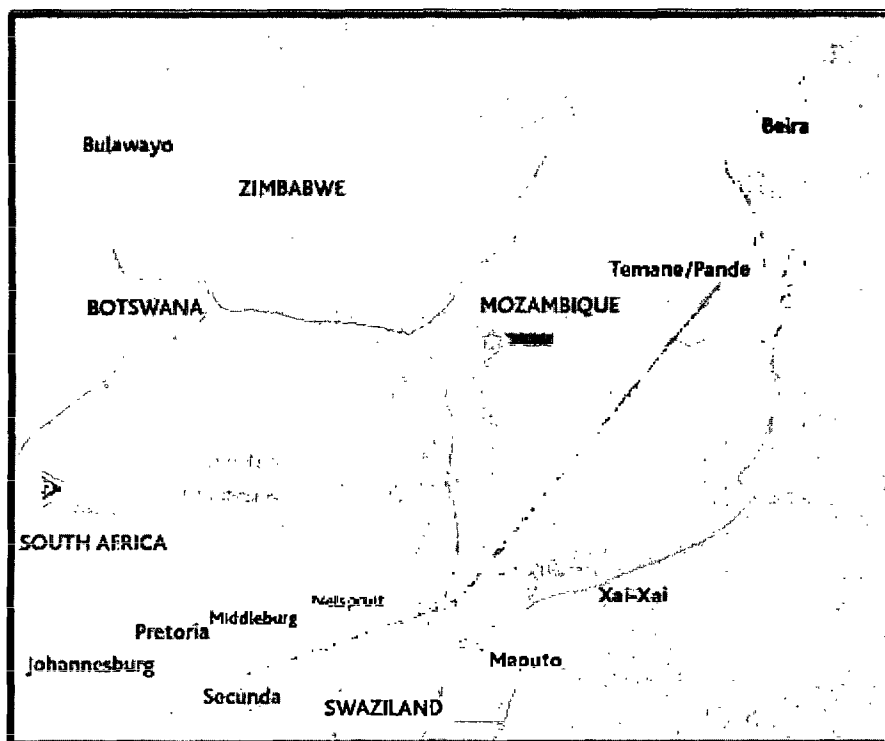


# NATURAL GAS PROJECT

## CONSOLIDATED EXECUTIVE SUMMARY AND UPDATE

July 2003

**E784**  
Volume 1



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### Explanatory Note on this Document

This document is submitted to the World Bank for purposes of meeting the financing requirements in accordance with the Safeguard Recommendations issued to Sasol by the World Bank in December 2002. Drafts of this document have been submitted to the World Bank and other stakeholders for inputs and comments prior to the finalisation of the documents, and comments have been noted, heeded or otherwise attended to. This document is submitted as a final version for clearance by the World Bank (AFTES), with submission to the World Bank Board for purposes of financing approval and disclosure at the Infoshop in Washington. The document will also be disclosed and made publicly available by Sasol in South Africa and Mozambique as required and explained herein in. The document reflects the status of the NGP as at the end of June 2003.

Reference made to Sasol as part owner and operator on the NGP (unless otherwise particularly stated or unless the context or usage in this document or any other document cross-referenced or summarised herein would indicate otherwise, in which case reference to Sasol in its context may refer to a particular business unit within the Sasol Group of Companies) herein refers to:

- *Sasol Gas Holdings (Pty) Limited*, the Guarantee Holder as defined in the Contract of Guarantee entered into with the Multilateral Investment Guarantee Agency on or about 20 December 2002 under No: 0384-01-01; and
- *The Republic of Mozambique Pipeline Investments Company (Pty) Limited (ROMPCO)* as the borrower under the Contracts of Guarantee to be entered into for non- shareholder loans and the long term financing agreements already concluded and those yet to be concluded as far as the pipeline portion of the Sasol Natural Gas Project (NGP) is concerned; and
- *Sasol Petroleum International (Pty) Limited (SPI)* as the Guarantee Holder defined in the Contract of Guarantee entered into with the Multilateral Investment Guarantee Agency on or about 20 December 2002 under No: 0384-01-02; and
- *Sasol Temane Limitada (SPT)* as the borrower under the Contracts of Guarantee to be entered into for non- shareholder loans and the long term financing agreements already concluded and those yet to be concluded as far as the *Upstream Portion* of the NGP is concerned.

The *Upstream Portion* of the NGP means the finance, development, exploitation, operation and maintenance of the natural gas fields at the Pande and Temane gas fields in Mozambique and the finance, design, construction, operation and maintenance of a central processing facility in Mozambique, to the extent undertaken by SPT.

The *Pipeline Portion* of the NGP refers to the design, development, financing, construction, ownership, testing, commissioning, operation and maintenance of the natural gas transmission pipeline, undertaken by ROMPCO.

To the extent that other parties are referred to herein, the following should be noted:

- such references form part of observations only;
- when recommendations are made to, involving, or implicating such parties, such references should not be construed to be binding on, or to form an obligation or potential obligation made by Sasol on behalf of the party concerned.

Sasol Company structures involved in the Natural Gas Project are illustrated below:

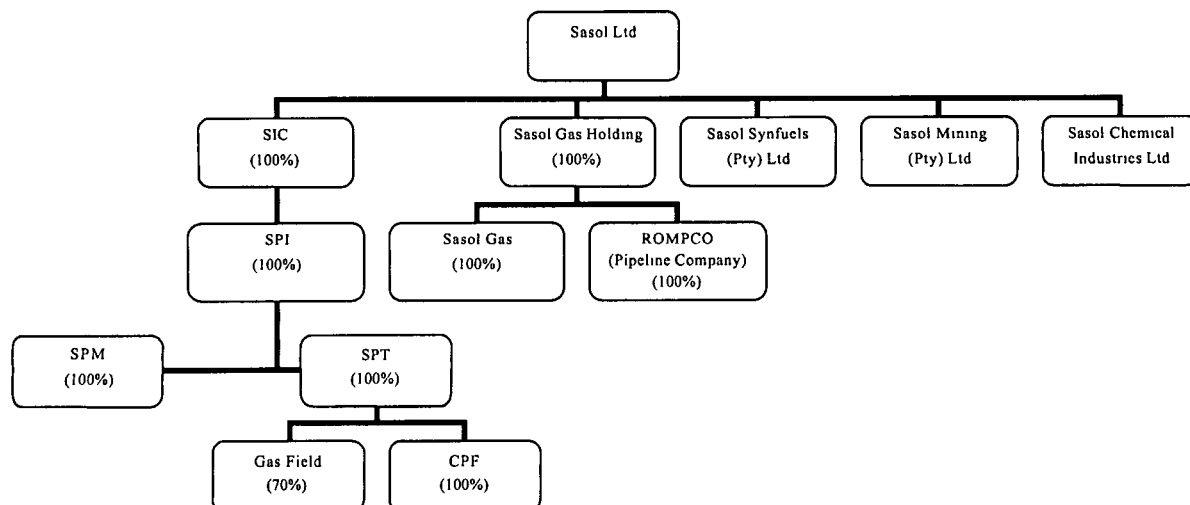


Figure 1: Sasol Company Structures Involved in the NGP

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## Acronyms

<b>ARA-SUL</b>	Administração Regional de Águas do Sul (Southern Regional Water Authority - Mozambique)
<b>AN</b>	Administrative Notice
<b>ASME</b>	American Society of Mechanical Engineers
<b>BEE</b>	Black Economic Empowerment
<b>CIF</b>	Community Interface Forum
<b>CMH</b>	Companhia Moçambicana Hidrocarbonetos SARL (80% owned by ENH, 20% by GOM)
<b>CPF</b>	Central Processing Facility
<b>DACE</b>	Department of Agriculture, Conservation & Environment (Provincial Department – Mpumalanga)
<b>DEAT</b>	Department of Environmental Affairs and Tourism (National Department – South Africa).
<b>DWAF</b>	Department of Water Affairs and Forestry
<b>EA</b>	Exploration Area
<b>EIA</b>	Environmental Impact Assessment
<b>EIR</b>	Environmental Impact Report
<b>EMP</b>	Environmental Management Plan
<b>EMS</b>	Environmental Management System
<b>ENH</b>	Empresa Nacional de Hidrocarbonetos de Moçambique, E.P (National Mozambique Oil and Gas Company)
<b>ESO</b>	Environmental Site Officer
<b>FS-DTEEA</b>	Free State – Department of Tourism Environment and Economic Affairs
<b>GJ</b>	Gigajoule
<b>GDP</b>	Gross Domestic Product
<b>GN</b>	Government Notice
<b>GOM</b>	Government of Mozambique
<b>GPS</b>	Geographical Positioning System
<b>HDD</b>	Horizontal Directional Drilling
<b>HIV/AIDS</b>	Human Immunodeficiency Virus / Acquired Immune Deficiency Syndrome
<b>I&amp;AP</b>	Interested and Affected Parties
<b>LVSDI</b>	Limpopo Valley Spatial Development Initiative
<b>MGC</b>	Matola Gas Company
<b>MGJ</b>	Million GigaJoules
<b>MICOA</b>	Ministry for the Co-ordination of Environmental Affairs (National Department – Mozambique)
<b>MTGE</b>	Medium Term Gas Expansion
<b>NDEA&amp;T</b>	National Department of Environmental Affairs and Tourism
<b>NEMA</b>	National Environmental Management Act (No. 107 of 1998)
<b>EMP</b>	Environmental Management Plan

<b>NFPA</b>	National Fire Protection Association
<b>NGE</b>	Natural Gas Expansion
<b>NGO</b>	Non Governmental Organisation
<b>NGP</b>	Natural Gas Project (encompassing the gas fields, the CPF and the gas pipeline)
<b>NO<sub>x</sub></b>	Nitrogen oxides
<b>NRC</b>	National Research Council
<b>PCD</b>	Public Consultation and Disclosure
<b>PPA</b>	Petroleum Production Area (consisting of the Pande and Temane gas field reservoirs (blocks) designated for development in terms of contractual agreements).
<b>PPS</b>	Pressure Protection Station
<b>PPZ</b>	Partial Protection Zone
<b>RESA</b>	Regional Environmental and Social Assessment
<b>RoD</b>	Record of Decision
<b>ROMPCO</b>	The Republic of Mozambique Pipeline Investment Company (Pty) Ltd
<b>RPIP</b>	Resettlement Planning and Implementation Programme
<b>SABS</b>	South African Bureau of Standards
<b>SCI</b>	Sasol Chemical Industries (Pty) Ltd
<b>SDAP</b>	Social Development Action Plans
<b>SDF</b>	Social Development Fund
<b>SEC</b>	Senior Environmental Consultant
<b>SIC</b>	Sasol Investment Company
<b>SMMEs</b>	Small, Medium and Micro Enterprises
<b>SPI</b>	Sasol Petroleum International (Pty) Ltd
<b>SPM</b>	Sasol Petroleum Mozambique
<b>SPT</b>	Sasol Petroleum Temane Limitada
<b>STD</b>	Sexually Transmitted Disease
<b>TEG</b>	Triethylene Glycol
<b>VAT</b>	Value Added Tax



## Terminology

<b>Baseline Information</b>	Information derived from data that records the existing elements and trends in a given environment and records the characteristics of a given project proposal
<b>Biophysical Environment</b>	That part of the environment that did not originate with and is not dependent on human activities
<b>Construction Right-of-way</b>	The temporary area within which the Contractor / Sasol will be required / permitted to work along the pipeline and flowlines in accordance with appropriate agreements reached and obtained for this purpose
<b>Contractors</b>	Reference to contractors in this Executive Summary, or in documents summarised or cross referenced in this document, should be construed to mean either the EPC (Engineering, Procurement and Construction Management Contract for the construction of the CPF and field gathering facilities) managed by Foster Wheeler South Africa (Pty) Ltd, or the EPC (Engineering, Procurement and Construction contract for the construction of the gas pipeline) as performed by GLMC (a company owned and incorporated in South Africa by Grinaker, LTA, McConnel Dowell, and Consolidated Contractors International as constituent shareholders)
<b>Environmental Impacts</b>	The consequences of the environmental aspects on environmental resources or receptors of particular value or sensitivity
<b>Environmental Consultant</b>	An independent consultant with experience in the execution of environmental impact assessments meeting the legal requirements that are or might be prescribed for this purpose
<b>Environmental Management Plan</b>	A plan adopted for purposes of managing or mitigating the environmental impacts explained in a related environmental impact assessment or report
<b>Environmental Management Plan Audit</b>	A systematic, documented objective evaluation of the environmental performance of a project regarding the execution of environmental responsibilities or obligations pertaining thereto, by objectively obtaining and analysing evidence to determine whether the implementation of the Environmental Management Plan conforms with its requirements
<b>Feedstock</b>	Raw material
<b>Flowlines</b>	Small diameter pipelines responsible for transportation of gas from the wellsites to the Central Processing Facility
<b>Maintenance Period</b>	A 12 to 18 month period following formal acceptance by Sasol in accordance with agreements reached and obtained in this regard.
<b>Machamba</b>	Subsistence farming plot as referred to in the RPIP
<b>Permanent Right-of-way</b>	An area that constitutes the permanent servitude, granting a right of way, to the holder in terms of the servitude agreement registered against the property owner's title deed
<b>Partial Protection Zone</b>	The area 50 m either side of the centre line of the pipeline within which the construction of new buildings is prohibited, and for which the exercise of any activity other than that for which the zone was defined, must be licensed
<b>Red Data Species</b>	The IUCN Red Lists of Threatened Species are a compilation of plant or animal species that are categorised as "Critically Endangered", "Endangered", or "Vulnerable" according to the IUCN Categories of Threat
<b>Socio-economic Environment</b>	That part of the environment that has its origin or being in human activities
<b>The Works</b>	All areas pertaining to the NGP within which Sasol's and the Contractor's activities will take place, including the right-of-way, access roads, campsites, borrow pits and the like

## FOREWORD

This document is a Consolidated Executive Summary and Update of the environmental and social impact assessments, other safeguard documentation required by the World Bank, and the Social Development Action Plan for Mozambique, prepared for and in relation to the Natural Gas Project (“NGP”). This document is prepared, submitted and disclosed in accordance with the Safeguard Recommendations issued to Sasol by the World Bank in December 2002.

The Sasol Natural Gas Project has been divided into eight separate elements, broadly divided into an upstream and downstream component. The upstream component includes all of the activities necessary to extract and process the gas in Mozambique, and to transport it to Sasol’s Secunda plant in South Africa. These include the Temane/Pande Gas Field Exploration in Mozambique, the Temane/Pande Gas Field Development, and the 865 km pipeline from Temane to Secunda, situated in both Mozambique and in South Africa. The downstream component of the project in South Africa, consists of the Interface at the Secunda Plant, the Natural Gas Expansion at Secunda, the Natural Gas Expansion of the Sasolburg Plant, and the Network Conversion.

