



**MANAGEMENT STRATEGIES & IMPLEMENTATION
PLAN OF ENVIRONMENTAL, HEALTH & SAFETY (EHS)
PLAN IN A RURAL ELECTRIFICATION PROJECT**

Prepared By

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Declaration by the Guide

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Further, I certify that the work is based on the investigation made, data collected and analyzed by him and it has not been submitted in any other University or Institution for award of any degree. In my opinion it is fully adequate, in scope and utility, as a dissertation towards partial fulfillment for the award of degree of MBA.



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DISSERTATION COVER PAGE

DISSERTATION for the Degree of MBA in POWER MANAGEMENT

DISSERTATION TOPIC “Management strategies & implementation plan of Environmental, Health & Safety (EHS) Plan in a Rural Electrification Project”.

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1.0 INTRODUCTION

This Environment, Health & Safety management plan has been developed to reflect the environment protection requirements of the project specific multi-discipline civil, mechanical & electrical works associated with project.

The Plan is designed keeping in view the mobilization, construction and demobilization period of the project.

This plan gives guidelines to all levels of personnel regarding their responsibilities in effective Environment, Health & Safety Management. It sets goals and targets for effective implementation of Environment, Health & Safety requirements through its policies and procedures. It clearly identifies action, action party and target completion dates.

Environmental Standards

For any particular Project, our EPC Company named i.e., M/s Mohan Energy Corporation Pvt Ltd. hereafter called as "MEC" is adopting and ensuring compliance with all Environment, Health & Safety related project specifications, standards of EMPLOYER and applicable international standards like ISO-14001 & OHSAS-18001.

The MEC's Management will demonstrate their commitment to Environment, Health and Safety Protection by the following means:

Resources, Training and Development

Making adequate funds and human resources available, ensuring the training/awareness about Environment, Health and Safety requirements, policies & procedures.

Ensuring that all levels of line management / supervisors spend an adequate proportion of their time on Environmental, Health and Safety matters.

Allocating adequate time and human resources for Environmental, Health and Safety training needs.

Monitoring and Follow-up

Visiting all work areas regularly. Participating in inspections and audits.
Participating in investigations of high potential incidents and accidents.

1.1 Purpose

Environment, Health and Safety are always of highest priority and concern. Environment, health & safety takes the same priority as other aspects of the project. This will be implemented to protect the environment, whole facilities, health/safety of employees, other relevant personnel, EMPLOYER employees, services and the property of the third party. The main purpose remains to comply employer's ENVIRONMENT, HEALTH & SAFETY requirements.

1.2 Scope

It will be implemented by all the members who belong to sub-contractor or MEC in any field, be it engineering, procurement, construction and commissioning of the Project throughout the execution of the Project at any/all sites of execution.

2.0 Management System

2.1 Environment, Health & Safety Policy

MEC's environment, health & safety policy is based on continual development in the environment, health and safety conditions.

MEC is committed to achieve zero accident and prevent work related ill health as well as to provide adequate control of environmental, health and safety risks from work activities.

We are committed to ensure a safe and healthy environment for all its employees, customers, sub-contractors and community where we operate.

This is achieved by effective implementation & continually improving the environment, health and safety management system by following legal/statutory & other requirements, pollution control, conservation of natural resources, training of employees & subcontractors & improving the work environment.

MEC is also committed to protect the environment, health and safety including the prevention of pollution and protection of biodiversity and ecosystem specific to the context of the organization and requirements of its customers & business associates.

2.2 Personnel Appointment

However, MEC will ensure one Specialist on ENVIRONMENT, HEALTH & SAFETY from MEC is appointed for Special guidance on Environment, Health & Safety issues of the laws of the country during execution of the project.

The ENVIRONMENT, HEALTH & SAFETY Organization Chart is prepared & submitted to employer for information. The Organization Chart will be updated if changes in Management Structure or new appointments occur. The HSE Officer will be set up under the leadership of the Project Manager who carries out the work with the assistance of Environmental, Health and Safety Policies of the EMPLOYER.

We will implement a voluntary local recruitment policy for its personnel for the duration of the works and shall enforce this policy to its subcontractors also. Our local office will look the activity of this local recruitment with the help of representative of employer/local concerned agency. Our representative provides information on job vacancies with the Contractor for the execution of the works (required qualifications, duration, and location) and on the information to be provided in applications. If the Worksites are located near to several different communities, it is ensured to have a fair distribution of local recruitment between the different communities.

MEC will maintain record of local employees indicating the hours worked, works allocated, the wages paid and any training provided. Records are available at the main Worksite at all times, so the Engineer and the authorized representatives of the government can assess the content.

2.3 Responsibilities of HSE Manager & HSE Officer/ Supervisor:

2.3.1 HSE Manager – Project Site Manager will act as HSE Manager and will be responsible for:

- The overall implementation of the project Environment, Health and Safety plan for the entire Project.
- Providing training, instruction and supervision for staff.
- Providing work places, accommodation and facilities for staff.
- Increasing awareness of Health, Safety & Environmental Protection among staff by way of:
- Organizing ENVIRONMENT, HEALTH & SAFETY information and promotional program within the organization.
- By chairing regular ENVIRONMENT, HEALTH & SAFETY Meetings and addressing ENVIRONMENT, HEALTH & SAFETY issues.
- Participating in ENVIRONMENT, HEALTH & SAFETY Audits and the Monthly Management ENVIRONMENT, HEALTH & SAFETY Meeting.
- Participating in accident investigations.
- Ensuring that Sub-Contractors comply with ENVIRONMENT, HEALTH & SAFETY requirement.
- Occasionally participating in emergency exercises as an observer.
- Participating in ENVIRONMENT, HEALTH & SAFETY Progress meetings.
- Coordinate with local authorities, local communities and with the EMPLOYER.

2.3.2 HSE officer/ Supervisor will be responsible for:

- Under the leadership of Project Manager implement various ENVIRONMENT, HEALTH & SAFETY works.
- Make the detailed ENVIRONMENT, HEALTH & SAFETY plan and Carry it out.
- Organize constant ENVIRONMENT, HEALTH & SAFETY education/training and awareness program for all employees including training on laws, disciplines, and regulations.
- Conduct health & safety examination periodically, specially to personnel of special job, e.g. high altitude, high temperature, etc
- Be responsible to ensure that relevant Personal Protective Equipment (P.P.E) are worn at all times.
- Provide protection articles for health care, heatstroke prevention. Take responsibility for heatstroke prevention in the work force.
- Provide First Aid facilities and suitable medical treatment facilities.
- Handle health & safety insurance affairs for employees and safety measure for mobile equipment and the treatment of any injured for any accident.
- Be responsible for investigation of occupational sickness and accidents. Investigate, analyze, prepare report along with preventive measure suggested.
- Monitor sickness, absenteeism and keeping records for the employees for sickness or injury.
- Ensure all applicable specifications and regulations/laws are followed by all employees, according to requirements.
- Employees follow the laws of local authorities and various regulations issued by project HSE officer and the laws of local authorities.
- Be responsible for the comprehensive management of ENVIRONMENT, HEALTH & SAFETY Dept. especially health protection and health promotion, safeguarding, labor protection, construction monitoring.
- Be responsible for issuing the permit to work system (in consultation with employer), such as excavation, rock blasting, electrical line permits etc.
- Organize health & safety examination, in case of finding unhealthy or unsafe elements that endanger employees and equipment. In case of emergency, have the right to stop work in concurrence of Project Manager.
- Coordinate with relevant department, for sanitation operations.
- Coordinate with engineering manager, procurement manager, construction manager, and etc. to ensure the environmental, health & safety measures have been fully considered during implementation of the project.

2.4 Contract Objectives & Accountability

MEC is committed to the principle of ZERO HARM on the sites that include the following three principles:

ZERO MINDSET: We believe that all injuries and occupational injuries are preventable and will achieve this commitment in a culture where we all are responsible for preventing and correcting unsafe behaviour of work conditions. Try to prevent any harm to the environment.

