

CHAPTER SIX

MITIGATION, AMELIORATION AND COMPENSATION MEASURES

6.1 INTRODUCTION

The measures that IEFCL intend to take to reduce (or eliminate) negative impact and promote positive Environmental and Social impacts of the proposed IEFCL-Train2 Project are presented in this chapter, taking into account also Health and Safety topics. In these measures, emphases are placed on those negative impacts rated as significant. These actions are aimed at reducing these impacts to as low as reasonably possible. The residual impacts that could arise despite these measures were also noted.

MITIGATION MEASURES

The associated and potential impacts on various components of the biophysical, health and social environments by the proposed IEFCL- Train2 Fertilizer Project is presented in Chapter Five. The negative impacts have been identified and ranked accordingly.

To preserve the environment and ensure sustainability of this project, a number of steps are suggested to be taken to mitigate the significant, medium and high ranking negative impacts identified as a result of the proposed development, as well as enhance those impacts identified as positive.

The mitigation measures proposed for the predicted impacts took cognizance of the following:

- Performance Standards on Social and Environmental Sustainability;
- World Bank Group (WBG) General EHS Guidelines;
- WBG Industry Sector Guidelines;
- Best Available Technology for sustainable development;
- Feasibility of application of the measures in Nigeria;
- Concerns and views of stakeholders during extensive consultations conducted during the study, and

- The residual effects that arise despite the mitigation measures have also been discussed for effective mitigation to a low level.
- Environmental laws at national, regional and international levels;

Other Factors considered for determining implementation of measures are:

- Avoiding the impacts altogether by not taking a certain action or parts of an action;
- Minimizing impacts by limiting the degree or magnitude of the action and its Implementation;
- Rectifying the impact by repairing, rehabilitating or restoring the affected Environment;
- Compensating for the impact by replacing or providing substitute resources.
- Feasibility;
- Ease of implementation;
- Local suitability;
- Institutional requirements;
- Training requirements;
- Monitoring requirements;
- Cost (capital and operating);
- Cost-effectiveness.

The Required General and Specific measures, includes:

- Pre-construction;
- Site Preparation and Construction;
- Commissioning and Start-up;
- Operation; and
- Decommissioning and Abandonment.

The measures are categorized by relevant impact category, potential impact, interested project phase and related nature (mitigation or compensation measures).

The measures that IEFCL commits to implement for the proposed IEFCL-Train2 Fertilizer project activities likely to determine environmental, socio-economical and/or health impacts are detailed in Table 6.1.

Table 6.1: Impact mitigation measure

Project Phase (C, O, D) ¹	Project Activity	Description of Impact	Significance Rating Before Mitigation	Action	Type of measure (MI, CO) ²	Significance Rating After Mitigation (Residual Impact Rating)
C+O+D	Recruitment for construction, operation and decommissioning phases	Inter and intra communities' conflicts	Medium	<ul style="list-style-type: none"> According to Rivers State Govt. Employment Policies, IEFCL arrangement will ensure that all host communities are represented in the employment of locals during pre-construction, construction and operation activities to avert any conflict that could arise from perceptions of unfairness IEFCL will ensure the monitoring of host communities development to identify in good time, possible causes of conflict IEFCL will adopt a Social Management System to avoid possible inter and intra communities' conflicts 	MI	Low

¹C= Construction
O = Operation
D = Decommissioning
²MI= Mitigation
CO= Compensation

Project Phase (C, O, D) ¹	Project Activity	Description of Impact	Significance Rating Before Mitigation	Action	Type of measure (MI, CO) ²	Significance Rating After Mitigation (Residual Impact Rating)
C+O+D	Recruitment for construction, operation and decommissioning phases	Socio-cultural conflicts between the construction team and members of the host communities	Medium	<ul style="list-style-type: none"> IEFCL will adopt a Social Management System to avoid possible socio-cultural conflicts between the construction team and members of the host communities. IEFCL will hold regular meetings with the representatives of the host communities as enunciated in the Stakeholder Engagement Plan. 	MI	Low
				<ul style="list-style-type: none"> IEFCL will abide by all Memorandums of Understanding (MOUs) (Appendix 6.1) signed with the host communities providing: <ul style="list-style-type: none"> Building renovation of educational/health facilities; Access to micro credit system and merit scholarships to some deserving members of the communities. <p>For more details, see the Stakeholders Management Plan in Appendix 7.2.</p>	CO	

