



ELECTRICITY SUPPLY CORPORATION OF MALAWI LIMITED

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HAZARDOUS MATERIALS AND WASTE MANAGEMENT PLAN

THE ELECTRICITY SUPPLY CORPORATION OF MALAWI [ESCOM]

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1. Introduction

This Hazardous Materials and Waste Management Plan (HMWMP) for the Malawi Emergency Power Restoration Project (MEPRP) component 2 which presents the activities to be conducted to support the safe handling of hazardous materials and waste during the project implementation in compliance with applicable legal requirements, standards and guidelines. The project focusses on rehabilitation and increasing resilience of transmission and distribution electricity infrastructures damaged by Tropical Storm Ana including both transmission, distribution line networks and the construction of two single storey warehouses.

This Plan provides instructions for the safe handling, storing, containment, use transportation, treatment and final disposal of hazardous materials and waste in order to prevent releases to the environment, and prevent human exposure.

1.1. Definition of Hazardous Materials

Hazardous materials and wastes are defined in the Environmental, Health and Safety Guidelines (EHSGs) as materials that present a risk to human health, property, and the environment due to their physical or chemical characteristics. Any material that is no longer usable for its original purpose and is intended for disposal, but still has hazardous properties, is hazardous waste.

These can include: explosives; compressed gases, including toxic or flammable gases; flammable liquids; flammable solids; oxidizing substances; toxic materials; radioactive material; corrosive substances; chemical fertilizers; soil amendments; chemicals, oils, and other hydrocarbons; paints; pesticides; herbicides; fungicides; asbestos; metal waste; hospital and pharmaceutical waste; used batteries; radioactive medical waste; fluorescent light bulbs and ballasts; byproducts of plastic incineration at low temperatures; and polychlorinated biphenyls (PCBs) in electrical equipment. Generally, the term “hazardous material” refers to materials brought on site for use during construction either as part of the construction process (for example, diesel fuel used by construction equipment) or as part of the MEPRP itself (for example, mineral oil used in transformers, which will remain on site during project operations).

1.2. Scope of this Plan

This plan is applicable to the construction, operation and maintenance of the MEPRP transmission and distribution lines as well as the warehouse, described under ‘project description’ below. It provides further guidance to construction contractors, and to ESCOM (for operation and maintenance) on the safe handling and management of hazardous materials and waste, and should be read in conjunction with the Environmental and Social Management Plans for transmission and distribution and for warehouses. Also note that this plan does not address non-hazardous wastes, which are addressed in separate General Waste Management Procedures.

The construction contractor is fully responsible for identifying, handling, storing, and transporting hazardous wastes in accordance with the provisions in the EMA section 42. The construction contractor will be responsible for implementing the hazardous waste management procedures in this Plan.

Construction contractors will be required to develop a specific plan which will guide the management of hazardous materials and waste. In that plan they will identify the specific hazardous materials and the anticipated hazardous waste and create an inventory for the

same. The contractor will also establish standard operating procedures (SOP) for the safe handling and transportation of hazardous materials and waste.

While the requirements described in the sections below are written for contractors, ESCOM will follow the same requirements during operation and maintenance.

1.3. Project Description

The MEPRP component II project has two components, namely transmission and distribution line rehabilitation and construction of two warehouses. ESCOM plans to reconstruct its infrastructure damaged by tropical storm Ana including both transmission (132kV & 66kV) and distribution (33kV, 11kV and 400V lines) networks where a number of power line components have been affected. These include steel towers, wooden poles and structures, transformers, conductors and insulators. The project will further construct two warehouses. The major activities under the transmission and distribution network rehabilitation project will target rehabilitating and upgrading of priority transmission and distribution assets affected by the storm. The prioritised scope summary for the proposed rehabilitation and reconstruction project for the resilience of the network infrastructure includes:

- Replacement of required wooden pole with steel monopole or steel lattice towers.
- Replacement of wood pole and ACSR conductor for river crossing with steel lattice tower and lighter and low sag AAAC conductor and its related hardware fittings.
- If required, replacement of an existing glass insulator with new 120 kN polymer insulator with its hardware fittings.
- New foundations shall be executed for the poles in water logged, river crossing area for wooden/ steel monopole and steel lattice tower.
- New hardware fittings suitable for the new types of poles/towers.

If required, replacement of the transmission line components i.e., wooden poles, transformers, hardware fittings, insulators, vibration damper, Shielding wire. X-arm, X-bracing, stay wire, foundation corrugated structure.

Two warehouses, associated offices and sanitary rooms are proposed to be constructed. The objective of the warehouse construction project is to keep ESCOM spare parts and equipment inventory level optimized by maintaining the supply with demand. This will help ESCOM to timely respond to future damages to ESCOM infrastructure, as well as towards improving the resilience and efficiency of ESCOM services. The main design elements and activities at each of the sites is typical of small-scale, single-storey building construction. The proposed project is anticipated to engage at least 3 different contractors who will be responsible for the works. One contractor will be responsible for reconstruction of distribution components, while the other two will be responsible for the reconstruction of Transmission components, and warehouse construction respectively.

During project works execution, The estimated amounts of hazardous materials to be used and hazardous waste to be generated will be determined by the selected contractors in respect of the established work schedule and the amount of hazardous waste generated and will be provided in the contractor's hazardous materials and management plan. However, the following hazardous materials and substances presented in Table 1 below are anticipated to be in use:

Table 1: Anticipated Hazardous Materials and Substances

Material name	Usage
Diesel	For fueling vehicles and plants
Motor oil	Used as lubricants in vehicles and plants
Welding rods	For welding works
Paints, thinners, cleaning solvents (Lead-free)	For painting and cleaning of equipment and tools
Batteries	For electrical powering of vehicles, plants and tools
Gasoline	For fueling vehicles
Gas	For hot works
Carbolineum	For preservation of timber and wood
Solignum	For preservation of timber and wood
Mineral oil	For use in transformers
Sulfur Hexafluoride (SF6)	Used in transformers
Polychlorinated Biphenyls (PCB)	Used in transformers

This plan therefore, outlines the measures/processes and/or instructions on how these materials/substances and their resultant wastes/residues will be handled throughout the project cycle.

1.4. Applicable Legal Requirements, Standards and Guidelines

Applicable legal requirements are set out in Malawi's Occupational Safety, Health and Welfare Act (OSHWA) 1997, the Environment Management Act (EMA) 2017, and the Public Health Act 1948. In addition, further guidelines are provided in:

- World Bank Group EHS Guidelines, including Sections 1.5 Hazardous Materials Management, and 1.6 Waste Management (including a sub-section on hazardous wastes management);
- <https://www.basel.int/> - the website of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, which Malawi has ratified.

According to the OSHWA 1997, Section 51, the following general guidelines must apply when managing hazardous substances and waste in Malawi:

- Manufacturers, importers and suppliers of hazardous substances used at workplaces, including those in the agricultural sector, shall provide sufficient information on such substances with the precautions to be taken.
- In the use of all materials containing hazardous substances and during the removal and disposal of wastes; the health of the workers and of the public and the preservation of the environment shall be safeguarded.
- Hazardous substances shall be clearly labelled giving their relevant characteristics and instruction on their use.
- Containers of hazardous substances shall carry, or be accompanied by, instructions for the safe handling of the contents and procedures to be followed in case of spillage.
- In application of hazardous substances preference shall be given to means other than spraying, such as by brush or, where feasible roller. Caution should also be exercised in terms of the location where the activity will be undertaken, in order to avoid contamination of soil or water.

