.00	0.00	0.00	0.00	36.00	23.00	10.00	1.2	SE	29.8	71.3
18:00	0.00	20.69	2.29	0.00	0.00	6.38	0.00	34.00	20.00	10.00	1.5	NE	30.4	69.9
19:00	0.00	24.45	0.00	0.00	6.54	0.00	0.00	32.00	19.00	10.00	1.3	ENE	31.6	70.1
20:00	0.00	20.69	2.29	0.00	6.54	6.38	0.00	35.00	20.00	10.00	1.5	ENE	30.4	69.9
21:00	5.24	22.57	0.00	0.00	0.00	0.00	0.00	34.00	21.00	11.00	1.6	NNE	33.7	67.9
Avg	**1.61**	**23.73**	**1.06**	**1.66**	**2.01**	**2.45**	**1.92**	**35.54**	**20.69**	**11.08**	**1.4**		**30.0**	**70.7**

AQ22 Okerewa N4o 48’17.8’’ E007o 07’ 06.7”														
Time	**SO2**	**NO2**	**CO**	**O3**	**CxHy**	**VOC**	**NH3**	**SPM**	**PM10**	**PM2.5**	**WIND SPD**	**WIND DIR**	**TEMP**	**REL HM**
9:00	5.24	24.45	0.00	0.00	0.00	0.00	0.00	33.00	19.00	10.00	1.3	ENE	31.6	70.1
10:00	0.00	20.69	0.00	0.00	0.00	0.00	0.00	39.00	25.00	10.00	1.5	ENE	30.1	70.6
11:00	0.00	30.10	0.00	0.00	6.54	0.00	0.00	34.00	19.00	11.00	1.5	SSE	30.1	70.6
12:00	0.00	22.57	0.00	3.93	0.00	0.00	1.39	33.00	18.00	10.00	1.3	NE	27.4	74.5
13:00	5.24	26.33	2.29	0.00	1.31	3.19	0.00	37.00	21.00	11.00	1.8	NNE	29.3	70.3
14:00	0.00	22.57	0.00	3.93	6.54	0.00	0.00	34.00	18.00	10.00	1.3	SSE	30.2	69.8
15:00	0.00	24.45	0.00	0.00	0.00	3.19	0.00	39.00	21.00	14.00	1.8	SE	31.3	68.7
16:00	0.00	22.57	0.00	0.00	0.00	6.38	0.00	38.00	22.00	11.00	1.7	NE	30.8	70.3
17:00	0.00	26.33	0.00	3.93	0.00	6.38	0.00	35.00	22.00	11.00	1.7	SSE	29.8	76.4
18:00	5.24	18.81	4.58	0.00	6.54	0.00	1.39	44.00	28.00	10.00	1.2	SSE	30.4	71.4
19:00	5.24	24.45	0.00	0.00	0.00	0.00	0.00	35.00	19.00	10.00	1.3	NE	31.6	70.1
20:00	0.00	20.69	0.00	0.00	0.00	0.00	0.00	37.00	25.00	10.00	1.5	ENE	30.1	70.6
21:00	0.00	30.10	0.00	0.00	0.00	0.00	0.00	33.00	19.00	11.00	1.5	SSE	30.1	70.6
22:00	0.00	26.33	0.00	0.00	6.54	0.00	0.00	32.00	19.00	11.00	1.5	ENE	30.1	70.6
Avg	**1.50**	**24.32**	**0.49**	**0.84**	**1.96**	**1.37**	**0.20**	**35.93**	**21.07**	**10.71**	**1.5**		**30.2**	**71.0**

AQC1 Oyigbo N4o 52'38.9'' E007o 07' 19.0"														
Time	**SO2**	**NO2**	**CO**	**O3**	**CxHy**	**VOC**	**NH3**	**SPM**	**PM10**	**PM2.5**	**WIND SPD**	**WIND DIR**	**TEMP**	**REL HM**
9:00	0.00	20.69	0.00	9.82	6.54	6.38	3.48	44.00	26.00	14.00	0.8	ENE	31.2	71.2
10:00	0.00	22.57	0.00	3.93	0.00	6.38	0.00	39.00	22.00	11.00	1.3	NE	28.4	70.3
11:00	0.00	26.33	0.00	3.93	0.00	6.38	0.00	34.00	22.00	11.00	1.7	SSE	28.4	76.4
12:00	0.00	24.45	4.58	0.00	6.54	0.00	1.39	39.00	28.00	10.00	1.5	SSE	30.4	71.4
13:00	5.24	24.45	4.58	0.00	6.54	0.00	8.34	35.00	19.00	12.00	1.6	NE	28.6	72.6
14:00	0.00	24.45	0.00	0.00	6.54	0.00	8.34	34.00	21.00	10.00	1.2	ENE	28.6	72.2
15:00	0.00	31.98	2.29	0.00	6.54	3.19	8.34	35.00	19.00	12.00	1.6	ENE	28.6	72.6
16:00	0.00	26.33	0.00	7.85	0.00	6.38	0.00	34.00	20.00	12.00	1.3	NE	30.1	67.8
17:00	5.24	22.57	2.29	3.93	0.00	6.38	0.00	35.00	22.00	11.00	1.6	NE	28.4	70.3
18:00	0.00	26.33	0.00	3.93	0.00	6.38	0.00	37.00	22.00	11.00	1.4	SE	28.4	76.4
19:00	0.00	24.45	2.29	0.00	6.54	0.00	0.00	39.00	28.00	10.00	1.2	SSE	31.4	70.4
20:00	5.24	18.81	4.58	0.00	6.54	0.00	1.39	41.00	28.00	10.00	1.2	SSE	30.4	71.4
21:00	5.24	24.45	0.00	0.00	0.00	0.00	0.00	34.00	19.00	10.00	1.3	NE	31.6	70.1
Avg	**1.61**	**24.45**	**1.59**	**2.57**	**3.52**	**3.19**	**2.41**	**36.92**	**22.77**	**11.08**	**1.4**		**29.6**	**71.8**

AQC2 Rumukrushi N4o 50’23.1’’ E007o 03’ 32.6”														
Time	**SO2**	**NO2**	**CO**	**O3**	**CxHy**	**VOC**	**NH3**	**SPM**	**PM10**	**PM2.5**	**WIND SPD**	**WIND DIR**	**TEMP**	**REL HM**
9:00	5.24	22.57	5.73	3.93	6.54	0.00	0.00	36.00	21.00	12.00	1.4	SSE	30.4	70.4
10:00	0.00	24.45	0.00	0.00	0.00	0.00	0.00	38.00	23.00	10.00	1.2	SE	29.8	71.3
11:00	0.00	20.69	2.29	0.00	6.54	6.38	0.00	35.00	20.00	10.00	1.5	NE	30.4	69.9
12:00	0.00	22.57	0.00	3.93	0.00	0.00	1.39	30.00	18.00	10.00	1.3	NE	27.4	74.5
13:00	5.24	26.33	2.29	0.00	1.31	3.19	0.00	35.00	21.00	11.00	1.8	NNE	29.3	70.3
14:00	0.00	22.57	0.00	3.93	6.54	0.00	0.00	30.00	18.00	10.00	1.3	SSE	30.2	69.8
15:00	0.00	20.69	4.58	3.93	6.54	0.00	0.00	36.00	21.00	11.00	1.4	SSE	30.4	69.4
16:00	5.24	22.57	5.73	3.93	6.54	0.00	0.00	35.00	21.00	12.00	1.4	SSE	30.4	70.4
17:00	0.00	24.45	0.00	0.00	0.00	0.00	0.00	38.00	23.00	10.00	1.2	SE	29.8	71.3
18:00	5.24	20.69	2.29	0.00	6.54	6.38	0.00	37.00	20.00	10.00	1.5	NE	30.4	69.9
19:00	0.00	24.45	0.00	0.00	0.00	6.38	0.00	40.00	23.00	12.00	1.8	NE	31.1	71.8
20:00	0.00	22.57	4.58	0.00	6.54	0.00	2.78	35.00	19.00	12.00	1.6	ENE	28.6	72.6
21:00	5.24	24.45	0.00	0.00	0.00	0.00	0.00	33.00	19.00	10.00	1.3	ENE	31.6	70.1
22:00	0.00	20.69	0.00	0.00	0.00	0.00	0.00	38.00	25.00	10.00	1.5	ENE	30.1	70.6
23:00	0.00	20.69	2.29	0.00	6.54	6.38	0.00	32.00	20.00	10.00	1.5	NE	30.4	69.9
Avg	**1.75**	**22.70**	**1.98**	**1.31**	**3.58**	**1.91**	**0.28**	**35.20**	**20.80**	**10.67**	**1.4**		**30.0**	**70.8**

Annexure 4.3

Stack Monitoring

IEFCL-Train1

Flue Gas Emissions from Pack Boiler Stack

1. Date/Time : 19-Oct -2021 / 0830 – 1130 hrs.
2. Flue Gas velocity : 12.12 m/sec
3. Flue Gas temperature : 131.9^{0}C (404.9^{0}K)
4. Ambient Temperature : 32.0^{0}C (305.0^{0}K)
5. Atm. Pressure at sampling point : 747mmHg

Particulate Matter : 2.20mg/Nm3 (Isokinetically sampled, gravimetrically Measured and flue gas volume corrected for 273^{0}K & 1atm)

Monitored values from flue gas analyses

Nitrogen Oxides (ppm) (as NO_2)	Sulphur Oxides (ppm) (as SO_2)	Carbon Monoxide (ppm) (as CO)	Hydrocarbons (ppm) (as CH4)	VOCs (ppm) (as C6H6)	Carbon Dioxide (%) (as CO_2)	Oxygen % (as O_2)
54.60	0.00	0.00	0.00	0.00	9.37	3.37

Corrected values in mg/Nm3 at 273^{0}K, 1atm and 3.0% Oxygen

Nitrogen Oxides (as NO_2) : 94.30 mg/Nm3

SOx, CO, CxHy, VOCs : BDL (<1.00 mg/Nm3)

Flue Gas Emissions from Primary Reformer Stack

1. Date/Time : 19-Oct -2021 / 1300 – 1600 hrs.
2. Flue Gas velocity : 10.96 m/sec
3. Flue Gas temperature : 134.2^{0}C (407.2^{0}K)
4. Ambient Temperature : 35^{0}C (308^{0}K)
5. Atm. Pressure at sampling point : 746mmHg

Particulate Matter : 2.40 mg/Nm3 (Isokinetically sampled, gravimetrically Measured and flue gas volume corrected for 273^{0}K & 1atm) Monitored values from flue gas analyses

Nitrogen Oxides (ppm) (as NO_2)	Sulphur Oxides (ppm) (as SO_2)	Carbon Monoxide (ppm) (as CO)	Hydrocarbons (ppm) (as CH4)	VOCs (ppm) (as C6H6)	Carbon Dioxide (%) (as CO_2)	Oxygen % (as O_2)
48.50	0.00	0.00	0.00	0.00	7.71	3.23

Corrected values in mg/Nm3 at 273^0K, 1atm and 3.0% Oxygen

Nitrogen Oxides (as NO_2) : 83.10 mg/Nm3

SOx, CO, CxHy, VOCs : BDL (<1.00 mg/Nm3)

Flue Gas Emissions from Urea Granulator Stack

1. Date/Time : 20-Oct -2021 xx / 1000 – 1400hrs.
2. Flue Gas velocity : 17.13 m/sec
3. Flue Gas temperature : 55.0^0C (328.0^0K)
4. Ambient Temperature : 32.0^0C (305.0^0K)
5. Atm. Pressure at sampling point : 749mmHg

Monitoring results (mg/Nm3)

(Isokinetically samples and flue gas volume corrected for 273^0K & 1atm)

Particulate Matter (mg/Nm3)	Ammonia (as NH_3) (mg/Nm3)
12.30	45.30

IEFCL-Train2

Flue Gas Emissions from Pack Boiler Stack

1. Date/Time : 21-Oct -2021 / 1000 – 1300 hrs.
2. Flue Gas velocity : 12.08 m/sec
3. Flue Gas temperature : 128.6^{0}C (401.6^{0}K)
4. Ambient Temperature : 32.0^{0}C (305.0^{0}K)
5. Atm. Pressure at sampling point : 747mmHg

Particulate Matter : 2.30mg/Nm3 (Isokinetically sampled, gravimetrically Measured and flue gas volume corrected for 273^{0}K & 1atm)

Monitored values from flue gas analyses

Nitrogen Oxides (ppm) (as NO_2)	Sulphur Oxides (ppm) (as SO_2)	Carbon Monoxide (ppm) (as CO)	Hydrocarbons (ppm) (as CH4)	VOCs (ppm) (as C6H6)	Carbon Dioxide (%) (as CO_2)	Oxygen % (as O_2)
56.70	0.00	0.00	0.00	0.00	8.83	3.54

Corrected values in mg/Nm3 at 273^{0}K, 1atm and 3.0% Oxygen

Nitrogen Oxides (as NO_2) : 98.90 mg/Nm3

SOx, CO, CxHy, VOCs : BDL (<1.00 mg/Nm3)

Flue Gas Emissions from Primary Reformer Stack

1. Date/Time : 21-Oct -2021 / 1500 – 1800 hrs.
2. Flue Gas velocity : 10.99 m/sec
3. Flue Gas temperature : 131.2^{0}C (404.2^{0}K)
4. Ambient Temperature : 34^{0}C (307^{0}K)
5. Atm. Pressure at sampling point : 746mmHg

Particulate Matter : 2.40 mg/Nm3 (Isokinetically sampled, gravimetrically Measured and flue gas volume corrected for 273^{0}K & 1atm)

Monitored values from flue gas analyses

Nitrogen Oxides (ppm) (as NO_2)	Sulphur Oxides (ppm) (as SO_2)	Carbon Monoxide (ppm) (as CO)	Hydrocarbons (ppm) (as CH4)	VOCs (ppm) (as C6H6)	Carbon Dioxide (%) (as CO_2)	Oxygen % (as O_2)
50.40	0.00	0.00	0.00	0.00	7.91	3.64

Corrected values in mg/Nm3 at 273^{0}K, 1atm and 3.0% Oxygen

Nitrogen Oxides (as NO_2) : 88.40 mg/Nm3

SOx, CO, CxHy, VOCs : BDL (<1.00 mg/Nm3)

Flue Gas Emissions from Urea Granulator Stack

1. Date/Time : 22-Oct -2021 / 0800 – 1200hrs.
2. Flue Gas velocity : 17.07 m/sec
3. Flue Gas temperature : 56.0^0C (329.0^0K)
4. Ambient Temperature : 33^0C (306^0K)
5. Atm. Pressure at sampling point : 749mmHg

Monitoring results (mg/Nm3)

(Isokinetically samples and flue gas volume corrected for 273^0K & 1atm)

Particulate Matter (mg/Nm3)	**Ammonia (as NH_3) (mg/Nm3)**
19.30	48.90

Consolidated data for Stack emission monitoring

Source	Plant	Date	Particulate Matter (mg/Nm3)	Nitrogen Oxides (as NO2) (mg/Nm3)	Sulphur Oxides (as SO2) (mg/Nm3)	Ammonia (as NH3) (mg/Nm3)	Remark
Pack Boiler Stack	Train1	19-Oct	2.20	94.30	<1.00	N/A	During stack emission monitoring, the Plants were Operating normal.
	Train2	21-Oct	2.30	98.90	<1.00	N/A	
Ammonia Reformer Stack	Train1	19-Oct	2.40	83.10	<1.00	N/A	
	Train2	21-Oct	2.40	88.40	<1.00	N/A	
Urea Granulator Stack	Train1	20-Oct	12.30	N/A	N/A	45.30	
	Train2	22-Oct	19.30	N/A	N/A	48.90	

Note

1. *The Nitrogen Oxides (NOx), Sulphur Oxides (SOx) and other gaseous pollutants are measured by flue gas analyzer equipped with electrochemical sensors. Ten readings recorded at five minutes interval and final reading is average of these readings.*
2. *PM & Ammonia sampled isokinetically and analyzed gravimetry & titrimetrically respectively.*
3. *The NOx values are corrected for 3% oxygen, 1atm and 273^0K for Pack Boiler and Primary Reformer Stack emissions*
4. *SOx, CO, CxHy & VOCs values were below detection limit (<1.0mg/Nm3).*

Result of Train 1-Package Boiler Stack Monitoring

Number of readings	SOx (PPM)	NO_x PPM)	CO (PPM)	CH_4 PPM	VOCs (PPM)	Temp (^{0}C)	O_2 (%)	CO_2 (%)
1	0.00	55.00	0.00	0.00	0.00	132.3	3.36	9.35
2	0.00	54.00	0.00	0.00	0.00	132.3	3.36	9.34
3	0.00	54.00	0.00	0.00	0.00	132.3	3.37	9.35
4	0.00	55.00	0.00	0.00	0.00	131.2	3.37	9.35
5	0.00	55.00	0.00	0.00	0.00	131.2	3.38	9.35
6	0.00	55.00	0.00	0.00	0.00	132.3	3.37	9.36
7	0.00	55.00	0.00	0.00	0.00	132.3	3.37	9.36
8	0.00	54.00	0.00	0.00	0.00	132.4	3.37	9.36
9	0.00	54.00	0.00	0.00	0.00	131.2	3.37	9.50
10	0.00	55.00	0.00	0.00	0.00	131.1	3.38	9.35
MEAN	0.00	54.60	0.00	0.00	0.00	131.9	3.37	9.37

Result of Train 2-Package Boiler Stack Monitoring

Number of readings	SOx (PPM)	NO_x PPM)	CO (PPM)	CH_4 PPM	VOCs (PPM)	Temp (^{0}C)	O_2 (%)	CO_2 (%)
1	0.00	57.00	0.00	0.00	0.00	128.6	3.55	8.84
2	0.00	57.00	0.00	0.00	0.00	128.8	3.51	8.82
3	0.00	56.00	0.00	0.00	0.00	128.2	3.54	8.84
4	0.00	57.00	0.00	0.00	0.00	128.6	3.55	8.84
5	0.00	57.00	0.00	0.00	0.00	128.6	3.55	8.84
6	0.00	57.00	0.00	0.00	0.00	128.6	3.51	8.84
7	0.00	57.00	0.00	0.00	0.00	128.6	3.56	8.82
8	0.00	57.00	0.00	0.00	0.00	128.8	3.54	8.82
9	0.00	56.00	0.00	0.00	0.00	128.6	3.56	8.84
10	0.00	56.00	0.00	0.00	0.00	128.8	3.55	8.84
MEAN	0.00	56.70	0.00	0.00	0.00	128.6	3.54	8.83

Result of Train-1 Reformer Stack Monitoring

Number of readings	SOx (PPM)	NO_x PPM)	CO (PPM)	CH_4 PPM	VOCs (PPM)	Temp (^{0}C)	O_2 (%)	CO_2 (%)
1	0.00	48.00	0.00	0.00	0.00	134.8	3.23	7.71
2	0.00	49.00	0.00	0.00	0.00	134.6	3.23	7.71
3	0.00	48.00	0.00	0.00	0.00	134.8	3.23	7.72
4	0.00	48.00	0.00	0.00	0.00	134.0	3.22	7.71
5	0.00	48.00	0.00	0.00	0.00	134.2	3.22	7.71
6	0.00	49.00	0.00	0.00	0.00	133.9	3.22	7.71
7	0.00	48.00	0.00	0.00	0.00	133.9	3.23	7.71
8	0.00	49.00	0.00	0.00	0.00	133.8	3.23	7.72
9	0.00	49.00	0.00	0.00	0.00	134.1	3.23	7.72
10	0.00	49.00	0.00	0.00	0.00	133.9	3.22	7.71
MEAN	0.00	48.50	0.00	0.00	0.00	134.2	3.23	7.71

Result of Train-2 Reformer Stack Monitoring

Number of readings	SOx (PPM)	NO_x PPM)	CO (PPM)	CH_4 PPM	VOCs (PPM)	Temp (^{0}C)	O_2 (%)	CO_2 (%)
1	0.00	50.00	0.00	0.00	0.00	130.9	3.63	7.90
2	0.00	50.00	0.00	0.00	0.00	131.1	3.63	7.90
3	0.00	51.00	0.00	0.00	0.00	131.3	3.63	7.90
4	0.00	51.00	0.00	0.00	0.00	131.3	3.63	7.92
5	0.00	51.00	0.00	0.00	0.00	131.4	3.63	7.92
6	0.00	50.00	0.00	0.00	0.00	131.1	3.65	7.92
7	0.00	50.00	0.00	0.00	0.00	131.2	3.65	7.92
8	0.00	50.00	0.00	0.00	0.00	131.2	3.65	7.90
9	0.00	50.00	0.00	0.00	0.00	131.3	3.63	7.90
10	0.00	51.00	0.00	0.00	0.00	131.1	3.63	7.91
MEAN	0.00	50.40	0.00	0.00	0.00	131.2	3.64	7.91

Annexure 4.4

Noise Monitoring

Station Code	Sampling Location	GPS Coordinates		Monitoring Date		Monitoring Duration		Remark or Field Observation, if any
		North (N)	East (E)	Noise (Day)	Noise (Night)	Noise (Day)	Noise (Night)	
X1	West end of the Project site (New Plot)	N4º 50'42.7''	E007o 06' 33.8"	18/10/21	19/10/21	10	60m	Proposed Project with vegetation
X2	North End of the Project Site (New Plot)	N4o 50'38.9''	E007o 06' 37.3"	19/10/21	20/10/21	10	60m	Proposed Project with vegetation
X3	Between North & East End of the Project Site (New Plot)	N4o 50'40.9''	E007o 06' 33.5"	20/10/21	21/10/21	10	60m	Proposed Project with vegetation
X4	East End of the Project Site (New Plot)	N4o 50'17.0''	E007o 06' 32.8"	21/10/21	22/10/21	10	60m	Proposed Project with vegetation
X5	South End of the Project Site (New Plot)	N4o 50'21.2''	E007o 06' 41.0"	22/10/21	23/10/21	10	60m	Proposed Project with vegetation
X6	Centre of the Project Site (New Plot)	N4o 50'25.0''	E007o 06' 46.3"	23/10/21	24/10/21	10	60m	Proposed Project with vegetation
X7	Flare area of Indorama Complex	N4o 50'09.3''	E007o 06' 35.3"	24/10/21	25/10/21	10	60m	Indorama complex with Industrial activity observed
X8	ETP Area of Indorama Complex	N4o 49'32.1''	E007o 06' 26.8"	25/10/21	26/10/21	10	60m	Indorama complex with Industrial activity observed
X9	Down-wind of Urea Warehouse within Indorama Complex	N4o 50'11.5''	E007o 05' 29.3"	26/10/21	27/10/21	10	60m	Indorama complex with Industrial activity observed
X10	Vegetation area towards North of the Project Site (New Plot)	N4o 49'32.1''	E007o 07' 25.6"	27/10/21	28/10/21	9	60m	Proposed Project with vegetation
X11	IRC within Indorama Complex	N4o 50'09.1''	E007o 05' 25.9"	28/10/21	29/10/21	10	60m	West corner of Indorama complex with no industrial activity
X12	Main gate of Indorama Complex (Close to East-West Expressway)	N4o 48'46.4''	E007o 05' 51.9"	29/10/21	30/10/21	10	60m	Close to the Express way with major vehicular movement

Station Code	Sampling Location	GPS Coordinates		Monitoring Date		Monitoring Duration		Remark or Field Observation, if any
		North (N)	East (E)	Noise (Day)	Noise (Night)	Noise (Day)	Noise (Night)	
X13	Agbonchia Community	N4o 48’48.7’’	E007o 07’ 29.8”	30/10/21	31/10/21	10	60m	Minimal vehicular movement observed
X14	Aleto Community	N4o 48’20.1’’	E007o 06’ 19.9”	01/11/21	02/11/21	10	60m	Minimal vehicular movement observed
X15	Akpajo Community	N4o 49’01.8’’	E007o 05’ 39.2”	02/11/21	03/11/21	10	60m	Minimal vehicular movement observed
X16	Elelenwo Community	N4o 51’02.7’’	E007o 04’ 47.7”	03/11/21	04/11/21	10	60m	Closed to road, Minimal vehicular movement observed
X17	Steel Market	N4o 51’46.8’’	E007o 05’ 32.1”	04/11/21	05/11/21	9	60m	Market environment, burning of waste heap observed
X18	Axis of Iriebe Market	N4o 52’15.2’’	E007o 06’ 38.6”	05/11/21	06/11/21	10	60m	Borrow pit waste dump observed
X19	Axis of Iriebe area	N4o 50’11.5’’	E007o 05’ 29.3”	07/11/21	08/11/21	10	60m	Close to the road with minimal vehicular movement
X20	Near Okra Market Iriebe	N4o 50’36.1’’	E007o 07’ 29.6”	08/11/21	09/11/21	8	60m	Waste heap observed
X21	Nguru Community	N4o 48’17.4’’	E007o 07’07.4”	09/11/21	10/11/21	10	60m	Minimal vehicular movement observed within the community
X22	Okerewa Community	N4o 48’17.8’’	E007o 07’ 06.7”	10/11/21	11/11/21	10	60m	Minimal vehicular movement observed within the community
CX1	GSS - Oyigbo	N4o 52’38.9’’	E007o 07’ 19.0”	11/11/21	12/11/21	10	60m	Vehicular movement observed
CX2	Rumukrushi	N4o 50’23.1’’	E007o 03’ 32.6”	12/11/21	13/11/21	10	60m	Close to the road with major Vehicular movement observed

Day - Noise Leq dB(A)

NL1		NL2		NL3		NL4		NL5		NL6		NL7		NL8		NL9		NL10	
Time	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**
9:00	54.7	9:00	51.7	9:00	50.5	9:00	63.1	9:00	59.1	9:00	50.6	9:00	64.3	9:00	57.2	9:00	57.3	9:00	51.5
10:00	54.9	10:00	52.4	10:00	51.2	10:00	62.5	10:00	57.2	10:00	52.6	10:00	65.3	10:00	54.6	10:00	55.8	10:00	51.2
11:00	53.8	11:00	51.2	11:00	52.7	11:00	64.2	11:00	54.3	11:00	51.6	11:00	60.8	11:00	58.9	11:00	58.3	11:00	50.6
12:00	54.5	12:00	50.9	12:00	50.1	12:00	63.2	12:00	59.5	12:00	51.8	12:00	66.3	12:00	56.3	12:00	56.3	12:00	50.7
13:00	55.2	13:00	52.6	13:00	50.4	13:00	63.8	13:00	58.9	13:00	52.3	13:00	63.2	13:00	57.2	13:00	55.6	13:00	50.8
14:00	52.3	14:00	53.7	14:00	50.9	14:00	63.5	14:00	56.3	14:00	53.6	14:00	62.3	14:00	57.9	14:00	57.3	14:00	51.6
15:00	53.8	15:00	54.6	15:00	54.9	15:00	64.3	15:00	58.9	15:00	51.8	15:00	63.2	15:00	56.7	15:00	56.3	15:00	52.3
16:00	54.2	16:00	59.3	16:00	52.3	16:00	63.8	16:00	57.3	16:00	50.8	16:00	60.8	16:00	56.8	16:00	56.4	16:00	51.2
17:00	54.5	17:00	52.6	17:00	52.1	17:00	62.8	17:00	58.7	17:00	51.6	17:00	61.5	17:00	58.3	17:00	56.8	17:00	52.2
18:00	53.5	18:00	53.2	18:00	51.3	18:00	62.9	18:00	58.6	18:00	52.3	18:00	63.8	18:00	57.2	18:00	57.2		
						19:00	62.7	19:00	59.2			19:00	63.7	19:00	55.6	19:00	57.1		
												20:00	60.9	20:00	56.9	20:00	58.2		
Min	**52.3**		**50.9**		**50.1**		**62.5**		**54.3**		**50.6**		**60.8**		**54.6**		**55.6**		**50.6**
Max	**55.2**		**59.3**		**54.9**		**64.3**		**59.5**		**53.6**		**66.3**		**58.9**		**58.3**		**52.3**
Avg	**54.2**		**53.6**		**51.8**		**63.4**		**58.1**		**51.9**		**63.2**		**57.0**		**56.9**		**51.4**

Day - Noise Leq dB(A)

NL11		NL12		NL13		NL14		NL15		NL16		NL17		NL18		NL19		NL20	
Time	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**
9:00	53.4	9:00	69.8	9:00	59.3	9:00	53.9	9:00	64.6	9:00	57.6	9:00	69.9	9:00	72.4	9:00	52.3	9:00	54.3
10:00	53.6	10:00	70.2	10:00	60.4	10:00	54.7	10:00	63.5	10:00	57.3	10:00	70.3	10:00	70.2	10:00	50.2	10:00	52.3
11:00	54.3	11:00	58.9	11:00	59.4	11:00	42.6	11:00	62.8	11:00	57.6	11:00	67.8	11:00	71.2	11:00	53.2	11:00	53.6
12:00	53.2	12:00	60.7	12:00	59.3	12:00	52.3	12:00	64.3	12:00	55.6	12:00	68.2	12:00	72.3	12:00	53.5	12:00	54.2
13:00	52.4	13:00	68.7	13:00	57.8	13:00	54.3	13:00	63.8	13:00	56.3	13:00	67.5	13:00	71.3	13:00	52.3	13:00	54.6
14:00	52.6	14:00	69.5	14:00	56.8	14:00	49.6	14:00	64.5	14:00	57.8	14:00	64.8	14:00	72.6	14:00	53.4	14:00	52.3
15:00	50.8	15:00	67.5	15:00	58.6	15:00	50.6	15:00	64.3	15:00	56.2	15:00	67.2	15:00	72.5	15:00	52.6	15:00	52.8
16:00	51.6	16:00	68.3	16:00	58.2	16:00	53.6	16:00	62.8	16:00	58.2	16:00	66.8	16:00	72.8	16:00	50.2	16:00	53.6
17:00	52.3	17:00	67.5	17:00	59.8	17:00	51.3	17:00	64.3	17:00	56.4	17:00	67.2	17:00	70.6	17:00	50.4		
18:00	53.2	18:00	65.8	18:00	58.7	18:00	50.8	18:00	64.3	18:00	56.5			18:00	71.6	18:00	50.9		
19:00	54.2	19:00	68.4	19:00	59.8	19:00	53.2	19:00	60.9	19:00	54.6			19:00	70.6	19:00	51.6		
20:00	53.2	20:00	66.7	20:00	56.8	20:00	54.2	20:00	63.4	20:00	54.9					20:00	52.4		
Min	**50.8**		**58.9**		**56.8**		**42.6**		**60.9**		**54.6**		**64.8**		**70.2**		**50.2**		**52.3**
Max	**54.3**		**70.2**		**60.4**		**54.7**		**64.6**		**58.2**		**70.3**		**72.8**		**53.5**		**54.6**
Avg	**53.0**		**67.4**		**58.8**		**52.2**		**63.7**		**56.7**		**67.9**		**71.7**		**52.0**		**53.5**

Day - Noise Leq dB(A)

NL21		NL22		NLC1		NLC2	
Time	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**
9:00	57.4	9:00	54.4	9:00	62.6	9:00	65.8
10:00	55.6	10:00	55.3	10:00	62.3	10:00	64.5
11:00	57.8	11:00	54.6	11:00	62.4	11:00	63.6
12:00	55.9	12:00	53.6	12:00	65.3	12:00	64.5
13:00	58.3	13:00	52.6	13:00	63.5	13:00	65.2
14:00	56.7	14:00	54.3	14:00	64.2	14:00	64.8
15:00	57.2	15:00	54.4	15:00	63.3	15:00	66.2
16:00	56.4	16:00	54.3	16:00	64.2	16:00	65.7
17:00	57.3	17:00	53.6	17:00	63.5	17:00	65.3
18:00	56.4	18:00	56.4	18:00	62.5	18:00	64.6
19:00	57.6	19:00	57.5	19:00	64.3	19:00	65.5
20:00	57.3	20:00	53.8	20:00	64.2	20:00	65.8
Min	**55.6**		**52.6**		**62.3**		**63.6**
Max	**58.3**		**57.5**		**65.3**		**66.2**
Avg	**57.0**		**54.7**		**63.6**		**65.2**

Night - Noise Leq dB(A)

NL1		NL2		NL3		NL4		NL5		NL6		NL7		NL8		NL9		NL10	
Time	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**
05:05	51.7	05:05	48.2	05:05	47.8	05:05	54.7	05:05	55.4	05:05	44.1	04:35	60.5	04:20	56.9	03:05	55.3	05:35	45.0
05:10	51.5	05:10	48.5	05:10	46.5	05:10	53.5	05:10	52.4	05:10	44.2	04:40	61.5	04:25	55.6	03:10	54.2	05:40	44.5
05:15	51.8	05:15	49.9	05:15	46.9	05:15	53.8	05:15	54.2	05:15	43.6	04:45	62.3	04:30	56.3	03:15	55.3	05:45	44.3
05:20	52.1	05:20	48.2	05:20	46.6	05:20	54.5	05:20	52.6	05:20	42.6	04:50	60.4	04:35	56.8	03:20	52.6	05:50	44.8
05:25	52.2	05:25	48.9	05:25	48.3	05:25	55.2	05:25	55.6	05:25	43.7	04:55	62.5	04:40	56.7	03:25	54.2	05:45	45.6
05:30	51.6	05:30	49.2	05:30	47.5	05:30	53.6	05:30	53.7	05:30	44.3	05:00	61.7	04:45	55.8	03:30	52.4	06:00	44.7
05:35	51.8	05:35	49.4	05:35	48.6	05:35	56.8	05:35	57.8	05:35	44.2	05:05	63.5	04:50	55.7	03:35	55.3	06:05	45.6
05:40	52.9	05:40	48.8	05:40	47.2	05:40	57.2	05:40	54.3	05:40	43.6	05:10	62.5	04:55	56.3	03:40	55.6	06:10	45.8
05:45	52.5	05:45	48.6	05:45	47.1	05:45	54.5	05:45	52.6	05:45	43.7	05:15	61.5	05:00	56.8	03:45	56.2	06:15	44.6
05:50	51.8	05:50	48.9	05:50	46.9	05:50	53.8	05:50	53.8	05:50	44.2	05:20	62.8	05:05	54.8	03:50	54.5	06:20	44.7
05:45	52.2	05:45	49.3	05:45	47.0	05:45	54.2	05:45	55.9	05:45	44.3	05:25	60.8	05:10	56.3	03:55	54.5	06:25	43.6
06:00	51.6	06:00	48.9	06:00	47.3	06:00	53.6	06:00	54.8	06:00	43.5	05:30	60.7	05:15	57.2	04:00	55.8	06:30	44.6
Min	**51.5**		**48.2**		**46.5**		**53.5**		**52.4**		**42.6**		**60.4**		**54.8**		**52.4**		**43.6**
Max	**52.9**		**49.9**		**48.6**		**57.2**		**57.8**		**44.3**		**63.5**		**57.2**		**56.2**		**45.8**
Avg	**52.0**		**48.9**		**47.3**		**54.7**		**54.6**		**43.8**		**61.8**		**56.3**		**54.7**		**44.8**

Night - Noise Leq dB(A)

NL11		NL12		NL13		NL14		NL15		NL16		NL17		NL18		NL19		NL20	
Time	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**
02:05	42.5	03:05	67.9	04:35	48.6	05:05	48.4	05:20	54.4	04:50	54.1	05:35	60.4	05:05	64.7	04:35	50.6	05:20	43.5
02:10	43.2	03:10	66.7	04:40	47.9	05:10	47.3	05:25	55.2	04:55	53.2	05:40	60.5	05:10	65.2	04:40	50.7	05:25	44.0
02:15	44.2	03:15	67.3	04:45	45.9	05:15	47.6	05:30	58.3	05:00	52.8	05:45	57.2	05:15	64.5	04:45	51.6	05:30	43.6
02:20	44.5	03:20	64.5	04:50	45.4	05:20	45.6	05:35	56.7	05:05	54.9	05:50	61.5	05:20	64.3	04:50	54.3	05:35	42.6
02:25	44.8	03:25	68.2	04:55	48.8	05:25	47.3	05:40	54.2	05:10	52.5	05:45	59.8	05:25	64.8	04:55	50.6	05:40	43.5
02:30	43.6	03:30	67.3	05:00	50.3	05:30	48.2	05:45	56.9	05:15	53.1	06:00	58.7	05:30	65.4	05:00	50.5	05:45	44.6
02:35	44.5	03:35	68.2	05:05	48.9	05:35	48.7	05:50	56.6	05:20	53.8	06:05	59.6	05:35	65.7	05:05	51.2	05:50	42.5
02:40	43.6	03:40	67.2	05:10	48.9	05:40	49.2	05:45	54.9	05:25	55.1	06:10	58.4	05:40	64.8	05:10	52.6	05:45	43.8
02:45	44.5	03:45	68.2	05:15	49.2	05:45	50.8	06:00	53.8	05:30	51.1	06:15	59.6	05:45	64.6	05:15	51.4	06:00	42.6
02:50	42.6	03:50	67.2	05:20	50.7	05:50	47.8	06:05	55.9	05:35	54.8	06:20	60.8	05:50	65.4	05:20	50.8	06:05	43.8
02:55	43.6	03:55	67.2	05:25	49.8	05:45	48.3	06:10	55.2	05:40	52.7	06:25	60.7	05:45	64.8	05:25	50.7	06:10	44.3
03:00	43.5	04:00	66.8	05:30	52.7	06:00	48.7	06:15	54.1	05:45	51.8	06:30	61.8	06:00	64.7	05:30	52.6	06:15	42.7
Min	**42.5**		**64.5**		**45.4**		**45.6**		**53.8**		**51.1**		**57.2**		**64.3**		**50.5**		**42.5**
Max	**44.8**		**68.2**		**52.7**		**50.8**		**58.3**		**55.1**		**61.8**		**65.7**		**54.3**		**44.6**
Avg	**43.8**		**67.3**		**49.1**		**48.2**		**55.6**		**53.4**		**60.0**		**64.9**		**51.5**		**43.5**

Night - Noise Leq dB(A)

NL21		NL22		NLC1		NLC2	
Time	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**	**Time**	**dB(A)**
04:50	44.3	04:35	42.6	05:35	44.8	05:05	63.9
04:55	43.6	04:40	43.6	05:40	43.8	05:10	62.6
05:00	42.6	04:45	42.6	05:45	44.6	05:15	63.2
05:05	43.6	04:50	42.7	05:50	46.6	05:20	64.2
05:10	44.5	04:55	43.2	05:45	44.6	05:25	63.5
05:15	45.6	05:00	43.6	06:00	45.6	05:30	63.7
05:20	45.8	05:05	42.8	06:05	45.6	05:35	62.8
05:25	45.6	05:10	42.7	06:10	42.5	05:40	62.7
05:30	43.6	05:15	43.6	06:15	45.6	05:45	63.2
05:35	45.2	05:20	42.5	06:20	44.5	05:50	63.4
05:40	44.6	05:25	43.5	06:25	44.3	05:45	65.2
05:45	42.6	05:30	42.8	06:30	44.2	06:00	64.5
Min	**42.6**		**42.5**		**42.5**		**62.6**
Max	**45.8**		**43.6**		**46.6**		**65.2**
Avg	**44.4**		**43.0**		**44.8**		**63.6**

Annexure 4.5

Soil Quality Results

Topsoil (0 – 15cm)