Project Phase (C, O, D) ¹	Project Activity	Description of Impact	Significance Rating Before Mitigation	Action	Type of measure (MI, CO) ²	Significance Rating After Mitigation (Residual Impact Rating)
C+O+D	Recruitment for construction, operation and decommissioning phases	Influx of workers into the host communities (including possible increase in diseases/mortality)	Medium	<ul style="list-style-type: none"> • Health awareness lectures shall be given to workers on the mode of transmission of STIs (including HIV/AIDS) • Provision of regular pest control and insecticide in residential and office area inside the complex • In accordance to the Monitoring Program (see Chapter Seven) IEFCL will support pre-determined health check-up programme in the communities to, in particular, identify likelihood of outbursts of communicable diseases and determine mitigation/control programs. • Awareness campaign will be carried out to enlighten the communities/field workers on the common communicable diseases and the health implications of drug and alcohol abuse, unprotected sex, prostitution, as well as others such as malaria, tuberculosis etc., and the need to sustain cultural values 	MI	Low
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Project Phase (C, O, D) ¹	Project Activity	Description of Impact	Significance Rating Before Mitigation	Action	Type of measure (MI, CO) ²	Significance Rating After Mitigation (Residual Impact Rating)
C+O+D	Recruitment for construction, operation and decommissioning phases	Influx of workers into the host communities (including possible increase in diseases/ mortality)	Medium	<ul style="list-style-type: none"> IEFCL will make adequate accommodation arrangement for expatriates prior to mobilization of workforce to reduce pressure on local housing. IEFCL to ensure that good, and sufficient water supply on the plant site will be maintained for workers to avoid Waterborne / water-related and water-based diseases. 	MI	Low
C+O+D	Recruitment for construction, operation and decommissioning phases	Influx of workers into the host communities (including possible increase in diseases/ mortality)	Medium	<ul style="list-style-type: none"> In accordance to the Monitoring Program, IEFCL will yearly verify the health status of the host communities, to identify possible actions to be taken for their safeguard in relation to the expected influx of workers 	MI	Low

Project Phase (C, O, D) ¹	Project Activity	Description of Impact	Significance Rating Before Mitigation	Action	Type of measure (MI, CO) ²	Significance Rating After Mitigation (Residual Impact Rating)
				<ul style="list-style-type: none"> IEFCL will assist the activities of the state action committee on STIs/HIV/AIDS and other communicable diseases (i.e. malaria, tuberculosis etc.) within the local communities If Authorities will take initiatives for provision of potable water to host communities, IEFCL will support projects for the provision of potable water to host communities 	CO	
		Increased cash flow and stimulation of local economies within the host communities	Medium	<ul style="list-style-type: none"> 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, high moral values with regard to sexuality, etc.) and discourage adverse influences (e.g. prostitution, drug abuse, alcoholism etc.) 	CO	Medium/High ³

Project Phase (C, O, D) ¹	Project Activity	Description of Impact	Significance Rating Before Mitigation	Action	Type of measure (MI, CO) ²	Significance Rating After Mitigation (Residual Impact Rating)
C+O+D	Recruitment for construction, operation and decommissioning phases	Localized economic benefits from material supplies by local contractors (C+D) and Induced secondary industrial development (O)	Medium	<ul style="list-style-type: none"> In accordance to the Monitoring Program, IEFCL will verify yearly 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 	MI	Medium/High ³
			Medium	<ul style="list-style-type: none"> IEFCL will support skill development programs IEFCL will support cooperatives and micro-credit schemes (directed in particular to women) 	CO	