- Where the use of toxic substances or other volatile chemical substances, including thinners and paints cannot be avoided, special control measures, including local exhaust ventilation, shall be instituted.
- Where the use of hazardous chemicals is likely to penetrate the skin and cause rash, skin contact with hazardous chemical shall be avoided and personal hygiene and the type of clothing worn shall be such as to enable rapid removal of any chemical from skin contact.
- Where it is necessary to deal with proven carcinogenic substances, particularly in work involving bituminous tar, asphalt, asbestos fibers, pitch, heavy oils, and aromatic solvents, strict measures shall be taken to avoid inhalation and skin contact.

2. Hazardous Materials and Wastes Management

2.1 Minimization of Hazardous Materials

To the extent possible, the construction contractor will minimize the use of hazardous materials. The construction contractor will make every effort to use chemicals presenting the least environmental hazard wherever possible or substitute hazardous materials with safer alternatives. During construction activities, hazardous materials will be properly used, stored, and disposed of in accordance with manufacturer recommendations and the national regulations. The Environmental Specialist in collaboration with the Health and Safety Specialist of the Contractor have the responsibility to determine hazardous materials and advise on safe management of the same.

1.5. 2.2 Hazardous Material Inventory

Hazardous materials stored on site and used during construction will be documented in the Hazardous Materials Inventory. A Hazardous Materials Inventory Form is included in Annex A. The Hazardous Materials Inventory Form will be completed by the construction contractor for new materials brought on site or if the amount to be stored on site changes significantly. The hazardous materials inventory will be maintained by the construction contractor and a copy should be shared with the OHS Specialist of ESCOM. The contractor shall ensure that all hazardous materials come with Safety Data Sheets (SDS) and that the SDS are available and accessible to the people handling the hazardous materials.

1.6. 2.3 Hazardous Waste Generation

Typical wastes that may be generated during construction activities are paints, spent solvents, waste lubricants, spent oil-absorbent materials, and impacted soil. Equipment that is decommissioned as part of the replacement of unstable structures will be disposed of or recycled in accordance with waste management guidelines and by-laws as guided by the respective District/City Councils within which work is being done, and World Bank ESF requirements and EHS Guidelines. Utility wood pole waste may be generated during decommissioning of existing lines. Utility wood pole waste will be reused by ESCOM elsewhere to minimize waste.

2.3.1 Restrictions on Hazardous Waste

When categorizing solid waste as hazardous, it becomes subject to subsequent restrictions. Hazardous waste will not be disposed of or recycled alongside regular trash or waste, burned, or allowing it to evaporate into the air. Additionally, hazardous waste will not be disposed of or diluted in water (such as by pouring it down the drain), nor can it be disposed of or buried in the land or water bodies.

2.4 Containerization and Labelling

Where possible, hazardous materials will be kept in their original containers and the containers will be clearly marked/ labelled with information such as waste type, hazards, accumulation start date, and generator information and the containers will be displayed with appropriate warning signs around hazardous waste storage areas to alert personnel and visitors to the presence of hazardous materials and will be periodically inspected by the assigned personal.

Hazardous waste will be accumulated and stored on site during construction. Hazardous waste will be managed by the construction contractor in conformity with the EMA guidelines, and World Bank ESF requirements and EHS Guidelines. The construction contractor will maintain a readily accessible supply of spill control measures, such as

absorbent pads; implement secondary containment measures as warranted; and conduct periodic inspections.

Hazardous waste must be packaged in containers compatible with the waste and a completed label affixed at the time the waste is first added to the container.

2.5 Storage and Transport

All hazardous wastes will be handled in a safe and environmentally sound manner. Hazardous wastes will only be stored at designated hazardous waste storage areas that would be used for hazardous waste collection or consolidation. Hazardous waste may be generated at any of the individual work areas or “remote sites” but will be stored at “consolidation sites,” which will be secured static project work areas. “Remote sites” will use the closest “consolidation site” during project construction for hazardous waste storage. A remote site is one where hazardous waste is generated but is not routinely staffed and is not adjacent or connected to a secured project site. Many work areas, primarily along the transmission line, qualify as remote sites. Waste from remote sites will be handled and transported to a consolidation site in accordance with the applicable guidelines.

In general terms, procedures will be implemented by the construction contractor to prevent leaks and spills during storage and transport, such as:

- Ensuring materials are stored in designated areas.
- Storage area will be cool, dry and away from heat and moisture to prevent chemical reactions. The storage area should be secured with restricted access and out of reach by children and the public.
- In areas with above-ground tanks with a total storage volume equal or greater than 1,000 liters, appropriate secondary containment structures will be used, consisting of berms, dikes, or walls capable of containing the larger of 110 % of the largest tank or 25% percent of the combined tank volumes, made of impervious, chemically resistant material.
- Different hazardous materials or waste should be stored separately to prevent reactions or cross-contamination.
- Materials will be stored on impervious surfaces or within secondary containment to prevent spills or leaks from infiltrating the ground.
- The area will also have appropriate drainage system to handle rainwater and prevent the accumulation of water within the containment area. This will help to avoid water contamination from runoff during wet weather.
- Only necessary quantities of materials will be stored.
- Only containers designated for storing hazardous materials will be used.
- Incompatible materials will be stored in segregated areas and will not be placed in the same containers.
- Hazardous waste containers will remain closed during transfer and storage, except when it is necessary to add or remove waste.
- Only personnel trained in handling of hazardous materials will be allowed to perform these tasks.
- No hazardous materials will be stored in proximity to wetlands, waterways, and waterbodies.
- Hazardous materials are prohibited in the following areas:
 - Food and beverage consumption areas
 - Recreational facilities
 - Washrooms

- Meeting rooms
- Carpeted areas
- Common areas accessible or used as a gathering location by the public
- Personal and administrative offices

Transportation procedures will include:

- Properly classify the hazardous waste according to international and national regulations. Ensure that accurate documentation, including waste manifests, is prepared and accompanies the shipment.
- Package hazardous waste in containers that meet the regulatory standards for strength, durability, and compatibility with the waste being transported. Label containers with appropriate hazard labels and markings.
- Use transportation vehicles that are specifically designed and equipped to handle hazardous waste materials. Ensure that these vehicles meet safety and regulatory requirements for the type of waste being transported.
- Provide specialized training for drivers and personnel involved in the transportation of hazardous waste. This training should cover emergency response procedures, handling practices, and safety measures.
- Implement security measures to prevent unauthorized access to the waste during transportation. This includes securing the cargo and ensuring that only authorized personnel have access.
- Develop and communicate an emergency response plan that outlines procedures for handling accidents, spills, or incidents during transport. Ensure that all personnel are familiar with and capable of executing the plan.
- Plan transportation routes carefully to minimize exposure to populated areas and sensitive environmental areas. Avoid routes that could pose a higher risk to public safety and the environment.
- Implement a system for tracking the movement of hazardous waste from its point of origin to its final disposal or treatment facility. Ensure that this system provides real-time information and reporting.
- Adhere to international agreements and conventions related to the transportation of hazardous waste, such as the Basel Convention, when applicable.
- Retain records of hazardous waste transportation activities, including manifests, bills of lading, and other relevant documentation, for the required period as specified by national regulations.
- Implement measures to prevent spills and leaks during transportation, including the use of secondary containment systems and spill response equipment.
- Continuously evaluate and improve transportation practices to enhance safety and minimize environmental risks.
- The above storage requirements apply equally to storage during transportation.
- Transportation procedures will include weekly inspections of storage and containment areas, inspection of containers prior to transport, and documentation of corrective actions taken to prevent leaks and spills.
- Qualified personnel will properly label hazardous materials containers, keep containers in good condition, follow written procedures for the transport of hazardous materials.