Parameters	SS 1T	SS 2T	SS 3T	SS 4T	SS 5T	SS 6T	SS 7T	SS 8T	SS 9T	SS 10T	SS 11T
pH	4.89	3.61	3.86	3.75	3.89	3.56	3.2	3.38	3.1	3.52	4.95
Sulphide, S2- (mg/kg)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sulphate, SO42- (mg/kg)	2	3	5	4	0	1	4	0	0	2	2
Nitrate, NO3- (mg/kg)	0.1	0.8	1.7	1.3	<0.01	0.3	1.3	<0.01	0.1	0.5	0.7
Phosphate, PO43- (mg/kg)	0.13	0.69	0.96	0.76	0.08	0.2	0.75	0.03	0.03	0.32	0.6
THC (mg/kg)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	10.4	<0.01
Color	Brownish	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Brownish	Brownish	Dark Brown	Brown
Permeability (cm/sec)	0.14	0.17	0.14	0.17	0.16	0.17	0.16	0.15	0.14	0.14	0.14
Moisture Content (%)	15.12	18.25	18.98	16.75	17.82	17.45	15.58	17.53	17.25	20.83	21.28
Porosity	0.39	0.398	0.41	0.406	0.396	0.389	0.402	0.406	0.387	0.397	0.4
Bulk Density (g/cm3)	1.38	1.51	1.15	1.18	1.28	1.51	1.35	1.27	1.25	1.35	1.15
Sand (%)	79.69	81.66	86.14	84.65	81.23	78.82	83.45	84.76	77.83	81.34	84.46
Silt (%)	3.51	2.94	1.58	1.55	3.97	4.36	2.27	2.41	5.85	5.01	1.79
Clay (%)	16.8	15.4	12.28	13.8	14.8	16.82	14.28	12.83	16.32	13.65	13.25
PSD	SL	SL	LS	LS	LS	SL	LS	LS	SL	LS	LS
Manganese, Mn (mg/kg)	129	130.23	128.03	127.02	90.9	35.52	17	8.51	9.73	12.21	9.47
Vanadium, V (mg/kg)	<0.001	<0.001	<0.001	0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.06
Nickel, Ni (mg/kg)	<0.001	<0.001	0.09	0.33	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	1.16
Chromium, Cr (mg/kg)	6.18	3.68	4.15	2.25	1.92	2.06	2.39	3.42	2.11	2.53	3.58
Iron, Fe (mg/kg)	3,711.80	3,436.50	3,602.70	2,901.90	2,032.20	2,242.10	2,167.40	1,665.10	3,874.00	2,755.60	2,975.60
Lead, Pb (mg/kg)	41.64	1.79	<0.001	<0.001	<0.001	0.51	1.15	0.57	<0.001	<0.001	3.37
Copper, Cu (mg/kg)	19.51	4.29	2.21	4.06	3.15	1.73	2.33	0.22	2.17	3.27	4.16
Zinc, Zn (mg/kg)	7.34	9.88	8.27	8.27	3.41	4.11	4.67	2.83	2.84	6.65	5.85

Parameters	SS 1T	SS 2T	SS 3T	SS 4T	SS 5T	SS 6T	SS 7T	SS 8T	SS 9T	SS 10T	SS 11T
Mercury, Hg (mg/kg)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic, As (mg/kg)	0.18	0.04	0.02	0.04	0.03	0.02	0.02	<0.01	0.02	0.03	0.07
THB (CFU/g)	1.3 ×106	2.9 ×105	1.3 ×106	3.8 ×105	1.5 ×106	4.3 ×105	3.6 ×105	2.4 ×106	3.8 ×105	3.1 ×106	3.4 ×105
THF (CFU/g)	0.8 ×106	1.0 ×105	1.6 ×106	1.6 ×105	0.5 ×106	1.2 ×105	1.5 ×105	0.3 ×106	1.2 ×105	1.0 ×105	1.1 ×105
HUB (CFU/g) x 103	0.8	0.4	0.3	0.6	0.8	0.8	0.7	0.4	0.6	0.7	0.6
HUF (CFU/g) x 103	0.5	0.2	0.1	0.3	0.5	0.4	0.5	0.2	0.2	0.4	0.2

Topsoil (0 – 15cm)

Parameters	SS 12T	SS 13T	SS 14T	SS 15T	SS 16T	SS 17T	SS 18T	SS 19T	SS 20T	SS 21T	SS 22T
pH	4.48	4.06	3.22	4.96	5.4	4.98	3.73	4.59	5.33	4.16	5.51
Sulphide, S2- (mg/kg)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sulphate, SO42- (mg/kg)	2	0	1	2	2	1	2	2	1	0	1
Nitrate, NO3- (mg/kg)	0.5	0.1	0.1	0.7	0.8	0.3	0.1	0.5	0.2	<0.01	<0.01
Phosphate, PO43- (mg/kg)	0.42	0.17	0.05	0.62	0.65	0.19	0.08	0.35	0.15	0.03	0.05
THC (mg/kg)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	38.43	<0.01	<0.01
Color	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Brown	Brown	Dark Brown	Dark Brown	Black	Dark Brown	Dark Brown
Permeability (cm/sec)	0.18	0.16	0.18	0.15	0.16	0.17	0.15	0.14	0.16	0.14	0.16
Moisture Content (%)	18.81	22.07	15.3	18.08	17.87	25.14	17.68	19.27	18.65	17.27	17.25
Porosity	0.398	0.395	0.391	0.396	0.404	0.39	0.396	0.404	0.395	0.396	0.382
Bulk Density (g/cm3)	1.19	1.32	1.52	1.28	1.15	1.62	1.54	1.18	1.28	1.42	1.23
Sand (%)	83.68	80.65	79.64	81.69	86.24	78.24	82.46	86.44	82.4	84.68	76.75
Silt (%)	2.95	4.52	5.08	4.06	3.3	5.53	4.92	2.29	2.85	2.48	8.18
Clay (%)	13.37	14.83	15.28	14.25	10.46	16.24	12.82	11.27	14.75	12.84	15.07
PSD	LS	LS	SL	LS	LS	SL	LS	LS	LS	LS	SL
Manganese, Mn (mg/kg)	7.73	15.1	26.05	108.21	141.72	127.97	95.58	118.95	57.67	22.55	43.09
Vanadium, V (mg/kg)	<0.001	<0.001	<0.001	0.19	0.84	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel, Ni (mg/kg)	<0.001	<0.001	<0.001	4.09	17.61	<0.001	<0.001	<0.001	0.13	<0.001	<0.001
Chromium, Cr (mg/kg)	0.16	3.19	2.8	8.36	8.56	1.59	1.44	0.38	3.43	<0.001	0.67
Iron, Fe (mg/kg)	1,088.00	2,403.30	2,498.90	4,295.50	3,611.70	1,691.40	1,944.50	1,480.60	2,071.10	1,081.40	1,270.80
Lead, Pb (mg/kg)	<0.001	5.05	5.16	15.65	3.88	11.1	<0.001	0.54	14.52	8.92	<0.001
Copper, Cu (mg/kg)	1.17	1.68	0.91	10.52	115.29	6.89	3.46	4.84	3.82	0.9	1.04
Zinc, Zn (mg/kg)	5.16	4.06	3.92	34.93	100.35	63.73	13.76	31.02	29.96	5.52	5.94
Mercury, Hg (mg/kg)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic, As (mg/kg)	0.01	0.02	0.01	0.1	1.06	0.06	0.03	0.04	0.03	0.01	0.01
THB (CFU/g)	2.8 ×105	2.3 ×106	3.8 ×105	2.9 ×106	4.2 ×105	2.5 ×106	4.0 ×105	2.4 ×105	1.8 ×106	3.6 ×105	2.8 ×106
THF (CFU/g)	0.8 ×105	0.1 ×106	0.4 ×106	1.5 ×106	1.2 ×105	1.7 ×106	2.0 ×105	1.3 ×105	0.7 ×106	2.6 ×105	1.2 ×106
HUB (CFU/g) x 103	0.3	0.2	0.8	1.1	0.9	0.9	0.8	0.6	1.1	0.5	0.6
HUF (CFU/g) x 103	NIL	0.1	0.4	0.6	0.5	1	0.6	0.3	0.4	0.2	0.2

Topsoil (0 – 15cm)

Parameters	SSC 1T	SSC 2T
pH	5.45	4.62
Sulphide, S2- (mg/kg)	<0.01	<0.01
Sulphate, SO42- (mg/kg)	0	1
Nitrate, NO3- (mg/kg)	<0.01	0.1
Phosphate, PO43- (mg/kg)	0.04	0.03
THC (mg/kg)	0.25	0.2
Color	12.3	<0.01
Permeability (cm/sec)	Dark Brown	Dark Brown
Moisture Content (%)	0.14	0.15
Porosity	17.56	13.46
Bulk Density (g/cm3)	0.405	0.399
Sand (%)	1.51	1.4
Silt (%)	84.5	82.46
Clay (%)	1.35	2.04
PSD	14.15	15.5
Manganese, Mn (mg/kg)	LS	SL
Vanadium, V (mg/kg)	64.13	46.37
Nickel, Ni (mg/kg)	<0.001	<0.001
Chromium, Cr (mg/kg)	<0.001	<0.001
Iron, Fe (mg/kg)	6.79	3.79
Lead, Pb (mg/kg)	2,946.90	2,277.00
Copper, Cu (mg/kg)	4.79	<0.001
Zinc, Zn (mg/kg)	4.59	1.96
Mercury, Hg (mg/kg)	26.04	3.05
Arsenic, As (mg/kg)	<0.001	<0.001
THB (CFU/g)	0.04	0.02
THF (CFU/g)	3.2 ×105	1.6 ×106
HUB (CFU/g) x 103	1.7 ×105	1.1 ×106
HUF (CFU/g) x 103	0.8	0.5

Subsoil (15-30cm)

Parameters	SS 1B	SS 2B	SS 3B	SS 4B	SS 5B	SS 6B	SS 7B	SS 8B	SS 9B	SS 10B	SS 11B
pH	5.12	3.72	3.95	3.86	3.87	3.75	4.1	4.25	3.67	3.67	4.25
Sulphide, S2- (mg/kg)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sulphate, SO42- (mg/kg)	1	2	3	2	0	1	3	0	0	2	2
Nitrate, NO3- (mg/kg)	0.1	0.4	0.8	0.5	<0.01	0.3	1	<0.01	0.1	0.3	0.5
Phosphate, PO43- (mg/kg)	0.15	0.46	0.72	0.42	0.07	0.16	0.68	0.02	0.03	0.25	0.45
THC (mg/kg)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	4.25	<0.01
Color	Brownish	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Brownish	Dark Brown	Brown
Permeability (cm/sec)	0.15	0.16	0.15	0.17	0.15	0.16	0.17	0.15	0.13	0.15	0.15
Moisture Content (%)	17.5	21.75	17.45	16.86	21.8	16.83	16.8	16.68	21.42	18.95	11.76
Porosity	0.389	0.395	0.408	0.408	0.389	0.41	0.41	0.392	0.385	0.395	0.396
Bulk Density (g/cm3)	1.42	1.4	1.25	1.17	1.4	1.43	1.4	1.34	1.3	1.3	1.27
Sand (%)	78.84	80.16	85.1	85.24	78.16	86.28	86.66	79.82	76.42	80.26	81.1
Silt (%)	3.36	4.16	2.48	2.08	5	1.47	1.59	5.76	6.75	4.26	4.32
Clay (%)	17.8	15.68	12.42	12.68	16.84	12.25	11.75	14.42	17.83	15.48	14.58
PSD	SL	SL	LS	LS	SL	LS	LS	LS	SL	LS	LS
Manganese, Mn (mg/kg)	119.12	59.39	61.44	129.91	120.81	40.71	7.27	6.72	8.43	11.41	6.03
Vanadium, V (mg/kg)	0.04	<0.001	<0.001	0.06	<0.001	<0.001	<0.001	<0.001	0.02	<0.001	0.09
Nickel, Ni (mg/kg)	0.87	<0.001	<0.001	1.19	<0.001	0.06	<0.001	<0.001	0.49	<0.001	0.86
Chromium, Cr (mg/kg)	6.44	5.3	3.13	4.07	1.46	4.51	2.14	2.79	1.19	2.08	2.23
Iron, Fe (mg/kg)	4,086.90	4,219.70	3,599.80	3,535.70	1,788.60	3,477.90	2,004.20	1,371.10	3,875.20	2,755.60	2,144.00
Lead, Pb (mg/kg)	<0.001	0.3	<0.001	<0.001	2.26	19.39	<0.001	<0.001	0.3	6.67	2.68
Copper, Cu (mg/kg)	5.16	3.47	2.56	3.88	2.01	10.24	2.58	0.2	1.21	3.06	3.33
Zinc, Zn (mg/kg)	7.59	8.46	2.28	5.62	6.68	3.99	6.35	1.78	2.03	5.38	4.98
Mercury, Hg (mg/kg)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic, As (mg/kg)	0.05	0.03	0.02	0.04	0.03	0.09	0.02	<0.01	0.03	0.03	0.03
THB (CFU/g)	2.1 ×105	1.8 ×105	2.0 ×105	2.8 ×105	3.3 ×105	3.0 ×105	2.7 ×105	1.7 ×106	2.7 ×105	2.3 ×105	2.0 ×105
THF (CFU/g)	1.3 ×105	0.4 ×105	1.0 ×105	1.1 ×105	0.7 ×105	0.9 ×105	0.6 ×105	0.9 ×105	0.2 ×106	0.2 ×105	0.7 ×105
HUB (CFU/g) x 103	0.6	0.3	0.1	0.4	0.6	0.6	0.3	0.3	0.1	0.3	0.4
HUF (CFU/g) x 103	0.2	0.1	NIL	0.2	0.2	0.4	0.1	0.1	NIL	0.1	0.2

Subsoil (15-30cm)

Parameters	SS 12B	SS 13B	SS 14B	SS 15B	SS 16B	SS 17B	SS 18B	SS 19B	SS 20B	SS 21B	SS 22B
pH	4.95	4.68	4.58	4.25	5.27	4.86	3.96	4.88	5.42	4.34	5.42
Sulphide, S2- (mg/kg)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sulphate, SO42- (mg/kg)	1	0	1	1	2	1	2	0	0	1	0
Nitrate, NO3- (mg/kg)	0.3	<0.01	0.2	0.5	0.6	0.2	0.2	0.3	0.3	<0.01	<0.01
Phosphate, PO43- (mg/kg)	0.27	0.03	0.08	0.46	0.52	0.17	0.08	0.28	0.12	0.03	0.04
THC (mg/kg)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	25.14	<0.01	<0.01
Color	Dark Brown	Dark Brown	Brown	Dark Brown	Brown	Brown	Dark Brown	Brown	Black	Dark Brown	Dark Brown
Permeability (cm/sec)	0.1	0.17	0.16	0.14	0.15	0.16	0.15	0.15	0.15	0.14	0.15
Moisture Content (%)	19.27	17.63	14.27	10.3	21.28	16.95	21.28	18.07	20.24	18.28	16.39
Porosity	0.391	0.388	0.386	0.396	0.392	0.372	0.395	0.396	0.395	0.396	0.38
Bulk Density (g/cm3)	1.27	1.16	1.43	1.32	1.27	1.43	1.27	1.42	1.31	1.18	1.34
Sand (%)	79.69	78.68	77.43	82.34	83.1	75.69	80.76	82.48	80.32	81.25	76.45
Silt (%)	4.68	5.89	5.33	3.18	4.14	7.06	4.78	3.98	4.85	3.91	7.27
Clay (%)	15.63	15.43	17.24	14.48	12.76	17.25	14.46	13.54	14.83	14.84	16.28
PSD	SL	SL	SL	LS	LS	SL	LS	LS	LS	LS	SL
Manganese, Mn (mg/kg)	6.68	15.42	15.27	26.26	145.68	134.41	91.44	130.41	63.33	18.9	21.57
Vanadium, V (mg/kg)	<0.001	<0.001	0.12	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.05
Nickel, Ni (mg/kg)	<0.001	0.09	2.53	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.95
Chromium, Cr (mg/kg)	1.1	2.62	13.34	4.89	5.42	2.61	1.06	2.09	2.42	3.94	1.56
Iron, Fe (mg/kg)	1,453.70	2,389.40	3,715.10	3,529.20	3,339.10	1,811.90	1,791.60	1,906.90	2,108.00	2,536.50	1,361.50
Lead, Pb (mg/kg)	<0.001	<0.001	<0.001	3.54	<0.001	5.05	1.82	0.69	<0.001	<0.001	2.35
Copper, Cu (mg/kg)	0.85	1.52	1.24	4.02	4.74	2.33	3.77	23.41	2.07	1.24	1.24
Zinc, Zn (mg/kg)	4.65	2.38	3.99	7.61	10.39	54.53	10.11	41.59	7.25	2.74	3.22
Mercury, Hg (mg/kg)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic, As (mg/kg)	0.02	0.01	0.01	0.04	0.04	0.02	0.03	0.22	0.02	0.01	0.01
THB (CFU/g)	1.5 ×105	1.9 ×105	2.6 ×105	1.0 ×106	3.3 ×105	1.6 ×106	2.7 ×105	1.0 ×105	2.3 ×105	2.0 ×105	2.2 ×105
THF (CFU/g)	0.4 ×105	0.8 ×105	1.0 ×105	0.3 ×106	0.5 ×105	1.0 ×106	0.6 ×105	0.8 ×105	0.3 ×106	1.1 ×105	0.8 ×105
HUB (CFU/g) x 103	0.1	0.1	0.3	0.7	0.6	0.7	0.4	0.2	0.6	0.3	0.2
HUF (CFU/g) x 103	NIL	NIL	0.1	0.3	0.3	0.6	0.2	0.1	0.1	0.1	NIL

Subsoil (15-30cm)

Parameters	SSC 1B	SSC 2B
pH	4.95	5.01
Sulphide, S2- (mg/kg)	<0.01	<0.01
Sulphate, SO42- (mg/kg)	0	0
Nitrate, NO3- (mg/kg)	<0.01	0.1
Phosphate, PO43- (mg/kg)	0.03	0.04
THC (mg/kg)	0.1	0.12
Color	7.65	<0.01
Permeability (cm/sec)	Dark Brown	Dark Brown
Moisture Content (%)	0.15	0.16
Porosity	15.26	14.38
Bulk Density (g/cm3)	0.397	0.395
Sand (%)	1.43	1.35
Silt (%)	81.68	80.78
Clay (%)	2.64	3.24
PSD	15.68	15.98
Manganese, Mn (mg/kg)	SL	SL
Vanadium, V (mg/kg)	66.6	12.35
Nickel, Ni (mg/kg)	<0.001	<0.001
Chromium, Cr (mg/kg)	<0.001	<0.001
Iron, Fe (mg/kg)	7.34	2.97
Lead, Pb (mg/kg)	2,835.40	1,197.80
Copper, Cu (mg/kg)	2.76	57.38
Zinc, Zn (mg/kg)	4.35	25.11
Mercury, Hg (mg/kg)	28.35	3.07
Arsenic, As (mg/kg)	<0.001	<0.001
THB (CFU/g)	0.04	0.23
THF (CFU/g)	2.1 ×105	1.0 ×106
HUB (CFU/g) x 103	0.6 ×105	1.4 ×105
HUF (CFU/g) x 103	0.4	0.3

Annexure 4.6

SIA/HIA Questionnaire

QUESTIONNAIRE FOR SOCIO-ECONOMIC AND HEALTH IMPACT ASSESSEMENT

SECTION A: DEMOGRAPHY
PLEASE TICK AS APPROPRIATE

LOCATION----------

Name of community:----------

Local Government Area:----------

FAMILY PROFILE

Name of Respondent----------

Position in Household----------

Age of Respondent

GENDER	MALE	FEMALE	Below 25	25 - 35	35 - 54	54 & above

MARITAL STATUS: Married	Single	Divorced	Widowed	separated
Educational Status	No Formal	Primary	Post Secondary	Secondary
Technical Skill	None	Formal	Apprentice	Craft school)
Number of Persons in household	Below 5	5 – 10	Above 10	
How many children do you have	Below 5	5 – 10	Above 10	
Number of household employed	Below 5	5 – 10	Above 10	
Type of employment	: Self	Government	Private	Others
What is your primary source of income				

SECTION B: **ECONOMIC PROFILE**

SN	**LIVELIHOOD**			
1	What is your source of livelihood?	Farming Trading	Hunting office work	Others
2	What is your estimated monthly income?	Less than N10,000	N10,000 – N50,000	Above N50,000
3	Do you have a vocational skill set?			
4	If No are you willing to acquire a skill?			
5	If YES please indicate the type of skill you desire to acquire			

STANDARD OF LIVING

6	Can you rank in order of importance the major items on which you spend your monthly income?	Food Rent/maintenance	Furniture Health	Entertainment/recreation Transportation

7	Are you satisfied with your present level of income?	Satisfied	Dissatisfied	Not sure
8	Do you have a savings culture? If Yes how often?	YES Daily	NO monthly	Weekly Others
9	Are there any recreational facilities in the community?	YES	DON'T KNOW	NO
10	If YES what recreational facilities are available?.			

INFRASTRUCTURE

11	**HOUSING** What type of house do you live in?	Thatch/ mud Zinc/mud	Thatch/cement	Zinc/plaster/cement
12	How many rooms are there in your house?			
13 **13b** **13c**	Do you own the house you are living in? If yes, how many other houses do you own? If No, how much do you pay monthly?	YES Less than #500	NO #500 – 1000	 Above #1000

ROAD AND TRANSPORTATION

14	What are the major means of transportation in the community?	Bus/Car Motorcycle/keke	Bicycle Boat/Canoe	WALKING
15	Describe the condition of roads in the community	Excellent Good	Fair Bad	Very bad
16	What challenges do you encounter with the number of trailers that are littered within the community waiting to load products from the industries			
17	How is the drainage system in your community?	Well networked	Bad	Very bad
18	Do you experience flooding during rainfall?	YES	NO	
19	**EDUCATIONAL** Is there any educational institution in this community?	YES	NO	
20	If yes, list all of them and indicate their functioning conditions (pls list them behind)	Primary Schools – Privately owned Secondary Schools – Government owned Secondary Schools – Privately owned Tertiary Institutions		
21	How far do children travel to the nearest school?	>1km -1-5km	above 5km	Don't know

SOCIO-CULTURAL: VILLAGE LEVEL ORGANIZATION

22	To which Association do you belong?	Farmers Traders	Chiefs Youth	PAC Others:
23	What are the common conflicts that occur in your community	Boundary dispute	Land dispute Chieftaincy Titles	Other conflicts (specify with frequency)
24	Are there Non – Governmental Organizations (NGOs) and	YES	NO	IF Yes List them

	Community Based Organizations (CBOs) in your community?			
25	Do you participate in the local administration of the community?	YES	NO	IF Yes do you hold any position? Yes No
26	If no, why don't you participate			
27	Are there any recreational facilities in the community? If yes, what recreational facilities are available	Yes	No	Don't know
28	Do you observe any cultural festivals in this community? If yes, what are some of the culture festivals	Yes	No	Don't know
29	What important purpose do the festivals serve?			
30	What customs on bush/farm work are practiced here?			
31	How many Churches are in your community / village?			
32	How many Mosques are in your community / village?			
33	How many Traditional places of worship/ Shrine in your village? (name them)			
	PERSONS WITH DISABILITIES Do you have persons with disability in your community?	YES	NO	
34	Are they being discriminated against?	YES	NO	If YES WHY
35	Do they have an enabling environment for their survival in terms of infrastructure?	YES	NO	
36	Are the rights of persons with disability prioritized and protected?	YES	NO	
37	Are there rules and regulations governing the behaviour of the people in this community?	YES	NO	
38	If yes, who makes the rules and regulations?	Community / Village Head	Local Government	State Government Others
39	Is there any government security post and help line?	Yes	No	If yes, how many? Please identify them and the help line too

RURAL IMMIGRATION AND MIGRATION

40	Are you a native of this community?	YES	NO	IF no, How long have you lived in this village? ≤ 10 yrs. 10 – 30 yrs. Above 30

41	Why did you move to this community?	Business interest	Employment purposes	Its the only place I could get a house I came to stay with a relative/friend
42	Have you experienced any traditional norms in the community that you are not ok with?	YES	NO	If Yes what are they?.
43	How hospitable are the people of this community?	20%	less that 50%	above 50%
44	Can you recommend the community for others to reside in? If Yes why? If No why?	Yes No		

SECTION E- HEALTH WATER AND SANITATION

45	**WATER** What is your source of drinking water?	Public stream	Private borehole Rain	Dugout well
46	Do you buy water?	Yes	No	If Yes what is your monthly cost? Btw N800 - 2,0000 above N2,000
47	Do you have public water that is functional?	Yes	No	
48	Is the water **Clear?** Yes No	**Clean?** No Yes	**Odourless ?** Yes No	**taste?** Yes NO
49	Has your community suffered any outbreak of waterborne disease?	Yes	No	
50	**TOILET SYSTEM** Do you practice open defecation?	Yes	No	Why Yes
51	What toilet facility do you use at home?	Pit latrine Open public sewer	Pail system Water closet	Bush and River others (specify
52	Are there public toilets you can access within your community?	Yes	No	
	SANITATION AND ENVIRONMENTAL FRIENDLY			
53	Are you willing to promote environmental sustainability?	Yes – Why No - Why		
54	How often do you clean your surroundings?	Daily	Weekly	Monthly
55	Do you separate your waste?	Yes	No	If Yes how
56	How do you dispose your household waste?	RIWAMA MANAGED DUMPSITE	DRAINAGE	Anywhere
57	What is the location of the dumpsite you use?	Within the community	far from the community	No dump site
58	Do you think the community can play a role in solid waste management?	Yes	No	If Yes how

59	Do you suffer any form of pollution?	Noise	air	soil
60	How does it affect you?	Water pollution	Breathing	soot
	HEALTH CARE			
61	How serious do you take care of your health	Very serious	Serious	
62	Is there any hospital/health Centre in your community?	Yes	No	If Yes how many……(list them)
63	Where do you and members of your family get treatment when sick?	Hospital/health Centre in your community Hospital/health Centre outside your community	Herbalist/traditional medicine in your community Others (specify	Spiritual house /church for treatment
64	Where did your deliver your children? At Home	Govt. Hosp. Private Hosp. Traditional Others (Specify	Is your child immunized or in the process Yes NO	
65	What type of sickness is very common in your community?	Malaria Typhoid cholera	Meningitis Dysentery Skin diseases	others

PUBLIC HEALTH GUIDIANCE FOR COVID -19

66	What is your understanding of COVID-19?			
67	Are you aware of the risk associated with COVID-19?	Yes No (if Yes specify)		
68	If Yes can you enlighten other people about COVID-19?	Yes	No	
69	What are COVID-19 protocol? (tick all thatis appropriate)	Nose mask Salt and pepper	Regular Hand washing Local Herbs	Social Distancing Anointing oil
70	Do you enforce COVID-19 protocol to visitors to your home?	Yes	No	
71	If you are a COVID suspect will you be able to self - isolate at home on the advice of healthcare worker ?	Yes	No	Not sure
72	Do we have a community reporting platform for COVID-19 suspect?	Yes	No	
73	Have you taken the COVID-19 Vaccine?	Yes Why? …… No Why?.....		

EPIDEMIC, COMMUNICABLE AND NON-COMMUNICABLE DISEASES

74	Are there some sickness in our community that occurs from time to time and it affects many persons?	Yes	No	If Yes please indicate type
75	When such sicknesses occur how does help come?	Emergency from govt	Traditional	self medication

66	Do you know that some sickness can easily affect you if someone around you has it?	Yes	No	
77	Do you agree that you can easily catch any of these sicknesses mentioned here? (HIV/AIDS, Tuberculosis (TB), cold/cough, hepatitis A and B, Measles, Ebola, Rabies, Sexually Transmitted Disease)			Yes No
78	What will you do to prevent them	Immediately go to healthcare centre	Go to church	Apply local herbs
79	Do you know that these sicknesses cannot affect you just by staying around someone that is suffering from it? (Heart disease, cancer, diabetes, high BP, Asthma, Eye Problem, Kidney/lung disease)?			YES NO

HEALTH FACILITY QUESTIONNAIRE

80. What is the percentage of patients that regularly come to access healthcare? up to 40%

above 40%

81. Which of the depts./unit has the most attendants asides

outpatient?.....

82. Do the above speak to the most prevalent ailment within this area? Yes ☐ No ☐

83. What do you suspect could be the reason?.....

……

84. Do patients receive prompt service in your facility? ☐ Yes ☐ No

85. Do you always refer them to private complementary services (lab, xray, ophthalmic etc)? Yes ☐

No

86. Do you periodically conduct community outreaches for health awareness? Yes ☐ No ☐

87. Eleme LGA is an industrial hub like you know, does the activities of the industries have any adverse

effect on the community? ☐ YES ☐ NO ☐ Not sure

88. Do you get any form of support from the industries that operate within this LGA? YES ☐ NO ☐

	DRUG ABUSE AND ADDICTION			
1	Do you take alcohol and other substances?	Yes	No	
2	How often?	Every day	Every week	Socially
3	Do you smoke?	Yes	No	
4	How often?	Every day	Every week	Socially
5	Do you inject drugs?	Yes	No	If Yes please (indicate type)

6	Are you accustomed to taking any particular drug that is not prescribed regularly?	Yes	No	

MENTAL HEALTH				
7	In recent times how have you been feeling especially with your work and everyday life due to health condition?	Very worried	Not worried	Not sure
8	Do you suddenly feel anxious, sad or depressed for no reason?	Yes	No	Not sure
9	In general how will you describe your mental health?	Perfect	50/50	Poor
10	In recent times how do you particularly feel low or down?	Always	sometimes	not at all
11	Does your sense of reasoning affect your relationship with people?	Yes	No	Not sure
12	Do you have mental health challenge in your family? Yes/ No	Yes If Yes please tick as appropriate (Mother Father brother sister grandparent) No Others		
13	Do you have someone you talk to when you feel low? Do you take their counsel?	Yes Always	No sometimes	Not sure I just want them to know my stress
14	How many hours do you sleep per day? How is your quality of sleep?	Less ≤4hrs good	≥ greater4-6 hrs poor	≥ greater7-9 very bad
15	Do you feel pressured by life expectations?	Yes	No	It is what it is
16	How often do you feel positive about life?	Never	once in a while	most of the time
17	Have you ever considered suicide?	Yes	No	For what

How often do you experience feeling low? (tick in the box)

YOUR MOOD	NEVER	ONCE IN A WHILE	50/50	MOST OF THE TIME	ALWAYS
Calm and peaceful					
Energetic					
Gloomy					
Angry					

Does your mental health limit you in doing your daily activities? (tick in the box)

physical activities	Very less	moderate	Much	No problem
Simple				
Moderate				
heavy				

GENDER BASED VIOLENCE YOUTH, WOMEN				
18	Do you understand what it means to be abused in any of the following? (Domestic violence, intimate partner violence, GBV, sexual abuse, and sexual harassment)	YES	NO	Not sure
19	Do you experience any of the above?	Frequently	Sometimes	rarely or Never

20	If frequently or sometimes or rarely what do you do?	Report to law enforcement	community	maintain the culture of silence others
21	How do you get help after such experience?	Counseling spiritual/emotional	medical care	friends and family
22	Do you know you can prevent any form of abuse?	YES	NO	If YES how?
23	Do you know that abuse can change your sexual orientation? (Lesbian, gay, bisexual, transgender etc) [LGBTQ+]	YES	NO	Not sure
24	Are you open to programs that promote prevention, nonviolent, equitable, and respectful relationships?	YES	NO	
25	Do you know that men and boys also suffer violent abuse?	YES	NO	
	RENEWABLE ENERGY YOUTH			
26	What energy source do you use?	PHED Inverter	Generator	Solar
27	How much do you spend monthly for electricity?	From N1,000 to N5,000	From N5,000 and above	No idea
28	What do you use for cooking?	Kerosene LPG	Firewood Electric cooker	coal
29	How much do you spend monthly for cooking? (Heating) ?	From N1,000 to N5,000	From N5,000 and above	No idea
30	If you use a toilet system, how regular do you empty the soak away?	6months	yearly	2years
31	How do you manage your food waste?	Composting	Thrown to dustbin	
32	If you do not produce enough waste that gets rotten will you be willing to buy waste?	YES	NO	
33	Is your business heavily dependent on electricity?	YES	NO	
34	Are you willing to invest/spend in renewable energy?	YES	NO	
35	If Yes why?			
AGRICULTURE farmers				
36	Are you currently farming? If YES indicate the type of farming		YES Crop	NO livestock
37	State the size of land allocated to you for farming (number of plots)			
38	Is the land allocated to you adequate?		YES	NO
39	If No What size of land will be adequate			
40	What type of land tenure system is practiced in this community			
41	Are you willing to practice other types of urban farming? e.g (bag or hydroponics)		YES	NO
42	Have you previously engaged in other types of farming		YES	NO
43	What type of manure do you prefer?		Organic	Fertilizer
44	How often do you go to farm?		daily	weekly Anytime
	How bountiful is your harvest?		High	Low

45	Reasons for low or high harvest?			
	TIMBER LOGGERS			
46	What is the various types of tree you have? (list them			
47	Which one do you log for timber			
48	Which one do you use for firewood			
49	How will this project affect you			
	WILDE LIFE HUNTERS			
50	Name the different animals you have here?			
51	Which one do you hunt?			
52	Of what use is the animal you hunt for?	Eating	Harnessing its potentials (leather etc	Sales
53	How is this project going to affect you?	good	Bad	Fairly
54	Any other issue of mention?			

	COMMUNITY RELATIONS	**PAC**		
1	Wakohu family /Eleme LGA is classified as an industrial hub how many multinational do you know that operate within your LGA (pls name them)			
2	As a project community; How will you describe the relationship between the companies and the communities	Mutually beneficial to all	Good	Fair
3	What is your opinion on quality of interface between the companies and the communities is	Very good	Very bad	Fair Good
4	In times past, has the company maintained their CSR with the community	YES	NO	NOT ALWAYS
	WHY NOT ALWAYS?			
5	What will you say is the citing of industries in Eleme?	Blessing - Why?	Curse – Why?	Don't' know
6	How has your community taken advantage of the businesses in your locality?	Vey strategic? HOW?	Not so strategic why	
7	Has the company being a source of conflict within your people	No	Yes how?	
8	How would you describe the company's CSR project to your community	Very strategic	Very well	Poor

SECTION F - PROPOSED PROJECT

How would you rank Indorama? Excellent ☐ Very good ☐ Average ☐ Poor ☐

Are you aware of a proposed Fertilizer Train 3 EIA in a section of your community? Yes ☐ No ☐

Are you in support of the project? Yes ☐ No ☐ Don't know ☐

If yes, give reasons for your support

……

Do you think the project will bring benefit to the community? Yes ☐ No ☐ Don't know ☐

What problems do you envisage would be caused by this Project?

……

What would you want INDORAMA to do for you before commencement of the project?

……

What would you like to be commenced with, should the project negatively affect you?

……

HUMAN RIGHTS:

Do you think this project will adversely affect your human right directly or indirectly? YES / NO

If YES how?

If NO How?