During the course of the past three years, Sasol has commissioned a number of independent studies to evaluate the social and environmental effects of the NGP. These studies have been prepared in accordance with the requirements of environmental legislation in South Africa and Mozambique, as well as World Bank guidelines and policies. In addition, provision has been made for international best practice. These studies consist mainly of Environmental Impact Assessments (EIAs) and Environmental Management Plans (EMPs). The EMPs, as is best practice worldwide, followed from the EIAs and provide detailed recommendations for the management of all project-related impacts, both positive and negative.

This document presents summaries or excerpts of the project specific EIA’s and EMP’s reflecting the position and circumstances at the date of their preparation. All of the EIAs have been approved by the relevant Government authorities in Mozambique and South Africa, with the exception of one element of the project, namely the Secunda Interface, which has been exempted from EIA requirements by the South African environmental authorities on the

grounds that it will involve no significant impacts. Acknowledging the status of the documents as referenced in this report, updates are provided, where applicable, for the EIA’s and for the implementation of the EMP’s. The interrelationship between the EIA’s and other generic reports, as explained below, is also indicated in the document.

In addition to the project-specific EIAs and EMPs, several generic documents were also prepared which are referenced and summarised in this report. These include the following:

- A Regional Environmental and Social Assessment (RESA) intended as an investigation to address impacts that are regional in scale, indirect in nature and too broad to have been assessed in the individual project-specific EIAs. This document broadens findings of the EIA’s and the reader should be cognisant of the fact that the summaries of the EIA’s in Chapters 3-10 should be read together with the summary of the RESA in Chapter 11. The reader should further take note of the fact that, in addition to the EMP’s and the EIA’s, the RESA also contains additional recommended actions regarding the management or mitigation of impacts.
- A Resettlement Planning and Implementation Programme (RPIP), documented in a comprehensive series of reports providing a framework and procedure for the equitable and fair treatment of all parties affected by the NGP, insofar as resettlement and compensation for property right infringement are concerned. Since this programme has mainly covered all of the upstream components of the NGP in Mozambique, it has been documented separately from the project-specific EIAs. The reader should thus be cognisant of the fact that the resettlement and compensation aspects relating to the specific project components have been addressed separately in Chapter 13 of this document. The updates provided in Chapters 3 – 8, however, also explain updates relating to resettlement and compensation issues where relevant.
- A Social Development Action Plan (SDAP), which is Sasol’s blueprint and strategy for social development in Mozambique and South Africa, and which gives effect to Sasol’s Corporate Social Investment Policy. The SDAP is summarised in

Chapter 14 of this document. The SDAP is in addition to Sasol’s commitment to train and maximize the utilization of local people, either directly or as service providers.

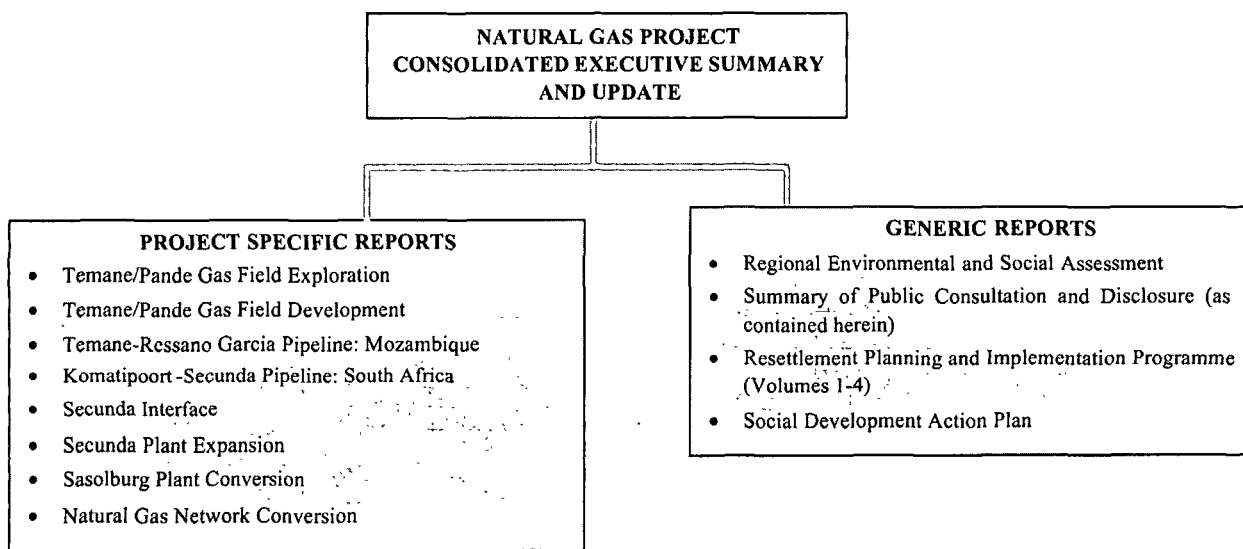
- A report on Public Consultation and Disclosure followed and adopted for all the documents referenced in this report, a summary of which is contained in Chapter 12 of this report.

The purpose of this report – the Consolidated Executive Summary and Update – is to provide readers with a comprehensive overview of the environmental and social assessment undertaken for the project, and the recommended actions that have flowed from the work, both to manage and mitigate potentially negative impacts and, where possible, to enhance positive impacts. It is important for the reader to be aware that while the summary is structured in a manner that reflects the “recommended actions” proposed by the individual EIAs, EMP’s or other documents such as the RESA, these actions have been committed to by Sasol, and are being, or will be,

implemented during the construction and operational phases of the project. The commitment statements contained in the relevant documents referenced herein enshrine this.

For ease of reference, this report has been divided along the same lines as the impact assessments and generic documents referred to above. It is also structured to meet the World Bank’s requirements for financing of the project. The reader is referred to the Document Map in Figure 2 and the individual report chapters, each of which deals with one of the reports referenced in the Document Map.

In total, the twelve chapters of the Consolidated Executive Summary and Update provide a thorough overview of the documentation that has been publicly disclosed, the impacts that have been forecast (with updates), the actions necessary to manage the impacts, and the implementation of these actions to date.



**Figure 2: Overview of Suite of Technical Reports for the NGP**

*Note: The full set of project documents appear on the Sasol website at [http://w3.sasol.com/natural\\_gas/](http://w3.sasol.com/natural_gas/)*

**Sasol's Statement of Commitment to Environmental and Social Responsibilities and Obligations on the NGP**

As a leading player in the South African economy and main sponsor of the NGP, Sasol prides itself in conducting its business activities as a responsible company with respect and care for people and the environment. Sasol recognises that the NGP's operations and activities, as well as those of its partners, may have impacts on the environment and people, both in South Africa and Mozambique. Therefore, safety, the protection of the environment and the responsible management of the social, regional and cumulative impacts of the NGP formed and will continue to form an integral part of Sasol's planning, decision making and management with regard to the NGP and the roll-out thereof.

In this regard, Sasol takes note of and acknowledges the assessments, studies, findings, observations, conditions, recommendations and proposals explained in the project specific documents and the generic documents, referenced and summarised in this Consolidated Executive Summary and Update. Sasol recognises that these documents give rise to or are potential sources of obligations and responsibilities for Sasol, whether legally binding, adopted and integrated into management systems such as ISO 14001 or otherwise committed to in terms of the Sasol Safety, Health and Environmental (SHE) Policy.

Sasol accepts its duty of care and responsibility to manage/mitigate the significant social and environmental impacts identified and explained in the project specific and generic documents referenced herein, directly associated with the NGP and that are within its control. This commitment has already and will continuously be effected by Sasol within the ambit, scope or objectives of any or all of the following:

- Honouring its obligations and responsibilities arising from the Social Development Action Plan (SDAP), The Regional Environmental Social Assessment (RESA), The Resettlement Planning and Implementation Programme (RPIP), undertakings with regard to public consultation and disclosure and the commercial and financing agreements pertaining to the NGP;
- Internationally recognised safety, health and environmental management systems to heed and give effect to, *inter alia*, the responsibilities and obligations arising from the proposed mitigatory measures, proposed recommendations, environmental management plans, authorisations and other requirements arising from the various project specific and generic documentation;
- Governance mechanisms, such as independent environmental compliance audits during the construction and operation phases of the NGP as explained in and adopted from project related environmental management plans;
- Adopting the precautionary principle and implementing best practices, risk management measures, best available technology or best practicable environmental options;
- Complying with, as a minimum, all applicable legal and other adopted and agreed requirements;
- Continuous engagement through specifically established task teams with the relevant authorities, the interested and affected communities and other stakeholders, promoting dialogue about safety, health, environmental and social development performance to ensure continuous improvement;
- Providing appropriate and responsible resources required to implement the above.

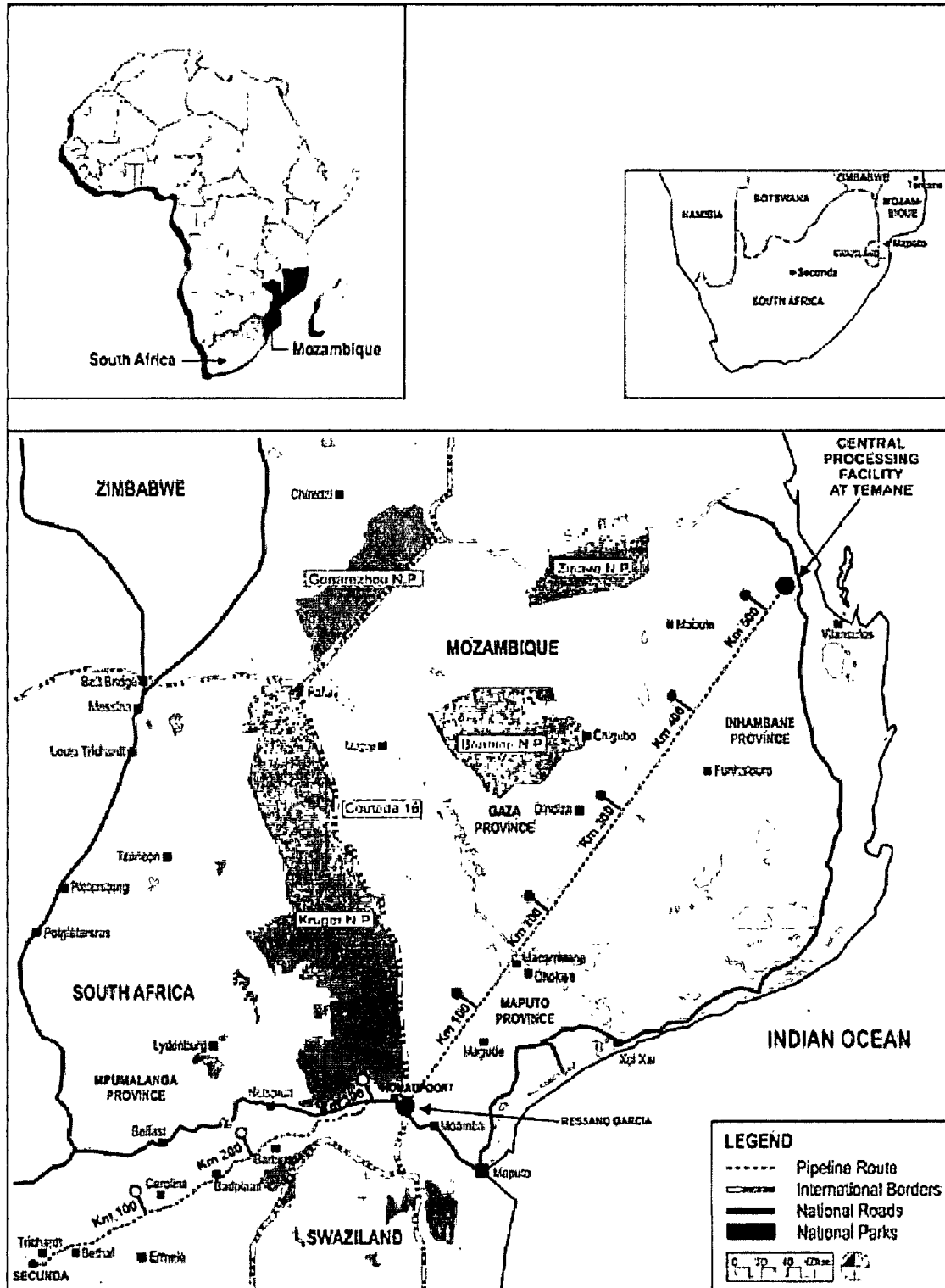
Sasol further recognises that this commitment will require a dynamic approach, which will be adaptable, adjusting to changing circumstances including the availability of new information and the sharing of knowledge and further consultation with stakeholders, including partners, communities and the governments concerned.

Aspect of Development	Stage of Completion (%)		
	Design	Construction	Operation
Temane/Pande Gas Field Exploration	100	N/A <sup>1</sup>	20
Temane/Pande Gas Field Development	100	83	0
Pipeline between Temane and Ressano Garcia: Mozambique	93	82	0
Pipeline between Komatipoort and Secunda: South Africa	93	61	0
Secunda Interface	95	40	0
Secunda Plant Expansion	100	70	0
Sasolburg Plant Conversion	94	25	0
Natural Gas Network Conversion	95	25	0

Table 1: Status of the Natural Gas Project (19 June 2003)

<sup>1</sup> Current drilling activities form part of the expansion of the gas reserves.

