

**REPORT**

# Central Térmica de Temane Project - Operational Environmental and Social Management Plan (o-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

March 2019



## Distribution List

- 1 x electronic copy World Bank Group
- 1 x electronic copy SNE, EDM and TEC
- 1 x electronic copy e-projects library [projectreports@golder.co.za](mailto:projectreports@golder.co.za)
- 1 x electronic copy Golder project folder

# Table of Contents

<b>1.0 INTRODUCTION .....</b>	<b>1</b>
1.1 Scope of the o-ESMP .....	3
1.2 Objectives of the o-ESMP .....	3
1.3 Details of the Proponent.....	3
1.4 Gas to Power Plant and Key Infrastructure during operation .....	7
1.5 Safety, Health and Environmental (SHE) Policy .....	10
1.6 Community Engagement Principles .....	10
1.7 Purpose of this Document.....	11
<b>2.0 ENVIRONMENTAL MANAGEMENT STRUCTURE .....</b>	<b>11</b>
2.1 Organisational Structure and Responsibility .....	11
2.2 Liaison, Co-ordination and Reporting .....	14
2.3 Environmental and Social Management System (ESMS) .....	14
<b>3.0 ACTIVITY AND IMPACT MANAGEMENT PLAN .....</b>	<b>15</b>
3.1 Background to Environmental Impact Mitigation and Management .....	15
3.2 Environmental Management Requirements.....	16
3.3 Administration and General Issues .....	17
3.4 Employment and Labour Management.....	23
3.5 Community, Stakeholder and Government Liaison .....	25
3.6 Office Management.....	35
3.7 Mosquito / Vector Control.....	36
3.8 Medical Services and Facilities .....	38
3.9 Water and Effluent Management .....	42
3.10 Waste Management .....	46
3.11 Business Services .....	52
3.12 Commissioning and Initial Start-up, Start-up following Shutdowns .....	53
3.13 Operation CTT.....	54
3.14 Maintenance of CTT & Transmission Line.....	59
3.15 Hazardous Materials / Spill Management .....	63
3.16 Upset Condition Management.....	66

3.17	Land Use Controls .....	67
3.18	Corporate Social Investment.....	68
3.19	Decommissioning.....	69
<b>4.0</b>	<b>PERFORMANCE ASSESSMENT, REVIEW &amp; CORRECTIVE ACTION.....</b>	<b>71</b>
4.1	Environmental Monitoring Strategy.....	71
4.2	Site Inspection and Audits.....	81
4.2.1	Site Inspections.....	81
4.2.2	Audits .....	81
4.3	Reviews.....	82
4.4	Corrective and Preventive Action.....	82
<b>5.0</b>	<b>COMPETENCY, TRAINING AND AWARENESS CREATION .....</b>	<b>83</b>
<b>6.0</b>	<b>CONTINGENCY AND DECOMMISSIONING PLANNING .....</b>	<b>83</b>
<b>7.0</b>	<b>EMERGENCY PREPAREDNESS AND RESPONSE .....</b>	<b>84</b>
<b>8.0</b>	<b>REPORTING REQUIREMENTS .....</b>	<b>84</b>
<b>9.0</b>	<b>DOCUMENT CONTROL.....</b>	<b>84</b>

## TABLES

Table 1:	Proponent details.....	3
Table 2:	Objectives of mitigation measures for adverse environmental impacts .....	15
Table 3:	Air Quality Monitoring programme.....	72
Table 4:	GHG emissions monitoring programme .....	73
Table 5:	Groundwater Monitoring programme .....	74
Table 6:	Noise Monitoring programme .....	75
Table 7:	Environmental Risk Monitoring Plan .....	75
Table 8:	Social Welfare Monitoring programme .....	76
Table 9:	Soil, Land use and Land Capability Monitoring Program .....	77
Table 10:	Surface water Monitoring programme .....	78
Table 11:	Ecological Monitoring programme.....	79
Table 12:	Visual Intrusion Monitoring programme - CTT plant .....	80
Table 13:	Minimum auditing requirements for the operational phase of the CTT and associated infrastructure .....	81

## FIGURES

Figure 1: Project Location.....	2
Figure 2: CTT Head Office operational phase organogram .....	5
Figure 3: CTT plant operational phase organogram .....	6
Figure 4: Examples of gas to power plant sites (source: <a href="http://www.industcards.com">www.industcards.com</a> and <a href="http://www.wartsila.com">www.wartsila.com</a> ) .....	7
Figure 5: CTT Key Infrastructure .....	8
Figure 6: Conceptual layout of CTT plant site .....	9

## ABBREVIATIONS AND DEFINITIONS

Acronym or Abbreviation	Description
ARA-Sul	Mozambique Regional Water Administration ( <i>Administração Regional das Águas do Sul</i> ) – southern area
BTEX	Benzene, Toluene, Ethylbenzene and Xylene
Compressor	A device that uses external energy to impart internal energy into the sales gas in order to raise sales gas pressure by creating a greater differential pressure between export point to delivery point and so allowing the gas to flow through the pipeline (gas pumping device)
Contractor	Construction and service provider personnel appointed by CTT to work on the project
CPF	Central Processing Facility
CPF Complex	Consists of original producing assets of the Central Processing Facility under the expansion introduced in the NATGAS 183 project, the CPF Facilities Upgrade Project and the Liquids Processing Facility and 5 <sup>th</sup> Gas Train
CSI	Corporate Social Investment
Drain system: Closed Drain System	Essentially for containment of process liquids. These liquids are all re-directed back into the liquid separator. These liquids are also known as “spill back” liquids
DRP	Decommissioning and Rehabilitation Plan
EC	Electrical Conductivity
Effluent	A liquid or waste water flowing out of a reservoir or sewer or purification works that may contain particulates, sediment, chemicals or waste matter
ESIA	Environmental and Social Impact Assessment
EIS	Environmental Impact Study
ESMP	Environmental and Social Management Plan. (c-ESMP – construction ESMP; o-ESMP – operations ESMP and d-ESMP – decommissioning ESMP)
ESMS	Environmental and Social Management System
Environmental Consultant	An independent environmental consultant with experience in the environmental management of industrial projects
Environmental and Social Management Plan (ESMP)	(i) Defines the measures to be taken during the life of a project, including design, construction, operation and decommissioning to prevent and/or manage adverse environmental and social impacts; (ii) defines the actions needed to implement these measures; (iii) describes how this will be achieved

Acronym Abbreviation	or	Description
		(iv) describes how this will be monitored, (v) defines inspection and auditing schedule
Environmental and Social Management Plan Audit		A systematic, documented and objective evaluation of the environmental performance of a project by objectively obtaining and analysing evidence to determine whether the implementation of the ESMP conforms to its requirements
Environmental and Social Management System		The part of the overall management system that includes organisational structure, planning activities, responsibilities, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining an environmental policy
ESO		Environmental Site Officer
Glycol		A chemical used during pigging that has an affinity for water
Government		The National Government of Mozambique
Hazardous waste		Waste bearing risk characteristics for being flammable, explosive, corrosive, toxic, infectious or radioactive, or for showing any other characteristic that constitutes hazard for the life and health of mankind and other living creatures and for environmental quality
HIV/AIDS		Human Immunodeficiency Virus / Acquired Immunodeficiency Syndrome
HP		High Pressure
IBRD		<i>International Bank</i> for Reconstruction and Development
km		Kilometres
km <sup>2</sup>		Square kilometres
LOCSA		CTT Liaison Officer – Community and Stakeholder Affairs
LP		Low Pressure
Liquid Separator		A device or vessel that can contain combined condensate and water for a sufficient retention time that allows both liquids to separate physically. The use of demulsifiers may be required to break the emulsion depending on the quantity of combined liquid intake
M		Metres
MSDS		Material Safety Data Sheet
MICOA		Ministry for the Co-ordination of Environmental Affairs, Mozambique
MITADER		Ministry of Land, Environment and Rural Development (replaces MICOA)

Acronym Abbreviation	or	Description
Non-hazardous waste		Waste with no risk characteristics, including but not exclusive to paper or paperboard, plastic, glass, metal, domestic rubbish, metal scrap and organic matter. Also known as domestic waste.
NOx		Oxides of Nitrogen
NTS		Non-Technical Summary
OHSAS		Occupational Health and Safety Assessment Specification
Open Drain System		Essentially for the direction of storm water and non-contaminated utility water
Operations		All operations related to the CTT plant, gas pipeline, water pipeline and Transmission line
PAC		Public Affairs Coordinator
Pipeline		Essentially a transmission device that maintains containment of product (i.e. refined gas or water) from source to end point. For CTT, this refers to an underground pipeline which carries gas or water to the CTT plant
PPE		Personal Protection Equipment
PPZ		Partial Protection Zone
PSA		Production Sharing Agreement
POC		Potentially Oil Contaminated: Liquids that may contain hydrocarbons cannot be allowed to flow into the open drain system. These liquids are directed through the POC system into the closed drain system and pumped back into the liquid separator
Pigging		The method used for cleaning flow lines and export lines and also displacing liquids from the said lines. Pigs are also used as internal condition monitoring devices within pipelines
PS		Performance Standard
RPIP		Resettlement Planning and Implementation Plan
CTT		Central Térmica de Temane
SEPI		Sasol Exploration and Production International (Pty) Ltd.
SES		Senior Environmental Specialist
Sewage Treatment Plant		A self-contained processing unit that is capable of removing suspended solids and bacteria from water to render it more suitable for any particular service / discharge. In this document it refers the plant that treats domestic sewage



Acronym Abbreviation	or	Description
SHE		Safety, Health & Environment
VOC		Volatile Organic Compounds
WHO		World Health Organisation

## 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 22<sup>nd</sup> 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) Transshipment 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

## 1.1 Scope of the o-ESMP

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

- Gas to Power Plant with installed capacity of approximately 450MW;
- Gas pipeline ( $\pm 1$ -2 km) that will feed the Power Plant with natural gas from the CPF;
- 400kV Electrical transmission line ( $\pm 25$  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.

## 1.2 Objectives of the o-ESMP

This document is the operational Environmental and Social Management Plan (o-ESMP) for the CTT project. It covers the management of the operational phase of the CTT. This o-ESMP is derived from the ESIA and supporting specialist studies.

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

- Provide a management plan for the operational activities of the CTT facilities in compliance with Mozambican legislative and regulatory requirements, as well as International standards and best practice.
- Ensure that measures stipulated in this document are in place and executed fully to appropriately manage impacts in order to reduce negative impacts and enhance positive impacts/benefits arising from the operation of the CTT;
- Provide requirements for assessment, monitoring and auditing, during operations.

## 1.3 Details of the Proponent

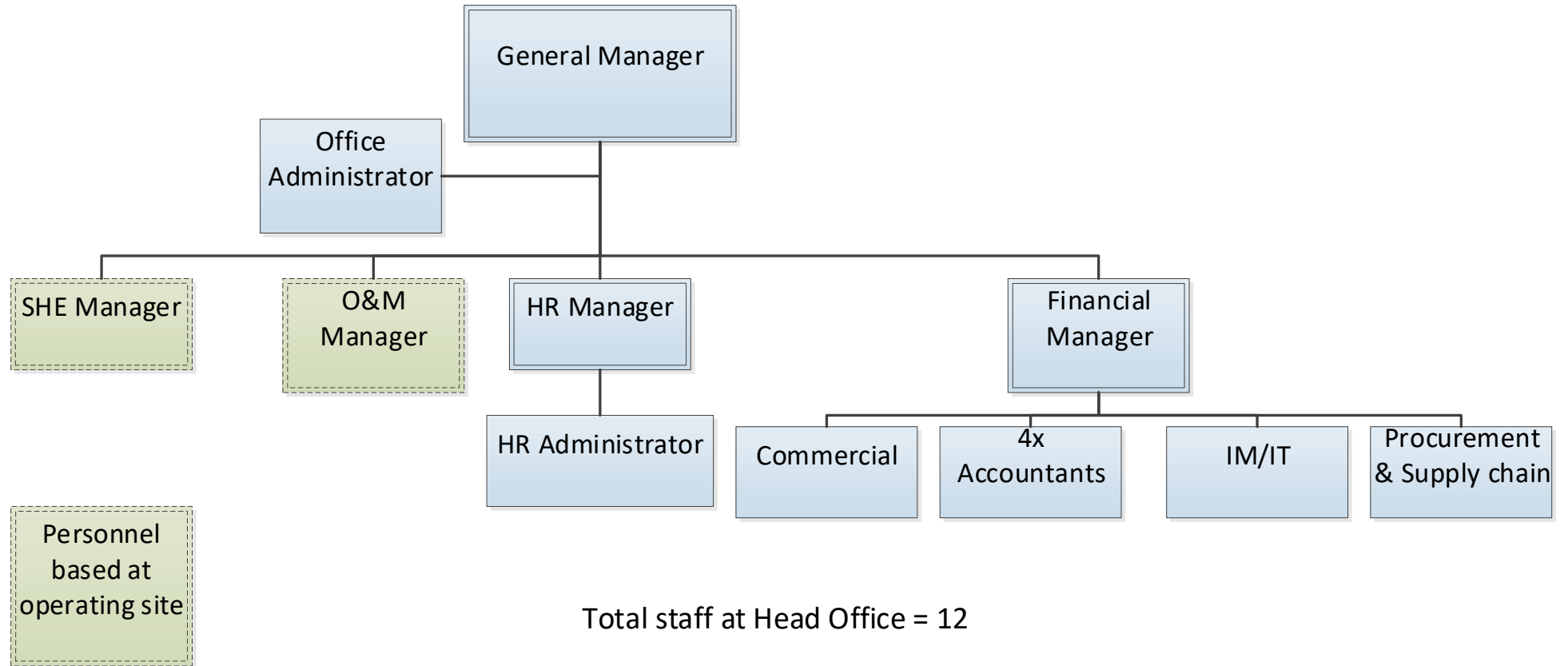
Moz Power Invest, S.A. (MPI), a company to be incorporated under the laws of Mozambique and CTT New Energy Holdings (Pty) Ltd (SNE) in a joint development agreement is proposing the construction and operation of a gas to power facility, known as the Central Térmica de Temane (CTT) project. MPI's shareholding will be comprised of Electricidade de Mozambique E.P. (EDM) and Temane Energy Consortium (Pty) Ltd (TEC).