Annexure 4.7

Traffic Count Survey Results

Agbonchia Eleme Market - Oyigbo (From Agbonchia Eleme Market – going towards Oyigbo)				
Friday 4/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	167	94	38	28
7 -8am	125	99	25	21
8 -9am	174	70	10	5
9 -10am	102	74	7	2
10 -11am	199	85	6	2
11 -12pm	125	62	3	0
12 -1pm	158	75	9	0
1 -2pm	151	64	3	1
2 -3pm	185	71	4	0
3 -4pm	142	87	3	4
4 -5pm	176	108	14	3
5 -6pm	141	102	25	4
6 -7pm	243	122	38	15
7-8pm	192	95	22	11
TOTAL	**2280**	**1208**	**207**	**96**
Saturday 5/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	149	82	1	2
7 -8am	156	117	0	1
8 -9am	180	123	2	3
9 -10am	159	90	0	2
10 -11am	176	129	1	0
11 -12pm	126	77	2	0
12 -1pm	138	137	5	0
1 -2pm	130	85	1	0
2 -3pm	178	126	8	0
3 -4pm	175	94	1	2
4 -5pm	162	73	5	1
5 -6pm	105	108	5	0
6 -7pm	184	125	30	11
7-8pm	163	142	19	0
TOTAL	**2181**	**1508**	**80**	**22**

Sunday 6/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	97	86	0	4
7 -8am	84	134	1	1
8 -9am	84	53	2	0
9 -10am	72	56	1	0
10 -11am	96	87	2	0
11 -12pm	84	78	1	0
12 -1pm	84	164	0	1
1 -2pm	72	42	3	0
2 -3pm	95	85	0	0
3 -4pm	76	56	0	0
4 -5pm	84	131	0	1
5 -6pm	72	51	4	3
6 -7pm	96	95	6	10
7-8pm	82	68	4	4
TOTAL	**1178**	**1186**	**24**	**24**

Monday 7/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	228	112	0	2
7 -8am	240	110	1	0
8 -9am	223	92	3	3
9 -10am	202	102	4	0
10 -11am	245	90	4	1
11 -12pm	203	108	0	1
12 -1pm	223	158	2	0
1 -2pm	175	63	2	1
2 -3pm	219	104	3	0
3 -4pm	224	90	2	1
4 -5pm	208	135	5	1
5 -6pm	182	94	2	7
6 -7pm	202	87	13	10
7-8pm	211	92	17	12
TOTAL	**2985**	**1437**	**58**	**39**

Tuesday 8/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	190	79	0	4
7 -8am	237	94	1	2
8 -9am	174	78	1	1
9 -10am	184	94	2	0
10 -11am	160	85	2	0
11 -12pm	170	73	4	0
12 -1pm	131	83	1	0
1 -2pm	126	63	4	0
2 -3pm	198	87	5	0
3 -4pm	140	83	3	0
4 -5pm	167	80	1	0
5 -6pm	146	95	5	2
6 -7pm	151	84	10	8
7-8pm	132	67	3	7
TOTAL	**2306**	**1145**	**42**	**24**
Wednesday 9/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	226	111	1	2
7 -8am	223	100	1	0
8 -9am	141	103	1	2
9 -10am	203	95	2	0
10 -11am	252	89	2	1
11 -12pm	213	86	1	0
12 -1pm	201	45	1	0
1 -2pm	169	62	0	0
2 -3pm	245	124	2	0
3 -4pm	200	96	2	0
4 -5pm	223	79	1	0
5 -6pm	191	118	1	2
6 -7pm	198	84	3	0
7-8pm	180	57	2	4
TOTAL	**2865**	**1249**	**20**	**11**

Thursday 10/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	187	88	0	2
7 -8am	165	84	0	1
8 -9am	189	73	0	0
9 -10am	155	60	0	0
10 -11am	190	71	0	0
11 -12pm	159	70	1	0
12 -1pm	173	70	1	0
1 -2pm	135	61	0	0
2 -3pm	144	81	0	0
3 -4pm	126	74	0	0
4 -5pm	126	80	0	0
5 -6pm	108	114	0	0
6 -7pm	122	82	2	0
7-8pm	126	77	4	3
TOTAL	**2105**	**1085**	**8**	**6**

Oyigbo - Agbonchia Eleme Market (From Oyigbo – going towards Agbonchia Eleme Market)				
Friday 4/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	178	107	32	24
7 -8am	190	146	36	7
8 -9am	132	158	7	15
9 -10am	120	92	7	10
10 -11am	140	96	22	3
11 -12pm	142	131	4	0
12 -1pm	116	81	6	0
1 -2pm	128	71	3	0
2 -3pm	118	65	3	0
3 -4pm	154	100	15	5
4 -5pm	150	76	8	2
5 -6pm	158	73	4	2
6 -7pm	244	132	38	32
7-8pm	196	105	18	44
TOTAL	**2166**	**1433**	**203**	**144**
Saturday 5/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	145	81	13	3
7 -8am	175	77	9	0
8 -9am	137	75	2	0
9 -10am	136	72	5	0
10 -11am	157	71	5	0
11 -12pm	131	82	5	0
12 -1pm	152	87	2	0
1 -2pm	135	98	4	0
2 -3pm	180	88	1	0
3 -4pm	159	124	3	1
4 -5pm	162	136	5	2
5 -6pm	117	100	8	1
6 -7pm	200	93	19	9
7-8pm	152	61	6	4
TOTAL	**2138**	**1245**	**87**	**20**

Sunday 6/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	203	80	10	15
7 -8am	146	92	7	10
8 -9am	165	78	2	26
9 -10am	140	61	5	1
10 -11am	182	102	5	1
11 -12pm	175	72	2	0
12 -1pm	154	77	3	11
1 -2pm	132	45	0	1
2 -3pm	158	79	3	0
3 -4pm	163	67	3	0
4 -5pm	174	84	6	0
5 -6pm	139	51	2	0
6 -7pm	174	120	10	6
7-8pm	155	104	0	0
TOTAL	**2260**	**1112**	**58**	**71**
Monday 7/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	238	77	2	4
7 -8am	260	106	4	0
8 -9am	230	129	7	1
9 -10am	205	73	2	0
10 -11am	241	80	9	0
11 -12pm	210	74	3	0
12 -1pm	219	63	8	0
1 -2pm	170	82	0	0
2 -3pm	205	103	4	1
3 -4pm	186	61	4	0
4 -5pm	221	57	3	0
5 -6pm	180	64	6	0
6 -7pm	235	44	3	0
7-8pm	206	30	2	0
TOTAL	**3006**	**1043**	**57**	**6**

Tuesday 8/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	228	88	3	8
7 -8am	232	97	4	1
8 -9am	203	45	7	0
9 -10am	212	30	10	0
10 -11am	223	35	5	0
11 -12pm	210	66	2	0
12 -1pm	184	30	2	0
1 -2pm	168	35	3	0
2 -3pm	240	51	4	0
3 -4pm	206	24	6	0
4 -5pm	202	68	2	0
5 -6pm	205	76	1	1
6 -7pm	250	64	0	0
7-8pm	220	58	0	0
TOTAL	2983	767	49	10
Wednesday 9/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	220	80	0	5
7 -8am	102	120	8	0
8 -9am	226	165	6	0
9 -10am	163	156	5	0
10 -11am	106	106	3	0
11 -12pm	104	84	4	0
12 -1pm	103	107	4	0
1 -2pm	106	61	3	0
2 -3pm	107	110	4	0
3 -4pm	124	80	2	2
4 -5pm	151	149	0	1
5 -6pm	168	82	4	0
6 -7pm	166	167	0	0
7-8pm	164	67	0	0
TOTAL	**2010**	**1534**	**43**	**8**

Thursday 10/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	234	58	2	4
7 -8am	247	115	3	0
8 -9am	254	100	3	0
9 -10am	185	85	8	0
10 -11am	237	78	6	0
11 -12pm	197	76	3	0
12 -1pm	238	71	2	0
1 -2pm	187	69	3	0
2 -3pm	194	79	1	0
3 -4pm	221	76	5	0
4 -5pm	210	68	2	2
5 -6pm	200	92	1	0
6 -7pm	230	29	0	0
7-8pm	222	17	0	0
TOTAL	**3056**	**1013**	**39**	**6**

Oyigbo – Agbonchia Okulu (From Oyigbo – going towards Agbonchia Okulu)				
Friday 4/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	20	25	3	2
7 -8am	24	50	5	3
8 -9am	41	59	4	1
9 -10am	75	38	3	2
10 -11am	43	35	2	2
11 -12pm	27	42	1	1
12 -1pm	34	37	0	1
1 -2pm	25	31	0	1
2 -3pm	16	22	2	5
3 -4pm	36	30	3	4
4 -5pm	53	27	1	3
5 -6pm	55	43	0	2
6 -7pm	44	56	4	6
7-8pm	37	43	5	4
TOTAL	**530**	**538**	**33**	**37**

Saturday 5/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	21	34	3	2
7 -8am	15	29	5	0
8 -9am	22	33	3	0
9 -10am	19	34	3	1
10 -11am	24	33	2	1
11 -12pm	7	26	4	0
12 -1pm	17	32	0	2
1 -2pm	15	31	0	0
2 -3pm	9	26	0	0
3 -4pm	13	24	2	1
4 -5pm	16	32	2	1
5 -6pm	19	44	4	3
6 -7pm	19	24	5	3
7-8pm	14	34	8	6
TOTAL	**230**	**436**	**41**	**20**

Sunday 6/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	13	22	2	1
7 -8am	18	31	1	2
8 -9am	14	19	0	2
9 -10am	17	25	0	0
10 -11am	23	20	2	0
11 -12pm	15	19	0	1
12 -1pm	7	17	1	0
1 -2pm	11	16	2	0
2 -3pm	7	20	0	1
3 -4pm	13	26	2	1
4 -5pm	12	22	1	0
5 -6pm	14	26	2	1
6 -7pm	12	21	2	0
7-8pm	9	19	1	1
TOTAL	**185**	**303**	**16**	**10**

Monday 7/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	16	23	2	0
7 -8am	13	52	4	2
8 -9am	14	67	3	3
9 -10am	23	48	1	0
10 -11am	14	45	4	2
11 -12pm	9	27	0	3
12 -1pm	15	26	0	2
1 -2pm	16	28	0	0
2 -3pm	9	26	0	3
3 -4pm	13	21	0	2
4 -5pm	12	32	2	0
5 -6pm	12	34	0	3
6 -7pm	21	34	3	1
7-8pm	14	27	1	1
TOTAL	**201**	**490**	**20**	**22**

Tuesday 8/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	16	40	3	1
7 -8am	20	47	5	1
8 -9am	25	40	1	5
9 -10am	29	24	4	5
10 -11am	20	38	0	4
11 -12pm	14	22	3	3
12 -1pm	13	26	1	2
1 -2pm	11	27	0	3
2 -3pm	12	13	2	0
3 -4pm	7	18	2	4
4 -5pm	15	31	0	1
5 -6pm	17	49	0	1
6 -7pm	16	42	3	0
7-8pm	9	33	1	2
TOTAL	**224**	**450**	**25**	**32**

Wednesday 9/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	24	29	2	1
7 -8am	26	37	4	1
8 -9am	25	53	4	3
9 -10am	27	28	1	3
10 -11am	24	42	5	2
11 -12pm	17	33	1	2
12 -1pm	14	34	0	0
1 -2pm	16	22	0	3
2 -3pm	10	27	2	1
3 -4pm	18	35	0	1
4 -5pm	22	34	0	0
5 -6pm	11	34	3	0
6 -7pm	19	28	3	1
7-8pm	12	25	1	2
TOTAL	**265**	**461**	**26**	**20**

Thursday 10/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	21	30	1	2
7 -8am	24	39	3	1
8 -9am	33	53	0	1
9 -10am	38	67	5	4
10 -11am	34	66	7	2
11 -12pm	17	41	0	1
12 -1pm	24	30	3	1
1 -2pm	34	34	0	1
2 -3pm	15	37	2	1
3 -4pm	42	34	0	3
4 -5pm	46	32	1	1
5 -6pm	41	41	0	3
6 -7pm	32	40	2	1
7-8pm	30	36	1	3
TOTAL	**431**	**580**	**25**	**25**

Agbonchia Okulu – Oyigbo (From Agbonchia Okulu – going towards Oyigbo)				
Friday 4/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	35	35	0	0
7 -8am	42	43	0	0
8 -9am	65	41	0	3
9 -10am	72	34	0	2
10 -11am	52	26	0	0
11 -12pm	30	26	1	0
12 -1pm	26	19	2	0
1 -2pm	28	26	1	0
2 -3pm	29	27	3	1
3 -4pm	30	29	1	0
4 -5pm	45	31	0	1
5 -6pm	39	72	1	2
6 -7pm	33	59	4	0
7-8pm	24	28	7	0
TOTAL	**550**	**496**	**20**	**9**

Saturday 5/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	26	37	4	0
7 -8am	29	36	0	0
8 -9am	29	34	1	1
9 -10am	30	28	1	0
10 -11am	28	27	0	0
11 -12pm	12	24	3	0
12 -1pm	17	26	4	1
1 -2pm	19	21	1	0
2 -3pm	20	23	1	2
3 -4pm	16	29	1	0
4 -5pm	13	33	3	0
5 -6pm	28	38	2	0
6 -7pm	26	46	5	3
7-8pm	32	36	13	11
TOTAL	**325**	**438**	**39**	**18**

Sunday 6/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	20	25	3	0
7 -8am	24	23	0	0
8 -9am	13	26	1	2
9 -10am	20	24	1	0
10 -11am	14	14	1	2
11 -12pm	13	22	0	2
12 -1pm	13	26	2	0
1 -2pm	15	28	2	2
2 -3pm	32	29	3	0
3 -4pm	11	30	1	0
4 -5pm	28	35	0	0
5 -6pm	27	45	0	0
6 -7pm	27	41	4	3
7-8pm	21	13	2	0
TOTAL	**278**	**381**	**20**	**11**

Monday 7/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	20	25	4	2
7 -8am	20	20	1	0
8 -9am	28	19	0	2
9 -10am	29	33	3	1
10 -11am	21	31	1	0
11 -12pm	14	35	0	1
12 -1pm	16	23	0	0
1 -2pm	20	20	0	0
2 -3pm	11	34	1	1
3 -4pm	14	22	2	1
4 -5pm	30	64	2	2
5 -6pm	18	66	5	3
6 -7pm	23	34	3	4
7-8pm	18	23	4	2
TOTAL	**282**	**449**	**26**	**19**

Tuesday 8/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	35	40	6	4
7 -8am	35	48	0	0
8 -9am	36	31	4	4
9 -10am	30	37	7	0
10 -11am	23	38	1	1
11 -12pm	22	34	2	1
12 -1pm	26	30	1	1
1 -2pm	24	28	2	1
2 -3pm	36	32	4	2
3 -4pm	29	46	4	1
4 -5pm	21	59	0	2
5 -6pm	29	83	4	6
6 -7pm	26	50	4	3
7-8pm	14	22	6	2
TOTAL	**386**	**578**	**45**	**28**

Wednesday 9/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	28	36	3	3
7 -8am	25	43	4	1
8 -9am	38	27	1	1
9 -10am	40	33	4	4
10 -11am	21	21	2	1
11 -12pm	26	26	3	2
12 -1pm	24	22	1	0
1 -2pm	28	32	4	2
2 -3pm	16	31	4	3
3 -4pm	23	27	5	3
4 -5pm	37	43	7	5
5 -6pm	13	54	5	3
6 -7pm	36	41	9	4
7-8pm	22	18	3	2
TOTAL	**377**	**454**	**55**	**34**

Thursday 10/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	32	35	4	0
7 -8am	38	32	0	0
8 -9am	98	44	2	2
9 -10am	79	36	2	0
10 -11am	35	37	3	0
11 -12pm	30	18	2	0
12 -1pm	40	30	2	0
1 -2pm	32	32	1	0
2 -3pm	19	31	2	2
3 -4pm	21	28	2	2
4 -5pm	46	53	4	4
5 -6pm	83	78	6	3
6 -7pm	38	41	0	0
7-8pm	18	27	0	0
TOTAL	**609**	**522**	**30**	**13**

Indorama Complex Inbound (From Eastwest Road – going inside Indorama Complex)				
Friday 4/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	150	195	35	19
7 -8am	178	228	42	28
8 -9am	284	142	46	3
9 -10am	163	105	18	0
10 -11am	106	56	21	0
11 -12pm	109	74	16	2
12 -1pm	139	103	25	3
1 -2pm	133	86	16	1
2 -3pm	157	83	17	2
3 -4pm	139	90	24	0
4 -5pm	167	65	16	0
5 -6pm	187	70	20	10
6 -7pm	215	90	12	19
7-8pm	180	71	8	6
TOTAL	**2307**	**1458**	**316**	**93**

Saturday 5/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	106	88	12	2
7 -8am	310	92	10	2
8 -9am	248	65	16	0
9 -10am	148	74	9	0
10 -11am	111	22	10	0
11 -12pm	155	18	6	0
12 -1pm	133	14	7	0
1 -2pm	135	16	9	0
2 -3pm	113	17	8	0
3 -4pm	100	27	6	0
4 -5pm	136	65	14	0
5 -6pm	167	78	10	1
6 -7pm	209	48	7	2
7-8pm	140	55	7	3
TOTAL	**2211**	**679**	**131**	**10**

Sunday 6/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	168	54	10	3
7 -8am	136	71	8	4
8 -9am	115	56	9	0
9 -10am	130	37	7	0
10 -11am	98	39	4	0
11 -12pm	99	40	9	0
12 -1pm	127	90	6	2
1 -2pm	97	41	4	0
2 -3pm	105	57	6	0
3 -4pm	84	41	3	0
4 -5pm	97	32	6	0
5 -6pm	84	94	4	4
6 -7pm	117	51	7	3
7-8pm	98	64	9	3
TOTAL	**1555**	**767**	**92**	**19**

Monday 7/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	260	85	14	8
7 -8am	205	87	15	5
8 -9am	381	105	13	3
9 -10am	139	120	8	1
10 -11am	157	106	13	2
11 -12pm	149	95	12	2
12 -1pm	148	38	16	1
1 -2pm	118	45	4	0
2 -3pm	90	32	14	2
3 -4pm	132	45	12	1
4 -5pm	110	70	13	1
5 -6pm	148	95	14	6
6 -7pm	201	106	23	5
7-8pm	159	78	12	8
TOTAL	**2397**	**1107**	**183**	**45**

Tuesday 8/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	234	262	32	24
7 -8am	234	267	19	20
8 -9am	305	252	337	0
9 -10am	152	114	31	0
10 -11am	129	93	17	0
11 -12pm	138	91	27	2
12 -1pm	129	104	20	0
1 -2pm	155	101	29	0
2 -3pm	85	82	32	13
3 -4pm	123	105	16	0
4 -5pm	105	102	19	3
5 -6pm	153	113	32	7
6 -7pm	191	84	17	25
7-8pm	157	65	25	9
TOTAL	**2290**	**1835**	**653**	**103**

Wednesday 9/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	225	111	15	27
7 -8am	450	252	13	3
8 -9am	382	200	43	0
9 -10am	172	124	21	0
10 -11am	163	111	28	0
11 -12pm	203	129	27	2
12 -1pm	133	93	24	0
1 -2pm	149	87	31	0
2 -3pm	133	88	19	1
3 -4pm	179	94	19	1
4 -5pm	239	112	25	1
5 -6pm	219	148	30	6
6 -7pm	215	116	34	23
7-8pm	185	102	17	10
TOTAL	**3047**	**1767**	**346**	**74**

Thursday 10/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	217	137	23	25
7 -8am	224	232	20	5
8 -9am	157	309	34	1
9 -10am	164	135	25	0
10 -11am	87	116	19	0
11 -12pm	69	120	34	2
12 -1pm	85	120	24	0
1 -2pm	86	87	16	0
2 -3pm	75	72	20	4
3 -4pm	105	105	25	0
4 -5pm	122	97	12	4
5 -6pm	152	109	28	7
6 -7pm	218	136	28	20
7-8pm	191	98	13	14
TOTAL	**1952**	**1873**	**321**	**82**

Indorama Complex Outbound (From Indorama Complex – going towards Eastwest Road)				
Friday 4/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	249	160	20	4
7 -8am	247	196	28	33
8 -9am	232	221	91	21
9 -10am	174	55	11	0
10 -11am	140	60	18	10
11 -12pm	129	84	19	0
12 -1pm	128	74	28	5
1 -2pm	146	87	46	0
2 -3pm	172	105	32	4
3 -4pm	160	98	17	0
4 -5pm	150	106	18	1
5 -6pm	177	282	48	32
6 -7pm	242	118	71	24
7-8pm	214	40	39	23
TOTAL	**2560**	**1686**	**486**	**157**

Saturday 5/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	125	180	63	16
7 -8am	135	232	62	12
8 -9am	214	374	41	11
9 -10am	229	170	20	5
10 -11am	171	75	26	2
11 -12pm	185	57	28	0
12 -1pm	124	70	23	0
1 -2pm	114	68	15	1
2 -3pm	166	59	30	2
3 -4pm	149	70	17	0
4 -5pm	174	135	29	6
5 -6pm	169	99	40	22
6 -7pm	254	90	54	17
7-8pm	213	35	23	9
TOTAL	**2422**	**1714**	**471**	**103**

Sunday 6/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	196	175	32	10
7 -8am	191	193	45	11
8 -9am	219	142	54	5
9 -10am	176	210	30	0
10 -11am	50	45	17	0
11 -12pm	76	23	6	3
12 -1pm	64	64	14	3
1 -2pm	101	50	3	1
2 -3pm	178	102	26	1
3 -4pm	156	82	22	0
4 -5pm	210	45	0	1
5 -6pm	208	96	0	0
6 -7pm	284	83	14	6
7-8pm	146	31	13	3
TOTAL	**2255**	**1341**	**276**	**44**

Monday 7/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	263	244	75	12
7 -8am	280	305	54	7
8 -9am	257	320	46	2
9 -10am	170	120	4	0
10 -11am	165	67	15	2
11 -12pm	198	102	18	0
12 -1pm	101	134	12	1
1 -2pm	164	153	25	0
2 -3pm	131	140	36	2
3 -4pm	192	92	45	1
4 -5pm	190	115	28	1
5 -6pm	180	269	97	6
6 -7pm	201	127	54	16
7-8pm	178	72	37	7
TOTAL	**2670**	**2260**	**546**	**57**

Tuesday 8/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	228	238	32	21
7 -8am	238	258	19	10
8 -9am	270	355	45	0
9 -10am	214	129	29	0
10 -11am	70	97	23	2
11 -12pm	120	62	22	0
12 -1pm	130	98	14	0
1 -2pm	174	201	20	0
2 -3pm	204	147	59	13
3 -4pm	186	163	52	0
4 -5pm	229	144	45	2
5 -6pm	213	162	48	6
6 -7pm	132	104	45	24
7-8pm	160	73	24	9
TOTAL	**2568**	**2231**	**477**	**87**

Wednesday 9/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	334	331	16	17
7 -8am	389	215	17	5
8 -9am	335	183	17	0
9 -10am	297	96	19	0
10 -11am	230	102	16	2
11 -12pm	135	69	15	0
12 -1pm	136	101	33	0
1 -2pm	125	59	32	0
2 -3pm	115	64	28	3
3 -4pm	138	92	38	0
4 -5pm	234	131	54	0
5 -6pm	207	149	62	0
6 -7pm	229	245	58	26
7-8pm	189	78	29	12
TOTAL	**3093**	**1915**	**434**	**65**

Thursday 10/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	290	281	96	29
7 -8am	303	274	99	7
8 -9am	318	118	48	0
9 -10am	147	170	18	0
10 -11am	158	100	31	2
11 -12pm	121	59	35	0
12 -1pm	187	83	31	0
1 -2pm	168	93	87	0
2 -3pm	131	61	29	2
3 -4pm	182	92	43	1
4 -5pm	180	101	48	3
5 -6pm	165	135	78	9
6 -7pm	192	143	88	25
7-8pm	195	109	84	12
TOTAL	**2737**	**1819**	**815**	**90**

Eastwest Expressway (From Eleme - Going Towards Port Harcourt)				
Friday 4/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	498	234	73	81
7 -8am	500	299	78	75
8 -9am	585	334	73	129
9 -10am	468	341	85	75
10 -11am	412	374	111	81
11 -12pm	364	386	76	82
12 -1pm	373	440	70	95
1 -2pm	393	491	92	88
2 -3pm	414	549	93	97
3 -4pm	389	573	59	82
4 -5pm	480	665	127	141
5 -6pm	568	711	139	192
6 -7pm	523	620	135	71
7-8pm	498	452	108	65
TOTAL	**6465**	**6469**	**1319**	**1354**

Saturday 5/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	425	241	76	68
7 -8am	491	260	86	90
8 -9am	598	336	101	131
9 -10am	542	391	78	108
10 -11am	375	351	87	85
11 -12pm	432	409	82	95
12 -1pm	476	444	95	77
1 -2pm	382	441	97	94
2 -3pm	395	497	78	94
3 -4pm	479	639	107	129
4 -5pm	465	692	159	126
5 -6pm	524	690	121	140
6 -7pm	521	612	141	97
7-8pm	475	584	125	84
TOTAL	**6580**	**6587**	**1433**	**1418**

Sunday 6/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	189	236	39	132
7 -8am	265	306	31	123
8 -9am	274	285	36	117
9 -10am	213	323	34	97
10 -11am	286	380	38	85
11 -12pm	302	369	27	73
12 -1pm	264	288	36	103
1 -2pm	236	296	44	94
2 -3pm	314	268	30	94
3 -4pm	247	258	39	129
4 -5pm	256	307	35	141
5 -6pm	249	294	34	192
6 -7pm	281	301	52	69
7-8pm	296	259	45	71
TOTAL	**3672**	**4170**	**520**	**1520**

Monday 7/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	398	235	47	68
7 -8am	418	250	32	57
8 -9am	699	406	47	125
9 -10am	434	323	56	97
10 -11am	487	380	240	85
11 -12pm	425	418	61	73
12 -1pm	464	431	84	103
1 -2pm	314	413	75	75
2 -3pm	419	511	67	75
3 -4pm	473	645	96	97
4 -5pm	331	715	105	131
5 -6pm	482	820	99	207
6 -7pm	410	600	124	60
7-8pm	398	524	150	58
TOTAL	**6152**	**6671**	**1283**	**1311**

Tuesday 8/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	584	324	93	132
7 -8am	590	323	73	123
8 -9am	527	324	70	117
9 -10am	434	347	69	102
10 -11am	495	383	76	93
11 -12pm	455	437	78	98
12 -1pm	429	413	77	71
1 -2pm	367	496	84	99
2 -3pm	330	500	107	71
3 -4pm	405	568	106	97
4 -5pm	487	656	122	153
5 -6pm	603	733	116	179
6 -7pm	601	725	98	81
7-8pm	598	684	160	91
TOTAL	**6905**	**6913**	**1329**	**1507**

Wednesday 9/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	479	268	72	85
7 -8am	503	260	84	96
8 -9am	584	378	80	138
9 -10am	440	344	84	89
10 -11am	415	353	67	91
11 -12pm	361	355	69	71
12 -1pm	415	414	75	82
1 -2pm	411	454	106	90
2 -3pm	306	461	106	71
3 -4pm	388	564	75	78
4 -5pm	477	638	105	144
5 -6pm	482	741	91	194
6 -7pm	388	600	110	92
7-8pm	523	620	135	71
TOTAL	**6172**	**6450**	**1259**	**1392**

Thursday 10/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	489	254	63	61
7 -8am	500	293	60	63
8 -9am	655	336	90	127
9 -10am	400	296	94	88
10 -11am	388	363	73	71
11 -12pm	416	420	77	80
12 -1pm	346	408	81	70
1 -2pm	388	497	68	88
2 -3pm	355	478	88	82
3 -4pm	431	591	92	88
4 -5pm	367	694	92	134
5 -6pm	511	741	97	189
6 -7pm	487	600	112	71
7-8pm	603	733	116	179
TOTAL	**6336**	**6704**	**1203**	**1391**

East west Expressway (From Port Harcourt – going towards Eleme)				
Friday 4/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	264	589	95	287
7 -8am	300	625	79	300
8 -9am	350	662	82	150
9 -10am	250	600	115	197
10 -11am	230	734	98	141
11 -12pm	245	633	89	134
12 -1pm	294	563	85	156
1 -2pm	254	541	147	120
2 -3pm	318	509	84	165
3 -4pm	398	537	103	157
4 -5pm	466	500	120	187
5 -6pm	596	504	97	191
6 -7pm	575	565	125	200
7-8pm	465	536	106	126
TOTAL	**5005**	**8098**	**1425**	**2511**

Saturday 5/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	368	521	101	198
7 -8am	400	560	90	208
8 -9am	167	540	80	200
9 -10am	350	560	73	236
10 -11am	570	545	56	160
11 -12pm	400	407	98	135
12 -1pm	400	352	130	167
1 -2pm	300	348	74	94
2 -3pm	450	419	116	105
3 -4pm	430	400	138	110
4 -5pm	414	400	107	175
5 -6pm	500	400	111	200
6 -7pm	526	498	135	232
7-8pm	487	425	120	198
TOTAL	**5762**	**6375**	**1429**	**2418**

Sunday 6/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	204	236	32	238
7 -8am	315	365	71	278
8 -9am	254	289	33	170
9 -10am	221	326	33	167
10 -11am	302	298	39	160
11 -12pm	204	279	55	167
12 -1pm	265	205	25	160
1 -2pm	300	367	12	94
2 -3pm	298	247	31	105
3 -4pm	302	305	81	110
4 -5pm	278	254	35	187
5 -6pm	398	269	30	191
6 -7pm	325	306	25	200
7-8pm	318	279	25	200
TOTAL	**3984**	**4025**	**527**	**2427**

Monday 7/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	687	721	72	232
7 -8am	712	769	54	245
8 -9am	635	787	108	219
9 -10am	446	472	83	167
10 -11am	528	574	90	160
11 -12pm	411	585	128	167
12 -1pm	406	416	87	160
1 -2pm	483	470	99	176
2 -3pm	417	417	96	164
3 -4pm	523	426	87	161
4 -5pm	575	464	111	154
5 -6pm	608	471	90	185
6 -7pm	669	487	137	223
7-8pm	587	465	157	213
TOTAL	**7687**	**7524**	**1399**	**2626**

Tuesday 8/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	597	698	80	256
7 -8am	633	741	244	278
8 -9am	628	593	100	170
9 -10am	444	618	96	233
10 -11am	468	415	107	156
11 -12pm	482	522	185	211
12 -1pm	415	440	133	110
1 -2pm	384	581	148	146
2 -3pm	522	515	145	205
3 -4pm	525	520	123	190
4 -5pm	412	423	97	141
5 -6pm	582	527	124	166
6 -7pm	629	600	275	200
7-8pm	536	584	252	198
TOTAL	**7257**	**7777**	**2109**	**2660**

Wednesday 9/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	168	675	70	198
7 -8am	213	702	63	229
8 -9am	298	726	75	147
9 -10am	268	648	97	140
10 -11am	210	652	88	138
11 -12pm	199	498	95	127
12 -1pm	184	446	94	132
1 -2pm	232	458	90	151
2 -3pm	202	379	113	136
3 -4pm	211	372	112	146
4 -5pm	202	322	105	141
5 -6pm	269	352	90	157
6 -7pm	256	315	86	162
7-8pm	575	565	125	200
TOTAL	**3487**	**7110**	**1303**	**2204**

Thursday 10/2/2021				
Hour	**Cat 1 (Motorcycle/Keke)**	**Cat 2 (Car and Light Vans)**	**Cat 3 (Lorries and Trucks)**	**Cat 4 (Buses and Coaches)**
6-7am	236	498	47	214
7 -8am	259	592	53	224
8 -9am	230	635	40	119
9 -10am	229	658	115	123
10 -11am	222	637	93	118
11 -12pm	206	520	98	130
12 -1pm	205	472	102	104
1 -2pm	175	463	93	109
2 -3pm	173	403	99	106
3 -4pm	219	404	85	128
4 -5pm	214	372	86	137
5 -6pm	254	377	65	139
6 -7pm	276	391	66	161
7-8pm	547	534	108	178
TOTAL	**3445**	**6956**	**1150**	**1990**

Annexure 4.8

Stakeholders Engagement Report

Report on Stakeholders Engagement done during ESIA Process of "IEFCL-Train3 Project"

Section – 1

1.0 Introduction

Stakeholder engagement in an ESIA aimed to provide a mechanism or a common ground which should enable interest groups and parties to express their perceptions, expectations concerning development intervention in a given locality and to have these issues documented for possible intervention during and after the environmental impact assessment process. At the same time, it is important to recognize that the consultation process is not designed to force consensus among stakeholders but rather to create a forum within which stakeholders can express their views without fear and threat of sanction. Stakeholder engagement is a critically important component of the ESIA for the proposed IEFCL-Train3 project.

1.1 Stakeholder Identification and Mapping

Stakeholder defined as person(s) or groups who are directly or indirectly affected by a project as well as those who may have interests in a project and / or the ability to influence its outcome positively or negatively. The first step in the process of stakeholder engagement therefore is the identification of stakeholders including their key groupings and subgroupings. In order to define the key stakeholders, it is necessary to identify the project areas associated with, that is the IEFCL-Train3 Project to be situated on 250Ha land adjacent to existing Indorama Petrochemical Complex, at the Eleme LG Area, Rivers State.

The interface areas which stakeholders can be identified for in a given project area (geographical locations) mentioned above after considering the following factors:

- ✓ Project's sphere of influence/ Impact zone
- ✓ Groups having special interests in the project
- ✓ Vulnerable groups
- ✓ Government / Regulators

The stakeholder identification is a dynamic activity that may be altered during the course of the project lifecycle based on the influencing factors as shown in the matrix below:

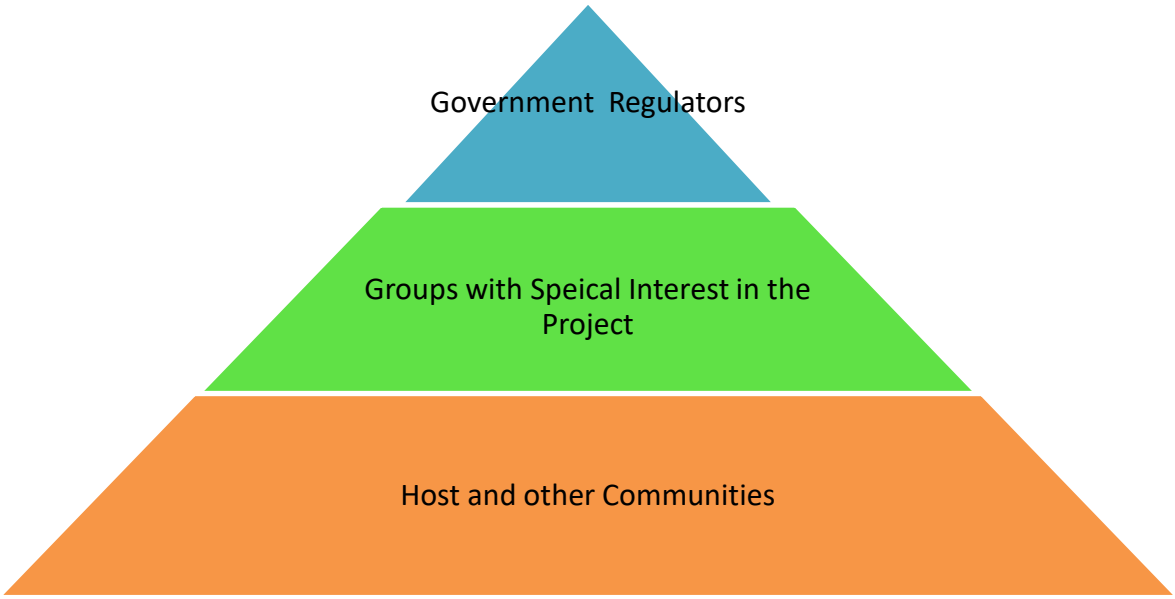


Figure 1: Stakeholder matrix based on Sphere of Influence

The Company have considered the stakeholders identified for the IEFCL Train 1 and 2 projects as one of the benchmarks for the project stakeholder identification process.

1.2 Stakeholder Engagements

Having identified the level of interest of each of the stakeholder in the previous section, the engagement plan attempts to identify a structure through which it is possible to build and maintain constructive relationships throughout project life cycle. The level of engagement with each stakeholder varies in accordance with the interest and influence the stakeholders have on the project.

The following engagements were performed in view of IEFCL-Train3 project ESIA process.

S. No.	Date	Stakeholder	Purpose
1	14th July'21	FMEnv – EA Dept, Team leaders; total attendees 10	Discuss proposed Train3 IEFCL project and draft ToR (Institutional Consultation)
2	26th July'21	FMEnv, RSMEnv, E&CS & Proponent reps; total attendees were 07.	Site verification required for Project categorization (Institutional Consultation)
3	20th Aug'21	FMEnv, RSMEnv, Eleme LGA, Relevant Stakeholders, E&CS & Proponent reps; total 89 were attendees.	Scooping workshop for ESIA, ToR/SoW (Institutional and Public Participation)
4	18th Oct'21	FMEnv, RSMEnv, E&CS Team Proponent & Community reps; total 17 were attendees.	Kick-off meeting for field data gathering exercise To streamline sampling strategy and techniques

S. No.	Date	Stakeholder	Purpose
5	25/26th Oct'21	E&CS & SIA/HIA study team,	Training of SIA/HIA field staff and field sampling procedure, techniques and strategy.
6	5th Nov'21	Akpajo community stakeholders - Paramount Ruler and community Chiefs, NGO, Women Leader and Executive, Community Youth President and Executive, Farmers, Traders. 99 participant	Educate participants on the proposed Train 3 project scope, environmental, social, economic and health aspects. Possible impacts of the project and community perspective (expectation, benefits, and perception etc).
7	8th Nov'21	Aleto community stakeholders - Paramount Ruler and community Chiefs, NGO, Internal Vigilante Reps, Women Leader and Executive, Community Youth President and Executive, Farmers, Traders. 99 participant	Educate participants on the proposed Train 3 project scope, environmental, social, economic and health aspects. Possible impacts of the project and community perspective (expectation, benefits, and perception etc).
8	9th Nov'21	Okerewa community stakeholders - Paramount Ruler and community Chiefs, Women Leader and Executive, Community Youth President and Executive, Fishermen, Farmers, Traders. 99 participant	Educate participants on the proposed Train 3 project scope, environmental, social, economic and health aspects. Possible impacts of the project and community perspective (expectation, benefits, and perception etc).
9	10th Nov'21	Agbonchia community stakeholders - Paramount Ruler and community Chiefs, CDC, Women Leader and Executive, Community Youth President and Executive, Farmers, Traders	Educate participants on the proposed Train 3 project scope, environmental, social, economic and health aspects. Possible impacts of the project and community perspective (expectation, benefits, and perception etc).
10	11/12th Nov' 21	Njuru and Akpakpan community stakeholders - Paramount Ruler and community Chiefs, Women Leader and Executive, Community Youth President and Executive, Farmers, Traders	Educate participants on the proposed Train 3 project scope, environmental, social, economic and health aspects. Possible impacts of the project and community perspective (expectation, benefits, and perception etc).
11	15th Nov'21	Family Chiefs Council, CDC Chairman, Youth President and Council, Women group, Vulnerable group Reps	Educate participants on the proposed Train 3 project scope, environmental, social, economic and health aspects. Possible impacts of the project and community perspective (expectation, benefits, and perception etc.).
12	7th Dec'21	Community Relations management, staff, PAC members, Consulting Team	Educate participants on the proposed Train 3 project scope, environmental, social, economic and health aspects. Possible impacts of the project and community perspective (expectation, benefits, and perception etc.). Expand on intermediary, ambassadorial, sensitization, company policy enlightenment, troubleshooting role etc.

S. No.	Date	Stakeholder	Purpose
13	13th Jan'23	FMEnv, RSMEnv, Eleme LGA & King of Eleme land with Paramount Rulers, Community Chiefs, Elders, Women & women leaders, Youths, NGOs, Civil Societies, Farmers, Traders, Fisherfolks, students etc.	A broader engagement to further educate participants on the proposed Train 3 project scope, environmental, social, economic and health aspects. Possible impacts of the project and community perspective (expectation, benefits, and perception etc.)

1.3 Components of the Report

This report is divided into two sections. The first section chronicles series of engagements with regulators, project affected communities, consulting firms (E&CS) and their subject matter experts, SIA/HIA team among others (S. No. 1 to 5 of above table1). The second section presents community wise engagements (project affected) and public forum with the stakeholders and decisions reached (S. No. 6 to 13 of above table).

Section – 2

2.1 Engagements with Executives of Environment Assessment Department (EAD) of Federal ministry of Environment (FMEnv), Nigeria

Date : 14th July'2021
Venue : Conference Room, EAD, Abuja
Stakeholders Present: EAD and Seven (7) Divisional Heads,
Proponent Head of Environment Dept.
Proponent Environmental Consultant
Disclosure:

The engagement session commenced at about 11:00am with introduction of participants which include executives of EAD, Lead Consultant of E&CS and Proponent Rep. Total 10 attendees in the session. The Summary of Brief is stated below:

1. The Project proponent Rep explained about the performance of the operating IEFCL-Train1 & Train 2 plants and the proposed project "IEFCL-Train3" emphasizing on its technology, process and production capacity which is a replica of Train 1 and 2
2. The Lead Consultant of E&CS, FMEnv accredited environment consulting firm presented draft Terms of Reference / Scope of Work for the EIA study/report for the proposed project.
   Technical discussion between proponent and FMEnv.
3. The discussion between EAD executives, Lead Consultant and Proponent Rep on various topics covering technical, environmental, social, financial etc. aspects.
4. The EAD executives appreciated the efforts of Proponent and made assurance to support the EIA approval process. They advised to submit the EIA registration application with relevant documents and evidence of payment of statutory fee.
5. Director EAD informed that after submission of application, the EAD will register the project for EIA approval as per first step of EIA approval process, the FMEnv officer along with State Ministry of Environment Rep will visit the site which is required for categorization of the project.
6. After session, the EIA registration application, project proposal, draft ToR along with statutory fee was submitted to offices of Director EAD and Minister of Environment FMEnv.

Attendance Sheets : The attendance sheets are attached below:

Attendance Sheet

INDORAMA FERTILIZER

INDORAMA ELEME FERTILIZER & CHEMICALS LIMITED, ELEME, RIVERS STATE, NIGERIA

ATTENDENCE SHEET

PROJECT	IEFCL – Train 3 Project
DATE & TIME	14th July' 2021 ; 11:30 AM
VENUE	FMEnv – EA Dept. Conference Room.
TOPIC	

S/N	NAME	ORAGNIZATION	PHONE NUMBER	EMAIL	Sign
1.	Ar Abbas Sulaimon	fmEnv	08034612933	abbasSule@hotmail.com asulaiman@ead.gov.ng	
2.	Gomwalk, Celestine W.G	✓	08037869670	cgomwalk@yahoo.com	
3.	H.D. Ladula	✓	08020910889	hdladula@yahoo.com	
4.	Dr. Musa Gashau	✓	08033141766	musagashau1967@gmail.com	
5	Babatunde A. Odunlami	✓	08033057302	babsodunlami@gmail.com	
6.	Omovoh, Gift O.	FMEnv Abuja	08076922055	giftodojetodo1@yahoo.com.	
7	A.B. Maina	✓ ✓	08036129076	abmaina24@gmail.com	
8	Ali Kogin Mala	✓ ✓	08033799803	alwa2660@yahoo.com	
9.	Dr. Mahendra Jain	Indorama	08070324523	mahendra.jain@indorama.com	
10	OLUA. WAS-OGOSU	✓	08033384134	envichemical@gmail.com	

2.2 Site Verification by Environment Assessment Department (EAD) and Rivers State Ministry of Environment (RSMEnv) officers

Proceedings

Date : 26th July'2021

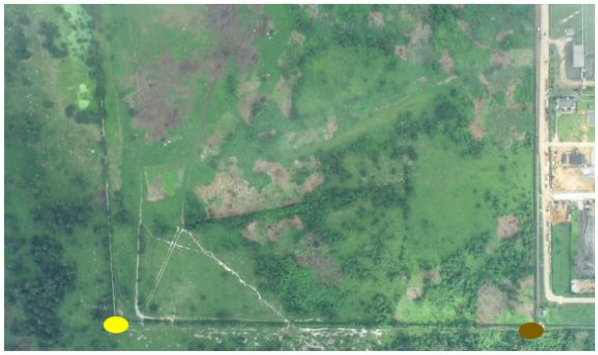
Venue : Indorama Complex and Project Site

The site verification engagement session commenced at about 10:00am with introduction of participants which include Reps of FMEnv Abuja, FMEnv Zonal Office Port Harcourt, Rivers State Ministry of Environment (RSMEnv), Lead Consultant of E&CS and Proponent reps (Mr Onyeka Ire Okoli, FMEnv Abuja; Mr. Ikomah Friday & Mrs. Obi Agusta, FMEnv PHC; Mr. Randolph Shadrach, RSMEnv; Engr Ogosu & Mr. Solomon, E&CS; and Dr. Mahendra Jain, Indorama). Total 07 attendees in the session.

The summary of engagement session is as below.