2.6 Disposal

Hazardous waste must only be accumulated for a limited and specific amount of time. The length of time for the accumulation of hazardous waste is based on the waste profile, quantity, and the rate of generation. Hazardous waste has a 90-day limit (180 days for small

quantity generators), PCBs greater or equal to 50 parts per million have a 30-day limit, and Universal Waste has a 1-year limit.

Accumulation periods will be monitored, and disposal of hazardous waste will occur in accordance with the by-laws of the City/District Councils in which work is being carried out and according to the World Bank's Environmental Health and Safety Guidelines..

Only approved hazardous waste transportation vendors and disposal facilities may be used to transport and disposal of hazardous waste, though at the time of writing, Malawi does not have a proper facility for safe disposal of hazardous waste. A hazardous waste disposal permit shall be obtained from the District/City Council before disposal is done. An Environmental Health Officer from the Council should be present during the disposal of hazardous waste and s/he should provide guidance on how the waste should be disposed of and where. Where there is no District Officer an official from Environmental Affairs Department will provide guidance. In cases, it may be necessary to store the materials on a temporary basis, in agreement with these authorities, until facilities for safe disposal are available.

Hazardous waste disposal sites must meet specific design requirements to ensure environmental protection and safety, aligning with international guidelines like the World Bank EHS Guidelines and GIIP. Key features and considerations include:

- 1- Choose suitable locations based on geological and hydrogeological factors, avoiding disaster-prone areas.
- 2- Employ containment systems like liners and leachate collection to prevent hazardous substance migration.
- 3- Implement comprehensive monitoring for groundwater, surface water, and air quality to detect hazards early.
- 4- Design facilities for proper waste segregation to prevent chemical reactions or fires.
- 5- Establish security with fencing, surveillance, and access controls to deter unauthorized dumping.
- 6- Develop plans and train staff for accident, fire, and spill responses.
- 7- Install systems to collect and treat leachate, safeguarding groundwater and surface water.
- 8- Plan site capping, long-term monitoring, and financial provisions for maintenance.
- 9- Involve local communities and stakeholders for transparency and issue resolution.
- 10- Conduct thorough assessments to identify and mitigate impacts on ecosystems, health, and communities.

Plan for waste removal, site reclamation, and environmental restoration upon closure.

3. Management and Disposal Measures of Different Types of Hazardous Materials and Waste

3.1 Fuelling and Maintenance of Construction Equipment

The construction contractor will be responsible for communicating the fueling and maintenance spill prevention measures to construction personnel to prevent leaks or spills of hazardous materials. The following fueling and maintenance spill prevention measures for construction equipment will be implemented, as applicable, during the construction on the MEPRP:

- Refueling of construction vehicles and equipment will occur within the Project work areas, but not within 200 meters of drains or waterways with flowing water or within 75 meters of drains or waterways that are dry.
- The contractor must obtain a refueling license from Malawi Energy Regulatory Authority (MERA) and he is obliged to use MERA approved methods only.
- spill-proof fuel containers with tight-fitting caps will be used to minimize the risk of fuel spills during refueling
- Plastic liners or drip pans will be placed under construction equipment while refueling.
- Plastic liners or other control measures will be used for fuel storage tanks to prevent spills from directly contacting the soil.
- Drip pans or other control measures will be placed under construction equipment when not operating to capture oil leaks.
- Construction equipment will be inspected daily for leaks and failures to ensure proper functioning.
- Used filters, rags, and other waste materials generated during maintenance will be properly disposed to prevent potential contamination.
- Hazardous materials, such as used oil and fuel, will be disposed of according to regulations and World Bank EHS guidelines.

The above spill prevention measures will be implemented during all construction activities. When it is not practicable to use these measures, personnel will use appropriate precautions to prevent spills through safe work procedures and will be efficient in spill response procedures.

3.2 Tyres and Waste Tyres

For the storage of tyres and waste tyres the following points should be observed:

- Store tyres on a level site away from surface watercourses, preferably indoors in well-ventilated and dry space. If outdoor storage is necessary, use tarps or covers to protect tyres from rainwater. Make sure the covers are securely fastened to prevent water accumulation.
- Provide all-weather vehicle access to the storage site
- Control vegetation or other fuel materials around the tyre storage pile
- Keep tyres away from potential sources of ignition or heat, including flammable or combustible liquids or other sources
- Keep tyres away from electric power lines
- Maintain sufficient separation distance to buildings and boundaries and between individual tyre piles.

3.3 Wood Poles

Treated wood pole waste will be stored safely before it is dispatched for reuse by ESCOM. Stockpiles of treated wood will be placed on plastic sheeting or comparable material. Stockpiles of treated wood will also be covered with plastic sheeting or comparable material and surrounded by a berm, prior to the onset of precipitation.

3.4 E-waste

There are few different ways recommended to dispose of e-waste. However, each method comes with their own set of environmental issues.

3.4.1 Recycling

This plan encourages recycling of e-waste. Many items of e-waste can be dismantled and their component parts repurposed into new products. The contractor will be encouraged to link up with interested partners who may want to recycle the e-waste into some useful products.

3.4.2 Reuse

By far, the most environmentally friendly e-waste disposal technique, where possible, is for the devices to be reused. Some individuals and companies may accept old electronic devices that could be reformed and reused.

3.4.3 Incineration

This is another way to dispose of e-waste. ESCOM does not have an incinerator but where necessary, arrangements could be made between the contractor and some institutions that have such facilities to provide the services for safe disposal of the waste. Any incinerators used must comply with the WHO limits on air quality, set out in Section 1.1 (Air Emissions and Ambient Air Quality) of the World Bank EHS Guidelines (specifically Annex 1.1.2 – Illustrative Point Source Air Emissions Prevention and Control Technologies).

3.4.4 Landfilling

Only properly designed, permitted and operated landfills designed for the respective type of waste should be used. However, as described above, Malawi has limited waste disposal facilities. If this method of disposal is to be used, it should at least use properly designed sanitary landfills. The facility will be lined with plastic with a leachate basin to prevent toxic waste from leaching into the surrounding environment.

The landfilling methods will only be applied where recycling and reuse are not applicable. Otherwise, this plan encourages the contractor to use the option of recycling and reuse.

3.5 Polychlorinated biphenyls (PCB)

Specifically for PCBs and oils the following should be ensured:

- Stored at a dry, leakproof place to prevent rain water from reaching the stored PCBs
- An adequate floor that has continuous curbing with a minimum of 6 inch high curb. The floor and the curbing must provide a containment volume equal to at least two times the internal volume of the large PCB containers stored.

- No drain valves, floor drains, sewer lines, or other openings that would permit liquids to flow from the curbed area.

3.5.1 Incineration

This is the recommended method for disposing of PCBs. Since ESCOM does not have incineration facilities, arrangements will be made with district hospitals or any other institutions within the respective districts where the project is being implemented to access their incinerator facilities for proper treatment and disposal of PCBs. PCB-containing transformers and capacitors will be drained of their PCB fluids (as advised by the City Council) and cleaned before they are finally disposed of. The cleaned components may be sent to recycling facilities or appropriate disposal sites.

Guidance will always be sought from the District Environmental Officers and the District Environmental Health Officers on how and where to dispose of PCBs.