**Table 1: Proponent details**

MPI		SNE
<b>Moz Power Invest S.A. (MPI)</b> (To be incorporated)		<b>Sasol New Energy Holdings (Pty) Ltd (SNE):</b>  <b>Hubert Naude</b> <i>Business Development Manager</i> Tel: +27 (0)10 344 5432 Fax: +27 (0)11 522 1175 Email: hubert.naude@sasol.com
EDM	TEC	
<b>Electricidade De Moçambique (EDM)</b>  <b>Pedro Nguelume</b> <i>Project Director</i> Tel: + 258 84 46 46 853	<b>Temane Energy Corporation:</b>  <b>Globeleg</b> <b>Ian Potgieter</b> <i>Business Development Manager</i>	

MPI		SNE
<p>Fax: + 258 21 32 82 33 Email: pnguelume@edmdipla.co.mz</p> <p><b>Dr. Aly Sicola Impija</b> <i>EDM Board Member</i> Tel: +258 2135 36 15 Fax: +258 2149 1040</p> <p><b>Belarmina Mirasse</b> <i>Environmental Manager</i> Tel: +258 2135 3615 Fax: +258 2135 3694 Email: mailto:belarmina.Mirasse@edm.co.mz</p>	<p>Tel: +27 (0) 12 443 6511 Email: ian.potgieter@globeleq.co.za</p> <p><b>Jonathan Frick</b> <i>Business Development Manager</i> Tel: +27 (0) 21 180 4595 Email: jon.frick@globeleq.co.za</p> <p><b>EleQtra</b> <b>Lauren Thomas</b> <i>Developer</i> Tel: +258 85 363 7639 Email: Lauren.Thomas@eleqtra.com</p>	

**Operational Phase Organogram:**



**Figure 2: CTT Head Office operational phase organogram**

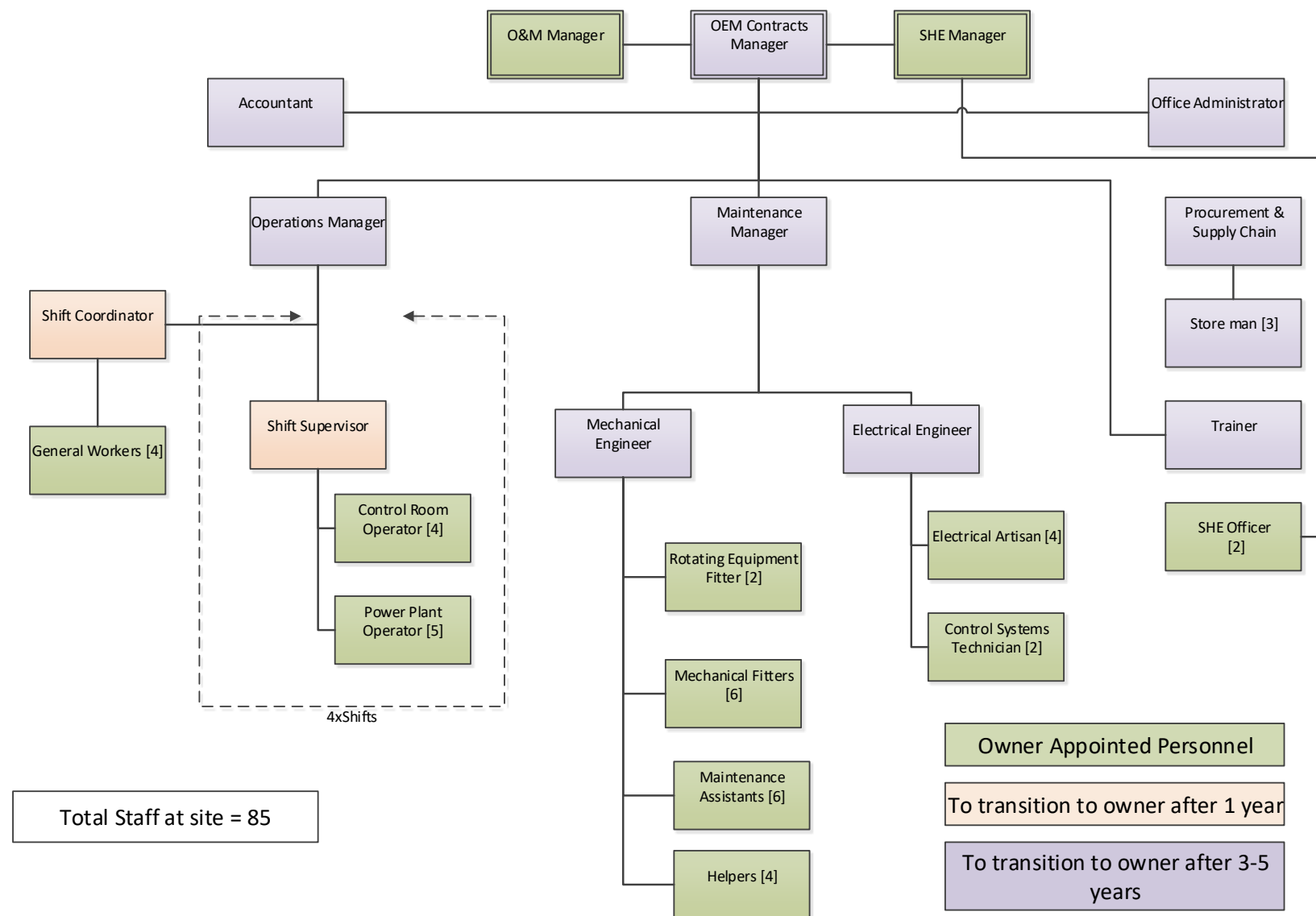


Figure 3: CTT plant operational phase organogram



## 1.4 Gas to Power Plant and Key Infrastructure during operation

The Central Térmica De Temane (CTT) project will produce electricity from natural gas in a power plant located 500m south of the CPF. The project will consist of the construction and operation of the following main components (Figure 5):

- Gas to Power Plant with installed capacity of approximately 450MW;
- Gas pipeline ( $\pm 1-2$  km) that will feed the Power Plant with natural gas from the CPF;
- 400kV Electrical transmission line ( $\pm 25$  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;



**Figure 4: Examples of gas to power plant sites (source: [www.industcards.com](http://www.industcards.com) and [www.wartsila.com](http://www.wartsila.com))**

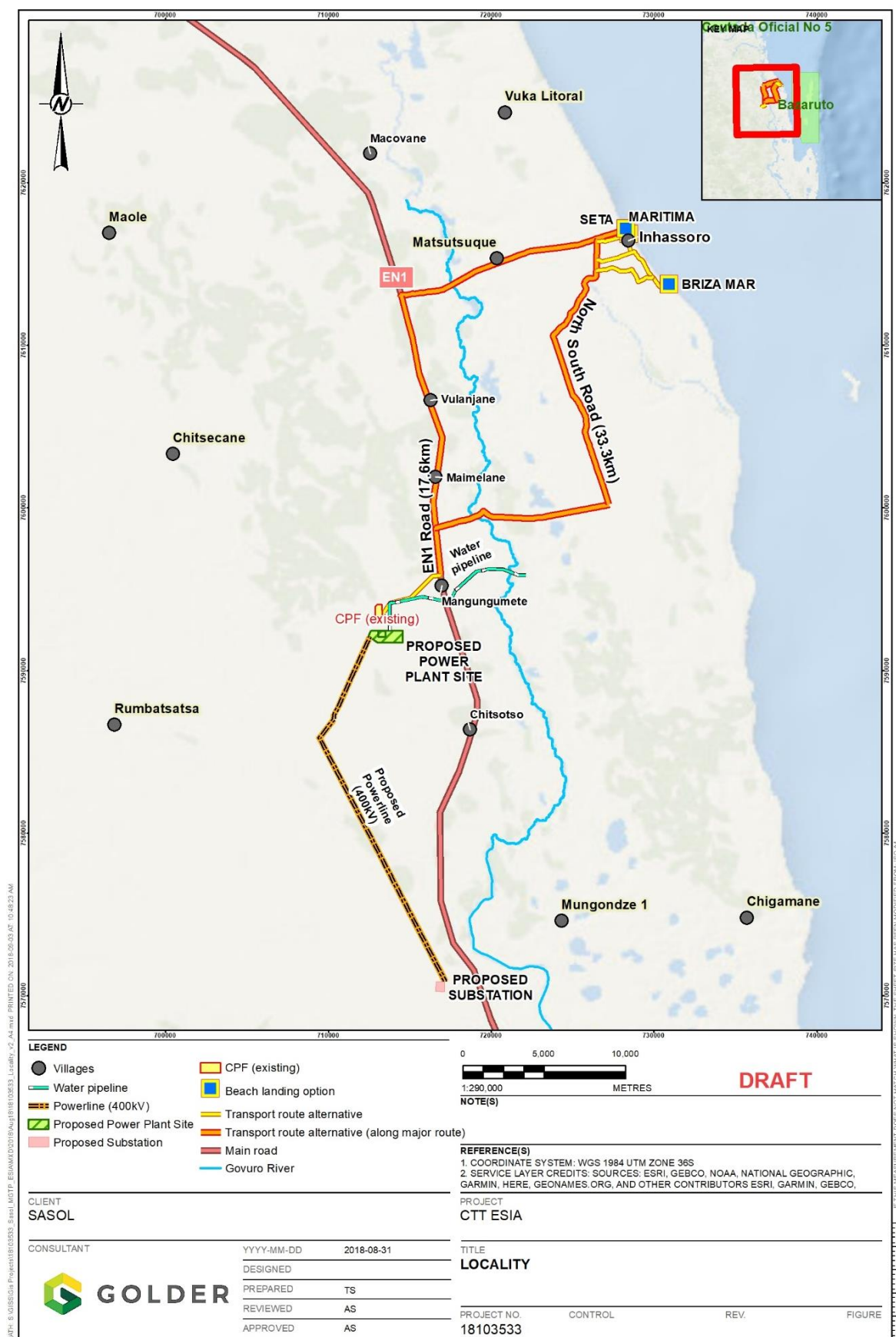
The final selection of technology that will form part of the power generation component of the CTT project has not been determined at this stage. The two power technology options that are currently being evaluated are:

- Combined Cycle Gas Turbine (CCGT); and
- Open Cycle Gas Engines (OCGE).

Once a technology and vendor is selected this ESMP must be updated accordingly.



**Figure 5: CTT Key Infrastructure**



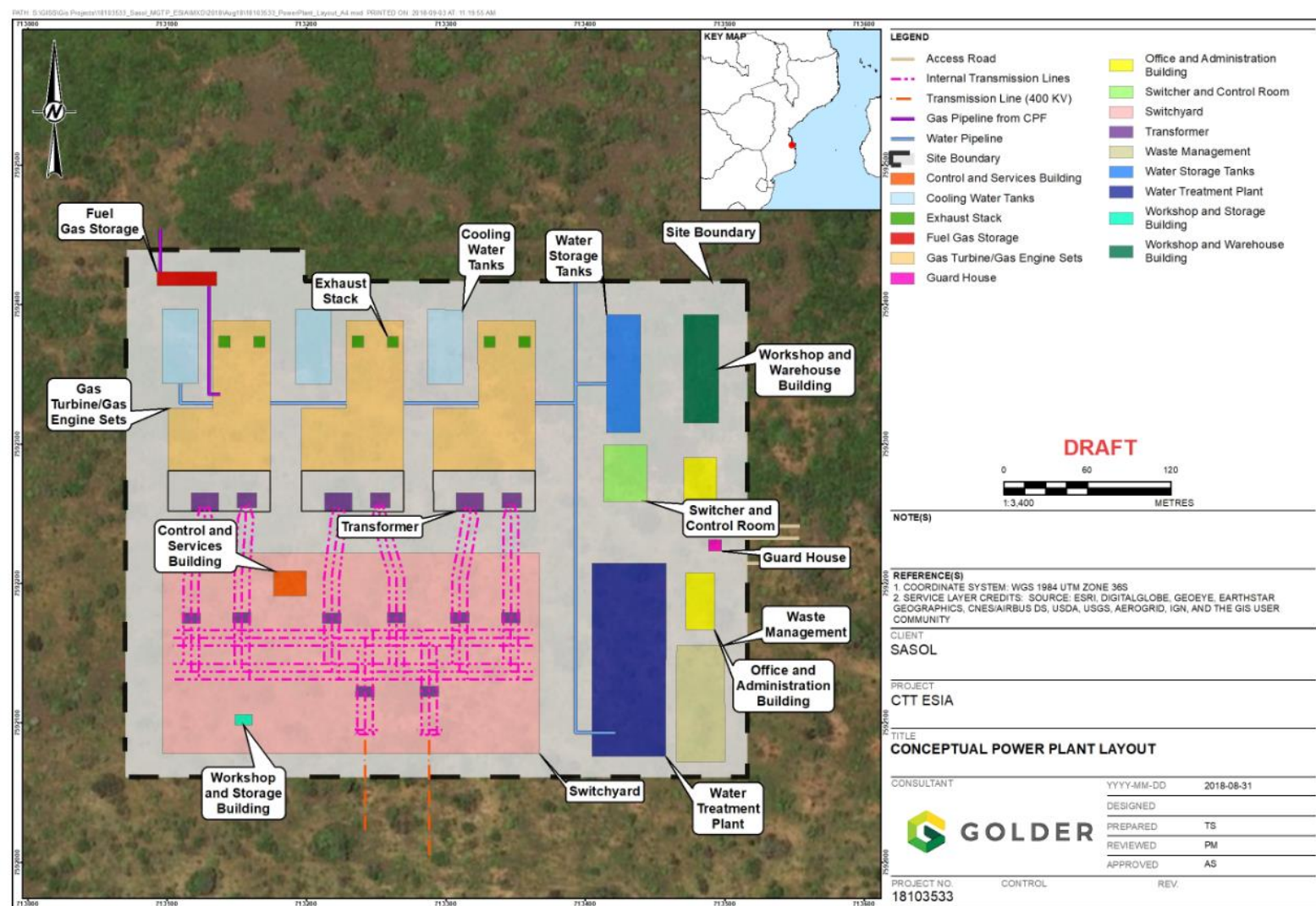


Figure 6: Conceptual layout of CTT plant site

## 1.5 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.

## 1.6 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.

## 1.7 Purpose of this Document

This document is the operational Environmental and Social Management Plan (o-ESMP) for the CTT project. It covers the management of the operational phase of the CTT. This o-ESMP is derived from the ESIA and supporting specialist studies.