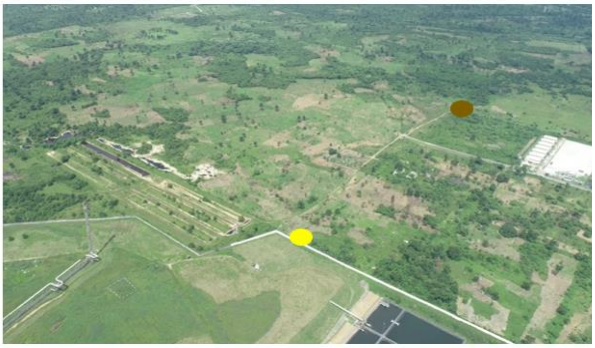
1. The Project Proponent Rep explained about the proposed project "IEFCL-Train3".
2. The FMEnv reps explained the purpose of the visit, which was supported by RSMEnv rep.
3. The FMEnv rep explained that EIA approval site verification visit is aimed to categories the project considering various environmental & social aspects.
4. The Lead Consultant of E&CS, FMEnv accredited environment consulting firm, presented the broad view of physical, biological, & socio-economic environment of proposed project.
5. The Team visited Project Site and gathered info/photographs. After site visit, the FMEnv Team concluded the meeting indicating that IEFCL will soon receive the feedback of site verification visit.
6. The FMEnv letter reference number FMEnv/EA/EIA/6063/Vol.1/68 dated 5th August 2021 indicated that the Ministry has placed the Project in Category One (1) with one (1) season baseline data gathering for the ESIA report. The Ministry also instructed to conduct a Scoping Workshop under observation of FMEnv & RSMEnv, involving relevant stakeholders in attendance.
7. The Ministry further instructed to submit Scoping Workshop report and revised Terms of Reference (TOR) incorporating significant issues raised at the Scoping Workshop and a detailed sampling frame for review and approval.
8. The Ministry was informed about Scoping Workshop Program and the Ministry confirmed the participation vide letter no. FMEnv/EA/EIA/6063/Vol.1/70 dated 19th August 2021.

Site Photographs



North -West end of the Project site

East end of the Project site



South end of the Project site

Visiting Team

Project Site

2.3 Scoping Workshop

Proceedings

Date : 20th August 2021

Venue : Swiss Spirit Hotel, Ken Saro Wiwa Road, Port Harcourt, Rivers State

Presenter/Facilitator: Engr. Andah Olu Wai-Ogosu (Consultant)

The workshop commenced at 10:25am with introduction of participants and key stakeholders namely:

i. Representatives of the Federal Minister of Environment
ii. Representatives of the Ministry of Environment, Rivers State
iii. Project affected communities
iv. Eleme Fishing Association
v. Eleme Hunters Association
vi. Eleme Youth Leaders
vii. Eleme Women Leaders
viii. Members of Project Advisory Committee (PAC)
ix. The King of Eleme
x. Paramount Rulers of various Communities in Eleme
xi. The Chairman, Eleme LGA
xii. The Leader, Eleme Legislative Assembly
xiii. The Consultant to Indorama, Engr. Andah Olu Wai-Ogosu
xiv. The Indorama Team

Total 89 attendees in scoping workshop.

Presentation of Scope of the EIA Study on the proposed Projects

Indorama's Environmental Consultants first informed the participants about the Proponents and background of the projects before diligently reviewing the Scope of the EIA work which covered description of the project and the physiobiological content of the components of the environment of the study area. He claimed that the EIA study would cover 4km radius and six (6) host communities. He also emphasized that the study would cover socio-economic variables, Occupational and normal Health Status of the project area, Transportation, and waste related issues, associated and potential (positive and negative) impacts of the proposed projects during construction and operations phases of the project implementation. He did not leave out the report format, deliverables and necessary management plans which will enhance the value of the projects not only on the community resources but also on the economy of the local, State and Federal Government. He closed by stating that the EIA study will be carried out with reference to National and International Environmental Regulations. The presentation made to stakeholders is appended as annexure 2.

Questions and Comments

1. **Engr. Fubara of FMEnv**

   Considering the huge traffic that will be generated from the Train-3 project, what are the implementation strategy to resolve the anticipated traffic problem, and the strategy for economic resettlement considering the likely impact of the operation on the people's source of livelihood.

2. **Hon. Dick Nwosu**

   Advised that refreshment be provided for participants of the workshop.

3. **Chief Emaa Jaka**. He asked for the implementation strategy for the huge traffic problem that will be created. He also observed that the anticipated overpopulation problem is not captured in the presentation. He also wished to know plans for ecological restoration following the effects that the project will have on the ecosystem.

   The presenter responded by saying that over-population is captured under what he described as social variables, which accounts for migrant workers and its management. He also emphasized that ecological related problems are duly treated under biodiversity plans.

   Mr. Kendrick Oluka, General Manager Community and Governance Affairs, the moderator of the workshop representing Indorama, also explained the plan put in place by the company for traffic management. That a traffic management park is been developed supervised by Hon. Nwosu. Also, that severally the company has assisted the government in road rehabilitation to reduce bad spots on the road which is also responsible for heavy traffic on the road. Also, that the company has severally made presentations to both State and the Federal government on the state of the Eleme-Onne Road. He also directed attention to the Rivers State Government's plan to construct a link road (MTECH road) connecting the Airport, through Agbonchia to Onne. All these plans will help to ease traffic in the proposed project area.

4. **Mr. Joseph Ekehe representing Agbonchia**

   He commended the excellent presentation and Indorama as a responsible company. He expected to hear more on the dangers and environmental challenges associated with the project. He appealed that an environmental expert should be engaged to interface between the community and the company for better understanding of the benefits that will be derived from the projects.

   A respondent from the community reacted that they will not be need for another external environmental expert since their own son, the presenter, an expert in environmental studies is the one handling the projects. That, he will be consulted privately, whenever the need arises.

5. **Barrister Wordi**

   He complained on the non-implementation of the previous traffic management plans and that what is the guarantee that all the traffic management plans contained in the present EIA will be

implemented. He advised the consultant to follow-up on the plans to ensure all that are stated in the report are implemented. He also suggested that an advanced copy of the presentation should be sent to stakeholders before the workshop for subsequent meetings to enable participants / non-professionals participate and flow along with the presenter.

6. **Rev. Oluji Joseph, representing Fishermen Association of Eleme**

   He expressed worry over the negative impact that harmful emissions have had on aquatic life, and wished to know the mitigation plans, alternative source of livelihood to fishermen if their fishing business is affected by the operation, and alternative source of drinking water for the people.

   The presenter reacted to most of the questions by drawing their attention to the purpose of the workshop for the day, which is to define the scope of the projects, and to get inputs that will enrich the study from the various stakeholders and not to be discussing hazards. And that in subsequent meetings other areas of concern will be addressed through direct interaction with the various groups.

7. **Elder Igolo, representing Hunters Association**

   He appealed that Indorama as part of their CSR should provide the following for the communities: potable drinking water, job opportunities, electricity, and pipeline surveillance contract. He also advised the company to roll out a robust environmental plan for the preservation of wide-life and biodiversity.

8. **Hon. Victor O. Goka**

   Commended the consultant and the company for always giving EIA lectures before commencing their projects. He also advised the company to take necessary precautions on the inherent environmental hazards associated with the projects. He also emphasized the need for regular meetings with relevant stakeholders so that they can make inputs as the study progresses. He praised Indorama for creating jobs and contracts for Eleme people and encouraged more investments from Indorama in Eleme to create more employment opportunities.

Reactions from the High Table

1. Representative of the Federal Minister of Environment

He commended the excellent presentation. Emphasized the need for inclusion of the fishery issue raised in the study. He advised that sampling locations for air quality, soil and groundwater should be spread across all the communities in the study area to avoid any issue coming from any community after the study have been carried out.

2. Representative of the Rivers State Minister of Environment

He expressed confidence in the expertise of the consultant. He appealed for cooperation among the various stakeholders (community, company, and consultant). He advised that concerns raised in

previous EIAs (implementation of environmental management plan) should be incorporated into the present EIA. He also emphasized on the need to incorporate safety and effluent discharge as key components in the EIA study. Worried about his observation during one of his visits to the facility on workers concept and poor safety behavior. He appreciated the cordial relationship between the company and the community, stressing that Indorama is a responsible company, and advised them to sustain the good relationship.

3. The Honorable Chairman, Eleme Local Government Area

He appreciated all that are present at the workshop. Advised that if the impacts of previous plants on health, economy and other areas are high, they should consider relocating the current plant. He appealed that more of this kind of investments should be sited in the area because of its economic benefits. He encouraged the planting of trees now as a long-term plan to mitigate the impacts of the operation on the environment. The Chairman advocates for the establishment of an Environmental Trust Fund to foster development. Finally, he appreciated the efforts and expertise of the consultant and that his expertise will be needed by the community instead of hiring someone else.

4. The Royal Majesty, the King of Eleme Kingdom-King Dr. Philip Obele

The king appreciated all for being present at the workshop. He stated that any place that is industrialized must always have problems of pollution and over-population. He encouraged all to expect that, but the challenges associated with it must be managed. What is most important is the development that comes with industrialization. He identified one source of traffic in the area as those coming with their private trucks to present them for hire by those doing business in Indorama complex. He further assured every one of the environmental safety considerations incorporated into the design of the plants from inception, of which he was part of the team that carried out due diligence on the company in India. He advised the Eleme people to embrace Indorama with good heart as there are other people who might be interested in them to avert relocation to other areas and states hotly itching for development.

In conclusion, the scoping workshop went well, and stakeholders participated actively to enrich the Scope of the EIA study work. The stakeholder's inputs are incorporated in revised Scope of Work (SOW)/ Terms of Reference (TOR) for both the Projects. The Scoping workshop report and revised TOR was submitted to the Ministry. The Ministry approval was received vide letter reference number FMEnv/EA/EIA/6063/Vol.1/160 dated 5th October 2021.

EVENT PHOTOGRAPHS








Plates showing Participants During Stakeholders at the Engagement Meeting

Attendance Sheet

INDORAMA ELEME FERTILIZER & CHEMICALS LIMITED, ELEME, RIVERS STATE, NIGERIA
&
INTEGRATED POLYCHEMICALS LIMITED, ELEME, RIVERS STATE, NIGERIA

ATTENDENCE SHEET

PROJECT	IEFCL-Train3 and PDH-PP PROJECTS
DATE & TIME	20TH AUGUST, 2021. 10 AM
VENUE	SWISS SPIRIT HOTELS & SUITES, NO. 79 STADIUM ROAD, PORT HARCOURT, RIVERS STATE.
TOPIC	SCOPING WORKSHOP

S/N	NAME	COMMUNITY/ ORAGNIZATION	PHONE NUMBER	EMAIL	SIGN
1.	HON. NWOSU NGOFA (JP)	ALETO PAC	08038748077		[signature]
2	Osaruka Godwin Ngesia	AKPAJO PAC	08037070505	osmolaka@gmail.com	[signature]
3	Emmanuel OBEFEOBE	ALETO PAC	08036739878		[signature]
4	WOSU, VICTOR -T.	NWAAKO PAC	08038897233		[signature]
5	Nwakama Nwafor	AKPAKPAN PAC	08104065296		[signature]
6	CHIEF (HON) GEORGE ESARO	AGBONCHIA PAC	08184225544		[signature]
7	Hon. Osaro Sampson Torgba	Okerewa PAC	08064860560		[signature]
8	Philemon Ofi Obele	AKPAJO PAC	08032765867		[signature]
9	OKANJE, N. Emmanuel	Okerewa PAC	08138097324		[signature]
10	OBELE EGB USAROWEN	NJUKRU PAC	08189972761	[illegible]@gmail.com	[signature]
11	Chf. Mgbigbi Osilaechuu	Okerewa	0813211379[illegible]		[signature]
12	H.H. Emere Eze Xoyan	N. Juru	070373 223[illegible]		[signature]
13	HRH. JOSEPH NGETO	AGBONCHIA	08032665963		[signature]
14	(Emere) Osaro A. Nwafor	Akpakpan	08033397185		[signature]
15	Chief Mike Wosu	Wosu family	08036202382	wosumichael10@gmail.com	[signature]

1

16	OSARO, SUSAN	Women ALETO	08146978465	08153722560	[signature]
17	MRS. FELICIA OLUNGWE OSARO	Women ALETO	08037020482	Licia4tee	[signature]
18	MRS ROSE OSAROLM	Women AGBONCHIA	07030981746		[signature]
19	MRS Florence Aj	Women AGBONCHIA	08038968692		[signature]
20	Edith Osaremube	Women AGBONCHIA	08135352		[signature]
21	NNE G. Sagbe	Women ALETO	07034259691		[signature]
22	BLESSING CYRUS	Women okerewa	08189912216		[signature]
23	Olane Chinwi Amadi	Women ALeto	09156096484		[signature]
24	NWIDAA N. MARTHA	Youth AKPAJO	08034409354		[signature]
25	heeky N. CHima	Youth Akpajo	07046495107		[signature]
26	Osarolu Blessing	Youth Agbonchia	07072651240		[signature]
27	Olukpobe Amebeban	(Youth) Agbonchia	08145434542		[signature]
28	Obari Kedee	(Youth) Aleto	08032953945	P.R.O	[signature]
29	OLUKPEOPE MIRACLE	(Youth) Akpajukpam	08038818162	Treasurer	[signature]
30.	CHU OBARIFOMI O	(Youth) AGBONCHIA	08134274537	V. President	[signature]
31	SOLOMON OPEEE	(Youth) A[illegible]	0816[illegible]		[signature]
32	JOSHUA omute N.	okerewa	07035584935	President	[signature]
33	IKOMAH, F.B	FMEnv. PH	08055662496		[signature]
34	Gbolahan Temilorun	FMEnv Abuja	08051691967		[signature]
35	CHIDUM NWUTCHE	RSMEnv	08052678089	chidumn3@y	[signature]
36	Prince Nwoko[illegible] Gombo Nwidaa	Akpajo	08035730317		[signature]
37	Nwogu michael	Agbonchia	09060644065	nwogumichael@g	[signature]
38	GAIUS OSAROBUNIOU	ALeto youth	08068351374	F.R.S	[signature]

2

39	Dubu Dubu	MLGTO	07063142244		[signature]
40	ROBINSON Anigor	—	08054848679		[signature]
41	Wisdom Nwaeji	Aleto	08131937874		[signature]
42	Chief Emma Jaka	Akpajo	07062795211		[signature]
43	Johnson Gumbanwafor	Akpajo	07068692505		[signature]
44	OSARO NWOLU YORGBA	PAC OKERENWA	08036687272		[signature]
45	ISAAC OLUKA E.	PAC PALACE	08033749087		[signature]
46	R.O. OKPARAJI ESQ	Agbonchia	08060318855		[signature]
47	WILCOX henry Chinnah	NWIKOHU	08032651622		[signature]
48	Joseph Ekee	Agbonchia	08038067118		[signature]
49	TUMII, DUMBARI K	RSMEHY	08038731155		[signature]
50	ELDER EBOTUKAKU F.S.E	FRIENDS, P.H.	08035533263		[signature]
51	OBI AUGUSTA	FMENV	08032658246		[signature]
52	Comr Deri T. Ogosu	omne	07065846588		[signature]
53	Comrd. Afenya Jacob	Nchia youth	08030858762		[signature]
54	Comr, OJINIKA A. OBARI	ODIO ofodih	08039525229		[signature]
55	MAGNUS ALVIN OSARONWAFOR	AKPAJO	09055881159		[signature]
56	Barinua Barikpoa	E & CS Ltd	08070442580		[signature]
57	Nachukwu Solomon	E & CS Ltd	08029060622		[signature]
58	Zorka Sunday	E & CS Ltd	07037993486		[signature]
59	DR. PRINCE NWONTA	E & CH. SERV.	08063988512		[signature]
60	Eld. IGWE O. NWAFOR	HUNTERS	08167500078	igwe_oluka @yahoo.com	[signature]
61	Godwin Monade	HUNTER	08056263409		[signature]

62	Andrew Ochuen	Hunter Ch	07039171425		[signature]
63	Chu Christian	Host Comm	08060033735		[signature]
64	SUCCESS. O. OBETA	Fisherman	08165234973		[signature]
65	REV. OLUJI, JOSEPH E.	Fishermen	08038069491		[signature]
66	Idemudia Maxwell	P.A / HRM	08066906564	maxwell1234@gmail.com	[signature]
67	Toyin Olanrebe	EEPL	08088286786	lucy2yok@yahoo.com	[signature]
68	OSARO OCHENI CHUREMI	Host Community	08164157449	chucemiesha2017@gmail.com	[signature]
69	OGBONDA ICHEBADU PRECIOUS	Host Community	07030550072	talkwithcesge yahoo.com	[signature]
70	Nwokorie Nnamdi	fishermen	08039295622	nn@ [illegible]	[signature]
71	Chief Hon. Obarilomate Ollor	L.G.A Chairman Lg	0803333525728		[signature]
72	Bright Mejiere	P.A to the Chairman LGA	07066562304		[signature]
73	Godwin Stephen	Inside Eleme Rivers	07036945589	godwinstephen@gmail	[signature]
74	ATE .O - CHINWI	PRESS SEC	08068667557	Atechinwi@gmail	[signature]
75	SALOKA DuDu	ALSTO	09092155650		[signature]
76	Rt Hon. Chuma Donnel ...	ALSTO	07066828717		[signature]
77	PRINCE OKEREKE	ALESA	08037755397	ELEME YOUTH PRESIDENT	[signature]
78	HON: ISAAC O. CHU	AGBONCHIA	08036634112		[signature]
79	ENGR. NTEIOBARI OLLOR	ONNE ELEME	08080843753	ombrotller@gmail.com	[signature]
80	HRM KING(DR) PHILIP OSARO OBELE, JP	ALETO / ELEME	08066926564	—	[signature]
81	Russel Nsofor	Indorama	08065334588	russelNsofor@gm	[signature]
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83	JAKA GODSPOWER	INDORAMA	08032447692	Jjaka@Indorama	[signature]
84	Hon. EMMANUEL Oluku	AKPAJO	08037104607	emmaokekenp@gmail.com	[signature]

85	Hon. Robert Ogom	Omne	07033656378	[illegible]	
86	HON. VICTOR O. GIKA	AKPAJO	08035588635	COUNCILLOR	
87	David Aike	ALESTO	08132493346		
88	PRADEEP EKKA	INDORAMA	–	–	
89	KENDRICK OLUKA	INDORAMA	–	–	

5

2.4 Field Data gathering Exercise – Kick-off meeting & Field Data gathering

Proceedings

Date: 18th October 2021

Venue: Project Office Conference room, Indorama Complex, Eleme

The kick-off meeting for ESIA study data gathering exercise was held within Indorama Complex on 18th October'2021. The Regulators, Consultant Team and Proponent representatives were in attendance. Total attendees were 17.

- Proponent rep welcomed Regulators and Consultant team and explained about the Project.
- The FMEnv reps explained the expectations from the Consultant Team & Proponent during/post exercise.
- The Lead Consultant explained about the approved TOR and execution plan. After discussion the teams were moved to the filed for field data gathering.

Event Photographs

Attendance Sheet

INDORAMA ELEME FERTILIZER & CHEMICALS LIMITED, ELEME, RIVERS STATE, NIGERIA
&
INTEGRATED POLYCHEMICALS LIMITED, ELEME, RIVERS STATE, NIGERIA

ATTENDENCE SHEET

PROJECT	IEFCL-Train3 and PDH-PP PROJECTS
DATE & TIME	18th October'2021; 09:30AM
VENUE	PROJECT OFFICE CONFERENCE ROOM
TOPIC	FIELD DATA GATHERING EXERCISE KICK-OFF MEETING

S/N	NAME	COMMUNITY/ORAGNIZATION	PHONE NUMBER	EMAIL	Sign
1.	IKOMAH, F.B	FMENV	08055662496	bari.engee.env@gmail.com	
2.	Obi Augusta	FMENV PHC	08032658246	augustacian@ydm.com	
3.	UKAULOR, LOVEDAY	RSMENV, PHC	08037769478	lovedayukaulor@gmail.com	
4.	OBA, MONDAY	RSMENV, PHC	08038999826	mobile.info17@yahoo.com	
5.	DANBABA BENJAMIN	FMENV ABUJA	08034730594	dambabab701@gmail.com	
6.	Gbolahan Temilorun	FMEnv Abuja	08051691967	gbolahantemilorun@gmail.com	
7	BOMA ARIWEIKUMA	E2CSLtd	08037226195	benzari2021@yahoo.com	
8	Okw. Wali-Ogoju	E2CSLtd	08033384034	envichemical@gmail.com	
9.	DR. MAHENDRA JAIN.	INDORAMA	08070324523	mkjain@indorama.com.ng	

INDORAMA ELEME FERTILIZER & CHEMICALS LIMITED, ELEME, RIVERS STATE, NIGERIA
&
INTEGRATED POLYCHEMICALS LIMITED, ELEME, RIVERS STATE, NIGERIA

ATTENDENCE SHEET

PROJECT	IEFCL-Train3 and PDH-PP PROJECTS
DATE & TIME	18th October'2021; 09:30AM
VENUE	PROJECT OFFICE CONFERENCE ROOM
TOPIC	FIELD DATA GATHERING EXERCISE KICK-OFF MEETING

S/N	NAME	COMMUNITY/ORAGNIZATION	PHONE NUMBER	EMAIL	Sign
10	Chunda Casca-Ogosu	ELEME LGA REP.	08108543457	ChundaCascaOgosu @yahoo.com	
11	JAKA GODSPOWER	INDORAMA	08134476692	gjak@indorama.com.ng	
12	Tayin Olamsebe	Indorama	08068264786	lucy2y2k@yahoo.com	
13	Nwachukwuka Solomon	E&CS	08032906022	Emperorsolo@yahoo.com	
14	DR Raphael A. Offiong	E&CS	08034506530	raphyxx5@gmail.com	
15	Dr D.O. Edoks	E&CS	08033275677	onojiede@gmail.com	
16	Dr Adewole Adeyemi	E&CS Ltd	08037203589	wole22ng@yahoo.com	
17	Sunday Iorka	E&CS Ltd	07037993486		
18					

2.5 Orientation / Planning Meeting for Field Staff on Data Gathering for SIA/HIA of IEFCL-Train3 Project ESIA

Date : 25th October' 2021

Venue : Environmental and Chemical Services Ltd Office

Background

Impact assessment is participatory research to ascertain current realities and its associated outcomes regarding the wellbeing of a given people. In this instance, social and health impacts of selected communities of Agbonchia, Aleto, Njuru/Akpakpan, Okerewa, Akpajo in Eleme LGA and Wakoahu Family in Elelenwo of Obio/Akpor LGA and to highlight identified gaps to Indorama Eleme Fertilizer & Chemicals Limited (IEFCL) with a recommendation on how the company can support the mitigation of identified challenges traceable to the Fertilizer operation.

DAY 1: Planning Meeting at Environmental and Chemical Services Ltd Office on 23rd October 2021

A pre-orientation meeting held at ECSL Office between the EIA/SIA consultant of Train 3 EIA and the youth representatives of target communities led by the ELEME LGA Youth President Mr. Joshua Ngokanya. The MD/CEO of ECSL set the tone of the meeting by enjoining all to be committed to the assignment and see it as an opportunity to rewrite the perception of the people regarding Indorama Company.

The Youth President in his speech appealed that the task at hand should be done objectively without bias or self-judgment. The Consultant requested that the youths should seek for information from elders and other anecdotal sources. They should see themselves as vanguard of change and should use this opportunity to abreast themselves with their history.

DAY 2: Capacity Building Sessions

Training Objectives:

1. Understand the basic concept of impact assessment (Social, Economic & Health) for development
2. Understand the Needs Response Approach (NRA) to development
3. Review of Information gathering tool (questionnaire).

Participants Expectations:

To be more enlightened on SIA and HIA processes

Topics discussed include the following:

- Brief overview of Why the Assignment?
- What is socio-economic and Health Impact
- Assessment
- The basic concept of development
- The Needs Response Approach
- Tools and strategies for engagement

After registration and opening formalities, the Youth President Eleme LGA gave his opening remark and charged the youths to be diligent by ensuring they provide an enabling environment for the survey to succeed. There should be no falsification in the information gathering process as the task should be viewed as bringing goodness to the community rather than being opinionated about Indorama that must fix all their challenges.

In the course of the meeting, the Managing Director of ECSL **Engr. Olu Andah Wai-Ogosu arrived to observe the process during** his speech, he stressed the need for participants to understand the importance of the orientation because they must be able to communicate to the understanding of the respondents the importance of SIA and HIA and a robust stakeholder engagement. He also emphasized that field enumerators should ensure that all questionnaire administered must be retrieved for analysis in order to capture the actual state of affairs of the people.

An Overview of SDGs:

Participants were quizzed on how far and how well they know and use the Sustainable Development Goals; surprisingly only very few knew about SDG. The introduction of the goals was intended to set the background on how to view the developmental challenges in their communities beyond the expectations from Indorama. It created a broad mindset to enable them think out of the box and how they can do some critical thinking on the issues that lies within.

Visualization Exercise and Problem Tree Analysis

We employed this strategy of reflections from their minds-eye on the challenges, causative effects and possible solutions they can bring based on the SDGs they have just experienced. Stated below in the plenary session is the outcome.

- ✓ Poor information/ignorance
- ✓ Low/ no education
- ✓ Poor civilization
- ✓ Poor standard of living
- ✓ Environmental pollution

- ✓ Youth restiveness
- ✓ Poor and nonfunctional health infrastructure
- ✓ Noise pollution
- ✓ Over population
- ✓ Compromised traditional institutions
- ✓ Security
- ✓ Capitalism
- ✓ Indiscriminate waste disposal
- ✓ Religious intolerance
- ✓ Inadequate government capacity
- ✓ Loss of some species of plant and livestock causing food crises

- ✓ The above are some of the random discoveries' opinion (in no particular order) expressed by participants which had little bearing on the "suspect" Indorama. They attributed most of the identified issues to ignorance, poor education and civilization. They profess that they will put caution to their activities and will begin to identify likeminded persons to drive a change process in their communities. A problem tree analysis was used to illustrate how to track and tackle an identified challenge from the root cause rather than dwell on an abridged solution which will often deepen the issue with diverse bearings.

Review of SIA and HIA Questionnaire

Participants were taken through all the aspects of questionnaire to be applied in the community precepts upon precept so they will be able to understand and give deep explanation to respondents as stated thus

- Demography
- Family profile
- Economic profile
- Standard of living
- Housing
- Road and transportation (migration and immigration)
- Infrastructure (Health, education and social)
- Natural resources and land use
- Socio-cultural practices/properties
- Village level organization
- Safety/Security
- Agriculture
- Biodiversity (vegetation and wildlife)
- Renewable energy
- Lifestyle and values
- Human Right

- Common ailment and care
- COVID-19 perceptions
- Risk and hazardous conditions

MAPPING OF POTENTIAL GROUPS FOR FOCUS GROUP DISCUSSION (Key informants)

1. Traditional Rulers
2. PAC
3. Hunters Association
4. Farmers (Crop and Fish)
5. Youths, Elders and women
6. Socio-cultural groups
7. Transport workers
8. Religious groups (Christian Association and African Religionist)
9. Politicians
10. Traders and Entrepreneurs
11. Non indigenes (Other Nigerians)

Participants unanimously agreed to work collectively in all communities (Akpajo, Njuru/Akpakpan, Okerewa, Aleto and, Agbonchia) irrespective of their primary community. Participants observed that Akpakpan was omitted in the identification of communities stating that it is a part of Njuru.

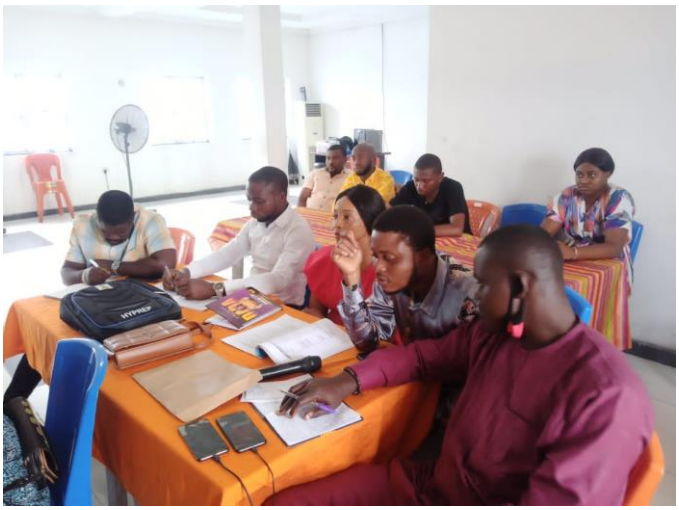
SIA/HIA Data Collection Team	
COMMUNITY	CONSULTANT TEAM
1. **Prince Nwokolu Gomba Nwidaa** 2. **Ngawala Godwin**	Belema Philip Akpali
3. **Sunny W. Eeh** 4. **Nwidaa N. Martha**	Ibibia Okerenta
5. **Aji Michael Goda** 6. **George Ogolo Nwolu**	Divine Ojaeko
7. **Obari Kedee** 8. **Gaius Osarobundo Ngofa**	Hope Pius
9. **Moses Obele Mube** 10. **CHU Obarifomi**	Ajangaboka Okoseimiema
11. **Olukpeobe Miracle** 12. **Favour Olukpe Obe**	Bekee Tams

Training Approach

Participatory and interactive approach was deployed during the capacity building session. Specifically, it involved the following:

- Power-point presentations and Flip chart
- Demonstrations
- Discussions
- Energizers, ice breakers and brain storming technique were used.
- Group work
- Question & Answer sessions

Event Photographs



Attendance Sheet

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS
ENGAGEMENT ATTAENDANCE SHEET

DATE: 25/10/2021

VENUE:

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
1	JOSHUA OMUTE	OKEREWA	07035974935	M		
2	Sunny-W-EEH	NJURU	08035659166	M	Sassyeeh@gmail.com	
3	Kate Ochun	ATETO	07068683623	F		
4	CHU OBARITOMI O.	AGBONCHIA	08154274357	M		
5	OLUMBEOBE MIRACLE	AKPAJEAKPAJO	07091716085	M	[illegible]@Yahoo	
6	OLUMBEOBE FAVOUR	✓ ✓ ✓	08145431592	F	olumbeobe[illegible]@gmail	
7	MOSES OBELE MUBE	AGBONCHIA	07034313067	M	Obezini@gmail.com	
8	NGAWALA' GODWIN	OGALE	07063056907	M	Gottyng[illegible]@gmail.com	
9	GEORGE OGOLO NWOKU	OKEREWA	08038041947	M		
10	OBARI KEDEE	ALETO	08032955745	M	Bennard[illegible]@Gmail.com	
11	NWIDAA N. MARTHA	AKPATO	08034409359	F		
12	Osamlein Blessing	agbonchia	09092681244	F	[illegible]@gmail.com	
13	AJI MICHAEL GODA	OKEREWA	08063612966	M	michael[illegible]@yahoo.com	

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS ENGAGEMENT ATTAENDANCE SHEET

DATE: 25/10/2021

VENUE: ....

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
14	Prince Nathaniel Nicolas	Akpajo	08033730319	M		[illegible]
15	Gaius Osarobundo [illegible]	ALETO	08068351371	M		[illegible]
16	Ozuka Dumme	MANKIND	080327[illegible]	M	[illegible]@gmail	[illegible]
17	Kalema Akpdi [illegible]	MANKIND	08035007571	F	[illegible]	[illegible]
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IEFCL TRAIN3-PDH PROJECT EIA ASSISTANTS

ENGAGEMENT ATTENDANCE SHEET

S/No	Name	Organization/Community	Phone No	Signature
1	JOSHUA OMUTE NGOKANWA	OKEREWA	07035834935	
2	Musa, Obale Mube	Agbonchia	07034313067	
3	Prince Nwakaku G. Nwaka	Akpajo	08033730519	
4	NWAOBA N. MARTHA	AKPAJO	05034409359	
5	NGAWALA GODWIN	OGALE	07063056907	
6	OBARI KEDEE	ALETO	08038953945	
7	GEORGE OGOLO NWOKU	OKEREWA	08038041947	
8	DUMFEDEE MIRACLE	AKPANKPAN	08171716015	
9	DUMFEBE AMEFEOBARI	✓ ✓ ✓	08145434592	
10	HOPE	MANKIND	08123221857	
11	Okoseimiema Ajanyabofa. J	MANKIND	08059019822	
12	Imuabo Anabumokoro/w	MANKIND	08033461886	
13	OKU ANDAH WAI-OGOSU	EZCS Ltd	08033351344	

Section 3

Stakeholder's Engagement - Okerewa Community

Date of Engagement: 9th November 2021
Venue : Okerewa Community Town Hall
Facilitators: Lead Consultant

Stakeholders Groups Present

- The Paramount Ruler, Chief of Okerewa Community
- Community Chairman
- E&CS Team
- Community Security Guards
- Youth President and Executives
- Women Leader and Executives
- Representative of Youths from Eleme Youth Council
- Cross section of Okerewa Community Members

Attendance of Participants by Gender

Male	-	34
Female	-	65
Total	**-**	**99**

Proponent Disclosures

The proponent disclosed as follows:

- The purpose of embarking on the development of the fertilizer project in Eleme LGA and specifically near the existing fertilizer Train 1 and Train 2 Plants.
- The product, services expected from the development and the socio-economic relationship between the communities/environment as well.
- Land take is approximately 80 hectares
- Raw material (Natural Gas, Water, Power)
- Production capacity Ammonia (2300MPD and Urea 4000MTD)
- Elaborate management plan established to sustain the numerous benefits (employments, development of trained/skilled manpower, CSR projects, social welfare packages, educational support programs etc.) associated with the project as well as control the fears associated with chemical industries.

Questions and issues raised

The questions raised were bordered on livelihood activities especially farming and fishing, trading, and other economic activities as well as pollution and traffic management that are likely to arise from the project phases.

Response

Responding to their concern on loss of livelihood activities the lead consultant assures that the project implementation will bring about new line of businesses, provide both direct and indirect employment and acquisition of new skills that will improve the quality of living with the area. While on the issue of pollution, the consultant assures them that the ongoing ESIA study will provide mitigation actions to all associated environmental, social and health concerns as expressed. The effectiveness of these mitigation actions will be monitored both during construction and operation phases of the project. Moreso, the company will continue on their quality CSR Projects to the benefit of the community.

On Traffic concern, the consultant assured them that the ESIA study scope include traffic survey to establish the current traffic volume within the major road within the project area in order to proffer an effective traffic management plan. Furthermore, he confirmed to them the possibilities of the Project linking to the proposed new road by the State Government will prevent the use of existing East-West Highway.

Event Photograph

Attendance Sheet

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS
ENGAGEMENT ATTAENDANCE SHEET

DATE: 9 – 11 – 2021

VENUE: OKERWA

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
1	Goya Nwoke	Okerenwa		F		
2	Lucky Patience S.	✓	09080097554	F		
3	Ameme Nwanna	✓	08168667335	F		
4	Grace Yogboa Chujor	✓	08[illegible]054358	F		
5	Blessing Nwaka	✓		F		
6	Adanne Obare Kanma	✓		F		
7	Grace Ikodie	✓	09060466681	F		
8	Suzan Ogaro		08153722560	F		
9	~~Gloria~~ Sunday O. Rhoda		08032573512	F		
10	Chika Okanje		08166346788	F		
11	Esther Promise		08064024991	F		
12	Rose Osengoda		09128291685	F		
13	Blessing Cyprus		08189122489	F		

ENVIRONMENTAL & CHEMICAL SERVICES LIMITED Date:

PRO Name

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS
ENGAGEMENT ATTAENDANCE SHEET

DATE: 9 - 11 - 2021

VENUE: OKERENA

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
14	Alimat Kamve	Okerenya	08143464499	F		
15	Rosemarie Nyimegina D.		08168429463	F		
16	Elera Godwin		07036743162	F		
17	Blessing Tampiro D.		09122523976	F		
18	Goya Promise N.		09096452401	F		
19	Rebecca Obute		08143400860	F		
20	Mercy Ameye		08037986926	F		
21	Victoria Okerenya		07089562506	F		
22	Mercy Osaro Goya			F		
23	Abigail Obanjana Kate		08139023114			
24	Mercy Obuzor					
25	Katyain Kang					
26	Evalyn Nwogu					

ENVIRONMENTAL & CHEMICAL SERVICES LIMITED
Date:

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3 –PDH PROJECT EIA ASSITANTS

ENGAGEMENT ATTENDANCE SHEET

DATE: 9-11-22

VENUE: OLOREWA

3

SN	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
27	Blessing Nwoku					
28	Rosehine Ohuka					
29	Mercy Gomba					
80	Dada Mba Agba					
81	Gloria Fedrick					
82	Nnena Eke					
83	America Gomba					
84	Gloria Okiri					
85	Florence Ayi					
86	Goya Aprama					
87	Rose Osaro Iale					
88	Serah Obele					
89	Kama Esther					

ENVIRONMENTAL & CHE... SERVI... Date:.....

P/O Continue

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3 –PDH PROJECT EIA ASSITANTS

ENGAGEMENT ATTENDANCE SHEET

DATE: 9-11-22

VENUE: OKERENA

4

SN	NAME	ORGANIZATION/COMMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
40	Rose Ewuni			F		
41	Mercy Nwoke			✓		
42	Precous Nwoke			✓		
43	Rose Silas			✓		
44	Chidemia Ngolumba			✓		
45	Labe Rose Osaro			✓		
46	Comfort Chiyor			✓		
47	Mma Nwaji			✓		
48	Roselnie Sambani			✓		
49	Heggar Obele			✓		
50	Evelyn Obele			✓		
51	Patience Korda			✓		
52	Catherine Soobare			✓		

ENVIRONMENTAL & CHEMICAL SERVICES LIMITED Date:

P20 Continue

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3 –PDH PROJECT EIA ASSITANTS

ENGAGEMENT ATTENDANCE SHEET

DATE: 9-11-22

VENUE: OKERENYA

6

SN	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
66	Nne Obasmelisi			F		
67	Ukeyo Nne			✓		
68	Nwaji Obari			✓		
67	Queneth Daniel			✓		
68	Favour Godfrey			✓		
69	Azuka Sabbanr			✓		
70	Favour Black			✓		
71	Mwaele Isaac			✓		
72	Ovie Beatrice			✓		
73	Ike Olugbemi			M		
74	Sokari John			M		
75	Pepple Tonye			M		
76	Monica Sunday			F		

ENVIRONMENTAL & CHEMICAL SERVICES Date:

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3 –PDH PROJECT EIA ASSITANTS

ENGAGEMENT ATTENDANCE SHEET

7

DATE: 9-11-21

VENUE: OKERENA

SN	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
77	Oniawa Stephanie			F		
78	Princess Ogechi			✓		
79	Theresa Bassey			✓		
80	Osondu Decora			✓		
81	Miriam Ayebatonye			✓		
82	Joy Barry			✓		
83	Boma Jama			✓		
84	Heben Monday			✓		
85	Anita Menasseh			✓		

ENVIRONMENTAL & CHEMICAL SERVICES LIMITED ★ Date:.....

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3 –PDH PROJECT EIA ASSITANTS

ENGAGEMENT ATTENDANCE SHEET

1

DATE: 9 – 11 – 21

VENUE: OKERENYA

SN	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
1	Amachi Emeka			M		
2	Emmanuel Ngele			✓		
3	Chima Johnson			✓		
4	Somnain Johnson			✓		
5	Amos Ksamu			✓		
6	Joseph Gordon			✓		
7	Otong James			✓		
8	Emmanuel Vincent			✓		
9	Joshua Okwesbe			✓		
10	Charles Davies			✓		
11	Tonye Pepple			✓		
12	Samuel Obuma			✓		
13	Melvin Maclean			✓		

ENVIRONMENTAL & CHE... SERVICES LIMITED Date:

PTO Continue

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3 –PDH PROJECT EIA ASSITANTS

ENGAGEMENT ATTENDANCE SHEET

2

DATE:.....

VENUE:.....

SN	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
14	Evans Paul			M		
15	David Michael			✓		

ENVIRONMENTAL & CHEMICAL SERVICES LIMITED Date:.....

Stakeholder's Engagement – Aleto Community

Date of Engagement: 8th November 2021
Venue Aleto Community Town Hall
Facilitator Lead Consultant

Stakeholder's Groups Present

i. The Paramount Ruler of Aleto Community
ii. Aleto Community Chairman
iii. Fishermen and Hunters Association
iv. E&CS limited
v. Aleto Security Guards
vi. Youth President of Aleto
vii. Women Leader and Executives
viii. Youth Leader of Eleme Community
ix. Cross section of Aleto Community

Attendance of participants by Gender

i.	Male	-	9
ii.	Female	-	56
	Total	**-**	**65**

Proponent Disclosures

In keeping with National and International best practice in complying with Environmental Impact assessment procedures, Indorama is carrying out this public consultation to get the buy-in of Aleto community and residents into the Project

The disclosure further buttressed on the below:

- The purpose of embarking on the development of the fertilizer project in Eleme LGA and specifically near the existing fertilizer Train 1 and Train 2 Plants.
- The product, services expected from the development and the socio-economic relationship between the communities/environment as well.
- Land take is approximately 80 hectares
- Raw material (Natural Gas, Water, Power)
- Production capacity Ammonia (2300MPD and Urea 4000MTD)
- Elaborate management plan established to sustain the numerous benefits (employments, development of trained/skilled manpower, CSR projects, social welfare packages, educational support programs etc) associated with the project as well as control the fears associated with chemical industries.

Questions and issues raised

Her Royal Majesty: Tell Indorama that our women need fertilizer for their crops to improve her yield, since our land is polluted and also inform them that the micro credit by Elano given to our women is not enough to start a good trade and so we plead it should be increased.

The spokeswoman of her Majesty appealed for the completion of the Okerewa hospital so that all women can benefit from it.

Our children should be engaged in life skills development programs and scholarship awards extended to their children.

Response

Women are encouraged to form cooperatives to prudently manage grants and make a fundable proposal for Indorama consideration.

The technology for Fertilizer production by Indorama uses less energy and water and therefore would not release wastes that would contaminate the soil. Consequently, no fears of land pollution should be entertained.

To address your concerns about micro credit, scholarship, Indorama has robust CSR programs which your community is a beneficiary. Indorama as usual regularly involves the host communities in the planning and implementation of CSR project through the active involvement of PAC. Indorama monitors the performance of PAC and would make necessary changes for improved delivery and efficiency.

Event Photographs

Attendance Sheet

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS

ENGAGEMENT ATTAENDANCE SHEET

DATE: 8 – 11 – 2021

VENUE: ALETO

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
1	CHIEF SILAS OLUKA-NKE	ALETO YOUTH COUNCIL	08036764429(M)		Silasoluka2017@gmail.com	
2	NWOKE JOHN EBIE	ALETO YOUTH COUNCIL	09077062800	male	Ebieamc2000@gmail.com	
3	Rufus OSARO	ALETO youth council	08035496257	(M)		
4	PRINCE GABRIEL OSARO	ALETO Youth Council	08085132631	(M)	Osarogaforce@yahoo	
5	[redacted]	" " "	[redacted]	M		
6	OBARISIMA OLUKA NICE	" " "	07010183810	M		
7	OSARO-N. Samuel	" " "	09071207896	M		
8	DIVNE REUBEN	" " "	08143323222	M	Divnekeu38@gmail	
9	EMMANUEL	" " "	08056085553	M		
10	SALOKA PRECIOUS	" " "	08107581185	M	—	
11	JOY OKPARASI	" " "	08131818946	F	—	
12	LOVEDAY AMADI	" " "	08063315863	M		
13						

PTO Time

ENVIRONMENTAL SERVICES LIMITED Date:

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3 –PDH PROJECT EIA ASSITANTS

ENGAGEMENT ATTENDANCE SHEET

DATE: 8-11-22

VENUE: ALETO

2

SN	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
14	Ebie Collins	ALETO		M		
15	Peter Nwoke			✓		
16	Comr. Nkere Silas			✓		
17	Gabriel Obarinza			✓		
18	Osaro Godwin			✓		
19	Emmanuel Oluka			✓		
20	Alaka Precious			✓		
21	Okparaji Emmanuel			✓		
22	Amadi Silas			✓		
23	Rufus Allison			✓		
24	Nwagor Eso			✓		
25	Constant Aresa			✓		
26	Obarizina Imoh			✓		

ENVIRONMENTAL SERVICES LIMITED Date:

P TO Continue

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3 –PDH PROJECT EIA ASSITANTS
ENGAGEMENT ATTENDANCE SHEET

DATE: 8-11-22

VENUE: ATBTO

3

SN	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
27	Mme Okute			M		
28	Nwoke Gabriel			✓		
29	Mtebaka Silas			✓		
30	Isreal Nkomoleo			✓		
31	Osamo - Tony			✓		
32	Godspowe Onome			✓		
33	Loveday Josiah			✓		
34	Ime Sunday			✓		
35	Godknows Sunday			✓		

ENVIRONMENTAL CONSULTANCY SERVICES LIMITED Date:

PTO Continue

9

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

1

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS

ENGAGEMENT ATTAENDANCE SHEET

DATE: 8 – 11 – 2021

VENUE: ALETO

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
1.	Joy Sam Obunge	ALETO		F		
2	Chi Owate			F		
3	Blessing Oluka		07026532098	F		
4	Blessing Mbadi			F		
5	Blessing P. Ononma		08032658364	F		
6	Faith Nwosu		08122446540	F		
7	Victoria Obanjima			F		
8	Joy Igwe		07053374278	F		
9	Blessing Nwafor		08062652589	F		
10	Olusola Ngugu		08028177816	F		
11	Florence Ogbe			F		
12	Felicia Eso			F		
13	Constant Osare			F		

Date:

SERVICES LIMITED

P.T.O Continue ....

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS
ENGAGEMENT ATTAENDANCE SHEET

2

DATE: 8 – 11 – 21

VENUE: ACETO

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
14	Christiana Mbaga	ACETO		F		
15	Victoria Chi Okpara			F		
16	Rose Waiv Same			F		
17	Rose Lucky Gogo			F		
18	Mercy Lambert Chi		08057979692	F		
19	Blessing Kati			F		
20	Ajiwa Mbeke			F		
21	Alice Chi Okpara			F		
22	Martha Ekebe		09032217779	F		
23	Lydia Mbangeeha		07044848268	F		
24	Ogbuny Ochon			F		
25	Virginia Sunday			F		
26	Sarah Mba		08173595571	F		

ENVIRONMENTAL SERVICES LIMITED Date:

PTO. Continue.

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS

ENGAGEMENT ATTAENDANCE SHEET

DATE: 8 — 11 — 21

VENUE: ALETO

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
27	Esther Kabi	Aleto		F		
28	Grace Iguwe		09057068567	F		
29	Olanchiwi Amadi		09156096484	F		
30	Hon. Mrs. Felicia Olungwe Osaro		08037026183	F		
31	HRM. EMEREONA MRS. EVELYN ADA COKPA		08053252724	F		
32	Edith Gumbake			F		
33	Nne. G. Sagbe		07034259691	F		
34	CHIEF. MRS. RUTH NGELUE			F		
35	CHIEF. MRS. OSILA OTU OLIKA			F		
36	Lekia Goya			F		
37	Grace Egbe			F		
38	Stella Kato		09055703271	F		
39	Jemy Ngota		07060879443	F		

ENVIRO SERVICES LIMITED Date:

P.T.O Continue

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS

ENGAGEMENT ATTAENDANCE SHEET

4

DATE: 2-11-21

VENUE: AETO

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
40	Rose Budu	AETO		F		
41	Felicia N. Obele		08059796097	F		
42	Afoji Sam			F		
43	Dada Ngofa		07061561856	F		
44	Blessing Peter Amadi		09068600399	F		
45	Gift Amadi		08057501248	F		
46	Mimi Joseph		08166696597	F		
47	Beauty Nkere Obe		08039829272	F		
48	Blessing Obaa		08106371298	F		
49	Charity Osaro E.		08039616845	F		
50	Rose Samuel		08032735571	F		
51	Elizabeth Ejire			F		
52	Odudo Obari Onyedikachi			F		

P2O Continue

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

5

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS

ENGAGEMENT ATTAENDANCE SHEET

DATE: 8-11-21

VENUE: ALETO

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
53	Julie Mbadi	ALETO	08180794211	F		
54	Evelyn Obari			F		
55	Gift Onuka		08051804018	F		
56	Diana George	ALETO	08039488469	F		
57	Blessing Obaro		08168119801	F		
58	Alice Obari Njoga		07038541971	F		
59	Joy Friday Ebiye		08037721928	F		
60	Charity Obari Igwe		09060036521	F		
61	Isioma Onukaba Obe		08063652254	F		
62	Blessing Ake			F		
63	Ifeoma Peter Obaa		09093416924	F		
64	Mercy John		08035049781	F	Date:..... SERVICES LIMITED	
65	Mercy Ebeb		08034878888	F		

Stakeholder's Engagement with Agbonchia Community

Date	10th November 2021
Venue	Agbonchia Town Hall
Facilitator	Lead Consultant

No of participants

Male	-	21
Female	-	56
Total	***-***	***77***

Stakeholder Groups present

- The Paramount Ruler of Agbonchia
- Agbonchia Community Chairman
- E&CS limited Team
- Agbonchia Security Guards
- Agbonchia Youth President and Executives
- Agbonchia Women group
- Agbonchia Youth Rep. of Eleme Youth Council
- Agbonchia Community Members

Proponent Disclosures

The proponent disclosed is as follows:

- The purpose of embarking on the development of the fertilizer project in Eleme LGA and specifically near the existing fertilizer Train 1 and Train 2 Plants.
- The product, services expected from the development and the socio-economic relationship between the communities/environment as well.
- Location of project site land take which is approximately 80 hectares
- Elaborate management plan established to sustain the numerous benefits (employments, development of trained/skilled manpower, CSR projects, social welfare packages,
- Raw material (Natural Gas, Water, Power)
- Production capacity Ammonia (2300MPD and Urea 4000MTD)
- EIA scope and environmental components to be studied
- Environmental monitoring plan during construction and operation phase.

Issues raised

No questions were asked rather the participants expressed sentiments and feelings ranging from personal grievances, pollution of air, lack of employment opportunities, polarization of the community, absence of town hall meeting with Indorama and poor representation by their Representative in PAC. Some of the participants stated that Indorama CSR is actual helping to develop their community.

Response

The company engagement facilitator responded by encouraging the Agbonchia stakeholders to leverage on the existing open door policy of Indorama, its Grievance protocol, community Relations and Government Department with her laudable CSR programs to solve her grievance which are self-inflicted. For instance, the community is advised to do the following:

- Develop viable plan to be meeting with its representative in PAC
- Consult Indorama's community Relation which has a desk on grievance solutions
- Community to sharpen its knowledge in the rules of engagement and advocacy instead of allowing trouble makers within their ranks to peddle unfounded stories of "divide and Rule" leveled against Indorama

Event Photographs

Attendance Sheet

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS

ENGAGEMENT ATTAENDANCE SHEET

DATE: 10 – 11 – 2021

VENUE: AGBONCHIA

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
1.	Blessing Obele	AGBONCHIA		F		
2	Peace Chinwe			F		
3	Nkpanya Gomba			F		
4	Joyce Clement			F		
5	Mini Osonlai			F		
6	Sarah Obele			✓		
7	Mercy Ibiniwi			✓		
8	Rose Osanaine			✓		
9	Patient Ogbe			✓		
10	Rose Gomba			✓		
11	Blessing Gikewii			✓		
12	Rose Maxwell			✓		
13	Rose Osaro			✓		

PTO Continue

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS
ENGAGEMENT ATTAENDANCE SHEET

2

DATE: 10 – 11 – 2021

VENUE: AGBONCHIA

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
14	Sarah Okpa					
15	Peace Nwoke					
16	Blessing Okpa					
17	Rose Osaro Sabiu					
18	Ogbonubo Wolu					
19	Joy Mark Ogaga					
20	Happiness Ekee					
21	Doris Samson					
22	Gomba Blessing A					
23	Fynn Osanbai					
24	Joy. A. Obene					
25	Alice Gomba					
26	Charity Paul Obare					

ENVIRONMENTAL & CHEMICAL SERVICES LIMITED
Date:

PTO Continue

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS
ENGAGEMENT ATTAENDANCE SHEET

3

DATE: 10-11-21

VENUE: AGRONCHA

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
27	Obebe Kemgor W		08[illegible]9082	F		
28	Charity Osaro Awaa					
29	Kachun					
30	Joy Chin Ngobele		08[illegible]08990			
31	Elizabeth Awaya		0807[illegible]1083			
32	Grace Chin		0802[illegible]013			
33	Ngaji Ngobele					
34	Adagi Ngebele					
35	Grace Nge					
36	Oluka Precious		08068[illegible]4555			
37	Chinyere Uche		08034808664			
38	Caroline [illegible]a		070			
39	Osaro Ada Diseji		0703[illegible]47			

ENVIRONMENTAL & CHEM... SERVI... Date:

pTO Continue

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS
ENGAGEMENT ATTAENDANCE SHEET

4

DATE: 10-11-2021

VENUE: AGRONCHIA

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
40	Happiness Patrick Dede					
41	Blessing Nwolu		08138878384			
42	Nwanna Nwolu					
43	Caroline Osamoje		08045466834			
44	Joy Fuke					
45	Evelyne Oluka					
46	Bright Oluka					
47	Paulina Sam Ngekewa					
48	Evelyn Kwida		08063776460			
49	Blessing Nwogu		08062230957			
50	Evelyn Ukeri					
51	Perhena Olodede					
52	Nne Ngosila					

ENVIRONMENTAL & CHEMICAL SERVICES LIMITED Date:

P20 Continue

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3 –PDH PROJECT EIA ASSITANTS

ENGAGEMENT ATTENDANCE SHEET

DATE: 10-11-2021

VENUE: AGBONCHIA

5

SN	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
53	Nne Osaeloai	AGBONCHIA		F		
54	Sarah Okele			F		
55	Goya Aprana			F		
56	Gloria Okiri			F		

ENVIRONMENTAL & CHEMICAL SERVICES LIMITED Date

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS
ENGAGEMENT ATTAENDANCE SHEET

DATE: 10 — 11 — 2021

VENUE: AGBONCHA

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
1.	HRH EMEKA JOSEPH NGETO	PROMINENT RULER	08038667962	MALE		
2.	HH CHIEF (DR) GEORGE OSAKO	AGBONCHA	08 [illegible]	MALE		
3	V GEORGE. W. IGWE	080 39 507153				
4	CHIEF [illegible]	08164798284	08164798284			
5	Elder Goda Saloka			male		
6	CHIEF PAUL OGBE	Ngeto	08038555454	MALE		
7	CHIEF William O. Goya	OGoLogba	09035199327	MALE		
8	CHF Emmanuel OSenda	ALongwa Community	08 [illegible]	Emeka		
9	Chief John OSaro	OGologba	07039565093	MALE		
10	Elder Godfrey O. Nwafor	Ngeto	08035519109	Male		
11	Cht stephen Obamorpa	OKPA	07032845177	MALE		
12	Cht. Eld NGEP GBAFOT	OBININGEN		MALE		NGB.
13	Chf. NNANA OKPA	OKPA	08054335074	M		

ENVIRONMENTAL & CHEMICAL SERVICES LIMITED
Date:

P10 Continue

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

2

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS
ENGAGEMENT ATTAENDANCE SHEET

DATE: 10-11-2021

VENUE: AGBONCHIA

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
14	CHIEF CHIJI CHU	NGBATA	~~	MALE		
15	CHIEF CHUKWUMA OKOR	NGBATA	07036439222	MALE		
16	ELDER NNOGU ADEYA	OGOLOGBAA	07037307142	MALE	—	
17	ELD. OBUZOR, O.T	OGOLOGBAA	08037104965	male	obuoluka@gmail.com	
18	CHIEF OBELE ADA WOMEN		08034580039	M		
19	Comr. Nwoke Sunday/Elechi	Ngbabata	08061145365	M		
20	REV. SAMUEL OKURA	ALUNGWA	08054993497	M	Samuelgee@gmail.com	
21	MUBE GWE-GWE	NGETO	08060256811	M		

ENVIRONMENTAL & CIVIL SERVICES LIMITED
Date:

Stakeholder Engagement with Elelenwo (Wakoahu Family)

Date 15th November 2021

Venue Wakoahu Community Town Hall

Facilitators Lead Consultant

Stakeholder Groups present:

The following stakeholders were present during the meeting:

- Community Chairman
- Youth President
- Women Leader
- Cross section of Wakoahu community
- Representative of the Proponent (Indorama)
- Wakoahu Youth Leader and Executive
- Wakoahu PAC member

Total Number of participants

Males	52
females	42
Total	94

Proponent Disclosure

This engagement was fixed in line with national and international laws governing the conduct of an Environmental Impact Assessment study which required due consultation of all interest groups for their opinion and concern on any developmental project within their locality. Consequently, Indorama through its environmental consulting team embarked on stakeholder engagement with the Wakoahu community. The Proponent disclosed as follows:

- The purpose of embarking on the development of the fertilizer project in Eleme LGA and specifically near the existing fertilizer Train 1 and Train 2 Plants.
- The product, services expected from the development and the socio-economic relationship between the communities/environment as well.
- Inform the stakeholders on the elaborate management plan established to sustain the numerous benefits (employments, development of trained/skilled manpower, CSR projects, social welfare packages, educational support programs etc) associated with the project as well as control the fears associated with chemical industries.
- Land take is approximately 80 hectares
- Raw material (Natural Gas, Water, Power)
- Production capacity of Ammonia (2300MTD and Urea 4000MTD)

Questions and issues raised

The major issues raised were:

There are 5 large families that make up Wakohu which according to them is larger than some of the Eleme communities; as at 2017/18 Wakohu youths headcount, male only numbered – 245 (18-40years), Registered married women were 170 in Wakohu family. Wakohu therefore, should not be continually seen as a family but should be treated as a community because we have the statistics to qualify us as a community.

We are yet to see full employment opportunities in Train 1 and 2 and another is coming as we are rightly informed. What are the job opportunities that await us in this new plant?

Will the pollution level of air and water be within a possible range? There is going to be an influx of human and materials into our community

Response

Indorama cannot be involved in determining Wakohu's classification as a family or community. This is purely a government function

Youth should strive to be rightly certified along the lines of skills requirement for Indorama employment. Your representative in PAC should be contacted to advise on Indorama employment, contract, and vendor polices. Moreover, contracts are in categories, they should seek for their classification and apply through their representative in PAC.

Indorama will continue to be a trail blazer in clean Industry operations in Nigeria and indeed in Eleme and beyond. I am too sure that the members of Wakoahu family present in this forum will attest to the fact that the gaseous smell that used to inundate the air during years of NNPC Petrochemical operations is an experience of the past and not existent in the past three years. Indorama will continue to sustain her laudable Policies on Health, Safety, Environment, employment and community Relations.

Event Photograph

Attendance Sheet

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS

ENGAGEMENT ATTAENDANCE SHEET

DATE: 15-11-21

VENUE: OWAKOTTY

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
1	RISI · R · EBERECHI	OWAKOTTY		F		
2	EMEKA AJAEGBU NORBU	✓		✓		
3	RITA SUNNY EJEKWU	✓		✓		
4	PRINCE AZUBUIKE ONUOR	✓		✓		
5	RISI OBUNEZI QUEEN	✓		✓		
6	RISI HOPE NNENDA	✓		✓		
7	ONUOR ITUOMA	✓		✓		
8	BLESSING CHIGONUM EJEKWU	✓		✓		
9	CHF WILCOXHENRY CHINAKAH	✓		✓		
10	LOVETH EJEKWU	✓		✓		
11	NKESI OVENDA RISI	✓		✓		
12	GIFT RISI	✓		✓		
13	JONATHAN ADORABLE CHINEDU	✓		✓		

ENVIRONMENTAL SERVICES LIMITED Date:

PTO Continue

SUPPORT FOR MANKIND DEVELOPMENT INTIATIVE

IEFCL TRAIN 3-PDH PROJECT EIA COMMUNITY WORKER SCHEDULE

2

S/N	NAME	PHONE NUMBER	ACCOUNT NO	COMMUNITY WAKOTHU	AMOUNT =N=	DATE	SIGNATURE
14	WORLU FAVOUR IGUNKA			✓	✓		
15	CHINDA NYESOM GODWILL			✓	✓		
16	EJEKWU HAPPINESS CHINYERE			✓	✓		
17	CHIOMA CHARITY EJEKWU			✓	✓		
18	AMADI HELLEN.			✓	✓		
19	RISI GRACE IHUOMA			✓	✓		
20	RISI . C . MIRACLE			✓	✓		
21	BLESSING JONATHAN			✓	✓		
22	MARY OWHOR			✓	✓		
23	WODI AMANDA NGOZI			✓	✓		
24	PRECIOUS CHIMA AMADI			✓	✓		
25	FAITH ADANNE WODI			✓	✓		
26	ROSE RISI			✓	✓		
27	WORLU AMBROSE ICHEBADU			✓	✓		
28	EMENIKE AMADI WAKOTHU			✓	✓		
29	WODI EDNA			✓	✓		

ENVIRONMENTAL SERVICES LIMITED Date:

PREPARED BY.....

APPROVED BY.....

P/O Continue

3

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS
ENGAGEMENT ATTAENDANCE SHEET

DATE:.....

VENUE: WAKOTH

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
30	JOY CHIGOZIEM RISI	WAKOTH		F		
31	JONATHAN MAUREEN	✓		✓		
32	GODSTIME RISI PROMISE	✓		✓		
33	BLESSING C. RISI	✓		✓		
34	FAITH AMADI	✓		✓		
35	INNOCENT STANLEY			✓		
36	GRACE GEORGINA			✓		
37	ARIT AMADI			✓		
38	RUTH VINCENT			✓		
39	OGECHI CHINEDU			✓		
40	STELLA COLLINS			✓		
41	IWUOMA ISAIAH			✓		
42	GLORY ISRAEL			✓		

ENVIRONMENTAL & CHEMICAL SERVICES LIMITED Date:.....

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS

ENGAGEMENT ATTAENDANCE SHEET

DATE: 15-11-21

VENUE: WAKOTHY

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
1	CHIBEZ80 EJEKWO	WAKOTHY		M		
2	HENRY ALFRED ONYIOR	—		M		
3	NWAKOTHY OGECHI	—		M		
4	AMARA ONYIOR	—		M		
5	RISSI NYEMONCHE EVANS	—		M		
6	JONATHAN BUDUKA	—		✓		
7	KINGSLEY NYEBUCHI	—		✓		
8	PROMISE NYEKAZI	—		✓		
9	MONDAY RISI	—		✓		
10	GODWILL AJEGBU	—		✓		
11	CHUDIEBERE JOHNSON	—		✓		
12	EJEKWU NED SUNNY	—		✓		
13	CHIDAMAITI JONATHAN	—		✓		

ENVIRONMENTAL & CHEMICAL SERVICES LIMITED Date:

P/o continue

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

2

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS
ENGAGEMENT ATTAENDANCE SHEET

DATE:.....

VENUE: WAKOTHY

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
14	CHIZIM WODI	WAKOTHY		M		
15	SAMUEL OWITOR	✓		M		
16	NWAKAOTHY SOLOMON	✓		M		
17	WODI EGWUMA HENRY	✓		M		
18	TEMPLE NWAKOTHY	✓		M		
19	ECHENDU HENRY	✓		M		
20	RISI WOBO BRIGHT	✓		M		
21	CHIBUZOR VICTOR	✓		M		
22	THANKGOD WODI	✓		M		
23	NWAKOTHY HARCOURT	✓		M		
24	NDUBUISI CHINDA	✓		M		
25	PETER AMADI OGUNA	✓		M		
26	GODWILL WODI	✓		M		

ENVIRONMENTAL & CHEMICAL SERVICES LTD. Date:

P/O Continue

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

3

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS
ENGAGEMENT ATTAENDANCE SHEET

DATE:.....

VENUE:...WAKOTHI.....

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
27	LOVEDAY BEKEE ROS	WAKOTHI		M		
28	OVUNDA MARTINS	✓		✓		
29	HEANYICHUKWU HENRY	✓		✓		
30	DESTINY WOOD	✓		✓		
31	EJEKWU HOPE NOBLE	✓		✓		
32	ROSI NYEBUCHI MAXWELL	✓		✓		
33	HEANYI LUCKY WOOD	✓		✓		
34	UFFORT CHARLES EMMANUEL	✓		✓		
35	AMADI AZUBUIKE ALOYSIUS	✓		✓		
36	CHF. DARIUS WOOD	✓		✓		
37	CHINDA OYIRINDA	✓		✓		
38	NYECHE OWOTOR	✓		✓		
39	FRANK OWOTOR	✓		✓		

ENVIRONMENTAL & SOCIAL SERVICES LIMITED
Date:.....

PTO Continue

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS
ENGAGEMENT ATTAENDANCE SHEET

4

DATE:.....

VENUE: WAKOTTU

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
40	WORLU OBINNA INNOCENT	WAKOTTU		M		
41	SUNNY AMADI	✓		✓		
42	GODSWILL OGBUNDA	✓		✓		
43	WODU NWENEKORO	✓		✓		
44	AMADI CHIZI KINGSLEY	✓		M		
45	EMMA EJEKWU	✓		✓		
46	COMR. ERNEST AMADI	✓		✓		
47	WORLU CHARLES	✓		✓		
48	AJEGBU WORLU	✓		✓		
49	CARLS GODFIRST. C.	✓		M		
50	CHRISTIAN WORLU	✓		✓		
51	WODU WISDOM	✓		✓		
52	RISI GOODLUCK	✓		✓		

ENVIRONMENTAL SERVICES LIMITED Date:.....

P.T.O Continue

SUPPORT FOR MANKIND DEVELOPMENT INTIATIVE

IEFCL TRAIN 3-PDH PROJECT EIA ~~COMMUNITY~~ ~~WORKER SCHEDULE~~ ASSISTANT ~~ENGAGEMENT~~ ATION ~~ANCE SHEET~~

5

S/N	NAME	PHONE NUMBER	ACCOUNT NO	COMMUNITY	AMOUNT	DATE	SIGNATURE
				=N=	=N=		
53	SHERRY ONYEOR						
54	IKECHI RISI						
55	MIRACLE ABBEY AMADI						
56	HENRY DUNDA						
57	BEREE TAMUNO						
58	OTOMKU - FAVOUR						

Date:.....

PREPARED BY.....

APPROVED BY.....

Stakeholder Engagement with Njuru Community (including Akpakpan area)

Date:	11 & 12th November 2021
Venue	Njuru Community Town Hall
Facilitator	Lead Consultant

Stakeholder Groups present

- The Paramount Chief
- Community Chairman
- Security Guards
- Youth President/Leader
- Women Leader and women groups

Attendance disaggregated by Gender

Male	-	75
Female	-	122
Total	-	197

Proponent Disclosures

The proponent disclosed as follows:

- The purpose of embarking on the development of the fertilizer project in Eleme LGA and specifically near the existing fertilizer Train 1 and Train 2 Plants.
- The product, services expected from the development and the socio-economic relationship between the communities/environment as well.
- Elaborate management plan established to sustain the numerous benefits (employments, development of trained/skilled manpower, CSR projects, social welfare packages, educational support programs etc) associated with the project as well as control the fears associated with chemical industries.
- Raw material (Natural Gas, Water, Power)
- Production capacity Ammonia (2300MTPD and Urea 4000MTPD)
- Land take is approximately 80 hectares
- Existing Environmental Monitoring program for Train 1 and 2

Questions and issues raised

The major issues raised were:

i. What are the mitigation measures to social, health, water, air and vegetation perturbations/disturbances?

ii. What is the faith of youths in the areas of employment and scholarship?
iii. How will the communities benefit from the products of the company?

Response

Responding to their concern the lead consultant assured them that the ongoing ESIA study will provide mitigation actions to all perceptive environmental, social and health concerns as expressed. The effectiveness of these mitigation actions will be monitored both during construction and operation phase of the project.

Furthermore, he assured them that Indorama Human Resource Department in collaboration with the Community Relations and Government Affair Department will work with local content law in the area of employment to ensure that their youths are gainfully employed, while in line with the company policy on scholarship programs will be given to those who meet the criteria of award. Moreso, the company will continue on their life changing CSR Projects to the benefit of the community in areas of expanding their employability and opening up new areas of livelihood.

Event Photographs

Attendance Sheet

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS

ENGAGEMENT ATTAENDANCE SHEET

DATE: 11—11—21

VENUE: NJURU

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
1 HRH	Emere Ejii Anyaogu			M		
2	Etd. Fred Osan			M		
3	Chf. Engr. Ezekiel Goya			M		
4	Dickson Ngonya			M		
5	Fred Chu			M		
6	Emmanuel Okpa			M		
7	Chf Okenya Gonka			M		
8	Samuel Wuru Eda			✓		
9	Elijah Simon			✓		
10	Gideon Aliah			✓		
11	Emmanuel Operika			✓		
12	Chf. Godwill Aso			✓		
13	Asari Timpriye			✓		

ENVIRONMENTAL & CHEMICAL SERVICES LIMITED Date:

P/O Continue

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3 –PDH PROJECT EIA ASSITANTS

ENGAGEMENT ATTENDANCE SHEET

2

DATE:.....

VENUE:.....

SN	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
	Samuel Nwoko			M		
	Emmanuel Okpenaji			M		
	Amadi Syrian			M		
	Rufus Osam			M		
	John Ebie			M		
	Okuka Nke			M		
	Precious Jay			M		
	Inoka Okpara			M		
	Divine Okaki			M		
	Hope Sunday			M		
	Idonojin Dominom			M		
	Una David			M		
26	Godson Godson			M		

ENVIRONMENTAL & CHE... SERVICES LIMI... Date:.....

P.T.O Continue

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3 –PDH PROJECT EIA ASSITANTS

ENGAGEMENT ATTENDANCE SHEET

3

DATE:.....

VENUE: NSUKU

SN	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
27	Reuben Ofunum			M		
28	Daniel Ofunum			✓		
29	Gabriel Mbebaka			✓		
30	Sunday Uwah			✓		
31	Akpan Gideon			✓		
32	Godspower Isreal			✓		
33	Nowuba Ofunum			✓		
34	Michael Inamo			✓		
35	Pere Ibinabo			✓		

& CHEMICAL SERVICES LIMITED Date:

P/O Continue

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS
ENGAGEMENT ATTAENDANCE SHEET

DATE: 4-11-21

VENUE: NJURU

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
1	Esther Wai Osaromuse			F		
2	Charity Goya			F		
3	Okelle Obele			M		
4	Blessing Mba-dee			F		
5	Goodness Michael			F		
6	Kudo Chizoba			F		
7	Chief Sunday Chindi			M		
8	Christian Wuwu			M		
9	Godwin Eeh			M		
10	Samuel Wuwu			M		
11	Chief Okenya Gombo			M		
12	Atonsemi Akah			M		
13	Etechi Osaro Ngbor			M		

ENVIRONMENTAL SERVICES LIMITED Date:

PTO Continue

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS

ENGAGEMENT ATTAENDANCE SHEET

2

DATE:.....

VENUE: NJURU

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
14	Mercy Ejine Gonka	NJURU		F		
15	Precious Nwolie			F		
16. Chief	Mrs. Eji Anyiaogu			F		
17	Patience Olugi			F		
18	Lawretta Levi			F		
19	Blessing Solomon			F		
20	Mmesoma Nnana			F		
21 Chief	Loveday Oluji			F		
22	Gift Prince			F		
23	Edna Aforjiokpa			F		
24	Grace Cyril Chu			F		
25	Ifechi Ngei			F		
26	Maureen Godwin			F		

ENVIRONMENTAL SERVICES LIMITED Date:.....

P20 Continue

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3 –PDH PROJECT EIA ASSITANTS
ENGAGEMENT ATTENDANCE SHEET

3

DATE:.....

VENUE: NJURU.....

SN	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
27	Chizioba Onome			F		
28	Chidimma Onome			✓		
29	Christiana Oluua			✓		
30	Edeh Godwin			✓		
31	Victoria Uwah			✓		
32	Okenya Henry			✓		
33	Ekechi Osaro			✓		
34	Obelle Victoria			✓		
35	Blessing Godstime			✓		
36	Samuel Freda			✓		
37	Afonseli Sarah			✓		
38	Grace Stella			✓		
39	Charity Goya			✓		

ENVIRONMENTAL IMPACT ASSESSMENT SERVICES LIMITED Date:

P/O Continue

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3 –PDH PROJECT EIA ASSITANTS

ENGAGEMENT ATTENDANCE SHEET

4

DATE:.....

VENUE: NJURU.....

SN	NAME	ORGANIZATION/COMMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
40	Levi Iavnetta			F		
41	Nwoby Nnana			✓		
42	Precious Gift			✓		
43	Pertence Afeni			✓		
44	Julin Deborah			✓		
45	Ifechi Amadi			✓		
46	Maureen Godwin			✓		
47	Cyril faith			✓		
48	Meray Ejine			✓		
49	Gomba Favour			✓		
50	Trust Ifeoma			✓		
51	Eji Ejiro			✓		
52	Success Ifure			✓		

P/O Continue

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3 –PDH PROJECT EIA ASSITANTS

ENGAGEMENT ATTENDANCE SHEET

5

DATE:.....

VENUE: NJURU

SN	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
53	Akparawa Glory			F		
54	Goya Obele			✓		
55	Sarah Kama			✓		
56	Esther Iele			✓		
57	Nne Osarenkai			✓		
58	Nana Ikoyo			✓		
59	Chubuike Goba			✓		
60	Gloria Okiri			✓		
61	Nwoke Blessing			✓		
62	Catherine Osoro			✓		
63	Kidobe Emilia			✓		
64	Oluka Gomba			✓		
65	Roselnie Anya			✓		

ENVIRONMENTAL SERVICES LIMITED Date:.....

WOMEN

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS

ENGAGEMENT ATTAENDANCE SHEET

DATE: 12-11-2021

VENUE: AKPANPAN

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
1	Comfort Onyoma		08086950755	F		
2	Comfort Clement-L		08067264288	F		
3	Evelyn Olaka		08099820654	F		
4	Grace Nwayor		09084269996	F		
5	Grace Onyoma		09039980945	F		
6	Patient Ejire			F		
7	Nneoma Olaka-Ngbor			F		
8	Evelyn Oluji			F		
9	Alice Ejire			F		
10	Rose Ejire			F		
11	Rose Obani Oluji		08068998889	F		
12	Joy Andy		07032021408	F		
13	Alice Amasi		08164174404	F		

ENVIRONMENTAL & CIVIL ENGINEERING SERVICES LIMITED Date:.....

PIO Com...

(2) WOMEN

2

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS

ENGAGEMENT ATTAENDANCE SHEET

DATE: 12-11-2021

VENUE: AKPAKPAN

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
14	Godstime Friday Osadaka		08148821255	F		
15	Grace Sea Olukpe		08076156458	F		
16	Elizabeth Ngbo		07046881972	F		
17	Iboro Eleeki			F		
18	Comfort Ogbonesh			F		
19	Nwapor Blessing		09028802853	F		
20	Grace Nwapor		0	F		
21	Mercy Olaka Ngboor		08136476468	F		
22	Jennifer Moses					
23	Osai Gift					
24	Blessing Okeke					
25	Mercy Peter					
26	Nwankwo Jennifer					

ENVIRONMENTAL & CHEMICAL SERVICES LIMITED Date:.....

P/O Coordinator

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3 –PDH PROJECT EIA ASSITANTS

ENGAGEMENT ATTENDANCE SHEET

3

DATE: 12-11-21

VENUE: AKPAKPAN

SN	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
27	Destiny Emmanuel			F		
28	Chinele Saturday			F		
29	Wobidike Princess			F		
30	Joyce Timothy			F		
31	Derefaka Ngo			F		
32	Suokiri Wealth			F		
33	Lawson Nathaniel			F		
34	Ngozi Government			F		
35	Joy Kpobari			✓		
36	Destiny Amadi			✓		
37	Sesuor John			✓		
38	Baakia Bomukari			✓		
39	Bright Chinedu			✓		

ENVIRONMENTAL TECHNICAL SERVICES LIMITED Date:

PTO Continue

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3 –PDH PROJECT EIA ASSITANTS

ENGAGEMENT ATTENDANCE SHEET

4

DATE: 12-11-24

VENUE: AKPAKPAN

SN	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
40	Barinabe James			M		
41	ASenyo Kehinde			M		
42	Banedi Sarah			F		
43	Okon Regina			F		
44	Amachi Peace			F		
45	Jane Owhonda			F		
46	Chichi Chima			F		
47	Beauty Friday			F		
48	Heben Obinna			F		
49	Soming Obili			M		
50	Amachi Emeka			M		
51	Ibilate Ngebe			F		
52	Otong John			M		

ENVIRONMENTAL & CHEMICAL SERVICES LIMITED Date:

PRO

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

5

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANT

ENGAGEMENT ATTENDANCE SHEET

DATE: 12-11-21

VENUE: AKPAKPAN

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
53	Helen Bandi			F		
54	Beauty Friday			F		
55	Jane Paddy			F		
56	Ojong Ruth			F		
57	Deborah Okigwe			F		
58	Ifeoma Tony			F		
59	Nwachukwu Juliet			F		
60	Hamson Glory			M		
61	Stella Gilbert			M		
62	Barinate Obunda			M		
63	Ayt Somina			M		
64	Jennifer Somina			M		
	Happiness Sunday			M		

ENVIRONMENTAL & CHEMICAL SERVICES LIMITED Date:

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS

ENGAGEMENT ATTAENDANCE SHEET

DATE: 12 – 11 – 2021

VENUE: AKPANPAN

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
1	Frank Oluji		08168557991	M		
2	Elechi Ejire			M		
3	Eje Olaka		08108779449	M		
4	Ebenezer Ejire		09095308079	M		
5	Clement Igwe		08067864288	M		
6	Edoo Sunday			✓		
7	Ezikiel Peter			✓		
8	Duke patience			✓		
9	Monday Bright			✓		
10	Walid Adeola			✓		
11	Favour Ibibia			✓		
12	Tamuno Ibibia			✓		
13	Tekena Godson			✓		

ENVIRONMENTAL & CHEMICAL SERVICES LIMITED Date:

PTO Continue

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

2

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANT

ENGAGEMENT ATTENDANCE SHEET

DATE: 12 – 11 – 21

VENUE: AKPAKPAN

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
14	Vincent Emmanuel			M		
15	Joshua Chizuwem			M		
16	Akachi Onwordi			M		
17	Isaih Onyebuchi			M		
18	Osai Gideon			M		
19	Thompson Elijah			M		
20	Oborn Simeon			M		
21	Peter Bisong			M		
22	Onele Clizo			M		
23	Clifford Obasi			M		
24	Okeke Josiah			M		
25	Elijah Bassey			M		
26	Blessing Blessed			M		

ENVIRONMENTAL & CHEMICAL SERVICES LIMITED Date:.....

