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REPORT

Central Térmica de Temane Project - Framework Decommissioning Environmental and Social Management Plan (d-ESMP)

Moz Power Invest, S.A. and Sasol New Energy Holdings (Pty) Ltd

Submitted to:

World Bank Group

Submitted by:

Golder Associados Moçambique Limitada

6th Floor, Millenium Park Building, Vlademir Lenine Avenue No 174

Maputo, Moçambique

+258 21 301 292

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ABBREVIATIONS AND DEFINITIONS

Acronym or Abbreviation	Description
BAT	Best Available Technology
Closure	Is a synonym for decommissioning
CPF	Central Processing Facility
Decommissioning	Activities related to the planning, preparation and implementation of the cessation of petroleum operations, including the termination of the use of facilities and their removal and disposal
Decommissioning Fund	Fund established to cover the costs of associated with the preparation and implementation of decommissioning operations
Decommissioning Plan	A document containing the options for the closure of petroleum operations, and the reuse or removal and storage of facilities, including a schedule of activities and costing
f-DRP	Framework Decommissioning and Rehabilitation Plan
Final DRP	Decommissioning and Rehabilitation Plan to be completed and authorised by MITADER in advance of closure
Environmental and Social Management Plan (ESMP)	Defines the measures to be taken during phase of the project under consideration to prevent, minimise and/or manage adverse environmental impacts; Defines the actions needed to implement these measures; and describes how this shall be achieved.
GDP	Gross Domestic Product
INP	*Instituto Nacional de Petróleo* (Mozambican National Petroleum Institute)
MITADER	Ministry of Land, Environmental and Rural Development
o-EMP	Operational Environmental Management Plan
PDP	Pipeline Decommissioning Plan
Petroleum Operations	The planning, preparation and implementation of activities, related to reconnaissance, exploration, development, production, storage or transportation, and the cessation of such activities, or the termination of the use of the facilities, including the implementation of a decommissioning plan and the sale and delivery of petroleum up to the delivery point, which is the point at which the petroleum is delivered for consumption or use, or loaded as merchandise, including in the form of liquefied natural gas
RoW	Right of Way

1.0 INTRODUCTION

The Mozambican economy is one of the fastest growing economies on the African continent with electricity demand increasing by approximately 6-8% annually. In order to address the growing electricity demand faced by Mozambique and to improve power quality, grid stability and flexibility in the system, Moz Power Invest, S.A. (MPI), a company to be incorporated under the laws of Mozambique and Sasol New Energy Holdings (Pty) Ltd (SNE) in a joint development agreement is proposing the construction and operation of a gas to power facility, known as the Central Térmica de Temane (CTT) project. MPI's shareholding will be comprised of EDM and Temane Energy Consortium (Pty) Ltd (TEC). The joint development partners of MPI and SNE will hereafter be referred to as the Proponent. The Proponent proposes to develop the CTT, a 450MW natural gas fired power plant.

The proposed CTT project will draw gas from the Sasol Exploration and Production International (SEPI) gas well field via the phase 1 development of the PSA License area, covering gas deposits in the Temane and Pande well fields in the Inhassoro District and the existing Central Processing Facility (CPF). Consequently, the CTT site is in close proximity to the CPF. The preferred location for the CTT is approximately 500 m south of the CPF. The CPF, and the proposed site of the CTT project, is located in the Temane/Mangugumete area, Inhassoro District, Inhambane Province, Mozambique; and approximately 40 km northwest of the town of Vilanculos. The Govuro River lies 8 km east of the proposed CTT site. The estimated footprint of the CTT power plant is approximately 10 ha once built, although during construction approximately 20 ha will be required to accommodate the plant footprint as well as the construction camp and contractor's laydown areas adjacent to the plant site (see Figure 1).

Associated infrastructure and facilities for the CTT project will include:

1) Electricity transmission line (400 KV) and servitude; from the proposed power plant to the proposed Vilanculos substation over a total length of 25 km running generally south to a future Vilanculos substation. [Note: the development of the substation falls outside the battery limits of the project scope as it is part of independent infrastructure authorised separately. Environmental authorisation for this substation was obtained under the STE/CESUL project. (MICOA Ref: 75/MICOA/12 of 22nd May 2012)];

2) Piped water from one or more borehole(s) located either on site at the power plant or from a borehole located on the eastern bank of the Govuro River (this option will require a water pipeline approximately 11km in length);

3) Access road; over a total length of 3 km, which will follow the proposed water pipeline to the northeast of the CTT to connect to the existing Temane CPF access road;

4) Gas pipeline and servitude; over a total length of 2 km, which will likely start from the CPF high pressure compressor and run south on the western side of the CPF to connect to the power plant;

5) Additional nominal widening of the servitude for vehicle turning points at points to be identified along these linear servitudes;

6) A construction camp and contractor laydown areas will be established adjacent to the CTT power plant footprint (construction phase only); and

7) Transhipment and barging of equipment to a temporary beach landing site and associated logistics camp and laydown area for the purposes of safe handling and delivery of large oversized and heavy equipment and infrastructure to build the CTT. There are 3 beach landing site options, namely SETA, Maritima and Briza Mar. The SETA site is considered to be the preferred beach landing site (construction phase only);

8) Temporary bridges and access roads or upgrading and reinforcement of existing bridges and roads across sections of the Govuro River where existing bridges are not able to bear the weight of the equipment loads that need to be transported from the beach landing site to the CTT site. Some new sections of road may need to be developed where existing roads are inaccessible or inadequate to allow for the safe transport of equipment to the CTT site. The northern transport route via R241 and EN1 is considered as the preferred transport route (construction phase only).