NO REPEATS: All unsafe practices and incidents will, be investigated to determine what happened and why and then all necessary steps will be taken to prevent a recurrence

SIMPLE; NON NEGOTIABLE STANDARDS

We will adopt a common, simple non-negotiable set of standards and rules throughout the Company. Management on all levels has the responsibility of implementing the standards and rules.

2.4.1 Objectives

MEC will:

- Support promotion and improvement of safe working methods and practices and road traffic safety.
- Promote the protection of the environment which may be affected by its activities and minimize the physical impact of operations and constructions as far as possible.
- Ensure by procedures, techniques, inspection and audits, that vehicles, plant equipment are maintained to a high standard and are operated so that they are safe and reliable and present a practical minimum risk of injury of people, leakage, fire or breakdown.
- Report and analyze any accident with follow-up recommendations to prevent recurrence, with accountability for all lost time accidents at department head level.
- Work with government departments, local authorities, technical advisers and professional bodies as appropriate and take the initiative, where necessary, to promote practicable and improved codes of practice and regulations in the field of health, safety & environment protection.
- No smoking, no consumption of prohibited drugs & alcohol is allowed at site.

2.4.2 Accountability

The Project Manager and his team of the HSE supervisor, Engineers will be accountable for the Environment success or failure.

The Project Manager under the professional support of the HSE officer will be responsible for

ensuring that all Environment, Health & Safety matters have been identified.

2.4.3 Manning/Communication:

Regular structured progress meetings between employer, MEC and Sub-contractors will form the forum for discussion of all Environmental, Health & Safety issues.

Communication:

The following will be used to generate topics for discussions in Environment, Health & Safety Meetings.

- Minutes of previous meeting / Corrections & Matters arising from previous meetings
- EMPLOYER and In-house Safety alerts and safety newsletters.
- Near Miss reports and learning points.
- Incident reports and learning points.
- Employer and Sub-contractor Environment, Health & Safety Plan Contents.
- Trainings imparted and future training schedule.
- Review of current status
- Recommendations.
- Next Meeting dates.

General Information and Learning Points

Local spoken language will be used for communication at site for the local employees. The same language this will be used to disseminate learning points and information to all during general safety meetings.

In case our site person are not well versed with the local spoken language, services of a suitable interpreter will be availed of. A separate meeting will be held in such a group of larger than 10 persons. This is to ensure correct learning.

ENVIRONMENT, HEALTH & SAFETY Meetings:

The Foreman/Permit Holder along with his crew will assemble at the place of work. The scope of work for the day will be discussed. Hazards associated with each Specific job activity and the precautions necessary to prevent incidents will be jointly discussed.

2.5 Environment Protection & Health and Safety work Plan

Environment Protection Plan consists of the following:

1. Marking out of the Worksite perimeter on a map/drawing
2. Definition of zones for vegetation clearing, zones for the storage of usable timber, zones for burning of green waste
3. Definition of on-site activities: construction, storage areas, accommodation areas, offices, workshops, concrete making units
4. Layout of activity areas on the Worksite: construction works, production/operation areas, rehabilitation and closure
5. Zones for the storage of topsoil, spoil from earthworks, materials
6. Access routes and checkpoints
7. Worksite occupancy schedule
8. Organisation of worksite preparation
9. Liquid discharge outlet points
10. Proposed sampling points for monitoring water quality
11. Atmospheric emission outlet points
12. Location of the storage site for dangerous products
13. Location and mapping of waste treatment facilities when handled by an external service provider
14. Any other information relating to the environmental management of the Worksite

Health and Safety Plan consists of following:

1. Identification and characterisation of health and safety risks, including the exposure of personnel to chemicals, biological hazards and radiation.
2. Description of working methods to minimise hazards and control risks.
3. List of the types of work for which a work permit is required
4. Personal protection equipment
5. Presentation of the medical facilities at Worksites:
 - a) Healthcare centre, medical equipment and allocation of medical staff
 - b) Medical acts that can be carried out on-site
 - c) Ambulance, communications
 - d) Referring hospital
6. Evacuation procedure for medical emergencies
7. Description of the internal organization and action to be taken in the event of an accident or incident

2.6 Resources Allocation

Following resources are provided at site for ENVIRONMENT, HEALTH & SAFETY management :

The human resources – HSE Manager, HSE supervisor, person trained in providing first aid, trained driver for vehicle.

Provision of the equipment - Mobile phone or satellite phone, GPS if required, digital camera, equipment for quality test of water, air, noise.

Access to lab- Nearby testing lab will be used for test those cannot be conducted at site.

Computer - A complete IT workstation: computer, printer, Internet access.

Vehicle- A 4WD vehicle.

2.7 Inspections/Audits

Safety Officer shall conduct safety audit as per Safety Audit Check List, every fortnight/month during construction of Transmission Lines / Sub Stations / any other work including excavation, rock blasting and scaffolding, welding and copy of the safety audit report will be forwarded to the Employer's Engineer In-charge / Site In-charge/Project Manager for his comments and feedback. During safety audit, healthiness of all Personal Protective Equipment (PPEs) shall be checked individually by safety officer and issue a certificate of its healthiness or rejection of faulty PPEs and has to ensure that all faulty PPEs and all faulty lifting tools and tackles should be destroyed in the presence of EMPLOYER construction staff. It is ensured that each gang be safety audited at least once in two months. During safety audit by the contractor, Safety officer's feedback from EMPLOYER concerned shall be taken and recorded. The Employer's site officials shall also conduct safety audit at their own from time to time when construction activities are under progress. Apart from above, the Employer may also conduct surveillance safety audits. The Employer may take action against the person / persons as deemed fit under various statutory acts/provisions under the Contract for any violation of safety norms / safety standards.

Inspections of following is done by the safety officer –

1. Personal Protective Equipment (PPEs)
2. Equipment Fitness Certificate
2. Plant & Machinery/Lifting equipment at various stages
3. Emission of site vehicles & vehicles coming to site

HSE Manager carries out audit/inspection for HSE compliance, this report is shared with site Engineer along with report of necessary actions.

2.8 Management of Non-Conformities (NC)

The NC detected in the course of inspections/audits carried out by the HSE Manager/Supervisor or its Engineer will be the subject of a treatment a technical plan to the seriousness of the situation. The non-conformities will thus be divided into 4 categories:

- The notification of observation, (NO) for the minor non-conformities. However repetition of NO on a site can be elevated to NC of Level 1.
- The NC of Level 1: the NC is not causing a serious and immediate risk for the environment and health; A NC of Level 1 non-corrected in a period of 15 days may be elevated at the level 2.
- The NC of Level 2: applicable to any NC with leads to a damage to the environment or the health or presenting a high risk to the environment or health. A NC of level 2 not corrected within a period of 7 days may be elevated at the level 3.
- The NC of Level 3: applicable to any NC of major nature, presenting immediate risks or leading to environmental damage or safety of humans. If MEC does not secure the situation immediately, the suspension of the activities concerned will be ordered.

Non-conforming situations are dealt by taking suitable action on the root causes and review with or without master, as required.

2.9 Site Rules - Discipline of Safety and Security at Work

1. The MEC shall establish the rules and regulations applicable to site personnel /visitors concerning in particular:

- (i) access to the camp (check the badge and other access restrictions),
- (ii) the rule of safety (including fire safety)
- (iii) the rules of environmental sensitivity/ environment protection,
- (iv) the rules of hygiene and maintenance,
- (v) the list of activities and products prohibited in the camp (including in particular the absolute prohibition of any contact with bush meat and the possession of wild animals),
- (vi) the dangers of STDs and HIV/AIDS
- (vii) the respect for the beliefs and customs of the local populations and community relations
- (vi) the penalties faced by offenders ;

2. The rules are conveyed & displayed at worksites, in common areas (centers of relaxation, canteens, ...) and posted in the vehicles and machinery driving cabs.

3. New employees and existing members of personnel are made aware and acknowledge their understanding of the rules of procedure and the associated provisions.