It should be noted that in Malawi, there are no proper facilities for the appropriate disposal of hazardous waste. Worse still at district level, there are no proper facilities even for the disposal of ordinary waste. It is only the Cities that have designated waste disposal sites. Therefore, where the District Council is found to be lacking capacity in the disposal of some hazardous waste like PCB, arrangements will be made to discuss with the nearest City Council to handle the disposal.

3.6 Gas

- Gas cylinders will be stored upright so that residual liquefied gas cannot contact the cylinder valves.
- Secured by a chain or rack so they cannot fall over
- Gas cylinders will be kept in well ventilated area, preferable a cage outside to reduce the risks associated with leakage
- Located away from radiant heat or anything that could cause fire
- Segregated so that volatile and incompatible gases are not stored together.
- Labelled and tagged so that staff and contractors know exactly what's inside and that it has been tested as "safe to use".
- No employee will be allowed to perform any hot works unless a hot permit is obtained prior to commencing as outlined in the health and safety management plan.

3.7 Waste batteries

To manage waste batteries, this plan encourages "reduce" and "recycling" strategies.

a) Reduce

- Maintain and protect batteries to prevent damage and charge loss by visiting the dealers as per schedule to ensure that batteries are regularly tested and maintained.
- Test batteries prior to disposal to confirm the battery is spent
- Replace non-rechargeable batteries with rechargeable batteries where possible

b) Recycle

- Service batteries to extend life
- Send spent batteries to recyclers.
- Make an agreement with the suppliers/distributors of the batteries to return the waste batteries.

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Table 2: Management measures for hazardous material and hazardous waste

Hazardous Materials and Hazardous Waste management measures	Description	Responsibility	Cost (US\$)
Hazardous Materials	Minimize the use of hazardous materials wherever possible.	Contractor	500
	Substitute hazardous materials with safer alternatives.		
	Keep hazardous materials in original containers with clear labeling.		
	Display appropriate warning signs around hazardous waste storage areas.	Contractor and PIU	2500
	Conduct periodic inspections of containers.		
Properly use, store, and dispose of hazardous materials in compliance with regulations and manufacturer recommendations.	Contractor	500	
Hazardous Material Inventory	Document hazardous materials used during construction in a Hazardous Materials Inventory.	Contractor	2000
	Maintain the inventory and share it with relevant specialists.		
	Ensure hazardous materials come with Safety Data Sheets (SDS).	Contractor and PIU	
Hazardous Waste Generation	Identify and properly manage typical wastes generated during construction activities.	Contractor and ESCOM During operation Phase	3000
	Dispose of decommissioned equipment according to waste management guidelines and by-laws.		
	Do not dispose of hazardous waste with regular trash or waste, burn, or allow it to evaporate into the air.		
	Do not dispose of hazardous waste in water bodies or land.		
Storage	Handle hazardous wastes safely.	Contractor	2000
	Store hazardous waste at designated areas.		
	Use secondary containment measures as needed.		
	Store materials on impervious surfaces or within secondary containment to prevent spills or leaks.		

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	<p>Ensure appropriate drainage systems in storage areas.</p> <p>Store different hazardous materials separately to prevent reactions or cross-contamination.</p> <p>Only allow trained personnel to handle hazardous materials.</p> <p>Prohibit storage of hazardous materials near wetlands, waterways, and waterbodies.</p>		
Transportation	<p>Properly classify hazardous waste according to regulations.</p> <p>Package hazardous waste in containers meeting regulatory standards.</p> <p>Use specialized vehicles for transporting hazardous waste.</p> <p>Provide training for drivers and personnel involved in transportation.</p> <p>Implement security measures to prevent unauthorized access during transportation.</p> <p>Develop and communicate an emergency response plan for transportation accidents.</p> <p>Plan transportation routes carefully to minimize risks to public safety and the environment.</p> <p>Track the movement of hazardous waste and retain records.</p> <p>Adhere to international agreements related to hazardous waste transportation.</p> <p>Implement measures to prevent spills and leaks during transportation.</p>	Contractors	2000
Disposal	<p>Accumulate hazardous waste for a limited and specific amount of time.</p> <p>Dispose of hazardous waste in accordance with local by-laws and international guidelines.</p> <p>Obtain a hazardous waste disposal permit when required.</p> <p>Dispose of hazardous waste at suitable disposal facilities.</p> <p>Ensure hazardous waste disposal sites meet design and environmental protection requirements.</p> <p>Plan for site reclamation and environmental restoration upon closure.</p>	Contractors	500

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Management and Disposal Measures of Different Types of Hazardous Materials and Waste	Implement specific measures for different types of hazardous materials, including fuels, tyres, wood poles, E-waste, PCBs, gas, and waste batteries.	Contractors	500
Fueling and Maintenance of Construction Equipment	Prevent fuel leaks and spills during refueling and maintenance of construction equipment.	Contractors and ESCOM during operation	2000
	Use spill-proof fuel containers and plastic liners or drip pans.		
	Inspect equipment daily for leaks and failures.		
	Dispose of hazardous materials generated during maintenance according to regulations.		
Tyres and Waste Tyres	Store tyres and waste tyres away from watercourses and potential ignition sources.	Contractors	500
	Control vegetation around tyre storage piles.		
	Maintain separation distances and provide all-weather vehicle access.		
Wood Poles	Store treated wood pole waste on plastic sheeting, cover it, and surround it with a berm.	Contractors and ESCOM during operation	500
E-waste	Encourage recycling and reuse of electronic waste.	Contractors	200
	Dispose of e-waste through methods such as incineration and landfilling only when recycling and reuse are not applicable.		
Polychlorinated Biphenyls (PCB)	Store PCBs at dry, leakproof locations with appropriate floor and containment measures.	Contractors	100
	Drain and clean PCB-containing transformers and capacitors before disposal.		
Gas	Store gas cylinders upright, secured, and in well-ventilated areas.	Contractors	500
	Label and tag cylinders with safety information.		
Waste Batteries	Reduce battery damage and extend their life.	Contractors	200
	Test batteries before disposal to confirm their condition.		
	Send spent batteries to recyclers or make arrangements with suppliers for return.		

4. Emergency Preparedness and Response

1.7. 4.1 Emergency Response Plan

The following sections outline the main components of such a plan as well as some of the best practices that will need to be included into this document.

3 4.1.1 Objective

In terms of risk management, the project's objective is to reduce them to the lowest levels, as much as is reasonably possible. However, an accident could affect people on-site as well as personal objects and the environment. Thus, risk identification is important in order to deploy appropriate staff and personnel to intervene with diligence and confidence in the case of a major accident.

4 4.1.2 Nature of the Emergency Response Plan

An appropriate emergency response plan will be elaborated in a more formal manner. The proponent will be required to complete an emergency plan in order to mitigate every risk that will have been identified in relation to the work needs. Furthermore, the emergency plan will regularly be reviewed and adapted to the project's evolution. The review must include all activities and associated risks. Any event that could threaten or affect the environmental components will trigger the emergency plan. The plan will list appropriate actions to be followed in order to properly respond to the emergency situations arising from the identified risks. The main elements that need to be retained and integrated in the emergency response plan are outlined.

The emergency response plan has three general objectives which are:

- clearly defining the role and responsibilities of all stakeholders;
- facilitating communications to all concerned parties such as workers and the general population;
- serving as a reference document during warning, mobilization and intervention procedures.

In order to minimize risks for all employees, the population and the environment, the following information will need to be detailed in the plan:

- mechanisms to alert stakeholders and all concerned organizations;
- coordination of the operational and intervention crews;
- definition of the role and responsibilities of all stakeholders;
- specification of the different levels of authority;
- measures that will reduce the intervention time in order to minimize the effects on the environment.