## 2.0 ENVIRONMENTAL MANAGEMENT STRUCTURE

### 2.1 Organisational Structure and Responsibility

The overall organisational structure for environmental and social management for the CTT facility has not yet been finalised, however the following principal roles and responsibilities of each key party within this structure is expected as follows:

<b>All parties</b>	<p>All parties shall comply with all the requirements of the CTT operations ESIA and ESMP and shall, in accordance with accepted industry standards and the World Bank, employ such up to date techniques, practices and methods that will ensure compliance to the requirements and, in general, minimise environmental damage, control waste, avoid pollution, prevent loss or damage to natural resources and minimise effects on surrounding landowners, occupants and the general public.</p> <p>All parties shall prevent or minimise the occurrence of accidents which may cause damage to the environment, prevent or minimise the effects of such accidents and shall return the environment to a state as close to the condition existing prior to any such accident as possible.</p> <p>All parties shall take proactive steps to ensure that the requirements in the ESMP are met during operation. These shall include, but not be limited to, the following:</p> <ul style="list-style-type: none"> <li>■ Employment of competent and dedicated members of staff to oversee the implementation of the ESMP.</li> <li>■ Instruction of staff about the relevant environmental aspects and the specific measures that each employee will implement to meet the environmental protection and management standards defined by the ESMP. This will also require adequate oversight of the implementation and management of the Resettlement Policy Framework (RPF). The Sponsor will be responsible to ensure that the RAP/ARAP/LRP is implemented according to requirements of MITADER as well as the WBG requirements (PS5).</li> </ul>
<b>Operations Manager: CTT</b>	<p>The Operations Manager shall ensure that all parties comply to all the requirements of the ESIA and ESMP and shall, in accordance with Mozambique Legislation, accepted standards of the international petroleum, oil and gas industry and the World Bank, employ such up to date techniques, practices and methods of Operations that will ensure compliance to these requirements and, in general, minimise environmental damage, control waste, avoid pollution, prevent damage to natural resources and minimise effects on surrounding landowners, occupants and the general public.</p> <p>Ensure the provision of sufficient and suitable resources both on and off-site to ensure that pollution is prevented, waste minimised and the rights of the environment protected.</p> <p>Ensure compliance to all applicable environmental legislation and commitments at all times.</p> <p>Ensure the implementation of an environmental management system to achieve all of the above.</p> <p>Assume responsibility for all decisions on all environmental matters.</p>



	<p>The Operations Manager shall establish systems and approaches to prevent or minimise the occurrence of accidents which may cause damage to the environment, prevent or minimise the effects of such accidents and shall return the environment to a state as close to the condition existing prior to any such accident as possible.</p> <p>The Operations Manager shall take proactive steps to ensure that the standards in the ESMP are met during operation. These shall include, but not be limited to, the following:</p> <ul style="list-style-type: none"> <li>■ Employment of competent and dedicated members of staff to oversee the implementation of the ESMP; and</li> <li>■ Instruction of staff about the relevant environmental sensitivities and the specific measures that each employee will implement to meet the environmental protection and management standards defined by the ESMP.</li> </ul> <p>The Operations Manager shall ensure the availability of sufficient and suitable resources to ensure the aforementioned. This will also require adequate oversight of the implementation and management of the Resettlement Policy Framework (RPF). The Sponsor will be responsible to ensure that the RAP/ARAP/LRP is implemented according to requirements of MITADER as well as the WBG requirements (PS5).</p>
<b>Production Manager: CTT</b>	<p>The Production Manager shall be responsible for: Monitoring; defining contingency measures; achieving continual improvement; and tracking all issues related to environmental management and performance for CTT operations.</p> <p>The Production Manager shall support the Operations Manager and SHE Manager in environmental management. He/she shall be responsible for meeting the standards of operation to ensure environmental performance and compliance.</p> <p>The Production Manager shall assume the responsibilities of the Operations Manager in the absence of the latter.</p>
<b>SHE Manager: CTT</b>	<p>The SHE Manager is responsible for providing overall governance for SHE matters relating to CTT's operations, including the management of resources such as the SES by providing guidance and support and monitoring progress against established work plans to meet defined environmental targets and objectives.</p> <p>He/she will ensure strategic planning with regard to medium and long-term environmental and social management for CTT operations by:</p> <ul style="list-style-type: none"> <li>■ Ensuring compliance with the approved ESMP for CTT's operations</li> <li>■ Ensuring that the ISO 14001 standard requirements are in place</li> <li>■ Ensure that the environmental parameters are monitored as per the o-ESMP requirements.</li> <li>■ Ensuring accurate and timeous reporting on environmental performance, analysing trends and ensuring that measures are in place to address deviations.</li> <li>■ Ensuring that all environmental incidents are reported and investigated and that measures are in place to prevent recurrence.</li> <li>■ Chairing the environmental task team meetings and ensuring that actions are allocated to responsible persons and that close-out is monitored in CTT's ESMS</li> <li>■ Ensuring that a regular meeting platform is created where environmental performance is discussed at employee and management level</li> <li>■ Ensuring that the environmental audit and inspection programme is carried out</li> <li>■ Periodically reviewing the CTT SHE Strategy</li> </ul>

	<ul style="list-style-type: none"> <li>■ Investigate Health and Safety incidents and near misses</li> <li>■ Monitor Health and Safety Performance</li> <li>■ Compile and verify regular environmental performance reports produced for CTT management and external stakeholders such as MITADER or Lenders (the Resettlement Policy Framework (RPF) and any tools such as the RAP/ARAP/LRP.).</li> <li>■ Conduct regular site visits, environmental audits and inspections (encompassing Environmental, Social, Health and Safety aspects).</li> <li>■ Review environmental performance, ensuring that action plans are in place to address non-compliance and that issues are investigated and reported to the appropriate levels within the organisation.</li> <li>■ Initiate, co-ordinate and manage all environmental related communication with the Government (local, provincial and national) on environmental matters.</li> <li>■ Liaising with the CTT Operations, and Public Affairs/CSI Manager.</li> <li>■ Providing advice and support to the CTT Operations Manager and Senior Environmental Specialist (SESS) and public affairs or CSI officers as required.</li> <li>■ Keeping abreast of local, regional and national developments in the environmental field</li> <li>■ Ensuring that the independent environmental monitoring activities are regularly conducted, the reports analysed and measures put in place to address trends.</li> </ul>
<b>Senior Environmental and Social Specialist (SESS): CTT</b>	<p>The SES will act as a guide and advisor to employees and contractors on environmental issues associated with CTT's operations. This will be achieved by ongoing inspections / auditing of Operations, identification of problem areas and provision of actions plans to ensure environment protection.</p> <p>The SES will ensure compliance to the requirements of the ESMP by all parties, as well as with any other requirements related to environmental issues as they become known. Specific responsibilities of the SES will be as follows:</p> <ul style="list-style-type: none"> <li>■ To thoroughly familiarise him/herself with existing information regarding operations area and the ESMP.</li> <li>■ Ensure the protection of the biophysical and social environment.</li> <li>■ Maintain CTT's ISO14001 Environmental Management System and ensure that CTT retains its certification</li> <li>■ Perform all of the day-to-day tasks necessary to monitor performance with regard to the requirements of the ESMP and any other relevant requirements and / or commitments.</li> <li>■ Update the ESMP based on requirements of operations, the Government or internal CTT requirements.</li> <li>■ Monitor the impact of operations on the environment with particular emphasis on areas of environmental sensitivity.</li> <li>■ Audit compliance by employees, contractor(s) and suppliers with this environmental standard.</li> <li>■ To liaise with the Operations Manager and SHE Manager in the case of incidents, non-compliance or any matter where the course of action is unclear.</li> <li>■ Prepare environmental audit reports documenting the effectiveness of environmental management, problem areas, remedial actions proposed and taken and compliance/non-compliance by the Contractor(s) with the Operations standard.</li> </ul>

	<ul style="list-style-type: none"> <li>■ Verify the accuracy of the information contained in the ESMP and to bring any errors, omissions, oversights to the attention of all parties as necessary.</li> <li>■ Compile regular environmental performance reports which include trend analysis and which identify areas and actions for improvement.</li> <li>■ Commission and oversee the execution of regular independent environmental monitoring activities.</li> </ul> <p>The SES should have adequate and relevant training in environmental management and will be required to be able to evaluate the effectiveness of specified management measures and be familiar with environmental management techniques. He / she should be able to propose solutions to problems identified as regards the implementation of the plans.</p> <p>The SES will liaise closely with the Operations Manager, the Production Manager, the SHE Manager, and the environmental supervisors of all appointed contractors. The SES will be based on site.</p>
<b>Environmental Site Officer (ESO): CTT</b>	The ESO is responsible for assisting the SESS in day to day environmental management responsibilities at the CTT.
<b>Safety Practitioner/Officer: CTT</b>	<p>The Safety Practitioner shall assist the SES in the environmental management on the Plant, with a specific focus on health a safety issues, including emergency response and contingency planning.</p> <p>The Safety Practitioner shall also undertake the inductions on site which include environmental aspects, as well as assisting the SES with the environmental awareness and training associated with ISO14001.</p> <p>The Safety Practitioner will liaise closely with the Operations Manager, the Production Manager and the SHE Manager. The Safety Practitioner will be based at site.</p>
<b>Public Affairs Coordinator (PAC): CTT</b>	To design and manage effective information dissemination and constructive engagement with District Government and community leaders in the CTT zone of influence
<b>CTT Liaison Officer – Community and Stakeholder Affairs (LOCSA)</b>	<p>CTT Liaison Officer – Community and Stakeholder Affairs (LOCSA). The CTT officer responsible for all ongoing communications with communities and stakeholders affected by CTT's operations in Mozambique.</p> <p>The core competencies and job descriptors of the LOCSA/CLO need to reflect the substantive role of CLOs (or other project social specialists) in implementing the social management plans and social aspects of the mitigation measures beyond purely communications in a manner more comparable to the role of the ESO.</p>
<b>Environmental Consultant</b>	An individual or company appointed for specific expertise to undertake monitoring, auditing and / or to provide CTT with independent advice, as required.

## 2.2 Liaison, Co-ordination and Reporting

The structure for all communication, correspondence and reporting between Operations stakeholders will be as per the overall Operations organisational structure (for environmental and social responsibilities) will need to be finalised prior to construction of the project and must be updated here.

## 2.3 Environmental and Social Management System (ESMS)

There are three main tools for environmental and social management at the CTT:

- The Environmental and Social Impact Assessment / Study (ESIA);
- The Operational Environmental and Social Management Plan (o-ESMP); and
- The Environmental and Social Management System (ESMS).

In addition, the ESMS will include the construction ESMP and decommissioning ESMP's.

The ESMP is intended to guide impact management and mitigation associated with the CTT. It converts ESIA mitigation measures into actions and allocates responsibility and deadlines to those actions. The ESMS confirms management commitment to the ESMP and describes how the requirements of the ESMP will be achieved. It sets the management framework in terms of environmental organisational structure, reporting, review and monitoring, training and public disclosure. The Operations Manager, in conjunction with the SHE Manager is to ensure that a suitable management system is implemented to ensure compliance (and be able to demonstrate compliance) to the ESMP.

A comprehensive ESMS aligned to IFC ESMS Implementation Handbook – General (2015) and ISO 14001:2015 standards will be developed and implemented, inclusive of the following system elements:

- 1) Policy;
- 2) Identification of Risks and Impacts;
- 3) Management Programmes;
- 4) Organisational Capacity and Competency;
- 5) Emergency Preparedness and Response;
- 6) Stakeholder Engagement;
- 7) External Communications and Grievance Mechanisms;
- 8) Ongoing Reporting to Affected Communities; and
- 9) Monitoring and Review.

### 3.0 ACTIVITY AND IMPACT MANAGEMENT PLAN

This section presents specific environmental management requirements for the operational phases of the CTT and associated infrastructure.

#### 3.1 Background to Environmental Impact Mitigation and Management

For environmental management to be effective the primary focus of this management must be placed on managing activities so as to prevent or minimise the occurrence of negative impacts. Environmental management measures can be varied and the measures themselves may have a variety of objectives, however the first priority is always to **prevent adverse impacts**, thereafter management measures with other objectives should be considered. The various objectives for management measures should be remembered when using this Environmental Management Plan. First priority is avoidance of negative impacts; the objectives are listed in decreasing order of priority.

**Table 2: Objectives of mitigation measures for adverse environmental impacts**

Avoidance	Avoiding activities that could result in adverse impacts. Avoiding resources or areas considered as sensitive.
Prevention	Preventing the occurrence of negative environmental impacts and/or preventing such an occurrence having negative environmental impacts.



Preservation	Preventing any future actions that might adversely affect an environmental resource. Typically achieved by extending legal protection to selected resources beyond the immediate needs of Operations.
Minimisation	Limiting or reducing the degree, extent, magnitude or duration of adverse impacts. This can be achieved by scaling down, relocating, redesigning elements of Operations.
Rehabilitation	Repairing or enhancing affected resources, such as natural habitats or water sources, particularly when previous development has resulted in significant resource degradation.
Restoration	Restoring affected resources to an earlier (and possibly more stable and productive) state, typically 'background / pristine' condition.
Compensation	Creation, enhancement or protection of the same type of resource at another suitable and acceptable location, compensating for lost resources.

## 3.2 Environmental Management Requirements

The management requirements presented in this section have been compiled based on activities required during the operational phase of the CTT. While specifications have been listed under activities, the requirements are not necessarily mutually exclusive to the activity under which the specification or requirement is listed. Should any specification be applicable to any other activity, listed or otherwise, the intent remains.

For each activity identified, the following items are specified in the management plan:

**Ref.:** A reference number for the specified management requirement / specification.

**Management requirements:** Detail on the management requirements / specifications required.

**Responsible party:** The person that will assume overall responsibility for ensuring that the requirement / specification is met.

**Scheduling:** The date by which the requirement shall be achieved. Should the requirement be applicable throughout the life of Operations or a period thereof, the date will be indicated as 'ongoing'.

**Compliance/Performance indicator(s):** Indicates means to determine if the requirement has been met and verified. Additional monitoring requirements are specified under Section 4. Note that the number of incidents, audit findings etc. shall also be used as indicators of performance.

### 3.3 Administration and General Issues

Ref.	Activity	Requirements / specifications	Responsibility	Completion Date or Scheduling	Compliance indicator(s) or verification
3.3.1	Release of contracts	Relevant SHE requirements extracted from the ESMP will be included as part of tender documentation and form part of contracts when the scope of the work to be conducted or service to be provided can impact on the environmental performance of the CTT.	Supply Chain (SC) Manager	At the time of release of requests for quotation. At the time of contract preparation.	Inclusion of ESMP as part of relevant tenders (RFT) and contracts.
3.3.2	Procurement of goods and services	The CTT will develop its own Local Content Policy (taking into consideration any relevant Mozambican laws relevant at that time), focused on stimulating economic growth throughout the value chain and creating opportunities for those who do not work at the CTT plant. In line with CTT's local content policy, which will cover a range of categories, from highly specialised to the commoditised. Local content is an integral part of tender evaluation criteria in major projects. Thus, goods and services should be procured whenever possible and whenever these meet established requirements in communities and the District and Province. The Local Content Plan shall prohibit the purchase of bushmeat or other local wildlife products in any quantity, as well as any bulk purchases of local fish (to	SC Manager	Ongoing	Local suppliers in service provider list Register and percentage of procurement in communities, the District and Province, and nationally

Ref.	Activity	Requirements / specifications	Responsibility	Completion Date or Scheduling	Compliance indicator(s) or verification
		avoid increasing local fishing pressures in the BANP or other sensitive marine habitats).			
3.3.3	Procurement of goods and services	CTT shall build capacity in the local area for provision of goods and simple services to the CTT complex.	SC Manager CSI Manager	Ongoing	Goods and services purchased locally as a result of CTT capacity building
3.3.4	Compliance to legislation	In all cases, the requirements of Mozambican legislation will be met.	Operations Manager SHE Manager SES	Ongoing	Legal update system Legal register Audit findings Absence of legal warnings / prosecutions / fines.
3.3.5	Legal register	Develop, annually review and where necessary update a legal register identifying all environmental legislation relevant to the operation. This register shall describe the relevance of applicable legislation to Operations as well as any permits / licenses that may be required.  A register of all permits and licences (and associated conditions) issued to CTT for Operations shall be maintained, with copies of the permits held in Document Control. The register should include date of issue and date of expiry.	Operations Manager SHE Manager SES ESO	Register updated on a regular basis.	Legal register document. Permit / licence register.