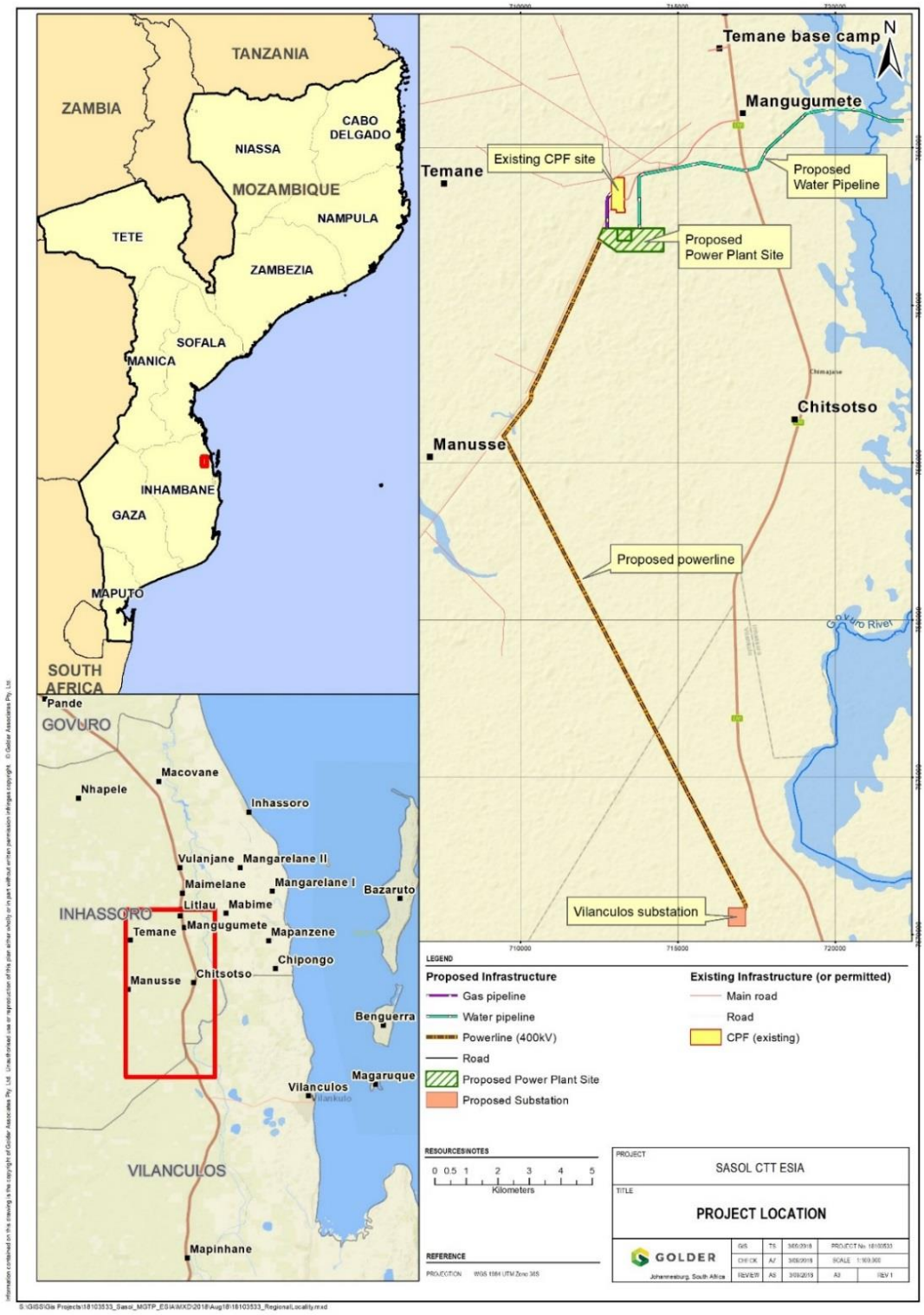

Figure 1: Project Location

This Decommissioning Environmental and Social Management Plan (d-ESMP) concerns the CTT and all associated facilities. It provides a framework for decommissioning and rehabilitation of infrastructure for the final decommissioning of all remaining infrastructure in the closure phase of the project. These plans are often referred to as a Decommissioning and Rehabilitation Plan (DRP). For purposes of this document, the two terms are used interchangeably and refer to the same activities.

A Decommissioning ESMP is a requirement of Mozambique National legislation and International best practice and is intended to ensure that companies that operate large industrial facilities identify and make sufficient provision for the closure costs of the facility. The lessons learned over many years have underscored the importance of early planning for decommissioning and closure. By critically examining the requirements for decommissioning and closure, it encourages companies to think carefully about long-term liabilities, early on, to minimise actions that will result in environmental liabilities and high costs at the end of the project, and to undertake as much as possible of the work required for closure during the operational life of the project. Figure 2 outlines the various sub-plans that will inform the d-ESMP or DRP, which will need to be developed at a later stage in the project life cycle.