5 4.1.3 Analysis of Environmental Risks

The use of a power line or an electrical station entails some environmental risks. These risks may be of a natural or a technological origin. In general, natural risks are caused by natural phenomenon such as rain fall, floods, droughts, bush fires, etc. Natural risks could be the source of hazards or technological risks. Technological risks rely on hazard identification (hazardous products, system failures, sources which lead to breaking, generic project risks etc.). Natural risks associated to the current project are mostly due to lightning which could short circuit the system, erosion in particular in floodplains or in areas which are prone to erosion and bush fires which could start in areas close to the lines or substations. However, these risks are mitigated at a technical level during the design of the project (grounding cable, appropriate choice of tower location, foundation composition, adequate clearing zone, etc.). The risk analysis relies mostly on the technological risks

associated to the use of the power line and the substations along the line. The sources of the two main risks are the storage and use of petroleum products and hazardous substances as well as the use of electrical transformers. Downed wires pose an additional risk.

4.1.3.1 Storage and use of Petroleum Products and Hazardous Substances

This section outlines the potential risks associated with the storage and use of petroleum products such as, diesel, light crude oils, fuel, lubrication oils and grease. The hazards which can lead to identified major accidents are: petroleum product spills, fires and/or explosions involving petroleum products as well as oil and grease spills. Equipment corrosion, breaking/leaks in equipment or human error can lead to spills of petroleum products or hazardous substances resulting in the contamination of surface water, groundwater and soils or fires. The following design measures have been adopted in order to reduce the risks of accidents, as well as their consequences in an emergency situation:

- the design of equipment and tanks in accordance with the regulations, standards, applicable codes and appropriate industrial practices;
- the storage of hazardous material, refueling and servicing of equipment and vehicles will be done minimally 100 m away from wetlands and watercourse floodplains;
- the control and reduction at the source of the production of waste and hazardous waste;
- double-wall tanks with a secondary retention basin with a sufficient capacity to contain up to 110% of the stored volume.

Additionally, ESCOM will:

- offer continuous training to all employees who are assigned to the handling of bulk petroleum products;
- develop and use work procedures;
- update the emergency response plan including the intervention procedures in case of an incident involving a petroleum product;
- store all ignitable, reactive, flammable, corrosive and toxic materials in clearly labelled containers;
- store all hazardous materials in a manner that prevents interaction with each other or with the environment or from being tampered accidentally;
- store and use intervention materials near the handling areas of petroleum products;
- maintain an on-going service contract with a company that specializes in the cleanup of spills and in industrial cleaning;
- undertake preventative maintenance of tanks and all related equipment in order to reduce potential breaks and premature wear of the equipment;
- ensure that a risk analysis is done by employees before realizing tasks which have not been described by an appropriate work procedure;
- prepare International Chemical Safety Cards (ICSC) or Material Safety Data Sheets (MSDS) that will be readily available in an easily understood language to exposed workers and first aid personnel;
- inspect and realize conformity assessments of the bulk petroleum product storage tanks.

Therefore, in the event of a spill, it would be confined to the area of the incident due to the measures outlined above.

4.1.3.2 Fire/Explosion Involving Petroleum Products or Hazardous Substances

A fire/explosion involving petroleum products or other hazardous substances could occur in exceptional circumstances, for example, a fire close to the petroleum tanks. Therefore, the probability of occurrence is very low. This type of incident could lead to serious injuries and potentially to the loss of the life of persons located within the impact radius, as well as damage to nearby buildings and infrastructures. In this event, an interruption of all operations would be needed that would inherently lead to economic losses.

At the preliminary stage, the equipment and tanks were designed in accordance with regulations, standards, applicable codes and appropriate industrial practices. Additionally, the following measures will be implemented to reduce the risks of accidents, as well as their consequences in case of an emergency situation:

- offer continuous training to all employees who are assigned to the handling of bulk petroleum products;
- develop and use work procedures;
- store all ignitable, reactive, flammable, corrosive and toxic materials in clearly labelled containers;
- store all hazardous materials in a manner that prevents interaction with each other or with the environment or from being tampered accidentally;
- update the emergency response plan including the intervention procedures in case of an incident
 - involving a petroleum product;
- store and use intervention materials near the handling areas of petroleum products;
- store all ignitable, reactive, flammable, corrosive and toxic materials in clearly labelled containers;
- store all hazardous materials in a manner that prevents interaction with each other or with the environment or from being tampered with accidentally;
- maintain an on-going service contract with a company that specializes in the cleanup of spills and in industrial cleaning;
- undertake preventative maintenance of tanks and all related equipment in order to reduce potential breaks and premature wear of the equipment;
- ensure that a risk analysis is done by employees before realizing tasks which have not been described by an appropriate work procedure;
- prepare International Chemical Safety Cards (ICSC) or Material Safety Data Sheets (MSDS) that will be readily available in an easily understood language to exposed workers and first aid personnel;
- inspect and realize conformity assessments of the bulk petroleum product storage tanks.

4.1.3.3 Oils and Grease Spills

Spills of lubrication oils and grease can occur when there are breaks or leaks in equipment, handling errors and machinery spills and can lead to soil, surface and groundwater contamination.

The following preventive measures will be in place in order to reduce the risks of accidents, as well as their consequences in an emergency situation:

- offer continuous training to all employees on the protection of the environment;
- develop and use work procedures;
- store all ignitable, reactive, flammable, corrosive and toxic materials in clearly labelled containers;

- store all hazardous materials in a manner that prevents interaction with each other or with the environment or from being tampered with accidentally;
- update the emergency response plan including the intervention procedures in case of an incident involving oils and greases;
- undertake preventative maintenance of tanks and all related equipment in order to reduce potential breaks and premature wear of the equipment;
- ensure that a risk analysis is done by employees before realizing tasks which have not been described by an appropriate work procedure;
- prepare International Chemical Safety Cards (ICSC) or Material Safety Data Sheets (MSDS) that will be readily available in an easily understood language to exposed workers and first aid personnel.
- A spill of lubrication oils and greases could occur during the operational phase of the project. The impact level on the environment is deemed to be low given the quantities of products that could be implicated and the mitigation measures in place.

4.1.3.4 Use of Electric Transformers

This section outlines the risks associated to the presence of electric transformers. The hazards which can lead to identified major accidents are the spills of dielectric oils and fires/explosions involving an electrical transformer.

a. Spills of Dielectric Oil

Spills of the insulating oil found in the transformers could lead to the contamination of surfaces, groundwater and soils, following the corrosion of equipment, breaks/leaks of equipment or due to human errors.

The following preventive measures will be in place in order to reduce the risks of accidents as well as their consequences in case of an emergency situation:

- preventive maintenance of transformers and related equipment in order to thwart equipment breaks and premature wear;
- protection against lightning;
- retention basin for all transformers that contain dielectric fluids;
- extra transformers, in stock, in case a break or failure occurs, to avoid a stop in operations;
- prepare International Chemical Safety Cards (ICSC) or Material Safety Data Sheets (MSDS) that will be readily available in an easily understood language to exposed workers and first aid personnel;
- risk analysis done by employees before realizing tasks which have not been described by an appropriate work procedure.

b. Fires/Explosions Involving an Electric Transformer

A fire in a transformer is a potential risk. Potential causes for a fire are contaminated dielectric oils, short-circuits and overheating.