Ref.	Activity	Requirements / specifications	Responsibility	Completion Date or Scheduling	Compliance indicator(s) or verification
3.3.6	Environmental management system	Implement an environmental management system for Operations that is compliant with the requirements of ISO 14001 and IFC/WBG. Conduct regular surveillance audits to ensure compliance with EMS requirements.	Operations Manager SHE Manager SES ESO	Ongoing	Maintain ISO14001 certification
3.3.7	Personnel management	An appropriate environmental and social awareness programme shall be implemented on site so as to ensure that all employees and contractors are aware of their environmental and social responsibilities.  The site induction programme shall address the key environmental and social aspects associated with CTT's operations.	ESO Safety Practitioner	Ongoing	Environmental and social awareness programme  CTT induction programme includes environmental and social requirements
3.3.8	Disturbance of archaeological or cultural sites (e.g. graves) / collecting specimens or artefacts	A "Chance Find Procedure" has been developed as a management tool for cultural heritage impacts, in accordance with the guidelines set out in IFC Performance Standard 8 and must be consulted and implemented as needed.  Should any archaeological or cultural sites be discovered this shall be reported to the SES and LOCSA who shall determine a course of action based on the Chance Find Procedure, consultation with local, provincial and national government, as necessary. Records shall be	ESO	Ongoing	As per requirement. Chance Find Procedure developed and available Inclusion in training / induction programme(s). Records on process followed

Ref.	Activity	Requirements / specifications	Responsibility	Completion Date or Scheduling	Compliance indicator(s) or verification
		kept to document the process followed and measures taken.			
3.3.9	Collecting or harvesting fruits, vegetables, grains and any other plant material	All employees shall be prohibited from collecting or harvesting fruits, vegetables, grains and any other plant material outside of the battery limits of the CTT.	Safety Practitioner SHE	Ongoing	Absence of complaints.
3.3.10	Hunting / harassing / poaching / keeping wild animals	No employee or contractor may hunt, harass, poach or keep wild animals.	Safety Practitioner ESO	Ongoing	Absence of complaints.
3.3.11	House-keeping	At all times the CTT complex, will be maintained in tidy order. No littering will be permitted. Where necessary, open containers shall be covered with lids or netting to prevent the occurrence of wind-blown litter.	Production Manager ESO	Ongoing	Absence of litter on site. Containers with lids
3.3.12	HIV/Aids, sex worker management	The presence of sex-workers inside the CTT complex boundary is prohibited. The presence of sex-workers outside of the CTT and campsite must be actively discouraged: Communicate and coordinate with District health personnel to align with and supplement existing	SHE Manager	Ongoing	Absence of sex workers on site. Reduction in sex workers in communities from numbers present during construction. Number and nature of

Ref.	Activity	Requirements / specifications	Responsibility	Completion Date or Scheduling	Compliance indicator(s) or verification
		<p>programs to prevent or reduce sexually transmitted diseases. Implement a concerted program of information provision and awareness creation to prevent or reduce sexually transmitted diseases. Work with health centres, churches, health workers and other respected community leaders to ensure awareness messages have credibility. Develop awareness materials in the local language that can be displayed on notice boards and distributed in communities.</p> <p>Condoms must be distributed free of charge to employees, contractors and visitors and should be readily available.</p>			<p>communication and awareness initiatives</p> <p>Visual observations.</p> <p>Number of CSI projects focusing on prevention or treatment of sexually transmitted diseases.</p> <p>Number of condoms distributed</p> <p>Annual survey amongst men, women and church leaders in terms of whether condoms were used and if not, the reasons</p> <p>Number of people provided with voluntary counselling and testing</p> <p>Number of communication/awareness initiatives in the communities</p> <p>Increase or decrease in the percentage of people with HIV/AIDs or other sexually transmitted diseases in the communities, and number of people treated</p> <p>Increase or decrease in</p>

Ref.	Activity	Requirements / specifications	Responsibility	Completion Date or Scheduling	Compliance indicator(s) or verification
					the number of people on the antiretroviral program, and how long they stay on the program.
3.3.13	Diseases	Continue with mitigation measures currently undertaken in coordination with District authorities and with the specialist advice of a health impact assessment professional and following international guidelines, develop a set of defensible indicators and a monitoring program for monitoring health in affected communities.	Doctor	Ongoing	Health indicators to monitor selected and agreed with District Government Monitoring of health indicators Improvement in health indicators annually
3.3.14	Site lighting	No lighting at the plant shall be directed away from the site so as to cause a disturbance to surrounding inhabitants.	Operations Manager SHE Manager	Ongoing	Absence of complaints from surrounding communities. Periodic inspections of lighting effects
3.3.15	Advertising and / or signage on roads	CTT shall ensure that road-side advertising is well considered so as to cause minimal visual pollution as well as negligible driver distraction. CTT shall ensure that it has obtained all relevant Government approvals for the erection of signage along public access routes.	SHE Manager Communication Manager	Prior to erecting any road-side advertising	Government approvals for roadside advertising.

Ref.	Activity	Requirements / specifications	Responsibility	Completion Date or Scheduling	Compliance indicator(s) or verification
3.3.16	Bush fire prevention and management	<p>A procedure for the prevention and control of bush fires shall be prepared. The procedure shall include, but not be limited to, the following:</p> <ul style="list-style-type: none"> <li>▪ Sources of fire risk</li> <li>▪ Measures to comply with any requirements of local authority fire departments</li> <li>▪ Measures to minimise the risk of accidental bush fires caused by any activity related to the works</li> </ul> <p>Measures to control an accidental bush fire.</p>	SHE Manager	Ongoing	Implementation of a fire prevention and fire emergency management procedure.

### 3.4 Employment and Labour Management

Labour and employee management will include compliance with Mozambican laws, ILO Labour Standards and World Bank OP 4.03/PS2, including adequate contracts, minimum wages, health care, adequate disability/ fatality insurance, etc. Additionally, the labour and/or employment contracts and policies will include guidance for employees and contractors in terms of community relations requirements, and guidelines for contractors (and subcontractors) on child and forced labour. These will also include codes of conduct with sanctions against adverse behaviour (drug and alcohol use, disregard for safety rules on and off site) and against Gender-based violence, sexual harassment and abusive behaviour. Codes of Conduct will need be signed by all workers and employees in order to avoid and sanction misbehaviour of workers, including sexual harassment, gender-based violence and sex with minors, drug abuse, hunting, wildlife capture, improper waste disposal, etc. CTT will provide Worker's /Employee manuals and training protocols to inform workers/employees of their rights and responsibilities, including grievance redress and channels for communication.



Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
3.4.1	Employment	<p>Employment shall be undertaken and managed according to Mozambican labour law and CTT's approved labour agreement with the Mozambican Government and a specific Project Labour Agreement with the Union, which support localisation of labour (taking into consideration World Bank Group policies and standards on labour).</p> <p>In particular, employment and skills development of Mozambican employees is an important success factor and therefore local labour shall be utilised as far as possible and within the constraints of Mozambican law. This shall be complimented with applicable skills training. Directly affected communities should be given special consideration in terms of the benefits arising from the project. The local resident status of applicants should be verified in consultation with a community representative. Where feasible, promote the creation of employment opportunities for women and youth.</p>	HR Manager	Ongoing	<p>Statistics reflecting percentage Mozambican employees.</p> <p>Training records.</p> <p>CSI Projects supporting education and training of Mozambicans.</p>
3.4.2	Employee supervision and training	CTT shall ensure proper supervision / management of employees, including after-hours where employees are resident on site.	HR Manager	Ongoing	<p>Inspection findings.</p> <p>Audit findings.</p>

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
		Employees shall all receive adequate training based on the activities they undertake and the associated SHE risks. Training shall also comply with any Mozambican legal requirements.			

### 3.5 Community, Stakeholder and Government Liaison

A key management principle during the operational phase of the CTT shall be that of respect of the rights of the surrounding community and the land and resources that belong to them.

The Operations area is characterised by the following socio-economic conditions, which shall at all times be taken into consideration:

- Subsistence living;
- Extreme poverty;
- Strong dependence on local natural resources;
- Limited access to health and education facilities, access roads (basic services); and
- Very limited employment opportunities.

All communication shall be in accordance with the CTT Stakeholder Engagement Plan, and as set out, in general, in the specifications below. Note that this section does not contain specifications for liaison in respect of compensation, which is covered under the RPF for this project. Furthermore, the RPF will refer to specific tools (RAP/ARAP/LRP) that may be required to be implemented in certain instances.

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
3.5.1	General	Access over land, the integrity of fences (boundaries), control of bush fires, littering, dust control, noise abatement, harassment of domestic and wild animals, sedimentation and contamination of ground and surface water, damage to the landscape and vegetation and all such environmental matters, shall be controlled in the best interests of CTT, the environment and the communities in the project zone of influence.	Operations Manager ESO	Ongoing	Number of complaints registered Number of complaints resolved Number of grievances registered Number of grievances resolved Number of compliments received Monitoring records Audit findings
3.5.2	Respect for local people	There shall be strict induction training for project workers and information dissemination to communities, so that both groups are clear as to what to expect of the other.	Public Affairs Coordinator and staff	Ongoing in standard induction training At least annually for communities	Included in standard induction training for staff, visitors and ad hoc contractors to CTT Evidence of annual communication initiative in each community
3.5.3	Compliments and complaints register (paper copies in communities,	A Compliments and Complaints Register shall be developed and widely communicated to communities as an instrument to air their views. The Register shall be kept in the community by the village leader or appointed designate, should	Public Affairs Coordinator and staff		Number of complaints registered Number of complaints resolved Number of compliments

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
	electronic database at CTT)	<p>be inspected monthly by a CTT Community Liaison Officer, and if complaints have been registered, follow up and close out on these. All issues raised by external parties shall be logged in these registers and should include, but not be limited to:</p> <ul style="list-style-type: none"> <li>▪ The name of the communicator</li> <li>▪ Contact details of the communicator</li> <li>▪ Nature of the communication</li> </ul> <p>Any action taken or that needs to be taken to address the issue raised.</p>			<p>received</p> <p>Nature of complaints analysed and corrective actions taken for trends in complaints</p> <p>Annual independent community and stakeholder perceptions survey</p>
3.5.4	Grievance procedure	A formal Grievance Redress Mechanism (Procedure) shall be developed as required by IFC Performance Standard 1, and wide communication to communities of the existence of this instrument to register grievances when they believe they have suffered damages that require compensation as a result of CTT's activities.	Public Affairs Coordinator and staff	Ongoing	<p>Number of grievances registered</p> <p>Number of grievances resolved</p> <p>Nature of grievances analysed and corrective actions taken for trends in grievances</p>
3.5.5	Communication with stakeholders	Development of an integrated public affairs, communication and CSI program for the CTT zone of influence	Public Affairs Coordinator and staff	Success evaluated and updated monthly Annual independent community and district/provincial	<p>Plan developed and annually evaluated and updated</p> <p>Annual increase in positive perceptions by</p>

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
				stakeholder perception survey	communities and District/provincial stakeholders Number of compliments and complaints registered Number of complaints resolved
3.5.6	Communication with stakeholders	All communication and awareness programs to communities shall be done in a good mix of written, visual and verbal methodologies. In all cases, not only CTT and its community liaison officers should provide this communication, but the support of respected people in the communities (church leaders, school principals and educators, health workers, heads of women, youth and other organisations) shall be enlisted to give more credibility to the messages and to carry the messages further and more consistently over time. This will require train the trainer sessions for the leaders.	Public Affairs Coordinator and staff	Ongoing	Number of complaints registered Number of complaints resolved Number of grievances registered Number of grievances resolved Number of compliments received Annual independent community and stakeholder perceptions survey
3.5.7	Management of expectations	Community leaders and residents may have expectations that CTT will play a supporting and	Public Affairs Coordinator and staff	Ongoing	Number of complaints registered

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
		developmental role within the area and that Operations will have other positive economic benefits. In order to maintain realistic expectations, CTT shall maintain close communication with local communities and government with the objective of clarifying roles, responsibilities and involvement throughout the Operations phase and ensuring that CTT's role is widely understood. The Corporate Social Investment (CSI) programme shall play a critical role in managing expectations.	LOCSA and staff		Number of complaints resolved Number of grievances registered Number of grievances resolved Number of compliments received Annual independent community and stakeholder perceptions survey
3.5.8	Management of expectations	One or more Community Development Officers shall be employed to support the CTT CSI programme, identification of opportunities including procurement, obtaining community inputs into plans, and ongoing information provision.	Public Affairs Coordinator and staff, LOCSA and staff	Ongoing	Opportunities for CSI projects including local procurement identified. Community inputs into forthcoming CSI plans obtained Number of communication initiatives inform communities about current CSI projects

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
3.5.9	Communication / liaison	CTT shall employ a Public Affairs Coordinator (PAC) and two LOCSAs who are actively involved in the Operations area. These persons shall liaise with the local communities and District authorities regarding CTT's activities. In this task, the LOCSA shall ensure the involvement of the SES on any environmental matters. Similarly, the SES will ensure that the LOCSA is informed of and involved with any environmental issues that might relate to the community, government etc.	LOCSA and staff	Ongoing	Number of complaints registered Number of complaints resolved Number of compliments received Number of grievances registered Number of grievances resolved Annual independent community and stakeholder perceptions survey
3.5.10	Communication / liaison	The SES, PAC and or LOCSAs shall hold regular meetings with surrounding community leaders often with communities themselves in order to inform them of any activity that may affect them in any way. Records of all meetings shall be kept.	LOCSA and staff SES	Ongoing	Number of complaints registered Number of complaints resolved Number of grievances registered Number of grievances resolved Number of compliments received Annual independent

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
					community and stakeholder perceptions survey Records of meetings
3.5.11	Communication / liaison	Build the capacity and status of Community Interface Forums to support ongoing communication in communities and to facilitate contributions to the CTT CSI Programme. Where such Forums no longer exist, re-establish them in a participatory process with communities and build their capacity in respect of their mandate as Interface Forums.	LOCSA and staff		
3.5.12	Access to private / government property	The property and rights of all persons shall be respected at all times. CTT personnel and its contractors shall not gain access to land outside of its approved areas of operation without prior consultation with community leaders and, where considered necessary by the LOCSA, the affected families themselves. No activities that cause damage may be undertaken without prior approval by the regulatory authority, and prior communication with an agreement on appropriate compensation by the affected person/s.	Operations Manager	Ongoing	Absence of complaints or formal grievances Number of compliments



Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
3.5.13	Population influx	<p>Ongoing communication, including national coverage from time to time and information meetings in all affected villages, explaining the negative impacts of population influx, and harnessing their support to reduce influx of work and opportunity seekers, communicating the following CTT policies inline with the CTT influx management plan:</p> <ul style="list-style-type: none"> <li>■ All ad hoc unskilled employment will be, without exception, from local villages, verified by community leaders</li> <li>■ No hiring on site for job seekers and no procurement at the gate</li> <li>■ Maximising local content in procurement i.e from local people and towns.</li> </ul> <p>Communication and coordination with local leaders and District Government in terms of curbing influx and obtaining their support and suggestions in this regard.</p>	Public Affairs Coordinator, LOCSAs and staff	Ongoing	<p>Number of communication initiatives nationally, in the Province and District and in the communities, at least annually</p> <p>Survey amongst village leaders on increase in number of new arrivals</p> <p>Google or satellite imagery survey of increase in size of towns</p> <p>Reduction in percentage increase of towns</p> <p>Compliance with Influx Management Plan</p>
3.5.14	Reporting	CTT shall report on environmental, social and health and safety performance for the Operation in keeping with the environmental and social reporting schedule detailed in the ESMP approval conditions letter.	SHE Manager	Bi-annually	Content of Bi-annual report

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
3.5.15	Reporting	CTT shall advise key Government stakeholders and community leaders about the availability of key environmental and social performance reports and shall assist stakeholders and in particular communities to fully understand these reports.	SHE Manager	Periodically	Proof of notification in stakeholder meeting records and other correspondence Number of communication initiatives and methods to communicate the contents Interim evaluation tool to assess degree of comprehension of information
3.5.16	Government liaison	CTT shall actively seek to participate with the Government on task teams and forums that relate to the operation of the CTT and associated activities and their influence on the communities and the environment. This should include consideration of forums that address the following issues in relation to CTT's activities in Mozambique: <ul style="list-style-type: none"> <li>Resource use and exploitation</li> <li>Management of exclusion zones</li> <li>Land use planning and zoning</li> </ul>	Operations Manager Government Liaison Manager/SHE Manager LOCSA SES	Ongoing	Minutes of meetings Number of complaints registered Number of complaints resolved Number of compliments received Annual independent community and stakeholder perceptions

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
		<ul style="list-style-type: none"> <li>Community needs, comments, issues and concerns.</li> </ul>			
3.5.17	Corporate Social Investment (CSI)	<p>Develop a CSI program in a transparent process through consultation with local communities, District government, NGOs and other stakeholders in which criteria are developed for projects and beneficiaries, and priorities are agreed upon in an open process.</p> <p>Establish, maintain, fund and support through a constructive and professional process a CSI Advisory Committee on which is represented representatives of communities it its zone of influence, government, NGOs and other stakeholders to:</p> <ul style="list-style-type: none"> <li>Build stakeholder capacity and understanding in CSI allocation, spending and management and in the process build trusting relationships and partnerships with stakeholders</li> <li>Support the company in developing a CSI strategy and plan for CTT in Mozambique</li> <li>Reach agreement on sustainability capitals to pursue for selected periods</li> </ul>	Operations Manager		

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
		<p>of time, and on transparent criteria for allocation of funding</p> <ul style="list-style-type: none"> <li>Participate in and advise the company on annual CSI spending</li> <li>Support the company in annual review against agreed criteria of the success or otherwise of measures implemented.</li> <li>Publicise the agreed CSI plan and obtain feedback.</li> </ul>			

### 3.6 Office Management

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
3.6.1	Electricity	Offices shall be electrified. Fires (cooking or heating) are prohibited except in the case of barbeques).	Operations Manager	Ongoing	Electrification of offices and accommodation
3.6.2	Food usage	<p>Should there be a kitchen or canteen on site at CTT, then left-over food shall be minimised to prevent the establishment of pests (cockroaches, mice and rats).</p> <p>No left-over food shall be provided on an ad hoc basis to local communities.</p>	Operations Manager Catering contractor SES	Ongoing	<p>Waste disposal records.</p> <p>Kitchen waste disposal records</p> <p>Composting records</p>

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
		The alternatives of minimising and/or using left-over food shall be investigated as an option.			
3.6.3	Air conditioner usage	Employees shall be encouraged and educated to use energy efficiently.	Operations Manager ESO	Ongoing	Awareness programmes
3.6.4	Local economic improvement	Only use the local Inhassoro facilities to accommodate the CTT staff, service providers, contractors or consultants where possible	CTT management HR Manager	Ongoing	Accommodation payments to local establishments

### 3.7 Mosquito / Vector Control

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
3.7.1	Mosquito control	Implement and maintain a programme to minimise malarial incidence among employees, contractors and visitors. .Prevent ponding at all CTT activities in the rainy season. Work with village leaders to prevent the establishment of informal settlements with bad drainage and lack of sanitation.	Doctor LOCSAs	Ongoing	Vector control programme implemented and maintained Communication with village leaders Tracking of and reduction in incidence of malaria among workers and in communities

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
3.7.2	Pesticide & larvicide management and medical waste	The disposal of waste pesticide and pesticide containers will be as per the waste management plan. A procedure for medical waste storage and disposal shall be developed in accordance with these requirements.	Doctor	Ongoing	Waste disposal records Procedure for medical waste disposal
3.7.3	Permissible dispersants	Diesel shall not be used as a dispersant during 'fogging' Operations.	Doctor	Ongoing	Procedure(s) for fogging
3.7.4	Personnel management	CTT shall ensure that the training of personnel who undertake spraying complies with relevant Mozambican legislation and authorisations If an external service provider is used the relevant permissions from the authorities shall be obtained All personnel responsible for spraying pesticides shall wear appropriate PPE and receive annual medical check-ups. A Pest and Pesticide Management plan must be compiled and approved by the SHE Manager prior to use of any chemicals.	Doctor	Ongoing	Records of training Government authorisations Records of medical check ups
3.7.5	Storage of pesticides	All pesticides shall be appropriately stored according to regulatory requirements based on their MSDS, including temperature control and containment.	Production Manager	Ongoing	Inspections

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
3.7.6	Community awareness	Extend specific community-based malaria and vector controls as part of the recommended communicable diseases strategy. Ideally this should be performed in partnership with the CPF. Awareness and education programmes in the workforce on how to prevent and effectively treat malaria	CTT management and LOCSAs (& CPF management)	Ongoing	communicable diseases strategy

### 3.8 Medical Services and Facilities

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
3.8.1	Health management - HIV	Prepare and implement a programme and procedure(s) to minimise the spread of HIV infection. A typical programme would include, among other things, the implementation of the following: <ul style="list-style-type: none"> <li>See also for sex workers and reduction in population influx</li> <li>An HIV / Aids training course and on-going education on transmission of HIV / Aids and STDs to employees, through</li> </ul>	Doctor	Ongoing	Implementation of procedures and programmes. Increase or decrease in the percentage of people with HIV/AIDs or other sexually transmitted diseases in the communities, and

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
		<p>workshops, posters and informal information session, as well as to communities</p> <ul style="list-style-type: none"> <li>Encouragement of employees and community members to determine their HIV status</li> <li>Supply of condoms to employees</li> <li>Distribute condoms in the communities, to both men and women and to church leaders, and explain their use where necessary</li> <li>Continue to promote voluntary counselling and testing</li> <li>Continue to support treatment and ongoing antiretroviral programme</li> <li>Other CSI projects focused on reduction in and treatment of HIV/AIDs.</li> <li>Evaluate opportunities for the empowerment of women and girls in the area to support livelihoods and reduce vulnerability of transactional sexual relationships</li> </ul>			<p>number of people treated</p> <p>Increase or decrease in the number of people on the antiretroviral program, and how long they stay on the program</p> <p>Number of CSI projects focusing on prevention or treatment of sexually transmitted diseases.</p> <p>Number of people provided with voluntary counselling and testing</p> <p>Number of communication/awareness initiatives in the communities</p> <p>Increase or decrease in the percentage of people with HIV/AIDs or other sexually transmitted diseases in the communities, and</p>



Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
					number of people treated Increase or decrease in the number of people on the antiretroviral program, and how long they stay on the program.
3.8.2	Medical waste storage	Medical waste shall be stored, separately from other waste, prior to incineration or disposal at another appropriate facility (via a waste contractor) as per the requirements laid down by the World Health Organisation and any Mozambican regulations on the management of biomedical waste.	Doctor	Ongoing	Inspection records. Audit findings.
3.8.3	Medical waste disposal	Medical waste shall be disposed of at the CPF on-site incinerator or another appropriate facility (via an accredited/licensed waste contractor). Records shall be kept of all medical waste disposed.	Doctor	Ongoing	Waste disposal records.
3.8.4	Community Health	Develop a Community Health Information System (CHIS) to collect and monitor key community health indicators in a longitudinal fashion. This may require specific Health	CTT	Ongoing	Community Health Information System records

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
		Systems Strengthening (HSS) in the local health facilities so that they can be used as a reliable source of information, and potentially support of Community Health Agent/ Agent Polyvalent Communautaire (CHA/APE) in the respective communities. There may be a need to support better diagnostics for TB in the study area and reporting on the District Health Information System (DHIS2).			
	Occupational health and safety	<p>Develop workplace health strategies as part of the occupational health plan or organisational health plan, to include:</p> <ul style="list-style-type: none"> <li>■ Develop a vaccine preventable disease programme for all employees, contractors and visitors based on risk for travellers and at-risk occupations</li> <li>■ Develop and/or extend outbreak preparedness policies and programmes to reduce the impact of any suspected or confirmed outbreak at the local level</li> </ul>	CTT management	At start-up Ongoing	Health strategies Preventable disease programmes

### 3.9 Water and Effluent Management

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
3.9.1	Water provision	Water for Operations shall be obtained from groundwater boreholes. (Operations shall have no detrimental impact on water volumes (groundwater) available to existing users in the area. Water shall not be abstracted from surface water resources. The relevant permits for the abstraction of groundwater shall be obtained from the regulatory authority prior to their use.	SES	Ongoing	Groundwater monitoring programme (volumes; water levels). Communication with community / complaints recorded in Communications Register. Government approvals (ARA-SUL).
3.9.2	Water provision	No seepage fields, 'soakaways' or evaporation ponds shall be developed (in addition to that currently assessed) without the approval of the SHE Manager and SES and based on a specialist evaluation commensurate with the level of risk involved.	SHE Manager SES	Ongoing	As per requirement.
3.9.3	Water provision	All final effluent discharged from the final effluent sumps shall meet the Mozambican standards or World Bank Group effluent standards, whichever is more stringent. No effluent or potentially contaminated storm water may be released from site other than from the final effluent sump, with the exception of the	Production Manager ESO	Ongoing	Monitoring records.

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
		clean storm water.			
3.9.4	Storm water management	Rain water falling off-site shall be prevented from entering the site. Measures to prevent storm water ingress onto site shall typically include storm water diversions, drainage channels etc. On-site, clean and contaminated water shall be kept separate. Clean storm water may be released into the surrounding environment without treatment. Potentially contaminated storm water shall be collected for treatment in the industrial effluent treatment plant. Appropriate use of soak-ways, seepage fields and vegetation filters will be put in place to prevent contamination of water resources. Water quality analysis on water bodies in the receiving environment.	Production Manager ESO	Ongoing	Storm water management system design as per requirements. Maintenance of the storm water management system
3.9.5	Open drain system	Rainwater collected within bunded areas (e.g.: diesel tanks, stores) may be released to clean (i.e. open) storm water drains if it meets the minimum discharge standards. If not, the contents shall be redirected via the closed drain system to the POC, where it shall either be treated or routed to an incinerator or disposed of	Production Manager ESO	Ongoing	Monitoring records. Procedure for release of liquid from bunded areas.

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
		at another appropriate facility (via a waste contractor). A procedure shall be developed describing the strategy for release of any liquid within the bunded area. This should include requirements concerning appropriate disposal and where required, sampling requirements prior to release.			
3.9.6	Final effluent disposal	The final effluent may be disposed of by irrigation onsite if the water quality meets the specifications required in terms of Mozambican law.	Production Manager ESO	Ongoing	Monitoring records Procedure of Final Effluent Irrigation
3.9.7	Effluent management (kitchen and other wash water)	All kitchen waste-water shall be discharged through grease / oil trap(s) into the sewage treatment plant. Cleaning and maintenance shall be in accordance with an appropriate maintenance schedule. Collected grease and oil shall be disposed of via an incinerator or disposed of at another appropriate facility (via a waste contractor). Efforts shall be made to avoid odours from the grease traps. Care should be taken to use efficient and environmentally friendly cleaning materials.	Catering contractor ESO	Ongoing	Grease / oil traps installed. Records of oil and grease disposal. Inspection reports. Records of products used and alternatives considered. Purchasing procedure reflecting approach to product selection.

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
3.9.8	Effluent management (laundry water)	Laundry water shall only be discharged to the sewage treatment plant. Kitchen and laundry staff shall be trained to avoid the excessive use of detergents. Where practical, environmentally friendly cleaning materials shall be used in preference to standard materials.	Cleaning contractor ESO	Ongoing	Drainage design to sewage effluent treatment plant. Records of products used and alternatives considered. Purchasing procedure reflecting approach to product selection.
3.9.9	Sewage management	Toilet facilities shall be properly maintained to minimise the risk of leakage of un- or partially treated sewage. Effluent streams must comply with the Mozambican and IFC discharge water quality standards for treated effluents. Continuous analysis of quality of the effluent streams prior to irrigation to determine compliance to discharge standards. Non-compliant effluent should be discharged to the evaporation pond. Water quality analysis of groundwater in the receiving environment.	Operations Manager Production Manager ESO	Ongoing	Inspection records. Audit findings. Monitoring records.
3.9.10	Shower water	Shower water shall only be discharged to the sewage treatment facility.	Operations Manager ESO	Ongoing	Effluent design Education programme

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
		CTT shall educate employees and contractors to minimise water use during showering and general use of ablution facilities.			

### 3.10 Waste Management

Waste management at the CTT complex shall comply with the requirements of the Waste Management Plan. As per the Mozambican general waste regulations, non-hazardous waste is defined as waste with no risk characteristics, including but not exclusive to paper or paperboard, plastic, glass, metal, rubbish, metal scrap, and organic matter. Hazardous waste is defined as waste bearing risk characteristics for being flammable, explosive, corrosive, toxic, infectious or radioactive, or for showing any other characteristic that constitutes hazard for the life and health of humans and other living creatures and for environmental quality.

The approach to waste management is to minimise waste production, re-use and recycle where possible and disposal as the final option.