Figure 3: Locality Plan



## Natural Gas Project – Document Map<sup>2</sup>

### TEMANE/PANDE GAS FIELD EXPLORATION

Briefing Document and Terms of Reference as in Temane / Pande Gas Field Development<sup>2</sup>  
 Seismic Exploration Exploratory and Development Drilling Environmental Impact Study (January 2001)  
 Environmental Management Plan - Chapter 10  
 Record of Decision (February 2002)

### TEMANE/PANDE GAS FIELD DEVELOPMENT

Briefing Document (July 2000)  
 Terms of Reference for an Environmental Impact Study Rev 02 (January 2001)  
 Environmental Impact Study Vol. 1 - Main Report (August 2001)  
 Environmental Impact Study Vol. 2a – Specialist Reports (August 2001)  
 Specialist Report 01: Environmental Design Review  
 Specialist Report 02: Impact on Air Quality  
 Specialist Report 03: Impact on Hydrology  
 Specialist Report 04: Impact on Flora and Fauna  
 Specialist Report 05: Impact on Socio-Economics  
 Specialist Report 06: Impact on Land Rights, Agriculture and Settlement  
 Specialist Report 07: Impact on Public Health and Social Pathologies  
 Specialist Report 08: Impact on Archaeology  
 Specialist Report 09: Impact on Public Safety  
 Specialist Report 10: Impact of Noise  
 Specialist Report 11: Impact on Sense of Place  
 Specialist Report 12: Impacts on the Marine Environment  
 Environmental Management Plan: Design (November 2002)  
 Environmental Management Plan: Construction (February 2002)  
 Environmental Management Plan: Operation (May 2003)  
 Record of Decision (February 2002)

### PIPELINE BETWEEN TEMANE AND RESSANO GARCIA: MOZAMBIQUE

Briefing Document (May 2000)  
 Corridor Screening Report (August 2000)  
 Terms of Reference for an Environmental Impact Study (October 2000)  
 Environmental Impact Study Vol. 1 - Main Report (August 2001)  
 Environmental Impact Study Vol. 2 – Specialist Report (August 2001)  
 Specialist Report 01: Impact on Terrestrial Habitats, Flora & Fauna  
 Specialist Report 02: Impact on River Systems  
 Specialist Report 03: Impact on Agriculture, Settlement and Other Land Use  
 Specialist Report 04: Socio-Economic Impacts  
 Specialist Report 05: Impact on Cultural Heritage  
 Specialist Report 06: Public Health and Safety  
 Environmental Management Plan – Part 1: Design (November 2001)  
 Environmental Management Plan – Part 2: Construction (November 2001)  
 Environmental Management Plan – Part 3: Operation and Decommissioning (November 2001)  
 Environmental Management Plan – Part 4: Environmental Impact Monitoring (November 2001)  
 Environmental Management Plan – Part 5: Supporting Documentation (November 2001)  
 Record of Decision (April 2002)

<sup>2</sup> This document map explains all documents required to be summarised or referenced, as explained in the *Safeguard Recommendations* issued by the World Bank to Sasol in December 2002, for purposes of the drafting of this *Consolidated Executive Summary and Update*. The documents were developed in accordance with Sasol's applicable policies, and in consultation with the relevant authorities and stakeholders, to meet the legal requirements in this regard in Mozambique and South Africa and to meet the financing requirements of the World Bank. Note that the terms Environmental Impact Assessment (South African Law) and Environmental Impact Study (Mozambican Law) are used interchangeably. The Environmental Impact Studies/Reports/Assessments, Environmental Management Plans, Records of Decision and generic documentation, *inter alia*, give rise to or are potential sources of obligations and responsibilities for Sasol, whether binding by law or otherwise committed to in terms of the Sasol Safety Health and Environment (SHE) Policy of Sasol. The documentation is available on the Sasol Natural Gas Website ([http://w3.sasol.com/natural\\_gas/](http://w3.sasol.com/natural_gas/)). Some of the generic documents (such as the RESA and the RPIP) are still being finalised. The final versions for public disclosure will be posted on the website. Note that the Temane / Pande Gas Field Exploration and Temane / Pande Gas Field Development were considered as one project for purposes of the Briefing Document and Terms of Reference stages of the Environmental Impact Assessment. Further note that, based on the initial scoping prepared for the Secunda Interface, no further studies or an environmental management plan were required. DEAT granted Sasol exemption, as provided for in terms of the legal framework, from conducting and submitting these studies prior to issuing the Record of Decision, due to the minimal and non-significant potential impacts of this part of the project. Therefore the document map contains no reference to an EIA or EMP for the Secunda Interface part of the NGP.

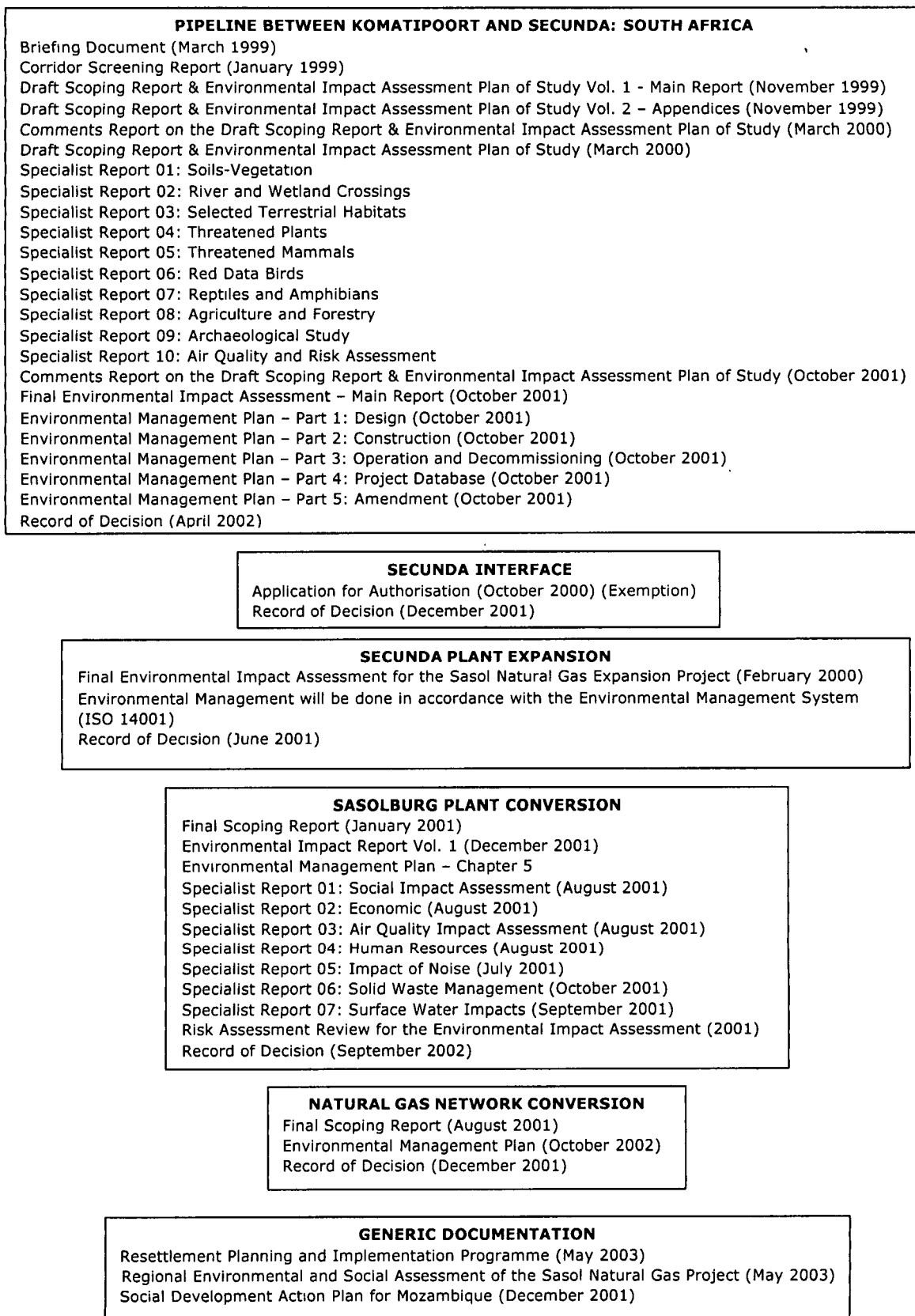


Figure 4: Detailed Document Map of Technical Reports for the NGP

## 1. The Natural Gas Project: An Overview

The Natural Gas Project (NGP) is an ambitious venture that involves the extraction, processing and effective utilisation of the natural gas reserves in the Inhambane Province of Mozambique. The Project includes the further exploration and development of the gas fields, the establishment of a central processing facility (CPF) at Temane, and the construction of an 865-kilometre (km) cross-border pipeline between Temane in Mozambique, and Secunda in South Africa. The project also entails the conversion of the Sasol network in South Africa, the conversion of the Sasolburg factory to process gas as its hydrocarbon feedstock, and the conversion of Sasol's Secunda factory to process gas as a supplementary feedstock.

The inception of the NGP follows the signing and implementation of a series of landmark agreements and undertakings during the last three years between the governments of Mozambique and South Africa, Sasol and *Empresa Nacional de Hidrocarbonetos de Moçambique* (ENH). The agreement to produce and export natural gas resources to South Africa was made public on 26 October 2000. In addition to funding a portion of the project from cash flow, Sasol will be raising about 30% of the project venture capital through international funding.

Construction of the 865-km cross-border pipeline to transport gas to South Africa commenced in June 2002. The first supply of natural gas is scheduled to reach Secunda – the home of Sasol's coal-based synthetic fuels and chemical feedstock manufacturing operations – during February 2004. On the basis of the currently known extent of the natural gas reserves, as well as the projected consumption by South African and Mozambican customers, Sasol envisages the venture having a lifespan of at least 25 years.

### Project Benefits and Rationale

The project holds important socio-economic benefits for Mozambique and South Africa, as well as potentially being a catalyst for development in the Southern African Development Community (SADC).

#### *Benefits to the Mozambican economy*

Mozambique stands to benefit from the economic stimuli associated through the new job opportunities, the additional revenue from royalties and taxes, the development of infrastructure and the optimisation of

local content. The use of royalty gas taken in kind by the government of Mozambique (GOM) could serve as a valuable catalyst for developing other economic areas.

#### *Stimulating South African Economic Growth*

During the project's lifespan the South African economy will benefit from the development of a natural gas energy industry and market. This should contribute to GDP growth, job creation, an increased tax base, and black empowerment.

#### *Promoting Black Economic Empowerment*

Black Economic Empowerment (BEE) is becoming an increasingly important component of business activities in South Africa. Similarly, in Mozambique, the government is endeavouring to encourage and support the development of existing and new private enterprises. As part of this project, Sasol and NGP contractors and suppliers are striving to maximise the participation throughout the supply chain of South African BEE companies and Mozambican private companies. In addition, Sasol and the governments of Mozambique and South Africa are seeking opportunities to engage South African BEE companies and new Mozambican private enterprises as shareholders in the gas pipeline and field facilities.

#### *Potential for Under-utilised Gas*

Gas is an under-utilised energy source in Southern Africa. Compared with the international average of between 15% and 20% of energy usage (and growing), South Africa's gas consumption forms only 2% of the national energy pool. The gas distribution networks that currently exist in the province of Gauteng in South Africa carry hydrogen- and methane rich gas, which has a lower heating value per volume unit than natural gas. A secure supply of natural gas will provide Sasol with greater feedstock flexibility, allowing the company to support the anticipated growth in the pipeline gas industry in South Africa and to initiate and support new gas-based ventures.

#### *Improved Environmental Performance*

The conversion to natural gas at Sasolburg will contribute towards improved air quality in the Vaal Triangle industrial area, with decreases in emissions of sulphur dioxide, nitrogen oxide, carbon dioxide and particulates, as well as the elimination of odorous hydrogen sulphide emissions.



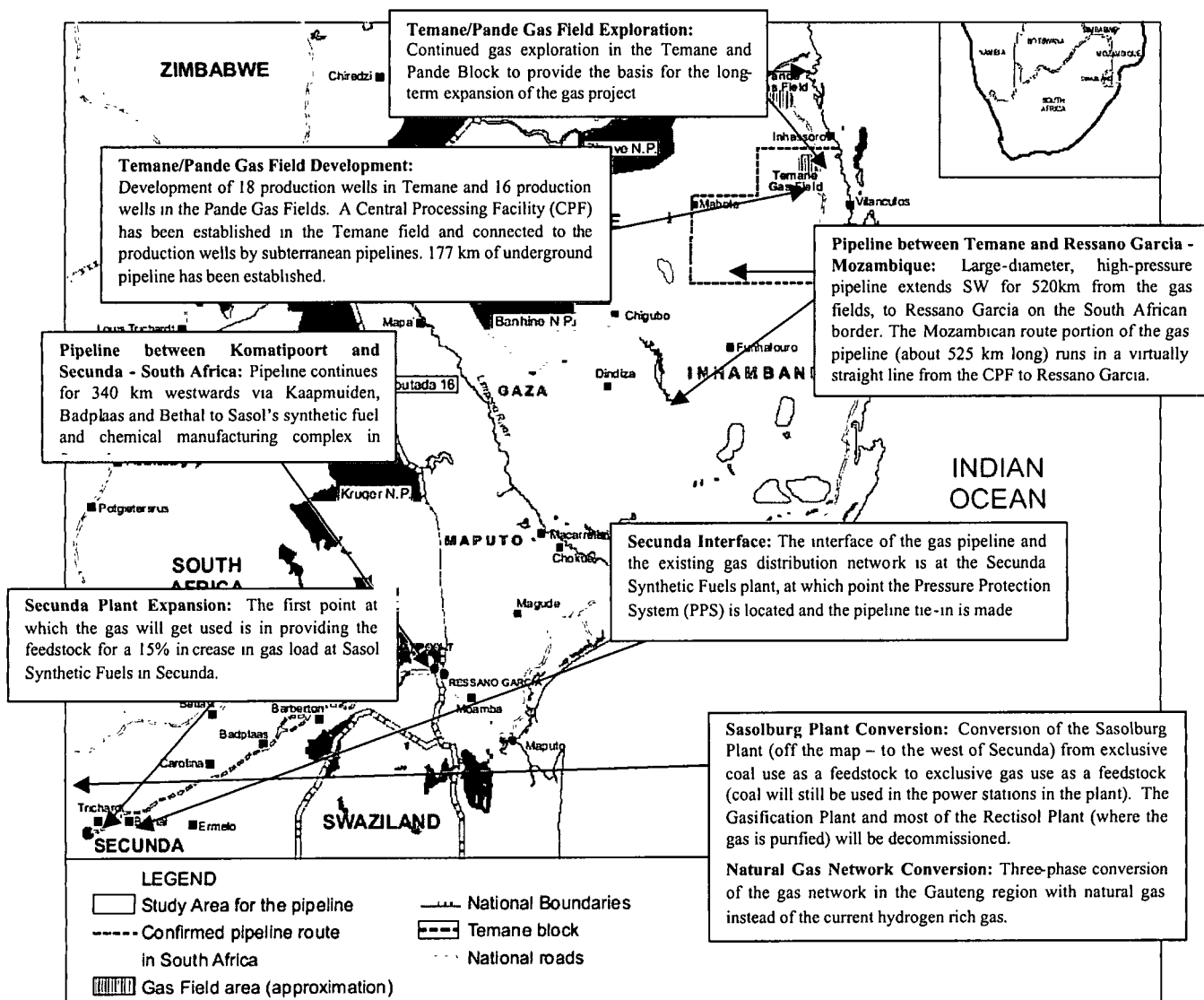


Figure 5: Map of the NGP project components in Mozambique and South Africa

**Key Project Features**

The project is divided into the following eight individual but integrated projects:

- Continued exploration in and around the Temane and Pande gas fields;
- Development of the gas fields, including establishing the CPF at Temane;
- Constructing the transmission gas pipeline between Temane and Ressano Garcia;
- Constructing the transmission pipeline between Komatipoort and Secunda;
- Interface of the pipeline at Secunda into the Sasol network;
- Natural gas expansion at Secunda;
- Conversion of the Sasol chemical plant at Sasolburg to replace coal with natural gas as its sole hydrocarbon feedstock; and

- Conversion of the gas network in the province of Gauteng to pipe natural gas instead of hydrogen-rich gas derived from coal.