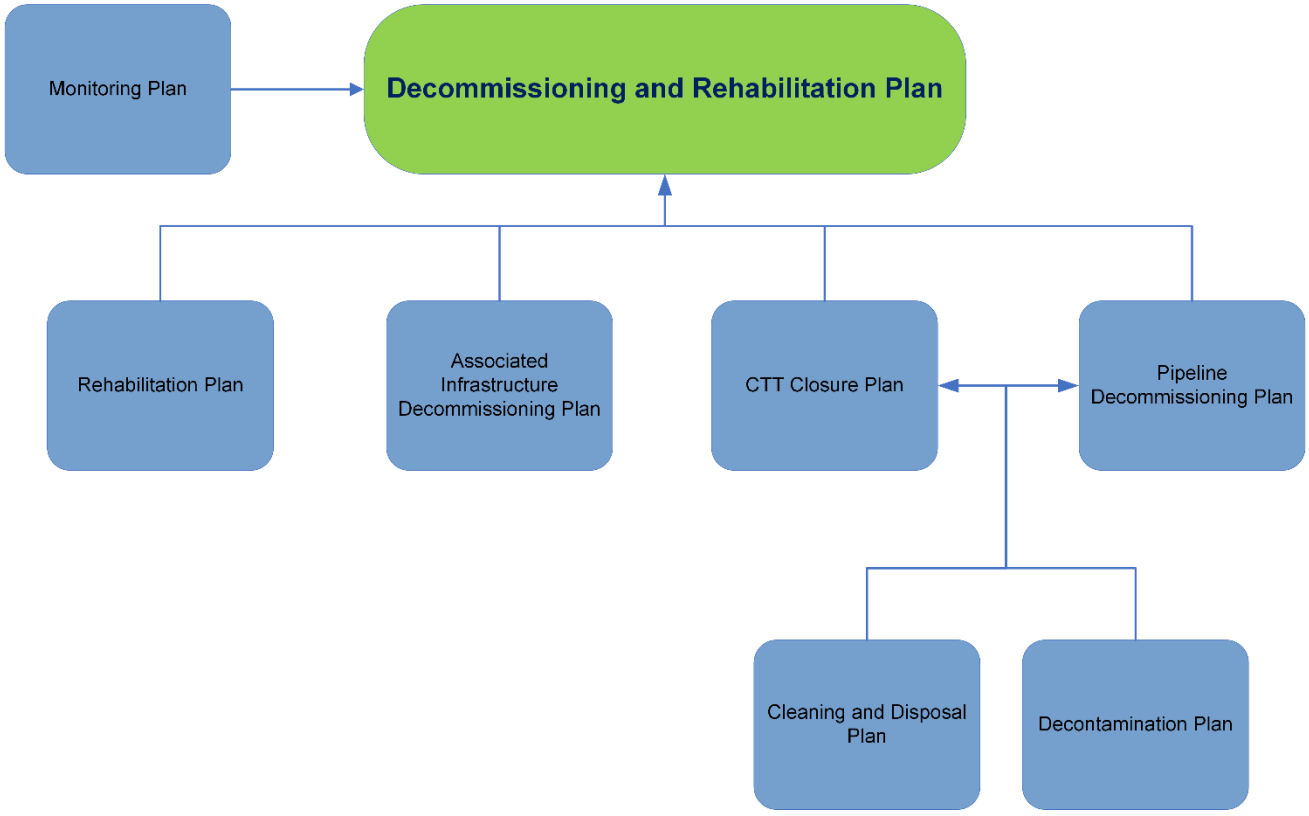

Figure 2: Sub-plans to be included in the Final d-ESMP / DRP

1.1 Objectives of the d-ESMP

The d-ESMP is intended to achieve the following objectives:

- Provide a framework for the final decommissioning of the CTT facilities and comply with Mozambican legislative and regulatory requirements for a decommissioning and rehabilitation plan.
- Investigate different options for decommissioning (including handing over useful assets to the project 's Mozambican Partners or other third parties such as Government, external stakeholders or communities – where feasible).

- Ensure that as much as possible of the work necessary for decommissioning is done before final closure of the project.
- Ensure that measures are in place to maximise, to the greatest reasonable extent, the recycling and re-use of decommissioned plant, materials, equipment and infrastructure to the benefit of people in Mozambique and local project-affected people in particular.
- Ensure that measures are in place to safely dispose of all wastes that cannot be recycled and to clean up any contaminated areas on site.
- Provide initial guidelines for reinstatement of land and rehabilitation requirements.
- Provide initial guidelines and future reporting requirements concerning the decommissioning and rehabilitation of the pipeline and transmission line right of way.
- Ensure that as much as reasonably possible is done to minimise the impact of job losses that will result from the closure of the project.
- Provide guidelines for the process to be followed to update the f-DRP, at the time of project decommissioning, including requirements for public participation.
- Provide requirements for assessment, monitoring and auditing, during and after decommissioning.

1.2 Scope of the d-ESMP

The facilities, infrastructure and activities that are covered by the d-ESMP include the following:

- Gas to Power Plant with installed capacity of approximately 450MW;
- Gas pipeline (±1-2 km) that will feed the Power Plant with natural gas from the CPF;
- 400kV Electrical transmission line (± 25 km in length) with a servitude of 100m that will include a fire break (vegetation control) and a maintenance road to the Vilanculos sub-station. The transmission line will have a partial protection zone (PPZ) of 100m width (i.e. 50m on either side of centre line). The transmission line servitude will fall inside the PPZ;
- Water supply pipeline to one or more borehole(s) located either on site or at borehole(s) located east of the Govuro River;
- Paved access road to the CTT site and gravel maintenance roads within the transmission line and pipeline servitudes.

1.3 Structure of the Report

The report is structured as follows:

Section 2: describes legal requirements and decommissioning principles

Section 3: describes general requirements for decommissioning including the transfer of responsibility for equipment and infrastructure left for community use, recycling and reuse of materials and wastes, contaminated land management and non-recyclable waste, recontouring, reinstatement and rehabilitation and socio-economic considerations

Section 4: considers specific requirements for the closure of the CTT complex and associated infrastructure

Section 5: describes closure, post closure monitoring and reporting

Section 6: deals with decommissioning costs and the provision of guaranteed funds to cover these costs

Section 7: refers to ongoing liability for the management of any risks or pollution after decommissioning.