4. The rules include a list of acts considered as serious misconduct and can result in dismissal, if an employee repeatedly commit the offence despite awareness of the rules of procedure, and this is without prejudice to any legal action by the public authority for non-compliance with applicable regulations:

a) Drunkenness during working hours, leading to risks for the safety of local inhabitants, customers, users and personnel.

b) Punishable statements or attitudes, and sexual harassment in particular,

c) Violent behavior.

d) Intentional damage to the assets and interests of others.

e) Repeated negligence or imprudence leading to damage or prejudice to the environment, the population or properties, particularly breaching provisions intended to prevent the spreading of STD and AIDS.

f) Drug use

g) Possession and/or consumption of meat or any other part of an endangered animal or plant as defined in the national regulations.

5. Serious misconduct, such as organization of sex trade (pimping), committing pedophilia, physical aggression, drug trafficking, deliberate and severe pollution, trading and/or trafficking in all or part of protected species, will lead to immediate dismissal as of the first report of misconduct is detected, in application of the rules of procedure and labor laws.

6. The employer establishes a record for each case of serious misconduct, and a copy will be provided to the employee in question, indicating all action taken to terminate the misconduct by the employee in question and to bring the attention of other members of personnel to the type of incident detected. This record will be provided to the Engineer as an attachment to the monthly report.

7. MEC will make a process of resolution of potential complaints allowing them to voice their concerns about their workplace.

8. The bins will be provided to the entry of each residential building and of activity for collection of waste. Employees will use these bins to dispose waste.

2.10 Meetings

MEC organizes daily (or at another frequency approved by the Engineer) environment, health and safety meetings at all Worksites, per shift and per team, prior to the start of the daily work. The meeting establishes the environment, health and safety risks associated with the day's tasks and activities, and means of prevention and protection to be implemented.

MEC does awareness meeting with his staff to inform them regarding:

- Respect of the habits and customs of the general population of the area of the works and along the length of the line;
- Discipline & site rules to be followed.
- Health & safety precautions to be taken.
- Upcoming training programs.
- Upcoming inspections & audits.

Another environment, health and safety meeting will be held per work-site per week or fortnightly (or at another frequency approved by the Engineer) with all the personnel assigned to the Worksite. This applies only to Worksites where work is ongoing. At the meeting accidents and incidents that occurred in the previous week are discussed and feedback provided. Means of improvements are identified, documented and assessed to establish corrective actions. The Engineer is invited to participate at all health and safety meetings. Meeting reports are provided to the Engineer.

The minutes for HSE Meeting may include following including action on them:

- Incidents highlighted in the "Incident Reviews" categorized as fatality, lost-time injury, restricted work case, medical treatment case, first aid, etc.
- Employer & In-House Safety alerts and safety newsletters.
- Near Miss reports and learning points.
- Incident reports and learning points.
- Employer and sub-contractor Environmental Plan Contents.
- Total no. of Man Hours last month.
- TRI- Rate (Total Recordable Injuries), in construction activities last month and accumulated since start of construction work.
- RUO-Rate (Rate of reporting unwanted occurrences) in construction activities last month and accumulated, since start of the construction activities.
- Goal of RUO-Rate for the construction activities.
- Authority permit schedule, actual and planned.
- Evacuation
- Firefighting management

2.11 Training, Promotion and Awareness

MEC shall organize regular environmental, health & safety awareness program for all activities, at least once a month.

MEC shall establish an HSE induction Program for all personnel that are going to work at the Site including the Employer, the Engineer and other sub contractor's team. HSE hand book shall be issued to all the personnel, It will cover the basic HSE awareness issues like:

- 1) Specific hazard at the site.
 - i. Traffic and transportation hazards
 - ii. Work at heights
 - iii. Lifting Operations
 - iv. Excavation works
 - v. High Voltage Electrical works, etc.
- 2) Health and safety procedures.
 - i. Health hazards (HIV/AIDS, Yellow Fever, Malaria, Etc.)
- 3) Security procedures.
- 4) Environmental procedures.
 - i. Weather conditions (heat stress, rain and flooding).
 - ii. Animal Bites (e.g.- snakes, ants, etc.)
 - iii. Soil Erosion.
 - iv. Indiscriminate vegetation clearance.
 - v. Air pollution.
 - vi. Accidental spills of hazardous materials.
- 5) Emergency preparedness.
- 6) Reporting routines of incidents, Hazardous conditions and near miss.
- 7) Rules of interaction with local communities.
- 8) Prevention of Infectious diseases, AIDS

Personnel HSE Handbook shall provide detailed information on environmental, health, safety, security, emergency procedures and rules of interaction with local communities which every site personnel shall be required to know.

MEC shall carry out the induction program for all the Engineering and Non-Engineering personnel for self, management personnel, workers and visitors visiting the site on regular basis.

MEC shall make sure that all the personnel are fully conversant with the HSE applicable rules & regulation at the site, in order to execute the Project by qualified individuals with adequate skills.

Suitable awareness and education is imparted for prevention of any infectious diseases, sexually transmitted diseases and AIDS. Workers are subject to periodic health checks and a record of these checks is maintained so as to avoid common allergies while at the workplace. Training sessions are held during ongoing projects at worksites to avoid epidemics, infectious diseases and AIDS.

MEC shall be documenting the training records and also shall maintain the register of all personnel and visitors who shall go thru' the induction programme on day to day basis.

General Information and Learning Points: French being the language known to the majority of the employees, this will be the language used to disseminate learning points and information to all during general safety meetings.

Where persons who do not understand French, services of a suitable interpreter will be availed of. A separate meeting will be held in such a group of larger than 10 persons. This is to ensure correct learning.

2.11.1 ENVIRONMENT, HEALTH & SAFETY Training

- Project personnel shall be trained for environment, health & safety education prior to taking position.
- Three Levels Environment, Health & Safety Training
 - Level I: by HSE Manager on relevant laws, regulations and EMPLOYER's policies and rules.
 - Level II: by site HSE coordinator on site work scope, work characteristics, demands of environment, health & safety operation and the use of safety equipment, emergency appliances, e.g. first aid, etc.
 - Level III: by supervisor/foreman on position condition, the characteristics of work and position scope, regulations and warning, the functions and use of tools and health & safety appliances, and the use and storage of labor protection appliances articles.
- Special health & safety indoctrination
- Constant Safety Training
 - Group leaders or foremen shall address environmental, health & safety every day before work. Work teams shall summarize the health & safety performance once a week; Project Group shall hold a health & safety meeting every month.
- Prior to construction, HSE Dept. shall organize environmental, health & safety education to personnel at all levels. Environment, Health & safety training register for personnel is kept on record.

2.11.2 ENVIRONMENT, HEALTH & SAFETY Promotion and Awareness

MEC shall carry out the Pictorial promotion and awareness of HSE amongst all the personnel's on site in the following ways.

SAFETY BOARDS

Safety Notice Boards shall be erected at prominent locations and facility for a television and video player shall also be made available at site.

HSE PERFORMANCE BOARDS

HSE performance boards indicating total man-days worked, since the last Lost –Time Injury (LTI) shall be posted at the entrance of the site.

SAFETY POSTERS

Safety Posters in pictorial form shall be displayed in the rest area, notice board and site notice board.

VIDEO FILMS ON SAFETY

Video films shall be screened to employees during HSE awareness programs / meetings. Commentary in other language if necessary shall be given or a running scroll shall be provided in regional language, if required.

SAFETY NEWSLETTERS / SAFETY ALERTS

Safety Newsletters and safety alerts will be disseminated to all in French/ any other regional language, (if required) where, any information of the utmost importance is to be passed on, a special meeting shall be called.

2.12 Emergency Preparedness

The emergency situations include the following:

1. Fire/Explosion in camp/store
2. Loss of the containment of dangerous substances

MEC details the above emergency plan as an appendix to this plan also ensures that all personnel are informed and aware of how to react in an emergency situation, and responsibilities are defined. Information and awareness training is documented in writing, and available on all Worksites.

MEC organizes and documents emergency simulation exercises (mock drills) within 3 months of the start of the works, and subsequently once every 12 months up to the provisional acceptance of the works. The Engineer is invited to participate in each of these exercises.

2.13 Implementation, Performance Monitoring, Reward and Record Keeping

Monthly report on HSE targets, monitoring, performance is made & submitted to the employer in the monthly progress report.