The location of these various components is illustrated in Figure 5. A brief summary of each of the various project components is provided below.

**Temane / Pande Gas Field Exploration<sup>3</sup>**

The presence of gas reserves of the Temane and Pande fields just north of the town of Vilanculos (400 km north of Maputo) has been tested extensively. Sasol Petroleum International Ltd (SPI), through its Mozambican subsidiary company *Sasol Petroleum*

<sup>3</sup> GOM, ENH, SPT and SPM have concluded two agreements for the gas fields and exploration acreage. A Petroleum Production Agreement has been signed for the unified Pande and Temane gas reservoirs by SPT, while a Production Sharing Agreement has been signed for the exploration acreage in the remainder of the two blocks by SPM.

*Temane Limitada* (SPT), commenced seismic surveying and drilling in 1998. The company continues to play a pivotal role in advancing the NGP. Through a 70:30 partnership with an ENH subsidiary company, *Companhia Moçambicana Hidrocarbonetos* (CMH), SPT is drilling additional production wells in the Temane and Pande fields to enable commercial production to start during January and February 2004.

Sasol has received all the required governmental approvals for appraisal and development in the Temane and Pande gas fields. In terms of such future activities to be undertaken in the Temane and Pande gas fields, approval has provisionally been granted subject to meeting the requirements that might be issued by the authorities, including the development of detailed specific Environmental Management Plans for the management of the related environmental impacts that may arise. In undertaking these future activities, Sasol is committed to adhering to the same principles already encapsulated in other project-related approvals / authorisations and related documents and plans.

#### **Temane / Pande Gas Field Development<sup>4</sup>**

During the lifespan of the Temane gas field, it is planned that gas will be produced from 16 strategically located vertical wells. The Pande gas field will be brought on stream in 2007, three years after the Temane field has commenced production. By that time, the pressure of the Temane reservoir should have dropped to a level equalling that of the Pande field. The Pande field will require the drilling of 18 wells, to bring the total number of wells in Temane and Pande to 34. The first five Temane wells have been temporarily plugged and will be completed once full-scale gas production begins in 2004. The full-scale field development drilling programme is expected to run throughout 2003.

The gas will be gathered on the surface and cleaned and compressed at a CPF at Temane before being delivered to the pipeline for transmission. The engineering, procurement and construction management of the CPF is being undertaken by an appointed contractor, Foster Wheeler South Africa (Pty) Ltd. The CPF will be established in the Temane field and linked to the production wells by 177 km of buried flowlines. The Temane field will require 81 km

<sup>4</sup> The Gas Field development in Mozambique is regulated by the Petroleum Production Agreement (GOM, ENH, SPT and CMH) and the Joint Operating Agreement between SPT and CMH for the development of the Petroleum Production Area ("PPA"). The former agreement grants

of flowlines, while Pande will require a further 96 km of flowlines.

The CPF's main functions include:

- Liquid separation to remove condensates from the extracted gas;
- Dehydration to remove small amounts of water;
- Hydrocarbon dewpoint control to prevent the gas from changing phase or re-liquefying in the pipeline;
- Gas compression to facilitate transportation;
- Gas metering to continuously monitor and record gas production; and
- Three-phase liquid separation of the removed condensates to produce three streams – gas, water and hydrocarbon condensate.

#### **The Natural Gas Pipeline<sup>5</sup>**

Sasol has almost completed construction of an 865-km-long high-pressure steel pipeline. Without initial intermediate compression, the gas pipeline will have a capacity of 122 million Gigajoules per year.

Initial capital cost for the gas pipeline is estimated at about US\$400 million. Sasol has appointed a contractor, GLMC, consisting of the multinational consortium of *Grinaker-LTA* (South Africa), *McConnell Dowell* (Australia) and *CCIC* (Lebanon), to undertake the engineering, design, procurement, construction and commissioning of the pipeline agreement. The Pipe Supply Contract was awarded to a consortium comprising *Europipe* and *Itochu. Hall Longmore* (South Africa), *Kawasaki* (Japan) and *Salzgitter* (Germany) manufactured portions of the pipe material. These contracts commenced towards the end of 2001. As outlined elsewhere in the report, these activities have been an important source of jobs for skilled and semi-skilled people in Mozambique and South Africa during construction.

#### **Pipeline between Temane and Ressano Garcia: Mozambique**

The Mozambican route portion of the gas pipeline (nominally 520 km long) runs in a virtually straight

SPT and CMH exclusive rights for the development, production and disposal of reserves in the Pande and Temane Field Reservoirs

<sup>5</sup> In terms of a Pipeline Agreement concluded in 2000, the GOM granted ROMPCO authorization to finance, construct, own and operate the Pipeline System in accordance with the Pipeline Development Plan; to conduct Natural Gas transportation and related activities in respect of the Pipeline System, and to occupy the Pipeline Corridor for the conduct of the Pipeline Operations. The Government of South Africa signed two regulatory agreements governing the regulatory environment to enable the introduction of natural gas into South Africa. Subsequent Gas

line from the CPF at Temane near Vilanculos, to the South African border at Ressano Garcia. The pipeline traverses the province of Inhambane in Mozambique, from the Temane gas field, crossing the Limpopo River near the towns of Macarretane and Chokwe and the Inkomati River further south, before crossing the border into South Africa near the town of Ressano Garcia. Five take-off points have been provided for, at Ressano Garcia / Maputo, Magude, Macarratane, Chigubu / Funhalouro, and Temane.

#### ***Pipeline between Komatipoort and Secunda: South Africa***

The gas pipeline continues for a distance of about 340 km in South Africa from the border town of Komatipoort, via Kaapmuiden, Badplaas and Bethal, to Sasol's synthetic fuel and chemical manufacturing complex in Secunda, the province of Mpumalanga, where it links up to the existing Sasol distribution network. All servitude agreements for the pipeline in South Africa have been concluded and construction has commenced.

#### ***The Secunda Interface***

The interface of the gas pipeline and the existing gas distribution network is at the Sasol plant in Secunda, at which point the Pressure Protection Station (PPS) is located and the pipeline tie-in is made. The system has two functions, namely to control gas pressure and remove condensates that may have accumulated in the gas during transmission. A portion of the gas will be used by Sasol as a supplementary feedstock.

#### ***Secunda Plant Expansion***

The first point at which the gas will be used is in providing the feedstock for a 3% increase in gas load at Sasol in Secunda.<sup>6</sup> Existing coal use will remain unchanged with coal to gas conversion remaining a central activity. The natural gas requires processing to give it the same properties as the synthetic gas that is used for liquid fuels production. The process involves sulphur removal, and gas reforming (into hydrogen, carbon monoxide and carbon dioxide).

#### ***Sasolburg Plant Conversion: Sasolburg***

An important component of the project is the conversion of Sasol's plant in Sasolburg from exclusive coal use as a feedstock to gas use as a feedstock (coal will still be used in the power stations in the plant). As a result of this initiative, the

Gasification Plant and most of the Rectisol Plant (where the gas is purified) will be decommissioned.

The Sasolburg plant currently produces coal-based fuel gas at an annual rate of about 52-million GJ. Sasol sells about 50% of this current annual gas production (about 28-million GJ) to customers in the province of Gauteng. Once the Sasolburg plant converts from coal, it will convert natural gas at an initial rate of about 39-million GJ a year.

#### ***Natural Gas Network Conversion***

Sasol currently supplies coal-based fuel gas to about 500 industrial users in the PWV area as well as 13000 domestic users via *Egoli Gas*. The network comprises some 1 500 km of pipeline. Where coal-based fuel gas is rich in hydrogen, natural gas is rich in methane and as a result, has a higher heating value per volume unit. For this reason the gases cannot be mixed.

With the exception of the *Egoli Gas* domestic market in Johannesburg, the established Sasol customers will be converted to the natural gas supply by 2004 in accordance with agreements to be concluded. The existing 13 000 *Egoli Gas* customers will continue to receive hydrogen-rich gas produced by the Sasolburg plant via a specially constructed pipeline. Natural gas will be delivered to South Africa at an initial annual rate of about 80-million GJ, before growing to about 120-million GJ annually in the shorter term in line with projected market growth.

From Secunda, almost half of the initial natural gas baseload will be piped through the existing gas network to Sasolburg. Here, the Sasolburg plant will reform the gas and convert it downstream into chemicals, including waxes, ammonia and solvents. The Sasolburg plant will reform about 39-million GJ of natural gas a year.

#### ***Safety and Risk Management Aspects of the NGP***

Safety and risk management forms an integral part of all of Sasol's operations globally. This is enshrined in Sasol's Safety, Health and Environmental Policy (SH&E Policy; see Box 1), and demonstrated by the company's active implementation of the international chemical industry's Responsible Care programme. A practice management code on process safety will also be adopted and implemented as part of this programme.

In effecting the SH&E policy, Sasol has implemented comprehensive safety and health management systems

Transportation and Gas Sales Agreements have also been concluded between SPT, CMH, Sasol and ROMPCO.

<sup>6</sup> An EIA has been conducted to use feedstock up to 15% above the current baseload.

at all of its relevant operations. These systems comprise internal procedures and processes relating, *inter alia*, to risk identification, the implementation of work instructions and operational procedures, employee training programmes, incident report and management systems, and periodic auditing and reporting.

Sasol has undertaken various measures aimed at ensuring that proper safety and risk management systems and procedures are in place throughout the different phases of the NGP. These measures have included appropriate design requirements, risk assessments, safety management systems, and monitoring and emergency response procedures.

In terms of risk assessment procedures, Sasol has, as a baseline, fully implemented the requirements Major Hazard Installation (“MHI”) Regulations in South Africa, and is in the process of ensuring full compliance with the Regulations in Mozambique. Sasol adopted the MHI requirements for its activities in Mozambique as well as in South Africa, since these requirements are far more stringent than the safety requirements under the Mozambican law. For this reason, Sasol also adopted internationally accepted codes of practice on safety.

The MHI Regulations provides, *inter alia*, for the following actions and procedures, applicable to the CPF and the pipeline considered to be major hazard installations:

- Providing notification to national, provincial, and local government institutions on the installation prior thereto;
- Undertaking a risk assessments prior to constructing the major hazard installation and thereafter at intervals not exceeding five years or when changing circumstances require such;
- Establishing an on-site emergency plan and undertaking review thereof at least once every three years;
- Reporting risk and emergency occurrences to the relevant authorities and collaborating with them regarding off site emergency response;
- The prohibition by local government of new major hazard installations at a separation distance which poses a risk to airports, neighbouring independent major hazard installations, housing and other centres of population, or any other similar facility.

Based on the risk assessments, development restriction zones were also instituted for safety and maintenance reasons. Section 3.2.6 of the RESA provides more detailed background information on this issue.

In addition to complying with the emergency response measures of the MHI Regulations, Sasol also operates a “Sasol Emergency Call Centre”, which aims to co-ordinate all requests for assistance regarding incidents involving Sasol’s products and materials. The Call Centre captures all relevant information and requests, activates the agreed integrated response protocols and procedures, and maintains an up-to-date database of all reported incidents.

In addition to the above, Sasol also implemented a communication strategy via the Public Liaison Team (PLT) for the purposes of ensuring proper communication with, and information dissemination to, stakeholders and affected individuals and communities along the pipeline route regarding safety and pipeline encroachment issues.

The CPF and pipeline will only be deemed ready for operation once the following procedures and plans have been prepared, approved, and implemented, and personnel have received appropriate training in their application:

- Operating, maintenance and repair procedures;
- Safety and Operating Plans, including Emergency Communication and Response Plans;
- Internationally accepted code of practice on leaks and ruptures;
- An Environmental Code of Practice; and
- Systems have been tested with at least one mock emergency.

Sasol is further committed to its responsibilities arising from the actions, relating to safety issues on the NGP, as explained in section 3.2.6.5 of the RESA. Refer to Chapter 11 of this document for more detail.

#### **Safety and Risk Management at the CPF**

A comprehensive risk assessment – covering safety, health and environmental issues – was undertaken prior to the construction of the CPF. As is outlined in more detail in Chapter 4, the findings of this risk assessment have been incorporated into the design and construction activities of the CPF (see e.g. Table 6).

In terms of the operation of the CPF, Sasol is currently finalising the development and implementation of an

integrated management system for health, safety and environmental issues. As at the beginning of July 2003, this management system was deemed to be 70% complete. This management system is aimed at ensuring compliance with relevant legislation and internationally acceptable codes of practices adopted, including in particular the South African Occupational Health and Safety Act and its regulations and the ASME codes and standards. The management system has also been developed on the basis of the requirements of ISO 9001:2000, ISO 14001, and OHSAS 18001. Implementation of the system will be audited internally and externally frequently. The fire and explosion risks will be managed through the utilisation of safety devices on equipment and the implementation of fire prevention practices in accordance with the standards of the US National Fire Protection Association (NFPA).

**Safety and Risk Management of the Pipeline**

The entire pipeline from the gas fields to Secunda has been designed according to the international accepted safety standards and requirements of the American Society for Mechanical Engineers Code (ASME B31.8) relating to gas transmission and distribution piping systems.

This code makes explicit provision for a range of safety considerations aimed at addressing the possible causes and consequences of failure, and at ensuring

the integrity of the pipeline. The code covers such aspects as: design, installation and testing; materials and equipment; welding practices; piping system components and fabrication details; operating and maintenance procedures; and corrosion control.

The pipeline design code also makes provision for population density requirements that have been factored into the pipeline agreement and pipeline developments plans signed between Sasol and the GOM. In terms of this agreement, various pipeline Exclusions Zones have been set aside with the aim of minimising the potential for any harm in the event of an incident. (See Box 5).