1.4 Safety, Health and Environmental (SHE) Policy

The CTT shall implement a Safety, Health and Environmental Policy declaration that sets the framework for an integrated management system for the Operations. All visitors, contractors and employees are required to comply with the requirements of the policy declaration.

CTT management and staff shall fully subscribe to the SHE policy declaration and shall demonstrate commitment to the policy by:

- Developing and implementing an integrated management system that will comply with the requirements of the OHSAS 18001 Occupational Health & Safety, and ISO 14001 Environmental Management Systems;
- Subjecting itself to third party audits conducted by an internationally recognised certification body as part of their drive towards continual improvement;
- Accepting and complying with Corporate Governance requirements, Mozambican SHE - related legislation, all Financing obligations (including WB/IFC PS) and any appropriate, recognised, industry codes of practice;
- Engaging with the Mozambican Government regarding the implementation framework for any new legislation that affects the CTT and its activities;
- Influencing suppliers and contractors to conform as a minimum to the Mozambican SHE - related legislation and to respect and adhere to the CTT codes of practice;
- Sharing and communicating relevant information about safety, health and environmental performance with interested and affected parties, employees and authorities in an open and transparent manner, and making this declaration available by displaying it in all office buildings and in the induction training;
- Minimising risks associated with its activities which may impact on the health and safety of its employees, communities and the environment;
- Enhancing the general awareness of its employees and contractors to ensure understanding of all the SHE risks and impacts associated with their work activities;
- Preventing pollution, accidents, injuries and ill health through setting and reviewing objectives and programmes;
- Responding effectively to safety, health and environmental emergencies;
- Providing appropriate resources to implement the above commitments;
- Reviewing such a declaration of intent on an acceptable basis or as and when required by CTT SHE Governance structure.

1.5 Community Engagement Principles

CTT shall engage communities based on the following principles:

- Community involvement and ownership;
- Strengthen community leadership;
- Targeted impacts-driven interventions;
- Addressing key community priorities;
- Strategic research informed interventions;
- Monitoring and evaluation; and
- Building capacity through partnership.

2.0 LEGAL REQUIREMENTS AND DECOMMISSIONING PRINCIPLES

2.1 The Mozambique Petroleum Law (Decree 21/2014)

Article 27 (1f) of Decree 21/2014 makes provision for the Government to specify rules for the abandonment of areas within concession contracts. Article 27 (2c) provides for Government to approve decommissioning plans.

Article 40 (d) obliges all holders of concession rights to establish a fund for the closure and decommissioning of facilities. This plan must be submitted to Government before the time scheduled for the end of the period of production, the use of facilities or the concession contract.

Article 66 deals with the protection of the environment, specifying that concession holders shall carry out operations in accordance with applicable environmental and other legislation and shall:

- Prevent of minimise environmental harm caused by petroleum operations
- Prevent the leakage or loss of petroleum products
- Avoid damage to the petroleum resource
- Avoid damage to groundwater, land, rivers, lakes, flora and fauna, crops, buildings and other facilities and goods
- Clean up sites after any spills and at the termination of the use of the facilities or the decommissioning of petroleum operations, and comply with environmental restoration requirements
- Report to the Government the number and scale of any spills

2.2 Petroleum Operation Regulations (Decree 34/2015)

Article 4 (2) of the decree makes provision for the orderly termination of petroleum operations by means of an approved decommissioning plan. Article 15 refers to the bank guarantee which is required to ensure fulfilment of obligations in relation to the concession contract, among which is decommissioning. The bank guarantee shall only be refunded after the completion of decommissioning and compliance with all obligations arising from the concession contract.

Article 29 requires the operator to demonstrate technical competence in respect of all petroleum operations, including decommissioning.

Article 31 sets out requirements for plans, among which is a Decommissioning Plan.

Article 36 requires the submission of a Development Plan, within 2 years of the declaration of commerciality of the concession. Among the requirements for this plan is information about the closure of the facility and the proposed measures to fund the decommissioning.

Article 40 sets out requirements for a Decommissioning Plan. The Plan must comply with the following:

- Be submitted to the Ministry of Natural Resources and Energy (with a copy to the INP) at least 2 years prior to the scheduled date of closure of the petroleum operations, or for the re-use of removal of the facility
- Comply with any relevant legislation at the time and follow best industry practice
- Be prepared in consultation with the INP and must as a minimum include details of alternatives to the decommissioning of the CTT plant, proposals for the shutdown and removal of equipment not required for any ongoing operations and any other reasonable measures to ensure that there is no hazard to human life, property or the environment
- Provide a schedule for all decommissioning activities

- Provide an operations budget, including details of the costs for removing facilities and equipment to restore the environment
- Provide a decommissioning fund to meet the requirements of the Plan
- Undertake any necessary specialist engineering and environmental feasibility studies necessary to support the proposed Plan
- Provide an inventory of all material that must be removed during decommissioning
- Prepare a separate Environmental Impact Assessment in accordance with Decree 54 /2015, as amended.

Article 41 requires the establishment of a decommissioning fund into which funds for decommissioning are periodically deposited. The calculations underpinning the fund shall be submitted to the Minister and shall include reference to alternative costs for other reasonable solutions. The estimated decommissioning costs shall be updated annually. In the event that there are insufficient funds to pay for decommissioning at the time when this is undertaken, the shortfall shall be paid for by the concessionaire.

Article 42 makes provision for the Decommissioning Plan to be reviewed by the INP within an agreed timeframe and, if necessary, call for additional information.

2.3 Decommissioning Principles

There is no single 'across the board' principle that will best fit all facilities to be decommissioned. All options should thus be kept open for thorough case-by-case analysis. To deliver the most responsible solutions, each facility should be considered on its own merits. In this respect, no single infrastructure component need set a precedent for any other, although opportunities for generic approaches should be followed, where appropriate. For each defence component of the project, the investigation into decommissioning must follow the precautionary principle, be risk based and cost effective.

