

Sasol Petroleum Mozambique

EIA FOR THE PROPOSED PIPELINE FROM THE TEMANE LIQUIDS PROCESSING FACILITY TO A FLOATING, STORAGE, AND OFFLOADING UNIT IN INHAMBANE PROVINCE, MOZAMBIQUE

Environmental Pre-feasibility and Scoping Report (EPDA) and Terms of Reference (ToR)

MSDP1401-ERM-0000-11400-REP-00004

July 2016

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Sasol Petroleum Mozambique)

*Environmental Pre-feasibility and Scoping Report
(EPDA) and Terms of Reference (ToR)*

Project Reference: 0312425

For and on behalf of Environmental Resources
Management

Approved by: Ingeborg McNicoll

Signed: 

Senior Partner

Date: July 2016

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Abbreviations

ABS	American Bureau of Shipping
ADI	Area of Direct Influence
ADNAP	Direcção Nacional de Administração Pesqueira (National Directorate for Fisheries Administration)
AII	Area of Indirect Influence
ALARP	As Low As Reasonably Practicable
ANE	Administração Nacional de Estradas (National Roads Administration)
AoI	Area of Influence
AOPL	Association of Oil Pipelines
API	American Petroleum Institute
AQUA	Agência Nacional para o Controlo da Qualidade Ambiental (National Agency of Environmental Quality)
ASME	American Society of Mechanical Engineers
BNP	Bazaruto National Park
BANP	Bazaruto Archipelago National Park
bbls	Barrel of Oil Unit
BID	Background Information Document
BPD	Barrels per day
BTEX	Benzene, Toluene, Ethylbenzene, and Xylene
Ca	Calcium
CEDAW	Convention on the Elimination of All Forms of Discrimination against Women
CMAS	Competency Assurance Management System
CLF	Community Liaison Forum
CMH	Companhia Moçambicana de Hidrocarbonetos (Mozambican Company of Hydrocarbons)
CO	Carbon Monoxide
COLREGs	Convention on the International Regulations for Preventing Collisions at Sea
CORDIO	Coral Reef Degradation in Indian Ocean
CPF	Central Processing Facility
CTRG	Mozambique Gas to Power Project Ressano Garcia
CSI	Corporate Social Investment
dB(A)	A weighted decibel
DINAB	Direcção Nacional do Ambiente (National Directorate of Environment)
DPCA	Direcção Provincial para a Coordenação da Acção Ambiental (Provincial Directorate of Environmental Affairs)
DPTADER	Direcção Provincial de Terra, Ambiente e Desenvolvimento Rural (Provincial Directorate of Land, Environmental & Rural Development)
DPREME	Direcção Provincial dos Recursos Minerais e Energia (Provincial Directorate of Mineral Resources and Energy)
DRP	Decommissioning and Rehabilitation Plan
DWT	Dead weight tonnes
EDM	Electricidade de Moçambique
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMP	Environmental Management Plan
c-EMP	Construction Environmental Management Plan
ENSO	El-Niño Southern Oscillation
EP	Equator Principles
EPDA	Environmental Prefeasibility and Scoping Report
EPFI	Equator Principle Financial Institutions
ERM	Environmental Resources Management

ESD	Emergency Shutdown valve
ESMP	Environmental and Social Management Plan
EWT	Endangered Wildlife Trust
F&G	Fire and Gas
FDP	Field Development Plan
FNP	Forum for Nature in Danger
FOC	Fibre Optic Cable
FSO	Floating Storage and Offloading Unit
GIS	Geographic Information System
GoM	Government of Mozambique
GHG	Green House Gas
GJ	Giga Joules
GPS	Global Positioning System
HH	Household
HDD	Horizontal Directional Drilling
HIA	Health Impact Assessment
HP	High Pressure
HVAC	Heating, Ventilation and Air Conditioning
IACS	International Association of Classification Societies
ICRPD	Convention on the Rights of Persons with Disabilities
I&APs	Interested and Affected Parties
IDPPE	Instituto Nacional de Desenvolvimento de Pescas de Pequena Escala (Small Scale Fisheries Development Institute)
IFC	International Finance Corporation
IFC PS	International Finance Corporation Performance Standards
IFI	International Finance Institutions
IIP	Instituto de Investigação Pesqueira (Fisheries Research Institute)
IMO	International Maritime Organization
INAHINA	Instituto Nacional de Hidrografia e Navegação (National Institute of Hydrography and Navigation)
INAMAR	Instituto Nacional da Marinha (Marine National Institute)
INE	Instituto Nacional de Estatística (National Statistics Institute)
INP	Instituto Nacional de Petróleo (National Petroleum Institute)
IPIECA	International Petroleum Industry Environmental Conservation Association
ITCZ	Inter-tropical Convergence Zone
IRR	Issues and Responses Report
IUCN	International Union for Conservation of Nature
L&FS	Life and Fire Safety
LP	Low Pressure
3 LPE	Three-layer Polyethylene
LPF	Liquids Processing Facility
LPG	Liquid Petroleum Gas
LRS	Lloyds Register of Shipping
mamsl	Meters above mean sea level
MAP	Mean Annual Precipitation
MAP	Marine Assurance Plan
MARPOL	International Convention for Prevention of Pollution from Ships
MATIP	Mozambique Anchor Tourism Investment Programme
MBC	Mix-Bury-Cover
MBR	Membrane Bioreactor
MDG	Millennium Development Goals