The pipeline's integrity will be assured through the introduction of an effective preventative maintenance plan that has been developed on the basis of guidelines contained in ASME B31.8 as well as Sasol's extensive experience. Technology is available to perform pipeline integrity evaluation test and predetermined intervals. This will be considered taking into account such issues as: area classification, uncontrolled third party activity, pipeline failures, pressure and temperature cycling, overpressure protection, above ground facilities and pressure vessel inspection reports. Sasol is currently in the process of evaluating for implementation the ASME B31.8S-2001 Code (Supplement to ASME B31.8) as the criteria for a Pipeline Integrity Management System.



Photograph 1: Changane River floodplain, vicinity of pipeline crossing

## 2. Environmental Impact Assessment Approach

### Introduction

The environmental and social impacts of the NGP have been studied in depth since the inception of the project in 2000. Sasol's approach to the assessment of the NGP's environmental impacts is based on its mission to generate sustainable growth while recognising the requirement to act responsibly towards the environment.

In order to comply with the regulatory requirements in Mozambique and South Africa and in following other adopted policies, guidelines and standards, reputable independent environmental consultants were retained to perform Environmental Impact Assessments (EIAs) required for components of the NGP.

The accompanying documentation relating to the EIAs and the environmental management plans (EMPs) – listed as project specific documentation in Figure 2 – provides the details of the work carried out for each of the project components. It also provides information on the more generic aspects such as public consultation and disclosure, and resettlement and compensation. The key findings of the EIAs and EMPs, as well as updates on these, are summarised for purposes of this Consolidated Executive Summary

and Update. All the EIA and EMP summaries presented in this document are presented as they were assessed in the EIA phase of the NGP.

A total of seven separate EIAs were conducted for the NGP. This separation was deemed necessary to accommodate the geographic spread of the project activities across the national and provincial borders, to facilitate effective project management, and to meet the relevant legal requirements in this regard.

Based on the initial scoping report prepared for the Secunda Interface component of the NGP and submitted to the provincial Department of Environmental Affairs and Tourism (DEAT) in South Africa, DEAT granted Sasol exemption from preparing and submitting comprehensive EIAs and an EMP. This exemption was granted due to indications from the scoping report that the impacts of this project activity are minimal and non-significant.

The EIAs were executed in compliance with and taking cognisance of the legal requirements, policies, standards, guidelines, to ensure that not only legal compliance was ensured, but also that international best practice were followed.

#### Box 1: Sasol's Safety, Health & Environmental Policy

We, the people of Sasol, striving for excellence in all we do, recognise the impact that our activities can have on people and the environment. Safety, health and protection of the environment will form an integral part of our planning and decision making. We will manage our company, wherever we do business, in an ethical way that strikes an appropriate and well reasoned balance between economic, social and environmental needs.

We are committed to:

- Conducting our business with respect and care for people and the environment
- Responsible utilisation of natural resources
- Implementing responsible care for all Sasol's chemical and associated businesses
- Non-chemical businesses will implement appropriate, recognised codes of practice
- Continually improving our safety, health and environmental performance
- Complying, as a minimum, with all applicable legal and other agreed requirements
- Promoting dialogue with stakeholders about safety, health and environmental performance

We will achieve these by:

- Implementing internationally recognised safety, health, environmental and quality management systems
- Developing and implementing inherently safer and cleaner technologies
- A "cradle to grave" approach to the products we develop, manufacture, use, distribute and sell
- Informing and appropriately training all employees and contractors on safety, health and environmental matters
- Responding effectively to safety, health and environmental emergencies involving our operations and products
- Engaging with relevant authorities and institutions on the formulation of legislation, standards and the implementation thereof
- Benchmarking internationally on best safety, health and environmental practices
- Sharing safety, health and environmental risk reduction best practices throughout Sasol
- Providing appropriate resources required to implement the above

- Sasol Safety Health and Environmental Policy;
- Guidelines from the World Bank;
- Guidelines from the World Health Organization;
- Guidelines from the US Environmental Protection Agency ;
- South African legal requirements;
- Mozambican legal requirements;
- International legal principles, where relevant.

The execution of EIA’s and obtaining environmental authorisations (Records of Decision) for the Mozambican parts of the project differ slightly from those that followed for the South African project components. This is mainly due to different environmental regulatory requirements in the two countries. However, as far as a methodology or approach to EIAs and commitment to sound environmental management is concerned, Sasol adopted and applied the principles explained above and best practices similarly in both countries.

Table 2: EIA Approval Timelines

Environmental Assessment	Approval date
Temane / Pande Gas field exploration	February 2002
Temane / Pande Gas field development	February 2002
Pipeline between Temane and Ressano Garcia	April 2002
Pipeline between Komatipoort and Secunda	April 2002
Secunda Interface	September 2002
Natural Gas Expansion at Secunda	June 2001
Conversion of the Sasolburg Plant	June 2002
Sasol Network Conversion	December 2001

**Legal and Regulatory Framework**

**Mozambique**

In Mozambique the NGP is, *inter alia*, governed by a range of laws and regulations relating to EIAs, environmental management, the access to and use of land, and the management of social impacts, especially resettlement.

The following core laws and government policies, referenced for purposes of the compilation of this document, were of particular relevance to the project, and were heeded or otherwise taken cognisance of for purposes of the NGP :

- Environmental Law (Law 20/97);
- Regulations for the EIA Process (Decree 76/98);
- General Regulations on Hygiene and Safety in Industrial Plants – Diploma 48/73;
- Regulations for the Licensing of Industrial Plants- Decree 44/98;

- General Regulations on Urban Construction-Legislative Diploma 1976;
- Municipalities Law 2/97;
- Regulations for Public Civil Construction Works-Decree Law 48/71;
- Water Law 16/91;
- General Regulation for the Supply of Water-Legislative Diploma 2091;
- Protection of Fauna and Flora Reserves Law 10/99;
- Legislative Diploma 3057
- Land Law (Law 19/97)
- Regulations under this law (Law 66/98)
- National Heritage Protection Law (Law 10/88);
- The Hydrocarbons Law (3/2001) and
- Draft Regulations/Guidelines for Petroleum Operations.

The EIA process is administered by the Ministry for the Co-ordination of Environmental Affairs (MICOA). In 1995 MICOA drew up a National Environmental Management Programme (NEMP), a policy document that outlines the priorities for environmental management and sustainable development in Mozambique and that serves as the framework for environmental law. The Mozambican Government passed the Framework Environmental Law (“Environmental Law 20/1997”) in 1997. The aims of the Environmental Law are to provide a legal framework for the use and correct management of the environment and its components and to ensure sustainable development in Mozambique.

The Environmental Law and regulations are applicable to all public and private activities in Mozambique that may directly or indirectly influence or affect the environment. The Environmental Law requires licensing of activities (listed in the regulations) that are liable to cause significant environmental impacts. The granting of an environmental authorisation (Record of Decision) is subject to the preparation and approval of an appropriate EIA, undertaken on behalf of the applicant by an organisation registered with the government. The undertaking of EIA’s, public consultation in EIA’s and environmental authorisation procedures are governed by Regulations on the Procedure for Environmental Impact Assessment (Decree 76/1998) promulgated under the Environmental Law.

In terms of the regulations, an EIA must comprise, amongst other things, the identification and

assessment of mitigatory measures and an environmental management plan, including the monitoring of impacts. This must be submitted to MICOA as a report. The technical review of the report forms the basis for the approval of the proposed activity and the issuing of a record of decision (environmental authorisation/license).

Within Mozambique, the points of departure for the EIAs were thus:

- To agree, prior to the formal EIA process commencing, appropriate terms of reference with MICOA to ensure that the final report would adhere to MICOA's requirements;
- To ensure compliance with the Sasol SHE Policy;
- To meet, as a baseline requirement, all the requirements of Mozambique's national regulations pertaining to activities with a potentially detrimental effect on the environment;
- To follow internationally recognised practice with respect to EIAs and implementing applicable World Bank Operational Policies;
- To encourage open debate with Interested and Affected Parties (I&APs);
- To provide thorough, independent analysis of potential impacts as a basis for an informed decision by the MICOA; and
- To enable the development of appropriate EMPs to enable Sasol to act responsibly with regard to environmental issues pertaining to the NGP.

The various EIA stages for the Mozambican components of the project are illustrated in Figure 6. The approval timelines for all the EIAs are summarised in Table 2.

#### **South Africa**

In South Africa, the construction and operation of the South African section of the gas pipeline is legally governed by, in particular, the following core national and provincial laws and regulations referenced below for purposes of the compilation of this document:

- National Environmental Management Act (107 of 1998);
- Environment Conservation Act (73 of 1989) and applicable Environmental Impact Assessment Regulations thereto (R 1182 and R 1183);
- National Water Act (36 of 1998) and relevant regulations thereto;
- Atmospheric Pollution Prevention Act (45 of 1965) and relevant regulations thereto;

- Occupational Health & Safety Act (85 of 1993) and relevant regulations thereto;
- Department of Water Affairs and Forestry Waste Management Series;
- Request to Register a Water Use in Mpumalanga (GN. 536, 2 June 2000);
- Major Hazard Installation Regulations (GNR1097 of 16 January 1998);
- White Paper on the Conservation and Sustainable Use of South Africa's Biological Diversity (GN 1095, 28 July 1997);
- Conservation of Agricultural Resources Act (43 of 1983);
- National Forests Act (84 of 1998);
- Mpumalanga Nature Conservation Act, 1998 Regulations (AN 2030 14 December 1983; ON 2 29 January 1999);
- Endangered and Rare Species of Fauna and Flora Act (AN 1643 February 1984);
- Minerals Act (50 of 1991) and relevant regulations;
- Maputo Protocol on Health in the Southern African Development Community;
- National Heritage Resources Act (25 of 1999) and relevant regulations thereto;
- Hazardous Substances Act (15 of 1973) and relevant regulations thereto;
- The Gas Act 48 of 2001.

The EIA process and granting of environmental authorisations (ROD's), required for the undertaking of certain listed activities which may have a substantial detrimental effect on the environment, is administered by the Department of Environmental Affairs and Tourism (DEAT). The National Environmental Management Act 107 of 1998 (NEMA) provides a framework for co-operative environmental governance by establishing principles for decision-making by authorities on matters affecting the environment. The principles, that must be heeded for purposes of the granting of an environmental authorisation include, *inter alia*, assessing whether the proposed activity will provide for integrated environmental management, accountability and responsibility for the environmental consequences of the project throughout its life cycle; mitigation and remediation of environmental pollution or degradation; and the principles of sustainable development.



The Act also obliges persons (natural or juristic) to exercise a duty of care in the instance where their activities, operations or conduct causes, or poses a risk of, significant pollution or environmental degradation. This duty of care, as explained in section 28 of the NEMA, entails that such persons must investigate, assess and evaluate the impact of the proposed activities on the environment and to implement precautionary or mitigatory and remediation measures. The development and implementation of an EMP related to an EIA required for a listed activity would be considered as legal compliance with this duty of care.

The requirement for and specifics regarding EIAs and authorisations is explained in section 21 and 22 of the Environment Conservation Act 73 of 1989 and the environmental impact assessment regulations thereto (R 1182 and R 1183 of September 1997, as amended). Prior to the undertaking of activities, listed in Regulation R 1182, environmental authorisation from DEAT is required. The ROD is generally issued and based on the EIA and must include conditions on measures to mitigate, control and manage environmental impacts. As such, submission of an environmental management plan and adherence thereto is generally a condition of an ROD.

The approach to the EIAs for the South African components followed adherence to the Sasol SHE policy, and relevant legislative requirements and World Bank Operational Policies, and was supported by principles of Integrated Environmental Management (Department of Environmental Affairs, 1992) and the Draft Guideline accompanying the EIA Regulations (DEAT, 1997). The EIA was also aimed at providing relevant information for environmental management to enable responsible management of the possible environmental effects that Sasol's activities may bring about regarding the NGP.

The EIA related studies in South Africa have been structured in the manner as outlined in Figure 7. The approval timelines for all the EIAs are summarised in Table 2.

#### ***International Legal Principles***

Provision was also made for relevant and appropriate principles of best practice reflected in various multilateral environmental ratified either by South Africa or the GOM, including for example:

- The Montreal Protocol on Substances that Deplete the Ozone Layer;

- The Kyoto Protocol to the United Nations Framework Convention on Climate Change;
- The Bonn Convention on the Protection of Migratory Species of Wild Animals;
- The RAMSAR Convention on Wetlands of International Importance;
- The Paris Convention for the Protection of the World Cultural and Natural Heritage;
- The Basel Convention on the Transboundary Movement of Hazardous Waste and the Disposal thereof;
- The Bamako Convention;
- The Convention on Biological Diversity.

#### ***World Bank Operational Directives***

The environmental and social reviews undertaken for this project were also governed and guided by the hierarchy of requirements of the World Bank Group, including:

- Environmental and social "safeguard" policies and recommendations;
- Specific guidelines developed primarily for the industrial sectors;
- Other guidance and reference documents.

These exist within a framework of review, appraisal and decision-making procedures that differ somewhat among the different component institutions of the World Bank Group. The primary reference documents that were utilised in the preparation of the EIA's were:

- Procedure for Environmental and Social Review of Projects (IFC 1998);
- Guidance for the Preparation of a Public Disclosure Plan (IFC, 1998);
- Occupational Health and Safety Guidelines (IFC, 1998);
- Guidance for the Preparation of a Resettlement Plan (World Bank 1998);
- World Bank Operational Manual (World Bank Group); and
- Pollution Prevention and Abatement Handbook (World Bank Group 1998);

An overview of the IFC/World Bank Safeguard Policies pertinent to the NGP is provided in Box 2. Detail on the application of these principles can be determined from the various EIA's, EMP's, specialist studies and the RPIP.