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
3.10.1	Overall waste management plan	CTT shall prepare a Waste Management Plan for Operations at the CTT complex that defines, but shall not be restricted to, the following: <ul style="list-style-type: none"> <li>Waste minimisation strategy</li> <li>Waste collection strategy</li> <li>Waste separation strategy</li> <li>Waste transport strategy</li> <li>Waste disposal strategy</li> </ul>	SHE Manager	Ongoing (review annually)	Documented waste management plan. Government approval

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
		<ul style="list-style-type: none"> <li>Waste recycling strategy.</li> </ul> <p>This plan shall be submitted to the relevant authorities for approval and renewed as per the regulatory requirements in Decree 83/2014 and Decree 94/2014, as amended.</p>			
3.10.2	Legal Compliance	A procedure shall be developed which provides details of all aspects of waste management and demonstrates compliance with Mozambique waste management legislation (Decree 83/2014 and Decree 94/2014).	SHE Manager	Review annually	Documented procedure
3.10.3	Waste storage and transport – general	Where markets exist (or could be created) for the re-use or recycling of waste materials these materials shall be separated from the waste stream at their point of generation and stored separately for collection by the recycling agent. No material may be provided to communities where the material could present a health or safety risk. Old chemical drums may only be released for recycling if crushed prior to release to prevent the containers being used as water vessels.	ESO	Ongoing	Disposal records.
3.10.4	Waste storage and transport – general	A clear distinction shall be made between hazardous and non-hazardous waste streams, with separation occurring at source. Wastes shall	ESO	Ongoing	Documented and implemented waste management strategy.



Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
		be placed in separate containers and transported to the disposal facilities separately.			Provision of separate containers for non-hazardous and hazardous waste.
3.10.5	Waste storage and transport – general	In all cases, waste shall be contained. Storage and disposal areas shall be contained / controlled to prevent scavenging by persons and / or animals. Wind-blown litter shall be prevented.	ESO	Ongoing	As per requirement.
3.10.6	Waste storage and transport – general	Waste containers shall bear labels that identify the contents. Where applicable this labelling shall meet the Mozambique legal requirements for the labelling of hazardous substances. Containers shall be lined or constructed of materials that are compatible with the wastes to be stored. Containers shall be in good condition, free from corrosion, leaks or ruptures.	ESO	Ongoing	As per requirements.
3.10.7	Waste storage and transport – general	Waste containers shall be stored above ground on an impermeable surface (where the risk of leaks and resultant contamination is such that this is required) and under cover or covered by lids.	ESO	Ongoing	As per requirement.
3.10.8	Waste disposal	All waste materials should be handled and disposed in compliance with the Waste Management Plan.	ESO/SES, Production Manager	Ongoing	Documented and implemented waste management strategy.

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
					Waste disposal records.
3.10.9	Disposal off-site	<p>Where off-site disposal is the only remaining option (i.e. only for non-combustible hazardous waste not permissible in the on-site landfill, then this must be done in such a manner that it does not create risks of non-compliance with legislation or company policy (including Responsible Care). This is particularly important in the context of the environment in which the Operations exist, which is characterised by lack of both waste disposal facilities and the capacity for transportation of waste (especially hazardous waste).</p> <p>The following requirements will therefore apply to the off-site disposal of waste:</p> <ul style="list-style-type: none"> <li>■ Transportation shall be undertaken by CTT or by an accredited/licensed contractor familiar with the requirements for the transporting of hazardous wastes, and shall meet the regulatory requirements for such transport including the Road Code</li> <li>■ CTT / the transportation contractor shall have in place the means to respond appropriately to spillages of waste</li> </ul>	SHE Manager SES	Ongoing	As per requirements

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
		<p>anywhere along the transport route within a time limit acceptable to CTT</p> <ul style="list-style-type: none"> <li>■ The frequency of waste collection and the interim measures for the storage of waste on site must be appropriate, such that the system as a whole does not pose an unacceptable risk to either the environment or health and safety</li> <li>■ Storage of waste must be on a contained area underlain by an impermeable substratum, and covered to protect from water ingress</li> <li>■ Certificates of safe disposal must be provided for all waste removed from site. Such certificates may only be issued by a recognised waste disposal operator</li> <li>■ The site at which waste is disposed must comply with the CTT and its shareholders' requirements. As such it must be audited on at least an annual basis</li> <li>■ No waste is to be disposed of off-site, except with the written approval of the SES who shall ensure that all necessary approvals have been obtained and all risks identified and managed</li> </ul>			

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
		<ul style="list-style-type: none"> <li>Where possible, suppliers shall be encouraged to take back unused products and the containers of used products</li> </ul> <p>An inventory of all waste stored on site for future off-site disposal shall be maintained.</p>			
3.10.10	Disposal off-site	CTT shall endeavour to ensure that suppliers of potentially hazardous substances (chemicals, batteries, etc.) shall remove used products and their containers when making their next deliveries of these substances. Certificates of safe disposal of the wastes must be provided by the supplier.	SC Manager	Ongoing	Certificates of safe disposal from the suppliers
3.10.11	Disposal off-site	Records shall be kept of all waste disposed to the incinerator, landfill and any off-site disposal if applicable (including sales to scrap dealers). These records should reflect date of disposal source of waste disposed, quantity of waste, responsible party for the waste being disposed and responsible party for the waste receiving facility. These quantities shall be disclosed in the 6-monthly reporting to the Government.	Production Manager ESO	Ongoing	As per requirements
3.10.12	Disposal in open fires	No waste shall be disposed of in open fires.	Operations Manager	Ongoing	As per requirements

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
3.10.13	Composting of organic waste	All compostable organic waste from the kitchen, and garden waste, shall be disposed of by composting in a dedicated facility. Alternatively, compostable waste shall be incinerated or disposed of at another appropriate facility (via a waste contractor) when composting is not viable.	Catering contractor ESO	Ongoing	As per requirements. Composting facilities.
3.10.14	Fluorescent tubes	Fluorescent tubes shall be crushed and stored at the hazardous storage facility(s) until sufficient volumes are obtained and are transported off-site by an approved service provider.	Maintenance Manager ESO, Catering contractor	Ongoing	As per requirements

### 3.11 Business Services

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
3.11.1	Environmental expenditure	CTT shall track and record all expenditure on environmental or environmentally related items.	SHE Manager	Ongoing	Expenditure records. Sustainable Development Data reporting tables

### 3.12 Commissioning and Initial Start-up, Start-up following Shutdowns

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
3.12.1	Water flushing of lines Pump testing using water	Water volumes used for flushing should be minimised. Water flushing shall not be used during normal operations. Effluent from flushing of lines or pressure testing shall be routed to the industrial effluent treatment plant or the incinerator or disposed of at another appropriate facility (via a waste contractor). Should any additives be used, the ability of the treatment plant to remove / treat these additives to ensure no environmental risk shall be determined prior to the use of the additives. This may include bioassay testing by specialists competent to conduct such tests.	Production Manager SES	Ongoing	As per requirement.  Record of evaluation of proposed additives and required treatment options.
3.12.2	Initial 'loading' of machinery and equipment with fuel, lubricants, chemicals	Care shall be taken during the initial loading (filling) of machinery and equipment to prevent spills / accidents etc. due to the relatively higher volumes / quantities of materials involved. An action plan shall be prepared detailing the approach to initial loading and precautions / safety measures to be put in place.	Maintenance Manager Production Manager	Ongoing	Document specifying approach to initial loading and indicating precautionary measures, safety measures and responses plans to be initiated in the event of an accident.

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
3.12.3	Building explosion due to natural gas leaks accumulated in buildings	Risk assessments, hazardous area classifications, ventilation studies and plant audits	Proponent, Design/ Project team.	At start up	Industry standards
3.12.4	Flammable vapour dispersion, ignition and flash fire or explosive effects due to uncontrolled loss of containment of natural gas	Detailed commissioning plan and risk assessment	Maintenance Manager Production Manager	At start up	Industry standards

### 3.13 Operation CTT

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
3.13.1	(External) cleaning / painting of piping and equipment	Products used for external cleaning shall be 'environmentally friendly' products as determined by MSDS specifications.	Maintenance Manager ESO	Ongoing	MSDS for products used. Effluent monitoring records.

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
		All effluent shall be routed to the industrial effluent treatment plants. If uncertain as to treatment capabilities, the precautionary principle shall be applied and either the chemical shall not be added to the effluent stream or the effluent shall be tested to ensure appropriate quality (specifically for the pollutant / contaminant) of concern, prior to release.			
3.13.2	Air emissions management	Installation of probes in stacks to allow for continuous monitoring of stack emissions to detect any plant inefficiencies.	Design team Operations Manager Maintenance Manager SHE Manager ESO	Ongoing	Monitoring records
3.13.3	Air quality management	<p>NO<sub>2</sub> emissions reduction for Gas engines:</p> <ul style="list-style-type: none"> <li>■ Increase stack height (where possible); or</li> <li>■ Control Technologies: <ul style="list-style-type: none"> <li>■ Low NO<sub>x</sub> burners;</li> <li>■ Homogeneous Charge Compression Ignition (HCI); and</li> <li>■ Flue-Gas Recirculation (FGR).</li> </ul> </li> </ul> <p>NO<sub>2</sub> emissions reduction for Gas Turbines:</p> <ul style="list-style-type: none"> <li>■ An increase in stack height (where possible); and</li> <li>■ Control Technologies:</li> </ul>	Design team Operations Manager Maintenance Manager SHE Manager	Ongoing	Monitoring records



Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
		<ul style="list-style-type: none"> <li>▪ Selective catalytic reduction (SCR);</li> <li>▪ Selective non-catalytic reduction (SNCR);</li> <li>▪ Catalytic combustion; and</li> <li>▪ Wet Low Emissions (WLE).</li> </ul>			
3.13.4	General CTT operational noise	<p>If ambient noise monitoring shows that these limits are exceeded, and community complaints indicate that noise levels from Operations need to be reduced, CTT shall initiate the action required to achieve the reduction in noise levels to meet the Operations standards.</p> <p><i>For Gas Engines:</i></p> <ol style="list-style-type: none"> <li>1) Alternative placement and/or design of cooling system</li> <li>2) Cladding of buildings designed for optimum noise reduction</li> <li>3) Minimisation of openings in façades</li> </ol> <p><i>For Gas Turbines:</i></p> <ol style="list-style-type: none"> <li>1) Selection of system elements with minimum noise emission in mind</li> <li>2) Cladding of buildings designed for optimum noise reduction</li> <li>3) Minimisation of openings in façades</li> </ol>	CTT Production Manager Design Team	Ongoing	Monitoring records. Records of action taken as necessary. Minimal/no complaints

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
3.13.5	Decline in groundwater levels	Use recycled water or rainwater for vehicle washing, dust settlement, and toilet flushing. Recycling of washing and cleaning water where possible. Water storage and delivery facilities should be safe and leakage free to reduce water wastage. Raising awareness and promotion of behavioural change within the plant area about water use. Monitoring of abstraction boreholes.	CTT operations manager	Ongoing	Monitoring records. Records of action taken as necessary
3.13.6	Death or injury to fauna	Selected on-site environmental staff should be trained in snake handling and be familiar with capturing and removing other fauna taxa; and A low speed limit (recommended 20-40 km/h) should be enforced on site to reduce wildlife collisions.	Environmental Manager	Ongoing	Training records No carcasses of fauna killed by employees on site
3.13.7	Visually intrusive operational power plant infrastructure	<ul style="list-style-type: none"> <li>■ To reduce the visual intrusion of the buildings, where feasible roofing and cladding material should not be white, shiny (e.g. bare galvanized steel that causes glare) or brightly coloured</li> <li>■ Buildings and workshops exteriors should also be painted in colours that are complementary to the surrounding</li> </ul>	Project engineer, site environmental manager	At design stage	Monitoring records. Records of action taken as necessary. Minimal/no complaints

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
		<p>landscape, such as olive green, light grey, blue-grey, or variations of tan and ochre</p> <ul style="list-style-type: none"> <li>■ Retain existing trees wherever possible, as they already provide valuable screening (Biodiversity study lists species that should be avoided as far as possible)</li> <li>■ Appropriate landscaping using indigenous vegetation should be introduced within the permanent camp facility as well as entrance areas to other facilities, in order to create a more welcoming overall appearance</li> </ul>			
3.13.8	Light pollution at night at the CTT plant	<ul style="list-style-type: none"> <li>■ Identify zones of high and low lighting requirements, focusing on only illuminating areas to the minimum extent possible to allow safe operations at night and for security surveillance</li> <li>■ Plan the lighting requirements of the facilities to ensure that lighting meets the need to keep the site secure and safe, without resulting in excessive illumination</li> <li>■ Reduce the heights of light post where possible and develop a lighting plan that focusses on illuminating the required areas through strategically placed individual lights rather than mass light flooding</li> </ul>	Project engineer, SHE Manager	At design stage At start up	Monitoring records. Records of action taken as necessary. Minimal/no complaints

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
		<ul style="list-style-type: none"> <li>■ Utilise security lights that are movement activated rather than permanently switched on where feasible, to prevent unnecessary constant illumination</li> <li>■ Fit all security lighting with 'blinkers' or specifically designed fixtures, to ensure light is directed downwards while preventing side spill. Light fixtures of this description are commonly available for a variety of uses and should be used to the greatest extent possible</li> <li>■ Eliminate any ground-level spotlights as these invariably result in both direct glare and increased sky glow, and cannot be effectively mitigated</li> </ul>			

### 3.14 Maintenance of CTT & Transmission Line

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
3.14.1	Transformers	Transformers shall be free of polychlorinated biphenyls (PCBs) and shall be banded and regularly inspected and maintained.	Maintenance Manager Electrical technician	Ongoing	No PCBs on site. Inspection schedule & records

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
3.14.2	Gas turbines / generators	All gas turbines and generators shall comply with the relevant Mozambique air emissions standard and/or or the standards set out in the project financing agreements; or the relevant IFC standard	Production Manager Maintenance Manager	Ongoing	All new gas engines to include low-NOx burners. Air emission and noise specifications for generators.
3.14.3	Gas turbines / generators / other noise generating equipment (cooling fans)	All noise generating equipment shall be checked to ensure that it is functioning optimally with respect to noise emissions and that emissions do not exceed the original design specification	Maintenance Manager ESO/SES	Annual	Assessment and monitoring reports
3.14.4	Vehicle and equipment maintenance	All equipment and machinery shall be maintained in good working order so as to prevent oil, fuel or other such leaks as well as elevated emission levels.	Maintenance Manager	Ongoing	Maintenance and service records.
3.14.5	Vehicle and equipment maintenance	All reasonable precautions shall be taken to prevent fuel and lubricant spills. The following shall be complied with: <ul style="list-style-type: none"> <li>■ No overfilling of diesel bowsers and equipment tanks</li> <li>■ Initial and regular subsequent inspections to verify that no leaking or defective equipment is brought onto site</li> </ul>	Maintenance Manager ESO	Ongoing	Inspection records.

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
		Any oils or lubricants discharged during routine vehicle servicing on site shall be captured using drip trays, containers or other appropriate containment measures.			
3.14.6	Vehicle washing	A wash bay(s) shall be designed and constructed at which all vehicles and equipment and high-pressure washing shall take place. The wash bay shall be constructed so as to capture all runoff. All wash bay effluent shall be directed to the industrial effluent treatment plant for further treatment before release. CTT shall strictly prohibit the washing of vehicles or other machinery, or the changing of lubricants, in rivers, streams, ponds, or other waterways.	Maintenance Manager	Complete	Wash bay(s) constructed as per requirement. Vehicle and equipment washing procedure. Wash bay Operating Procedure
3.14.7	Pigging	Any effluent produced from pigging shall be diverted into the closed drain system. Further containment and treatment of spillage shall be via the POC System. A procedure shall be compiled indicating methods and frequency of pigging.	Production Manager	As per procedure	As per requirement. Record of evaluation of treatment options should glycol inhibitors be used. Procedure.
3.14.8	New infrastructure within CTT	The SHE Manager shall be consulted during the design of any new infrastructure. The design shall be in accordance with Mozambican legislation and best practices internationally.	SHE Manager SPI Interface Manager	Ongoing	SHE Manager and SEPI Interface Manager to approve, in writing, the establishment of new

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
		Prior to development, the relevant authorities shall be notified of any changes to infrastructure within the plant area and authorisation shall be obtained and this ESMP be updated, where required.			infrastructure. Government approvals
3.14.9	Establishment of Alien Invasive plants	Continue to implement the alien invasive plant species control programme, with regular monitoring informing any revisions to overall strategy, priority sites, control methods and follow-up treatments	CTT Environmental team	Ongoing	Site cleared of or limited alien invasives present
3.14.10	Maintenance of Transmission Line servitude	<p>Regular clearance of vegetation to shrub height will be required to ensure access to the maintenance track to facilitate inspections of the transmission line. Only the vegetation encroaching on the maintenance track should be cleared.</p> <p>The ECO shall relocate slow-moving wildlife (snakes, tortoises, etc.) to safe areas outside the project work zones (during maintenance of transmission line servitudes and maintenance roads), including other right of ways (ROWs).</p> <p>Bird flight diverters shall be installed and maintained along the transmission line to reduce collisions, prioritizing areas with higher presence</p>	CTT / Transmission line Environmental Team	Ongoing	Only maintenance track cleared of vegetation Records of mortalities (birds, bats etc)

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
		of vultures and other vulnerable bird species (and bats), with at least 3 meters between the conductors.			
3.14.11	Maintenance of Right of Way	The PPZ around the transmission line and CTT must be enforced and maintained, by co-operative agreements with the relevant local community leaders/chiefs and government departments. Any change shall be certified by the Operations Manager and SHE Manager. If there is an economic loss or displacement requiring compensation, then this will be handled in accordance with the process set out in the RPF.	CTT Security Team Operations Manager and SHE Manager (changes to alignements)	Ongoing	No encroachment into PPZ No grievances from communities

### 3.15 Hazardous Materials / Spill Management

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
3.15.1	General	CTT shall comply with all applicable laws, regulations, permit and approval conditions and requirements relevant to the storage and use of hazardous materials. All unused product which is not returned to the supplier shall be treated as	SHE Manager	Ongoing	Disposal records Audit findings.



Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
		waste and managed in accordance with the CTT Waste Management Plan.			
3.15.2	Storage and handling of hazardous materials on site	A comprehensive inventory of all hazardous materials and volumes / quantities on site must be kept updated and maintained.	SHE Manager Stores Supervisor ESO	Ongoing	Inventory.
3.15.3	MSDS usage and availability on site	MSDS contents shall be used as a mandatory requirement for the appropriate storage and handling of all materials and for assisting to make an assessment of the possible risk associated with any materials. Where necessary, the SES shall be consulted as to the environmental risk associated with the use of any material. MSDS's shall be available for all hazardous materials on site and a summary of requirements shall be immediately available in areas where such materials are stored or used.	SHE Manager SC Manager	Ongoing	MSDS's available for all hazardous materials on site.
3.15.4	Storage facilities for hydrocarbon products and chemicals	Proper storage facilities shall be provided for the storage of oils, grease, fuels, chemicals and any other hazardous materials. These storage facilities (including any tanks) shall consist of an impermeable surface and shall be surrounded by a bund wall in order to fully contain accidental spillages,	SC Manager	Ongoing	Storage areas as per requirement.

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
3.15.5	Health and environmental risks of hazardous substances	Workers shall be made aware of the health and environmental risks associated with any hazardous substances used and shall be provided with appropriate protective clothing (PPE) / equipment in case of spillages or accidents.	Occupational Health Practitioner	Ongoing	Training records. Regular inspections Health and safety meetings minutes
3.15.6	Purchasing	Business-related non-stock items may not be purchased and brought to site without prior approval of the Procurement & Supply Department.	SC Manager	Ongoing	MSDS for non-stock items. Approval of P&S Manager for purchase of all non-stock items.
3.15.7	Expertise, equipment and procedures to deal with spills	<p>The necessary tools, materials and expertise must be readily available to deal with spills of oils, fuels, lubricants and other hazardous materials. Spill clean-up kits shall be available on site. The capacity and number of spill kits for each area shall be based on the risk associated with a spill (volume / quantity and severity). An Oil Spill Management Plan shall be written for the prevention and management of major spills outside of the boundary fence of the CTT.</p> <p>The procedure shall contain:</p> <ul style="list-style-type: none"> <li>■ Guidance to employees regarding safe working practices and spill avoidance</li> <li>■ Actions to be taken in the event of a spill.</li> </ul>	SHE Manager	Ongoing	Register of tools available for handling spills. Procedure for spill Training records

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
		<ul style="list-style-type: none"> <li>■ Ongoing training requirements for employees, equipment operators and for emergency spill response teams.</li> </ul>			
3.15.8	Spillages of chemicals and oils, poor housekeeping; Vehicle and equipment maintenance	<ul style="list-style-type: none"> <li>■ Storage of new and used oils in bunded areas.</li> <li>■ No co-handling of reactive liquids or solids.</li> <li>■ Creation and monitoring of an inventory of chemicals held on site.</li> <li>■ Storage of hazardous or toxic substances securely and controlled use thereof.</li> <li>■ Vehicle and equipment maintenance limited to designated areas only.</li> </ul>	SHE Manager	Ongoing	Register of tools available for handling spills. Procedure for spill Training records

### 3.16 Upset Condition Management

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
3.16.1	Effluent management	No untreated effluent (or effluent outside of specification) shall be released from site. Untreated effluent shall be held on site in existing facilities until such time as treatment is possible.	Production Manager ESO	Ongoing	Monitoring records.

### 3.17 Land Use Controls

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
3.17.1	General	The operation of the CTT complex and associated activities may influence development in the local area, bringing about changes in what was previously a rural environment. Without proper management this could lead to conflict between the rural and industrial land uses. CTT shall ensure liaison with the Government to encourage suitable planning of land use and land zoning around the CTT site.	Operations Manager	Ongoing	Records of meetings / communication with the Government. Aerial photographs / satellite imagery to identify changes in activities around the Plant
3.17.2	PPZ boundary	CTT shall approach the relevant Mozambique authorities to motivate for an extension of the PPZ boundary, within which no building infrastructure or settlement should be permitted.	Operations Manager	Prior to beneficial operation of the CTT	Formal agreement with the Mozambique Government

### 3.18 Corporate Social Investment

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
3.18.1	CSI policy	Implement the intent of the “Corporate Social Responsibility Policy for the Mineral Resources Extractive Industry”.	Public Affairs Coordinator and staff	Ongoing	As per requirement
3.18.2	Community interface forums	The capacity and status of Community Interface Forums shall be built up to help facilitate contributions by community members. Where such forums no longer exist, they should be re-established in a participatory process with communities. They can play a critical role in community development in the villages providing they are empowered to do so. Capacity building would need to start at ‘how to run a committee’.	Public Affairs Coordinator and staff	Ongoing	As per requirement
3.18.3	CSI awareness	CTT shall publish and create awareness of the many CSI projects the company has already established and the local benefits derived from these projects. Use shall be made of a good mix of verbal, visual and written information. In villages, the information campaign should be rolled out <i>to the entire population of the village</i> and not only to village leaders.	Public Affairs Coordinator and staff	Ongoing	Information campaign records
3.18.4	CSI local management	Evaluate opportunities to create local economic development initiatives associated with	CTT management	Ongoing	As per requirement

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
		agriculture, farming and getting goods to market as well as other entrepreneurial activity. This should have the objective of supporting local food security and generating sustainable improvements in livelihoods			
3.18.5	Allocation of CSI funds	Once the system of setting aside funds for local communities is established, CTT should work closely with District Government to coordinate wise application of these funds in tandem with CTT's CSI program.	Public Affairs Coordinator and staff	Ongoing	As per requirement. Records of fund allocations in consultation with District Government

### 3.19 Decommissioning

Any additional development activities for Operations must be conducted in terms of the construction and operational ESMP for the CTT and associated facilities. These documents will need to be updated as necessary to reflect the additional Operations activities and associated management requirements.

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
3.19.1	General	An Environmental and Social Impact Assessment (ESIA) shall be prepared for the decommissioning of the CTT complex and all other infrastructure, including the Transmission line (as applicable), 2 years before project closure, in accordance with	Operations Manager SES	Authorisation required prior to start of decommissioning	As determined in the ESIA and DRP.

Ref.	Activity	Requirements / specifications	Responsibility	Scheduling	Compliance indicator(s) or verification
		relevant laws, and industry best practice. The ESIA shall be used as a basis for updating and expanding on the Decommissioning and Rehabilitation Plan (DRP), which must be approved by MITADER prior to decommissioning.			

## 4.0 PERFORMANCE ASSESSMENT, REVIEW & CORRECTIVE ACTION

The assessment of performance has three key aims:

- i) Confirmation of compliance to the requirements as set out in the ESMP and RPF;
- ii) Measurement of environmental performance (degree of success of the ESMP and its specifications) and
- iii) Ensuring that any deficiencies in the ESMP are identified and remediated.

These aims shall be met by making use of four important tools:

- Monitoring, auditing / inspections, non-conformance / incident identification and close-out, and management review.
- Corrective action will be critical in ensuring that any identified problem areas are effectively addressed.
- Specifications for monitoring, non-conformance identification, auditing and review are provided in the sections that follow.

CTT shall produce procedures for monitoring, auditing and inspections, management review, non-conformance / incident reporting and corrective action that will address the requirements of this section.

### 4.1 Environmental Monitoring Strategy

A monitoring<sup>1</sup> strategy must be defined to ensure that the effectiveness of management and mitigation measures can be tracked and corrective action (see section 4.4) identified as necessary. Note that monitoring shall be intended to evaluate the effectiveness of environmental, social and health and safety management, independently of whether the specifications in the ESMP have been complied with. Proper monitoring will enable any impacts of Operations on the environment to be detected as early as possible and corrective action implemented as required.

Where monitoring is specified as a requirement, the responsible party will develop a monitoring, measurement and reporting procedure that will outline:

- The monitoring objectives;
- A detailed description of the required monitoring measures, including responsibilities, parameters to be measured, methods to be used, sampling locations, frequency of measurement, detection limits and the definition of thresholds that will signal the need for corrective actions (see section 4.4); and
- The approach to the analysis of results and the identification of activities and impacts requiring corrective action.

Reporting requirements, with defined responsibilities, to ensure early detection of conditions that require corrective action and approach to initiating corrective action.

The monitoring requirements outlined below will therefore need to be updated as required upon finalisation of the abovementioned plans, as well as additional parameters and monitoring criteria added for plans that still require further development.

---

<sup>1</sup>Monitoring is a process of surveillance, based on specified approaches and schedules, used to detect whether any changes have occurred in the predefined, quantifiable properties of the particular environment under consideration.



**Table 3: Air Quality Monitoring programme**

Objective	Detailed Actions	Monitoring Location	Frequency / Duration	Responsibility
PM <sub>10</sub> emission limit compliance	Iso-kinetic testing.	All stacks	Bi-annual	CTT Environmental Section
NO <sub>2</sub> emission limit compliance	Flue gas analyser & iso-kinetic testing	All stacks	Continuous / Bi-annual	CTT Environmental Section
SO <sub>2</sub> emission limit compliance	Iso-kinetic testing.	All stacks	Bi-annual	CTT Environmental Section
PM <sub>10</sub> ambient air quality guideline compliance	Ambient air quality monitoring (E-sampler / Passive PM <sub>10</sub> )	Continuation of SEPI 2014 monitoring program (jointly SEPI/CTT) or alternatively CTT adopts its own monitoring programme.	Bi-annual	CTT Environmental Section
NO <sub>2</sub> ambient air quality guideline compliance	Ambient air quality monitoring (Radiello)		Bi-annual	CTT Environmental Section
SO <sub>2</sub> ambient air quality guideline compliance	Ambient air quality monitoring (Radiello)		Bi-annual	CTT Environmental Section

**Table 4: GHG emissions monitoring programme**

Objective	Detailed Actions	Monitoring Location	Frequency	Responsibility
Reduce gas consumption of gas engines	Calculate average consumption of gas engines / turbines based on consumption of natural gas and electricity produced (i.e. product unit intensity).	Gas to energy plant	Monthly	Operations manager
	Monitor stack emissions to ensure compliance with relevant regulations and determine efficiency of gas engines.	Gas to power plant	Continuous	Operations manager
Reduce diesel consumption of fleet vehicles	Calculate average consumption of vehicles based on diesel consumption and distance travelled.	Gas to power plant	Monthly	Fleet manager
Reduce diesel consumption of diesel generators	Calculate average consumption of diesel generators based on diesel consumption and running time.	Gas to power plant	Monthly	Operations manager
Reduce diesel consumption of generator and water pump sets	Calculate average consumption of generator and water pump sets based on diesel consumption and running time.	Site of abstraction	Monthly	Head electrician

**Table 5: Groundwater Monitoring programme**

Objective	Detailed Actions	Monitoring Location	Frequency	Responsibility
To assess compliance of the treated effluent to discharge standards	Monitoring of treated effluent to determine compliance to the effluent standards as stipulated in terms of the Mozambican and IFC standards for discharge and irrigation. Non-compliant effluent should be discharged to an evaporation pond.	Sewage treatment plant discharge point, oily water management system	Continuously	CTT Environmental Section
To assess groundwater levels at abstraction boreholes	Installation of continuous flow and water level equipment at abstraction boreholes	Continuous monitoring of groundwater levels and abstraction rates at boreholes W5A and T9 (as well as any other identified/new monitoring boreholes in the vicinity of abstraction points)	Continuous	CTT Environmental Section
To assess compliance of the stormwater discharge quality	Monitor the stormwater runoff from site activities. Stormwater should be tested and treated to remove contaminants before being released into the environment. IFC Environmental and the Mozambican standards for treated effluent must be complied with.	At stormwater discharge points around the plant area.	At all times	CTT Environmental Section
To assess the impact of water supply, if any, on the local groundwater	Monitor groundwater levels at monitoring points near abstraction boreholes and other sensitive receptors i.e. affected community wells/boreholes.	Continuous monitoring of groundwater levels and abstraction rates at boreholes W5A and T9. Install/include dedicated monitoring boreholes near abstraction points.	Continuous for W5A and T9. Monthly for monitoring boreholes.	CTT Environmental Section