The following broad decommissioning principles apply:

- Carefully consider long term social and environmental liability of all proposed development actions during the lifespan of the project and, where feasible, implement alternatives that minimise long term risks.
- Follow an incremental approach to decommissioning by minimising the project footprint during the project lifespan and by decommissioning and rehabilitating all areas which are no longer required for the project at the time. This provides the benefit that decommissioned facilities can be monitored over an extended period while the company still has operational capacity on site to manage any deficiencies in the closure process.
- Review current legislation that may influence decision - making at the time of decommissioning, together with best international practices of the energy and gas sectors. Where applicable, use existing supporting ESMPs such as the Waste Management Plan to manage aspects of decommissioning.
- Prepare an Environmental and Social Impact Assessment (ESIA) as a basis for planning the decommissioning of facilities at project end-of-life, in consultation with statutory authorities, local communities and other interested parties. The ESIA shall include detailed consultations with all relevant stakeholders in order to determine preferred decommissioning options and shall be used to inform the (draft) DRP; following which the both documents shall be made available for public and authority review before being finalised and submitted to MITADER for authorisation and receive non-objection from the World Bank. Issues to consider in the ESIA are:

  - impacts on the terrestrial environment, including exposure of biota to contaminants associated with the installation, other biological impacts arising from physical effects, conflicts with the conservation of species, with the protection of their habitats, and interference with other legitimate uses of the sea;
  - Impacts on other environmental aspects, including emissions to the atmosphere, leaching to groundwater, discharges to surface fresh water and effects on the soil;
  - Other consequential effects on the physical environment which may be expected to result from the option; and
  - Impacts on amenities, the activities of communities and on future uses of the environment.
- Maximise efforts to assist local communities to build capacity throughout the life of the project so as to reduce the impact of job losses on decommissioning and the termination of CTT's contribution to development in the area. Efforts should include, wherever possible, the re-deployment of local CTT personnel to other operations (held by the proponent).
- Systematically shut down the operating processes in a manner which minimises risks to project personnel, the environment and the surrounding community, both during and post-decommissioning.
- Provide early warning to stakeholders who are likely to be affected by the decommissioning.

3.0 GENERAL REQUIREMENTS

3.1 Transfer of Responsibility for Equipment and Infrastructure left for Community Use

Mozambique authorities and communities may request that some equipment or infrastructure is left in place for community use. The following general requirements shall apply:

- Before ripping and rehabilitating roads, consult with local, district and regional Government to determine whether they could be useful if left in place, while taking into consideration the ecological risk of induced impacts (unsustainable resource harvesting). If roads are to be left open, the transfer of the responsibility of maintaining them shall be considered - any conflicts between local, district and provincial interests regarding the maintenance of the roads must be resolved by the competent Government authorities.
- Consider the feasibility of transferring other fixed assets with beneficial re-use to third parties. Where practical, safe and useful options exist, which are agreed to by the parties, formally transfer responsibility (for maintenance and legal compliance) of specifically defined remaining infrastructure and equipment to identified third parties. Verify that the recipient of any infrastructure is properly instructed in the safe operating methods and appropriate maintenance of the equipment or infrastructure. If the recipient cannot demonstrate competence to safely manage the infrastructure, then it shall be removed or the necessary training shall be provided to ensure that it is safely managed.
- Obtain the approval of the relevant regulatory authorities and potentially affected community leaders before a decision is made to leave any equipment or infrastructure on site for third party use. Provision shall be made to ensure that this infrastructure or equipment does not create a safety hazard. Agreement will need to be reached and documented in such cases for these parties to take over liability for the equipment / infrastructure.

3.2 Recycling and Reuse of Materials and Wastes

Recycling and reuse of materials and waste is a key component of CTT's overall waste management strategy and this f-DRP. The following general requirements apply:

- Dismantle equipment and materials that are not to be left in situ;
- Identify suitable recycling options for the equipment and materials that are dismantled, in line with best management principles of the waste hierarchy. Contract with an accredited recycling contractor for removal of all recycled waste. Recycling and reuse of materials is to be maximised to the greatest extent possible, subject to safety and contamination considerations. All management of decommissioned infrastructure earmarked for recycling or re-use shall be done in accordance with the most recent updates of the CTT's Waste Management Plan, Mozambique's domestic waste regulations (Decree 94/2014), and any other relevant regulations applicable at the time. Comply with the specific requirements that are set out in the CTT Waste Management Plan and Decree 94/2014 concerning the identification, separation, temporary storage and transport of recyclable and reusable materials. Materials for which separation and recycling is a requirement are:
  - Paper or cardboard
  - Plastic
  - Glass
  - Metals
  - Textiles
  - Rubber (tyres)
  - Timber
  - Electrical cables
  - Electronic equipment
  - Scrap wood.
- Maintain a detailed manifest of all recycled and reused materials and equipment, including auditable chain of custody information.
- As far as reasonably practical, and subject to considerations about safety and pollution, provide local people with first choice concerning acquisition of recyclable or reusable materials and infrastructure, non-polluting waste (such as uncontaminated timber), parts and equipment.

3.3 Contaminated Land Management and Non-Recyclable Waste

It is a principle of this f-DRP that any areas of contamination associated with exploration, appraisal and development activities are to be remediated at the time as a part of normal operations. Consequently, significant areas of contamination are not expected at closure other than any spillages associated with decommissioning itself.