³ Positive Impact

Project Phase (C, O, D) ¹	Project Activity	Description of Impact	Significance Rating Before Mitigation	Action	Type of measure (MI, CO) ²	Significance Rating After Mitigation (Residual Impact Rating)
C+O+D	All construction, operation and decommissioning phases	Increase in solid/liquid waste production, dust, noise and vibration effects	Medium	<ul style="list-style-type: none"> IEFCL will train its personnel by an Environmental Capacity Building Program for minimizing the environmental impact and risks In accordance to the Monitoring Program IEFCL will periodically check the initiative in compliance with air quality/noise standards in order to implement dedicated actions if necessary In accordance to the Monitoring Program IEFCL will compile annual report on waste production in order to implement dedicated actions if necessary In accordance to the Monitoring Program IEFCL will verify the characteristics of water discharges and the quality of receiving water body (water and hydrobiology/ sediment quality) in order to implement dedicated actions if necessary 	MI	Low

Project Phase (C, O, D) ¹	Project Activity	Description of Impact	Significance Rating Before Mitigation	Action	Type of measure (MI, CO) ²	Significance Rating After Mitigation (Residual Impact Rating)
C+O+D	All construction, operation and decommissioning phases	Increase in solid/liquid waste production, dust, noise and vibration effects	Medium	<ul style="list-style-type: none"> In the event that either construction or decommission site activity run into dry season, water will be sprayed on onsite to reduce dust level. IEFCL will alert communities in advance of such activities that are likely to increase noise in the very nearby residential houses IEFCL will ensure that demobilization activities are according to international best practice. 	MI	Low

Project Phase (C, O, D) ¹	Project Activity	Description of Impact	Significance Rating Before Mitigation	Action	Type of measure (MI, CO) ²	Significance Rating After Mitigation (Residual Impact Rating)
C+O+D	All construction, operation and decommissioning phases	Risk of spills of hazardous materials	Medium	<ul style="list-style-type: none"> IEFCL will ensure that a controlled fuelling, maintenance and servicing protocol for construction machinery at worksite is established and followed to minimise leaks and spills 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 IEFCL will ensure integrating prevention and control measures set in a General Hazardous Materials Management program In case of environmental contamination IEFCL will ensure that a planned risk management approach will be followed 	MI	Low

Project Phase (C, O, D) ¹	Project Activity	Description of Impact	Significance Rating Before Mitigation	Action	Type of measure (MI, CO) ²	Significance Rating After Mitigation (Residual Impact Rating)
C+O+D	All construction, operation and decommissioning phases	Risk of spills of hazardous materials	Medium	<ul style="list-style-type: none"> IEFCL will ensure a thorough characterization of soil after site cleaning, to detect potential historical releases of hazardous material⁴ IEFCL will train its personnel by an Environmental Capacity Building Program for minimizing the environmental impact and risks In accordance to the Monitoring Program 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 	MI	Low

⁴For decommissioning phase only

Project Phase (C, O, D) ¹	Project Activity	Description of Impact	Significance Rating Before Mitigation	Action	Type of measure (MI, CO) ²	Significance Rating After Mitigation (Residual Impact Rating)
C+O+D	All construction, operation and decommissioning phases	Risk of spills of hazardous materials	Medium	<ul style="list-style-type: none"> 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 IEFCL will implement a Hazardous Materials Management Plan to minimize the risk derived from spills of hazardous materials 	MI	Low

Project Phase (C, O, D) ¹	Project Activity	Description of Impact	Significance Rating Before Mitigation	Action	Type of measure (MI, CO) ²	Significance Rating After Mitigation (Residual Impact Rating)
C+O+D	All construction, operation and decommissioning phases	Potential increase of workplace accidents/diseases	High	<ul style="list-style-type: none"> IEFCL will ensure there are adequately trained numbers of first aiders at each site; IEFCL will ensure that safety workshops to identify, evaluate and recommend contingency plans for all security risks are regularly organized IEFCL will implement an Occupational Health and Safety Management Plan (including Hazardous Materials Risks Management Plan) to minimize the risk of potential increase of workplace accidents/diseases 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. 	MI	Medium

Project Phase (C, O, D) ¹	Project Activity	Description of Impact	Significance Rating Before Mitigation	Action	Type of measure (MI, CO) ²	Significance Rating After Mitigation (Residual Impact Rating)
C+O+D	All construction, operation and decommissioning phases	Potential increase of workplace accidents/ diseases	Medium	<ul style="list-style-type: none"> Alcohol and drug policy shall be implemented to encourage healthy lifestyle for workers IEFCL will ensure site clinic is provided to take care of minor illnesses for all construction workers IEFCL will conduct enlightenment campaign and health education for the abatement of abuse of drugs, alcohol among workers throughout the life of the project IEFCL will ensure that contractor enforces the alcohol and drug policy for staff IEFCL will ensure that contractor implements social and health awareness programs for all workers at induction and on a continuous basis throughout the life of the project 	MI	Low