The following preventive measures will be in place to reduce the risks of accidents as well as their consequences in an emergency situation:

- preventive maintenance of transformers and related equipment in order to thwart equipment breaks and premature wear;
- protection against lightning;

- store all ignitable, reactive, flammable, corrosive and toxic materials in clearly labelled containers located as far as possible from the transformers;
- store all hazardous materials away from the transformers and in a manner that prevents interaction with each other or with the environment or from being tampered with accidentally;
- retention basin for all transformers that contain dielectric fluids;
- extra transformers, in stock, in case a fire or explosion occurs, to avoid a stop in operations;
- risk analysis done by employees before realizing tasks which have not been described by an appropriate work procedure.

4.1.3.5 Downed Wires

This section outlines the risks associated to the breakage of conductors. The hazard which can lead to identified major accidents are downed wires. Downed wires can lead to serious or fatal injuries of community members, especially if the downed conductor is live.

The following preventive measures will be in place in order to reduce the risks of accidents as well as their consequences in case of an emergency situation:

- preventive maintenance of conductors and related equipment in order to thwart equipment breaks and premature wear;
- protection against lightning;
- ongoing sensitization of the local communities along the line about dangers of high voltage transmission lines;
- ongoing sensitization of the local communities along the line about dangers of electrocution in cases of contact with transmission line components and especially downed wires.

5. Emergency Interventions

ESCOM and its contractors will ensure that emergency procedures are rapidly put in place in the event of an accident. Appropriate procedures will be established and communicated to all operating staff, as well as suppliers. These procedures will outline the proper way of recuperating from the accident. The following will be assured:

- wear of appropriate clothes and personal protective equipment (i.e. security goggles or sealed goggles, resistant gloves, etc.);
- management and control of the leak (i.e. eliminating the ignition source, identifying the product which was used, and stopping, if possible, the source of the spill, by disabling or turning off the equipment that controls the flow of the product);
- confinement of the spilled product (i.e. stemming the spilled product in order to prevent the product from migrating to a river or water or to the sewer, and absorbing with items found in the emergency kit such as absorbents, dry sand or any other dry and non-combustible material);
- outline of a security perimeter (i.e. prohibiting traffic, vehicles, and any unauthorized staff near the accident);
- evacuation of the area, if there is a risk of explosion or a fire;
- notification to the concerned staff that is in charge according to the warning procedures and following the instructions given by the team who is managing the emergencies;
- recovering all contaminants and restoring the contaminated area (in compliance to all regulations and appropriate practices, in order to prevent the migration of any contamination).

The emergency response plan will include specific procedures for every emergency situation. All persons and organizations that must be notified for each situation will be identified in the emergency response plan. Also, the emergency response plan will include a risk communications program to the general population and a section on preventive measures. After each event, a report on the emergency situation will be completed with the personnel staff that is in charge, in order to evaluate the measures which were taken, specify possible improvements and make the necessary changes to the procedures.

1.8. 5.1 Emergency Response Procedures

Emergency response procedures provide guidance for personnel to respond safely and quickly to hazardous materials spills or releases to prevent adverse impact to human health or impact to surrounding environmental media such as streams, lakes, wetlands, or storm water system or sensitive areas including conservatories and wildlife areas. The emergency - response procedures stated in this section will be implemented by the construction contractor for the MEPRP. The construction contractor will follow the emergency - response procedures for the MEPRP. Construction personnel, ESCOM personnel, construction monitors, and other field personnel will be trained on the emergency release response procedures. The emergency response procedures will be documented on the Emergency Response Form provided in Annex B.

Typical response steps in the event of a release of hazardous materials are presented in table 3 below.

Hazardous Materials and Waste Management Plan | ESCOM

Table 3: Typical response steps in the event of a release of hazardous materials:

Assess the Situation & Define A Safety Perimeter	<ul style="list-style-type: none"> • Refer to the product’s SDS/MSDS. • Identify the product (look at labels, placards or other markings). • Keeping a safe perimeter, carefully locate the source of the release. • Assess the source of the release (such as drum, storage tank or other container) to assist with the approximation of quantity spilled. • If the spill has reached a drain or watercourse, it can no longer be contained and external parties and potentially surrounding communities will have to be immediately notified.
Determine Response Level	<p>What’s the response level required?</p> <ul style="list-style-type: none"> • Level 1: You are trained and capable to handle response • Level 2: Require additional assistance from internal resources • Level 3: External third-party assistance required
Carefully Stop or Control the Release	<ul style="list-style-type: none"> • Approach the- site with the wind at your back. • Only if the situation is deemed safe to do so (For example: eliminate source of leak/spill by turning off valves, taps, faucets or other controls). • Cover grates/drains/sewers.
Confine the Spill or Contain the Product	<ul style="list-style-type: none"> • Contain the spilled product in the smallest possible space close to the source. • Avoid directing the product toward the sewer system or body of water
Notify Authorities and The Public (As Appropriate)	<ul style="list-style-type: none"> • If the spill is no longer under your control, notify the District Environmental Officer or fire/police (emergency response agencies). • If you activate emergency services contact the region Communications Branch. • Notify the public (if necessary).
Recover Spilled Materials	<ul style="list-style-type: none"> • The product must be recovered quickly to limit its migration or spread, taking into consideration the properties of the product and weather conditions
Safely Dispose of Contaminated Materials And Waste	<ul style="list-style-type: none"> • Store wastes separately from in-use products. • Use an accredited contractor. Obtain a disposal permit from the District/City Council.
Prepare An Incident Report & Report to The Authorities	<ul style="list-style-type: none"> • Use Environmental Emergency (Spill Response) Incident Form. • Site Manager will assume responsibility for informing and reporting to District Authorities as a result of the environmental incident
Replenish Response Supplies	<ul style="list-style-type: none"> • Conduct a spill kit inventory check, document. • Restore spill kit equipment, ensure used PPE is clean or replaced.

6 5.1.1 Evacuation

The construction contractor will identify the emergency evacuation procedures for material yards, staging areas, and other construction work areas. The procedures will identify the methods for communicating the evacuation of onsite personnel and surrounding neighbors in the event of a serious incident. The emergency evacuation procedures prepared by the construction contractor will identify nearby hospitals and will

provide the route from the site to the nearest hospital. These procedures and evacuation areas will be communicated in training and during onsite safety briefings to all personnel that visit the construction site.

7 5.1.2 Sensitive Habitats

Spill prevention is particularly critical in and around any sensitive areas including habitats for special-status species, and wetlands, waterways, and water bodies. Most of the sites targeted in this project are where the lines are crossing rivers. Therefore, the particular sensitive areas of concern are wetlands and water bodies. The project's Biodiversity Management Plan can be referred to for details of the identified sensitive habitats and protected areas.

The following preventative measures will be implemented during equipment fueling and maintenance activities, particularly for construction work areas along the transmission line:

- No fueling will occur within 200 meters of drains or waterways with flowing water or within 75 meters of drains or waterways that are dry;
- Spills will be immediately cleaned up as described in this plan;
- Applicable secondary containment will be implemented where hazardous materials must be stored or fueling must occur adjacent to sensitive habitats.

8 5.2.3 Emergency Response Equipment

The construction contractor will maintain the emergency response equipment listed below. The location of the spill response equipment will be identified on site by the site manager and communicated to construction personnel during training. The construction contractor will be responsible to maintain a current inventory of response equipment and regularly inspect and service equipment per manufacturer's recommendations. Construction vehicles will be equipped with response kits.