The following requirements set out the general procedure to be followed to rehabilitate contaminated land and to dispose of non-recyclable waste generated during decommissioning:

- Prepare a Contaminated Land Assessment which identifies all areas of contaminated land, the nature of the contamination and the necessary measures to contain and rehabilitate these sites. Specifications are to include *in situ* bioremediation, where feasible, or other measures to remediate the area in accordance with Mozambican legislation and good industry practice, including the removal of the contamination to a hazardous waste disposal site if no other options are available.

- Contain liquid and solid hazardous wastes for temporary storage and safe disposal, in accordance with Mozambique legal standards (Decree 83/2014), the CTT Waste Management Plan and any other appropriate standards and guidelines applicable at the time. This includes any wastewater generated by flushing and cleaning of pipelines and tanks to remove hydrocarbons and solid or liquid wastes generated during the decommissioning of wells.
- Prepare manifests of all hazardous wastes to be disposed in accordance with the CTT Waste Management Plan and Mozambique Decree 83/2014.
- Remove and dispose of uncontaminated concrete demolition waste at an appropriate certified waste disposal facility or as otherwise agreed with MITADER.
- Remove and dispose of all litter, used parts, non-recyclable equipment and general mixed non-recyclable domestic waste at a certified disposal site.
- Disassemble and remove all non-recyclable parts, equipment and machinery from the site. If contaminated, either clean to remove hydrocarbons for disposal at a municipal landfill or dispose of in accordance with the hazardous waste requirements in the CTT Waste Management Plan and Decree 83/2014. For items that are cleaned to remove hydrocarbons, prepare a Decontamination Plan as a part of the final DRP.

3.4 Re-contouring, Reinstatement and Rehabilitation

The general recommendations in this regard are a guide to preparing a more detailed, site specific Rehabilitation Plan, prior to closure, as a part of the final Decommissioning Plan:

- Shape, level, de-compact and scarify the final landscape after removal of project infrastructure, dress with topsoil and, where necessary, vegetate with indigenous species. Commission specialists to assist in planning re-vegetation and the management of environmental impact, as required.
- Remove access roads with no beneficial re-use potential by deep ripping, shaping and levelling after the removal and disposal of any culverts, drains, ditches and/or other infrastructure. Natural drainage patterns are to be reinstated as closely as possible.
- Shape all other channels and drains to smooth slopes and integrate into the natural drainage pattern.
- Construct contour banks and energy dissipating structures as necessary to protect disturbed areas from erosion prior to stabilisation.
- Promote re-vegetation through the encouragement of the natural process of secondary succession. Natural re-vegetation is dependent on de-compaction of subsoils and adequate replacement of the accumulated reserves of topsoil (for example, over the well sites), so as to encourage the establishment of pioneer vegetation.
- Remove alien and/or exotic vegetation.
- Undertake a seeding programme only where necessary, and as agreed with a re-vegetation specialist. Strategies currently employed by the adjacent CPF facility are based on natural re-seeding as the most effective means of rehabilitation, acceptable cover from which typically occurs over two or three rainy seasons, can also be utilised for the CTT site.
- Reduce heavy vehicle movements to the absolute necessary required for earthworks as part of re-contouring and topsoil placement.
- Creation and monitoring of an inventory of chemicals held on site during decommissioning activities;

- Storage of hazardous or toxic substances securely and controlled use thereof;
- Availability and accessibility of HAZOP sheets of all chemicals;
- Wet suppression (wet misting during material handling activities);
- Covering or keeping stockpile heights as low as practicable to reduce their exposure to wind erosion and thus dust generation;
- Progressive rehabilitation and re-vegetation of exposed areas as soon as possible following infrastructure removal (this also to reduce exposure to elements and potential for erosion);
- Reduction in unnecessary traffic volumes;
- Routine inspections to identify areas of unpaved roads that are increasingly dusty;
- Maintenance work to be undertaken on these areas including watering, application of dust suppressants, compaction, dust removal and/or utilisation of soil aggregate;
- Vehicles and machinery to be serviced regularly to reduce the generation of black tailpipe smoke;
- Speed control and the institution of traffic calming measures;
- Maintain and service all vehicles, backup power generation and other equipment regularly to ensure that emissions are kept to a minimum (reduce Trace Gasses (NO_2 / SO_2);
- Where possible, use low sulphur fuels to reduce SO_2 emissions;
- Vehicles and machinery should be turned off when not in use to avoid unnecessary idling (i.e. idling should be limited to a maximum of three minutes on site);
- No burning of waste onsite; and
- Continue the air quality monitoring programme, however this may be reduced to only monitor for nuisance dust (iimplementation a dust bucket fallout monitoring system).

3.5 Socio-Economic Considerations

The following positive employment and economic benefits are expected during the life of the project: -

- Creation of significant direct and indirect employment during the life of the facility.
- Stimulation of local business.
- Community investment and development.
- Decreased social vulnerability and increased household income due to employment.
- Significant contribution of the project to the Mozambican Gross Domestic Product (GDP) locally and nationally.

The closure of the project will present socio-economic challenges for the local community. For example, loss of direct and indirect business and work opportunities due to the closure of operations may lead to increased unemployment and secondary negative socio-economic impacts. Most of the impacts will be related to the closure of the CTT, since few direct jobs are associated with the pipelines and Transmission line during the operational phase of the project.