MEC will maintain one record per local employee indicating the hours worked per person allocated to the works, the type of tasks carried out, the wages paid and any training provided. Records are available at the main Worksite at all times, so the Engineer and the authorized representatives of the government can assess the content.

2.13.1 HSE Target / Measurement

Performance indicators will include:

- Completion of the project without any major Environment, Health & Safety mishap.
- Minimum number of Corrective Action Requests during HSE audits.
- Clearance of all inspection and Audit action items/CAR(s).
- Environment, Health & Safety awareness of the personnel performing the job at site.

* Record of other Environment, Health & Safety issues like Non-Compliance to HSE regulation.

* Environmental, Health & Safety training, inspection & audit record is kept in the HSE file of site.

* ENVIRONMENT, HEALTH & SAFETY meeting record is kept in the file.

* Record of environmental, health & safety damage issues:

1. Non-Compliance to Regulation
2. Environment, Health & Safety incident

2.13.2 Reporting to employer

MEC will keep the following routine reports and submit to the Employer if required:

- Monthly summary

- Weekly statistics in prescribed forms

After emergency or corrective action has been taken, all incidents will be reported immediately to HSE officer.

A final ENVIRONMENT, HEALTH & SAFETY report is prepared & submitted to the employer at the completion of the project.

2.13.3 Feedback analysis

The above data will be reviewed in regular General and Supervisor's ENVIRONMENTAL, HEALTH & SAFETY meetings and the remedial measures discussed to avoid recurrence for any serious issues arising out of the above.

2.13.4 Comparison of performance

The above data will be compared with EMPLOYER performance indicators to assess comparison of trends.

2.13.5 Rewards

The site employees excelling in maintaining, improving, providing good suggestions for ENVIRONMENT activities will be rewarded suitably to motivate employees for promotion of ENVIRONMENT activities.

3.0 Protection of Environmental

The Environmental Quality Management (EQM) Program will conform to the work of erection/commissioning, construction standards and the requirements of the Environmental Management System principles of EMPLOYER. MEC's activities will comply with all applicable laws, regulations, environmental standards, guidelines and conditions of approvals (including the latest revision of The country Environmental Policy Act) issued by environmental authority of the Republic of the country.

3.1 Environmental Impact Assessment (EIA)

In the beginning, Environmental Impact Assessment (EIA) report is prepared, which includes the Qualitative Risk Analysis report. The EIA will be implemented through the following procedures:

- (a) EIA preparation meeting will be held once EIA is decided to be done.

(b) Environmental protection engineers will work out engineering analysis of the project in which environmental issues will be presented during construction, commissioning and operation. Engineering analysis mainly includes the following aspects:

- Specify quantity and characteristic of hazardous wastes during construction and system operation.
- Specify temporary noise sources and levels during construction
- Specify waste disposal measures, noise abatement and dust control Measures to be adopted for the project during construction

MEC will strictly follow & consult , if required, with local parties concerned for the selection of dispersion models to be used for impact prediction. Predict and analyze the adverse effect and potential effect on water, air and soil quality, and impact on archaeological heritage, assess waste management system, and determine risk levels which will be posed to the health and safety of operators and the surrounding population at and around the project site.

(c) Comparison of alternative schemes including investment, technology and design from environmental point of view.

(d) Provided mitigation and remedial measures and work out environmental management plan to mitigate adverse impact and personnel training plan.

Work out monitoring plan to monitor the implementation of mitigation measures and impact during construction. Monitoring points, methods and estimated cost will be determined in the plan. The EIA report will be approved by EMPLOYER.

3.2 Ground Pollution Management

3.2.1 Protection of adjacent areas

MEC uses construction methods and means of protection in order that no adverse effects are incurred on vegetation, soils, groundwater, biodiversity, natural drainage and the water quality in areas adjacent to Worksites for the entire duration of the works.

Wetland areas are protected, filling of all or part of a wetland area is not done, unless the works are necessary according to the provisions of the contract or the instructions of the Engineer.

With the exception of access roads, or unless instructed otherwise by the Engineer, the entire perimeter of land sites is physically demarcated with a fence or or any other means leaving no

possible ambiguity as to the location of the Worksite perimeter.

Selection of borrow areas, backfill material stockpil sites and access road

1. MEC will submit to the Engineer for prior approval.

(i) the location of proposed borrow areas or areas to be excavated.

(ii) proposed backfill material stockpile locations or zones designated for the rubble from demolition works.

(iii) Side casting during the construction of linear infrastructure (roads, pipelines, transport routes) and which are included in the category of stockpiling of waste material.

2. The opening or rehabilitation of all access routes between Worksites will be shown on a map and prior approval is taken from the Engineer.

Physical & Cultural Resource Management

In the case of discovery and the security of the cultural resources while limiting the maximum impact on the conduct of the work.

In the event of discovery,

- Before commitment of the work in a site gives, the employer of the book will confirm has the MEC (i) the presence of cultural resources substantiated during the impact studies and their location for the purposes of preservation, or (ii) the absence of information on the possible presence of cultural resources on the site;
- Notification process internal to the MEC of any discovery made by one of its employees, allowing a reloading immediate of the information has the hierarchy of the MEC & has the Engineer
- Discovery is immediately communicated to Engineer.
- The work will be stopped at site, and wait for directions from the engineer.
- The MEC will consult, through the employer of the book, the competent national authorities for the provisions has put in work;
- The MEC integrates an information on this procedure in its awareness program of the whole of its staff.

3.2.2 Spill Control

The following steps shall be followed to handle any pollution spill :

- 1) The sources of the leak or spill shall be stopped immediately once discovered.

- 2) The alarm shall be raised throughout the site
- 3) Work on the site shall be stopped and all available resources directed into resolving the problem.
- 4) Emergency measure shall be taken to contain all remaining material
- 5) Appropriate measures shall be taken to neutralize hazardous substances
- 6) The Engineers shall be informed immediately ;and
- 7) The Site-specific and material –specific details shall be given immediately for the disposal of contaminated soil and water, and mitigation of the damage caused.

Staff members in charge of storage area must have appropriate training. Also, all supervision staff is aware of the procedure and capable of implementing them, in the event of leak or spillage.

3.2.3 Waste Management

3.2.3.1 General waste management

Waste management planning

- MEC shall be identifying all waste material and characterize the waste according to its source, composition, generation rates, and treatment or disposal method.
- Waste management list shall be categorized that considers prevention, recycling and re-use, treatment and disposal.

Waste Prevention

- MEC shall carry out good housekeeping and operating practices, including inventory control to reduce the amount of waste on regular basis.
- Also, MEC shall institute procurement measures that recognize opportunities to return usable materials and which prevents the over ordering of materials.

Site cleanup

- A full clean-up of the site shall be carried out after constructions .All wastes accumulated during constructions and all demolition wastes from temporary structures have to be disposed properly.

3.2.3.2 Solid waste / household waste

The different types of solid waste shall be separated and disposed of separately. Solid waste generated during constructions and at campsites shall be properly treated and safely disposed of only in demarcated waste disposal sites.

A sufficient number of garbage bins and containers shall be made available at the main work sites and camps. The containers shall be marked with clear labels for organic, paper, and other waste

for sorting waste collection.

Garbage and other waste shall be regularly collected and be transported to a designated waste disposal site located at a distance from the nearest village and from watercourse or wells. Only materials approved by the Engineer may be buried.

3.2.3.3 Waste water management

MEC shall supply and install wastewater treatment facilities for processing and disposal of sewage from the contractors' housing, camp accommodation, camp amenities, workshops, stores, and offices and other buildings and facilities. The facilities shall be complete with adequate closets, urinals and hand-basins, septic tanks, absorption trenches or other sewerage disposal installation.

The septic tank and / or temporary holding tank(s) shall be kept pumped out at such intervals that the tank(s) will not overflow and contaminate the ground, flowing streams or surface drainage. On completion of the works, sanitary facility shall be properly disinfected and all evidence of same including temporary buried tanks and foundations removed from the site.

MEC shall also install, operate and maintain temporary toilet facilities at all work sites. Toilet (male and female separate) shall be installed at each short term work site employing 5 workers or more. An appropriate distance of approx. 30mtrs. shall be maintained from sources of drinking water and shall also be kept where practicable pit latrine should always be located below (down slope) a drinking water sources.