The following material will be available at designated location(s) throughout the MEPR Project areas that are under active construction and easily accessible in the event that a spill may occur:

- Large 55-gallon drum spill kits or "spill attack kits" will include:
 - 3-ply or greater disposable plastic bags,
 - 50 to 100 count 16-inch by 20-inch oil sorbent pads,
 - 10 count 3-inch by 4-inch socks (if needed),
 - Four pairs of Nitrile gloves,
 - Two pairs of splash goggles, and
 - A copy of the spill response procedure sheet.
- Vehicle spill kits will include:
 - 3-ply or greater disposable plastic bags,
 - 16-inch by 20-inch oil sorbent pads,
 - One to two pairs of Nitrile gloves, and
 - A copy of the spill response procedure sheet.

9 5.2.4 Spill Containment Measures

The best way to deal with a spill is to stop it before it even happens. If it is not possible, the provide spill containment at the source, so that it cannot spread into the environment. The following measured shall be followed to stop spills before they happen or contain them at the source:

- a) Inspect the containers

Regularly inspect all containers. This will help identify pinhole leaks before a major container rupture occurs. Daily or weekly check sheets will help to delegate responsibility and make sure that everyone plays their part. The Environmental Specialist of the Contractor has the responsibility to ensure that these checks are happening as scheduled.

b) Use secondary containment

The use of secondary containment systems prevents a spill from spreading beyond a specific area. It should surround one or more primary storage containers to collect spillage in case of a failure

c) Use spill preventing equipment

Equipment and accessories for storing and dispensing flammable liquids should meet regulatory standards. Safety faucets are self-closing and have drip proof replaceable seals. Safety drum vents maintain a constant pressure in the drum. They provide vacuum relief when drawing liquids out and emergency pressure venting in the case of a fire or excessive heat. Spill control funnels are designed to facilitate waste disposal. Their low profile enables quick liquid collection or passive draining.

d) Train Employees

Having the right equipment to prevent and contain spills is a good starting point. Yet, spills may occur due to poor training of employees and lack of supervision. Regularly update work procedures and work instructions to ensure everyone is up to date with the equipment in use and the operating context. Train employees on how to use spill prevention equipment. Supervise activities to keep the workplace safe and environmentally friendly.

10 5.2.5 Clean-up Procedures

The construction contractor will document containment and clean-up measures taken in the event of a spill or release of hazardous materials or hazardous waste. The spent spill response material, contaminated media, and spent PPE will be placed into appropriate containers, properly labeled, and placed in an appropriate area until the hazardous waste can be transported and disposed at an appropriate disposal site.

Spill or release response procedures will depend on the following factors:

- If large quantities of hazardous materials were released;
- If specialized PPE is required for the cleanup;
- If property owners or the community are concerned about the release;
- If there is a threat to the public;
- If there is a threat to surface waters;
- If a sensitive environment is or may be affected; or
- If a highway or roadway is affected.

When cleanup has taken place, the following information should be well documented and recorded:

- Actions taken to contain the spill and prevent it from spreading further
- The cleanup procedure applied
- The methods and equipment used during the cleanup. This may include the use of barriers, absorbent, or other containment materials.
- The timelines for the cleanup activities
- Challenges encountered during the cleanup exercise.

If hazardous materials/wastes (including land/soils contaminated by such wastes) are uncovered by the contractor, e.g. during excavations, the contractor is responsible for clean-up according to the above requirements.

6. Documentation

The construction contractor will complete required documentation on the Spill Log/Report Form (Appendix B). The documentation will include records of spill or releases, regardless of the quantity. The Spill Log/Report will be maintained at the construction site for records.

7. Responsibilities, Training, and Performance Requirements

7.1 Organization and Responsibilities

A planning committee in charge of the emergency measures will be active and will maintain an up-to-date emergency plan in order to efficiently mobilize workers in an emergency. A thorough review of every item in the plan will be regularly completed by the planning committee. The committee will be involved in elaborating, preparing, updating and disseminating the emergency response plan as well as initiating and preparing large-scale simulations, reviewing the results and ensuring follow-ups. The committee will also train the workers and upper management, via simulation and evacuation exercises, to develop proper intervention relations with the civil authorities as well as initiate the annual emergency response plan review process and ensure that the operation plans are updated.

Additionally, an internal emergency intervention team will consist of on-site staff and personnel representing the first line emergency team, in charge of the communication and deployment in an emergency situation. The role of this team will consist of receiving all emergency calls, giving them priority and giving them the required and needed attention. The team will convey all information to upper management without delay, as well as all appropriate emergency services and, if necessary, acquire external aid.

7.2 Performance Requirements

The construction contractor will be responsible for complying with the legal requirements for the handling, storage, transport, use, and disposal of hazardous materials and hazardous waste in compliance with sections 39 to 44 of EMA 2017 and the World Bank's General Environmental, Health, and Safety (EHS) Guidelines on Hazardous Materials Management. The construction contractor will be responsible for implementing the performance requirements identified in this Plan.

As summary, the following performance requirements related to hazardous waste management will be adhered to by the construction contractors' Environmental, health and safety officer:

- Conduct worker and contractor consultation encouraging site Health and Safety within the team
- Review and promote all safe systems of work and ensuring that all practices to be undertaken are carried out to the applicable legislation and site rules.
- Undertaking frequent site inspections and audits.
- Carry out toolbox meetings, induction training, sites rule clarification and awareness
- Clearly identify and secure hazardous waste storage area to prevent the release of hazardous substances to surrounding areas or groundwater.
- Site isolation to restrict access, ensuring that only authorized personnel can enter the area.
- Take preventative measures to avoid spills or leaks in hazardous waste storage areas or during handling or transport of wastes.
- Promptly clean up spills or leaks and document the corrective action.
- Limit the storage of hazardous waste to designated storage areas.
- Prohibit overnight storage of hazardous waste in non-secure storage areas.
- Perform risk assessment to identify potential hazards and assess the level of risk posed by hazardous substances at the site.
- Risk management strategies, such as implementing institutional controls or engineering measures, to mitigate identified risks.

- Ensure adequate health and safety measures to protect workers and the public from exposure to hazardous materials during site cleanup and ongoing maintenance.
- When feasible, implement waste recycling programs for all applicable waste streams.
- Properly label all waste containers and keep incompatible wastes segregated.
- Assure that all containers are kept closed when waste is not actively being added or removed.
- Train construction personnel in proper hazardous waste management procedures
- Ensure that hazardous waste site comply with all relevant local, state, and federal regulations and standards governing hazardous waste management and clean-up, as well as World Bank ESF requirements and EHS Guidelines.
- Ensure condoms are provided on site on regular basis at well designated areas such as the toilets

All workers on this project (including temporary labourers) are responsible for:

- Taking reasonable care of their own health and safety when working with hazardous substance
- Taking reasonable care that their conduct does not adversely affect others
- Complying with instruction, so far as they are reasonably able
- Cooperating and complying with reasonable notified policies and / or procedures
- Raising concerns where uncontrolled risk is evident and the task cannot be completed safely
- Reporting any incident or unsafe condition as soon as reasonably practicable
- Assisting in incident investigations (where required)
- Only operating plant and equipment that they hold current certification and Verification of Competency for
- Presenting to work in a fit condition free from fatigue, alcohol or other drugs.