Nevertheless, at the time of closure, CTT shall consider the potential effects resulting from the project decommissioning and shall work closely with local communities to:

- Ensure that employees are fully informed about decommissioning and how it will affect them well before the project finally closes. Initial consultation should take place as a part of the ESIA.
- Assisting employees in seeking alternative employment at other power plants or related facilities.
- Training and education of employees to equip them with skills that could benefit them in other industries.
- Build community capacity to manage opportunities and impacts arising from the decommissioning and post-decommissioning phase of the project.
- Ensure that land is not used for agricultural purpose before soil analysis is conducted
- Community access to the area should be restricted until clearance is granted by competent authority
- Ensure that used equipment are not disposed or handed over to the community before health issues are assessed
- Provide training to transfer project-learned skills to alternative and secondary industries tailored to respond to a market economy.
- The client should develop exit strategies for all its community development initiatives.
- Apply the measures in the Influx Management Plan to ensure that any sudden in-migration of job-seekers during the decommissioning phase is managed accordingly.
- Similarly, the health interventions contained in the c-ESMP can be used to manage any health-related impacts that a sudden influx of job seekers during the decommissioning phase may have on the local communities and health infrastructure in the District.
- As with the construction phase, there will be an increase in heavy vehicles and trucks visiting the CTT site and linear infrastructure (transmission line and pipeline) as part of the decommissioning activities, there the following traffic measures will need to be in place in order to safeguard local communities and other road users in the area:
  - Indicate areas where heavy vehicles will be expected with adequate signage and points men with flagging;
  - Clearly indicate pedestrian crossings (if necessary, with adequate signage and points men with flagging;
  - Educate drivers on potential areas of high pedestrian and cyclist activity and reduce speeds in these areas to appropriately low speeds; and
  - Educate community on dangers of heavy vehicles and trucks new to their area.

4.0 SPECIFIC REQUIREMENTS

4.1 Decommissioning of the CTT

The CTT consists of a wide variety of physical infrastructure, including process equipment and infrastructure and support infrastructure. The following requirements shall apply. Details shall be included in the CTT Closure Plan:

- All equipment and infrastructure shall be fully inventoried, and its hazard status determined in accordance with Decree 83/2014 and other applicable current legislation at the time of decommissioning.

- Decisions shall be made about partial or full abandonment of different parts of the site. Where third party use of some of the facilities on the site is negotiated, Section 3.1 shall apply.
- Fluids and hydrocarbons (transformer oils, lubricating fluids etc) shall be recovered from process equipment and tanks. Any hydrocarbons shall be recovered and re-used (avoid disposal). Sludge materials and decontamination residues shall be dewatered where possible to reduce bulk and disposal costs. Recommendations for management and disposal shall be made at the time based on current legislation and best practice.
- Particular emphasis shall be placed on the management and disposal of:
  - Hydrocarbon liquids / sludge and other hazardous materials;
  - Lubricating oils from rotating equipment (pumps, compressors, transformers etc.);
  - Asbestos containing materials in insulation, gaskets, packing, partition boards and cement roof sheets (if applicable);
  - Polychlorinated biphenyls (PCBs) in oils from capacitors, transformers and other electrical switchgear.
- Where full site rehabilitation is required, the general requirements of Section 3.4 shall apply.

4.2 Decommissioning of Pipelines and Transmission lines

CTT's pipelines and transmission line are likely to be decommissioned in a single campaign at the end of life of the project. Due to the impact associated with removing buried pipelines, it is expected that most of them will be left in situ.

The following requirements shall apply:

- Prepare a detailed and site-specific Pipeline Decommissioning Plan. This plan shall be approved by MITADER (and receive no-objection from the World Bank), as a part of the final DRP before proceeding with pipeline decommissioning and rehabilitation.
- Where pipelines are left in situ, leave them in a safe and stable condition that minimises the risks of land settlement and erosion.
- Flush and clean pipelines (were required) in accordance with industry best practice guidelines and any relevant legislation at the time. Prior to disconnection and isolation, pig and purge all pipelines to remove residual fluids and residues using the Best Available Technology (BAT) to ensure effective cleaning (where required). A project specific "Cleaning and Disposal Plan" shall be developed as a part of the Pipeline Decommissioning Plan.
- Prepare a project-specific 'Decontamination and Disposal Plan'. Appoint specialist contractors with a proven track record in this regard to manage and dispose of any contaminated waste.
- Provide relevant Mozambique authorities and local communities with information regarding the depth, position, size and condition of any pipelines left in situ to ensure the pipelines do not become an obstruction or hindrance to any future land management activities and utilities.
- Where applicable, take suitable measures (such as cement plugs) in sloping areas to ensure the pipeline does not become a conduit for water.
- Remove all pylons and electrical cabling (if the Transmission line cannot be used as part of the greater electrical grid).

- The pylon footprint foundations should be rehabilitated, and any holes should be closed.
- Where possible, recycle or reuse all surface infrastructure, or dispose of it in accordance with the requirements set out in Sections 3.2 and 3.3 above.
- Use Best Available Technology in the appropriate areas to prevent the risk of future subsidence or erosion (road crossings, wetland/river crossings, steep slopes).
- Reinstate land in accordance with the requirements of Section 3.4.
- Prepare a monitoring and audit programme in accordance with the general guidelines set out in Section 5.

4.3 Decommissioning of Water Boreholes

Boreholes used for water supply on the project shall be plugged and sealed, with the exception of some which are to be used for long term monitoring or where the boreholes could reasonably be used by local communities for domestic water supply. In which case, boreholes are to be equipped with hand pumps or similar mechanisms. CTT shall consult with all relevant stakeholders in this regard. A formal request shall be made to the local authorities to allow any monitoring boreholes to remain post -decommissioning.

4.4 Decommissioning of Govuro River crossings

Should the temporary bridge crossing of the Govuro river not be removed during the CTT construction phase (i.e. after the beach landing and transport of heavy and oversized equipment is complete as part of construction of the CTT plant), but at a later stage during the project life cycle, then the following measures still apply to decommissioning, removal and rehabilitation of the river crossing.