Objective	Detailed Actions	Monitoring Location	Frequency	Responsibility
To assess water quality of aquifers	Monitoring of groundwater quality	Install dedicated monitoring boreholes at the CTT plant – location of boreholes will depend on infrastructure layout i.e. evaporation pond, chemical storage areas, waste disposal areas, etc.	Monthly for 1 <sup>st</sup> year thereafter quarterly	CTT Environmental Section

**Table 6: Noise Monitoring programme**

Objective	Detailed Actions	Monitoring Location	Frequency	Responsibility
Monitoring of ambient noise levels	Sampling noise measurements during day- and night-time	At selected points around the perimeter of the CTT operation	Every two years	ESO or independent consultant
Maintenance of a complaints register	1) Discussion at regular meetings 2) Identification of source of noise 3) Remedial steps 4) Feedback to management and complainant	-	Environmental management meetings	ESO LOCSA

**Table 7: Environmental Risk Monitoring Plan**

Objective	Detailed Actions	Monitoring Location	Frequency	Responsibility
Monitoring and alarming of gas levels in confined plant spaces	Identification of confined spaces and installation of gas detection and alarming devices. Monitoring of the effectiveness of ventilation systems	Confined spaces such as turbine enclosures and engine rooms	Ongoing	Production Manager Safety Practitioner

Objective	Detailed Actions	Monitoring Location	Frequency	Responsibility
Monitoring of effectiveness of dirty water treatment processes to prevent egress from the plant	Installation of sampling and measurement protocols	Site boundaries	Ongoing	Production Manager Safety Practitioner

**Table 8: Social Welfare Monitoring programme**

Objective	Detailed Actions	Monitoring Location	Frequency	Responsibility
Assess the client's community development initiatives	Monitor community development indicators	Project area	Quarterly	Social manager
Assess livelihood options for vulnerable groups such as women, elderly and children.	Monitor social behaviours and activities within the project area	Project area	Quarterly	Social manager
Engage and consult with stakeholders during the project operation phase	Monitor the stakeholder engagement and consultation accordingly to avoid interruptions during the operation phase	Project area	Quarterly	Social manager

**Table 9: Soil, Land use and Land Capability Monitoring Program**

Aspect	Monitoring Requirements	Locations	Parameters	Frequency	Responsibility
Soil Quality	Visual verification; and sampling of soils for analysis.	Along the perimeter of the newly developed project infrastructure.	pH and salinity values; Content of major plant nutrients; Organic matter content; Metals and hydrocarbons	Bi-annually	CTT Environmental Section
Soil Stockpiles	Visual verification; Sampling of stockpiled soil	All stockpiled soils. Minimum of one sample per 50m <sup>2</sup> of stockpile taken at regular intervals from both the surface 1m and the core of the stockpile.	Volume of soil stockpiled. Height of stockpile Type of soil stockpiled. pH and salinity values; Content of major plant nutrients; Organic matter content; Heavy metals and hydrocarbons.	Annually	CTT Environmental Section
Soil erosion	Visual assessment Surface water monitoring.	All infrastructure. Streams and rivers near the soils with high erodibility.	Evidence of erosion.	Monthly, and weekly during	CTT Environmental Section
Land use	Land use	Project Area	Satellite imagery to be utilized to evaluate Land use.	2 Years	CTT Environmental Section

**Table 10: Surface water Monitoring programme**

Objective	Detailed Actions	Monitoring Location	Frequency	Responsibility
To assess compliance of the treated effluent to discharge standards	Monitoring of treated effluent to determine compliance to the effluent standards as stipulated in terms of the Mozambican and IFC standards for discharge and irrigation. Non-compliant effluent should be discharged to an evaporation pond.	Sewage treatment plant discharge point, oily water management system	Continuously	CTT Environmental Section
To assess compliance of the stormwater discharge quality	Monitor the stormwater runoff from site activities. Stormwater should be tested and treated to remove contaminants before being released into the environment. IFC Environmental and the Mozambican standards for treated effluent must be complied with.	At stormwater discharge points around the plant area.	At all times	CTT Environmental Section
To assess the impact of water supply, if any, on the local groundwater	Comply with the recommendations of the Specialist Study, Geohydrology Impact Assessment, with regard to the monitoring of water levels in the water supply boreholes.	At perimeter boreholes and at T9 and W5A.	Monthly	CTT Environmental Section
To assess the impact of spillages/leakage from the evaporation pond on the receiving environment	Water quality analysis of the boreholes in the vicinity of the evaporation pond to determine existence of pollution impacts.	Perimeter of the evaporation pond.	Monthly	CTT Environmental Section

Objective	Detailed Actions	Monitoring Location	Frequency	Responsibility
	Implement remedial actions if impacts are noted.			

**Table 11: Ecological Monitoring programme**

Objective	Detailed Actions	Monitoring Location	Frequency	Responsibility
Assess the extent of alien species establishment and effectiveness of control treatments	<ul style="list-style-type: none"> <li>■ Monitor the type of alien species, extent and density of infestations; and</li> <li>■ The effectiveness of control and mechanical control treatments.</li> </ul>	All areas where vegetation clearing and earth works has occurred.	Annually (wet season)	CTT Environmental Section
Assess success of rehabilitation	Monitor vegetation basal cover and species composition, and take corrective measures as required	All areas where rehabilitation has occurred. Priority sites include: a) coastal dunes at the selected beach landing site; and b) Govuro River crossing point.	Annually (wet season)	CTT Environmental Section
Access the effectiveness of bird and bat diverters	<ul style="list-style-type: none"> <li>■ Monitor the number of Bird and Bat mortalities caused by the Transmission line.</li> </ul>	Along Transmission line	Monthly inspections	CTT Environmental Section



Objective	Detailed Actions	Monitoring Location	Frequency	Responsibility
	<ul style="list-style-type: none"> <li>Take note of hotspots for mortalities and adjust bird and bat diverters as required.</li> </ul>			

**Table 12: Visual Intrusion Monitoring programme - CTT plant**

Objective	Detailed Actions	Frequency	Responsibility
To improve the appearance or otherwise reduce the visual intrusion caused by the power plant complex	<ul style="list-style-type: none"> <li>Conduct periodic inspections of the power plant and associated infrastructure under construction, to ensure that visual improvement measures are implemented where practical. Additional measures such as tree planting as effective screening of the CTT plant should be considered (not beneath transmission line)</li> </ul>	Periodically during operation as required,	Plant operations manager, site environmental manager
Light pollution at night at the CTT plant	<ul style="list-style-type: none"> <li>Conduct periodic night-time visual inspection of the operating power plant from immediate surroundings and nearest settlements / residences, to determine whether undue light pollution is occurring</li> </ul>	Annually, in the event of stakeholder complaints	Plant operations manager site environmental manager

## 4.2 Site Inspection and Audits

Mozambican regulations updated in 2015 require that regular internal and external inspections and audits must be conducted to evaluate compliance with the requirements of the ESMP. Section 4.2.1 defines the site inspection requirements and associated responsibilities for the Operations phase of the CTT complex. Section 4.2.2 defines the auditing requirements for the Operations phase of the CTT complex.

### 4.2.1 Site Inspections

The ESO will undertake regular inspections of all works so as to identify any Operations activities or components that are causing, or may cause, a potential environmental, social and health and safety impact. Inspections will be ongoing and will form part of the day-to-day function of the ESO. The ESO will immediately bring any identified non-conformances to the attention of the responsible party for rectification. Any potential problem areas will be logged and managed as per the requirements of Section 4.4 (non-conformance and preventative action).

### 4.2.2 Audits

The main goals of an ESMP audit are to evaluate compliance with stipulated ESMP requirements, to identify any non-conformance and to assess whether objectives and targets have been achieved. An audit programme and procedure shall be developed by CTT to ensure that the audits are sufficiently comprehensive and scheduled.

Auditing must consider the results obtained from monitoring and inputs from PAPs and stakeholders to assess whether objects and targets have been met, and whether there is any non-conformance with stipulated ESMP and legal requirements. The audit must also assess whether ESMP and RPF implementation has been undertaken according to planned arrangements and that the ESMP itself is being appropriately updated based on Operations requirements and impacts identified. The audit shall confirm that any identified corrective action has been undertaken and assess the effectiveness of that action.

CTT shall develop a procedure for conducting ESMP audits that shall incorporate details of:

- Audit approach
- Scheduling
- Reporting and
- Responsibilities.

Table 13 defines the minimum requirements in terms of audit types and frequency that shall be conducted during the operational phase of the CTT complex operations.

**Table 13: Minimum auditing requirements for the operational phase of the CTT and associated infrastructure**

Nature and scope of audit	Conducted by	Reported to	Frequency of audit
Internal ESMP compliance audit – all Operations components	ESO	Operations Manager SHE Manager	Entire operations to be covered annually.
External ESMP compliance audit - all Operations components	Independent consultant – appointed by CTT	SES SHE Manager Operations Manager	Independent audit annually as per Government regulations

Nature and scope of audit	Conducted by	Reported to	Frequency of audit
		MITADER (with action plan of how to address findings)	
Government audit As per the requirements of Government.	MITADER	SES SHE Manager Operations Manager	As requested by Government

**Note:** It is in the nature of environmental auditing to be conservative. Wherever latitude exists in interpretation, the auditor will take the most conservative (worse-case) stance. Credit will only be given for management actions that demonstrably comply with the Operations standard. Records should be kept of all actions taken to meet the requirements of the ESMP. Similarly records and motivations must be kept of all changes / modifications to the ESMP.

### 4.3 Reviews

Site management at the CTT complex shall establish an environmental committee. This committee shall meet on at least a monthly basis to review environmental performance, including incidents/non-conformances reported, corrective actions implemented, monitoring results, ESMP compliance, internal and external audit findings and remedial actions taken. Management actions and planning shall be specified based on the results of the review. The monthly meeting shall be documented.

In addition, a management review meeting shall be held on at least an annual basis to review the status of Environmental Management and ESMP implementation and to ensure the continued effectiveness of the ESMP as well as its appropriateness. The review meeting shall be attended by senior management. The meeting shall be documented.

The management review should:

- Review ESMP objectives and evaluate the need for new or revised objectives, as appropriate;
- Set new objectives as appropriate;
- Evaluate environmental performance and the effectiveness of the ESMP by reviewing monitoring and audit results;
- Evaluate changing circumstances and how these may influence and be reflected in the ESMP. This could include changes to permits, contracts, loan agreements etc;
- Examine the results of any action items from the previous management review meeting; and
- Examine the remedial actions taken to address non compliances and close out of any external audit findings.

### 4.4 Corrective and Preventive Action

The need for setting corrective action will arise from deviations from:

- A predetermined baseline or limit (as detected through monitoring) or
- ESMP requirements.

In this regard, CTT shall establish an incident and non-conformance reporting procedure. The procedure shall include details for:

- Ensuring the recording of incidents / non-conformances
- Reporting channels for incidents / non-conformances
- The identification of corrective and preventative action measures.

Corrective actions shall be identified based on incident / non-conformances reported and on the results of ESMP monitoring, internal or external ESMP audits and/or management review. Corrective action should result in:

- The implementation of a specific action(s) to remedy the identified deficiency(ies) or
- A change to the targets or objectives set in the ESMP and
- Corrective actions implemented shall be documented.

Should it be considered by Government Authorities that operational activities are causing unacceptable environmental damage; the SES and Operations Manager through the Corporate Affairs Department will immediately consult with the Government and agree on the remedial measures to be taken. Such agreed measures shall be undertaken immediately to prevent further damage and to repair any damage that may have occurred.

## 5.0 COMPETENCY, TRAINING AND AWARENESS CREATION

Those persons who are involved in activities that could result in an environmental impact(s) must receive appropriate environmental awareness training (and must also possess the necessary skills so as to successfully and responsibly undertake their tasks). All employees must be made aware of CTT's undertaking to conduct the proposed activities in a manner that is respectful to local people, their land and resources and sensitive biophysical habitats. Training shall take the form of, but not be limited to: induction training, use of educational posters and toolbox talks.

During these training sessions, the following principles should be presented / discussed:

- ESIA and ESMP commitments;
- Restrictions and procedures for operations;
- Restrictions and procedures for collection, treatment and disposal of waste and hazardous substances;
- Statement and clarifications of CTT's communications policies;
- Firefighting procedures;
- Procedure for emergency preparedness and response;
- Procedures for incident reporting and handling; and
- Need to refrain from destruction of animals and plants, indiscriminate defecation, waste disposal and/or pollution of local soil and water resources.

## 6.0 CONTINGENCY AND DECOMMISSIONING PLANNING

CTT shall undertake and submit full decommissioning proposals at least 2 years in advance of decommissioning, in accordance with the requirements of CTT's Framework Decommissioning and Rehabilitation Plan (yet to be developed).

## **7.0 EMERGENCY PREPAREDNESS AND RESPONSE**

CTT shall develop an Emergency Response Plan for the CTT activities. These plans shall identify the potential for, and response to accidents and emergency situations in accordance with Mozambique law and recognised international standards. The plans shall also address measures to prevent such situations and to mitigate environmental impacts that may be associated with them (SHE Manager).

The emergency plans shall include the establishment of a network of communication between CTT, employees, contractors, available emergency services including police, traffic police, fire departments, community associations, specialist services etc. that may be available.

The emergency plan(s) shall be tested on a regular basis through the use of drills and mock emergencies so as to identify and rectify any shortcomings (Production Manager and SHE Manager).

## **8.0 REPORTING REQUIREMENTS**

All reporting shall be as per CTT reporting structures and as specified elsewhere in the ESMP, or as per legal requirements.

In addition to all reporting requirements identified in the ESMP, records shall be kept of all monitoring results, monitoring reports, incident records, audit reports (encompassing environmental, social and health and safety aspects) and management reviews. Minutes of all environmental Operations meetings shall be maintained.

Where monitoring reports are prepared by independent specialists, the recommended actions in the reports shall be recorded, assessed and acted upon.

All reports shall be managed as per the requirements of Section 9.0.

## **9.0 DOCUMENT CONTROL**

The ESMP forms the basis for environmental management on site. Based on the results of the performance assessment and review process (Section 4), the ESMP may be modified as the Operations progress. Modifications shall only be permitted by the SHE Manager and shall be approved by MITADER and receive non-objection from the World Bank. A single master copy of this ESMP shall be retained in the document control system. All changes to the ESMP shall be made as per the CTT Document Control Procedure to which all affected parties shall comply. This procedure should define document modification, distribution, retention and management of ESMP revisions.

The SHE Manager shall ensure that any modifications are communicated, explained to and discussed with all affected parties (i.e. the authorities, contractors, employees, Operations Manager and any affected party who requests this information).

# Signature Page

**Golder Associados Moçambique Limitada**

NUIT 400196265

Directors: G Michau, RGM Heath

Golder and the G logo are trademarks of Golder Associates Corporation

g:\projects\18103533 - sasol mgip esia\6. deliverables\drafts\oemp\18103533-321207-27b\_rep\_ctt\_operation esmp\_final\_29112018\_golder revision.docx



**[golder.com](http://golder.com)**