Project Phase (C, O, D) ¹	Project Activity	Description of Impact	Significance Rating Before Mitigation	Action	Type of measure (MI, CO) ²	Significance Rating After Mitigation (Residual Impact Rating)
C+O+D	All construction, operation and decommissioning phases	Loss of biodiversity	Low	<ul style="list-style-type: none"> In accordance to the Monitoring Program IEFCL will evaluate possible effects of the project on vegetation and wildlife in the area under the thematic region of the project. On this basis, if necessary, dedicated actions aimed at minimizing any potential risk in loss of biodiversity will be implemented. In accordance with the Monitoring Program IEFCL will carry out yearly assessment of Hydrobiology parameters in the receiving water body interested by the project. If necessary, dedicated actions aimed at minimizing any potential risk in loss of biodiversity will be implemented. 	MI	Very Low

Project Phase (C, O, D) ¹	Project Activity	Description of Impact	Significance Rating Before Mitigation	Action	Type of measure (MI, CO) ²	Significance Rating After Mitigation (Residual Impact Rating)
C+O+D	Mobilization, Transportation of personnel, materials and equipment from/to site by road	Potential increase of traffic accidents	Medium	<ul style="list-style-type: none"> Ensure maintenance of roads of any damaged parts caused by project activities 	CO	Low
				<ul style="list-style-type: none"> IEFCL will adopt a dedicated traffic management plan for the mobilization of vehicles during the construction, operation and decommissioning phases to minimize the risk of traffic accidents 	MI	
		Increase in noise levels	Medium	<ul style="list-style-type: none"> Transportation activities during night hours will be minimized up to extent possible IEFCL will verify that all vehicles and equipment conform to World Bank limits for noise 	MI	Low

Project Phase (C, O, D) ¹	Project Activity	Description of Impact	Significance Rating Before Mitigation	Action	Type of measure (MI, CO) ²	Significance Rating After Mitigation (Residual Impact Rating)
C+O+D	Mobilization, Transportation of personnel, materials and equipment from/to site by road	Increase in noise levels	Medium	<ul style="list-style-type: none"> In accordance to the Monitoring Program. On monitoring basis, if necessary, dedicated actions aimed at reducing any potential effect associated to increased traffic related noise will be implemented IEFCL will implement a Traffic Management Plan to minimize potential effects on noise levels associated to the additional vehicular movements generated by the initiative 	MI	Low
		Increase in air pollution (dust, exhaust fumes)	Medium	<ul style="list-style-type: none"> IEFCL will permit that only vehicles with pre-mobilization certificates to operate in Project area as to reduce emissions from vehicle exhaust IEFCL will implement a Traffic Management Plan to minimize potential effects on air quality associated to the additional vehicular movements generated by the initiative 	MI	Low

Project Phase (C, O, D) ¹	Project Activity	Description of Impact	Significance Rating Before Mitigation	Action	Type of measure (MI, CO) ²	Significance Rating After Mitigation (Residual Impact Rating)
C+O+D	All construction, operation and decommissioning phases	Contamination of groundwater/ surfaces water	Medium	<ul style="list-style-type: none"> • IEFCL shall organize training on safe practices for personnel involved in handling, storage and disposal of materials and wastes • Use of quality and approved storage facility during construction and operation • Adoption of reuse of the waste water in process operation; • Storage containers should be certified prior to use and periodically checked for leaks during project implementation; 	M1	Low

Project Phase (C, O, D) ¹	Project Activity	Description of Impact	Significance Rating Before Mitigation	Action	Type of measure (MI, CO) ²	Significance Rating After Mitigation (Residual Impact Rating)
C+D	All construction and decommissioning phases	Stress on existing security structures	Medium	<ul style="list-style-type: none"> • IEFCL will ensure that both contractor and IEFCL personnel develops a high level of security consciousness both within and outside the work area • If required, additional security arrangements will be made to enable the existing federal security forces to cope with such situation • IEFCL will ensure that a liaison to foster partnership with the community so as to guarantee security for the project is established and sustained • 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 	MI	Low