In order to minimise the impacts during decommissioning of the Govuro temporary bridge crossings on the aquatic ecosystems, it is necessary to minimise the impacts on water quality, including contamination, flow and sedimentation. This can be accomplished by the following means:

- Where possible, place decommissioning activities as close to the existing road servitudes as possible to limit unnecessary clearing:
  - Avoid non-perennial bodies of water such as flooded borrow pits / drainage canals and floodplain depressions where possible.
- Decommission the Govuro River crossings during the dry season so as to limit the amount of impact on the sites, particularly in terms of flow diversion and surface water runoff following rainfall;
- Implement low-impact decommissioning techniques to minimise the impact on the river system, especially during the diversion of any water during decommissioning (if required):
  - *E.g. low-impact techniques are those that make use of on-site construction waste (i.e. rock substrate, topsoil) for use as non-structural fills or landscaping/rehabilitation materials.*
- Where possible, keep decommissioning activities out of the riparian areas, floodplain and inland depressions, and clearly demarcate no-go areas:
  - Limit movement of vehicles and activities (e.g. spoil heaps) to the demarcated zone only; and
  - Restrict vehicles to service roads.
- Monitor the water quality downstream of the river crossing sites during decommissioning on an at least bi-annual basis. Information from this monitoring can be used to quickly implement management actions

should a significant decrease in water quality downstream of the crossings be observed. More frequent surface water quality monitoring may be required during decommissioning; this should be implemented in agreement with the mitigation measures set out in the surface water impact assessment section;

- To ensure that any adverse impacts are reduced, the project team must ensure that any accidental spillages or impacts to the aquatic and riparian ecosystems are cleaned up and rehabilitated immediately in accordance with the Engineering, Procurement and Construction (EPC) spill management plans;
- In line with the terrestrial ecological impact assessment report, vegetation clearing, and rehabilitation mitigation measures should be implemented;
- A suitable rehabilitation programme should be developed and implemented in all disturbed areas. The programme should include active re-vegetation, using locally-occurring indigenous grass and tree species; and
- Monitor the water quality and habitat downstream of the river crossing sites during construction on an at least bi-annual basis (see Surface Water chapter) and implement an early warning system that would trigger a survey of the biological responses, should water quality or habitat alterations warrant this.

The Govuro River crossing point and river approaches should be considered priority sites for stabilisation and rehabilitation immediately following infrastructure removal.

5.0 CLOSURE AND POST-CLOSURE MONITORING, AUDITING AND REPORTING

5.1 Monitoring

Prior to decommissioning and rehabilitation activities, and as a part of the ESIA and site-specific Decommissioning and Rehabilitation Plan (DRP), a Monitoring Plan shall be developed and submitted to MITADER for approval and receive no-objection from the World Bank. The plan is to cover proposed monitoring during **and after** the closure of the facility and shall include verification of the following:

- that any waste, wastewater or other pollutants generated as a result of decommissioning are appropriately managed, in accordance with the detailed requirements set out in the DRP.
- If applicable, that all de-contaminated sites are free of residual pollution after decommissioning.
- that pipelines left in-situ have been cleaned and are left in a safe condition which minimises the risks of pollution, ground settlement and erosion, and that all surface infrastructure has been removed.
- that progress towards an acceptable vegetation cover is being made in areas where natural vegetation is being re-established. ‘Acceptable cover’ means re-establishment of a mixture of indigenous herbaceous and woody plant communities over the disturbed areas at a density similar to surrounding undisturbed areas, non-eroding and free of invasive alien plants.

5.2 Reporting and Auditing

Although post closure reporting is not mandatory according to the Petroleum Law and Regulations or according to the Environmental Regulations for Petroleum Operations, annual environmental reporting to the INP and MITADER and other relevant Departments is recommended **for at least one year** post-decommissioning. In the case of the CTT site, the frequency of this reporting period may be extended to include longer term water quality monitoring (where required), at intervals to be agreed with the INP and MITADER and as specified in the Decommissioning ESIA.

Monitoring reports shall include a list of any remedial action necessary to ensure that infrastructure that has not been removed remains safe and pollution free and that rehabilitation of project sites is in a stable condition, progressing towards 'acceptable cover', and free of alien invasive species. Monitoring reports may be prepared by experienced CTT personnel or by independent specialists.

A final audit report of all decommissioning activities shall be prepared by an independent specialist consultant, with experience of the energy and gas industry on final project closure. Any post closure audit requirements shall be determined in consultation with the INP and MITADER. This report shall cover all environmental and social aspects described in the final DRP.

In addition, in accordance with the Regulation for the Licensing of Petroleum Installations and Activities - Ministerial Order no. 272/2009 of 30 December, the National Institute of Petroleum (INP) is expected to audit the decommissioning activities until rehabilitation is complete.

6.0 DECOMMISSIONING COSTS

The Petroleum Operation Regulations (Decree 34/2015) may require that CTT prepares decommissioning cost estimates and establish a fund to cover these costs. The estimates and the fund must be updated annually. Costs should continue to be updated, as required by Decree 34/2015 and should include the possible costs associated with the decommissioning ESIA and any ongoing monitoring that is required in the period after decommissioning.

7.0 POST DECOMMISSIONING LIABILITY

Although highly unlikely, any residual liability arising from or in connection with decommissioning will remain with CTT in perpetuity. The Company will remain responsible for complying with any conditions attached to the Authority's approval of the Decommissioning and Rehabilitation programme; provided, however, that such residual liability will not extend to any damages and losses arising out of acts or omissions from a third party. A "third party" will include but not be limited to new owners, operators or licensees. In no event will the Company be held liable for losses or damages caused by third parties other than itself.

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NUIT 400196265
Directors: G Michau, RGM Heath

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