P10 Continue

8

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANT

ENGAGEMENT ATTENDANCE SHEET

DATE: 12-11-21

VENUE: AKPAKPAN

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
27	Orie Okugbeby			M		
28	Prince Nwida			✓		
29	Israel Charles			✓		
30	Anthony Favour			✓		
31	Success Cudi			M		
32	Gogo Bills			M		
33	Black Favour			M		
34	Okara Emelia			M		
35	Harmony Ubiye			M		
36	Ayigechi Silas			M		

ENVIRONMENTAL & CHEMICAL SERVICES LIMITED Date:

Stakeholder Engagement with Akpajo Community

Date:	05- 11- 2021
Venue :	Akpajo Community Town Hall
Facilitator/Presenter	Lead Consultant

Stakeholders Present

- The Paramount Chief
- Community Chairman
- Fishermen and Hunters
- E&CS limited
- Security Guards
- Youth President/Leader
- Women Leader

Attendance disaggregated by Gender

Male	-	24
Female	-	78
Total	-	102

Proponent Disclosures

The proponent disclosed as follows:

- The purpose of embarking on the development of the fertilizer project in Eleme LGA and specifically near the existing fertilizer Train 1 and Train 2 Plants.
- Raw material (Natural Gas, Water, Power)
- Production capacity Ammonia (2300MTPD and Urea 4000MTPD)
- The product, services expected from the development and the socio-economic relationship between the communities/environment as well.
- Elaborate management plan established to sustain the numerous benefits (employments, development of trained/skilled manpower, CSR projects, social welfare packages, educational support programs etc) associated with the project as well as control the fears associated with chemical industries.
- Land take is approximately 80 hectares
- Existing Environmental Monitoring program for Train 1 and 2

Questions and issues raised

The major issues raised were:

- How will the project affect the general wellbeing of the community, since the project has taken over our farmland in perpetuity
- Will compensation for the community consider pollution and health risks associated with chemical manufacturing industries.

Response

The Proponent representative took time to dispel the poor knowledge surrounding fertilizer production from natural gas. The facilitator in simple language explained production process, control and containment of bye-products (Solid waste, treated waste water, gaseous emission) and methods of joint environmental monitoring of operation (Frequency and Reporting) by LGA, State, Federal and IFC environmental Regulators. It finally re-assured the participants of continuous engagement with all their stakeholders to keep them constantly informed of the progress and challenges of development and the environment. The engagement came to a close after five (5) hours of useful interaction with kind words of commendation by Akpajo stakeholders on Indorama.

Event Photographs

Attendance sheet

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS
ENGAGEMENT ATTAENDANCE SHEET

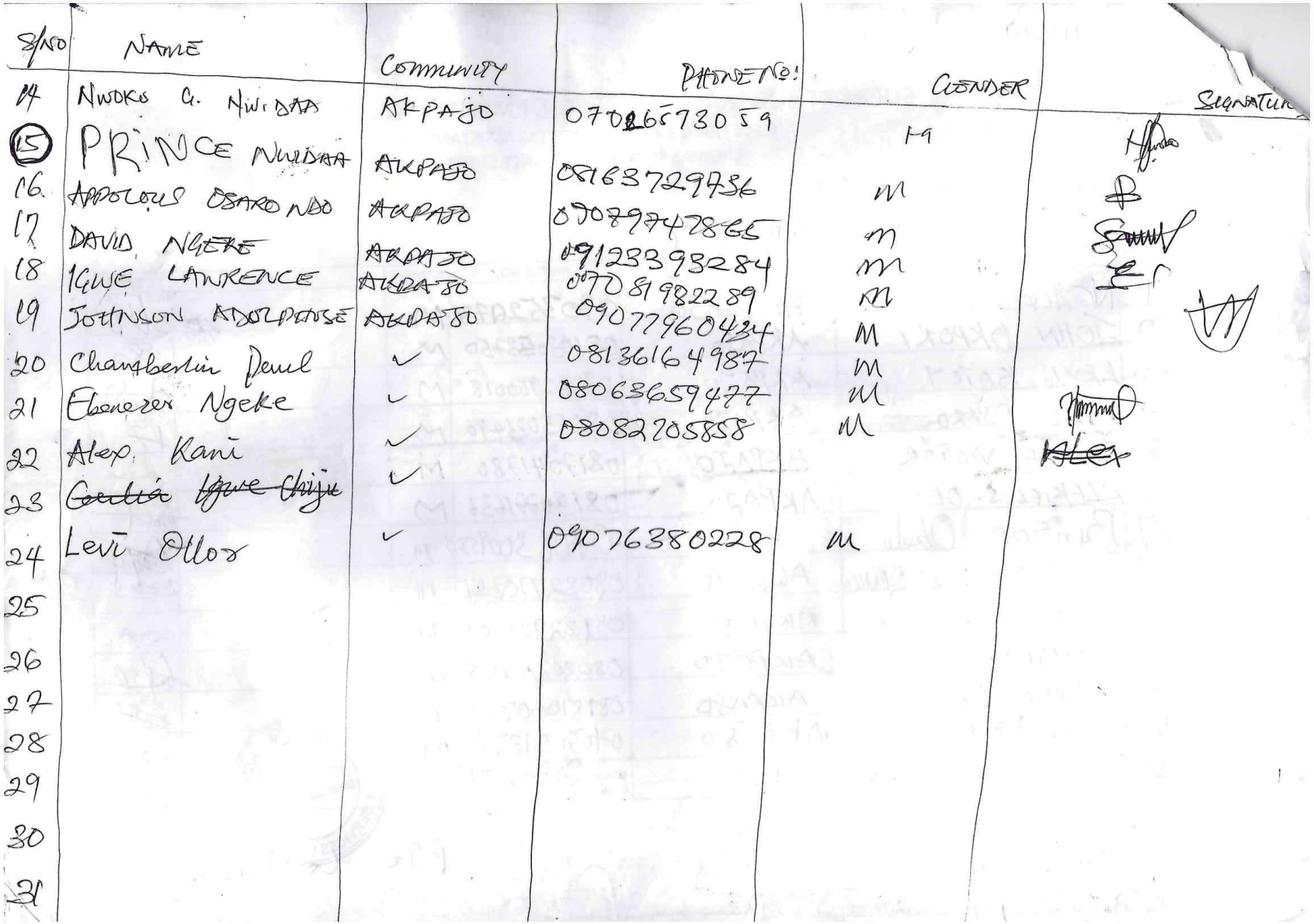
DATE: 5 – 11 – 2021

VENUE: AKPAJO COMMUNITY

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
1	NGALAKA NWAFOR OBO	AKPAJO	07035260776	M		
2	JOHN OKPORI	AKPAJO	08103053750	M		
3	LEVI KATEY	AKPAJO	07062950018	M		
4	IGWE OSARO	AKPAJO	08055006490	M		
5	DANIEL VICTOR	AKPAJO	08170411780	M		
6	EZEKIEL S. OBO	AKPAJO	08130771636	M		
7	Benson Obele	✓	07063009585	M		
8	SAMPSON OSARO OLUKA	AKPAJO	08082776557	M		
9	PAUL SAROLUKA	AKPAJO	08132923305	M		
10	NWAKAJI KATAY	AKPAJO	08020770463	M		
11	GEORGE GABRIEL	AKPAJO	08181060981	M		
12	Nwidar Igwe gomba	AKPAJO	07030513745	M		
13	PETER MIRACLE GOMBA	AKPAJO	08117893637	M		

ENVIRONMENTAL & CHEMICAL SERVICES LIMITED
Date:

PTO continue



S/NO	NAME	COMMUNITY	PHONE NO:	GENDER	SIGNATURE
14	NWOKO G. NWADA	AKPAJO	07082657305 9	M	
15	PRINCE NWADA	AKPAJO	08163729736	M	
16	APPOLOUS OSARONDO	AKPAJO	07089747865	M	
17	DAVID NGEKE	AKPAJO	09123393284	M	
18	IGWE LAWRENCE	AKPAJO	07081982289	M	
19	JOHNSON ADOLPHUS	AKPAJO	09077960434	M	
20	Chamberlin Deul	✓	08136164987	M	
21	Ebenezer Ngeke	✓	08063659477	M	
22	Alex Kani	✓	08082705858	M	
23	~~Godia Igwe Chiju~~	✓			
24	Levi Ollor	✓	09076380228	M	
25					
26					
27					
28					
29					
30					
31					

2

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS

ENGAGEMENT ATTAENDANCE SHEET

DATE: 5-11-21

VENUE: AKPAJO

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
1	Blessing Promise	AKPAJO		F		
2	Comfort Frank	✓	08074373811	F		
3	Bernine Kelta	✓	07054848933	F		
4	Victoria Ka	✓		F		
5	Mercy Giate	✓		F		
6	Helen Mini	✓	08163332078	F		
7	Constance Sgbe	✓	08031959311	F		
8	Mercy Reuben	✓	08036682794	F		
9	Grace Amadi	✓		f		
10	Victoria Kenga	✓		f		
11	Victoria Amadi	✓	08107876214	f		
12	Nnemba Kingsley	✓		f		
13	Gift Ka	✓	08101295782	f		

ENVIRONMENTAL & CHEMICAL SERVICES LIMITED Date:.....

PTO Continue

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS

ENGAGEMENT ATTAENDANCE SHEET

DATE: 5-11-21

VENUE: AKPAJO

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
14	Mimi Mbeke.G	AKPAJO	08064259069	F		
15	Ogbonnaagbara	✓		F		
16	Grace Eyeo	✓		F		
17	George Joy Gumba	✓		F		
18	Charity Afoji	✓	08149149282	F		
19	Smana Isaac	✓	08139210340	F		
20	Gospel Alfred	✓	08037952242	F		
21	Josphine John	✓	08137657786	F		
22	Peace Oluka	✓	08038485894	F		
23	Mary Sicaba	✓		F		
24	Chioma Sagbe	✓		F		
25	Ime Okukake	✓		F		
26	Sarah Salvaa	✓		F		

ENVIRONMENTAL & ... SERVICES LIMITED ... Date:.....

PTO Continue

3

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS

ENGAGEMENT ATTAENDANCE SHEET

DATE: 5-11-21

VENUE: AKPAJO

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
27	Dorcas Nnanno	AKPAJO		F		
28	Mercy Nwosu Ngoga	✓		F		
29	Ogbonne fred Ngoga	✓		F		
30	Glory Oluka	✓	08121824794	f		
31	Stella Saloka	✓		f		
32	Mary Nwanne	✓		f		
33	Gift Samuel	✓	08037698820	f		
34	Rose Inna	✓		f		
35	Mercy Goya Abolo	✓		f		
36	Alice Kaka	✓		f		
37	Chinwe Amaefojo	✓	07068070142	f		
38	Nwolu Bridget C.	✓	08140824595	f		
39	Ramatu C. Ngoga	✓	08068128790	f		

ENVIRONMENTAL & SOCIAL SERVICES LIMITED Date:

Confirmed

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS

ENGAGEMENT ATTAENDANCE SHEET

DATE: 5-11-21

VENUE: AKPAJO

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
40	Patient Ohukaibe	AKPAJO	08142594630	F		
41	Salome Apolo	✓		F		
42	Eunice Chijo	✓	08063776592	F		
43	With Bode	✓	08068739169	f		
44	Esther Repe Ohiga	✓	08132250104	f		
45	~~Salokanwofa Splendour~~					
46	Saloka nnwofa splendor	✓	08038826422	F		
47	Nne Emeren Ngofa	✓	08061613455	f		
48	Abigail Chu	✓	.	f		
49	~~Ogbongesia~~					
50	Ogbe Gesia	✓		f		
51	Charity Chinya	✓	.	f		
52	Sonia Nwogo	✓	09041030828	f		

ENVIRONMENTAL & CHEMICAL SERVICES LIMITED Date:.....

P.T.O Continue

5

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS

ENGAGEMENT ATTAENDANCE SHEET

DATE: 5-11-21

VENUE: AKPAJO

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
53	Patience Ogoya	AKPAJO	08185954462	f		
54	Blessing Igwe A.	✓	09052204192	f		
55	Happiness Ezekiel E	✓	08148108692	f		
56	Rose Loveday Ohuka	✓	07036033614	f		
57	Joy Sunday	✓		f		
58	Rose Amaka	✓		f		
59	Mercy Andrew Odam	✓		f		
60	Grace Agoju Obe	✓		f		
61	Josphine Ohuka	✓	08060317788	f		
62	Blessing Ohuka	✓	08065333378	f		
63	Dada Ohuka Nne	✓		f		
64	Mrs. Roseline Amenya	✓	08057984082	f		
65	Hannah Saloka O.	✓	07036469882	f		

ENVIRONMENTAL & ENGINEERING SERVICES LIMITED Date:.....

P To Continue

SUPPORT FOR MANKIND DEVELOPMENT INITIATIVE

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS

ENGAGEMENT ATTAENDANCE SHEET

DATE: 5-11-21

VENUE: AKPAJO

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
66	Stella Labobe .O.	AKPAJO	08039260259	F		
67	Grace Saybe	✓	08167737866	F		
68	Vicky Oeben	✓		F		
69	Alice Chido	✓	07059249342	F		
70	Ngozi Nwosu	✓	09128244589	F		
71	Patient Edward	✓	09092872351	F		
72	Patient Ejonson	✓	08086527752	F		
73	Augusta Chris	✓	09065419630	F		
74	Lucky Osanmoya	✓	09080297554	F		
75	Blessing Fortune	✓		F		
76	Peace Sokari	✓		F		
77	Sarah Victor	✓		F		
78	Ebe Chisom	✓		F		

ENVIRONMENTAL & CHEMICAL SERVICES LIMITED Date:.....

To Continue

Stakeholder Engagement – Project Advisory Committee (PAC)

Date of Engagement:	7th December, 2021
Venue:	IEFCL Conference Room
Facilitator/Presenter:	Lead Consultant

No of participants by gender

Male	-	14
Female	-	7
Total	**-**	**21**

Stakeholders Groups Present

i. PAC Chairman
ii. PAC Executives
iii. PAC Community Rep
iv. Indorama Community Relations Staff
v. Consulting Team

The proponent Briefing:

- The purpose of embarking on the development of the fertilizer project in Eleme LGA and specifically near the existing fertilizer Train 1 and Train 2 Plants.
- The product, services expected from the development and the socio-economic relationship between the communities/environment as well.
- Land take is approximately 80 hectares
- Existing Environmental Monitoring program for Train 1 and 2
- Raw material (Natural Gas, Water, Power)
- Production capacity Ammonia (2300MTPD and Urea 4000MTPD) \Scope of the proposed environmental impact assessment study and environmental components to be covered
- Expected National and International Regulatory interface during the construction and operational phases.
- Elaborate management plan established to sustain the numerous benefits (employments, development of trained/skilled manpower, CSR projects, social welfare packages, educational support programs etc) associated with the project as well as control the fears associated with chemical industries.

Questions and issues raised

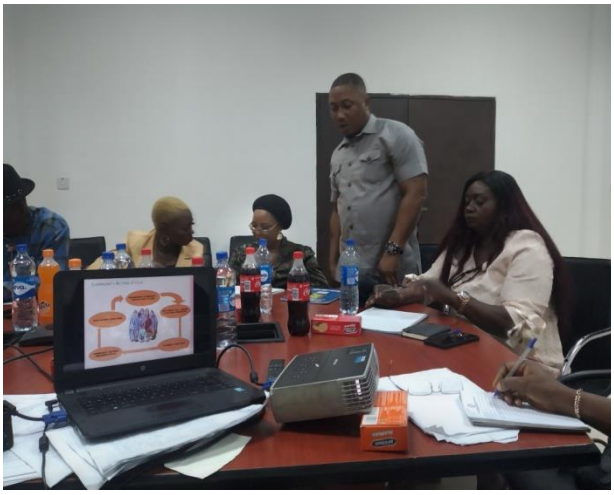
The major issues raised is:

- What is expected of PAC in the actualization of the project

Response

The proponent took time to dispel the poor knowledge surrounding fertilizer production from natural gas. The facilitator in simple language explained production process, control and containment of bye-products (Solid waste, treated waste water, gaseous emission) and methods of joint environmental monitoring of operation (Frequency and reporting) by LGA, State, Federal and IFC environmental Regulators. In light of the above since PAC members are also members of the host communities the role is very important to correct wrong information about fertilizer production. They must cross check every information about Indorama operations before attempting to get involved realizing that they ambassadors of Indorama.

Event Photographs



Attendance Sheet

IEFCL TRAIN 3-PDH PROJECT LIA ASSISTANTS
ENGAGEMENT ATTAENDANCE SHEET

DATE: 7 Dec 21

VENUE: IWORAMA CONFRENCE HALL (PAC)

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
01	Chief Steve Wodi (JP)	Wakolm Ekelemow	08089485830	Male		
02	HON EMEKA IBIAARI	WAKOMA FAMILY	08035301953	Male	whatfpn 08090623541	
03	Mabel Ejiekwu	Wakoma L	08035312086	F		
04	Chief Engr. Ezekiel .S. Oluka	NJURU	08051111838	MALE		
05	BIBIRA SYLVIA CHIKA	ALETO	08037312433	F		
06	ANIGE CHU.O.CHU	AGBONCHIA	08167902221	F		
07	ADEYA. JACOB. A.	AGBONCHIA	08030855762	M		
08	NGODIGHA MICHAEL OSILAECHUKU	OKEREWA	07055838516	M		
09	OLUKA OSARO BODE	ALETO	08037745558	M		
10	ALESI Emmanuel	Agbonchia	07038063426	M		
11	HON NWOSU NKWA (JP)	ALETO	08038748079	M		
12	Nwakama Nwagu	Akpakpan	08104065296	M		
13	Prince Friday Jorjbad	Okerewa	08037986437	M		

IEFCL TRAIN 3-PDH PROJECT EIA ASSISTANTS
ENGAGEMENT ATTAENDANCE SHEET

DATE: 7 DEC 21

VENUE: INDORAMA CONF HALL (PAC)

S/NO	NAME	ORGANIZATION/COMMUNITY	PHONE NO.	GENDER	E-MAIL	SIGNATURE
14	Hon. Blessing Eji (JP)	Afuru	08064212070	F.	blessingejijp@mail.com	[signature]
15.	Amb. Adeya, Jacob. A.	Agbonchia	08030858762	M	Jacobadeya35@gmail.com	[signature]
16	ALICE CHU. D. CHU	AGBONCHIA	08167902221	F		[signature]
17	CONSTANCE AUGUSTINE.	OKERENKA	08038892079	F	dickejire@gmail.com	[signature]
18	Kendrick Oluka	Indorama	08033098625	M		[signature]
19	JAKA GODSPOWER	INDORAMA	08134476692	M	g.jaka@indorama.com.ng	[signature]
20	Bekee Tamunibelema	MANKIND	08069514112	M		[signature]
21	Iminabo Aulan-Okwafn	"	08033461886	F	mankindngo Ogahoo.G	[signature]
22	Engr. Olu A. Wai-Ogosu	E&CS Ltd	08033384134	M	envichemical@gmail.com	[signature]

Proceedings of Public Forum

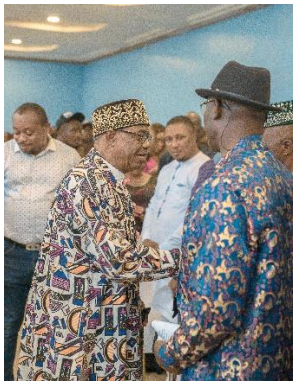
ITEMS	DESCRIPTION
Project	Environmental Impact Assessment for the proposed Train3 Fertilizer Plant by Indorama Eleme Fertilizer and Chemical Limited
Title	Public Forum Engagement/Consultation Meeting with all Project affected communities
Venue	Swiss Spirit Hotel, Port Harcourt
Date	January, 13th 2023
Language of Communication	English and Eleme
Group Participation	1. Representatives of the Federal Minister of Environment 2. Representatives of the Ministry of Environment, Rivers State 3. Project affected communities 4. Eleme Fishing Association 5. Eleme Hunters Association 6. Eleme Youth Leaders 7. Eleme Women Leaders 8. Eleme Graduate Forum 9. Members of Project Advisory Committee (PAC) 10. The King of Eleme 11. Paramount Rulers of various Communities in Eleme 12. The Chairman, Eleme LGA 13. The Leader, Eleme Legislative Assembly 14. The Consultant team lead by Engr. Olu Andah Wai-Ogosu 15. The Indorama Team
Introductions	The meeting started at about 10:30am, with an opening prayer. Followed by the introduction of High Table by Mr. Kendrick Oluka and individual introduction by all participants. After which a brief opening remark was given by Anand Gupta (Project Director)
Presentation by lead Consultant	The lead Consultant **Engr Olu Andah Wai-Ogosu,** started by welcoming all stakeholders, while thanking them for honoring Indorama's invitation and keeping faith with Indorama. Furthermore, he stressed on the importance, aim and objective of the stakeholder's engagement as global best practice, adding that apart from this engagement been a statutory requirement (EIA Act Cap E12 LFN 2021), it is in the culture of Indorama to regularly engage its stakeholders on any developmental projects and programs. Quickly, he applauded Indorama success story especially in the use of natural gas to produce Urea Fertilizer which has increased fertilizer usage in Nigeria from 8.7kg/ha to 19.7kg/ha Furthermore, he confirmed that the proposed Train 3 fertilizer plant is a replica of the existing Train 1 and 2 both in design (energy efficiency, production capacity) and control technology, adding that both Train1 and 2 have been safely operated till date without any episode. Consequently, the existing EMS will be modified to accommodate the proposed Train3. Major highlight of his presentation was on possible impacts of the project (negative and positive) and mitigation action to ameliorate the possible negative impacts and also to enhance the positive impacts drawing from the experience of the existing Train 1 and 2. Concluding, he confirmed that this is a grand finale of all engagements which has taken place in our various localities concerning the proposed Train3 project.

	Furthermore, he applauded Indorama for their giant strive in delivering life touching corporate social responsibility projects which speaks for itself.
Stakeholders' Perceptions, Questions and Comments.	**Hon. Nwokolu Nte** I appreciate Indorama for all they are doing for their stakeholders and encourage them to hold such meetings in Eleme LGA jurisdiction. He further reminded the company on their promise to build a dialysis center during last engagement. **Adaosila Chu (Okerewa)** I conducted a research on the Okulu stream and found out some of the activities that have affected the chemistry of the stream are sand mining, discharge from the mechanical sand dredgers, storm runoff from vegetables farm and waste dump littered along the stream banks. What are the mitigation measures to restore the water body? **Host community Graduate Forum** As a group we are interested in Technical skill acquisition, we appeal Indorama to help us build Technical skill acquisition center. **Ernest Amadi (Wakahua)** Please throw more light on the modification of existing EMS **Okazu Godspower (LGA Environment Supervisor)** Waste water treated and recycled should be used in the system to reduce waste water discharge How do you ensure implementation of local content law to the benefit of the community? **Saint Mube** He thanked the company for the opportunity to engage with the host community. He asked How do you manage migration issues and its security consequences? **Comrade Jacob Adeya** Environmental changes affect health; how will Indorama manage the health consequences of the proposed Train 3? **Fishermen Association** Last time we were promised employment till now, no employment **Comrade Marcus** Okulu River is receiving polluted water and as such we can no longer drink it. Please provide water and electricity for us. **Hon. Virtue (Eleme LGA Vice Chairperson)** What is the direct benefit of the increased fertilizer usage as mentioned by presenter to Eleme farmers? **Engr. Chujor Eric** I Thank the presenter for a good presentation

	I appeal to Indorama to consider all other Eleme graduates during employment and not to focus on host community alone. I appeal to Indorama to extend its scholarship program to postgraduate students also.
Response	Responding to the last question Mr. Kendrick confirmed that Indorama do not segregate when it comes to employment, citing example of Engr. Salome Chujor who is not from the project host community. The issue of postgraduate scholarship is noted and will be discussed with the management. Responding on environmental concerns Engr. Olu Andah Wai-Ogosu confirmed that: • No effluent leaves the Indorama retention pond without satisfactory treatment according to National and International standard. • Treated effluent are reused within the system to reduce groundwater extraction • Surface water monitoring of the Okulu stream are carried out on monthly basis • The June 2021 incident on the Okulu stream was a technical fault which has been addressed • Waste dumping by the shores of the Okulu stream is a major impact on the water body • Local government should discourage the use of the Okulu shore as waste dump. • Project Advisory Community (PAC) will work with the management to address the issue of migration
Remark by FMEnv	The Zonal Controller Federal Ministry of Environment **Mr. Ikomah** thanked all participants, appealing that the ongoing sand mining on the water body should be discouraged.
Remark by Rivers State Ministry of Environment	The representative of the Ministry **Dr. Kenneth Okoro** apologized for late coming to the meeting: • He stressed the importance of the engagement for sustainable development as it will give the host community opportunity for their voice to be heard on the proposed Train3 Project. • Appealed to Indorama to help the community in the area of power and security.
Remark by the Executive Chairman of Eleme Local Government Council	• I appreciate the level of awareness and consciousness of the host communities about the happening of things around them. • Considering, the fact that our son is the consultant to this project our fears are alleviated owing to his wealth of knowledge in this area • I confirmed that Indorama CSR project is good, however it can be improved upon. Moreso, Indorama can support the LGA in the area of security, encourage small scale business which will support employment • He further confirmed action will be taken to discourage the ongoing sand mining and waste dumping on the shores of Okulu stream • He concluded by thanking all participants for their presence.
Remark by the King of Eleme Land, HRM Philip Osaro Obelle	He thanked God for Journey mercies, while appreciating Indorama for welcoming them into the new year with this good news. Furthermore, he applauded Indorama for their good work in Eleme land and their consistent communication to all stakeholders. He confirmed that the communities will continue to support Indorama
Vote of Thanks /Closing	Vote of thanks was made by **Mrs. Toyin Olasinde** of Indorama HSE who in her remark thanked all stakeholders for honoring their invitation and for the fruitful deliberations.

	The meeting came to a close at about 1:15pm with a closing prayer.
Attachments	Event photographs, Attendance sheet and Briefing document

Event Photographs
















Attendance Sheet

INDORAMA FERTILIZER

INDORAMA ELEME FERTILIZER & CHEMICALS LIMITED, ELEME, RIVERS STATE, NIGERIA

ATTENDENCE SHEET

PROJECT	IEFCL-TRAIN3 PROJECT
DATE & TIME	13TH JANUARY' 2023; 10:00AM
VENUE	SWISS SPIRITS HOTEL, STADIUM ROAD, PORT HARCOURT
TOPIC	STAKEHOLDER ENGAGEMENT MEETING (PUBLIC FORUM)

S/N	NAME	ORAGNIZATION / COMMUNITY	PHONE NUMBER	GENDER	Sign
1	HRM PHILIP OBELE (JP)	KING OF ELEME	—	M	
2	IKOMATH, F. BARIEENEE	FMENV. PH.	08055662496	M	
3	Chf(Hon) Obaribomate Ollor	Executive Chairman Eleme L.G.A	08033385778	M	
4	WOA - OGUSO	CONSULTANT (INDORAMA)	08033384134	M	
5	Prof Erema Daka	EC 4S Ltd	08033385685	M	
6	ANAND KISHORE GUPTA	INDORAMA	08053002069	M	
7	MANOJ CHATURVEDI	INDORAMA	09053992063	M	
8	HON. MRS VIRTUE J. EKEE	VICE CHAIRMAN, ELEME LGA	08035483229	F	
9	Dr. K. O. OKORO	DIR EPRSD, RSMEnv	08033094426	M	
10	Dr. M.K. Jain Maharda	Indorama	08070324523	M	

INDORAMA FERTILIZER

S/N	NAME	ORAGNIZATION / COMMUNITY	PHONE NUMBER	GENDER	Sign
11	Success. O. OBETA	Fishing	08165234713	M	
12	Kaizer e Osuvo	Fishing	08067919949	m	
13	Sunday Rattey	fishing	08166497337	m	
14	REV'D OLUTI JOSEPH E.	FISHERS ASS.	08038069491	M	
15	Goodnews Olaks	Fishers LGA Ass	08032692777	m	
16	OLLOR ABEL	L.G.A	08033693614	M	
17	Ernest O. Amady	Host Comm. Youth	08035754234	M	
18	SILAS OLUKA-NKE	Host Comm. Youth	08036706421	m	
19	OBARI KEDEE	Host Commty Youth forum	08032953945	M	
20	OLUKPEOBE MIRACLE	Host Community Y. F.	08171716015	M.	
21	UBA IFEANYI KENNEDY	Economics	08064195440	m	
22	Gaius OSAROBUNDO	Host Commty youth forum	08068351379	M	
23	BEATHER, AMAKA ✓	Mul. Environment	08168427977	f	
24	OSARO. N. SUSANA	Fishing	07146975465	F	
25	Hon. Michael Osilaechuu	PAC	07055838516	m.	

INDORAMA FERTILIZER

S/N	NAME	ORAGNIZATION / COMMUNITY	PHONE NUMBER	GENDER	Sign
26	Chief Steve Wodi (JP)	PAC (Wakoko Community)	08039489530	Male	
27	Mrs Mabel Elekwa	PAC (Wakoko Community)	08055312086	F	
28	JOSHUA OMUBE .N.	youth	07035824955	m	
29	NWOKOLO Gomba Nicolas	Youth	08033730319	M	
30	OBELE MUBE	YOUTH	08062863518	M	
31	OSanolai Blessing	Youth	09072681240	F	
32	Ohuk Peobe Amebieobari Favour	Youth	08145434592	F	
33	NWIDAA N. MARTHA	Youth	08034409354	F	
34	OCHEN PROMISE .O.	ELEME GRADUATE F	08067420693	MALE	
35	CHIJIOK PATRICK OBELE	YOUTH	07054005992	M	
36	Saint Mube	Eleme Graduate Forum	08035055772	m	
37	Rt Hon Chuma Domi of	leader Eleme legislative Council	09163655958	m	
38	Hon. VICTOR O. GOCA	Eleme Assembly legislature	080 35588658	m	
39	Alice Ubu. O. Ubu	PAC Member	08167902221	F	
40	ITRIT(Emere) Osaro A. Nwafor Akpakpan		08033397185	M	
41	Chief Com. Efeeh Osaro Elechi	OKEREWA	08033122044		

INDORAMA FERTILIZER

S/N	NAME	ORAGNIZATION / COMMUNITY	PHONE NUMBER	GENDER	Sign
42	Chy Obarifomi Osaromube	Youth	09079010903	M	
43	Prince Nsao Okereke	Eleme Youth President	07064408390	M	✓
44	Ojimgba Atonsemi Obari	Vice President E.Y.C	08039525229	M	
45	Hon Praise God Moses-Kattey	Secretary Eleme youth	08119234116	M	✓
46	Engr. Marcus Teteni	publicity Chief	08039341682	M	
47	His Highness Emere Ejii Akpaoga	Njuru Community	07031322315	M	
48	HRH, Emere, Joseph Ngeto	Agbonchia Community	08038667962	M	
49	HRH Chief (Hon) George Osaro	Agbonchia Community	08055805960	M	
50	Chief Sunday Chinwa	Agbonchia Community	08136913628	M	
51	Chf Engr. Ezekiel Gofa Oluka	Njuru Community	07064900755	M	
52	Alesi Emmanuel	Agbonchia	07038063426	M	
53	Appolos Orregirinna	Youth	08064468787	M	
54	Kelechi Ngokanya	Okerewa Community	07062034294 ~~0802208~~	F	Ikebgo
55	Nwakama. E. Nwafor	Akpakpan community	08104572878	M	
56	Olube - E Obe	Agbonchia Community	08107793816	M	
57	Ochen Obele	Agbonchia Community	08061214592	M	

S/N	NAME	ORAGNIZATION / COMMUNITY	PHONE NUMBER	GENDER	Sign
58	Sir. Jacob Afeya	Eleme youth/PAC	08030858762	Male	[signature]
59	HENRY ECHENDU RISI	WAKOHU YOUTH	08064074111	MALE	[signature]
60	CHIEF DARIUS RISI	CHIEF OF WAKOHU	07036098321	MALE	[signature]
61	LOVEDAY RISI	WAKOHU YOUTH	~~070~~ 08097457701	MALE	[signature]
62	Rissi Ovunda Martins	Wakohu youth	08035080836	male	[signature]
63	HON. NWOSU NGOFA (JP)	ALETO ELEME	08038748098	MALE	[signature]
64	HON: ISAAC O. CHU	AJURU	08036684112	MALE	[signature]
65	ENGR CALEB AKARA OSARO	ELEME GRADUATE FORUM	07031991390	MALE	[signature]
66	ENGR. CHUBOR ERIC	ELEME GRADUATE F.	08061274514	MALE	[signature]
67	ATE AWAJI	✓ ✓ ✓	08078687357	MALE	[signature]
68	HRH. Emere (Dr) Nwokoha Dimkpa Nte (JP)	Njuru Community	080386928[illegible]	male	[signature]
69	Hon. Blessing Eju (JP)	Njuru Community	08064212070	F.	[signature]
70	Comr Prince Friday Torgbara	Okerewa Comm.	08037964371	M	[signature]
71	NWAFOR N. ADANNE	ALETO Com.	08030851619	F	[signature]
72	BARR. BRIGHT NGIBERE	ELEME L.G.A.	07066562307	M	[signature]
73	Esther Fred-Owate	Okerewa Comm.	0816665885[illegible]	F	[signature]

INDORAMA FERTILIZER

S/N	NAME	ORAGNIZATION / COMMUNITY	PHONE NUMBER	GENDER	Sign
74	Constance Augustine	Okrevwa PAC	08038859277	F	
75	Immabo Austen-Okoroafor	ENV. & Chemical Co.	08033461888	F	
76	Prof Erema Daka	✓	080 33381665	M	
77	~~EMR BELA~~ NYIMABARI ✓	VIOLA CONSULTING	07034448850	M	
78	OKRAZUA CHRISTOPHER ✓	Eleme LGA	08039163150	M	
79	BIBIRA SYLVIA OLUKA	PAC-ALETO	08037312433	F	
80	Nwogu michael	Agbonchia	09060644065	m	
81	Nwogu Johnson	Agbonchia	09017465180	M	
82	MARY OSARO	Agbonchia	09090701924	F	
83	NKIACHUKWU SOLOMON	E & CS LTD	08032906022	M	
84	Sunday Zooks	E$CS Ltd	07037993486	M	
85	Chinyere Agatha Ukegbu	Agbonchia	08039196792	F	
86	OBI AUGUSTA ✓	FMENV PH	08032658246	F	
87	Paul Obasa ✓	FMENV, PH	08161185071	M	
88	Idemudia, Maxwell	PATO ONEH-EH Eleme	08066906564	M	
89	Engr. Godwand	Eleme LGA	08036962221	M	

INDORAMA FERTILIZER

S/N	NAME	ORAGNIZATION / COMMUNITY	PHONE NUMBER	GENDER	Sign
90	NWOKOLO OKAKAOBIKE	NJURU	08165232611	M	
91	Toyin Olanseke	Indorama	08056115586	F	
92	SALOME CHUJOR	"	0 80 60 145315	F	
93	Oluka Osas Bodo	PAC Aleto	0803774	M	
94	GRACE E EGBE	Trader Aleto	0806076264	F	
95	Imo Augustine Igwe	Trader Union	09063133333	M	
96	Mbombo S. Akem	Agbonchara II	07034722		
97	NIKE AFORJI	Trader Union	08066852188	M	
98	Adaosila Osilaechuu	Okeowa	08066825627	M	
99	Andrew Ochen	Ogale/Hunter	07039171485	m	
100	Comba O. Nwaji	Agbonchia/Hunter	09048571227	m	
110	Nwibatpo Golden	NYCOP	07036166266	F	
111	JUSTINA ONYOMCHU	Onne Trader	08036165224	F	
112	Prince Obele	Traders	08107758849	M	
113	Chief Jamel Obefa	Traders	08173344046	F	
114	Eld. Igwe O. Nwaji	Hunters Ass.	08037160348	m	

INDORAMA FERTILIZER

S/N	NAME	ORAGNIZATION / COMMUNITY	PHONE NUMBER	GENDER	Sign
115	Mission Sunday	Hunters	08108097185	M	
116	NDU EMMANUEL IBIAARI	NNAKOTHU PAC	08035501953	M	
117	JIMA BEBE-OKPABI	INDORAMA	09027713280	M	
118	JAIKA GODSPOWER	INDORAMA	08134477892	M	
119	OKAKAOBARI OLNOR	INDORAMA	07067576053	F	
120	Ruzzel Ngofa	Indorama	08063345885	M	
121	KENDRICK OLUKA	INDORAMA	09036956825	M	

BRIEFING DOCUMENT

BRIEFING DOCUMENT FOR THE STAKEHOLDER ENGAGMENTS/PUBLIC FORUM
ESIA OF PROPOSED IEFCL- TRAIN 3 PROJECT
PROPONENT: INDORAMA ELEME FERTILIZER & CHEMICALS LIMITED (IEFCL)

PURPOSE OF THE PUBLIC FORUM

This forum is organized by management of IEFCL to enlighten the communities and other interested Stakeholders that may be directly or indirectly benefited / affected by the proposed project.

In line with Federal Governments Policy on Environment, including Environmental Impact Assessment (EIA) EIA Act Cap E12 LFN 2021, this project will be executed in compliance with all relevant statutory regulations.

This forum is a part of a series of consultations with all the communities and other stakeholders within the project influence zone. This engagement offers the stakeholders, the opportunity for their views to be heard while soliciting for their support in the execution of the project.

BACKGROUND TO THE PROJECT

Keeping in view with Federal Government Polices on the diversification of the Nigeria's economy from an oil-based mono-economy through exploring alternative uses of oil and gas to drive Nigeria's agro-based economy, Indorama in 2012 took the bold step to use natural gas for the manufacturing of Ammonia and Urea, an essential component to consolidate Nigeria's Agriculture and food security policy.

Consequently, from 2012 to 2021 Indorama has constructed & commissioned two (2) Trains of Fertilizers plant each producing 2,300MT/Day of Ammonia and 4,000MT/Day of Urea. These plants are operating at 100% installed capacity and has helped in catapulting Nigeria from using 8.7kg per hectare of Fertilizer in 2012 to 19.6kg per hectare of Fertilizer in 2020 according to World Bank.

With the successful operation of IEFCL-Train1 and Train2, Indorama is now planning to set-up IEFCL-Train3. This will help in enhancing agriculture and food security in Nigeria. This will also help in beneficial utilization of natural resources of Nation.

PROJECT DESCRIPTION

The proposed fertilizer plant will utilize natural gas as its basic raw material and will be sited on land space totaling approx. 80 hectares adjoining the Northern fence of the existing Indorama Eleme Complex. Other utilities (water, and power) needed by this new plant are available within the existing complex whereas some other infrastructure will be developed. IEFCL-Train3 will be replica of the

existing operating Train1 & Train2. The smooth operation of Train1 & Train2 has proven technology and design.

The new fertilizer plant will have the following production capacities:

Ammonia	2,300MT/Day
Urea	4,000MT/Day

BENEFITS OF THE PROJECT

During Project Execution (construction)

- There will be employment opportunities for skilled, semi-skilled and unskilled manpower.
- The Federal Government Policy on local content will be implemented which will benefit the host communities.
- Construction contractors will be encouraged and required to employ (as many as possible) skilled, semi-skilled and unskilled manpower and technicians from the local communities.
- The project will encourage sub-contractors and vendors from the host communities through patronage.

During Operations

- Commerce and economic activities will generally be enhanced, Agricultural sector in the Niger Delta, as well as Nigeria at large, will have reliable and alternative source of fertilizer for their farming.
- Also, reliable source for fertilizer as well as Urea for NPK blending plants will improve, consequently agriculture production which will reflect on food security.
- This project will provide suitable ground for skill acquisition, technology transfer, human empowerment etc.
- The plant processes involve conservative energy/water use in its production process with minimal emissions and discharge into the environment. The adopted technology is the latest of the art in Fertilizer manufacturing.
- This Train3 project will positively increase the nation's cumulative foreign exchange earning thus improving the nation’s GDP and the stakeholder’s capacity and quality of life.
- Most importantly the project will cumulatively increase the economic activities in Eleme LGA and Rivers State.

NEGATIVE EFFECTS

During construction

The only foreseeable negative impacts will include:

- Increase vehicular transport (especially commercial trucks) that will visit the site to deliver goods/services.
- Transient impact on air quality because of increased vehicular emissions.
- Increase in-house solid waste stream within IEFCL complex.

- Increase population into the host communities may have some negative social impacts.

During operations

- Increase traffic volume in the area.
- Increase in migrant workers.
- Impact on air quality in the event of gaseous emissions.
- Increase solid waste stream (plastic, metal, wood) within IEFCL complex.

Generally, biodiversity and socio-economic structure & composition and status may be modified.