### Box 2: Overview of World Bank Group and IFC Safeguard Policies

Following is a brief summary of the Operational Policies (OPs), Bank Procedures (BPs) and Operational Directives (ODs) of the World Bank Group that have been applied by Sasol in relevant components of the Natural Gas Project:

- **OP 4.01 Environmental Assessment (EA):** This states that all projects proposed for World Bank funding require EIA review/analysis to ensure that they are environmentally and socially sound. An environmental assessment (EA) evaluates a project's potential environmental risks and impacts, examines project alternatives, and identifies ways of preventing, minimising, mitigating or compensating for adverse environmental impacts and for enhancing positive impacts. An EA provides for: the natural environment (air, water and land); human health and safety; social aspects (involuntary resettlement, cultural property); and transboundary and global environmental aspects. Various instruments are used to perform the EA depending on the complexity of the project, including EIAs, environmental audits, risk assessment and environmental action plans. Category 'A' projects require that a full EIA is undertaken by an independent expert, and that a Public Consultation and Disclosure Programme (PCDP) is prepared.
- **OP 4.04 Natural Habitats:** The World Bank Group does not support projects that involve significant conversion or degradation of natural habitats unless there are no feasible alternatives and analysis demonstrates that overall benefits substantially outweigh environmental costs. If a project would significantly convert or degrade natural habitats, the project includes mitigation measures acceptable to the Bank. [*Critical natural habitats* include existing protected areas and areas officially proposed by governments as protected areas (e.g., reserves that meet the criteria of the World Conservation Union classifications, areas recognised as protected by traditional local communities (e.g., sacred groves), and sites that maintain conditions vital for the viability of these protected areas (as determined by the EA process)].
- **OP 4.09 Pest Management:** This policy supports the use of biological or environmental control methods over the use of pesticides and herbicides. If pesticides and herbicides are to be used, this policy sets out the criteria governing their use.
- **OPN 11.03 Cultural Property:** This covers sites with archaeological (prehistoric), paleontological, historical, religious, and unique natural values, including graves and cemeteries.
- **OP 4.12 Involuntary Resettlement:** In terms of this procedure involuntary resettlement should be avoided wherever feasible, with all viable alternatives explored. Where it is not feasible to avoid resettlement, resettlement activities should be conceived and executed in a sustainable manner, providing sufficient investment resources to enable the persons displaced by the project to share in project benefits. Displaced persons should be meaningfully consulted, and should have opportunities to participate in planning and implementing resettlement programmes. They should also be assisted in their efforts to improve their livelihoods and standards of living or at least restore them, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher. This procedure covers land acquisition, compensation for crops, trees or other productive use of the land, physical resettlement and loss of access to resources for temporary use of land such as borrow areas or quarries.
- **BP 4.12 Involuntary Resettlement:** This outlines the procedure and actions required of the borrower, should involuntary resettlement be identified. For any specific investment initiative causing involuntary resettlement, these procedures are most commonly contained within a Resettlement Planning and Implementation Programme (RPIP) that details the entire resettlement process, from initiation through to after-care and monitoring and evaluation.
- **OD 4.30 Involuntary Resettlement:** This aims to ensure that the population displaced by a project receives benefits from it and has objectives that are closely aligned to those of OP 4.12.

### Public Consultation and Disclosure

Public consultation and disclosure formed an integral part of the EIA approach for all the components of the NGP, with specific emphasis on Mozambique, where the geographic spread, poor infrastructure, cultural demands and high rural populace necessitated a strong community consultation element. For the purposes of this Consolidated Executive Summary and Update, the public consultation and disclosure (PCD) process, conducted as part of the EIA process, has been briefly summarised both at the generic level as well as at the project level, as the issues and concerns raised differed for each. An overview of the PCD component pertaining to EIA's is provided in Chapter 12.

### Monitoring and Auditing

The mitigation, control and management of environmental impacts is of the utmost importance for

Sasol, its stakeholders and the relevant authorities. Safety, health and environmental performance and improvement is enshrined in the Sasol SH&E Policy, which commits Sasol to acting responsibly, carrying out its duty of care and ensuring good corporate governance practice. Environmental monitoring and auditing is undertaken, both internally and externally, in accordance with the requirements of internationally accredited management systems such as ISO 14001, OHSAS 18001, and ISO 9000. The implementation of environmental management plans for specific projects or activities, and the compliance with adopted standards or requirements, will be measured and tested as such.

The company implements regular internal Corporate Governance audits to ensure compliance with the corporate governance requirements within the

jurisdictions (including the USA) that Sasol operates. This includes ensuring compliance with the recommendations of the progressive King Code of Practice on Corporate Governance (King II) recently developed in South Africa. Sasol's internal information management systems and selected areas of its safety, health and environmental performance data are also verified by external auditors for the purposes of Sasol's publicly available Sustainable Development Report.

In addition to complying with the above standards, the monitoring and auditing practices on the NGP have

also been undertaken in accordance with, and to meet the requirements and obligations arising from, the commercial and other agreements pertaining to the NGP. Both MICOA and DEAT require independent quarterly auditing to be conducted to assess compliance during the construction phase of the project. Over and above the auditing function, the authorities are directly involved in monthly Environmental Monitoring Committee meetings where monitoring and auditing status are discussed, supported by site visits where and when required.

Figure 6: Overview of the EIA Process in Mozambique

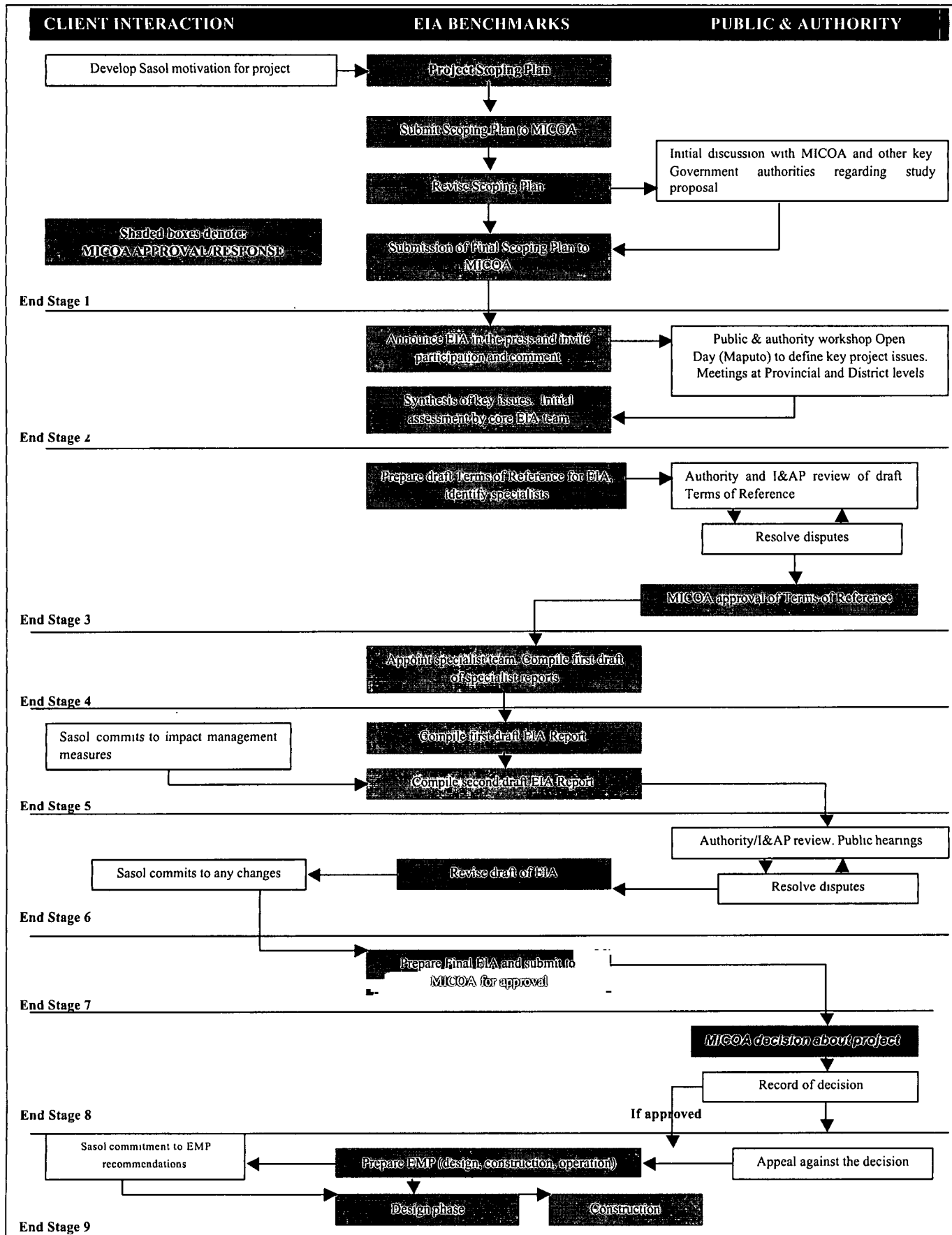
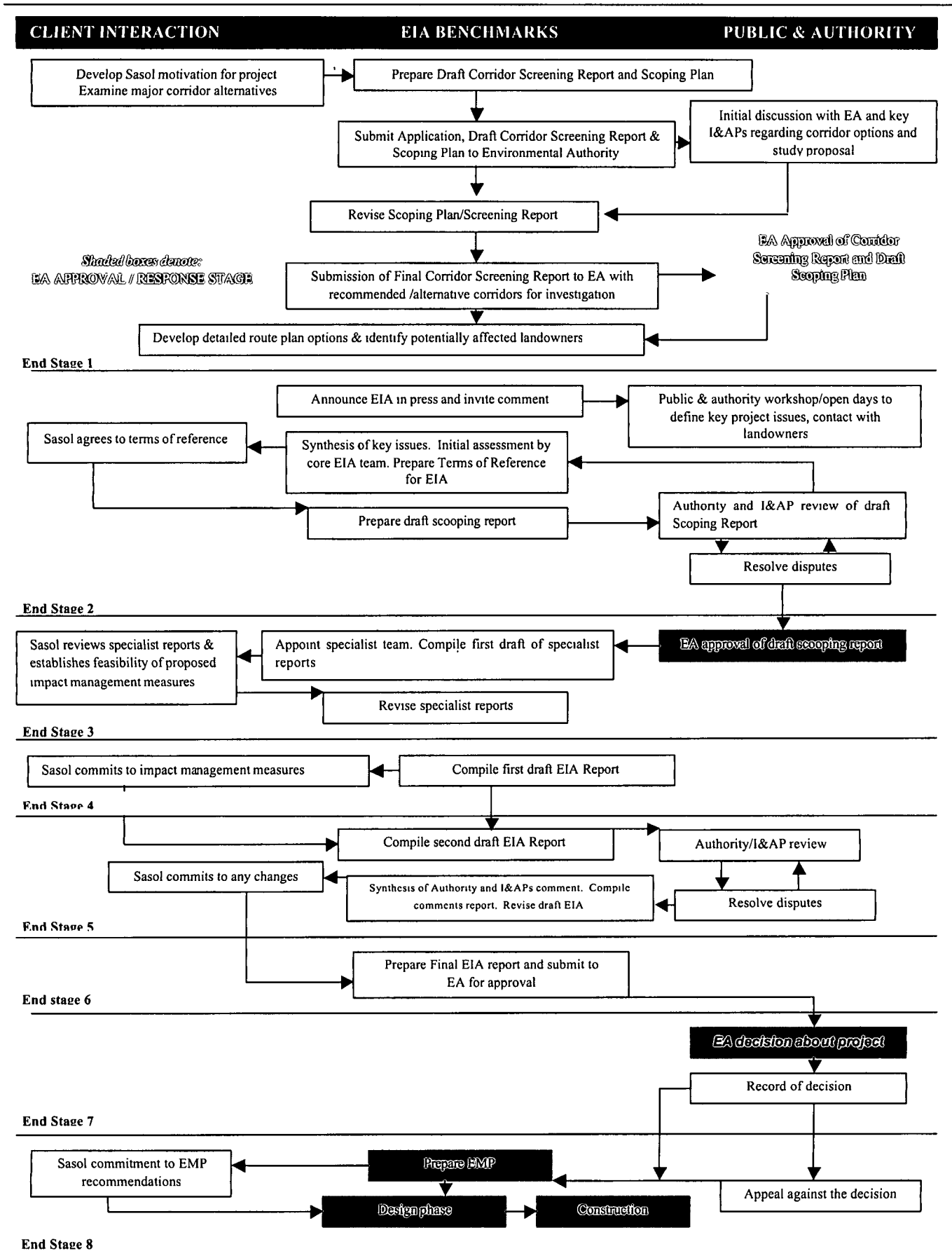


Figure 7: Overview of the EIA Process in South Africa



### 3. Temane / Pande Gas Field Exploration

#### Background

Exploration work in the Pande and Temane Gas Fields Blocks has taken place over the past 35 years by various international companies. After Sasol acquired the rights to explore the gas fields, an EIA was undertaken in 1998 for the geological exploration of the Temane Gas Field by ARCO Mozambique (Temane) Ltd., in partnership with Sasol Petroleum International Ltd through its Mozambican subsidiaries. Using this initial EIA study as the basis, a new EIA was conducted and approved by MICOA. The associated Environmental Management Plan was approved and implemented during the subsequent seismic activities conducted during 2000.

#### Project Description

The seismic exploration and development drilling programme comprised the following stages:

- *Seismic data collection:* In this stage, geological data was collected in order to determine the geographical extent of the gas reserves in the gas field. The seismic exploration work began in June 2001 within the Temane and Pande Block. During the seismic programme, workers and equipment and temporary offices were located at a temporary centralised base camp.
- *Drilling of exploration wells:* During the drilling phase, the data collected from the seismic exploration activities was analysed to confirm the gas field development drilling programme and a separate exploration drilling programme. Sasol scheduled the first development drilling activities from May to December 2003. In addition, exploration wells are being drilled during this period to assist in the planning of Sasol's longer-term development programme.
- *Closure/completion of the programme:* In those cases where the results show that the exploration wells are not economically producible, the exploration wells are plugged and abandoned, and the reserve and disposal pits are closed and filled in a responsible manner and in accordance with the provisions and requirements of the EMP. Those wells that prove to be economically producible will be temporarily plugged, pending development of the CPF and pipeline construction. The drilling pad and access roads will be retained for future use. Personnel required for the drilling operations will be accommodated

in the existing base camps as far as possible. A further seven development wells are planned in Pande in 2006 as well as further exploration wells in 2006.

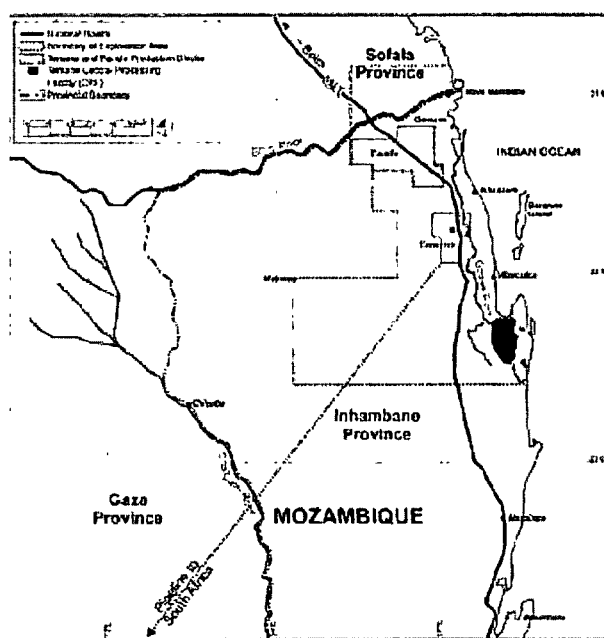


Figure 8: Map of the Temane and Pande Gas Field Development Areas

#### Project Setting

The project area is situated on the broad southern coastal plain of Mozambique. The Govuro River, with a catchment area of 11200km<sup>2</sup>, flows parallel to the coast from north to south and bisects the Temane Block. The national road between Maputo and Beira (EN-1) corresponds with the western boundary of the wetlands complex associated with the Govuro River.