MdP	Ministério das Pescas (Mozambican Ministry of Fishing)
Mg	Magnesium
MGC	Matola Gas Company
MGO	Marine Gas Oil
MGJ/annum	Million Gigajoule per annum
PJ/a	Petajoules per annum
MGtP	Mozambique Gas to Power
MIREME	Ministério dos Recursos Minerais e Energia (Ministry of Mineral Resources and Energy)
MISAU	Ministério de Saúde (Ministry of Health)
MITADER	Ministério da Terra, Ambiente e Desenvolvimento Rural {Ministry of Land, Environment and Rural Development (previously known as MICOA)}
MITUR	Ministério do Turismo (Ministry of Tourism)
MSP	Mozambique - Secunda Pipeline
MSV	Marine Support Vessel
NGP	Natural Gas Project
NTS	Non-Technical Summary
NaCl	Sodium Chloride
NGO	Non-Governmental Organization
NO ₂	Nitrogen dioxide
NO _x	Oxides of Nitrogen
OCIMF	Oil Companies International Marine Forum
o-EMP	Operational Environmental Management Plan
OPRC	International Convention on Oil Pollution Preparedness, Response and Cooperation
OSCP	Oil Spill Contingency Plan
PARPA II	Plano de Acção para a Redução da Pobreza Absoluta (Action Plan for the Reduction of Absolute Poverty)
PATI	Priority Areas for Tourism Investment
PDP II	Plano Director das Pescas (Fisheries Master Plan)
PESPA	Plano Estratégico para o Sector da Pesca Artesanal (Strategic Plan of the Small-Scale Fishing Subsector)
PEDPA	Plano de Desenvolvimento do Pesca de Atum (Strategic Development Plan for Tuna Fisheries)
PIG	Pipeline Inspection Gauge
PEDD	Plano Estratégico de Desenvolvimento Distrital (District Strategic Plan for Development)
POB	Personnel on Board
PPA	Petroleum Production Agreement
PPE	Personal Protective Equipment
PPP	Public Participation Process
PPR	Public Participation Report
PSA	Production Sharing Agreement
PSU	Practical Salinity Unit
PTI	Pande, Temane and Inhassoro
PPZ	Pipeline Protection Zone
QRH	Quick Release Hook
RESA	Regional Environmental and Social Assessment
ROW	Right of Way
SAR	International Convention on Maritime Search and Rescue
SDPI	Serviço Distrital de Planeamento e Infra-estruturas (District Services of Planning and Infrastructures)
SEP	Stakeholder Engagement Plan
SEPI	Sasol Exploration and Production International
SDG	Sustainable Development Goals

SES	Simplified Environmental Study
SHE	Safety, Health and Environmental
SO ₂	Sulphur dioxide
SOLAS	International Convention for the Safety of Life at Sea
SO _x	Sulphur Oxides
SPM	Sasol Petroleum Mozambique
SPT	Sasol Petroleum Temane
SSIV	Subsea Isolation Valve
SST	Sea Surface Temperatures
TAC	Total Allowable Catch
TDS	Total Dissolved Solids
ToR	Terms of Reference
TMS	Turret Mooring System
TRP	Tactical Response Plan
UNFCCC	United Nations Framework Convention on Climate Change
US-EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds
VOS	Voluntary Observing Ship
WHO	World Health Organization
WWF	World Wildlife Fund