ENVIRONMENTAL MANAGEMENT

The environmental risk management for the project will be implemented through a structured Cause and Effect Management Process (CEMP). This involves the identification of the potential environmental and social impacts, risks and hazards. The CEMP provide the opportunity for effective management of identified potential impacts proactively.

To this end, Environmental Impact Assessment (EIA) Studies has been commissioned for the project and in-fact field data gathering is conducted with FMEnv officers and community representatives' participation. Issues addressed in the study include socio-economy, health status of the study area, soil, surface water quality, ground water quality, air quality, noise, construction, and operational wastes, etc.

The results of the EIA will contain an Environmental Management Plan (EMP) for the implementation by IEFCL, the proponent of the project.

ENGINEERING DESIGN

The potential environmental effects associated with the project will occur generally during project construction, as a result of minimal earth movement, machinery movement and noise. These will occur during the first half of the construction phase.

The second half of construction which involves equipment installation will pose a localized and temporary environmental impact as a result of numerous constructions works. This temporary environmental impact will be limited to construction site and may have some minor effect on surroundings.

Several control/mitigation measures are built into the Engineering design to reduce environmental pollution, risks and hazards during construction as well as when the plants will be functional. For example, all calculations and drawings required for fabrication, welding and sourcing of materials shall conform to National and International Standards / Codes. The project management procedures will include specified HSE procedures and safety workshops etc.

COMMUNITY AFFAIRS/COMMUNITY RELATIONS

The project team will promote mutually beneficial relationships with all the host communities through close, prompt contacts, and regular engagements. Effort will be made to identify and proactively deal with community issues arising from the execution of the work. The project team and Community Relations & Development Department will interact and ensure that all stakeholders are adequately and routinely briefed on the project progress and operations.

The Proponent, in conjunction with its Consulting Engineers, will maintain a policy of high engineering proficiency, and compliance with the requirements of the relevant Government regulations, laws and statutes in the execution of this project.

Thank you for your attention, and we are willing to take questions.

Engr. Wai-Ogosu O. *FNES*
Lead Consultant

Presentation on Indorama Engagements with Stakeholders in Host, Pipeline and Jetty Communities through Government & Community Relations

Introduction

- MOU & Community Development Projects
- Stakeholders Engagement Mechanism: “PAC”
- Host Communities Youth Forum
- Host Communities CSR Projects Status
- Women in Project Advisory Committee (PAC)
- Micro Credit Grant for Women
- Scholarship – Gender analysis
- Skill Acquisition Programme
- Palliatives measures during covid 19
- Customized Indorama Exercise Books Distribution

MOU & Community Development Projects

Harmonious relationship with local environment plays an important role on the overall industrial peace. Since 2007 company has successfully executed (6) MOU's with the Host communities. Highlight of budgets are as under:

MOU's with Host Communities - 14% increase 2022 – 2025 MOU in view of Line 3

MOU Period	Duration	No of Communities	Naira/Host Comm./Year	Budget (Naira)
2007 - 2010	3	6	10,000,000	180,000,000
2010 - 2013	3	6	15,000,000	270,000,000
2013 - 2015	2	6	17,500,000	210,000,000
2016	1	6	20,000,000	120,000,000
2016 - 2019	3	6	30,000,000	540,000,000
2020 - 2022	3	6	35,000,000	630,000,000
2023 - 2025	3	6	40,000,000	720,000,000

MOU's with Pipeline Communities – 25% increase in 2022 – 2025 MOU in view of Line 3

MOU Period	Duration (Yrs)	No of Communities	Budget (Naira)
2014 - 2016	3	30	150,000,000
2017 - 2019	3	30	240,000,000
2020 - 2022	3	30	300,000,000
2023 - 2025	3	30	375,000,000

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Overview of Community Development Projects – to be carried out during Line 3

6 Host Communities

Community	Total Spend	Projects
Akpajo	265 Million	Construction of 14 classrooms block
Agbonchia	215 Million	Construction of technical college
Okerewa	175 Million	Construction and furnishing of Health centre
Njuru	135 Million	Construction of street solar light
Aleto	70 Million	Construction of school Auditorium in Aleto community school
Elelenewon/Wakahu	80 Million	Construction of police divisional headquarter

Overview of Community Development Projects – to be carried out during Line 3

30 Pipeline Communities

Community	Total Spend	Projects
Cluster 1	**FOR 2022,** ₦37.5 Million for three (3), Akpajo community no project for 2022 due to pending litigation	Extension of Electricity in Atali Community, Construction of five (5) Classroom Block in Elelenwo Community School, Construction of 300 Meters Rumuwutche, Apamini Rumuwogo Concrete Road in Rumukwurusi.
Cluster 2	₦87.5 Million	Construction of Fence around community Health centre in Abara Community, Extension of Electricity in Chokocho Community, Extension of Electricity in Umuogodo Community, Extension of Electricity in Imeh Community, /Renovation of Health Centre in Umuechem community, Construction of ICT Training Centre in Umuakuru community and Construction of Health Centre in Edegelem Community.
Cluster 3	₦75 Million	Construction of 5 Nos Overhead Tank Stands for Community Water in Ipo Community, Construction of Modern Market in Omuawa Community, Construction of Shops Inside Market in Omademe Community, Construction of 12 Lock Up Shop in Ozuaha, Construction of Civil Centre Phase II in Omerelu Community and Construction of Police Quarters in Ubima Community
Cluster 4	₦12.5Million	Construction of Community Development Centre/Conference Hall in Akanu community
Cluster 5	₦100 Million	Rehabilitation of Technical Workshop Building in Modern Boys Secondary School in Omoku 1 Community, Construction of Health Centre in Omoku 2 Community, Construction of Drainage System in Obrikom Community, Renovation of Community Health Centre in Egbogoro Community, Construction of Administrative Office for Teachers & Classroom in Okpurukpuali Community, Extension of Electricity in Okansu Community, Construction of Administrative Block in Uju community and Construction of Market Complex in Obor Community

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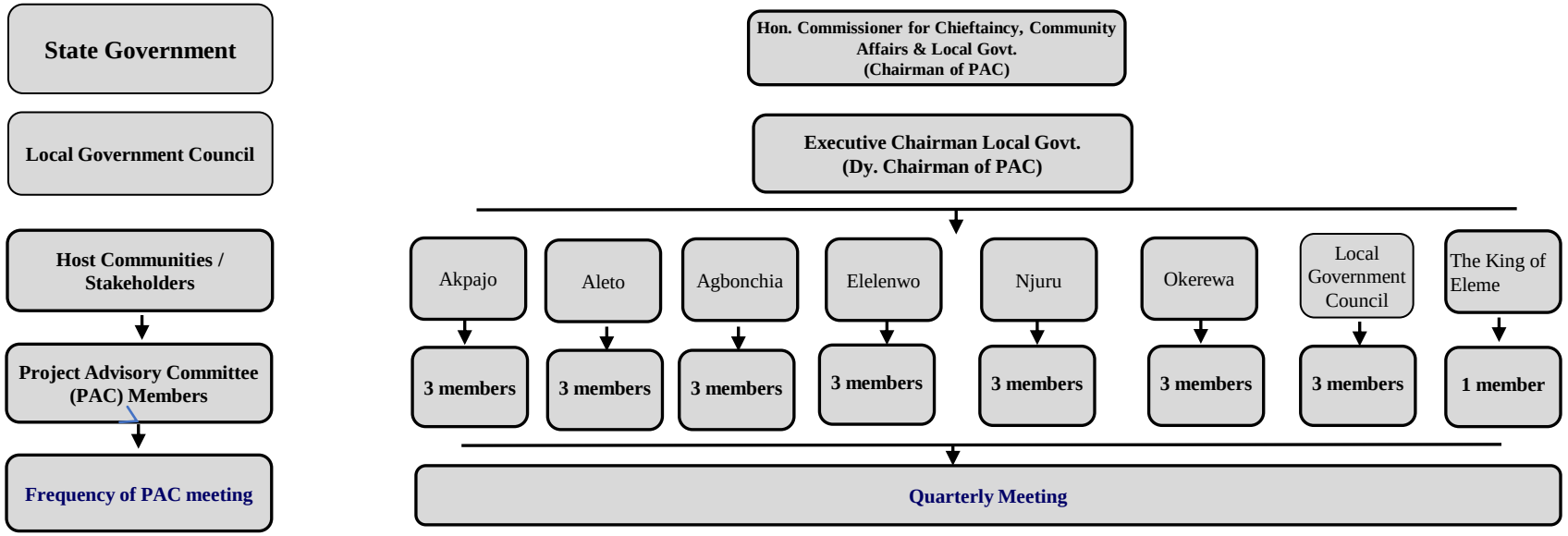
Stakeholders Engagement Mechanism: “PAC”

Within the framework of MOU, Rivers State Govt. constituted a Project Advisory Committee (“PAC”) comprising the representatives from six (6) Host Communities, Rivers State Govt. and Eleme Local Govt.;

- PAC is constituted by The Ministry of Chieftaincy and Community Affairs as interface between Indorama Eleme and Host Communities for sustainable Company and Host Communities relations
- The Commissioner for Chieftaincy and Community Affairs is the Chairman of PAC
- Chairman, Eleme Local Govt. is the Vice Chairman of PAC
- Each Host Community has three (3) members representatives in PAC, one (1) representative from the King of Eleme and 3 Councilors from our immediate host communities

PAC Composition



Women in Project Advisory Committee (PAC)

- New PAC for 2021 – 2022 was constituted in September 2021 by Hon. Commissioner of Chieftaincy and Community Affairs.
- One (1) woman member each has been elected from each of the Host Communities.
- New PAC was inaugurated in the company in November 2021
- 1st meeting between Sub Committee of Women in PAC and Community Relations Department held in February 2022

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Host Community Youth Forum (HCYF) – Engagement & Empowerment Initiatives

- MOU with HCYF for empowerment & Monthly office upkeep (May’ 22 – April’ 23)

- MOU with Host Community has provision for Youth Entrepreneurship Scheme (YES) with an annual budget of N 5,000,000 per annum.

Host Communities CSR Projects Status – Currently in-progress

Akpajo – 14 Classroom Block

Agbonchia – Technical College

Aletp – Construction of Auditorium in the School

Okerewa – Community Health Center

Njuru – Installation of Solar Panel for street lighting

Elelenwo – Construction of Division Poilice HQ

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CSR – Impact Assessment of Micro Credit Grant

- 75 women were awarded Micro Grant for the year 2022.
- We commenced Impact assessment of Micro Grant Scheme for Host Community women.
- 63 women have put the grant into their micro business.
- 5 women started new micro business.
- 7 women put the grant for farming.

Scholarship for Host Communities & Pipeline Communities for Year 2022

Host Communities:

- Total of 28 young men & women qualified for scholarship in 2021.
- Six (6) beneficiaries are women
- Due to Academic Staff Union of Universities (ASUU) strike, that of 2022 was delayed, but the process is ongoing

Pipeline Communities:

- Total of 56 young men & women qualified for scholarship in 2022
- 25 beneficiaries were women

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Refresher Course for Host Community applicants for Graduate / Diploma Engineer Internship Programme

- Refresher Training Course for indigenous applicants has been effective tool for enabling candidates perform better in Aptitude Test, Technical Test & Oral Interview during line1 & Line2. thereafter successful candidates join Graduate & Diploma Engineer Training Programme for further capacity development for managing their roles and responsibilities as engineers and technicians respectively.
- This philosophy will continue during Line3.

Some of the highlights of Refresher Training Course during Line1 & Line2:

- 1st Refresher Course Training – 65 young men & women participated in 2 week programme during October'2019. 12 candidates were successful and were enrolled in the DET & GET programme.

- 2nd Refresher Course Training – 48 Young men and women from our Host Communities participated in 2 weeks Re-fresher course in chemical engineering , mechanical engineering and quantitative aptitude organised on collaboration with Rivers State University during 3rd & 4th week of May 2021.
- The objective of the programme was to prepare applicants for the Technical Test and Aptitude Test for GET & DET Programme.
- 18 applicants were able to qualify for Interview
- 5 GETs and 1 DETs were selected

Pipeline Communities – Skill Acquisition Programme

- Skill acquisition was conducted October 4th 2021.
- 182 young men and women successfully completed the program
- Total of 64 women successfully completed the skill acquisition programme.
- And Starter packs were given to all the trainees
- Vocational Training Programme includes - Scaffolding, Rigging, Electrical Wiring & Installation, Grinding, Tile fixing, Paint Production & Painting, Fish Farming, Catering, Bead Making, Cake Baking & Pastry, Hair Dressing, Tying of Gele and Soap / Perfume making.
- According to the MOU provision, the programme is programmed to hold once for the period of MOU, 2020 - 2022



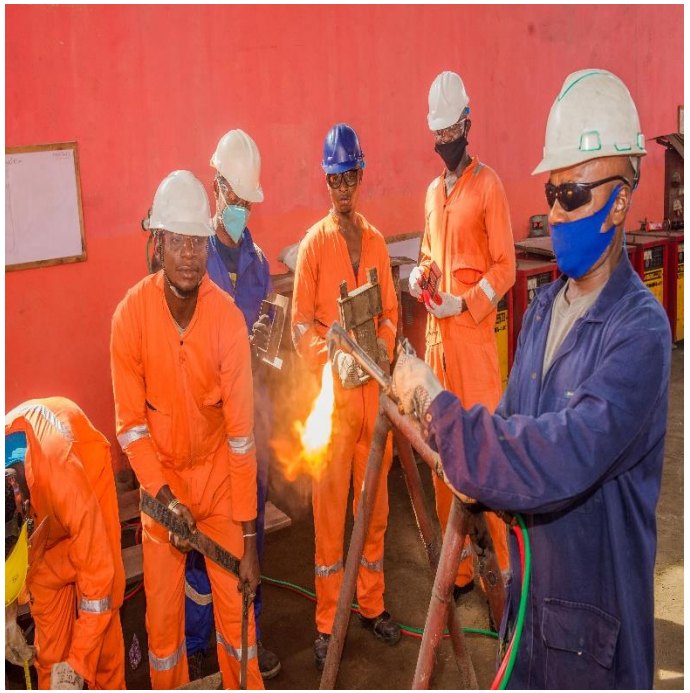






Host Communities – Skill Acquisition Programme

- Skill Acquisition opening programme was conducted on the October 14th 2022.
- 200 young men and women were successfully trained
- Total of 49 women were successfully trained in Hair Dressing and Make up.
- Vocational Training Programme includes – Welding, Scaffolding, Rigging, Insulation, Grinding, Iron Bender, Hair Dressing and Make up.



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Host Communities CSR Projects Status

Host Comm.	S. No.	Project	Phase	Amount	Status
Akpajo Comm.	1	Electricity Project	I	N10M	Completed
	2	33MVA Substation	II	N15M	Completed
	3	33MVA Substation	III	N15M	Completed
	4	440 Meters Road Project	IV	N20M	Completed
	5	14 Class Room Blocks	V, VI, VII	N70M	Completed
	6	14 Class Room Blocks Cont'd	VIII	N40M	On Going
			TOTAL	N170 MILLION	

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Host Communities CSR Projects Status

Agbonchia Comm.	1	266Meters Road Project	I	N10M	Completed
	2	340 Meters Road Project	II	N15M	Completed
	3	366 Meters Road Project	III	N15M	Completed
	4	360 Meters Road Project	IV	N15M	Completed
	5	440 Meters Road Project	V	N20M	Completed
	6	600 Meters Drainage	VI	N17.5M	Completed
	7	600 Meter Drainage	VII	N17.5M	Completed
	8	Building of Technical College	VIII,IX,X	N80M	On Going
			TOTAL	N190 MILLION	

Host Communities CSR Projects Status

Host Comm.	S. No.	Project	Phase	Amount	Status
Aleto Comm.	1	Purchase of Land for	I	N10.0M	Completed
	2	Construction of 12 Class room Block	II	N15.0M	Completed
	3	Continuation of School Project	III	N15.0M	Completed
	4	Continuation of School Project	IV	N15.0M	Completed
	5	Continuation of School Project	V	N17.5M	Completed
	6	Finishing of School Project	VI	N20.0M	Completed
	7	Finishing of School Project	VII, VIII	N37.5M	Completed
	8	25 Mts Solar Street Light	IX,X	N60M	Completed
	9	25 Mts Solar Street Light	XI	N30M	Completed
			TOTAL	N220 MILLION	

Host Communities CSR Projects Status

Njuru Comm.	1	Electricity Project	I	N10M	Completed
	2	Palace Road Project	II	N15M	Completed
	3	Drainage/ Road Project	III	N15M	Completed
	4	Drainage Project	IV	N20M	Completed
	5	1km Road With Double Side Drainage	V, VI, VII, VIII	N97M	Completed
			TOTAL	N157 MILLION	

Host Communities CSR Projects Status

Host Comm.	S. No.	Project	Phase	Amount	Status
Okerewa Comm.	1	Electrification Project	I	N10M	Completed
	2	600mtrs drainage Project	II	N15M	Completed
	3	366 Meters Road Project	III	N15M	Completed
	4	360 Meters Road Project	IV	N20M	Completed
	5	440 Meters Road Project	V	N15M	Completed
	6	Health Center Building	VI	N55M	Completed
	7	Building a Health Center Cont'd	VII, VIII, IX	N90M	On Going
			TOTAL	N220 MILLION	

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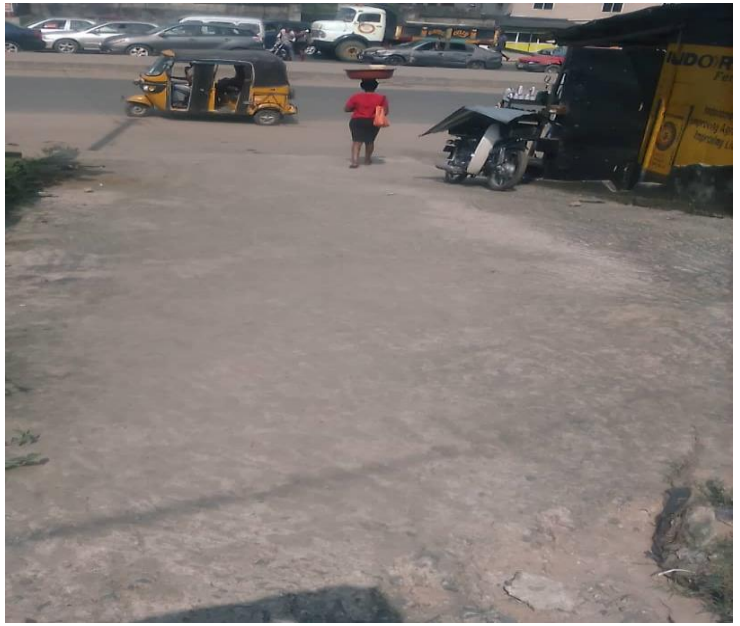
Host Communities CSR Projects Status

Wakohu Family Of Elelenwo Comm.	1	266Meters Road Project	I	N10M	Completed
	2	340 Meters Road Project	II	N15M	Completed
	3	366 Meters Road Project	III	N15M	Completed
	4	360 Meters Road Project	IV	N15M	Completed
	5	440 Meters Road Project	V	N20M	Completed
	6	Interlocking of Road network	VI	N17.5M	Completed
	7	8 Block Classroom School	VII, VIII	N35M	Completed
	8	Divisional Police Headquarters	IX,X	N40M	On Going
			TOTAL	N167.5 MILLION	

Pipeline communities; Cluster 1 CSR Projects

CLUSTER 1 is made up of four (4) communities group into one cluster as see below,				
S/N	COMMUNITY	PROJECTS	PHASES	STATUS
1	Akpajo Community	Purchase & installation of 500KVA Transformer	I	Completed
		Purchase & installation of 500KVA Transformer	II	Completed
2	Rumuokwurusi Community	Interlocking & construction of pavement round Rumuokwurusi Civic center	I	Completed
		Construction of Road	II	Completed
		Construction of 300 Meters Concrete Road	III	WIP
3	Atali Community	Grading of Road	I	Completed
		Construction of Borehole water	II	Completed
4	Elelenwo Community	Construction of Police station at Mangrove Estate	I	Completed
		Construction of police administrative block	II	Completed
		Construction of five (5) classroom blocks	III	WIP



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Pipeline communities; Cluster 2 CSR projects

CLUSTER 2 is made up of Seven (7) communities group into one cluster as see below				
S/N	**COMMUNITY**	**PROJECTS**	**PHASES**	**STATUS**
1	Abara	Renovation of Community Health Center	I	Completed
		Renovation of Community Health Center	II	Completed
		Construction Fence around Community Health Center	III	Completed
2	Umuecheme	Construction of Borehole water with solar	I	Completed
		Construction of Corpers Lodge	II	Completed
		Rehabilitation /Renovation of Health Centre	III	WIP
3	Chokocho	Electricity Extension	I	Completed
		Electricity Extension and Purchase & installation of two (2) Transformers	II	Completed
4	Umuakaru	Construction of Borehole water	I	Completed
		Electricity Extension	II	Completed
		Construction of ICT Training Centre	III	WIP
5	Edegelem	Electricity Extension	I	Completed
		Electricity Extension	II	Completed
		Construction of Health Centre	III	WIP
6	Imeh	Grading of four (4) different farm roads	I	Completed
		Construction of seven lock-up shops	II	Completed
7	Umuogodo	Construction of Borehole water	I	Completed
		Construction of mini daily market shops	II	WIP

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Pipeline communities; Cluster 3 CSR projects

CLUSTER 3 is made up of six (6) communities group into one cluster as see below

S/N	COMMUNNITY	PROJECT	PHASES	STATUS
1	Ipo Community	Construction of Market shops	I	Completed
		Construction of Teachers Quarters	II	Completed
		Construction of five (5) Nos over Head Water Tank stands	III	WIP
2	Omademe Community	Construction of Chapel Hall in community Secondary School	I	Completed
		Construction of Corpers Lodge	II	Completed
		Construction of Shops inside market	III	WIP
3	Ozuoha Community	Construction of Town Hall	I	Completed
		Construction of Community Development Center	II	Completed
4	Ubima Community	Construction of Corpers Lodge	I	Completed
		Construction of police station	II	Pending
		Construction of police Quarters	III	WIP
5	Omerelu Community	Purchase of land/Fencing	I	Completed
		Construction of Civil center	II	On - going
		Construction of Civil center Phase 2	III	WIP
6	Omanwa Community	Construction of Chapel Hall in community Secondary School	I	Completed
		Construction of five bedroom Corpers Lodge	II	Completed
		Construction of Modern Market	III	WIP

Pipeline communities; Cluster 4 CSR projects

CLUSTER 4 is made up of three (3) communities group into one cluster as see below				
S/N	**COMMUNITY**	**PROJECT**	**PHASES**	**STATUS**
1	Awarra 1 community	Construction of police station	I	WIP
		Construction of six (6) classroom blocks	II	WIP
2	Awarra 2 community	Construction of police station	I	WIP
		Construction of six (6) classroom blocks	II	WIP
3	Akanu Community	Construction of Development Centre /Conference Hall	1	WIP

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Pipeline communities; Cluster 5 CSR Projects

CLUSTER 5 is made up of nine (9) communities group into one cluster as see below				
S/N	**COMMUNITY**	**PROJECT**	**PHASES**	**STATUS**
1	Omoku 1 Community	Construction of Borehole water	I	Completed
		Construction of four (4) classroom blocks	II	Completed
		Rehabilitation of technical workshop building in modern boys secondary school	III	WIP
2	Omoku 2 Community	Construction of Borehole water	I	Completed
		Renovation of six (6) classroom blocks	II	Completed
		Construction of Health Centre Building	III	WIP
3	Okprukpuali Community	Construction of six (6) classroom blocks	I	Completed
		Construction of Fence	II	Completed
		Construction of Administrative office for teachers & classroom	III	WIP
4	Obrikom Community	Construction of Borehole water	I	Completed
		Renovation of six (6) classroom blocks	II	Completed
		Construction of Drainages system	III	WIP
5	Obor Community	Electricity Extension	I	Completed
		Construction of lock-up shops	II	Completed
		Construction of Market complex	III	WIP
6	Okansu Community	Electricity Extension	I	Completed
		Renovation of Town Hall	II	Completed
7	Egbogoro Community	Construction of Chapel Hall for community secondary school	I	Completed
		Construction of six (6) classroom blocks	II	Completed
		Renovation of Health Center	III	WIP
8	Egbeda Community	Renovation of Health Center	I	Completed
		Renovation of Town Hall	II	Completed
9	Uju Community	Construction of six (6) classroom blocks	I	Completed
		Construction of Fence	II	Completed
		Construction of Administrative blocks	III	WIP

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Pipeline communities; Cluster 5 CSR projects (continuation)

Jetty Communities CSR Projects

Community	Year	Projects	Amount	Phase	Stages
Onne Community	2016	Purchase and installation of Transformer	N5,000,000.00	I	Completed
Onne Community	2022	Renovation of community Health Centre	N45,000,000.00	III	Work in progress
Ogu Community	2015	Construction Health Centre	N5,000,000.00	I	Completed
Ogu Community	2017	Fencing & interlocking of Health Centre	N7,000,000.00	II	Completed
Ogu Community	2018	Health Centre Equipping/Furnishing/Delivery Room Setup	N7,000,000.00	III	Completed
Ogu Community	2019	Doctor's and Nurse's Quarters Construction/ Generator set	N15,000,000.00	IV	Completed
Ogu Community	2020	Construction of Solar street Light	N15,000,000.00	V	Completed

Ogu Community CSR projects

Palliative Measures During Covid-19

Executive Summary on Palliative Measures

Frequency	Rice (50 kg Bag)	Beans (50 kg)	Garri (50 kg)	Noodles (cartons)	Beneficiaries
Phase - I	1,320	880	880	4,400	6 Host Communities; 2 Jetty Communities; 30 Pipeline communities; 6 other communities from Eleme LG
Phase - II	240	160	160	800	6 Host Communities; 2 Jetty Communities
Phase - III	240	160	160	800	6 Host Communities; 2 Jetty Communities
Phase - IV	240	160	160	800	6 Host Communities; 2 Jetty Communities
Phase - V	240	160	160	800	6 Host Communities; 2 Jetty Communities
Phase - VI	240	160	160	800	6 Host Communities; 2 Jetty Communities
Phase - VII	240	160	160	800	6 Host Communities; 2 Jetty Communities
Total (Bags / Cartons)	2,760	1,840	1,840	9,200	
Total quantity distributed (Kgs / Packs)	138,000	92,000	92,000	552,000	** Noodles is in Pack. Other Items are Kgs
No of Household reachedout	17,250				
Avg Family Size	5				
Total No of people benefited	86,250				

Pictures From Palliatives Distribution

- CR&D staff with Ogoloma clan members Onne Community

Some Appreciation Letters From Stakeholders

12 Inside Eleme May 18 - 26, 2020

Food items donated by Indorama to Njuru community

Distribution of the food items to members of the community

A member of the community receiving the palliatives

Traditional ruler of Njuru community, Chief Ejii Anyaogu with women of the community

Traditional ruler of Njuru community with youths of the community

Traditional ruler of Njuru community with a cross section of the community

Chief Ejii Anyaogu, Chief Ezekiel Uma with other members of the community who benefitted from the palliative brought by Indorama

Members of the community in a group photograph shortly before the distribution of the food items

Food items being presented to members of the community

COVID-19: Anyaogu Commend Indorama for Supporting Njuru With Palliatives

One of the community women in possession of her palliatives

Cont'd from front page

goodwill for the host communities; he is a responsible leader to the core. The Supreme Council of Chiefs and Elders of Njuru want to tell him thank you and his team for what he has done. "He has created a precedent in Njuru Community as there are lots of companies that have not done what he has done. What Manish has done has gone a long way to better the lives of the less privilege, the widows and orphans in the community", he said.

He further commended Mr. Kendrick Oluka Ejire for his proactive Community Relations representation.

On her part, the women chief of Njuru Community, Chief Mrs. Mimi Wuobele, thanked the management of IEPL for the gesture especially in these hard times. She further prayed that God should bless them abundantly and continue to keep them.

Similarly the youth leader of Njuru, Comrade Obele Solomon, expressed his sincere appreciation to the management of IEPL for providing a second phase of the palliatives. He asserted that IEPL has never failed in the discharged of its corporate duties to the host communities and urged other multi-national companies residing in Eleme to emulate IEPL.

The palliatives were delivered through the company's General Manager on Community Relations and Development, Mr. Kendrick Oluka who happens to be an illustrious son of Agbonchia Community. The Njuru Council of Chiefs led by Emere Ejii Anyaogu, the Paramount Ruler received the palliatives.

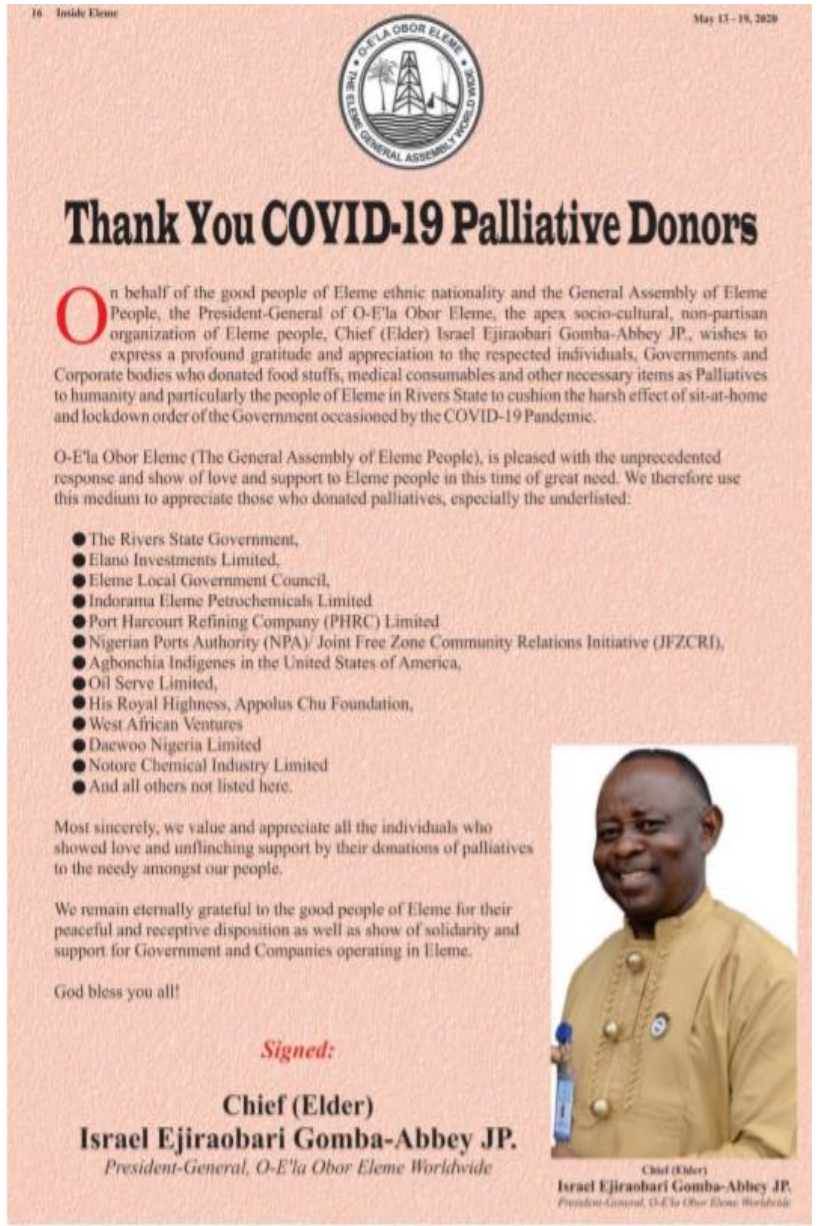
Emere Phylle Te-nwaji
July 31 at 9:31 AM ·

And today, INDORAMA ELEME PETROCHEMICALS sent palliatives to Ogale Community.

The palliatives was received by HIS Royal Highness, Chief GMB Okpabi, Paramount Ruler of Ogale; Emere Nchia X.

Our targets are the indigents, vulnerable in the community, it must get to them.....

GOD bless Kendrick Oluka;
GOD bless INDORAMA ELEME PETROCHEMICALS.



16 Inside Eleme May 13 - 19, 2020

Thank You COVID-19 Palliative Donors

On behalf of the good people of Eleme ethnic nationality and the General Assembly of Eleme People, the President-General of O-E'la Obor Eleme, the apex socio-cultural, non-partisan organization of Eleme people, Chief (Elder) Israel Ejiraobari Gomba-Abbey JP., wishes to express a profound gratitude and appreciation to the respected individuals, Governments and Corporate bodies who donated food stuffs, medical consumables and other necessary items as Palliatives to humanity and particularly the people of Eleme in Rivers State to cushion the harsh effect of sit-at-home and lockdown order of the Government occasioned by the COVID-19 Pandemic.

O-E'la Obor Eleme (The General Assembly of Eleme People), is pleased with the unprecedented response and show of love and support to Eleme people in this time of great need. We therefore use this medium to appreciate those who donated palliatives, especially the underlisted:

- The Rivers State Government,
- Elano Investments Limited,
- Eleme Local Government Council,
- Indorama Eleme Petrochemicals Limited
- Port Harcourt Refining Company (PHRC) Limited
- Nigerian Ports Authority (NPA)/ Joint Free Zone Community Relations Initiative (JFZCRI),
- Agbonchia Indigenes in the United States of America,
- Oil Serve Limited,
- His Royal Highness, Appolus Chu Foundation,
- West African Ventures
- Daewoo Nigeria Limited
- Notore Chemical Industry Limited
- And all others not listed here.

Most sincerely, we value and appreciate all the individuals who showed love and unflinching support by their donations of palliatives to the needy amongst our people.

We remain eternally grateful to the good people of Eleme for their peaceful and receptive disposition as well as show of solidarity and support for Government and Companies operating in Eleme.

God bless you all!

Signed:

Chief (Elder)
Israel Ejiraobari Gomba-Abbey JP.
President-General, O-E'la Obor Eleme Worldwide

Chief (Elder)
Israel Ejiraobari Gomba-Abbey JP.
President-General, O-E'la Obor Eleme Worldwide

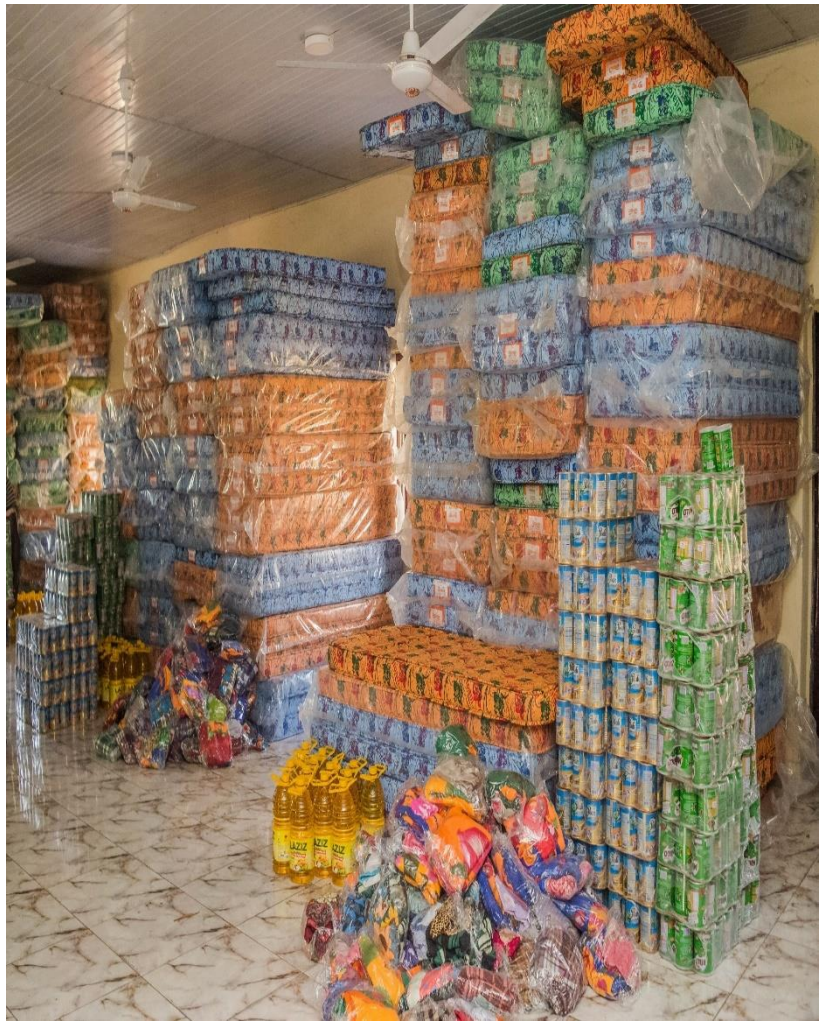
2022 Flood relief outreach

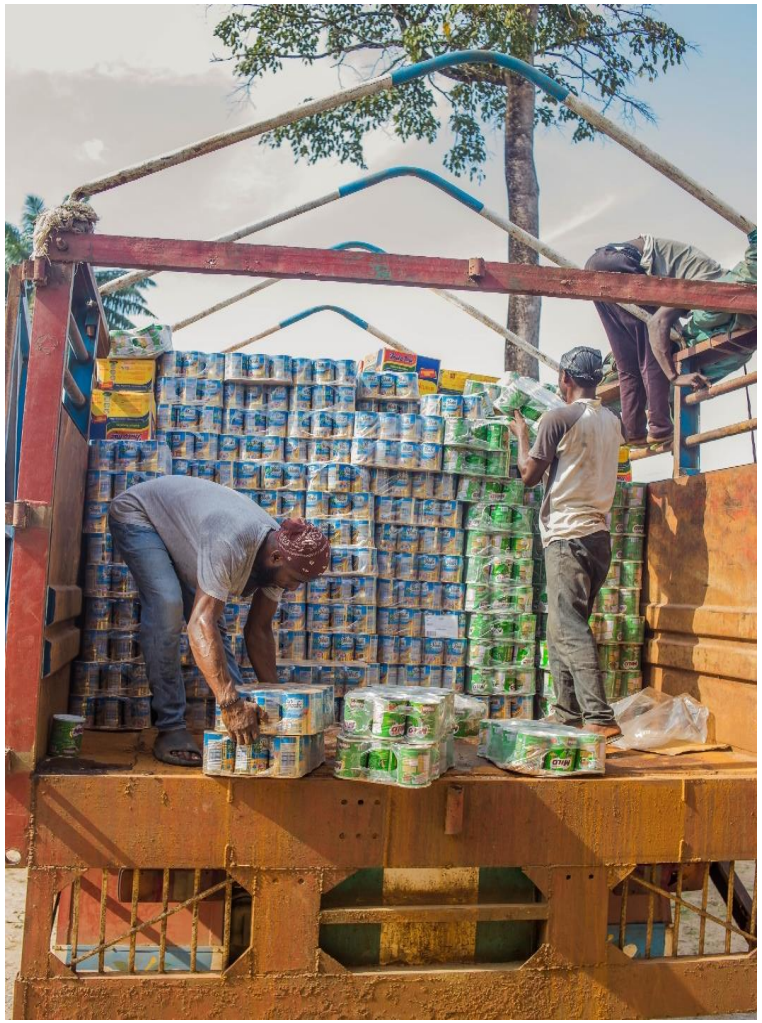
- In the wake of the 2022 flood that hit some states in Nigeria and caused untold hardship, Indorama through its Community Relations & Development department donated some relief materials to the flood victims in its Cluster V Pipeline communities as well as some neighboring Communities within her sphere of influence and operations as a support to cushion the effects of flood induced challenges.
- A total of nine (9) Cluster V pipeline communities were affected and they include,
  - Omoku I,
  - Omoku II,
  - Uju,
  - Obor,
  - Okansu,
  - Ebogoro,
  - Obrikom,
  - Egbada,
  - Okpurukpuali

  And three (3) neighboring communities,
  - Ebocha,
  - Ahoada and
  - Ahoada - West Communities.