The project area supports a complex mosaic of vegetation types and plant communities. Eight broadscale vegetation types occur within the Exploration Area of which four are represented in the Pande and Temane Production Blocks. The high diversity of vegetation types and plant communities in the Production Blocks support a wide variety of animals, with a predominance of small animal species. Seventeen of the mammals recorded are Red Data species, and seven are listed as Vulnerable. There is high species diversity of lower vertebrates in the study area, many of which depend on wetland habitats.

The administration of the Districts occurs through both formal and traditional structures. Eighteen percent of the population of Inhambane Province lives in the Vilanculos, Inhassoro and Govuro Districts. With the exception of the population living in the towns of Vilanculos and Inhassoro, the population of the study area is essentially rural and reliant on subsistence farming. Most of the labour is unskilled.

The formal economy is dominated by tourism activity along the coast, particularly in Vilanculos and the Bazaruto Archipelago. The limited road infrastructure restricts accessibility, with settlement taking place predominantly along the EN-1 and adjacent to the few internal secondary roads.

### **EIA Objectives<sup>7</sup>**

The key objectives of the EIA for the seismic and exploration drilling activities within the Temane and Pande exploration areas were as follows:

- To identify and evaluate the potential impacts on the natural and human environment of the seismic exploration and development drilling activities within the Temane and Pande exploration area;
- To identify means of mitigating negative impacts and enhancing positive spin-offs associated with the project activities;
- To compile and update Environmental Management Plans that will guide Sasol's activities within the exploration area; and
- To ensure that Sasol, through its Mozambican subsidiaries, complies with Mozambican law regarding EIAs / Studies.

### **EIA Approach<sup>8</sup>**

The EIA was approached in the following way:

- Baseline data concerning the physical, biological, socio-cultural and socio-economic environment was collected. In addition to using pre-existing data that was collected for the EIA undertaken for the exploration work conducted by ARCO in the late 1990s, social and biological field surveys were conducted;
- Social surveys were undertaken at villages in proximity to the proposed seismic lines both as a

means of consulting with potentially affected communities about the exploration work, and as a means of collecting socio-cultural and socio-economic data for analysis in the EIS;

- Satellite imagery was used as the basis for the development of a structural interpretation of vegetation, natural resources and land use. A classification of the vegetation types of the study area was drawn up, using this satellite land type analysis, existing information about vegetation classification of the region and the results of ecological field analysis;
- Specific field analysis of vegetation types, occurrence of threatened plant and animal species and overall ecological sensitivity in respect of the impact of seismic analysis was undertaken at selected points along each proposed seismic line. Pre-existing seismic lines cut during ARCOs exploration programme were examined in order to assess the recovery potential of habitat in different parts of the study area. The extent to which the pre-existing seismic lines had been used to create improved access to natural resources was also examined as a basis for an assessment of the risk of opening up further access to natural resource exploitation.

### **Scoping Process**

A Scoping process was carried out from July to September 2000 with the objective of informing the public and authorities about the project, establishing communication channels and gathering comments and concerns from interested and affected parties (I&APs).

### **Key Issues and Questions Raised**

Most of the issues raised during the scoping phase related to the construction and operation phases of the project. Key issues were captured and these informed the scope for the specialist studies, which structured the EIA for both the exploration and production phases of the project.

### **Analysis of Impacts of Previous Seismic and Exploration Work**

In general, the predictions made in the EIA prepared for the ARCO exploration were found to have been accurate. Biophysical impacts had been low and habitat recovery of the seismic lines was excellent. Most areas of ecological sensitivity were avoided during the programme. Recovery of vegetation in the immediate vicinity of the exploration wells was poor,

<sup>7</sup> Reference to specific EIA objectives in this and other chapters to follow must be read and interpreted against the background information provided in Chapter 2.

<sup>8</sup> The explanation of the project specific EIA approach in this chapter and other chapters to follow, must be read in conjunction with the explanation provided in Chapter 2.

attributable to soil stripping and the absence of rehabilitation after completion of the programme.

The communities interviewed about the ARCO exploration programme were generally positive about the project, although some grievances were expressed. These included the failure to compensate for certain losses such as fruit trees, the absence of sufficient consultation with community leaders in respect of employment and compensation issues, and insufficient employment for local people on the contract. The measures that have been taken to address these concerns are outlined in the RPIP (see Chapter 13).

**Alternatives Examined**

The following alternatives were examined during the course of the planning of the exploration work:

- *Two-dimensional versus three-dimensional seismic grid:* the lower impact two-dimensional grid was selected. A three dimensional grid requires more seismic lines cut through the bush;
- *Alternative energy sources:* the lowest impact alternative was selected (vibrois as opposed to explosive methods);
- *Alternative grid design:* on the basis of the work done in the EIS, ten (11%) of the seismic lines were removed from the grid in order to avoid areas of higher environmental sensitivity.

**Summary of Key Impacts and Environmental Management Plan**

A detailed summary of the main impacts evaluated in the EIA is provided in Table 3. Impacts were divided into three groups: those occurring as a result of seismic activities, those occurring as a result of the

drilling of exploration wells, and those occurring as a result of the development of base camps.

**Overall Conclusion**

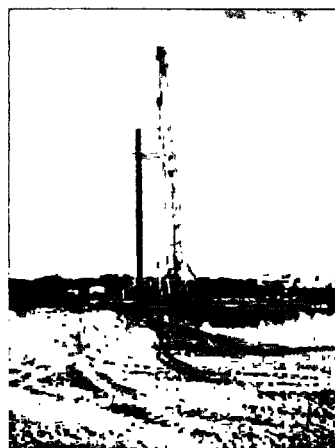
The EIA predicted that the direct negative project effects that were identified in the report could be reduced to low levels of significance, subject to the implementation of the recommendations in the EMP.

The most enduring of the impacts identified related to the activities of people who could gain access to previously inaccessible parts of the exploration area. Some of the land within the exploration area was thought to have good arable soils and the potential to support commercial agriculture, as well as traditional settlement and cropping, subject to better access. The EIA also identified considerable opportunities for the harvesting of natural resources such as hardwoods, medicinal plants and game.

Recognising the potential benefits of increased access using the seismic lines, local inhabitants were strongly in favour of the lines being left open for community use. While seismic lines have the potential to support poor communities by providing better access to previously inaccessible natural resources, the EIA expressed concern that this may not be sustainable without effective management, and that leaving seismic lines open would run a risk of permanent impact on sensitive sites within the study area. Further detail about the nature and implications of these issues is provided in Chapter 3 of the RESA (Summarised in Chapter 11 below).



Photograph 2: Wellhead in the Temane Gas Field area: Mozambique



Photograph 3: Drilling rig exploring gas reserves in the Temane Gas Field area: Mozambique



Table 3: Summary of Impacts as Foreseen in the EIA– Temane/Pande Gas Field Exploration

ISSUE	KEY IMPACTS
<b>Soils</b>	Soil erodibility in the exploration block is often high, but the areas where work was to be carried out in the year 2001 programme are generally flat, so erosion risk was considered to be small. Coastal plant communities are, however, very sensitive to soil disturbance. Recommended mitigation measures included leaving topsoil and vegetation rootstock intact during clearing and avoidance of steep slopes. Avoiding or loosening compacted soils was also regarded as an important requirement to minimise impact of all components of the project.
<b>Hydrology</b>	Impacts of high significance were predicted for the seismic lines proposed in the mangrove swamp and barrier lake habitats. The EIA recommended that these lines be removed from the seismic programme. Except at stream crossings, where riparian woodland would be affected, other seismic lines proposed for the year 2001 programme were not considered to be a significant threat to surface or groundwater hydrology. Restricting seismic line construction outside of permanent wetlands, and ensuring all seismic work is planned in the dry season were some of the recommended mitigation measures. Exploration/ production drilling risks were considered to be low subject to the management of the potentially hazardous or toxic wastes produced by the drilling. Problem wastes were characterised and their risk to surface and groundwater identified. A field assessment was undertaken in the area surrounding six of the well sites drilled in the ARCO programme and no evidence of residual impact on hydrology was found.
<b>Habitats</b>	The EIA forecast that some 682 ha would be affected by seismic clearance. On an area-habitat basis, the impact was thus considered to be low. The affected vegetation would recover well within the grassland, savannahs and open thicket environment. Permanent long-term loss would result where the forest canopy had been affected. Recommended mitigation included the omission of 10 sections of seismic line from the proposed seismic grid due to sensitive and vulnerable habitats (11% of the total proposed seismic grid for the year 2001). These habitats included: the canopy forest in the south west of the Pande Block; dune pioneer communities along the coastal strip; mangrove swamps and associated salt marshes between the mouths of the Govuro and the Save Rivers; aquatic and wetland habitats associated with the Save and Govuro Rivers and their floodplains; the barrier lakes situated mainly between the EN -1 highway; and the coast and various short coastal streams in the study area.
<b>Fauna</b>	The direct impacts of seismic activities were considered to be low, except the line near Moabasa that would impact on a bat colony. The longer-term indirect impact on fauna could be highly significant, due to increased access, increased hunting and potential loss of forest habitats/ breeding grounds due to plant harvesting. Recommended mitigation measures included the re-alignment of Seismic Line 15 to avoid the bat colony, and the implementation of contractual penalties for illegal poaching by the contractor's employees. Proposals for the management of long term indirect impacts were also made (refer to the discussion of the EMP below).
<b>Settlements/ Agriculture</b>	It was predicted that the significance of the impact of both seismic lines and exploration wells would depend mainly on the adequacy of communication with local people and the development of fair and equitable compensation rates and procedures. In the event of damage or loss of property, compensation was to be paid by Sasol based on pre-defined rates and procedures. Given the experience of the affected communities with previous exploration by ARCO, it was considered to be important that a thorough and structured programme to manage these impacts be implemented. Other recommended mitigation measures included the ripping of compacted soils to prevent long-term impacts on arable land.
<b>Income/ Employment</b>	The study considered that the temporary employment that would be created by the seismic and exploration work would be of low to medium significance, with the possibility of enhancing the benefits if the necessary management was implemented. It was estimated that the 2001 seismic programme would require 60 locally sourced unskilled and semi-skilled employees for 5 months, while the drilling programme would require 100 unskilled and semi-skilled workers. The multiplier effect of these incomes and that of skilled workers within the area would have a positive, short-term effect on the local economy. Recommended enhancement included a transparent hiring process, giving priority to hiring local workers amongst others.
<b>Nuisance/ Community disturbance</b>	The study identified the main nuisance sources as being the result of vehicular activity, dust from bush clearing, the operation of machinery, and movement and noise caused by employees. Location of Seismic Line Five through the village of Pambarra was considered to be a likely cause of significant community nuisance. It was forecast that impacts would depend on the way the matter was handled with the affected parties. Community disruption could also result from the influx of a predominantly "foreign" male work force. Discontinuing those seismic lines that impacted directly on homesteads and restrict vibroseis activity to more than 50m from nearest homestead were among the key recommended mitigation measures.
<b>Places of cultural value</b>	None of the seismic lines for the year 2001 programme were known to affect sites, but the study recommended that this be verified once the final details of the lines were determined.

**Table 4: Summary of EMP Recommendations and Mitigatory Measures – Temane/Pande Gas Field Exploration****The Environmental Management Plan**

The Environmental Management Plan developed by Sasol for this specific component of the project was prepared as a detailed framework for managing and monitoring the impacts of both the 2001 seismic and exploration drilling programme and future programmes. For the 2001 programme, the EMP specified the co-ordinates of the seismic lines that were to be omitted from the seismic programme for environmental reasons. Of these, 19 km were in the barrier lake zone, 19.5 km were in the mangrove swamps in the north-east of the Exploration Area, and the remaining 42,5 km were in the *Carpodiptera-Guiboutea* canopy forest in the south-west of the Pande production block. This made up some 11% of the total year 2001 programme. Sasol committed to these changes and the lines were taken out of the seismic programme when it was conducted in 2001. For future programmes, the EMP specified a site selection procedure. Eleven habitats were identified within which seismic lines and exploration wells should be prohibited. These include:

- *Carpodiptera-Guiboutea* canopy forest
- Hummock Dune communities along the coastal strip
- Ironwood forest (small areas represented in the Exploration Area)
- *Xylia mendoncae* habitat (threatened plant occurring in distinctive and restricted areas)
- Mangrove swamps and salt marshes
- Rivers and associated riparian forest
- Barrier lakes and pans mainly between the EN-1 highway and the coast
- Other places of known special interest

Following are some of the more important of the comprehensive range of other management and monitoring recommendations:

*Biophysical Impact Management: Seismic Lines*

- All seismic lines in future programmes to be evaluated by Sasol's Environmental Co-ordinator. Where necessary, field visits to be made to verify ecological sensitivity. Seismic lines in sensitive localities to be excluded from the programme where possible
- An Environmental Site Officer (ESO) to be present during bush clearing for seismic lines. Where necessary, lines should be altered in the field to avoid site specific areas of ecological significance
- Seismic work to be planned for the winter period when access is best and impact on areas subject to seasonal flooding is least
- The width of seismic lines to be restricted to 6m so as to reduce habitat disruption and enhance the opportunities for rapid recovery of trimmed bush. Bush should not be uprooted but should be cut leaving rootstock in place.
- Rehabilitation along the seismic lines to be as determined by the ESO. The principle should be to create stable, non-eroding cut-lines, free of alien weeds which rapidly recover to a state approaching the pre-seismic condition.