The roles and responsibilities of ESCOM PIU are as summarized below;

- Undertakes the inspection and evaluation of workspace environments and ensures the implementation and compliance of OHS plans.
- Provide training to contractor's staff, onsite mentorship and advise on hazardous waste management
- Ensure that the project follows health and Safety standards and regulations.
- Organise and coordinate implementation and compliance of environment safeguards aspects under the project including overall management, oversight and monitoring of environmental measures
- Ensure that the project, complies with the provisions of WB's Environmental and Social Framework (2016) (ESF),
- Ensure that Project complies with Government of Malawi environmental laws and regulations;

The DEO and DEHO Responsibilities: The Environmental Management Act (EMA) 2017 gives powers to the District Environmental Officer (DEO) under the Environmental Affairs Department to be the advisor and lead in all matters relating to the environment at district level. Similarly, the Public Health Act 1948 gives powers to the District Environmental Health Officer (DEHO) under the Directorate of Health and Social Services to lead on matters of public health/environmental health at district level. Therefore, throughout the implementation of this project, all matters relating to the safe

handling, storage, containment, transportation, treatment and final disposal of hazardous materials and waste will be done with the guidance of the DEO and DEHO of the respective districts where the project is being implemented. Disposal of hazardous waste will be guided by the two council representatives (DEO and DEHO). Sign sheets bearing signatures of all representatives witnessing the disposal will be prepared and filed by the contractor as evidence that the disposal was handled and guided by the Council Authorities.

7.3 Inspections and Records

The PIU and construction contractor will regularly inspect hazardous materials and waste storage areas for containment systems, waste management practices, spills or leaks from containers. Regular inspections will be performed during construction to reasonably prevent spills or leaks and to ensure that the site is meeting all legal requirements and performance standards.

These inspections will be completed weekly and in response to specific incidents or complaints. For sites undergoing closure or remediation, inspections will be performed before and after the process to ensure that closure requirements are met and to monitor the site's stability and safety.

If a spill or leak is detected, immediate action will be taken to clean up and implement the necessary corrective actions. The inspections and corrective actions will be documented, and records maintained on site. A Spill Log/Report Form is included in Annex B. A Spill Log/Report Form will be completed by the construction contractor in the event a leak or spill is discovered.

The contractor should maintain accurate and up-to-date records of all hazardous waste activities, including waste generation, transportation, and disposal. For hazardous waste storage areas, a comprehensive record of the types and quantities of hazardous waste generated, stored, transported, and disposed of at the site will be maintained. Detailed reports documenting the findings of routine, compliance, and emergency response inspections will be recorded. These reports will outline any issues identified and the actions taken to address them. Copies of all permits and licenses related to hazardous waste management will be kept on file, demonstrating the site's authorization to handle hazardous materials. Records of hazardous waste management training provided to employees, contractors, and personnel involved in site operations will be maintained. For hazardous waste transported off-site, detailed records of shipments, manifests, and disposal receipts will be kept tracking the waste's final destination and ensure proper disposal. Documented weekly inspections are required and records will be maintained on site. If a spill or leak is detected, immediate action will be taken to clean up and implement the necessary corrective actions. The inspections and corrective actions will be documented, and records maintained on site. A Spill Log/Report, provided in Appendix B, will be completed by the construction contractor in the event a leak or spill is discovered.

7.4 Training

All project personnel will be provided with project-specific training to ensure that all hazardous materials and wastes associated with the project are handled in a safe and environmentally sound manner and disposed of according to applicable rules and regulations. Workers responsible for managing hazardous materials, generated waste, conducting hazardous waste inspections, or involved in emergency response procedures will be trained on hazardous materials and waste management procedures, emergency and spill response procedures, and waste minimization procedures.

The operating staff will benefit from continuous training in order to guarantee a certain level of knowledge and adequate competence. The operating staff must fully understand the emergency response plan's procedures. Each worker will be trained in order to know the warning and intervention procedures in the event of an emergency. The emergency response plan will be regularly tested in order to verify its efficiency level. A program consisting of a series of exercises will allow the users to verify the efficiency level of every aspect of an intervention, of the equipment and of the workers identified in the emergency response plan. The plan will outline the types of exercises which need to be done and the frequencies. Every exercise will be evaluated in order to validate and/or improve the operational processes of the emergency response plan. Reference will be made to the World Bank EHS Guidelines and their details on hazardous materials and waste management. The training will also include information regarding the use of appropriate PPE when handling hazardous materials and waste, and OHS procedures. Also, the employees will receive awareness about the importance of proper hazardous waste management and its potential impact on the environment and health. The capacity and training program are presented in Table 4 below.

This training does not relieve the construction contractors of the responsibility to train employees as required by the OSHWA of the Republic of Malawi. Training records will be maintained for records.

Table 4: Capacity Building and Training Program

Trainees	Training mode	Thematic	Agency animating training	Approx. Cost
PIU, ESCOM Environmental & Social Personnel Ministries Staff	Workshops and Seminars Case Studies on site of existing projects and current project	<ul style="list-style-type: none"> • Overview of environmental, health, Safety & social aspects of energy projects • Regulations and Laws surrounding environment, • Hazardous Materials and waste Management in energy sector including Health, Safety Quality and emergency procedure 	National Consultants and where possible International Experts/ training course	According to the number of participants and sessions may go up to US \$100,000
ESCOM operating and maintenance personnel	Workshops Case Studies on the site of existing projects and current project	<ul style="list-style-type: none"> • Hazardous materials and waste management plan Implementation • Best Environmental, health, safety & social Practices • Integrating Hazardous materials and waste management measures in plans and specifications • Hazardous materials and waste Monitoring of construction work • Environmentally-friendly and socially responsible construction management • Health and Safety Quality in relation to hazardous materials and waste management 	External or National Consultants and International Experts	According to the number of participants and sessions may go up to US \$100,000

Annex A. HAZARDOUS MATERIAL INVENTORY FORM

1. Project:			
2. Site Name			
3. Site Location:			
4. Hazardous Material Information ((Complete this form for each hazardous material used or stored on site)			
Hazardous Material Name:			
Hazard Classification:			
Toxic (Specify)	Flammable	corrosive	Other
Instructions for safe handling:			
Instructions for safe use:			
PPE Requirement:			
Instructions for safe disposal:			
Is a SDS Available Onsite? Yes / No: (attach SDS)			
New Hazardous Material or Quantity Change?			
Quantity Stored Onsite:			
Type of Container:			
Size of Largest Container:			
Location of Hazardous Material on Site			
5. Inventory prepared by:			
Requestor's Name:		Date:	
Signature			
Supervisor's Name		Date:	
Signature			
6. Emergency Response			
I case of emergency; the Contractor must follow the instructions on the safety data sheet (SDS). Should there be need for medical attention, the contractor must call for an ambulance/emergency vehicle for referral to the medical center.			
7. Emergency Medical Facility			
Facility Name:		Phone:	
Address:			
City:			

Annex B. SPILL LOG/REPORT

REPORTABLE / NON-REPORTABLE QUANTITY SPILL	
1. Log Prepared by:	
Name:	Date:
Email:	Phone:
2. Location of the spill	
Specific Spill Information:	
Date of Spill:	Time of spill:
Material Spilled:	
Quantity spilled:	
Media affected: (Tick appropriately) Concrete / Asphalt / Water / Vegetation / Soil / Other If Other, please specify:	
Cause of spill:	
3. Extent of spill:	
4. Potential Threat to Surface and/or Groundwater, Human Health (Affect Groundwater/residential areas, etc.)	
5. Impact Assessment a) Impact of the spill on the: Environment Personnel Property b) Any observed damage or risks resulting from the spill	
6. Response and Cleanup Action Taken: a) Measures taken to protect the health and safety of personnel involved in the spill response b) Use of PPE during the clean up	
7. Measures taken to prevent similar spills in the future:	
Date:	Time:
Name of Officer:	Signature: