Integrated Traffic Management Plan

For

IEFCL-Train2
Fertilizer Project

INDORAMA ELEME FERTILIZER & CHEMICALS LIMITED

1.0 INTRODUCTION

This report present result of a traffic survey to establish baseline conditions of traffic situation within the immediate surrounding environment of the proposed Indorama Train2 project. The survey includes traffic volume, traffic flow and mean journey time for 2 roads of interest that the proposed project may have influence on. The survey was undertaken as a prelude to the conduct of a Traffic Impact Assessment (TIA) and the elaboration of a Traffic Management Plan for the area.

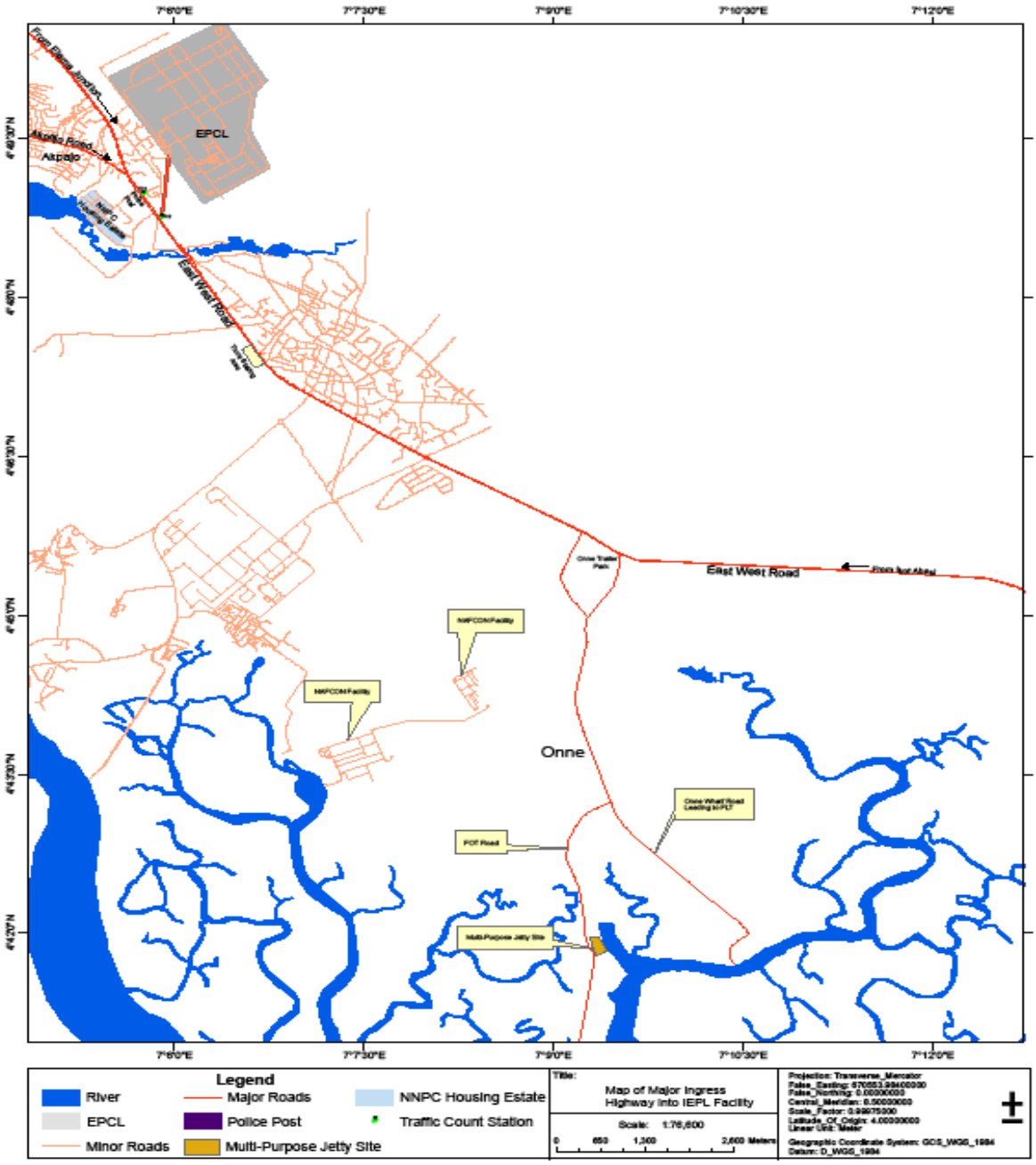


Figure 1: Showing the key features of interest, traffic volumetric survey points

1.1 ROADS OF INTEREST

i. IEPL Road; (for Vehicles leaving and entering Indorama complex)

ii. East-West Road; (Port Harcourt – Eleme and Eleme – Port Harcourt axis)

1.2 Methodology

The volumetric survey was undertaken by teams of trained assistants. They recorded hourly flow of traffic (6am to 7pm.) on a daily basis over a 7-day period, as given below. The vehicle types that were taken into account in the survey were:

(i) Motorcycles and tricycles;

(ii) Cars/Mini-buses;

(iii) 2-axle Vehicles;

(iv) 3-axle vehicles;

(v) 4-axle vehicles;

(vi) 5-axle vehicles;

(vii) 6 or more axle vehicles ; and

(viii) Buses and Coaches.

For each of the 2 roads, there were 8 trained assistants, 2 on each side of the road recording in-coming and out-going traffic on pre-designed forms with a supervisor. Therefore, for the 2 routes, there were 8 trained assistants. The assistants worked in shifts. Thus, for a given pair of assistants on either side of the road, the first worked for 6 hours (i.e. 6a.m. – 12p.m.) while the other worked from 12p.m. – 7p.m. The purpose of employing the shift method was to eliminate fatigue among assistants, which might have led to errors. Information collected was collated and analysed with the aid of Microsoft excel.

An important component of the training of assistants was the quick and unambiguous identification of vehicular types because any confusion that would led to erroneous recording, needed to be avoided at all costs. There were 1 day of intensive training of assistants, including 1 day of hands-on recording of the vehicular types to ensure that assistants gained the necessary proficiency to satisfactorily complete their task.

Assistants for the work were drawn from the nearest settlement nodes to avert any hostilities or resistance, which could have arisen if assistants belonging to different ethnic groups were imported into the areas to carry out the assignments.

Survey points were geo-located using the hand-held Global Positioning System (GPS) and mapped as contained in figure 1 above.

1.2.1 Conversion of Miscellaneous Vehicular Traffic Volumes to Standard Passenger - Car Units (PCUs)

Since different types of vehicles use the roads, it would have been impossible to determine aggregate volumes of traffic periodically or for a whole day without some form of standardization. To deal with this problem, transportation planners and engineers adopt the Passenger Car Unit (PCU) concept, such that a given type of vehicle is associated with a number of PCUs. There has been considerable research, especially in more advanced countries on methods of assigning PCUs; there are variations between countries and between rural and urban environments.

In Nigeria, in the absence of local standards, the tendency has been to adopt British standards (because of the country's colonial experience). For this reason, the standard that was applied in this survey is the conversion factor employed in the British study -- *Traffic in Towns*: the Buchanan Report[1]. This is given in Table 1.

Table 1: Conversion of Vehicular Types to PCUs

S/No.	Vehicular Type	PCU
1	Motorcycles/Tricycles	0.75
2	Cars and Light Vans	1
3	Medium and Heavy Goods Vehicles	2
4	Buses and Coaches	3

HMSO (1963).*Traffic in Towns* – the Buchanan Report, London.

These vehicular groupings are now described.

[1] Her Majesty's Stationary Office (HMSO) (1963). *Traffic in Towns* – the Buchanan Report, London.

1.2.2 Motorcycles/Tricycles

A motorcycle (also called a motorbike, bike) is a two- or three-wheeled motor vehicle.[2] Motorcycle design varies greatly to suit a range of different purposes: long distance travel, navigating urban traffic, cruising, sport, racing and off-road riding.

1.2.3 Cars and Light Vans

A car is an automobile for carrying a limited number of passengers (no more than nine)[3]. The original van was a large covered wagon. A modern van is a kind of vehicle used for transporting goods or people. There are vans in all shapes and sizes, ranging from the classic van version of the tiny Mini to much larger vehicles such as cargo vans and other commercial transport vehicles. Vans run up to about 4 tons and are classified as Light or Medium Duty Trucks (North America) or Light Commercial Vehicles (Europe).

1.2.4 Medium and Heavy Goods Vehicles

A large goods vehicle (LGV), also heavy goods vehicle (HGV), is the European Union term for any truck with a gross combination mass (GCM) of over 3,500 kilograms (7,716 lb). Sub-category N2 is used for vehicles between 3,500 kilograms (7,716 lb) and 12,000 kilograms (26,455 lb) and N3 for all goods vehicles over 12,000 kilograms (26,455 lb). The term Medium Goods Vehicle (MGV) is used within parts of the UK government to refer to goods vehicles of between 3.5 and 7.5 tonnes, which according to the European Union (EU) are also 'Large Goods Vehicles'.[4]

1.2.5 Buses and Coaches

A coach (also motor coach, often simply called a bus) is a type of bus used for conveying passengers on excursions and on longer distance inter-city bus service or even between countries. Unlike transit buses designed for shorter journeys, coaches often have a luggage hold that is separate from the passenger cabin and are normally equipped with facilities required for longer trips, including comfortable seats and sometimes a toilet. The term 'coach' was previously used for a horse-drawn carriage designed for the conveyance of more than one

[2] Foale, Tony (2006). *Motorcycle Handling and Chassis Design*. Tony Foale Designs. pp. 4–1. ISBN 978-84-933286-3-4.

[3] *http://www.merriam-webster.com/dictionary/passenger%20car*

[4] *"Towing trailers with medium sized vehicles between 3.5 and 7.5 tonnes"*. *DirectGov*.

passenger, the passengers' luggage, and mail that is covered for protection from the elements. The term was applied to railway carriages in the 19th century, and later to motor coaches (buses**).**[5] The next task was to group the vehicle types of the survey according to the major groups described in Table 1, to facilitate the assignment of PCUs to them during the process of standardization. In this study, we dealt with these types as shown in Table 2.

Table 2: Assigning Survey Vehicle Types to Major Vehicle Groups and Associated Passenger-car Units (PCUs)

S/No.	Survey Vehicle Type	Major Vehicle Group	PCUs
1	Motorcycles and tricycles	Motorcycles	0.75
2	Cars/Mini buses	Cars and Light Vans	1.0
3	2- axle vehicles	Medium and Heavy Goods Vehicles	2.0
4	3-axle vehicles		
5	4-axle vehicles		
6	5-axle vehicles		
7	6 or more axle vehicles		
8	Buses and Coaches	Buses and Coaches	3.0

1.2.6 Deliverables

Deliverables for the traffic volumetric survey report essentially covered.

(i) Tables showing daily, hourly raw (standardised) volumes of traffic (for in-coming and out-going traffic) along each of the 2 roads of interest, according to vehicle type, for 7 consecutive days and presented in Ms Excel

(ii) Tables showing daily hourly volumes of traffic (two directional traffic) (in PCUs) along each of the 2 routes, for seven consecutive days;

(iii) Divided column chart showing daily standardized (in PCUs) volumes of traffic along each of the 2 route links, for 7 consecutive days;

(iv) Line chart showing daily hourly traffic flow (two-directional traffic) in PCUs for each of the 2 route links, for 7 consecutive days;

(v) Line chart showing weekly average hourly traffic flow (two-directional traffic) in PCUs for each of the 2 route links.

[5] *en.wikipedia.org/wiki/Coach_(bus)*

2.0 BASELINE CONDITIONS

2.1 Methodology

2.1.1 Traffic Volumetric Survey and Conversion to PCUs

Traffic volumetric survey was undertaken by trained assistants at points along hypothetical cordons traversed by motorised traffic on the roads of interest. Survey points or stations are shown in Map 1 and their coordinates are given in Table A. 1.

Table A 1: Coordinates of Traffic Volumetric Survey Points

S/No.	Road	Coordinates	
		Northing (N)	Easting (E)
1	East-West Road	4^0 48' 56.65"	7^0 65' 44.36"
2	IEPL Road	4^0 48' 46.25"	7^0 05' 51.34"

Source: Field Surveys, Oct 2017

In order to properly account for all types of motorised traffic and to be able to carry out basic arithmetical operations, vehicle types were converted to Passenger-car Units (PCUs), using the conventional conversion method shown in Table A.1.1.

Table A.1.1: Conversion of Vehicle Types to Passenger-Car Units

S/No.	Types of Vehicle	Passenger-Car Units (PCUs)
1	Private Cars and Light Vans	1.0
2	Motorcycles (Okada)	0.75
3	Medium and Heavy Goods Trucks (including "Tankers")	2.0
4	Buses and Coaches	3.0

(Source: HMSO (1973**).** *Traffic in Towns* (The Buchanan Report). London)

2.2 Traffic Volumetric Survey Results

2.2. 1 IEPL Road

2.2. 2 Vehicle Leaving Indorama Complex)

Results of the traffic survey on vehicles leaving Indorama are shown in Tables A.2.1.1 and A.2.2.2. Figures A.2.1.1 and A.2.2.2 present the same information. The result revealed that over the 7-day survey period (Wednesday, 18th October 2017 to Tuesday, 24th, October 2017), the highest volume of traffic was recorded on Thursday with a volume of 2250 PCUs, while the lowest was on Sunday with a traffic volume of 884 PCUs. The peak weekly average (hour) volume of traffic was recorded between 5:00pm to 6:00pm with a volume of 238.1PCUs. While the lowest was recorded in the morning during the hours of 6:00am to 7:00am with a volume of 81.71PCUs. The peak traffic volume during this period (5:00 -6:00pm) can be attributed to closing of Indorama staff from work.

Table A.2.1.1: Daily Traffic Volumes Leaving Indorama Complex

Vehicle Types	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday
Cat 1 (Motorcycle)	0	0	0	0	0	0	0
Cat 2 (Car and Light Vans)	486	839	835	431	324	804	743
Cat 3 (Lorries and Trucks)	330	628	346	500	284	460	592
Cat 4 (Buses and Coaches)	579	783	597	252	276	495	464
Total	1395	2250	1778	1183	884	1759	1799

Source: Field Surveys, Oct, 2017

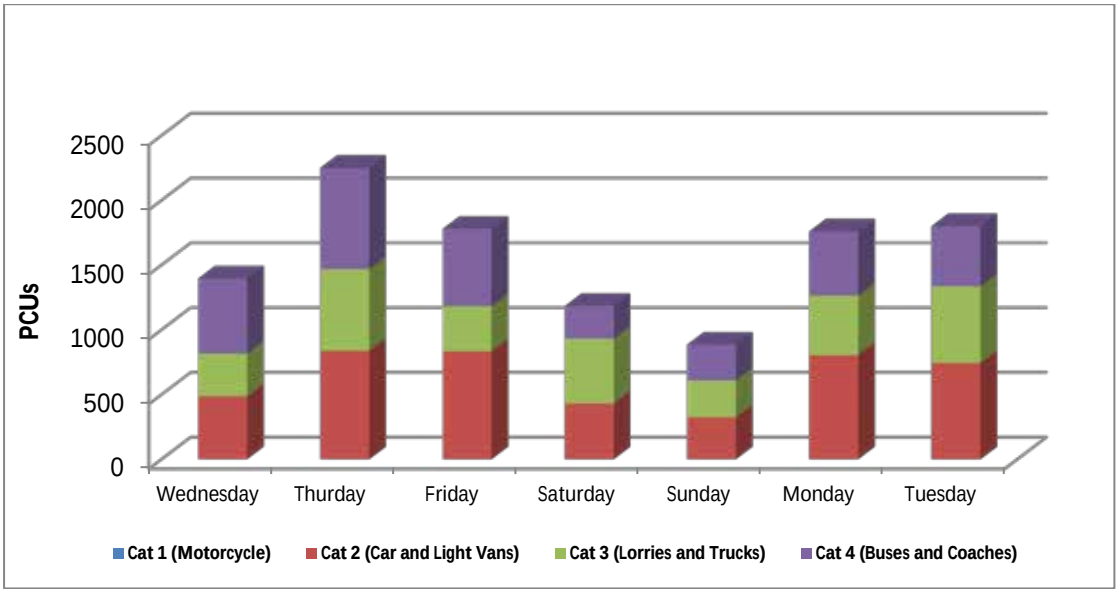


Figure A.2.1.1: Daily Traffic Volumes Leaving Indorama Complex

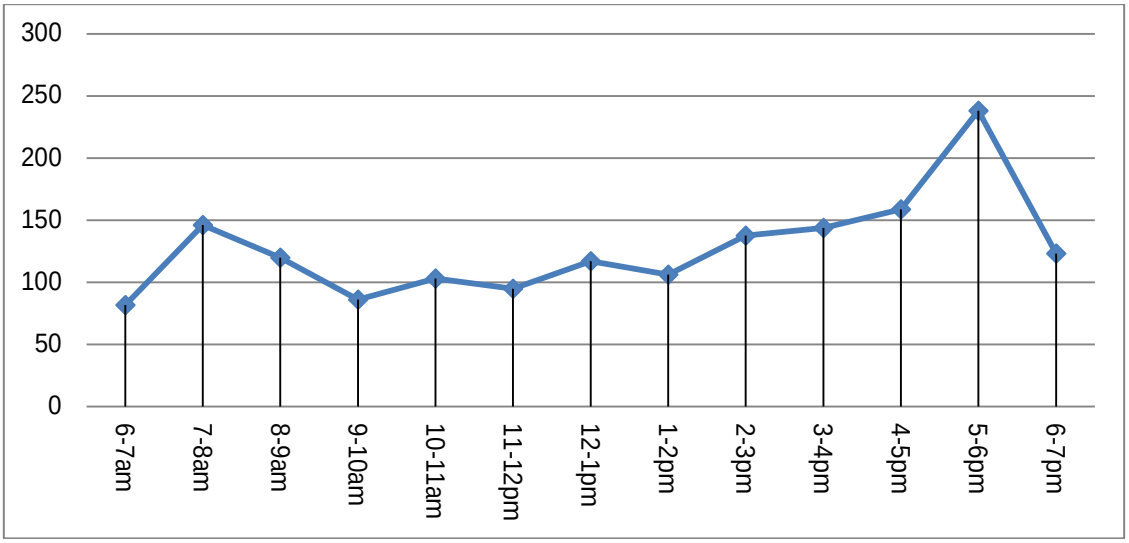


Figure A.2.1.2: Weekly Average Hourly Volume (in PCUs) of vehicles Leaving Indorama Complex

Table A.2.1.2: Weekly Average Hourly Volume (in PCUs) of vehicles Leaving Indorama Complex

	Time											
6-7am	7-8am	8-9am	9-10am	10-11am	11-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	5-6pm	6-7pm
81.71	146.1	119.7	86	103.1	94.71	117	106.2	137.7	143.7	158.8	238.1	123.1

Source: Field Surveys, Oct, 2017

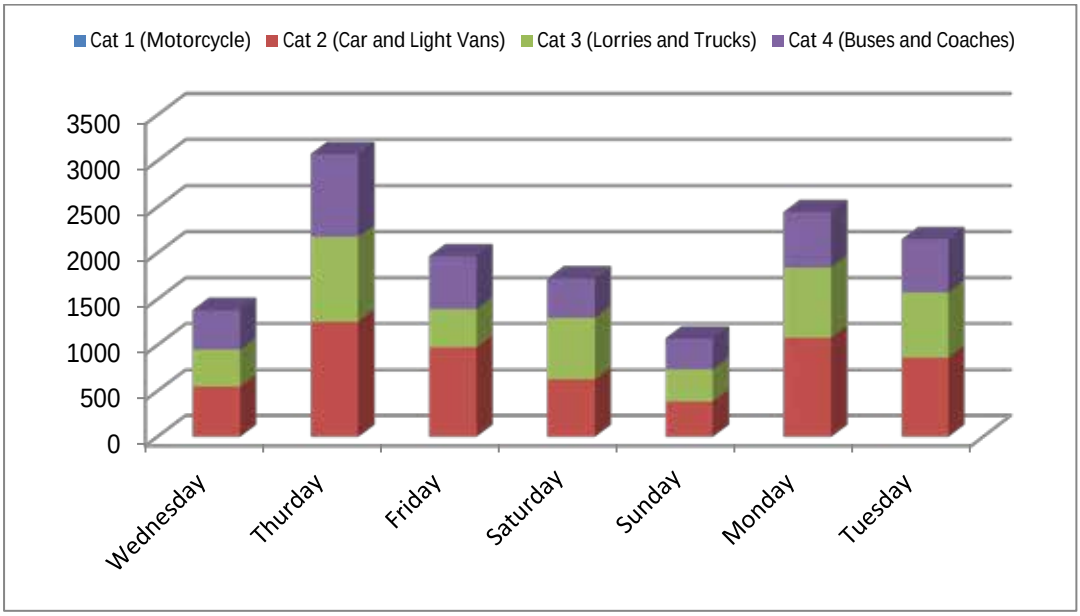
2.2. 3 Vehicle Entering Indorama Complex)

Results of the traffic survey are shown in Tables A.2.1.3 and A.2.1.4. Figures A.2.1.3 and A.2.1.4 present the same information. They reveal that over the 7-day survey period (Wednesday, 18th October 2017 to Tuesday, 24th, October 2017), the highest volume of traffic was recorded on Thursday with a volume of 3074 PCUs, while the lowest was on Sunday with a volume of 1072 PCUs. The peak hourly average for the weak was recorded between 8.00 to 9.00am with a volume of 244.5PCUs. While the lowest was recorded in the evening during the hours of 6:00pm to 7:00pm with a volume of 100.8PCUs. The peak period between 8:00 to 9:00am can be as a result of Indorama staff going to work.

Table A.2.1.3 Daily Traffic Volumes Entering Indorama Complex

Vehicle Types	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday
Cat 1 (Motorcycle)	0	0	0	0	0	0	0
Cat 2 (Car and Light Vans)	548	1255	975	627	385	1081	862
Cat 3 (Lorries and Trucks)	402	922	416	672	354	764	712
Cat 4 (Buses and Coaches)	432	897	573	423	333	600	576
Total	1382	3074	1964	1722	1072	2445	2150

Source: Field Surveys, Oct, 2017)

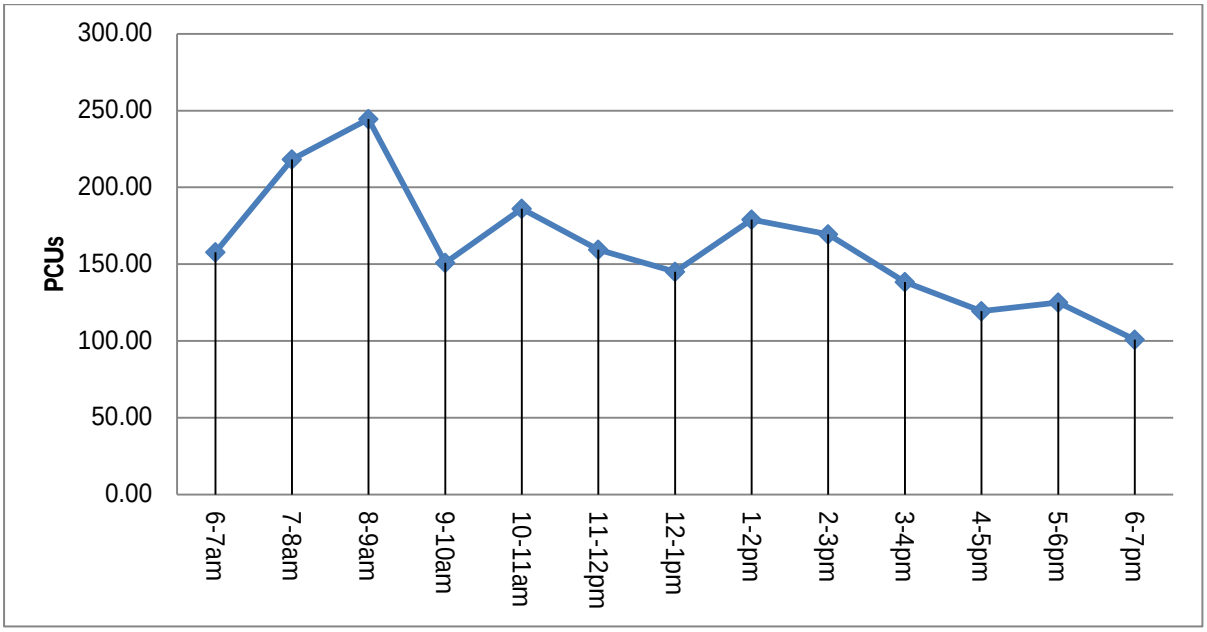


A.2.1.3 Daily Traffic Volumes Entering Indorama Complex

Table A.2.1.4: Weekly Average Hourly traffic Volume (in PCUs) of Entering Indorama Complex

	Time											
6-7am	7-8am	8-9am	9-10am	10-11am	11-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	5-6pm	6-7pm
157.70	218.2	244.5	151	186.2	159.4	145	179	169.4	138.4	119.4	125	100.8

Source: Field Surveys, Oct, 2017



A.2.1.4: Weekly Average Hourly Volume (in PCUs) of Entering Indorama Complex

2.3 East West Road

2.3.1 Eleme Junction to Bori/Onne Axis

Results of the traffic survey are shown in Tables A.2.2.1 and 2.2.2. Figures A.2.2.1 and A.2.1.2 present the same information. They reveal that over the 7-day survey period (Wednesday, 18th October 2017 to Tuesday, 24th, October 2017), the highest volume of traffic was recorded on Friday with a volume of 18396.75 PCUs which can attributed to people from the Ogoni and Akwa-Ibom communities leaving to spend weekend in their village, while the lowest was on Wednesday with a volume of 9835.25PCUs, which is surprising owing to the fact that Wednesday is always the Oil market day, which influence traffic on this day. The peak hourly average for the weak was recorded between 8.00 to 9.00am with a volume of 1686.39PCUs. While the lowest was recorded in the evening during the hours of 3:00pm to 4:00pm with a volume of 1037.36PCUs. The peak period between 8:00 to 9:00am is as a result of workers Eleme and Onne going for work.

Table A2.2.1Daily Traffic Volume along Eleme Junction to Bori/Onne Axis

Vehicle Types	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday
Cat 1 (Motorcycle)	1154.25	1379.25	1723.75	1463.25	1057	1461	1461
Cat 2 (Car and Light Vans)	2992	6770	7053	5914	5286	6998	7009
Cat 3 (Lorries and Trucks)	1918	2564	2606	2954	1096	2890	2488
Cat 4 (Buses and Coaches)	3771	6030	7014	7392	4437	5721	6885
Total	9835.25	16743.25	18396.75	17723.25	11876	17070	17843

Source: Field Surveys, Oct, 2017)

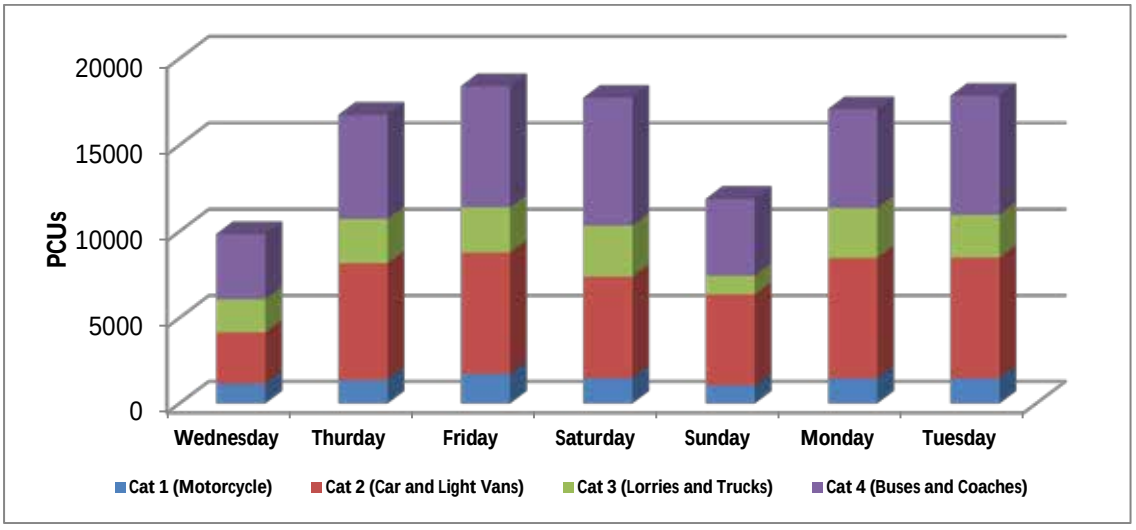


Figure A2.2.1: Daily Traffic Volume along Eleme Junction to Bori/Onne Axis

Table A2.2.2 Weekly Average Hourly Volume (in PCUs) along Eleme Junction to Bori/Onne Axis

	Time											
6-7am	7-8am	8-9am	9-10am	10-11am	11-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	5-6pm	6-7pm
1686.39	1591.96	1459.57	1432.29	1315.89	1271.14	1200.11	1183.04	1090.04	1037.36	1109.57	1345.5	1141.61

Source: Field Surveys, Oct, 2017)

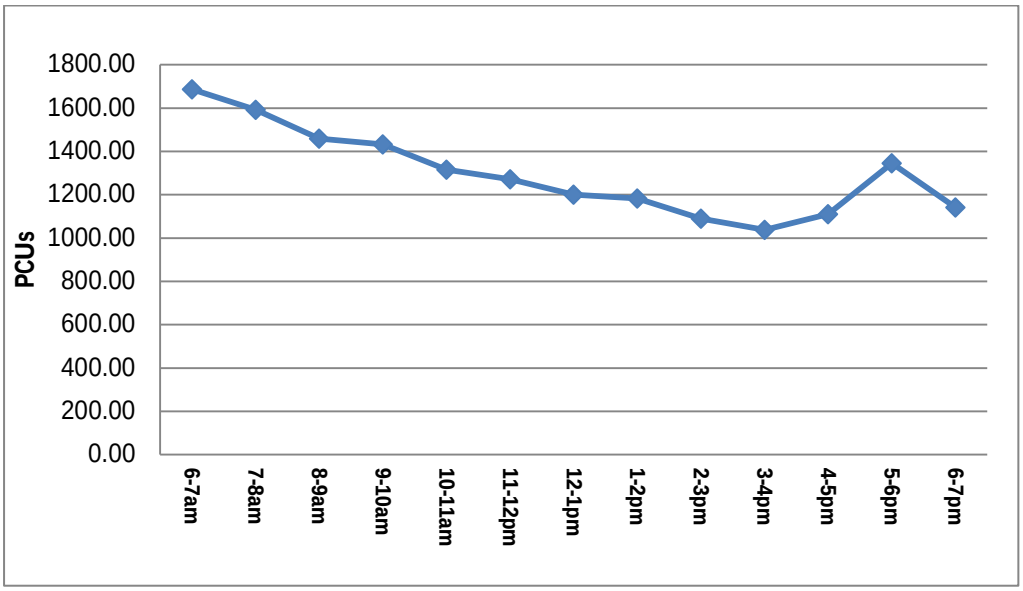


Figure A.2.2.2: Weekly Average Hourly Volume (in PCUs) along Eleme Junction to Bori/Onne Axis

2.3.2 Bori/Onne to Eleme Junction Axis

Results of the traffic survey are shown in Tables A.2.2.3 and A.2.2.4. Figures A.2.2.3 and A.2.2.4 present the same information. The result revealed that over the 7-day survey period (Wednesday, 18th October 2017 to Tuesday, 24th, October 2017), the highest volume of traffic was recorded on Thursday with a volume of 17534.5PCUs followed by Friday with traffic volume of 16261PCUs, while the lowest was on Sunday with a volume of 10346.75PCUs. The peak hourly average for the weak was recorded between 3.00 to 4.00pm with a volume of 2263.43PCUs. While the lowest was recorded in the evening during the hours of 10:00am to 11:00pm with a volume of 909.64PCUs.

Table A.2.2.3 Traffic Volume along Bori/Onne to Eleme Junction Axis

Vehicle Types	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday
Cat 1 (Motorcycle)	860.25	1375.5	1317	1051.5	993.75	1118.25	1142.25
Cat 2 (Car and Light Vans)	4089	5949	5778	5734	5318	6415	6144
Cat 3 (Lorries and Trucks)	1948	3280	2590	2875	858	1906	2512
Cat 4 (Buses and Coaches)	3921	6930	6576	5574	3177	5277	5967
Total	**10818.25**	**17534.5**	**16261**	**15234.5**	**10346.75**	**14716.25**	**15765.25**

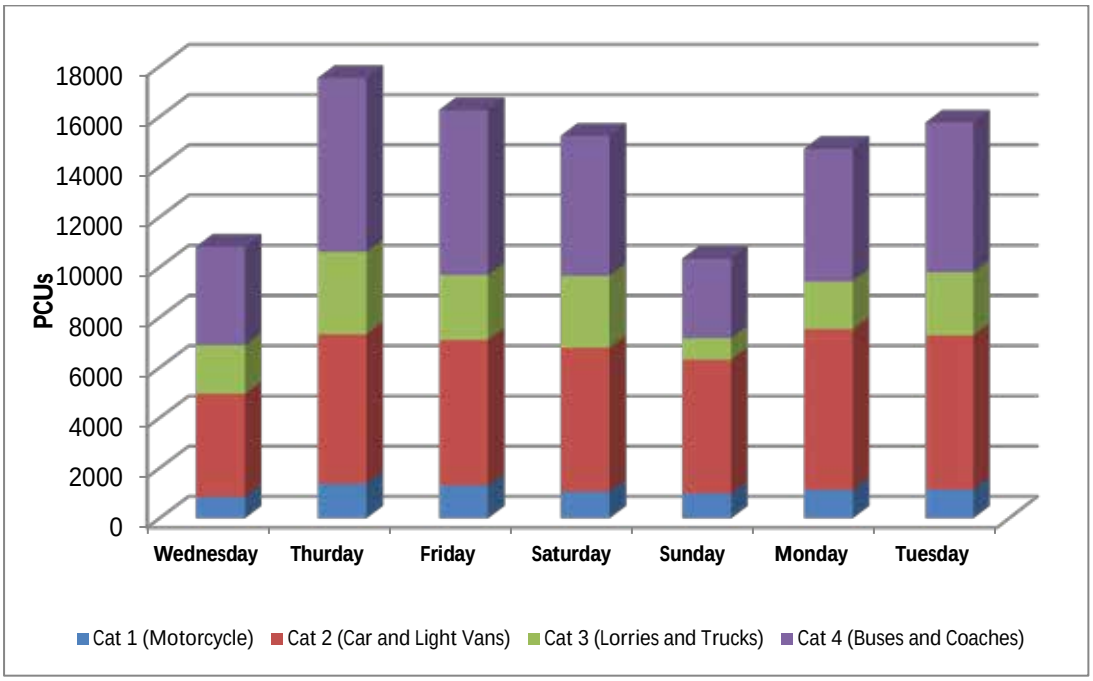


Figure A.2.2.3: Traffic Volume along Bori/Onne to Eleme Junction Axis

Table A.2.2.4: Weekly Average Hourly Volume (in PCUs) along **Bori/Onne to Eleme Junction Axis**

Time

6-7am	7-8am	8-9am	9-10am	10-11am	11-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	5-6pm	6-7pm
1207.57	1057.89	994	956.57	909.64	913.54	1032.36	1008	1152.82	2263.43	1754.11	1865.61	1160.61

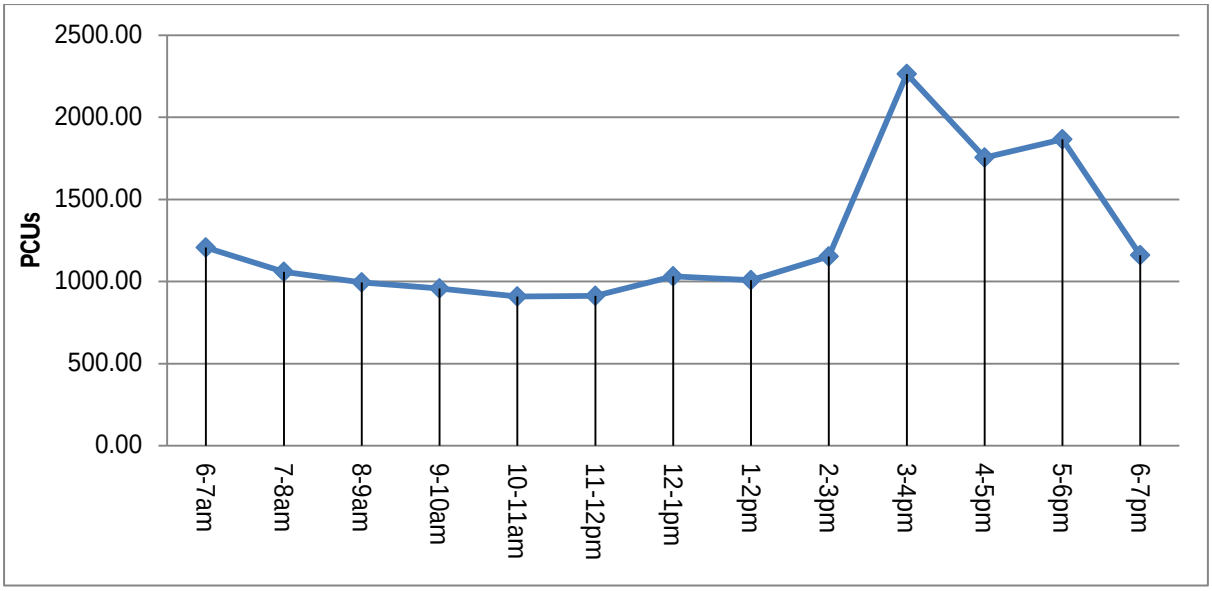


Figure A.2.2.4: Weekly Average Hourly Volume (in PCUs) along **Bori/Onne to Eleme Junction Axis**

2.3.3 IEFCL-Generated Traffic

Characteristics of traffic to be generated by Indorama Eleme Fertilizer & Chemical Limited (IEFCL) are given in below.

Design Basis for Traffic Management

1. Number of vehicles for Material movements

1.1. IEFCL-2 Urea Movement:

- Urea to be transported in a day in MT : 4000
- Truck capacity in MT : 30
- No of outgoing trucks in a day : 134

1.2. IEFCL-2 Bagged Urea Movement:

- Bagged Urea to be transported in a day in MT : Nil
- No of outgoing trucks in a day : Nil

1.3. Miscellaneous movement for IEFCL-2 including UF85

- Chemicals, Packing materials in a day : 6

1.4. Existing IEFCL-1, IEPL, PET Plant Product Movements:

S No	Description	Quantity in MT	No of trucks
1	IEFCL-1 product to be transported in a day	4000	134
2	PE/PP product to be transported in a day	1500	55
3	PET product to be transported in a day	300	10
4	APL (preform) product to be transported in a day	80	6
5	Super Packaging	50	2
6	Raw material movement in a day in MT	67	7
	Total	5,697	214

1.5. Miscellaneous deliveries to MMD : 15

1.6. Scrap sales by MMD : 6

1.7. **Total number of trucks for Material movement in a day (Sum of 1.1 to 1.6) : 375**

2. Number of vehicles for Man movement (including Visitors)

2.1. IEPL buses : 54

2.2. IEFCL-1 buses : 12

2.3. Employees own cars : 140

2.4. Contractors / Visitors vehicles : 185

2.5. Anticipated IEFCL-2 vehicles : 100*

*This figure is assumed and is likely to vary.

2.6. **Total number of vehicles for Man movement in a day (Sum of 2.1 to 2.5) : 491**

Total number of vehicles in a day (Sum of 1.7 & 2.6) 866

These figures help to provide an insight into the magnitude of contributions to be made to the road network in the study area by IEFCL operations.

2.3.4 Comparative Finding

This survey showed 23% increase in traffic volume when compared with the result of the last traffic survey conducted in 2013 for the increase in operations in Indorama. Consequently, one can therefore infer that the situation may change when the Urea Train2 project commence operation.

2.3.5 Mean Journey Time to Onne Port and Back:

Direct measurement of time it takes a 300MT customized Indorama Truck to reach the Port in Onne from Indorama complex and back to the Indorama complex was carried out both during peak and lean period. The journey time for both directions and period are greatly affected by the very deplorable conditions on the East-West highway between Indorama and the Onne Port, which is as a result of heavy rains of the season. Below is a typical results during this period of survey.

From the complex to Onne Indorama Port Limited - Day & Night hours; in high and lean peak hours.

- During lean traffic Journey time was 0.45hr to 0.55hrs
- During peak traffic period it takes 2hr depending the cause of traffic (rain, broken down vehicle caused by large potholes)

From Onne Indorama Port to complex - Day & Night hours; in high and lean peak hours.

- If there is no traffic it takes 0.35hrs
- During peak traffic it takes 1.30 to 2:00hr

B. TRAFFIC IMPACT ASSESSMENT

B 1.0 METHODOLOGY

Traffic impact assessment (TIA) was carried out, using the Hazards and Effects Management Process (Shell, 2005). This method entails identifying hazards and sensitivities.

A *hazard* has been defined as "an aspect of the activities or facilities of a project during all of its phases that has the potential to cause harm to the environment" (Shell, 2005). "Hazards" may be construed as sources of the anticipated environmental (traffic) effects.

Sensitivity is "a specific characteristic of the environment, which once disturbed, leads to the disturbance of the stability or integrity of the environment" (Shell, 2005).

B.1.1 Identification, Qualification, and Significance Rating/Evaluation of Impacts

Identification of impacts

The Leopold matrix of sensitivities against hazards was used to identify traffic impacts, by noting the nature of interaction between hazards (vehicle movements) and sensitivities (road network attributes).

Impact qualification

Impact qualification *means* specifying attributes for each impact, including:

- Positive or negative;
- Direct or indirect;
- Short term/temporary or long-term/permanent;
- Reversible or irreversible

Rating significance (risk) level of impacts

Using the HEMP approach, rating of impacts was carried out with reference to the *probability* of their occurrence and their *consequence.*

Likelihood or probability of impact occurrence -- Estimation of probability (likelihood) of occurrence is a *qualitative* issue – it is not usually practicable to quantify the statistical probability of occurrence of an impact. However, a simple, qualitative estimation can yield meaningful results, e.g.

- High probability (80 – 100%) refers to a very likely or very frequent impact (e.g., continuous/hourly);
- Medium high probability (60 – 79%) refers to a likely or frequent impact (e.g., daily/weekly);
- Medium probability (40 – 59%) refers to a possible or occasional impact (e.g., monthly);

- Medium low probability (20 – 39%) refers to an unlikely impact (e.g., one that occurs in 1 – 10 years);and
- Low probability (1– 19%) refers to a very unlikely or rare impact (e.g., one that will take over 10 years to occur).

Consequence of impacts -- The potential consequence of an impact depends on two things:

- The magnitude of the potential changes to the environment, caused by a hazard; and
- The level of sensitivity of the receiving environment.

The interaction between the *magnitude of change* and *receptor sensitivity* will yield a level of *effect* as shown in Table B.1 Levels of effect translate to potential consequences as shown in Table B.2. The potential consequences of social (traffic) impacts can be described in the following manner:

Table B.1: Interaction Matrix of Receptor Sensitivity and Magnitude of Change, Showing Resultant Effects

Receptor Sensitivity	Level of Change		
	Low	Medium	High
Low	Trivial effect	Slight effect	Substantial effect
Medium	Slight effect	Substantial effect	Big effect
High	Substantial effect	Big effect	Massive effect

(Source: Shell (2005)

Table B.2: Levels of Effect and Potential Consequences

Levels of Effect	Potential Consequences
Massive	Extreme
Big	Great
Substantial	Considerable
Slight	Little
Trivial	Hardly any

(Source: Shell (2005)

Hardly any – A trivial effect on the social environment is one which causes almost no nuisance or damage in the neighbourhood. The local culture and lifestyle as well as the social infrastructure are somewhat negatively affected, but the effect is only temporary. The impact could result in some disagreement with stakeholder groups, but relationships are likely to remain strong.

Little – A slight effect on the social environment, which causes temporary changes in the way of life of the neighbourhood. The local culture and societal structure are negatively affected. There is disagreement with stakeholder groups, but relationship remains fairly strong.

Great - A big effect on the social environment. There is permanent disruption to communal lifestyle. The local culture and the societal structure suffer greatly. There is presently a fundamental disagreement between the company and its stakeholders that destabilizes the company-stakeholder relationship. This may affect the speed and effectiveness of future decision making processes.

Extreme - A massive effect on the social environment. There is sustained large disruption of, and changes to, the lifestyle of a neighbourhood, leading to a reduction in quality of life. Impacts have become a concern for all stakeholder groups. There is irreversible damage to social structure, traditional culture and infrastructure, as well as total breakdown of stakeholder relationships. The rating or risk assessment of potential impacts may be done numerically or qualitatively.

B.1.2 Qualitative Risk Assessment

Table B.3 shows a qualitative risk assessment matrix. In this method a Risk Assessment Matrix (RAM) is employed with *likelihood* plotted on the y-axis and *consequence* on the x-axis. The cells of this matrix, representing possible combinations of *likelihood* and *consequence*, give the levels of impact significance as judged by experts. For instance, an impact adjudged to have a *low* likelihood of occurrence but of *great* potential consequence will have a *minor* significance rating.

Table B.3: Qualitative Impact Assessment Matrix

Likelihood	Potential consequences					
		Negative				
	Positive	Hardly any	Little	Considerable	Great	Extreme
High		Moderate	Moderate	Major	Major	Major
Medium high		Minor	Moderate	Moderate	Major	Major
Medium		Minor	Minor	Moderate	Moderate	Major
Medium low		Negligible	Minor	Minor	Moderate	Moderate
Low		Negligible	Negligible	Minor	Minor	Moderate

(Source: Shell (2005)

B.1.3 Objective Impact Identification, Qualification and Rating

B.1.3.1 Impact Identification

A matrix (Table B.4) of sensitivities against hazards was used to identify impacts, by noting the nature of interaction between hazards and sensitivities as shown:

The number shown at the point of intersection of sensitivity against hazard and shaded is the Interaction Code, used for identification of the impact, and in the impact description**.**

Table B.4: Interaction Matrix of Hazards and Road Sensitivities

HAZARDS	Access to Road transport	Road Traffic Volume	Composition of Road Traffic	Road Traffic Flow	Mean Journey Time	Road safety
Bulk Urea Movement	1	2	3	4	5	6
Bag Urea Movement	7	8	9	10	11	12
Daily Miscellaneous Movement for Fertilizer plant (including UF85, UAS, Chemicals, Packing materials)	13	14	15	16	17	18
Existing IEPL/PET Plant Product Movement	19	20	21	22	23	24
Miscellaneous Deliveries to MMD	25	26	27	28	29	30
Daily Man Movement	31	32	33	34	35	36

Table B.5 shows the identified impacts, their qualification and rating.

Table B.5: Traffic Impacts Qualification and Rating

Interaction Code	Hazard (source of effect)	Sensitivity	Impact Description	Qualification	Likelihood	Consequence	Impact Rating
1.	Bulk Urea Movement	Access to road transport	1. Reduction of access to road transport	- Negative - Direct - Long term - Reversible - Incremental	Medium High	Considerable	Moderate
2		Road traffic Volume	2. Increase in volume of road traffic	- Negative - Direct - Long term - Reversible - Incremental	Medium High	Considerable	Moderate
3		Composition of road traffic	3. Alteration of the composition of traffic	- Negative - Direct - Long term - Reversible - Incremental	Medium	Little	Minor
4		Road traffic flow	4. Reduction in road traffic flow	- Negative - Direct - Long term - Reversible - Incremental	Medium	Little	Minor
5.		Mean Journey time	5. Increase in mean journey time	- Negative - Direct - Long term - Reversible - Incremental	Medium High	Little	Moderate
6		Road safety	6. Decrease in road safety	- Negative - Direct - Long term - Reversible - Incremental	Medium	Little	Minor
7	Bag Urea Movement	Access to road transport	7. Reduction of access to road transport	- Negative - Direct - Long term - Reversible - Incremental	Medium High	Considerate	Moderate
8		Road traffic Volume	8. Increase in road traffic volume	- Negative - Direct - Long term - Reversible - Incremental	Medium High	Considerable	Moderate
9		Composition of road traffic	9. Alteration of the composition of traffic	- Negative - Direct - Long term - Reversible - Incremental	Medium	Little	Minor

10		Road traffic flow	10. Reduction in road traffic flow	- Negative - Direct - Long term - Reversible - Incremental	Medium High	Little	Moderate
11		Mean Journey time	11. Increase in mean journey time	- Negative - Direct - Long term - Reversible - Incremental	Medium High	Little	Moderarte
12		Road safety	12. Reduction in road safety	- Negative - Direct - Short term - Reversible - Incremental	Medium High	Little	Moderate
13	Daily Miscellaneous Movement for Fertilizer plant (including UF85, UAS, Chemicals, Packing materials)	Access to road transport	13. Reduction of access to road transport	- Negative - Direct - Short term - Reversible - Incremental	Medium High	Considerable	Moderate
14		Road traffic Volume	14.Reduction in road traffic volume	- Negative - Direct - Long term - Reversible - Incremental	Medium High	Considerable	Moderate
15		Composition of road traffic	15.Alteration of the composition of traffic	- Negative - Direct - Long term - Reversible - Incremental	Medium High	Little	Minor
16		Road traffic flow	16. Reduction in road traffic flow	- Negative - Direct - Short term - Reversible - Incremental	Medium High	Little	Moderate
17		Mean Journey time	17. Increase in mean journey time	- Negative - Direct - Long term - Reversible - Incremental	Medium High	Little	Moderate
18		Road safety	18.Reduction in road safety	- Negative - Direct - Long term - Reversible - Incremental	Medium	Little	Minor
19	Existing IEPL/PET Plant Product Movement	Access to road transport	19.Reduction of access to road transport	- Negative - Direct - Long term - Reversible - Incremental	Medium High	Considerate	Moderate
20		Road traffic Volume	20.Increase in road traffic volume	- Negative - Direct - Long term - Reversible - Incremental	Medium High	Considerable	Moderate

21		Composition of road traffic	21.Change in composition of road traffic	- Negative - Direct - Short term - Reversible - Incremental	Medium	Little	Minor
22		Road traffic flow	22.Reduction in road traffic flow	- Negative - Direct - Short term - Reversible - Incremental	Medium High	Little	Moderate
23		Mean Journey time	23. Increase in mean journey time	- Negative - Direct - Long term - Reversible - Incremental	Medium High	Little	Moderate
24		Road safety	24. Reduction in road safety	- Negative - Direct - Long term - Reversible - Incremental	Medium	Little	Minor
25	Miscellaneous Deliveries to MMD	Access to road transport	25. Reduction of access to road transport	- Negative - Direct - Short term - Reversible - Incremental	Medium High	Considerable	Moderate
26		Road traffic Volume	26. Increase in road traffic volume	- Negative - Direct - Long term - Reversible - Incremental	Medium High	Considerable	Moderate
27		Composition of road traffic	27. Change in composition of road traffic	- Negative - Direct - Short term - Reversible - Incremental	Medium	Little	Minor
28		Road traffic flow	28. Reduction in road traffic flow	- Negative - Direct - Short term - Reversible - Incremental	Medium High	Little	Moderate
29		Mean Journey time	29. Increase in mean journey time	- Negative - Direct - Long term - Reversible - Incremental	Medium High	Little	Moderate
30		Road safety	30. Reduction in road safety	- Negative - Direct - Long term - Reversible - Incremental	Medium	Little	Minor
31	Daily Man Movement	Access to road transport	31. Reduction of access to road transport	- Negative - Direct - Short term - Reversible - Incremental	Medium High	Considerable	Moderate

32		Road traffic Volume	32. Increase in road traffic volume	- Negative - Direct - Long term - Reversible - Incremental	Medium High	Considerable	Moderate
33		Composition of road traffic	33. Change in composition of road traffic	- Negative - Direct - Short term - Reversible - Incremental	Medium	Little	Minor
34		Road traffic flow	34. Reduction in road traffic flow	- Negative - Direct - Short term - Reversible - Incremental	Medium High	Little	Moderate
35		Mean Journey time	35. Increase in mean journey time	- Negative - Direct - Long term - Reversible - Incremental	Medium High	Little	Moderate
36		Road safety	36. Reduction in road safety	- Negative - Direct - Long term - Reversible - Incremental	Medium	Little	Minor

Table B.5 shows that 36 negative traffic impacts were identified for all the “hazards” (sources of effects), 24 of them adjudged to be of moderate significance.

B.1.3.2 Description of Identified Moderate Negative Impacts

1. *Reduction of Access to Transport (Moderate)*

   IEFCL trucks will contribute significantly to the number of trucks that ply the relevant road network in the study area. The traffic survey revealed that there will be about 23% increment on the existing traffic volume coming from Indorama complex to enter the East-West Road. This level of contribution will lead to overall reduction of access for other road users.

2. *Increase in Traffic Volumes (Moderate)*

   All forms of IEFCL vehicular movement will lead to extra loading of traffic on the road network.

3. *Reduction in Traffic Flow (Moderate)*

   Increased vehicular traffic along the roads of interest will lead to reduction of flow computed to be 5, 9 and 1 vehicles per minute for the FOT, East-West, and IEPL Roads, respectively.

3. *Increase in Mean Journey Time*

   Similarly IEFCL-induced increase in vehicular traffic will lead to increase in journey time (as computed in Tables A.12–A.14) along the roads of interest.

B.1.3.3 Traffic Impact Mitigation Measures

Table B.6 presents mitigation measures for the identified potential negative impacts of moderate significance.

Table B.6: Traffic Impacts Mitigation Framework

S/No.	Impact Description	Gross Rating	Mitigation /Enhancement	Net Rating
Mitigation Measures				
1.	Reduction of Access to Transport	Moderate	M.1 Schedule much of vehicular movement during observed off-peak periods. Make more use of Saturdays and Sundays as the survey has shown that there is relatively light traffic on those days. Staging areas	Minor
2.	Increase in Traffic Volumes	Moderate	M.2 Carry out major movements at night possibly with armed escorts. There should be another staging /parking area off the FOT Road to supplement the one along the East-West Road.	Minor
3.	Reduction in Traffic Flow	Moderate	M.3 Apply mitigations M1 and M2. Consider construction of another junction opposite the MP Jetty to ease movement of trucks to the jetty, i.e. to prevent them from swinging around before entering the jetty.	Minor
4	Increase in journey time	Moderate	M.4 Apply mitigations 1, 2, 3 to reduce journey time.	Minor

Table B.7: Traffic Management Plan

Mitigation /Enhancement No.	Description of Mitigation/ Enhancement	Action Party	Monitoring Parameters	Monitoring Party	Reporting	Timing
Mitigation Measures						
M.1	Schedule much of vehicular movement during observed off-peak periods. Make more use of Sundays as the survey has shown that there is relatively light traffic on that day.	IEFCL	· Schedule of vehicular Movements	· IEFCL · Federal Police	· IEFCL · Federal Police in NPA	Weekly
M.2	Carry out major movements at night possibly with armed escorts. There should be another staging /parking area off the FOT Road to supplement the one along the East-West Road.	· IEFCL	· Number of armed escorts hired · Schedule of vehicular Movements	· IEFCL	· IEFCL	Weekly
M3	Apply mitigations M1 and M2. Consider construction of another junction opposite the MP Jetty to ease movement of	· IEFCL · FGN	· Number of armed escorts hired · Pace of construction of the proposed junction	· IEFCL	· IEFCL	Weekly

	trucks to the jetty, ie to prevent them from swinging around before entering the jetty.					
M4	Apply Mitigations 1, 2, 3 to reduce journey time	· IEFCL	· Number of armed escorts hired · Schedule of vehicular movements · Pace of construction of the proposed junction	· IEFCL	· IEFCL	Weekly

FGN – Federal Government of Nigeria

Conclusion

The traffic survey has been conducted in-line with international best practice taken in cognizance baseline of traffic situation, associated impact and management. The survey revealed that Thursday recorded the highest traffic volume within IEPL road, while on the East-West road it was between Thursday and Friday. The hourly peak period was between 3:00-4:00pm on Bori to Eleme axis and 6:00 – 7:00am on Eleme to Bori axis. While on the IEPL road the peak period was noticed between 8:00 -9:00am to enter Indorama complex and between 5:00 – 6:00pm leaving the complex. This finding is expected to inform the management on Journey time with respect to product delivery and personnel movement to and fro Indorama complex.

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Social Impact Assessment and Stakeholder Engagement Plan

For

IEFCL-Train2
Fertilizer Project

INDORAMA ELEME FERTILIZER & CHEMICALS LIMITED

Table of Contents

1. Abbreviations:

Abbreviation	Description
CR&D	Community Relations and Development
CRO	Community Relation Officer
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
HR	Human Resources
IEFCL	Indorama Eleme Fertilizer & Chemicals Limited
IFC	International Finance Corporation
LGA	Local Government Area
MTPD	Metric Ton Per Day
NAOC	Nigerian Agip oil Company
SEP	Stakeholders Engagement Plan
PS1	Performance Standard-1

2. Introduction:

Indorama Eleme Fertilizer & Chemicals Limited (IEFCL), the Proponent requires an Environmental Impact Assessment (EIA) of the proposed IEFCL - Train 2 (Ammonia and Urea) project in Indorama Complex. The Proponent wishes to ensure that the project is carried out fully in line with world class policy statements on HSE, Nigerian and International legislative requirements, including World Bank/IFC standards. These standards include a requirement to assess the environmental, Social and Health consequences of any development, so that adequate measures can be taken to mitigate negative effects and to enhance opportunities. These assessments will be carried out prior to commencement of the development phases. For the environmental impact assessment 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 Nigerian Government developed an Environmental Impact Assessment Procedural Guidelines as blueprint to protect the environment from accelerated economic growth in the country. The aspirations of the Guideline are to ensure that possible and potential effects (positive and negative) of any development project /program are determined prior to the commencement of the development project/ program/policy.

2.1 Proponent

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

It is the proponent's intent to establish IEFCL – Train 2 (Ammonia and Urea plant) from concept to design and to engineering, construction in line with the Nations Guidelines on manufacturing sector.

3. Objectives

Integration of Equator Principles, IFC Performance Standards (PS1) and applicable laws of Nigeria in the process of identification, assessment &mitigation of social risk is a key element of project planning, development and implementation. Effective social risk assessment assists good design, builds strong relationships with local communities and reduces the potential for

delays through the early identification of issues to be addressed as a project progresses. Important objectives are as under:

- Assessment of social risk and impacts.
- Development of social risk management plan in line with IFC Performance Standards and applicable laws of Nigeria.
- Development of Social Management System to address the identified gaps.
- Identify Project stakeholders and understand their interests, concerns and influence in relation to Project activities
- Reaffirm the relationship of trust between the company management,local communities and local government
- Respect local traditions, languages, timeframes and decision making processes.
- Resolve any grievances in a timely manner arising from Project-related activities.
- Identification of resources requisite for fulfillment of the Plan.
- Improve the internal communication in the company and thereby increase efficiency of the work process as a whole.

3.1 Objectives of IFC Performance Standard

- To promote improved social and environmental performance for companies through the effective use of management systems.
- To identify and assess social and environmental impacts, both adverse and beneficial, in the project area of influence
- To avoid or where avoidance is not possible, minimize, mitigate or compensate for adverse impacts on workers, affected communities and the environment;
- To ensure that affected communities are appropriately engaged on issues that could potentially affect them
- To establish a system for long-term communication between the project and communities.

4. Social Impact Assessment Framework (SIA)

Social Impact Assessment (SIA) plan is an umbrella term encompassing a range of activities and interactions over the life of the project. This SIA is designed to provide guidance to IEFCL in terms of engagement with external and internal stakeholders during all phases of project

development. The approach in the compilation of the SIA comprises the following main components, namely:

- Assessment of social impact
- Social impact management plan
- Stakeholders Identification and Analysis
- Stakeholders Consultation / Information Disclosure
- Management Functions
- Social engagement plan
- Grievance Mechanism
- Monitoring and Reporting to Stakeholders

The potential impact is going to be on occupation, income and lifestyle some of which may be offensive to local norms, customs and practices; sexual laxity/prostitution; youth militancy; pressure on social infrastructure such as schools, health care facilities, water supplies which are limited. In view of the above mitigation measures are summarized below to cushion areas of grievances.

- Identification of potential socioeconomic issues/risks
- Consultation with relevant communities, government officials and appropriate stakeholder organizations to share information, opinions/ideas/feedback, and respond to expressed concerns
- Development of appropriate prevention , control, mitigation, and monitoring strategies related to potential socioeconomic issues/impacts

4.1 Identification of Social Risk and Mitigation Plan

The possible adverse social impacts of the project are spelt out under social impact assessment. These impacts were derived from experience elsewhere and from the views of respondents in the communities. The impacts provide the basis for the articulation of appropriate mitigation.

Relevant measures needed at each stage of the project, i.e. construction, operation and decommissioning are indicated as under:

4.1.1 Construction Phase:

Key Aspects	Key Impacts	Mitigation Plan
Increase in Population	In-migrant workers	Use local labour as much as possible.
	In-migrant contractors	Encourage development of local contractors for labour supply, sand supply and construction material supply.
	In-migrant traders, ancillary business	Encourage skill development and acquisition program so that local personnel can set up business support centers, electrical workshops, mechanical workshop, vehicle repair workshop etc.
Pressure on Social Infrastructure due to increase in Population	Pressure on Public Health Facility	Use of local labour and indigenous contractors will minimize the load.
	Pressure on Roads	- do -
	Pressure on Public Utility Services: water supply, electricity supply etc.	- do -
	Pressure on Housing facility	- do -
	Pressure on Primary / Secondary School	- do -
Change in life style and social conflict	Communal conflict between indigenes vs outside workers, contractors, traders, businessmen etc.	Engagement of indigenous workers and contractors as much as possible will minimize the conflicts.
	Social Laxity	Above will minimize the social disruption. Secondly there will be public enlightenment programme on STDs and other communicable diseases.
Youth Militancy	Demonstration, obstruction of roads, gates etc.	Gainful employment as stated above will minimize youth militancy.

4.1.2 Post Construction of Fertilizer Plant

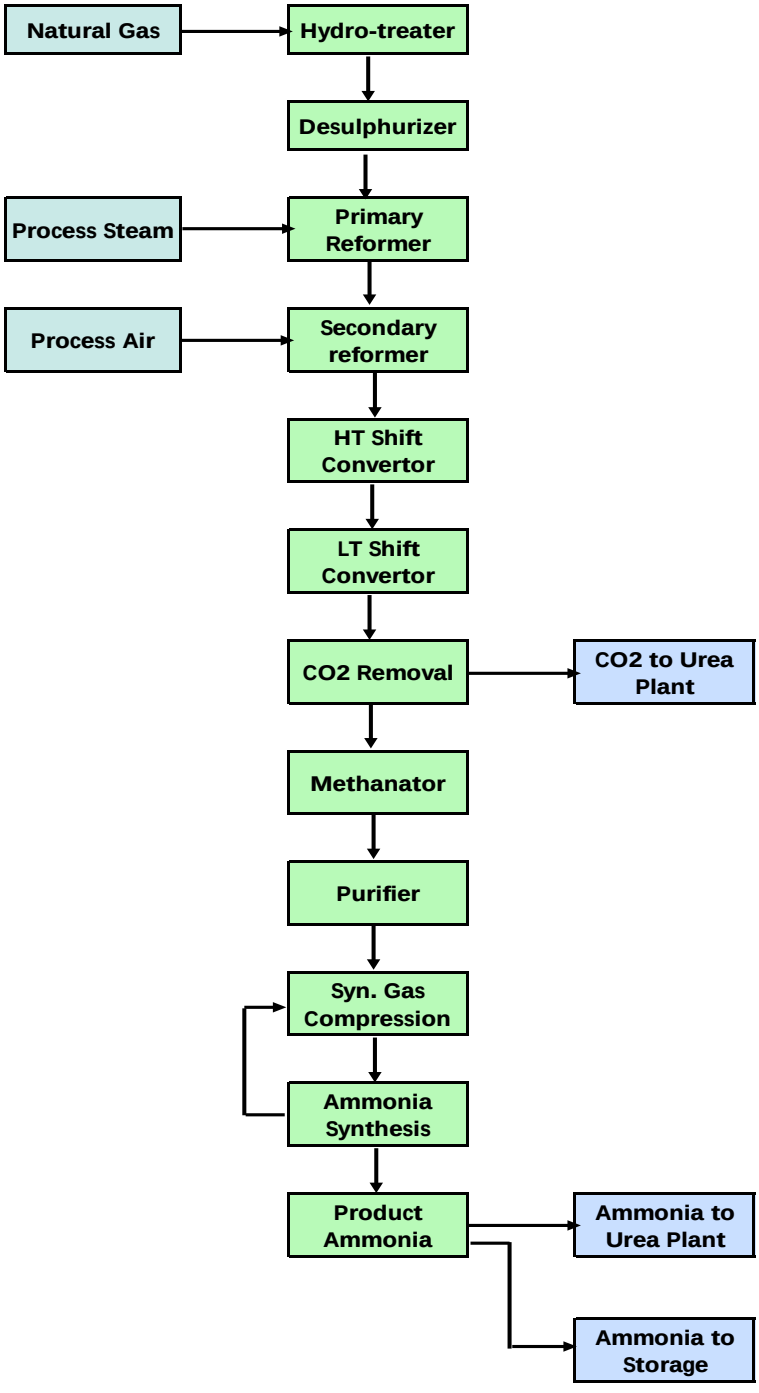
Key Aspects	Key Impacts	Mitigation Plan
Loss of Jobs on completion of Fertilizer project Train 2	Unemployment amongst youths	Local skilled manpower will be considered for civil, mechanical, electrical, environmental jobs after the construction of Fertilizer Project Train 2. They will be also considered during the construction as well as regular / contract jobs under operation and maintenance of fertilizer plant.
	Disengagement of Local Contractors labour / material supply jobs without following due process as contained in contract agreement	Local contractors will be considered for jobs like security surveillance, environmental management, civil maintenance, etc. Follow disengagement plan

5. Project Description

The project involves setting up of Ammonia Plant and Urea Plant to manufacture granular Urea.

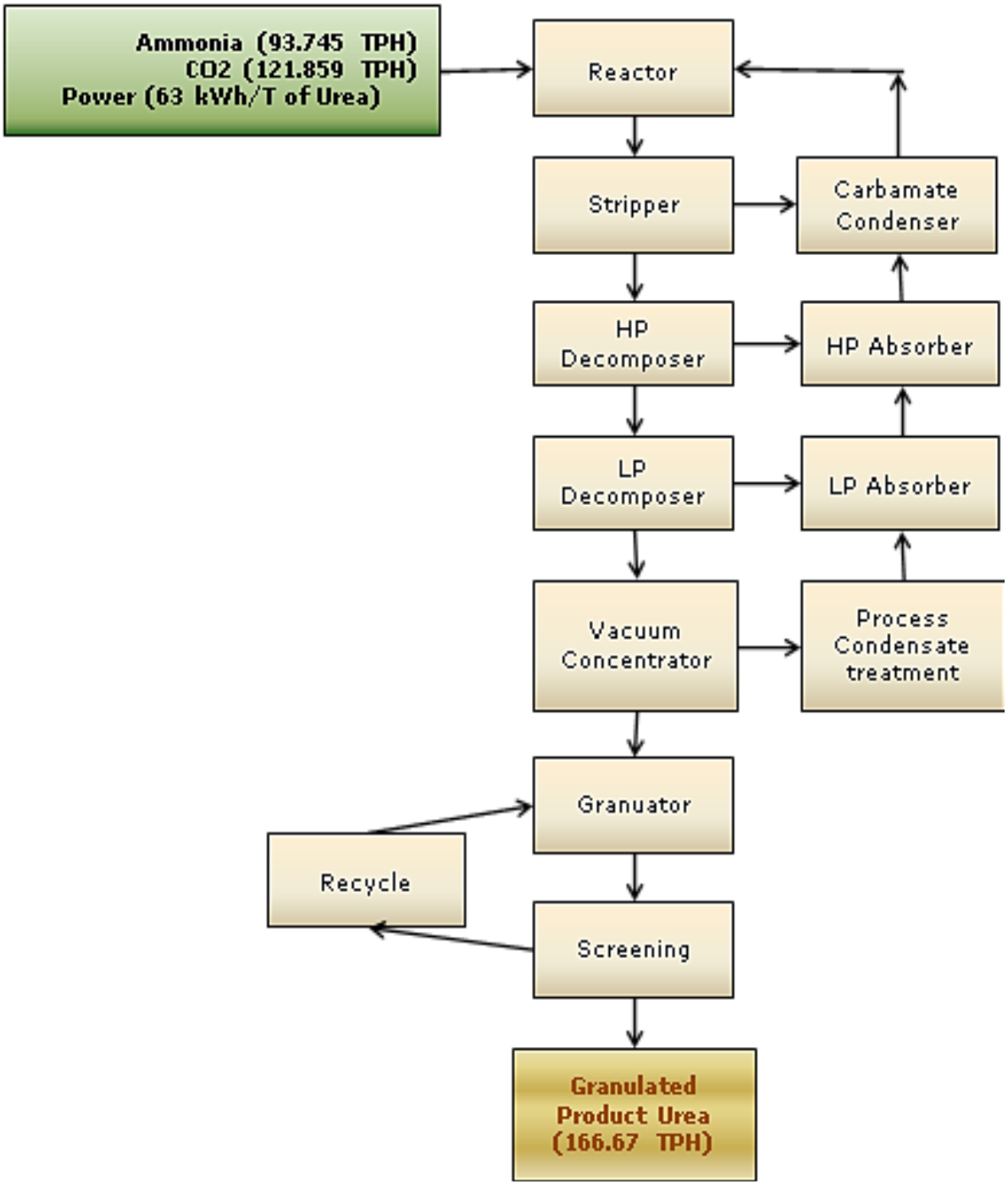
5.1 Ammonia Plant:

Natural gas is used as feed and fuel in Ammonia plant. The reforming and further processing of natural gas produces hydrogen and CO2 which is supplied to Urea Plant. Nitrogen from air and Hydrogen from reformer are synthesized to form Ammonia which is also fed to Urea Plant. Ammonia Plant process steps are illustrated below.



5.2 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.



Proposed production capacity is 4000 MT/Day of granulated fertilizer grade Urea.

6. Legal and Regulatory Requirements

Several regulations exist to control development activities (oil and gas, chemicals, 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. Environmental planning and permitting in Nigeria as is related to this project is carried out through the provisions of environmental legislation.

6.1 Federal Regulations/Guidelines

- Department of Petroleum Resources (DPR) Environmental Guidelines and Standards for the Petroleum Industry in Nigeria, (revised Ed.) 2002.
- Department of Petroleum Resources (DPR) Mineral Oils Safety Regulations 1997
- The Petroleum Act No. 51 of 1969
- The Oil Pipeline Act and Oil and Gas Pipeline Regulation of 1995
- The Environmental Impact Assessment (EIA) Act CAP LFN E12 2004
- Federal Ministry of Environment (FMEnv) National Guidelines for Environmental Audit in Nigeria 1999.
- S.I.8 - National Environmental Protection (Effluent Limitations) Regulations of 1991
- S.I.9 – National Environmental Protection (Pollution Abatement in Industries and Facilities Generation Wastes) of 1991
- S.I.15 – National Environmental Protection (Management of Solid and Hazardous Wastes) Regulations of 1991
- Land Use Act of 1978
- National Health Act 2005
- Nigerian Labour Act, 2003
- FMEnv Guidelines and Standards for Environmental Pollution and Control in Nigeria (Act Cap 131 LFN)
- National Environmental Standards and Regulation Enforcement Agency (NESREA) Act 25 of 2007

6.2 State Regulations

- 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 Environmental Protection Agency (now Rivers State Ministry of Environment) was established by the State Environmental Protection Agency Law Edit No. 2 of 1994
- Rivers State Interim Guidelines and Standards on Environmental Pollution Control and management, 2002.
- Rivers State Waste Management Agency Law 2014
- Rivers State Noise (Control) Edict, No. 20, 1985

6.3 Relevant International Conventions, Guidelines and Standards

- International Union for Conservation of Nature and Natural Resources (IUCN) Guidelines 1996
- World Bank Guidelines on Environmental Assessment, 1991
- World Bank Operational Directive 4.00, Annex A: "Environmental Assessment"
- Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention) 1979.
- Convention on Biological Diversity (Rio Summit) 1992
- Basel Convention on the Control of Trans-Boundary Movements of Hazardous Wastes and their Disposal 1989.
- Convention to Regulate International Trade in Endangered Species of Fauna and Flora (CITES) 1973
- International Finance Corporation (IFC), Environmental and Social Standards (Equator Principle) Revised Edition, 2006
- Ramsar Convention on Wetlands (Ramsar, Iran, 1971)

7. Stakeholders Analysis, Identification and Mapping

Stakeholders analysis is important for stakeholders identification and analysis of their needs. It is used to identify all key (Primary and secondary) stakeholders who have vested interest in the issue with the project concerned. The following stakeholder analysis is used for the different phases of project.

- Primary: those who are directly affected, either positively or negatively by project activities.
- Secondary: those who are indirectly affected by project activities

7.1 Identification:

- Identification of individuals, groups, local communities and other stakeholders that may be affected by the projects, positively or negatively, and directly or indirectly, particularly those directly and adversely affected by projects' activities, including those who are disadvantaged or vulnerable.
- Identification of broader stakeholders who may be able to influence the outcome of the projects because of their knowledge about the affected Communities or due to influence of political or other nature over them.

Table 1.0: Level of Interest and influence of Stakeholder

Stakeholder	**Group**	**Level of Interest**			**Level of Influence**		
		Low	Medium	High	Low	Medium	High
Government	Federal State Local			ü		ü	
Lenders and insurers	Bankers Financial Institution			ü		ü	
Community	Main group of Host Communities Sub group of Host Communities			ü		ü	
Education	Institute University College		ü		ü		
NGO's	Environmental Social		ü		ü		
Internal	Employees Union			ü			ü
Connected	Contractors Suppliers Consumers			ü			
Media	Representatives		ü		ü		

Stakeholders have been identified in accordance with the above classification.

7.2 Identification of primary Community / Stakeholder:

Indigenes of Eleme Kingdom live in clusters of 10 clans which constitutes them as Communities / villages. Ten (10) clan heads constitute the Council of Chiefs which is headed by King of Eleme Land with the Title "Oneh – Eh Eleme'' The present King of Eleme Kingdom is known and addressed as His Royal Majesty, Emere Dr. Samuel Oluka Ejire, JP, Oneh –eh Eleme X.

The Eleme Kingdom is divided into two sub kingdoms known and addressed as Nchia and Odido. Each of the sub kingdoms is headed by a traditional ruler who is addressed Royal Highness. Eleme LGA Council is the Highest Political Structure in Eleme Kingdom.

7.3 Host Communities:

IEFCL has six (6) immediate host communities recognized by the Federal Republic of Nigeria and the Government of Rivers State:

- Akpajo Community
- Aleto Community
- Agbonchia Community
- Njuru Community
- Okerewa Community
- Wakoahu Family of Elelenwo Community

7.4 Demographic Details:

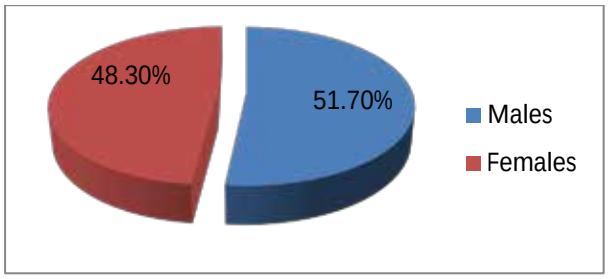
The Eleme people are an enthusiastic and aspiring group of people. Eleme is a local government area in Rivers State, Nigeria, located east of the Port Harcourt LGA; it is part of the Greater Port Harcourt metropolitan area. It covers an area of 138 km2 and at the 2006 Census had a population of 190,194. Its headquarters was changed from Nchia to Ogale by the legislative council.

The territory known as Eleme constitutes one Local Government Area out of the 23 that make up Rivers State and is located between longitude 7′ and 7′ 35" (seven degrees thirty-five minutes) East of the Meridian and latitudes 4′ 60" and 4′ 35" (four degrees sixty minutes and four degrees thirty-five minutes) North of the Equator. The area is about 138 square kilometers

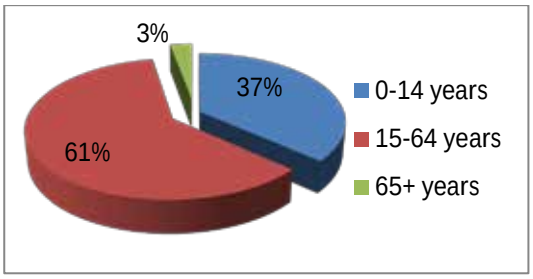
Current Population (as per projection in 2015): 257,700

Further population figures (Census 2006):

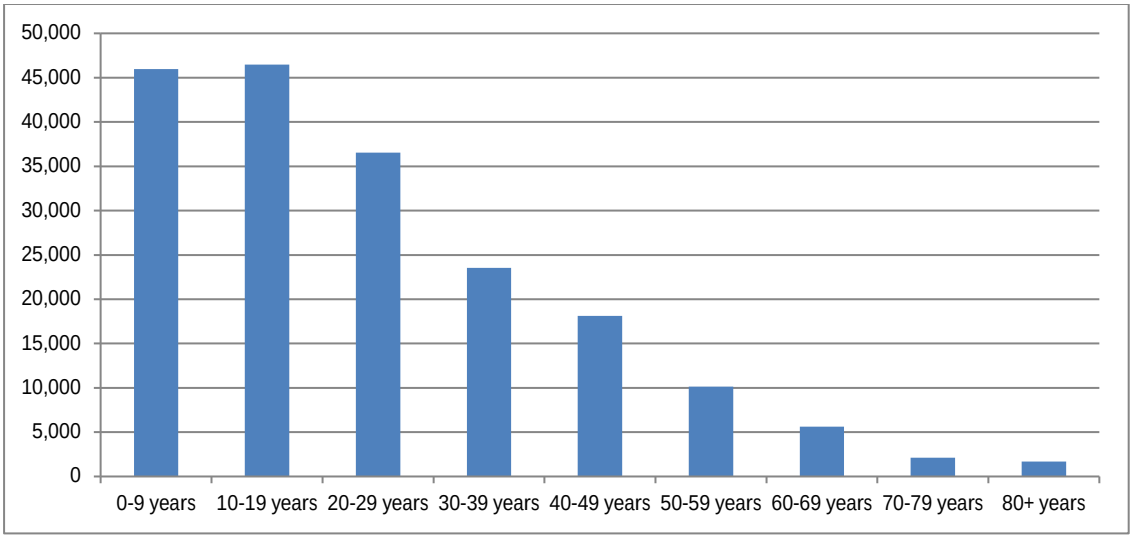
Gender Wise



Age group Wise Breakup



Age distribution



8. **Social Management Plan:**

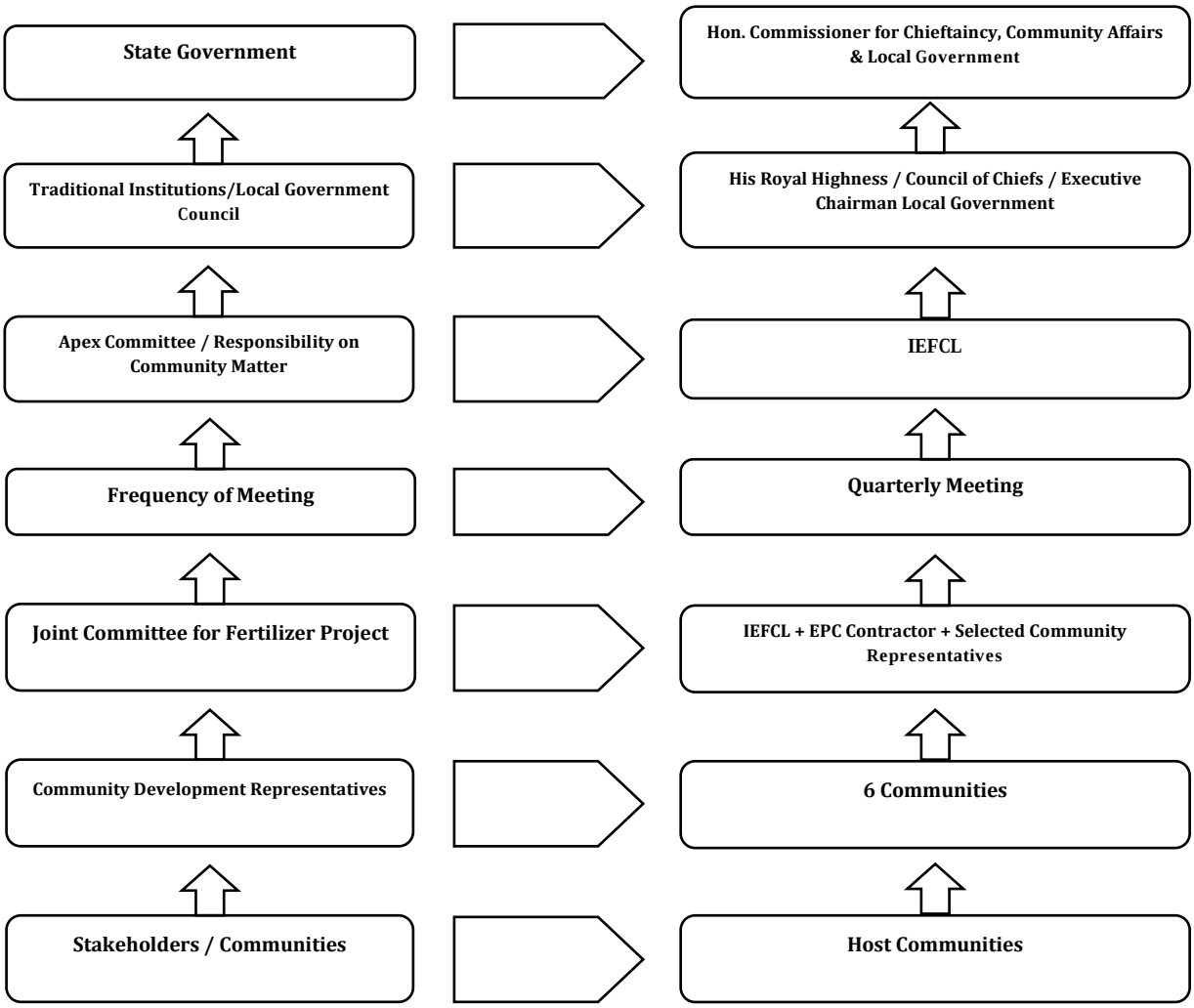
Stakeholder	**Stakeholder Interest(s)**	**Assessment of Impact**	**Potential Strategies for Obtaining Support or Reducing Obstacles**
INTERNAL GROUP Company employees	The group is determined as a key player - Want the company to be stable to secure their lives long term - Want to be part of good environment, remuneration and recreation - Retention of employment - Improved working conditions	Exerts high direct impact on the company activities both as individuals and as one group; Job losses	Meetings with employees to introduce new projects, company goals; Create an open forum to ask direct questions to the company management; Transparency of recruitment policy Communicate the labour policy early in the process Establish incentives.
EXTERNAL GROUP Community – collective residents of the local villages. Public opinion leaders	- Want clean air, good environment for life, good infrastructure - Resources to have for education, social events, etc. - A number of people formed an Initiative committee within the Coalition for Sustainable development - Initiative committee formed in various host communities	High impact, generally high interest	Meetings – informal with people and groups of people. Visits on site and discussions with people on various topics; newsletter distribution and information materials; individual and community support. Open door community information centers at Indorama Complex
Contractors Vendors Security companies Distributing agents	- Want to be on the list of approved suppliers; - Require information on future projects to be able to prepare; - Interest to meet safety requirements and internal regulations; - Employment opportunity	Local suppliers of goods & services have stronger impact since they are also in relationships with both local governments and the community of the region; A good relationship of responsibility develops and local contractors improve services, capacities of staff, safety records. Transparency of tendering and contracting policy	Participation in joint projects, presentations of good practices of joint cooperation. Very positive and productive partnerships with a lot of opportunities Communicate the labour and contracting policy early in the process.
Local government	- Have the company as a major employer in the area - Support the Local government in terms of infrastructure and culture - Work with the council in good partnership - Improve capacity of local administration	High impact, high interest in all activities	Funding of events, discussions and meeting, partners in major communal projects – working to reduce unemployment with women and long-term A pilot project is in place to improve the qualifications and opportunities in the labour market of members of the Host communities living in Eleme and Obio-Akpor LGA

National/State Governments and relevant ministries	- Following the Law and regulations - Good environmental practices - Sharing experience with the authorities - Providing employment and better investment climate in the country - Economic development of the Region. - Improved labour conditions - Social investment program	High impact and high interest	Regular reporting, joint Programs, possibly organize relevant discussion panels to discuss on a wider basis business and national local content opportunities
NGOs	- Improvements in the quality of the Environment in the region. - Meeting the legal requirements; - Appropriate compensation measures.	Impact in all activity	Proactive behavior, meetings. Maintain an open door approach with those who have concerns with respect to the Project construction and operation.
Local Institutions – schools, hospitals, etc.	- Want to be able to develop and to have a variety of services with the support of the company; rely on the company personnel for their services - Willingness to participate in joint projects	Keen interest, potential for impact	Continue joint project implementation with the schools. A good media for introducing school subjects and industrial information.
Academic circles – professional societies and students from the Universities / Polytechnics	- Want to promote the disciplines to students and attract new technical skills; - Want to have a strong link between theory and practice; - Want to have some researches and Industrial attachment work funded by the company to be able to have good results for analysis	High interest, however with without a big impact.	Continue joint projects with universities and presentations and visit by students and lecturers on site. Possibility of involving the academics in more practical technological experiments.
Industrial and employers' organizations - the Nigerian Chamber of Commerce and Industry, Manufacturers Association of Nigerian (MAN)	Want the business to be successful and profitable; Work towards making business in Rivers State and Nigerian responsible and transparent Establish a broad network of supporters in various branches of industry; Chambers of Commerce and MAN works towards major changes in regulations, procedures and tries to introduce responsible Industry initiative	High interest in development of projects. Possibility of high impact both on local level with individual companies and on a national level.	Potential for stronger partnerships and especially with MAN and the chamber of commerce opportunities for joint projects. Presentations and round table discussions with government, international associations and academic circles.

Media (National and Local) – as an external target group outstanding in its role as the mediator between the public at large and the Industries; A major source of objective information, the media form a separate target group	Want to become partners with Industries on big management and production -related events; Actively looking for information from the source CSR is often in the top topics of business	Very influential; attitude forming; information is not always represented objectively through proper cross-checking with all parties involved.	Direct meetings with journalists and editors-in chief. Visits on site and discussions with responsible management representatives Information from the MAN and Chambers as well as an active member of the community. The company supports the chambers development events and good practice sharing events.
Shareholders of the Company	Project implementation as planned	Project failure / closure	Continue with consultations and dialogue.

9. Primary Stakeholders (Host Community) engagement structure and process

Project Advisory Committee (PAC) is constituted to interface with IEFCL on community issues. The Commissioner for Chieftaincy, Community Affairs and Local Government presides over as the Chairman of Project Advisory Committee. Local Government Chairman acts as deputy chairman of the Committee. PAC comprises of 3 representatives from each Host Communities, 1 representative for the Palace of Eleme King and 2 representatives for Local Government Council.



10 Project Disclosure and Engagement methods

Disclosure of relevant project information is being disclosed in several ways such as internet, email, printed form reports, letters, face-to-face meetings and telephone conversations. Stakeholder engagement will continue throughout the construction, operation and ultimately decommissioning of the Project even after EIA/EIS permitting process.

Table 3.0: Stakeholder Engagement program

Stakeholder	Engagement Mechanisms	Frequency	Disclosure methods
Lenders and insurers	Environmental & Social construction monitoring and audit on HSE system	As required	Site visit, project progress report and review of HSE documents.
Controlling organization (Regulatory Authorities)	Environmental impacts mitigation reports	Quarterly	Notifications, key reports. Comply with regulatory recommendation on IMM.
Suppliers, Consumers and employees	Safety management system Environmental and social responsibility	As required	HSE report and Company In-house magazine
Host Community	Environmental impact Safety management system	As required	Paper copies of documents
Non-governmental organisations (NGOs) and Academic and scientific organisations Media	Awareness programs on specific issues Media announcements and briefings	As required As required	.Paper copies of documents Press releases and media interviews regarding Project Updates.
Shareholders	Annual Reports	Annual	Project development status & report

10.1 Internal group

10.1.1 Employees

- Regular meetings (shift meetings and department meetings, open presentations to all employees) between management and representatives of the employees
- Company newsletter with circulation across the company and our Internal and External groups in rivers State and Nigeria is distributed on a quarterly basis;
- Internal company events.

10.2 External group

10.2.1 Community

The external stakeholder group "community" involves the residents of the local villages surround all IEFCL projects/operational site. The people living in these villages are to a varying degree in contact with the routine activities of IEFCL. Since Indorama and in addition IEFCL in future will be the major employers in the region, a lot of the local community residents are either directly or indirectly involved with the company activities. Crucial for building up a good relationship is the ongoing dialogue with the local community. This social dialogue with the community is supported bythe local media.

Information centers – in order to provide quick access to the company and its activities, two Information centers are listed below:

Head, Community Relations & Development
Indorama Complex, Eleme
PTDC Building
Tel: 0805 5064 248

- The Community Relation Department working at the centers provide information about ongoing projects, collects questions and concerns raised by local citizens, collects letters of complaints, requests for donations, letters of gratitude, etc. The department liaison between company and communities. The team organizes a calendar of events with the local relevant associations focused on community social and or health projects;

- Announcement or individual visits to people in relation to forthcoming company activities – in the cases when work on a particular company project requires gathering of machines, heavier traffic in a particular period of time or anything else that may be related with possible disturbance of the normal life, the company posts announcements on information boards around the villages;

- Informal meetings – this is the preferred way of sharing information about the company and providing feedback. Held in the information center between representatives of community and company on various topics related or not to company activities.

10.2.2 Contractors

Representatives of the contractors meet with the respective department managers on a regular basis depending on job specifics and timeline of involvement. In particular situations, where outstanding issues need to be discussed (economic situation, industry context, etc.), company management meets the management of the respective contractor or their representatives. In cases of complaints relating to subcontractors, meetings and respective action is requested by the company.

10.2.3 Local Government

The Eleme and Obio-Akpor Local Governments being individual and independent authorities, the Company meets with both Chairmen and councilors on a regular basis.

- Meetings - In order to provide advance information about forthcoming projects or such that may be of higher public interest, IEFCL organizes meetings with the Chairmen and the councils in order to present the projects and answer questions. Feedback from such meetings is very important and serves as a point of further discussions both with the local government staff as well as communicate decisions to the community;
- Visit to operations – the company provides opportunities for Council members visit our present sites for exchange of information and better experience; also at requests raised by local government, visits to the operation or specific part of it are organized.

10.2.4 National/State Governments

The company holds regular meeting with the Ministry of Local Government and Chieftaincy affairs, Ministry of Trade and Industries, Ministry of Environment, Ministry of Health for actualization of projects.

- Regular reporting – IEFCL is bound by the national legislation to reporting on its activities, production results and environmental monitoring data on a regular basis.
- Consultations – consultations with representatives of particular relevant ministries, governmental agencies or relevant experts.
- Inspections – site inspections are scheduled by the respective regional authorities of the Ministry of Environment, the Ministry of Labour, Ministry of Petroleum Resources, and other government authorities to check compliance with legislation and environmental requirements.

- Workshop/ round table discussions - discussion of industry-specific and environmental issues with representatives of Ministries and regional authorities.

10.2.5 Non-governmental Organizations (NGO)

NGOs represent an important group of stakeholders with views covering a wide spectrum. Recognizing the importance of this group to influence government policy as well as public attitude, Stakeholders Engagement Plan thrives to set up a foundation for effective and productive dialogue through:

- Discussions of problem arising from proponents operations/activities
- Transparency – invitations to the site and tour around the process plant;
- Questions and Answers with utilities and processing managers and specialists;
- Work on environmental and charity projects;

10.2.6 Local Institutions

Indorama considers that preserving the culture and enhancing the education of the young generations are of utmost importance in its area of present operations. In that regard a close cooperation is maintained with the mainstream schools in Eleme and Obio-Akpor LGAs.

10.2.7 Industrial organizations

Cooperating with industrial and employers organizations helps boost and forward the interests of the industry.

11 Management, Resources and Responsibilities

The management of IEFCL will allocate sufficient budget and resources to ensure adequate implementation of Stakeholder Engagement Plan throughout all project phases. Funding socially-important community projects – Indorama provides annually funds for carrying out of significant projects related to community benefits such as infrastructure, energy efficiency, health facilities etc. Local groups who support education or sports, or work in the sphere of social work, get support in order to build capacity.

The implementation of this social management plan for the project will be managed and monitored by Head Human Resource / Industrial Relation / Community Relation & Development, , Manager - Community relation and development, Head-Corporate Communication & Head HSE Department. At project level, external communication for the management will be coordinated by Community Relation & Development Manager.

The Corporate Communications, Community Relations and the HSE departments are run with specialist staff/employees. Responsibilities of staff include but are not limited to:

- Coordinate communication with local communities.
- Coordinate and follow-up on responding to comments and concerns from public.
- Manage grievance mechanism locally.
- Developing Information center activities;
- Planning and organization of programs and company events;
- Timely communication to stakeholders;
- Preparation of news releases, information and presentation materials;
- Interaction with stakeholder groups; involvement in joint projects;
- Liaises with the local community, etc.

11.1 Management Functions

Organizational structure is very important for successful implementation of social management plan. Human resource and community development department will be responsible for implementation and coordination of activities associated with social management plan. Human resources and community relations will be responsible to manage all activities related to documents and logistics.

11.2 Head-Human Resource (HR) and Industrial Relations (IR):

- Overall responsibility for all stakeholder engagement activities with community-based stakeholders
- Provides sufficient and competent resources, including budget, for effective implementation of this Plan
- Continuously update stakeholder information (contact details, Organizational

- Details and engagement activities)
- Support Corporate communication department in organizing, sponsoring and attending events on behalf of the company as required.
- Reviews performance indicators and issues with the Managing Director and Project Management at Project Stewardship Reviews; elevates issues (as appropriate) should they emerge urgently and outside of Project Stewardship Reviews

11.3 Community Relation & Development Manager:

- Build and maintain strong working relationships with key stakeholders and manages stakeholder engagement activities with local communities
- Communicate with the local community, contractors and subcontractors around project plans, progress, impact and benefits.
- Identify community needs for social development or engagement requirements and required logistics.
- Act as mediator between company and stakeholders (communities, Government structures, Traditional structures, NGOs, etc.)
- Monitor and prioritize relevant political and social intelligence in the areas of operation to the company and report this information in a timely manner through line management.
- Advises management on the outcomes of stakeholder engagement activities and programs
- Assist the HR Manager during the recruitment process by soliciting community requirements.

11.4 Community Relation Officer:

- Provide feedback to the Community Relation & Development Manager on concerns raised by the community / traditional structures.
- Facilitates the internal review of quantitative and qualitative community engagement data
- Facilitates community engagement meetings across the Project area
- Assists in the preparation of various reports and publications

11.5 Corporate Communication Manager

- Responsible for the disclosure of Project information and public consultation activities
- Responsible for sustain relationships and communicate with Government entities and the media. He would also be interacting with stakeholders (Government and Media).
- Responsible for internal communications with staff and contractors concerning occupational health and safety.
- Participate in all relevant corporate and community events and provide proactive advice, Identify need, develop and implement plans on engagement and stakeholder matters where needed.

12. Grievance Mechanism

In accordance with the IFC PS1, a grievance mechanism needs to be developed when the Possibility exists that communities may be affected by a project. The aim of the grievance mechanism is to ensure that all complaints by affected communities concerning the project are examined and appropriate corrective measures are implemented.

The grievance mechanism procedures implemented by IEFCL will ensure that all stakeholder complaints and grievances throughout the project life cycle are captured and addressed in a systematic and structured manner.

This grievance procedure sets out the steps to be taken to resolve grievances, role players involved in the process and timeframes to resolve grievances.

The grievances handling procedure as below:

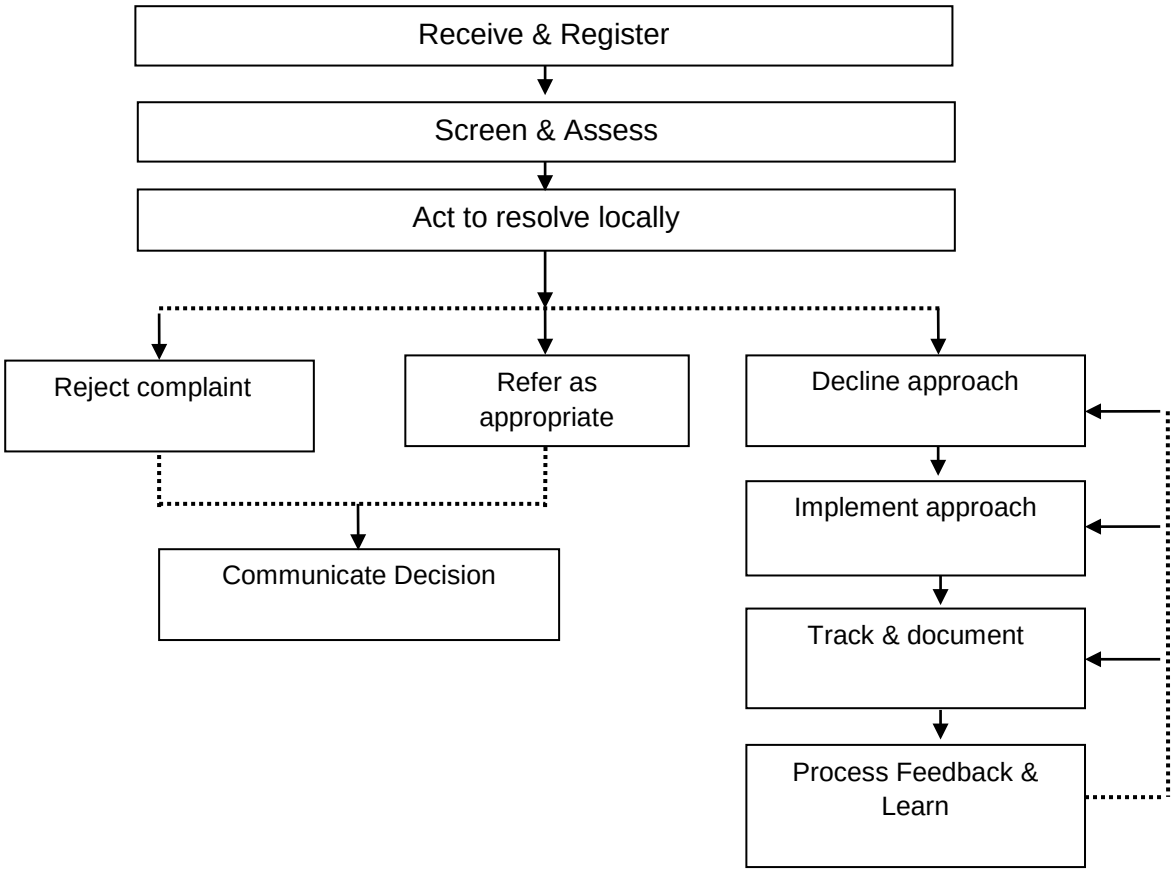


Figure 1.0: Grievance Mechanism

12.1 Register grievances:

All stakeholder (Individuals or groups) can submit written grievances using the form or alternatively verbally by telephone or by email. The template of the grievance recording form is included in Annexure-A

12.2 Investigation:

The grievance will be evaluated by the relevant staff and management to identify what actions need to be taken. This evaluation will be completed using a measuring impact severity.

12.3 Resolution / close-out:

The complainant is contacted through telephone or face-to-face meeting, if needed to confirm that the proposed corrective action taken is satisfactory

With completion of the investigation, the details thereof will be explained to the complainant's and a course of action will be proposed. If the complainant is satisfied with outcomes & accepted, then the grievance will be closed formally. If proposed outcome not be acceptable, then the grievance will go into mediation.

12.4 Mediation:

Grievances that could not be resolved would need to be investigated by a grievance committee. Unresolved grievances will be investigated by a grievance committee, which will include members of senior management. IEFCL will provide for independent mediator if grievances cannot be resolved internally.

12.5 Workers' Grievances

A separate workers' grievance procedure will be established for the Company's employees. Workers will be given the possibility to lodge grievances both through workers representatives and independently, personally, regardless of the matter of the complaint.

13. Monitoring and Reporting

All complaints will be recorded in a grievance register respectively and will be evaluated on regular basis during the construction and operation phases.

Throughout the project life cycle, IEFCL will maintain communication channels with relevant stakeholders as identified. Significant changes or updates in the production process from raw material to processing, environmental and social issues will continue to be addressed and reported to the stakeholders. Improvements, production upgrades and all environmental issues will be timely communicated via articles in the local media, company information materials, site visits, etc.

13.1 Disclosure of Information during Construction and Operation Phases

The consultation activities will continue during the construction and operation phases of the Project as well which will aim to maintain constructive relationships both with the local communities and other stakeholders

13.2 Construction Phase

- Project related information will be disclosed on company website and it will be updated on regular basis.
- Ongoing communication with Federal, state and local authorities will continue during construction phase related to impact mitigation monitoring and other issues.
- Any activities likely to cause particular disturbance (such as noisy activities etc.) to the nearby communities will be informed via Community Relation and Development department.
- All comments and grievances will be managed in accordance with the Grievance mechanism.

13.3 Operation Phase

- Environmental policy plans and procedures will be displayed on company website and will be updated as necessary.

- Ongoing communication with Federal, State and local authorities will continue during operation phase related to check compliance with legislation and environmental requirements.
- The stakeholder list will be revised in case any new stakeholder is identified.
- As community health and safety is a key impact with regard to operational activities, communities will be notified and informed about the project risks and impacts during emergency situations.
- All comments and grievances will be managed in accordance with the Grievance mechanism.

14. Conclusion

The nature of our business brings us in contact with many stakeholders. Many of the relationships we have established over the past are fruitful and bring benefits back to both company and stakeholders. We do have some relationships that need to be further nurtured and developed. Though we sometimes meet negative attitudes, we know that overcoming the problems may result in healthy relationships of confidence and trust. IEFCL is confident to continue working and enhancing its stakeholder engagement by listening and responding effectively in order to build constructive and mutually beneficial relationships.

Annexure-A: Grievance Form

<table>
<tr><td colspan="3">Company Reference No:</td></tr>
<tr><td colspan="3">Applicant's name: …….</td></tr>
<tr><td>Contact Information
Please mark how the applicant should be contacted (telephone, e-mail or post).</td><td colspan="2">By Post: (Please provide correspondence address)
……
……
……
Telephone:
……
By E-mail:
……</td></tr>
<tr><td>Preferred Language for communication</td><td colspan="2">English</td></tr>
<tr><td colspan="2">Description of Incident or Grievance:</td><td>When did the case occur? Where did it happen? Who did it happen to? What is the result of the problem?
Please provide location/area</td></tr>
<tr><td colspan="3">One time incident/grievance (date ……)
Happened more than once (how many times? ……..)
On-going (currently experiencing problem)</td></tr>
<tr><td colspan="3">What would you like to see happen to resolve the problem?</td></tr>
<tr><td colspan="3">----------
Applicant Signature & Date</td></tr>
</table>

TABLE ESAP
Environmental and Social Action Plan for the IEFCL-Train2 Project
Indorama Eleme Fertilizer & Chemicals Limited

Item	Specific Related Impact	Specific Activity /Action	Schedule
Air Quality	The new Fertilizer Project may have impacts on the air quality	- IEFCL will implement a Traffic Management Plan to minimize potential effects on air quality associable to the additional vehicular movements generated by the project.	Within three months of the construction activities started
		- IEFCL will permit only vehicles with pre-mobilization certificates to operate in Project area as to reduce emissions from vehicle exhaust.	Strictly implemented. It will be maintained during the life span of the project
		- In accordance to the Monitoring Program (see Chapter Seven) IEFCL will periodically verify stack emissions and air quality levels. On the basis of monitored data, dedicated actions for the safeguard of ambient air quality will be implemented, if necessary.	Air quality monitoring for existing plants already in place. For new Fertilizers plant will be implemented after the start up of the plant.
		- IEFCL will implement a Leak Detection and Repair (LDAR) Program that controls fugitive emissions by regularly monitoring. On the basis of monitoring activities, dedicated actions for the safeguard of ambient air quality will be implemented, if necessary (see Chapter Seven).	1 month after the start-up of the process plants.
		- Water will be sprayed on construction/ decommissioning sites during dry season to reduce dust levels especially during dry season.	From the opening of site preparation activities.

Item	Specific Related Impact	Specific Activity /Action	Schedule
Health and Safety	The new Fertilizer Project may have an impact on the existent Health and Safety conditions of the host communities/workers interested by the project.	- IEFCL will ensure that demobilization activities are according to regulatory agencies' approved plan (see Chapter Seven, par. 7.1.9)	From the opening of the decommissioning activities
		- IEFCL to ensure that good, and sufficient water supply will be maintained for workers to avoid Waterborne/water-related and water-based diseases.	From the opening of construction activities.
		- IEFCL will ensure that site clinic is provided to take care of minor illnesses for all construction workers.	Already in place
		- Provision of regular pest control and insecticide in residential and office area inside the complex	Already in place
		- Health awareness lectures shall be given to workers on the mode of transmission of STIs (including HIV/AIDS).	At the starting of construction activities.
		- IEFCL will conduct enlightenment campaign and health education for the abatement of abuse of drugs, alcohol among workers throughout the life of the project. Alcohol and drug policy shall be implemented to encourage healthy lifestyle for workers.	After construction is started program will be done regularly
		- IEFCL will ensure that contractor enforces the alcohol and drug policy for their staff	During the plant construction stage of the project.

Item	Specific Related Impact	Specific Activity /Action	Schedule
		- IEFCL will ensure that there are adequately trained and sufficient numbers of first aiders at each site.	At the starting of construction activities, during construction phase
		- IEFCL will ensure that anti-venom/anti-histamine is provided on site to mitigate snake bites and insect stings.	From the opening of construction activities.
		- IEFCL will implement an Occupational Health and Safety Management Plan, to minimize the risk of potential increase of workplace accidents / diseases (see Chapter Seven), also including a Hazardous Materials Risk Management Plan to minimize the risk deriving from spills of hazardous materials (see Chapter Seven).	Already in place for existing plant. For the new plants 1 month before the starting of the construction activities
		- A quantitative Risk Assessment (QRA) of the whole complex will be implemented to verify that the adopted safeguard measures are consistent with the required high level of protection.	By the end of the project detailed engineering activities.
		- IEFCL will ensure that the regular workshops will be organized to identify, evaluate and recommend contingency plans for all security risks related to safety of personnel and property.	1 month before the opening of construction activities. During the life span of the project.

Item	Specific Related Impact	Specific Activity /Action	Schedule
Loss of biodiversity	Due to Project, the new stream of workers could stress the wildlife nearby the IEPL/IEFCL Complex.	- Monitoring of the effects of changes in water quality that may influence activities of fishes, benthic organisms etc. shall be undertaken in the projects life cycle, by IEFCL HSE department.	Already in place. It will be done from time to time
		- IEFCL will undertake to educate construction workers and locals on the sensitive nature of the biodiversity of the area and the need for conservation.	From the opening of construction activities.
		- IEFCL will train its personnel by an Environmental Capacity Building Program for minimizing the environmental impact and risks (see Chapter Seven).	From the opening of construction activities in different phases.
		- In accordance to the Monitoring Program (see Chapter Seven) IEFCL will verify the characteristics of water discharges and the quality of receiving water body (water and hydrobiology quality) in order to implement dedicated actions, if necessary.	Already in place and maintained during construction and different phases of the Project.
		- In accordance to the Monitoring Program (see Chapter Seven) IEFCL will evaluate possible effects of the project on vegetation and wildlife in the area interested by the project and will yearly monitor Hydrobiology parameters in the receiving water body interested by the project. On this basis, if necessary, dedicated actions aimed at minimizing any potential risk in loss of biodiversity will be implemented.	After production started and based on environmental audit guidelines

Item	Specific Related Impact	Specific Activity /Action	Schedule
Noise	Possible noise annoyance associated to the project	- IEFCL will develop a dedicated study for the noise impact assessment aimed at ensuring the compliance with regulatory guidelines/standards. If necessary, mitigation measures will be implemented.	By the end of commissioning of the project.
		- In accordance to the Monitoring Program (see Chapter Seven), IEFCL will periodically check the project is in compliance with noise standards in order to implement dedicated actions, if necessary.	After 1 month from the opening of construction activities and during the life span of the Project
		- IEFCL will alert communities in advance of such activities that are likely to increase noise in the very nearby residential houses.	During the life span of the project, if necessary.
		- Transportations activities during night hours will be minimized up to extent possible	Already in place It will be maintained during the life span of the project.
		- IEFCL will verify that all vehicles and equipment conform to World Bank limits for noise.	From the opening of construction activities. During the life span of the project.

Item	Specific Related Impact	Specific Activity /Action	Schedule
Environmental risks	The Fertilizer project may increase the risk of spills of hazardous materials and waste, thus causing soil and ground water pollution.	- IEFCL will ensure that a controlled fuelling, maintenance and servicing protocol for construction machinery at worksite is established and followed to minimize leaks and spills.	From the opening of construction activities. During the life span of the project.
		- IEFCL will ensure that all maintenance and repair of equipment and vehicles are done in a secure location with clean-up materials (e.g. drip pans, containers, absorbent materials etc) readily available.	From the opening of construction activities. During the life span of the project.
		- IEFCL will ensure integrating prevention and control measures set in a General Hazardous Materials Management program.	From the opening of construction activities. During the life span of the project.
		- In accordance to the Monitoring Program (see Chapter Seven) IEFCL will verify the status of ground water quality in order to adopt, if necessary, dedicated actions aimed at minimizing the risk of contamination of ground water from spills of hazardous materials.	Already in place. It will be continued during the life span of the project.
		- IEFCL will implement a Risk management Plan for Contaminated lands in order to identify, if necessary, dedicated actions aimed at minimizing the risk of land contamination caused by accidental spills of hazardous materials (see Chapter Seven)	It will be taken care in the ESMS

Item	Specific Related Impact	Specific Activity /Action	Schedule
		- IEFCL will implement a Hazardous Materials Management Plan to minimize the risk deriving from spills of hazardous materials (see Chapter Seven).	Already in place for existing plants. To be implemented accordingly for new plants from opening of construction activities.
		- In case of environmental contamination IEFCL will ensure that a planned risk management approach will be followed.	During the life span of the project, if necessary.
		- IEFCL will ensure a deep characterization of soil after site cleaning, to detect potential historical releases of hazardous material[1].	By the end of decommissioning activities.
Odor Annoyance	The production processes may be associated as a source of odor annoyance by the local population.	- Adopt operational measures to avoid possible fugitive emissions.	Already in place for existing plants. To be implemented accordingly for new plants.
		- If necessary, adopt technical methods to prevent fugitive emissions.	Immediately, during start-up operation
		- Hold yearly environmental awareness/education programs for the stakeholders	1 month before the start-up of the new plants.

[1] For decommissioning phase only

Item	Specific Related Impact	Specific Activity /Action	Schedule
Waste production	The new project will determine an increase in solid / liquid waste production.	- In accordance to the Monitoring Program (see Chapter Seven) IEFCL will yearly verify the waste production in order to implement dedicated actions, if necessary.	Already in place. It will be maintained during the life span of the project.
Security	New people attracted by work opportunities may cause an increase in levels of crime and other social vices in the local communities.	- In order to beef up security for the project, IEFCL will contact government authorities to improve the strength of the police force and shall consider providing assistance with equipment to ensure improved security, if necessary.	Upon receiving the Project Authorization, if necessary. As per requirement IEPL / IEFCL security department will take care.
		- If required, additional security arrangements will be made to enable the existing federal security forces to cope with such situation	If required, from the opening of construction activities. During the life span of the project.
		- IEFCL will ensure that both contractor and IEFCL personnel develops a high level of security consciousness both within and outside the work area.	From the date, worker starts his activity
		- IEFCL will ensure that a liaison to foster partnership with the community so as to guarantee security for the project is established and sustained.	From the opening of construction activities. During the life span of the project.

Item	Specific Related Impact	Specific Activity /Action	Schedule
Social impact	The new opportunities, allowed by the Project, could modify the social equilibrium, potentially causing frictions and social strains.	- According to the MoU with host communities, IEPL/IEFCL will ensure that all host communities are represented in the employment of locals during land clearing and excavation to avert any conflict that could arise from perceptions of unfairness.	From the opening of recruitment phase.
		- IEFCL will ensure the monitoring of host communities development to identify and minimize possible causes of conflict.	From the opening of construction activities. During the life span of the project.
		- IEFCL will adopt a Social Management System to avoid possible inter and intra communities conflicts or possible socio-cultural conflicts between the construction team and members of the host communities.	From the opening of construction activities.
		- IEFCL will regularly hold Stakeholders Forum with the representatives of the communities	From 6 months after the opening of construction activities. During the life span of the project.
		- IEFCL will make adequate accommodation arrangement for expatriates prior to mobilization of workforce to reduce pressure on local housing.	Before the opening of construction activities.

Item	Specific Related Impact	Specific Activity /Action	Schedule
Socio-economical condition	The Fertilizer project will be a new opportunity to improve the socio-economical condition of the communities and the workers.	- IEPL/IEFCL will abide by all Memorandums of Understanding (MOUs) signed with the host communities providing: - Building of/arrangements to educational/health facilities; - Access to micro credit system and merit scholarships for members of the communities. For more details, see Stakeholders Engagement Plan in Appendix 7.2.	Existing MoU under review and will be signed before opening of construction activities.
		- IEFCL will ensure that contractor implements social and health awareness programs for all workers at induction and on a continuous basis throughout the life span of the project.	From the opening of construction activities.
		- In accordance to the Monitoring Program (see Chapter Seven) IEFCL will support for health check up programme of communities.	Already in place During the life span of the project.
		- IEFCL will carry out enlightenment campaigns to encourage positive influences on cultural values and healthy lifestyles (e.g. breast feeding habits, alcohol and drug use, exercise, monogamy, high moral values with regard to sexuality, etc.) and discourage adverse influences (e.g. prostitution, drug abuse, alcoholism etc).	From the opening of construction activities.

Item	Specific Related Impact	Specific Activity /Action	Schedule
		- IEFCL will support skill development programs.	By 1 year after the Project Authorization.
		- In accordance to the Monitoring Program (see Chapter Seven) IEFCL will yearly verify the status of Assisted Projects in order to verify their effectiveness and to identify possible actions to be taken aimed at obtaining an enduring improvement in the existing living conditions inside the host communities.	1 year after the start of Assisted Projects. During the life span of the project.
		- IEFCL will assist the activities of the state action committee on STIs/HIV/ AIDS within the local communities.	Already in place. It will continue during the life span of the project.
		- If Authorities will take projects for provision of potable water to host communities, IEFCL will also assist up to extent possible	Whenever required
Traffic	Movement of workers (staff, labour and construction workers), equipment, materials and Urea product.	- IEFCL will adopt a dedicated traffic management plan for the mobilization of vehicles during the construction, operation and decommissioning phases (For more details, see Traffic Management Plan in Appendix 7.1) to minimize the risk of traffic accidents,	From the opening of construction activities. During the life span of the project.
		- Ensure maintenance of roads of any damage caused by project	From the opening of construction activities. During the life span of the project.

INDORAMA
ELEME FERTILIZER & CHEMICALS

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

QHSE POLICY

We, at IEFCL are committed to total customer satisfaction & continual improvement in Quality, Health, Safety and Environment practices through:

- **Improving the business processes by adopting innovative approaches & best practices.**
- **Implementing effective quality management system across the entire supply chain ensuring highest standards of quality and Services.**
- **Commitment to prevention of injury and ill health by ensuring safe operational and occupational health practices in all facilities involving all employees, Contractors & other associates.**
- **Protecting & preserving the environment by implementing effective environment management system and control on emission and discharge.**
- **Continual review of quality, health, safety & environment objectives, procedures & practices for attaining highest level of operational efficiency and excellence.**
- **Commitment to comply with all applicable statutory, regulatory and legal requirements on QHSE and position as a responsible corporate entity.**
- **Creating lasting partnership with customers and associates by providing quality products & services at all times.**

Munish Jindal
Chief Executive Officer

Rev.: 00	Date: 15th Dec- 2016