MEC shall take care of changing the lavatory to a new location if it becomes unpleasant due to use of excessive smell, becomes full, or a month of use time elapses. When this is done, the pit must be carefully backfilled and the soil compacted. The ground surface over and around the pit shall be regards and made good, and if necessary re-vegetated.

All water discharged from the works and living area into natural waterways from the wastewater treatment facilities shall be chemically tested for .the water quality shall comply with the sanitary sewage discharge standards according to ENVIRONMENT guidelines.

3.2.3.4 Hazardous materials and hazardous waste management

- 1) All refueling of heavy equipment and machinery shall be undertaken by a service vehicle, with appropriate safeguards and protection measure to prevent any spillage or contamination by chemical wastes or maintenance oils, lubricants, etc.

- 2) All the fuel and hazardous material shall be stored in special designated facilities away from the river. The storage shall be roofed and have a concrete floor with a bund for secondary containment and collection of spills. Storage areas shall be designed such that they will contain 110% of the largest container / vessel stored in a storage area.
- 3) Each storage container should be marked visibly with the necessary precautions signs and the Material Safety Data Sheet needs to be readily accessible to the workers.
- 4) The diesel shall be stored in a standard skid tank with secondary containment providing 110% volume of the total capacity of the skid. The skid tank shall be located at least 100m away from any watercourse. The skid tank shall be inspected at regular intervals to ensure that no spillage occurs.
- 5) Maintenance of machinery and Lorries shall be done in workshops servicing and repair areas away from the river.
- 6) Spent solvents and oily rags, empty paint cans, used lubricating oils, used batteries, lighting equipment, etc. shall be categorized as a schedule waste. This scheduled waste is to be stored in containers, with the proper bunds, which are able to prevent spillage or leakage of the scheduled wastes into the environments, the containers of the scheduled wastes shall be clearly labeled for identification and warning purposes.
- 7) MEC shall engage a contractor certified by the Environmental protection Agency of Ghana and Burkina Faso to collect, transport and dispose of all the scheduled waste generated at the project site. Alternatively, this responsibility can be given to the supplier .the contractor shall verify the same.
- 8) All employees working with hazardous materials shall be trained in hazard identification, safe work practices, basic emergency procedures, and (if applicable) special hazards unique to their jobs.
- 9) Transportation procedure for hazardous materials shall be prepared and will be consistent with internationally accepted standards. It shall cover, at a minimum, the following:
 - (i) Ensuring that the nature, integrity and protection provide by packaging and containers used for transport are appropriate.
 - (ii) Ensuring adequate transport vehicle specifications including the route followed.
 - (iii) Method of Loading and unloading procedure.
 - (iv) Informing employees involved in the transportation and training them as appropriate to handle normal operations and emergencies
 - (v) Using labeling and placarding (external signs in transport vehicles) as required;

3.2.4 Control of Erosion and sedimentation

Soil Erosion and sedimentation control practices shall be implemented prior to any major soil disturbance and same shall be maintained till permanent protection is provided. In order to maintain the healthy environment condition in and around the permissible construction site, MEC shall make sure that:

- 1) Sites within the project area shall not be disturbed by construction activities.
- 2) Only approved areas due for construction activity shall be cleared for vegetation and top soil.
- 3) All the exposed surfaces shall be covered with topsoil and re-planted or re-seeded at MEC expense and or as directed by the Engineer.
- 4) Excavated materials which are unsuitable for any kind of permanent works shall be disposed of as soil dumps in spoil disposal areas.
- 5) All the water from batching plant, concrete mixer washing facilities and crusher plants shall be collected and treated before releasing to environment. Small discharges will be directed towards surrounding forest as may be possible, in order to limit the discharge of drainage water directly in the course of water.
- 6) It is preferred to measure quality of water(sediment load & other parameters) before discharging the water.
- 7) The work in the river always will be carried out free of protective structures aimed to limit the release of sediment in the stream.
- 8) Before the development of the sites, the remove the surface organic soil (earth vegetable) will be an obligation, and its storage for the purposes of reuse during the rehabilitation of the site.
- 9) Waters from concrete plant will be equipped with basins of sedimentation.
- 10) The ponds will be created in areas which will remain accessible to the gear in order to allow their regular maintenance (cleaning of the sediments); pits of deposition will be maintained near the basin in order to allow the soaking of sediments cured before their evacuation to a zone of final discharge.

3.2.5 Removal of Temporary Facilities and Clearing away the Rubbish

In the process of clearing, MEC ensures :

- Put the remains of construction materials in order at all times and clear away the rubbish in the course of construction. Prior to putting any portion into operation, remove all rubbish, odds and ends in the areas and leave such areas safe, clean. Good housekeeping at all times.

- In accordance with the requirements, clear away redundant materials and spoil arising from the Work, and leave the area tidy and clean after the completion of work each activity.
- Demarking of the area for clearing and means of control to ensure the respect of the demarcation by the forestry teams;
- The evacuation and the storage of wood that has commercial value.
- Disposal of waste wood forest and branches without commercial value and without interest for the local population.
- Control measures put in place to avoid the hunting or poaching of animal species/wildlife on the occasion of the clearing.
- The clearing will not prefer the chemical methods.
- The clearing by bulldozer will not be used in less than 10 m of areas notified as sensitive and manual clearing will be done.
- The clearing by the fire will not be done after approval.

3.2.6 Reconditioning of Site

MEC before final handing over of the site shall make sure of the following:

- 1) All temporary buildings, including concrete footings, slabs, construction material along with debris are removed from the site.
- 2) The area shall be re-graded or re-vegetated and maintained for the duration of the Defects Liability Period, so that all surfaces drain naturally.
- 3) Topsoil is stored according to the provisions.
- 4) Land is levelled to ensure that run-off water drains.
- 5) Revegetation of all Worksites. Revegetation is undertaken throughout the duration of construction works, and is not limited to the rehabilitation of worksites at the end of the works.

3.3 Control of Damage to Trees and Vegetation

MEC shall arrange ROW clearance with the help of employer during construction and operation of the works. Also, special approval shall be arranged from Employer, if potential exist for vegetation outside the approved ROW to interfere with the work.

Following rules shall be followed during clearing of ROWs:

- 1) MEC shall obtain approval from the Engineer prior to clearing the ROW and any adjacent areas that may require clearing.

- 2) MEC shall make sure that vegetation clearing procedures are developed and communicated to the workers directly involved in the clearing activities prior to the commencement of clearing work.

The vegetation clearing procedures shall consist of following features:

- a) Limit of vegetation clearance
- b) Vegetation clearing methods and
- c) Environment safeguards for erosion, sedimentation and pollution.

Special precautions shall be taken to minimize potential impacts. MEC shall to some extent practicable maintain desirable streamside vegetation in order to maintain habitat, shading and bank stability and to minimize the potential for sedimentation. Special precautions shall be taken to minimize rutting in wetlands. Mostly in wetlands only low-impact pressure equipment shall be used.(where practicable).

MEC shall make sure that care is being taken to preserve the natural landscape and shall conduct the construction operations, so as to prevent any unnecessary destruction, scarring, or defacing of the natural surroundings in the vicinity of the work.

Movement of labor or equipment within the right of way and over routes provided for the access to the work shall be performed in a manner to minimize damage to grazing land, crops and property.

Upon completion of the work, all work areas not re-vegetated shall be sacrificed and left in a condition which will facilitate natural re-vegetation.

Some more activities are already described under point no. 3.1, 3.2.1 & 3.2.6.

3.4 Management of Water Pollution

3.4.1 Waste Water Management

These activities are already covered under point no. 3.2.3 & 3.2.4

3.4.2 Control of Effluents

Effluents consist of liquid discharges, including infiltration, from worksite, transporting a pollutant (dissolved, colloidal or particles)

1. A pollutant is a given chemical compound that is at a concentration that is greater than the limit values recognised for that compound.

2. No effluent will be discharged into water courses, soils, lakes or the marine environment without prior treatment and without monitoring of the treatment's performance to guarantee the absence of pollution.
3. MEC to carry out in-situ monitoring and laboratory analysis of the performance indicators.
4. The effluent monitoring is carried out pursuant to and using an equipment that complies with the relevant standards of the International Standards Organization (ISO).
5. The physical and chemical parameters of the effluent that are monitored are those that are listed in the Employer's country environmental regulations, or if these do not exist, the parameters are based on the recommendations of specialised international organisations. The parameters have prior approval from the Engineer.
6. MEC will list, locate, and characterise (flow, expected quality, discharge frequency) all sources of effluents and outlets in the natural environment in the Site Environment Protection Plan(s).
7. MEC will submit to the Engineer an effluent quality monitoring report, including documentation for the following for each effluent discharge point: (i) average flow rates of discharged effluents, (ii) discharge frequencies and durations over the month, and (iii) the physical and chemical quality of the effluent discharged
8. The special case of rainwater run-off
 - a) Run-off consists of the rainwater flow on the surface or the soil and other technical surfaces at worksites.
 - b) In the context of the Contract, run-off is considered as an effluent unless demonstrated otherwise, as documented and substantiated by the Contractor, and approved by the Engineer.
 - c) All platforms where generators, hydrocarbon storage tanks and refuelling stations are installed have impervious surfaces, are drained and equipped with an oil removal treatment to prevent pollution. For concrete platforms, run-off will be drained to settling basin, where the pH will be buffered.

3.4.3 Monitoring of Quality of Water

This procedure is applicable if required by Employer to a natural surface water, groundwater and has all the releases from sites of dependent activities of the project.

A regular monitoring of the quality of water is applicable in following cases:

- The Effluent drafts from the stations for the treatment of wastewater (lagoons, septic);
- Basins of sedimentation of the power stations has Concrete;
- Basins of sedimentation of storm water in the Sites judges particularly sensitive ;
- The drainage waters from the sites of workshops, storage of hazardous products and areas of canteens;
- Rivers receiving of the releases of the sites, with Check upstream and downstream of the point of discharge;
- Sites of work in Rivers, with control of the solid load upstream-downstream work;
 - Drilling of installed follow-up around the center of landfilling of solid
- Points of the storage and distribution of drinking water.
- The monitoring will cover at the quality indicators of water like nitrates, phosphates, Oils and grease, Matter in suspension, Bacterial pollution, Residual chlorine, ammoniacal nitrogen, nitrate, chloride, Zinc, Chromium, Lead, mercury, pH, dissolved oxygen etc.;
- To achieve these followed during the duration of the work, the MEC will get water tested at a laboratory for chemical analysis to carry out the analysis of these basic parameters;
- The frequency of the measures will vary fas decided with Engineer depending on the type of installation concerned. The MEC shall , has a prior estimate of the number of sites and analysis in the framework of its offer; the frequency may be occasionally and temporarily increased in some sites or problems will have been identified;
- The MEC will submit to the Engineer the results of the monitoring of quality of water.

3.5 Control of emissions in Air & Dust (Air pollution control)

MEC shall use only adequate and well maintained construction and transportation equipment including diesel & fuel of good quality. Equipment and vehicles that show excessive emissions of exhausts gasses due to poor engine adjustments, or other inefficient operating conditions, shall not to be operated until corrective repairs or adjustments are made.

MEC shall take appropriate measures for dust suppressions.

Heavy duty vehicles which transport constructions material for longer distances (quarry to constructions site) shall be covered by a tarpaulin.

- We maintain strict maintenance of gears, engine and of vehicles in order to minimize releases of the exhaust gases in the atmosphere;
- The burning of waste will be limited in order to reduce nuisance by the odours; only the combustion of waste non-toxic will be permitted: wood, cardboard and paper; the latter could not

be carried out, for small quantities, at sites dedicated on site (has the example of biomedical waste centers of health, to eliminate in appropriate incinerators reaching at least the temperature of 700°C).

- MEC will combat emission of dust on the sites specific to the site and along the roads of access frequented by vehicles to the project site at the right to within inhabited areas;
- The speed of vehicles passing through village nearby worksite will be kept less.
- The fight against the dust will be based on the following principles:
 - Reduction in potential Areas of transmitting dust: minimizing disturbed areas, cleared and opened at the same time, progressive revegetation of disturbed sites, deposits of debris or materials as and when they are completed;
 - On roads and tracks inside the site, reduction of the speed of vehicles;
 - On roads of access and internal channels to the site, regular spreading of water or other product allowing a fixation of particles in the soil.
- To stop spreading of dust, MEC will identify:
 - The road sections or the presence of residential unit for measures required for the reduction of dust;
 - The width of the track in order to determine if the spreading Request a passage (close track) or 2 passes (track large);
 - The number of spreading of water proposed daily
 - The water points identified or created for the refueling of tanker trucks;
 - The capacity of the tanker trucks mobilized and the calculation of the number of trucks needed.

3.6 Control of Noise & Vibrations

MEC shall carry out regular noise/vibration level management, using standards sound level meter, to demonstrate compliance with Noise level Guidelines. In case of non-compliance, mufflers and other noise control devices shall be installed in construction site, workers shall be provided with adequate hearing protections.

Various precautionary measures that MEC shall take in order to minimize the Noise Pollution are as stated below:

- Installations areas, for example mechanical workshops etc. shall be made separate from areas that are used by people for temporary housing and recreation.

- Avoid any noise-intensive works during night time.
- Avoid transporting of materials (rock, concrete, steel, machinery) during night time.
- Instruct the workforce to avoid unnecessary noise.
- Equipment at site like DG set will have soundproofing.
- Vehicles should make minimum noise.

4.0 Health & Safety Management

4.1 Health & Safety Management at site

Health & safety management requires various activities at site including following:

- Defining Health & Safety inspection requirements during construction/ erection at site
- Health & Safety inspection of all activities including excavation, rock blasting and scaffolding, welding etc.
- Fire Fighting Management
- Evacuation training & mock drill
- Management of Transportation of Heavy Equipment
- Defining & providing Health & Safety requirements for commissioning
- Defining & ensuring Sub-contractors health & safety duties
- Providing awareness of infectious & communicable diseases
- Providing awareness for use of personal protective equipment
- Providing first aid & medical care/facilities at site

4.2 Hazard Identification, Risk Assessment (HIRA) and Controls

4.2.1 Assessment of exposure of the work force to hazard and effect:

The Civil & Electrical construction related hazard sheets will be developed.

4.2.2 Handling of Chemicals

If any chemical is to be used, it will be ensured that the necessary safety information is available prior to its use & handling

Personnel involved in the handling of these chemicals and their supervisors are made aware of the of the contents of the SHOC(Strategic Health Operations Centre) cards/MSDS(Material

safety data sheets). Adherence to the guidance given on the SHOC cards/MSDS will be ensured by the HEALTH & SAFETY Supervisor through regular routine checks.

4.2.3 Hazard Assessment / PPE Requirements:

All personnel engaged on the project will be provided with PPE that meets the requirements of EMPLOYER.

Construction contractor will be required to identify all activities requiring the use of PPE and implement a procedure covering issue, inspection, replacement and instruction/training.

4.2.4 Risk Assessment And Risk Management Plan

A risk management system where hazards, risks and mitigating actions are identified is implemented by MEC and its Sub-Contractors.

Risk assessment includes:

- Baseline risk assessment
- Issue based risk assessment
- Continuous risk assessment

Risk assessment is conducted and communicated to employees before working on site.

MEC will make and submit Risk Management Plan to the employer for approval. The implementation of the plan is ensured throughout the duration of the project.

4.3 Usage of Personal protection equipment (PPE)

All personnel engaged on the project will be provided with PPE that meets the requirements.

MEC will identify all activities requiring the use of PPE (like helmet, safety shoes, safety reflective jacket etc.) and implement a procedure covering issue, inspection, replacement and instruction/training.

Sufficient quantity of Personal Protective Equipment (PPE) are made available at site conforming to Indian / International standards and provide these equipment to every workman at site as per need and to the satisfaction of employer.

The site Supervisor/ Project Manager shall ensure that all personnel, visitors or third parties

entering a Worksite are equipped with Personal Protection Equipment (PPE) pursuant to the practices and standards. It shall also be ensured that Industrial Safety helmets are being used by all workmen at site irrespective of their working (at height or on ground). It is further ensured to use safety shoes by all ground level workers and canvas shoes for all workers working at height, Rubber Gum Boots for workers working in rainy season and concreting job, Use of Twin Lanyard Full body Safety Harness with attachment of light weight such as aluminium alloy etc. and having features of automatic locking arrangement of snap hook, by all workers working at height for more than three meters and also for horizontal movement on tower shall be ensured by contractor. The half body safety harness shall not be used at site. MEC has to ensure use of Retractable type fall arrestors by workers for ascending / descending on suspension insulator string and other similar works etc., Use of Mobile fall arrestor for ascending / descending from tower by all workers. The contractor has to provide cotton / leather hand gloves as per requirement, Electrical Resistance Hand gloves for operating electrical installations / switches, Face shield for protecting eyes while doing welding works and Dust masks to workers as per requirement. MEC will take action against the workers not using Personal Protective Equipment at site and those workers shall be asked to rest for that day and also their Salary be deducted for that day.

4.4 Care & Medical Staff

All sickness must be monitored and kept in file, and if severe, be reported to HEALTH & SAFETY Dept. All accidents and near misses shall be reported to EMPLOYER. Any health problems, sickness and casualty accident that occur during the performance of the project shall be investigated and handled right away by HEALTH & SAFETY Dept.

For treatment of sickness or handling of an accident, the following procedure will be followed:

- Look into the matter and analyze the cause.
- Assess personnel and make them draw lessons from the accident or sickness.
- Take appropriate preventive measures.
- Complete the Sickness & Accident Report
- Accident Emergency Measures and Treatment
- Present the accident report and the claim report timely to the insurance company in order to get adequate insurance indemnity.

The HSE Manager / Officer shall make sure of the requirements are met at the site:

- (a) Tie up, with a nearest medical care and health station is provided with an ambulance, relevant apparatus and instruments and medical personnel and public health workers.
- (b) The station checks up the constructor's health periodically and raises plans of

changing posts for workmen not suitable to particular jobs of existing posts, The plans are coordinated/put into practice by Project Department and Administration Department.

- (c) Provide emergency services like first aiding service to an accident and responding to emergency as quickly as possible.
- (d) Provide enough sanitary facilities in the camp and construction areas, and clear away garbage in time to prevent infectious and endemic diseases.
- (e) Monitor the sources of dust, noise and vibration caused by construction periodically. Control and reduce their injury and ensure workforce is healthy.
- (f) Arrange and carry out sanitary inspection and appraise through comparison at regular intervals.

4.5 Sickness & Accident Control-First Aid, Medical evacuation of emergency

Accident Emergency Measures and Treatment

- When accident happens rescue the injured first.
- Appropriate measures shall be taken to stop the accident and to prevent secondary harm, such as the burning and trench cave-in, liquid to form explosive mixture, and to prevent toxication, burning again, falling of materials...etc.
- Set up a security line, evacuate all unrelated personnel and prevent them from entering. At the site where combustible gas or/and liquid is leaking traffic will be prohibited.
- Protect the site and keep it in original state. All the objects, marks and items relating to the accident shall remain intact. Make appropriate marks at the site if any objects have to be moved due to the rescue of the injured.
- Report to the parties concerned according to the level and nature of the accident.

Complete "**accident or sickness report**" including:

- Accident investigation report
- Site investigation record and photos.
- Material evidences, witness evidences.
- Economic loss of the accident.

- Personnel statement
- Medical certificate for the dead and the injured by a medical department or hospitals.
- Notification, brief report and other information about the accident.

Insurance company indemnity data. Investigator's signature on Notes

Emergency medical evacuations

MEC will provide the Engineer within one month of the start of works, an agreement with a specialized company for the handling of personnel in the event of a serious accident requiring an emergency medical evacuation, which cannot be organised using the first aid vehicle without endangering the life of the patient.

Evacuation of affected persons will be done to nearby hospital where the member will be treated.

4.6 Control of Infectious & Communicable Diseases (HIV/AIDS, Malaria ,....)

Suitable awareness and education is imparted for prevention of any infectious diseases, sexually transmitted diseases and AIDS. Workers are subject to periodic health checks and a record of these checks is maintained so as to avoid common allergies while at the workplace. Training sessions are held during ongoing projects at worksites to avoid epidemics, infectious diseases and AIDS.

The initial pre-recruitment examination must confirm that applicants carry no infectious diseases and are physically able to carry out the tasks required for the position.

Provide enough sanitary facilities in the camp and construction areas, and clear away garbage in time to prevent infectious and endemic diseases.

4.7 Work permit

MEC puts in place a work permit procedure to manage risks through the implementation of prevention and protection measures prior to the starting of work. The procedures define the approval process between the person qualified to issue the work permit and the personnel (or subcontractors) carrying out the work.

The period of validity of a permit does not exceed twelve (12) hours without renewal. Permits are issued in writing. Works which require a work permit are defined.

5.0 Labor Protection and Sanitation

5.1 Labor Protection

- (a) According to the country rules & regulation we prepare the management and schedules of appliances for labor protection against the special conditions (dry, hot) on construction site, and provide suitable equipment and supplies for the work force,
- (b) The HEALTH & SAFETY Dept. prepares the schedules of equipment and supplies for labor protection and the Procurement Department purchases and provides these for the workforce.
- (c) Obey The country labor laws and regulations and comply with other's requirements, The department shall plan its works on the basis that all construction activities shall be performed.

The HEALTH & SAFETY Dept. prepares the schedules of equipment and supplies for heatstroke prevention and the Procurement Department purchases and provides them to the workforce. The construction sites are provided with sunshades, enough sanitary and filtered pure drinking water.

5.2 Medical Care and Sanitation

- (a) Tie up, with a nearest medical care and health station provided with an ambulance, relevant apparatus and instruments and medical personnel and public health workers.
- (b) The station checks up the constructor's health periodically and raises plans of changing posts for workmen not suitable to particular jobs of existing posts, The plans are coordinated/put into practice by Project Department.
- (c) Provided emergency services like first aiding service to an accident and responding to emergency as quickly as possible.
- (d) Provided enough sanitary facilities in the camp and construction areas, and clear away garbage in time to prevent infectious and endemic diseases.
- (e) Monitor the sources of dust, noise and vibration caused by construction periodically. Control and reduce their injury and ensure workforce is healthy.
- (f) Arrange and carry out sanitary inspection and appraise through comparison at regular intervals.

6.0 List of Tables & Illustrations

6.1 Monthly Man-hours detail

For the Month of April- 2020				
	ACCIDENT STATISTICS SUMMARY	DAILY	TOTAL PER MONTH	REMARKS
1.	Numbers of Manpower worked		35	
2.	Working hours per Man-day		8	Each man-hours
3.	Total Number of Workdays in APRIL-2020		22	
4.	Total No. Of Holidays		8	
5.	TOTAL = Total Manpower per day X per day man-hours X Total Working Days in a month (35 X 8 X 22)			
6.	Overtime hours (in 22 days)			
7.	TOTAL MANHOURS (in the month of April -2020)			
8.	Number of Reportable Fatal Accidents	0	0	
9.	Number of Reportable Non-Fatal Accidents	0	0	
10.	Number of Dangerous Occurrences	0	0	
11.	Number of Man-hours Lost (First Aid cases only)	0	0	
12.	Average Number of Workers Daily	45	990	Including staffs/client representatives / Subcontractor's staffs