Glossary of Terms

Area of Direct Influence	Area that the activity directly affects based on the physical, biotic and socioeconomic characteristics.
Area of Indirect Influence	Area affected by activities or influences not directly linked to the Project but which are triggered by the physical presence of the Project or associated activities
Area of Influence	Area of Influence refers to the spatial or physical scale at which the impact may occur - it does not relate to the potential consequence of the impact
Anchor handler	A vessel that tows the shuttle tanker to its offloading location and anchors it.
Auger bore	Auger bore is a technique for forming a horizontal borehole through the ground by means of a rotating cutting head.
Actuated	To actuate means to cause (a machine or device) to operate.
Beach Station	Beach station is where the offshore and onshore pipeline will connect onshore and it is where pipeline servicing, testing and maintenance will take place.
Brownfield	Previously developed land.
Bunded	A secondary enclosure, typically consisting of a wall or berm, which surrounds a tank or fluid-handling mechanism, intended to contain any spills or leaks.
Buoy	A float placed in water and usually moored, as to mark a location, enable retrieval of a sunken object, or record oceanographic data.
Cathodic protection	An electrochemical technique used to control the corrosion (rusting) of a metal surface. It involves the introduction of a very small electric current onto the metal surface.
Carbon Monoxide	A highly toxic, colourless, odourless, flammable gas produced industrially for use in the manufacture of numerous organic and inorganic chemical products; it is also present in the exhaust gases of internal-combustion engines and furnaces as a result of incomplete combustion of carbon.
Central Processing Facility	The Central Processing Facility (CPF) is Sasol's gas and condensate processing plant supplied by onshore production wells in the Temane gas field.
Cumulative Environmental Impacts	Impact caused by the Project that interacts with an impact from another activity to create an additional impact.
dB(A)	A unit used to measure the intensity of a sound or the power level of an electrical signal by comparing it with a given level on a logarithmic scale. The scale is A-weighted to approximate the sensitivity of human hearing.
Dynamic Positioning	A computer-controlled system to automatically maintain a vessel's position and heading by using its own propellers and thrusters.
Environmental Impact Assessment	The process by which the anticipated effects on the environment of a proposed development or Project are measured.
Exclusive Economic Zone	The Exclusive Economic Zone of the Mozambique Republic comprises the sea zone beyond and adjacent to Mozambique's territorial waters that extends up to a distance of 200 nautical miles from the coast, measured from the low tide line.
Environmental Management Plan	A site-specific plan generally developed from recommendations made in an Environmental Impact Assessment to ensure that all necessary impact management measures are identified and implemented, in order to protect the biophysical and social environments and to comply with environmental legislation. The Term is often used interchangeably with 'Environmental and Social Management Plan'
Environmental and Social Management Plan	This term is often used interchangeably with 'Environmental Management Plan'. See definition above.
El-Nino Southern Oscillation	Is a general term used to describe both warm (El Niño) and cool (La Niña) ocean-atmosphere events in the tropical Pacific. The Southern Oscillation is the accompanying atmospheric component, coupled with the sea temperature change.
Equator Principles	Provide a risk management framework, adopted by financial institutions, for determining, assessing and managing environmental and social risk in Projects, and primarily intended to provide a minimum standard for due diligence to support responsible risk decision-making.

Environmental and Social Management Plan	A site-specific plan to ensure that social and environmental impacts, risks and liabilities are identified. The term is often used interchangeably with 'Environmental Management Plan'.
Exporting Pump	Pump that provides enough pressure to export oil or gas along the pipelines
Fatal flaws/risks	Environmental and/or social negative and irreversible impacts, of such significance that the implementation of the project or activity in analysis is not of public interest.
Field Development Plan	A plan that provides the best technical solutions for field optimization. FDPs comprise all activities and processes required to develop an oil or gas field: environmental impact, geophysics, geology, reservoir and production engineering, infrastructure, well design and construction, completion design, surface facilities, and economics and risk assessment.
Floating, Storage and Off-Loading Unit	A permanently moored, floating vessel used for the storage and offloading of stabilised light oil.
Forward Shelter	Closed area above deck at the fore part of the FSO near the turret for the purposes of emergency evacuation.
Hawser	Mooring rope between the FSO and the offloading shuttle tanker.
Hermatypic reef formations	Corals which build reefs by depositing hard calcareous material, forming a stony framework of the reef.
Horizontal Directional Drilling	Is a steerable trenchless method of installing underground pipe along a prescribed bore path by using a surface-launched drilling rig, with minimal impact on the surrounding area.
Hydro-testing	Strength testing the pipeline by pressurizing with water.
Inert Gas Vent	An elevated stack or port through which inert gas will be released to atmosphere during loading operations. This vent forms part of the Inert Gas and venting system.
International Finance Corporation	Is an organization that assists developing countries by achieving a greater degree of private investment.
Intelligent Pigs	Sophisticated instruments inserted into a pipeline that include electronics and sensors to collect various data measurements to highlight integrity issues.
Inter-tropical Convergence Zone	Is a belt of low pressure circling the Earth, generally near the equator, where the trade winds of the Northern and Southern Hemispheres come together.
Lowest Astronomical Tide	Is an internationally standardised reference size for measuring the depth of water and to define the coastal line in sea charts.
Liquids Processing Facility	The LPF will process production fluids from oil/gas wells in the Inhassoro Field, store and prepare them for export.
Liquid Petroleum Gas	Gas mainly composed of propane and butane, which has been liquefied at low temperatures and moderate pressures.
MARPOL73/78	MARPOL 73/78 is the International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978. ("MARPOL" is short for marine pollution and "73/78" short for the years 1973 and 1978).
Metering Skid	A special platform on which various devices and instruments are installed.
Metocean	Metocean refers to the syllabic abbreviation of climate, weather and (physical) oceanography.
Manifold	A wide and/or bigger pipe connector into which smaller pipes lead.
Nitrogen Oxides	May refer to a binary compound of oxygen and nitrogen, or a mixture of such compounds: Nitric Oxide, also known as Nitrogen Monoxide (NO), Nitrogen (II) Oxide, Nitrogen Dioxide (NO ₂), Nitrogen (IV) Oxide, Nitrous Oxide (N ₂ O), Nitrogen (-I, III) Oxide.
Operational Environmental Management Plan	An EMP is a site-specific plan developed to ensure that all necessary measures are identified and implemented in order to protect the environment and comply with environmental legislation. An operational EMP refers to the operational phase of the Project.