Project Phase (C, O, D) ¹	Project Activity	Description of Impact	Significance Rating Before Mitigation	Action	Type of measure (MI, CO) ²	Significance Rating After Mitigation (Residual Impact Rating)
C	Site Preparation	Threat to health of workers (snake, bites, insect stings, injuries, etc.) as potential increase of workplace accidents/diseases	Medium	<ul style="list-style-type: none"> IEFCL will ensure there are adequately trained and sufficient numbers of first aiders at each site IEFCL will ensure that anti-venom/anti-histamine is provided on site to mitigate snake bites and insect stings IEFCL will implement quarterly fumigation/treatment against snakes along perimeter fence of the Project. 	MI	Low

Project Phase (C, O, D) ¹	Project Activity	Description of Impact	Significance Rating Before Mitigation	Action	Type of measure (MI, CO) ²	Significance Rating After Mitigation (Residual Impact Rating)
O	Routine Operation and Maintenance of the Fertilizer plants	Degradation of ambient air quality by emissions of air pollutants	Low	<ul style="list-style-type: none"> IEFCL will train its personnel by an Environmental Capacity Building Program for minimizing the environmental impact and risks. In accordance to the Monitoring Program IEFCL will quarterly 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 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 	MI	Very Low

Project Phase (C, O, D) ¹	Project Activity	Description of Impact	Significance Rating Before Mitigation	Action	Type of measure (MI, CO) ²	Significance Rating After Mitigation (Residual Impact Rating)
O	Routine Operation and Maintenance of the Fertilizer plants	Odour annoyance concerns by host communities	High	<ul style="list-style-type: none"> IEFCL will hold yearly environmental awareness /education programs for the stakeholders to educate more about environmental management systems and practices. IEFCL will implement operational strategy and actions to reduce leakages and fugitive emissions (LDAR Program) IEFCL will train its personnel by an Environmental Capacity Building Program for minimizing the environmental impact and risks 	MI	Low
				<ul style="list-style-type: none"> IEFCL will adopt operational/ technical measures to avoid possible emissions within the facility 	CO	

Project Phase (C, O, D) ¹	Project Activity	Description of Impact	Significance Rating Before Mitigation	Action	Type of measure (MI, CO) ²	Significance Rating After Mitigation (Residual Impact Rating)
C+O+D	Vehicular Traffic	Noise pollution; Gaseous emissions that contaminate/pollute air, land, plants at roadsides, water; Traffic incidences and accidents;	Medium	<ul style="list-style-type: none"> All vehicles will be made to observe the speed limits and long/large vehicles have warning lights to alert other road users; all the vehicles will be maintained at optimal conditions & ensured that all the drivers are certified 	MI	Low
O	Routine Operation and Maintenance of the Fertilizer plants	Spent catalysts and sludge	Medium	<ul style="list-style-type: none"> Segregate by type and store in water-proof metal skips/containers for transportation to approved contractor for low thermal desorption 	MI	Low

Project Phase (C, O, D) ¹	Project Activity	Description of Impact	Significance Rating Before Mitigation	Action	Type of measure (MI, CO) ²	Significance Rating After Mitigation (Residual Impact Rating)
O+D	All construction and decommissioning phases	Base camp site for workers: Influx of migrant workers, Contamination and spread of HIV/AIDS and STDs	Medium	<ul style="list-style-type: none"> Workers awareness on HIV/AIDS and STDs shall be aroused through posters and oral enlightenment by nurse-in-charge at the Community Health Centre. Implement 	MI	Low
O	During Operation	Emission of Oxides of Sulphur and Nitrogen, and particulates	Medium	<ul style="list-style-type: none"> The Process heaters and boilers will be designed to achieve emissions to atmosphere as per FMEEnv and IFC Guidelines. 	MI	Low
C+O+D	All construction and decommissioning phases	Excessive noise and vibrations from generators, pumps and compressors	Medium	<ul style="list-style-type: none"> Installation of noise reducing devices to exhausts & ensuring the use of earmuffs/plugs by personnel. 	MI	Low