6.2 Risk Assessment

	CONSULTANT	FEEDBACK INFRA PVT. LTD
	PROJECT	CONSTRUCTION OF MV/LV DISTRIBUTION NETWORK-UGANDA
	TITTLE	HSE

RISK ASSESSMENT: Office Activities

CODE	1	2	3	4	5
RISK	LOW	MODERATE	MEDIUM	HIGH	CATASTROPHIC
SEVERITY	LOW	MODERATE	MEDIUM	HIGH	CATASTROPHIC

6.2.1 ACTIVITY/ TASK BEING CONSIDER:

HAZARD	WHAT COULD GO WORNG	INITIAL RISK	SEVERITY	CONTROL MEASURES	INITIAL RISK	SEVERITY
Safety of the worker's/ Visitors	Near miss or site injury could cause by falling in excavated pit or Hit by any object or Plant and machinery.	2	1	Clear safety / Warning signs for visitors in noticeable places and using of appropriate visibility gears. Identification of high-risk areas/ locations No storage of materials or waste in public walkways.	1	2
Manual Excavations	Personnel falling into excavated foundation holes or trenches. Public, personnel and fauna injury Night-time	2	1	Barricading, Surveillance and/or security, Minimize trench depth where possible. Maintain safe clearances.	1	2

	hazards					
Reinforcement cutting & bending	Hit & fall by steel, Physical Injury could happen	2	2	All mandatory PPE's have to be used, To avoid back injuries, training should be given in the correct methods of handling and lifting of any equipments.	2	1
HAZARD	WHAT COULD GO WORNG	INITIAL RISK	SEVERITY	CONTROL MEASURES	INITIAL RISK	SEVERITY
Failure of support systems	Support system like shuttering, platform ladders etc. may failure or break	2	1	Inspect all support system prior to the work.	2	1
portable electrical equipment for construction work (welding machine,drilling machine,grinding or cutting achine etc)	contact with live parts causing shock and burns.	2	2	Ensure Fuses are correctly fitted avoid overloading socket-outlets and adopters, it can cause fires. Avoid water at all times when working with electricity	2	1
Pouring of concrete into pole foundation pit/ plinth	Concrete spillage on the ground occurred soil pollution	2	1	Appropriate corrective measures have to be implement to control & minimize spillage of concrete.	1	2

Trip, Slip and Fall Hazards	Physical Injury could happen	2	1	cleaning all spills immediately removing obstacles from walkways and always keeping them free of mess.	1	2
Lifting of Materials	Any swing object could fall on the body ,Back injuries could happen if worker's will not lift the civil materials properly	2	2	Minimize required access to height. To avoid back injuries, will follow correct method of lifting and handling equipment's	2	1
Electrical Equipment	Electric shock	2	2	Pre-use inspections of working areas, Protect overhead cables Area to be kept clean and tidy, All electric leads should keep insulated.	1	2

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	TITTLE	HSE

RISK ASSESSMENT: Office Activities

CODE	1	2	3	4	5
RISK	LOW	MODERATE	MEDIUM	HIGH	CATASTROPHIC
SEVERITY	LOW	MODERATE	MEDIUM	HIGH	CATASTROPHIC

6.2.2 ACTIVITY/ TASK BEING CONSIDER:

Hazard	What could go wrong	Initial Risk	Severity	Risk Severity	Control Measures	Initial Risk	S	IxS = R
Clerical works	Ergonomics	1	1	1	Continuous use of computer shall be avoided	1	1	1
Use of Computer	Health hazard due to prolong exposure/ Stress on Eye	2	1	2	Use specs for eye protection	2	1	2
Xerox & printing activity	Health Hazard / Carcinogenic	2	1	2	Machine shall be kept in well-ventilated area	1	1	1
Utilities (Room & toilets)	Fall hazard/slippy area/ Injury	2	1	2	Proper house keeping	2	1	2
Transportation of staff for official work	Vehicular Accident / Injury	2	2	4	Safe Driving & follow road safety rules	2	1	2

					,Respecting road signs at all time,Using safety belts, Not using a mobile phone when driving			
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6.2.3 Activity / Task Being Considered :

List of hazards identified in the activity.	Calculated Risk Level	Controls required?(Yes/No)	What controls are proposed?	Action By	Target
Emergency Preparedness	High	Yes	Assembly point has been already demarked at Safe place near site entrance area , and Emergency exit plan will display at some places.	Safety Officer/ site In charge	On Going Process
Without wearing PPE	High	Yes	All the worker has to wear the PPE before enter in to Site	Safety Officer/ Site Engineers	On Going Process
House keeping	Medium	Yes	All waste materials disposing at designated places Housekeeping works should perform on regular basis.	Safety Officer/ Site Engineers	On Going Process

6.3 Safety or PEP Talks

Details of safety & pep talk for the month of April- 2020

SL NO.	DATE	DESCRIPTION	NO. OF ATTENDEES	TRAINING CONDUCTED BY	LOCATION
1.	01 to 30 April- 2020	Induction Training for new workers/staff	10	SAFETY OFFICER	At SUBSTATION
2.	01 to 30 April- 2020	Importance of PPE's, Electrical safety, Emergency response procedure, accident preventions, workplace safety negligence, health hygiene & sanitation, Prevention & control of transmittable disease etc.	120	SAFETY OFFICER	At SUBSTATION

6.4 HSE Inspection (April- 2020)

SL NO.	DESCRIPTION	DATE/DAY	FREQUENCY
1	PLANNED GENERAL INSPECTION		
	Safety inspection by (HSE officer)	01. 04.2020 To 30.04.2020	Daily
2	ROUTINE INSPECTION		
	Inspection of site area , plant and equipment by operator or technician (Concrete mixer machine, Hydra crane , grinder machine, welding machine Etc)	01. 04.2020 To 30.04.2020	Weekly/ as require
	Inspection of temporary electrical systems by competent electrical supervisor/Electrician	Check	Weekly
	Inspection of Electrical cables, Ladders, Power supply Booth by Authorized/Competent person	01. 04.2020 To 30.04.2020	Weekly

6.5 Details of communication for the month of April '2020

Sr. No	Location	Type (Poster / Slogan)	Topics Covered	Number of Poster / Slogan
1.	Project Site Entrance area	Safety Sign Board	Construction Work Information	1
			Speed Limit	
			Site safety Instruction	
			STOP	
			MEN AT WORK	
			Emergency Contact numbers	
			Assembly Point	
2.	Working Location	Safety Sign Board	Hard Hat Area	1
		Safety Sign Board	MEC's Environment policy	1
		Safety Sign Board	MEC's Safety Policy	1
		Safety Sign Board	Site safety Instruction , PPE's Construction Work Information	1
		Safety Sign Board	First Aid Kit Information	1
		Safety Sign Board	FIRE Extinguishers Information	1
		Safety Sign Board	Electrical Hazard information	1
		Safety Sign Board	Wear protective clothing information	1
		Safety Sign Board	Safe Working Instructions	2
		Safety Sign Board	Way to Assembly Point information	3
		Safety Sign Board	Site Emergency evacuation layout	2
		Safety Sign Board	Emergency Contact Numbers	2
		Safety Sign Board	Welding and cutting safety instructions	1
		Safety Sign Board	Notice Board	1
Safety Sign Board	Safety Rules	1		

7.0 Safety Signboards / Displays



FIGURE 1: PPE KIT TO BE USED AT CONSTRUCTION SITE



FIGURE 2: WARNING BOARDS USED AT CONSTRUCTION SITE



FIGURE 3: FIRE EXTINGUISHER SIGN BOARD



FIGURE 4: AWARE SITE PERSONNELS & LOCALITES ABOUT AIR POLLUTION

8.0 BIBLIOGRAPHY

The entire data required for the dissertation has been arranged by direct interaction with the Village heads & local villagers of MALI, DR CONGO & UGANDA Provinces where we are executing our Rural Electrification Project.

Besides above, the information & relevant data has been collected from the experience gained during the execution of the Rural Electrification projects executed in the past.

Other source of EHS data gathered from the below mentioned e-books:

1. Safety, Health & Environment Handbook written by K.T. Narayanan
2. Handbook on Environmental Health & Safety Vol -1& 2 written by Herman Koren & Michael Bisesi
3. Environmental Health & Safety Audits: Edition 9 written by Lawrence B. Cahill & Raymond W. Kane
4. Environmental & Health Safety Management: A Guide to Compliance written by Nicholas P. Cheremisinoff & Madelyn L. Graffia
5. Project Management for Environmental Health & Safety Professionals: 18 Steps to Success written by Pierce, CSP, CIH, F. David
6. Safety, Health & Environmental Auditing: Practicla Guide, Second Edition written by Simon Watson Pain

THANK YOU

HAVE A GOOD DAY !