2022 FLOOD RELIEF MATERIALS DONATION

2022 FLOOD RELIEF MATERIALS DONATION





INDORAMA


INDORAMA


LAZIZ
Pure Vegetable Oil
Premium
5 Litres x 4
Pure Vegetable Oil
Premium
5 Litres

Customized Indorama Exercise Books Distribution

- The community relations department team embarked on the distribution of sixty thousand (60,000) customized exercise books

- To all the primary and secondary schools within our host and jetty communities.

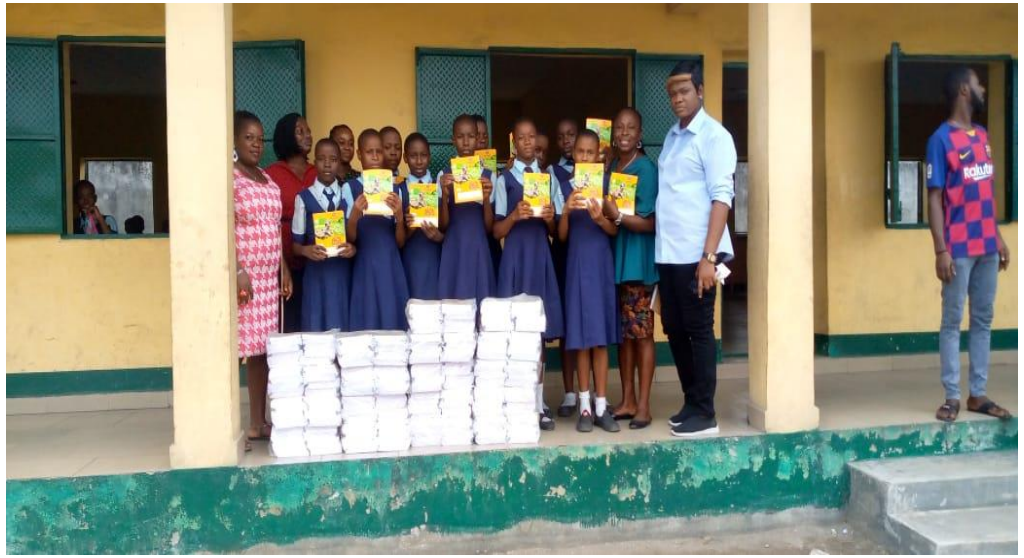
- A total of twenty-two (22) schools benefited from the distribution

- They were super excited with Indorama for its benevolence towards them

- They send their appreciations

Pictures From The Exercise Books Distributions

Pictures From The Exercise Books Distributions



Pictures From The Exercise Books Distributions

WED22 Celebration in Host Communities Sr. Secondary Schools

- WED22 Celebration in 4 Sr. Secondary Schools of Host Communities - theme “Only One Earth”
- Environmental Awareness Speech, Environmental On-Spot Quiz and Tree plantation
- Prize distributed for all winners (100 Nos.) and Participants (815 Nos.)

WED22 Celebration in Host Communities Sr. Secondary Schools

INDORAMA

WED22 Celebration in Host Communities Sr. Secondary Schools

WED22 Celebration in Host Communities Sr. Secondary Schools

Thank You

…

Annexure 5.1
Climate Risk Assessment

Climate Change Risk Assessment (CCRA)

Aim and Objectives

The aim of the Climate Change Risk Assessment (CCRA) is to assess the potential impact of climate change on the Project. This high-level CCRA considers the potential impact climate events may have on the Project during its construction and operational phases.

The objectives of the CCRA are to:

- Review the potential existing extreme weather that may affect the Project
- Undertake a high-level assessment of the way in which these physical hazards may become more intense and/or frequent as a result of climate change; and
- Identify the high-level climate-related risks and opportunities facing the Project over the construction and operational periods.

Context

Climate change, and the associated political and social response, is already presenting material risks and opportunities to business and industrial sectors. These risks and opportunities have grown in prominence over the last five to ten years and are expected to increase significantly in scale and coverage in the next decade.

The physical impacts of climate change pose a threat to business operations and may have financial consequences, through impacts of extreme weather events such as storms, floods, and droughts. The effect of these changes could result in business interruption through damage to physical assets. Understanding the nature of these risks will support sites in increasing their resilience against climate change.

Climate Scenarios

Scenarios are plausible descriptions of how the future may develop, based on a coherent and set of assumptions about driving forces, e.g., rate of greenhouse gas emissions or changes in land use. They are not predictions nor forecasts. Scenario analysis is a useful approach for assessing the exposure of sites to climate-related risks and opportunities in an uncertain future world.

ERM utilises the latest climate projections data available from world-leading scientific organisations when assessing the impact of climate change on physical climate hazards for any given location. The Intergovernmental Panel on Climate Change (IPCC) has set out a series of Shared Socio-economic

Pathways (SSPs) that vary on the basis of projected greenhouse gas (GHG) emissions over the next century. With increasing projected GHG emissions, there is the potential for a change in the climatic conditions at any given area, e.g., temperature and/or precipitation changes. This can vary depending on the concentration of projected emissions associated with each SSP and chosen timeframe. SSPs are used in this assessment to indicate the impact of varying degrees of warming on the risk associated with each climate hazard. As is standard practice when undertaking climate risk assessments, scenarios are selected on the basis of their appropriateness for any given assessment being undertaken. The SSPs selected for this assessment are:

- **SSP1-2.6**: lower emissions outcome most closely aligned with the Paris Agreement.
- **SSP5-8.5**, which describes a 'business-as-usual' scenario, where global emissions continue to rise unabated. Implied warming may increase by 4.4°C by end of 21st century, with many physical climate risks (e.g., cyclones) increasing in frequency and severity.

Where such uncertainties are material to ESIA findings, they are clearly stated and are approached conservatively ('the precautionary approach'), to identify the broadest range of likely residual impacts.

Time Horizons

The time horizons used within this assessment have been selected to best align with the expected schedule of the construction and operation phases (**Table** Error! No text of specified style in document.**.1**). These time horizons reflect the technical view of the assessment team in terms of identifying periods that provide best insight to climate-related trends. Climate data is available for specific future time horizons – typically in 5- or 10-year intervals. For physical climate risk, it is recommended to review trends over generally longer timeframes as it provides a clearer indication of possible emerging issues. The 2030-time horizon is therefore provided as an insight to the possible climate trends for the construction stage and beginnings of the operation stage, whereas 2050 are used to provide insight to the climate trends towards the later stages of the operational phase.

Table Error! No text of specified style in document.**.1 Time Horizons included within the CCRA**

Future Time Horizons Included within this Assessment	Justification
2030	Provides insight to the possible climate trends for the construction period and start of operation phase.
2050	Provides insight as to the climate trends for the operation phase

Data and Sources

The projections data collated by ERM for use within this assessment originates from a range of providers, determined to be the best available for demonstrating the change in the hazards included within the assessment.

The main data source is the IPCC, the UN's leading body for assessing the science related to climate change. It releases Assessment Reports (AR), which provide information about the state of scientific, technical, and socio-economic knowledge on climate change, its impacts and future risks, and options for trying to reduce the rate at which climate change is taking place. With each new AR comes a new round of climate models and data developed by the IPCC and Coupled Model Intercomparison Project (CMIP). The last AR (AR6) was published in 2021, marking the latest round of finalized, fully reviewed, and fully published climate data (CMIP6) by the IPCC and CMIP.

Approach

The CCRA is conducted through two key steps, namely:

- High-level Physical Screening
- High-Level Assessing of the Climate Risks of the Projects.

High-Level Physical Screening

Step 1 involves a high-level screening assessment to review and document the anticipated climate change impacts within the Project region, including:

- Existing and projected climate, weather extremes and any resultant climate-related risks.
- How climate change is likely to amplify or diminish these climate-related risks.

There are a wide range of climate hazards that have the potential to impact any given Project. ERM has undertaken a high-level scenario-based screening exercise, which involves reviewing the exposure of assets included as a part of the Projects against a range of climate hazards. ERM primarily relied on data provided by its proprietary Climate Impact Platform by ERM and supplemented that data with its propriety Climate Data Tool (CDT) data where necessary and appropriate to produce baseline (aka. Current) and future climate data associated with the Project. The predominant source of data has been global, reputable sources such as NASA, World Bank and the IPCC.

High-Level Risk Review

Based on the results of the high-level physical screening, this step involves conducting a review of the climate data, which has been collected for each hazard included within this assessment. This includes the analysis of baseline and future projected trends for each climate hazard included a review of the potential materiality of any risk present under baseline conditions, and how this risk could potentially change in the future according to any key trends identified within the climate data. Each climate hazard will be assessed in relation to the Project using a mixture of climate data and some qualitative research, which is sourced from industry-leading academic and governmental sources.

ERM collects a series of data variables for each climate hazard included within this assessment. This climate data is collected primarily using Climate Impact Platform by ERM and Global Climate Database

(GCD) and is supplemented by any climate data provided by the client as well as the best available online sources of data.

Once the climate data is collected, the trends associated with each variable are assessed for each climate hazard. Following this, ERM undertakes a high-level review of the potential risks posed to the Project in relation to each climate hazard. This section provides an overview of any impacts (associated with specific hazards), which are identified as being potentially material to specific risk areas associated with the Project (called Site Receptors).

Climate data is collected and discussed in relation to two time periods (2030 and 2050) - 'Risk Materiality Categories' (refer to Table Error! No text of specified style in document.**.2**) are assigned to all of these two time-periods, representing the start (baseline & construction) and its operations and possible end of operations (till 2050). These two time periods have been selected with an aim to identify the potential change in the level risk posed to the Project by the end of operations, in comparison to the baseline level of risk.

Table Error! No text of specified style in document.**.2 Risk Materiality Categories and associated Definitions**

Risk Materiality Category		Definition
Unlikely material		Impacts with this category (such as those related to operational, financial, or other types of impacts) are unlikely to be material. This means that, for example, (a) operational impacts could be expected to be short term, impacting a limited proportion of the overall asset and its operations, or (b) financial impacts would be expected to be minimal relative to the Project's overall revenue and/or costs.
Likely material	**Low to moderate**	Impacts with this category (such as those related to operational, financial, or other types of impacts) are likely to be of low-moderate materiality. This means that, for example, (a) operational impacts could be expected to be short to medium term, impacting a low to moderate proportion of the overall asset and its operations, or (b) financial impacts would be expected to be small to moderate relative to the Project's overall revenue and/or costs.
	High	Impacts associated with this category (such as those related to operational, financial, or other types of impacts) are likely to be of high materiality. This means that, for example, (a)

Risk Materiality Category		Definition
		operational impacts could be expected to be medium to long term, impacting a low to moderate proportion of the overall asset and its operations, or (b) financial impacts would be expected to be moderate to high relative to the Project's overall revenue and/or costs.

Climate Impact Platform by ERM

ERM's proprietary Climate Impact Platform by ERM provides an indication of climate trends at site locations. It provides data for key climate physical hazards, such as extreme temperatures, flooding, storms, precipitation-induced landslides, wildfires, and water stress and drought. The platform uses the best available global data sources to provide baseline and future projected results for each climate hazard. The climate data includes the latest round of IPCC and CMIP climate data (CMIP6), amongst other industry-leading sources of data. Figure **Error! No text of specified style in document.**.1 below outlines the methodology followed by the Platform to complete a screening of physical risks relevant to a single asset or a scope of assets. The goal of a risk screening is to identify assets that have exposure to one or more climate Hazards, and to gain insight on the scale of the magnitude of that exposure.

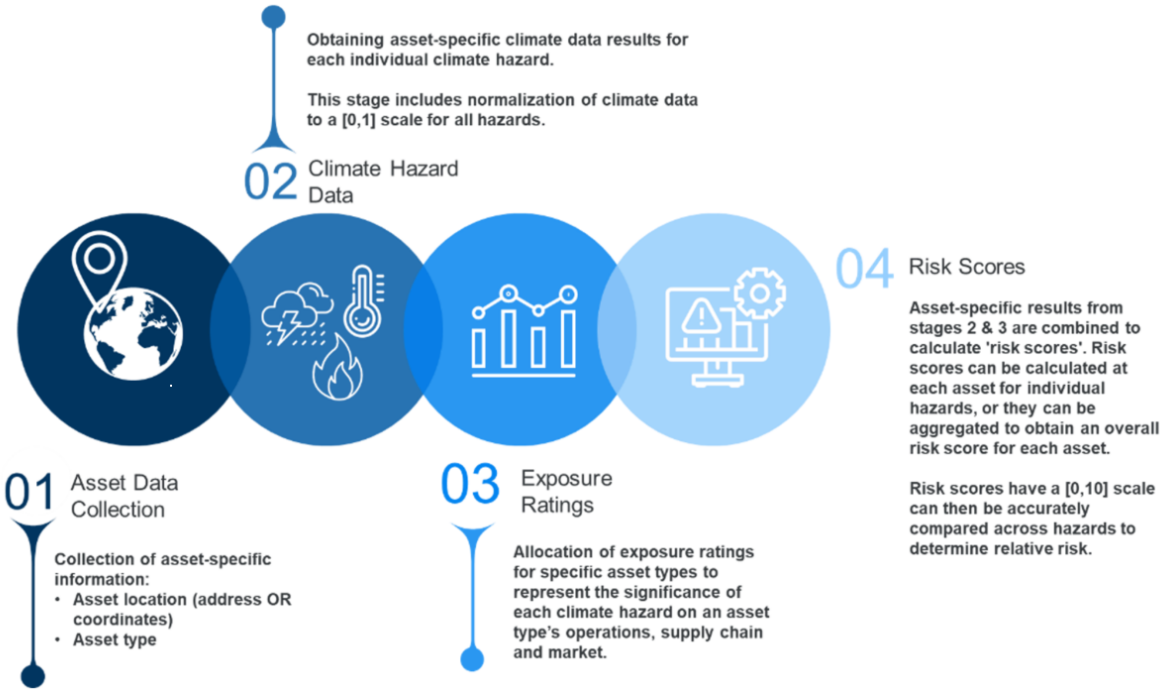


Figure Error! No text of specified style in document.**.1 Climate Impact Platform**

Assumptions and Limitations

The CCRA presented in this ESIA provides a high-level review of the possible risks posed to the Project. As a result, this CCRA aims to identify risks and aspects of the Project's design that ERM believes should be assessed further as the Project and its operations progress. There are limitations and

assumptions that accompany this type of approach, which should be recognised when interpreting the results of this assessment:

- This is a fully desk-based assessment, meaning that ERM's team has not conducted any on-site visits associated with this physical CCRA, and thus assessments of the exposure of each asset are based upon information provided by the Client and ERM's research.
- ERM has not sought to verify the accuracy of any information provided by the Client (for example design specifications, observational data provided etc.).
- This assessment uses projected outputs from Global Climate Models (GCMs). This means that GCM data has not been regionally downscaled and validated for the region where the Project is located (no downscaling specific to Nigeria has been undertaken).
- According to IEFCL, the Project site can be considered as UCB Zone 0, which means that there is no Seismic activity in the Project Area. As such, this ESIA does not include an assessment of the potential impact of seismic activity (e.g., earthquakes) on the Project and its operations as these events are associated with, and induced by, seismic activity and therefore not considered a physical climate change event/hazard**.**
- The Project team has mainly used existing reports and existing Project design reports to gather baseline and future climate data of the Project area. For future climate data, the team uses global data sources from Climate Impact Platform and other sources.
- ERM has made assumptions and limitations where there may be data gaps, e.g., related to the site itself.

Annexure 5.2
Air Quality Impact Assessment

Air Quality Impact Assessment

The Nigerian National Environmental (Air Quality Control) Regulations, 2021 were set out under section 34 of the National Environmental Standards and Relations Enforcement Agency (Establishment) Act, 2007, "*to improve control of the nation's air quality such an extent would enhance the protection of flora and fauna, human health and other resources affected by air quality deteriorations".* In the majority of cases, the IFC EHS General Guidelines are substantially more stringent than the Nigerian Air Quality Standards; however, it is acknowledged that the IFC/WHO Guidelines do not consider the economic factors affecting guideline attainment.

Within the assessment, both the relevant Nigerian and IFC standards and guidelines have been used.

Baseline air quality typically varies across any particular area. In essence, the baseline can be considered in the following components:

- **Natural Baseline** – this represents the pollution concentrations that are ubiquitous in the region due to sources other than human activity. This primarily influences PM_{10} / $PM_{2.5}$ concentrations. Naturally occurring NO_x and SO_2 are typically minimal.

- **Regional Sources** – this represents the pollution concentrations that arise from large point or non-point sources that will affect substantial areas.

- **Local Sources** – this represents pollutant concentrations that vary on a small spatial scale but may be substantially elevated on a local level. An example of such sources includes road traffic and in the middle of towns where there are vehicles, industry, and multiple small-scale sources. These sources can lead to elevated pollutant concentrations on a localised scale, for the pollutants of interest.

The assessment uses dispersion modelling to identify the increase in air pollutants at ground level attributable to the emissions. With due consideration of the baseline, the potential for future significant impacts is assessed.

For this ESIA, ERM used the air dispersion modelling software called AERMOD, which is a is a steady-state plume dispersion model for simulating transport and dispersion from point, area, or volume sources based on an up-to-date characterization of the atmospheric boundary layer. AERMOD fully incorporates the PRIME building downwash algorithms, advanced depositional parameters, local terrain and urban heat island effects, and advanced meteorological turbulence calculations. Moreover, ERM used the software AERMAT to prepare meteorological data, which is required for modelling. AERMET uses standard meteorological measurements and surface parameters representative of the modelling domain to compute boundary layer parameters.

The assumptions and parameters used when undertaking air dispersion modelling are provided in Table Error! No text of specified style in document.**.1**.

Table Error! No text of specified style in document.**.1 Definition of Magnitude Criteria for Air Pollutants**

Parameter	Approach	Notes
Dispersion model	USEPA Aermod 18081	
Number of sources	Project: 3	Refer to **Figure** Error! No text of specified style in document.**.1**
Model domain	10km x 10km	
Receptor grid resolution	50m within 1,000m 100m 1,000m – 10,000m	Environment Agency for England guidance (1) (cited by WBG) states that the grid resolution is no greater than 1.5 times the stack height
Buildings	Included	
Terrain	Not included	The terrain elevation is not significant, with no peaks in excess of 100m above mean sea level (AMSL) within 5km of the site. There are no sustained gradients of 1:10 or greater in the vicinity of the Project and therefore terrain was not included in the model.
Albedo	0.14 – 1.00	
Bowen Ratio	9.82 – 9.96	
Surface Roughness	0.80 – 0.80	
Meteorological data	Weather Research and Forecasting (WRF) data for Project site, sourced from Lakes Environmental 2018 to 2022	5 years hour-sequential data.
NO_x to NO_2 conversion ratio	Short-term concentrations: 35% Long-term concentrations: 70%	Environment Agency guidance.

(1) Environment Agency (2012) Dispersion Modelling Frequently Asked Questions

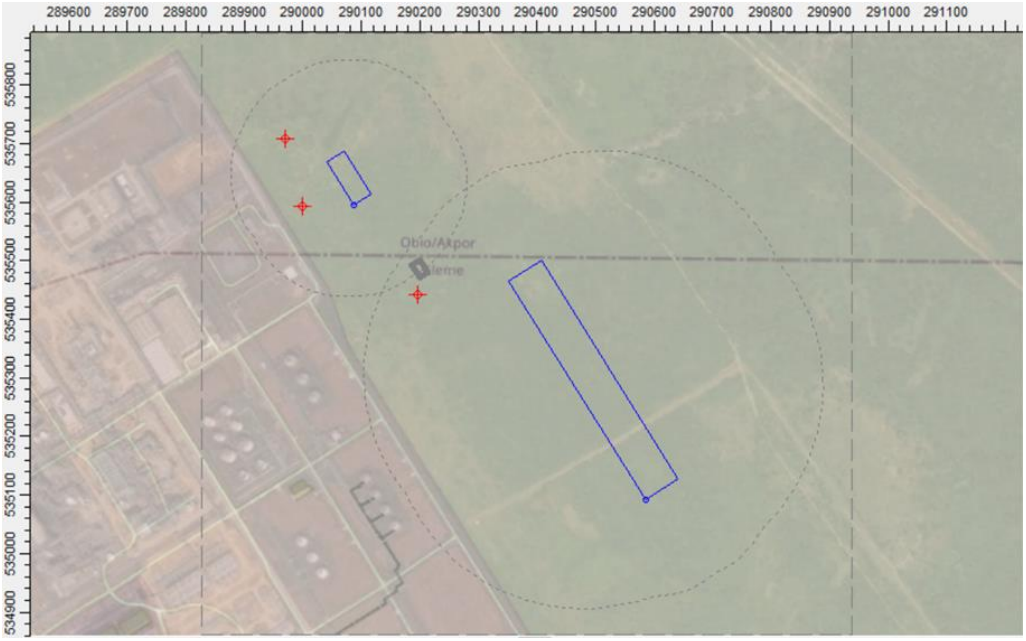


Figure Error! No text of specified style in document.**.1 Modelling Points**

The predicted change in ground level concentrations of pollutants from the Project is referred to as the 'Process Contribution' (PC).

In order to consider the significance of potential impacts, the existing baseline also needs to be taken into consideration. The sum of the PC and the existing baseline is described as the 'Predicted Environmental Concentration' (PEC).

The IFC differentiate the significance of impacts using a risk-based approach, which is based upon the existing baseline air quality in the vicinity of the project. The magnitude of the impact can therefore be defined on the basis of two functions:

- **Process Contribution (PC)**, this is the impact associated with emissions from the Project only; and
- **Predicted Environmental Concentration (PEC)**, this is the impact associated with PC added to the existing background conditions.

The significance of potential impacts, using both the PC and PEC, is assessed following WBG guidance as described below.

The WBG General EHS Guidelines state:

> *"Projects with significant sources of air emissions, and potential for significant impacts to ambient air quality, should prevent or minimize impacts by ensuring that:*
>
> *Emissions do not result in pollutant concentrations that reach or exceed relevant ambient quality guidelines and standards by applying national legislated standards, or in their absence, the current WHO Air Quality Guidelines, or other internationally recognized sources.*

and that:

> *Emissions do not contribute a significant portion to the attainment of relevant ambient air quality guidelines or standards. As a general rule, this Guideline suggests 25 percent of the*

applicable air quality standards to allow additional, future sustainable development in the same airshed [i.e. in an undegraded airshed]".

In general, the '25% threshold' is being applied as a rule rather than a guideline.

The WBG also states that:

"An airshed should be considered as having poor air quality [degraded] if nationally legislated air quality standards or WHO Air Quality Guidelines are exceeded significantly".

and:

"Facilities or projects located within poor quality airsheds, and within or next to areas established as ecologically sensitive (e.g. national parks), should ensure that any increase in pollution levels is as small as feasible, and amounts to a fraction of the applicable short-term and annual average air quality guidelines or standards as established in the project-specific environmental assessment."

In general, the WBG guidelines are interpreted such that where air quality standards are exceeded, then the airshed is described as 'degraded'.

The criteria presented in **Table** Error! No text of specified style in document.**.2** have been used in the Project ESIA to assess the significance of effects on sensitive human receptors. The process is in two stages:

- First stage to determine the **magnitude** of impacts of the PC as a percentage of the air quality standard or guideline; and
- Second stage, to determine the **significance** of effects in terms of the magnitude of impacts identified from the screening stage, considered alongside the PEC.

Table Error! No text of specified style in document.**.2 Definition of Magnitude Criteria for Air Pollutants**

Magnitude of impact	Un-degraded airshed (i.e. baseline < AQS)	Degraded airshed (i.e. baseline > AQS)
Negligible	PC <25% of AQS	PC <10% of AQS
Small	PC between 25% and 50% of AQS and PEC <100% of AQS	PC between 10% and 30% of AQS
Medium	PC between 50% and 100% of AQS, and PEC <100% AQS; or	PC between 30% and 50% of AQS
	PC between 25% and 50% of AQS, and PEC >100% of AQS	
Large	PC > 100% of AQS; or	PC > 50% of AQS
	PC > 50% of AQS, and PEC >100% of AQS	

Magnitude of impact	Un-degraded airshed (i.e. baseline < AQS)	Degraded airshed (i.e. baseline > AQS)
PC: Process Contribution PEC: Predicted Environmental Concentration AQS: Air Quality Standard		

Classification as to whether a site or location is deemed to be undegraded or degraded (i.e. where ambient pollutant concentrations meet or exceed local or IFC standards, respectively), is generally ascertained through a review of local air quality monitoring data. It should be noted that an airshed can be classified as degraded for one pollutant and not for another, thus setting out different levels of criteria based on the potential significance of difference pollutant emissions.

When determining the level of significance, consideration of the sensitivity of receptors also needs to be given. In particular, there is growing evidence[2] that the elderly, children and those with cardiovascular and/or respiratory disease are more susceptible to the harm from air pollution. The following sensitivity definitions have therefore been derived to take into account the potential receptor variability:

- **High Sensitivity**: Locations where particularly vulnerable individuals (for example elderly, very young or infirm) are present, which include hospitals and schools.
- **Medium Sensitivity**: Locations where the general population are present for large periods of the year, for example residential areas, towns and villages.
- **Low Sensitivity**: Locations where humans are transient or present for short periods only, such as agricultural areas or fishing areas.

The potential impact significance is therefore determined by considering both the magnitude of impacts and the receptor sensitivity.

The method for identifying significance of impacts of operational activities is set out in Figure **Error! No text of specified style in document.**.2.

[2] Defra & PHE (2017). Air Quality - A briefing for Directors of Public Health. Department for Environment, Food and Rural Affairs, and Public Health England, March 2017.

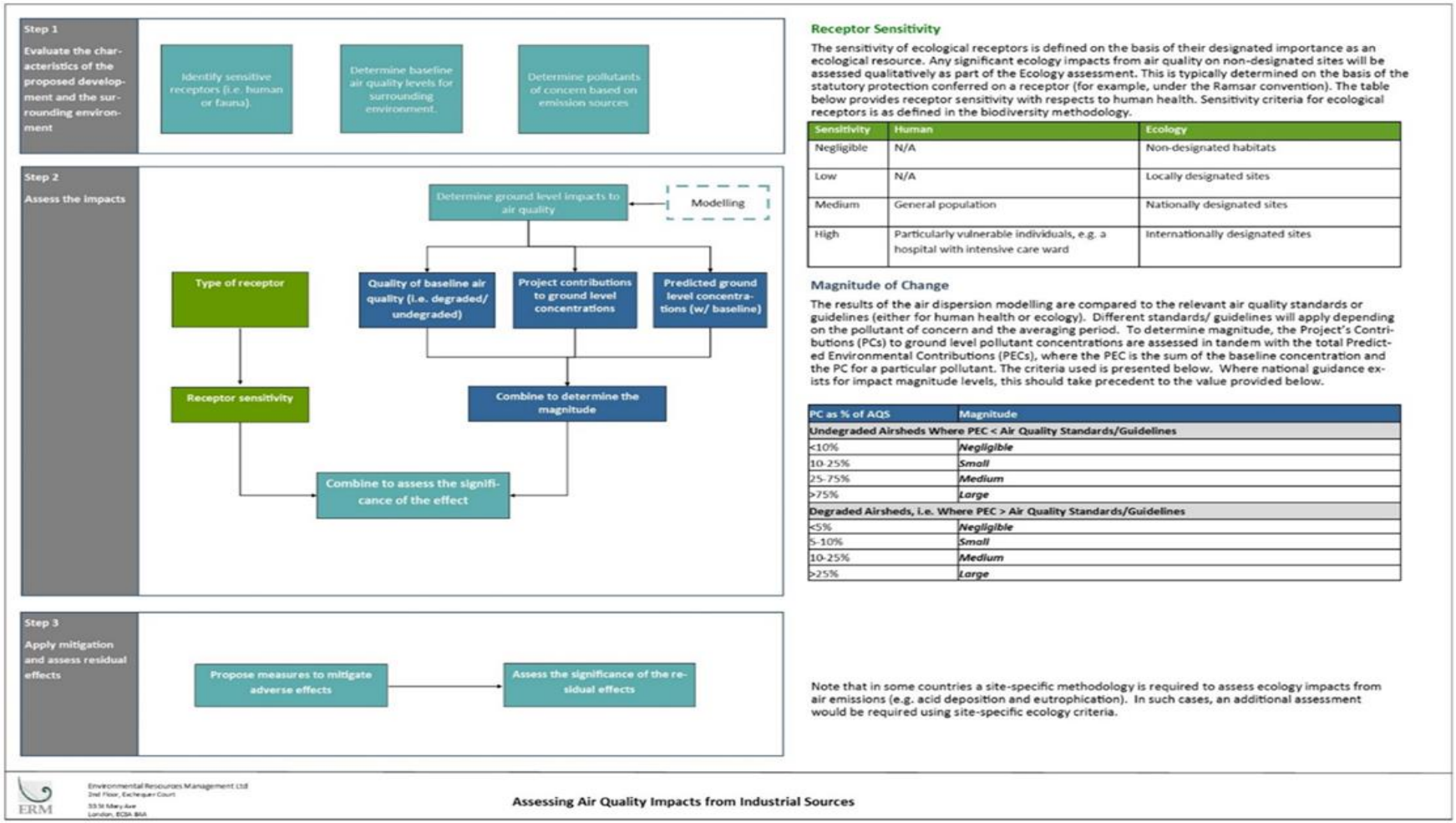


Figure Error! No text of specified style in document.**.2 Assessment Methodology Operational Activities**

Annexure 5.3

Noise Impact Assessment

Noise Impact Assessment

Many numerical noise standards are noise source-specific (e.g., industrial noise is different from aircraft noise), some refer to baseline levels (i.e., allowable increases above baseline), and there can be a number of other factors that are relevant to determining Impact Significance.

Rather than applying a two-dimensional matrix for noise impact significance, the process for noise instead considers the type of receptor, draws on relevant standards or guidance to determine impact magnitude, and then considers other factors to determine significance.

Project Noise Criteria – Construction Phase

To evaluate the impact of temporary construction activities it is necessary to establish criteria above which significant adverse effects are likely be experienced. International best practice has been followed and thresholds above which a significant construction noise impact is considered to occur have been based on Nigerian criteria for construction (refer to Chapter 2).

When assessing the significance of a noise impact, the process is slightly different to most other topics in this ESIA. The significance of an impact is derived from assessing the magnitude of the impact, but it also takes into consideration other factors like the duration of that specific construction activity, how well the infrastructure associated with the Noise Sensitive Receptors (NSR) can attenuate noise, etc.

Moreover, the sensitivity of the receptor is also considered in the assessment of impact magnitude. For example, NSRs sensitive to daytime noise are only assessed on the criteria associated with daytime activities, while those NSRs sensitive during the night-time are assessed using the criteria that consider the impact of noise on sleep disturbance.

For Project activities during the construction phase to create a significant noise impact, the noise generated must be above the noise impact threshold levels, as summarised in Table Error! No text of specified style in document.**.1**.

Table Error! No text of specified style in document.**.1 Project Noise Criteria for Construction Phase**

Receptor	**Maximum noise level permitted L_{Aeq} dB(A)**	
	Day time	**Night-time**
Hospitals, schools institutions of higher learning, homes for the disabled, etc.	**60**	50
Buildings other than those prescribed above	**75**	65

Construction activities will take place only during the day time, therefore the assessment of construction noise is based only on the daytime noise criteria (i.e. – those included in **bold** in Table Error! No text of specified style in document.**.1**).

The Project noise criteria used to assess the magnitude and significance of construction noise effects are included in **Table** Error! No text of specified style in document.**.2**.

Table Error! No text of specified style in document.**.2 Magnitude and Significance of Construction Noise Effects**

Exceedance of criteria, dBA	Magnitude of predicted impact	Other relevant factors	Resulting Significance of effect
5 or more below the criteria	Negligible	Factors which may influence significance of effects, e.g. duration of construction activity	Negligible
> 5 below, up to the criteria	Small		Minor
Up to 5 dB above the criteria	Medium		Moderate
> 5 above the criteria	Large		Major

The classification of significance refers to Negligible, Minor, Moderate and Major. Impacts rated as Moderate or Major should be mitigated where practicable, feasible and reasonable with proportionately more emphasis on the Major items. Mitigation may not fully eliminate an impact but would be expected to reduce its severity.

Project Nosie Criteria – Operational Phase

For Project activities during the operational phase to create a significant noise impact, the noise generated must be above the noise impact threshold levels, as summarised in Table Error! No text of specified style in document.**.3**.

Table Error! No text of specified style in document.**.3 Project Noise Criteria for Operational Phase at Receptors**

Receptor	One Hour L_{Aeq} (dB(A))	
	Daytime (06:01 – 22:00)	Night (22:01 – 06:00)
Residential; institutional; educational	55	45

The Project noise criteria used to assess the magnitude and significance of operational noise effects are included in Table Error! No text of specified style in document.**.4**. Existing noise baseline data are above the IFC absolute criteria for day and nighttime, and therefore the assessment for operational noise is based on the absolute IFC criteria for day and night time.

Table Error! No text of specified style in document.**.4 Magnitude and Significance of Operational Noise Effects**

Exceedance of criteria, dBA	Magnitude of predicted impact	Other relevant factors	Resulting Significance of effect
> 5 below, up to the criteria	Negligible		Negligible

Up to 5 dB above the criteria	Small	Factors which may influence significance of effects, e.g., how well NSR infrastructure can attenuate noise	Minor
> 5 to 10 dB above the criteria	Medium		Moderate
> 10 dB above the criteria	Large		Major

Assessment of Potential Nosie Impacts (Modelling)

ERM conducted Project specific noise modelling scenarios for both the construction and operational phases of the Project. These models were used to estimate Project induced noise levels at nearby NSRs due to construction and operation of IEFCL Train 3 Project. Predictor V2022.11 (by SoftNoise) noise modelling software package has been utilised to calculate noise emissions from the Project using *ISO 9613-2:1996 (ISO9613:2) - Acoustics* - Attenuation of Sound during Propagation Outdoors - Part 2: General Method of Calculation noise propagation algorithms (international method for general purpose, 1/1 octaves).

The Predictor software package allows topographic details to be combined with ground regions, water, foliage, significant building structures etc. and receptor locations, to create a detailed and accurate representation of the site and surrounding area. The noise model allowed for the quantification of noise levels from multiple sources, based on the sound characteristics (overall level, frequency data etc.) emitted from each source to predict the contributed noise levels the Project would have at the nearest potentially affected receivers for various operating scenarios.

The inputs and assumptions used in the predictive noise modelling are outlined below:

- Ground factor of 0.5 was applied for the study area (0 is acoustically hard or reflective, 1.0 is soft);
- Temperature 20˚C; and
- Relative Humidity of 60%.

All noise levels were predicted at a height of 1.5m, are presented in decibels, dB(A) and rounded to the nearest whole integer or decimal place where necessary.

All Sound Pressure Levels (LP) values are expressed as dB(A) re: 2×10^{-5} Pascals (Pa) and all Sound Power Level (LW) values are expressed as dB(A) re: 10^{-12} Watts (W).

Modelling Assumptions

This Section details the assumptions that have been incorporated into the construction and operational phase noise models

For the Construction phase modelling:

- Construction activity will take place during daytime for approximately 32 months;
- The worst scenario chosen was based on the number of equipment and its sound power level (SWL) especially for the heavy equipment.
- Construction activity of earthworks and site clearance has been assumed to have the greatest noise emissions; and
- The noise sources have been modelled as a source area on the footprint of the operational plant.

For each item of equipment, a SWL value has been determined for the purposes of noise modelling. The determination of the source noise level is based on the type and maximum number of items and is show in **Table** Error! No text of specified style in document.**.5**. Sound power levels have been derived by the BS 5228 database.

Table Error! No text of specified style in document.**.5 Earthworks Construction Equipment**

Equipment	Quantity	BS5228 Reference	Sound Power Level, dB(A)	Sum Sound Power Level, dB(A)
Air compressor (upper 100 cfm)	8	D.7.9	102	111
Generator (heavy)	2	D.7.48	98	101
Man lift, straight	16	C.4.38	113	125
Water truck	3	D.11.52	117	122
Concrete pump car	3	D.6.16	109	114
Dump truck	11	D.3.60	110	120
Excavator	16	D.8.15	103	115
Mixer truck	6	D.6.5	102	110
Motor grader	2	D.3.75	112	115
Self-load mixer	1	C.4.20	108	108
Wheel loader	7	D.3.3	102	110
Crawler crane	21	C.4.50	99	112
Hydraulic crane (rt)	14	C.4.43	98	109
Forklift	10	D.7.94	116	126
Forklift, telescopic	1	C.2.35	99	99
Vibratory roller	2	D.3.116	106	109
Batch plant	1	D.6.10	106	106

ERM based on data from the client, March 2023

The overall sound power level of the construction activities is estimated to be 131 dB(A).

For Operational phase modelling:

- Plant will be operating 24 hours per day, seven days per week;
- Equipment located outdoors has been modelled as point sources;
- Only Ammonia equipment located indoors has been modelled as emitting facades and roof;
- A reduction index of 15 dB has been assumed for all walls and roofs as a conservative approach; and
- The noise calculations assume that all operational equipment is facing directly the facades and the roof of the building, representing a worst-case scenario, as it does not take into account the noise reduction due to other rooms between the operational equipment and the emitting facades, nor the ceiling between the operations equipment and emitting roofs.

Noise sources related to the operation are presented **Table** Error! No text of specified style in document.**.6**, **Table** Error! No text of specified style in document.**.7** and **Table** Error! No text of specified style in document.**.8**.

Table Error! No text of specified style in document.**.6 Ammonia Plant Noise Sources**

ID	Description source	Quantity	Sound Pressure Level at 1m, dB(A)	Location
A-101-J	Air Compressor	1	85	Indoor Comp Building
A-102-J F	Feed gas Compressor	1	85	Indoor Comp Building
A-103-J	Synthesis Gas Compressor	1	85	Indoor Comp Building
A-105-J	Ammonia Refrigerant Compressor	1	85	Indoor Comp Building
A-101-JT	Steam Turbine for 101-J (101-J package)	1	85	Indoor Comp Building
A-103-JT	Turbine for 103-J (103-J package)	1	85	Indoor Comp Building
A-105-JT	Turbine for 105-J (105-J package)	1	85	Indoor Comp Building
A-107-JAHT	Hydraulic Turbine for 107-JA	1	85	Outdoor
A-104-JA/JB/JC	HP BFW Pumps	2	85	Outdoor
A-107-JA,JB,JC	Semi-Lean Solution Pump	2	85	Outdoor
A-108-J,JA	Lean Solution Pump	1	85	Outdoor

ERM based on data from the client, March 2023

Table Error! No text of specified style in document.**.7 Urea Plant Noise Sources**

ID	Description source	Quantity	Sound Pressure Level at 1m, dB(A)	Location
U-GB-101	CO2 Compressor	1	85	Indoor Comp Building*
U-GB701	N2 Compressor	1	85	Outdoor
U-GT-101	Turbine for CO2 Compressor	1	85	Indoor Comp Building*
U-GA101A, B	Ammonia Feed Pump	1	85	Outdoor
U-GA102A, B	Carbamate Feed Pump	1	85	Outdoor
U-GB604	Dust Collection Blower	1	85	Indoor Granulation Building*
*Has been modelled as outdoors				

ERM based on data from the client, March 2023

Table Error! No text of specified style in document.**.8 Plant Periphery Noise Sources**

ID	Description source	Quantity	Sound Pressure Level at 1m, dB(A)	Location
B-GA 1301A,B	BFW Pump for Package Boiler	1	85	Outdoor
C-GA 6001A,B,C	Cooling Water Pump for Ammonia	2	85	Outdoor
W-GB-1001A,B	Mixing Blower (In Polisher Unit)	1	85	Outdoor

ERM based on data from the client, March 2023

The predicted noise levels for during the construction and operational phases were compared against the Project noise criteria referenced in Section 0 and Section 0 respectively.