Pig Launcher/ Receiver	A device installed on the pipeline to launch/ receive 'pigs'. These pigs perform various operations (eg: cleaning, inspection) in a pipeline without stopping the flow of the product.
Pigging	Refers to the practice of using an inspection gauge called a 'pig' which is inserted into a pipeline to perform various maintenance operations on pipelines. These operations include but are not limited to cleaning and inspecting the pipeline
Pipeline Barge	A maritime vessel used in the construction of subsea infrastructure. It serves to connect oil production platforms with refineries on shore.
Petroleum Production Agreement	PPA and PSA licences overlap each other to a large extent in both the Pande and Temane areas. The PPA licence applies to specific hydrocarbon bearing formations within these areas.
Public Participation Process	The process by which an organization consults with interested or affected individuals, organizations and government entities before making a decision.
Production Sharing Agreement	A licence that covers all other formations in the Temane and Pande geographical areas that are currently being considered for development, and also includes other fields and prospects where exploration and appraisal wells have been drilled but have not as yet been declared commercial.
Red Data	The IUCN Red List is a critical indicator of the health of the world's biodiversity
Riser	A flexible pipeline which transfers the light oil from the riser base on the seabed to the surface.
Riser Base	A subsea support structure to tie in the pipeline and connect to the umbilical.
Safety Exclusion Zone	A safety exclusion zone is an area extending from any part of offshore oil and gas installations and is established automatically around all installations, which protrude above the sea at any state of the tide. Subsea installations may also have safety zones, created by statutory instrument, to protect them. Vessels of all nations are required to respect them.
Scoping Report	A report in which key issues are identified from a broad range of potential concerns for inclusion in EIA process. The Scoping Report confirms the level to which identified issues should be studied and the areas affected.
Sulphur Oxides	Refers to all sulphur oxides, the two major ones being sulphur dioxide (SO ₂) and sulphur trioxide (SO ₃). Sulphur dioxide is a colourless gas with a pungent, irritating odour and taste. It is highly soluble in water forming weakly acidic sulphuric acid.
Subsea Isolation Valve	A valve that creates a safety barrier in case a part of a pipeline needs to be shut down. The main purpose of a Subsea Isolation Valve (SSIV) is to isolate the import of stabilised light oil to the FSO in the event of an emergency.
Tandem Mooring Hawser System	Offloading operation characterised by the relative "tandem" position between the FSO and the shuttle tanker. The bow of the shuttle tanker is connected to the stern of the FSO via a hawser.
Transmissivity	Fluid flow in porous media.
Turret Gantry	Bridge like structure on the deck above the turret.
Turret Mooring	The turret mooring system consists of a turret swivel assembly that is integrated into a vessel and permanently fixed to the seabed by means of a mooring system. This system allows the vessel to rotate around the fixed part of the turret into the direction of oncoming seas when the FSO requires protection from high winds, waves and strong currents.
Umbilical	A flexible hose providing hydraulic power and controls to the FSO.
Volatile Organic Compounds	Known as a large group of carbon-based chemicals that easily evaporate at room temperature. While most people can smell high levels of some VOCs, other VOCs have no odour.