*Biophysical Impact Management: Exploration Wells*

- Site selection to be determined with reference to an environmental assessment of risks, in respect of sensitive habitats as defined above, proximity to water resources and other defined environmental criteria. If the site is considered to be acceptable, any special management measures, over and above the requirements of the EMP should be documented.
- Waste management to be strictly controlled in accordance with the specifications of the EMP
- Fuels and other hazardous or toxic materials used on site to be categorised and storage and handling procedures to according to best practice and the specifications in the EMP
- Rehabilitation of drilling sites to be undertaken by reinstating the stockpiled topsoil from around the site perimeter and instating any measures necessary to control runoff from the site and prevent erosion. Rehabilitation success should be monitored and appropriate remedial action taken where necessary

*Social Impact Management: Seismic Lines and Exploration Wells*

- Compensation to be managed strictly in accordance with the compensation and resettlement procedures agreed for the NGP (Note: compensation procedures and rates have been agreed by Sasol and the GOM following extensive consultation with stakeholders. The procedures are comprehensive and equitable and should resolve the kinds of issues raised by communities following the drilling programme undertaken by ARCO – refer to the references above in the section on the EIA).
- Employment and related issues to be managed in order to enhance potential benefits of temporary employment while minimising the disbenefits. The EMP proposes a range of measures to ensure that employment procedures are equitable, that local people are employed as far as possible and that employment opportunities do not cause in-migration and the accompanying social tensions and pathologies
- STDs and HIV/Aids prevention programmes to be prepared which include employee education and training
- Communication in local communities to be developed and continued in order to ensure that any issues that arise during the programme are quickly and effectively managed
- Training of contract employees to be undertaken to ensure compliance with the requirements of the EMP and a courteous approach to interaction with local people

*Monitoring of the Programme*

A Senior Environmental Consultant (SEC) to be appointed (experience requirements defined in the EMP) to manage the work required in each future seismic and exploration contract. The SEC to prepare an Environmental Management Report following evaluation of the planned programme. The report to include any recommendations for changes to or omissions of seismic lines and changes to positions of exploration wells. The SEC to monitor implementation of the contract with the assistance of an ESO and Community Facilitation Officers. The SEC to prepare monthly monitoring reports during the contract.

**Box 3: Post-EIA Update of the Temane/Pande Gas Field Exploration Activities**

Following is a brief outline of some key actions that have been taken in addressing the recommendations arising from the environmental and social impact assessment regarding the gas field exploration:

- The recommendation not to include certain seismic lines within the seismic programme, for environmental reasons, has been followed. A site-selection procedure that provides for environmental considerations continues to be implemented.
- The bush clearing teams that were deployed to clear-cut lines of all vegetation generally ensured that the cut-line width was not more than 6m, although this was wider in some sections to accommodate seismic equipment and machinery. An Environmental Site Officer has been present during bush clearings. On completion of seismic testing on a particular cut line, all the cleared areas have been left to regrow/revegetate in accordance with the approved environmental management programme.
- Waste and material handling procedures have been implemented in accordance with the recommendations of the EMP.
- The resettlement impacts arising from the exploration activities have related mainly to grave exhumation and reburial, crop losses and temporary loss of access to machambas. Apart from minor accidental damage to infrastructure and the death of one unit of livestock (a goat), no infrastructure or homesteads have been impacted during the seismic exploration. Where these were encountered on a cut line, they were avoided by altering the predetermined route of the cut line. (Further details on these resettlement and compensation activities are presented in Volume One of the RPIP, summarised below in Chapter 13).



Photograph 4: Gavuro River East of the Temane 8 Wellsite: Mozambique

## 4. Temane/Pande Gas Field Development

### Background

This EIA related to the Exploration Area. This area, which covers 16 540km<sup>2</sup> in the Inhambane and Sofala Provinces, is where the wider activities associated with the project took place. The Production Blocks, consisting of the Temane Production Block (458km<sup>2</sup>) in the south and the Pande Production Block (1234km<sup>2</sup>) in the north, were also considered in this EIA. Most of the direct activities of the project, including the construction and operation of the CPF, the flowlines and the production wells were within these two Production Blocks. (See Figures 8 and 9).

### Project Description

The two gas fields and the CPF comprise the following project activities and infrastructure:

- Eighteen production wells in the Temane field (458 km<sup>2</sup>) and 16 production wells in the Pande field (1 234 km<sup>2</sup>).
- The Temane field is currently in the process of being developed. The Pande field will be developed three years after the commissioning of the Temane field, and a flow line will be constructed to connect the two.
- Subterranean pipelines (installed 1m below the surface) link the production wells in the field to a Central Processing Facility (CPF) at Temane. 177 km of pipeline has been laid. (81 km in Temane and 96 km in Pande).
- Permanent all-weather access roads have been constructed to each production well. The land use above the flowlines is being controlled to ensure that access remains possible for maintenance and monitoring purposes.
- The CPF is located near the hydraulic centre of the production wells in the Temane field. The operational control is being managed from the CPF via telemetry. The CPF site will cover an area of about 50 ha. The proposed site is 4.8 km west of the EN-1 (national road). Tared access roads link it to the EN-1

The gas field facilities will initially produce 122 MGJ/annum of gas. The field is capable of being expanded to supply 240 million GJ per annum when additional capacity is required. As a by-product of the process, approximately 320m<sup>3</sup>/day of stabilised condensate will be produced which can be refined into usable hydrocarbon products. The condensate will be

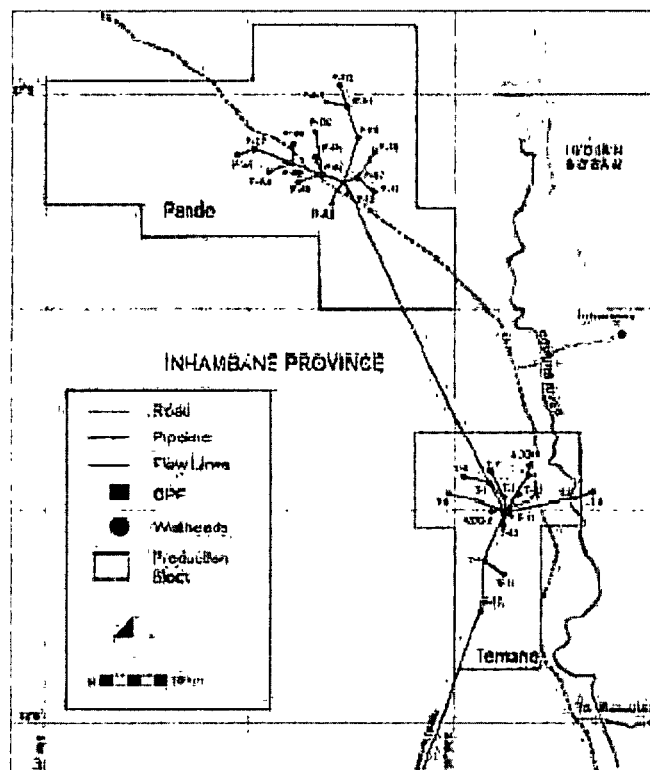
sold at the gate of the CPF, to the highest bidder under strict legal controls imposed by Sasol.<sup>9</sup> Sasol forecasts that the project will have an envisaged lifespan of 25 years. During this time additional fields may be developed which could further extend the lifespan of the facility.

All construction activities were preceded by de-mining and vegetation clearance. Depending on the extent and the nature of the area to be cleared, the vegetation was removed either by hand or cleared with a bulldozer. Much of the equipment and material used in the construction of the gas fields was pre-constructed in modular and transportable packages and then delivered to the site by means of a combination of sea and road transportation.

### Project Setting

The project setting is the same as for the Temane and Pande Gas Field Exploration, as outlined in Chapter 3.

Figure 9: Location of CPF and Proposed Wellsites in the Temane and Pande Gas Fields



<sup>9</sup> The commercial rights and provisions pertaining to the sale of condensate is provided for and explained in the Field Development Plan, prepared by Sasol and approved by The National Directorate for Coal and Hydrocarbons (Division of the Ministry of Mineral Resources and Energy) in Mozambique in December 2001.

### **EIA Objectives**

The EIA was undertaken with the following specific objectives:

- To identify and evaluate the potential impacts of construction and operation of the gas field
- To identify means of mitigating the negative impacts and enhancing positive spin-offs
- To ensure Sasol complies with Mozambican regulations and policies.

### **Scoping Process**

A scoping process was undertaken between July - September 2000, with the aim of informing I&APs about the project, establishing communication channels with I&APs, and recording their issues and concerns. Briefing documents were circulated to some 250 I&APs, invitations-to-comment were placed in several publications, and an open day was held along with several provincial and district level meetings.

### **Key Issues and Questions Raised**

The following principal issues and concerns were raised by I&APs during the scoping phase:

- Employment opportunities;
- Degradation of the natural environment;
- Protection of cultural heritage;
- Management of the social interface;
- Payment of compensation;
- Restrictions on the use of land for future agricultural and other activities;
- Post-construction use of infrastructure;
- Access to natural gas by local communities;
- Provision of social services and infrastructure to local communities by Sasol Petroleum Temane; and
- Extent of risk associated with the production facilities.

### **Scope of Specialist Studies for the EIA**

The issues identified in the scoping process defined the scope of the specialist studies, which were commissioned to ascertain the impacts on:

- Air quality;
- Hydrology;
- Flora and fauna;
- Socio-economics;
- Land Rights, agriculture and settlement ;
- Public health and social pathologies;
- Archaeology ;
- Public safety;

- Noise;
- Sense of place; and
- Marine environment

### **Alternatives Examined**

Strategic alternatives were not considered in this investigation nor were the implications of the use of gas as an energy source compared with other hydrocarbon and non-hydrocarbon fuels, as both were considered beyond the terms of reference of the EIA. Specific process and location alternatives were examined in detail in the preliminary design work for the project. These related to the:

- CPF process design;
- Alignment and construction method of flow lines and location of well heads; and
- Screening of the alternative locations for the CPF.

### **Summary of Key Impacts and Environmental Management Plans**

A detailed summary of the main issues identified in the EIA, and managed in terms of the EMP, is provided in Tables 5, 6 and 7.

### **Overall Conclusions**

The EIA found no fatal flaws associated with the proposed development of the gas fields. However, appropriate management of impacts was a recurring recommendation throughout the report. Of the fifteen categories of social and ecological impact evaluated in the construction phase of the project, ten were considered to cause impacts of high significance, modified to low significance if mitigation and management were implemented. A similar breakdown applied to the evaluation of impacts of the operational phase of the project.

Of the direct social impacts during construction, the EIA identified the impact on employment as the most significant. The impact was seen to be double edged, with the potential, on the one hand, to benefit local people and promote sound relationships between Sasol and local communities and, on the other hand, to cause disputes and lasting divisions among the stakeholders. Specific recommendations, outlined in more detail in the RESA (see Chapter 11 of this report, and note for example recommendations 16 and 17 in Table 20) were made to enhance the positive and minimise the negative effects of this impact.

Resettlement impacts were also considered to be very significant. The EIA demonstrated that the proposed

flow lines, as laid out in the feasibility level planning, could result in nearly 100 homesteads being directly affected. The report concluded, however, that relatively minor shifts to the final alignments of these flow lines would reduce the impacts to near zero. This has subsequently been verified and total resettlement in the gas field development areas has been negligible (see Box 4 and Chapter 13). The resettlement that has occurred has resulted from the implementation of the buffer area around the plant and not from the flow lines, all of which were moved to minimise impact.

All of the impacts affecting family agriculture and compensation for lost resources were considered to be highly significant in the absence of sound management practices. Most rural people in Mozambique are extremely poor and do not have the resources to withstand even small losses. It was forecast that impacts of construction on machambas, while temporary, could severely affect households ability to sustain themselves. These problems were considered to be manageable as long as compensation procedures were fair and were carefully planned and implemented.

Of the other social impacts during construction, malarial risk, HIV Aids, social pathologies caused by in-migration and impacts on cultural traditions were all considered to be potentially significant in the absence of sound construction impact management. With appropriate management, their significance was considered to be low. As is outlined in Box 4 and Chapter 13, actions are being taken to address these issues.

Biophysical impacts during construction were considered to be generally less significant than social issues, subject to appropriate mitigation and management. A number of alternative sites were considered for the CPF and the selected option was well situated from a biophysical point of view. The site was proposed in habitats with low conservation significance and in which no threatened species were found. The site was also chosen partly because of its elevation so as to minimise the risk of flooding which is a problem over much of the lowland area in proximity to the coast. No significant drainage lines or wetlands were situated on or in immediate proximity of the site. Management recommendations were primarily aimed at preventing pollution while construction teams were on site.

The EIA forecast that most of the direct impacts of the project that would occur during the operational phase could be reduced to low levels of significance. In the remaining instances, where the design was still developing, recommendations were made to clarify design issues as the basis for a final assessment of impact as a part of the design EMP. The main outstanding concerns at the time of the EIA were:

- The discharge of treated effluent into the Govuro River: requiring more investigation before a final decision is made;
- Issues relating to the management of solid wastes: while quantities were expected to be small and high volume/low toxicity according to EPA criterion, details of the location and design of the facility were not available;
- Some outstanding questions concerning the venting of gases from the TEG unit as an alternative to flaring.

Box 4 below summarises some of the actions that have been taken to address the recommendations of the Design EMP.

The EIA forecast very limited positive and negative social effects in communities surrounding the CPF as a result of the operation of the plant. The NGP will neither benefit, nor prejudice large numbers of local people. The CPF is intended to be almost totally self reliant in respect of service provision, and with a small staff complement and a location remote from urban centres and the coastline, it was forecast that the impact on surrounding communities and future development would be small. Situated in dense woodland inland of the EN-1 highway, the facility will not be visible from the road and from any existing or future tourism development along the coast.

The EIA emphasised that Sasol's Social Development Strategy (as explained in the SDAP) in the local communities in the Production Blocks, will have an important bearing on whether the project is perceived to be beneficial or harmful by the majority of people who live in the area. If Sasol becomes involved in building capacity among local people and companies, with particular emphasis on creating capabilities that will serve the needs of the project over its envisaged 25-year lifespan, then the limited benefits that will flow from direct employment on the project would expand significantly.

The EIA considered the most significant impacts potentially affecting the NGP to be indirect, and

related to the opening up of access into previously remote areas. Access created by the permanent roads to the well heads will influence future settlement and resource use, which may be both beneficial and harmful, depending on how the issues are managed. While this possibility was favoured by many members of local communities who envisaged improved opportunities to hunt and harvest hardwoods and medicinal plants, it was of concern because of the

likelihood that such exploitation could easily become unsustainable, with significant loss of species richness and diversity.

Further details on these issues, with recommendations for action, have been provided in Chapters 3 and 6 of the RESA. (A summary of the RESA is provided in Chapter 11 of this document, while the SDAP is summarised in Chapter 13 below).

Figure 10: Three dimensional representation of the Central Processing Facility

Note: This representation is of the CPF as envisaged at the time of the EIA. Various changes have since been implemented

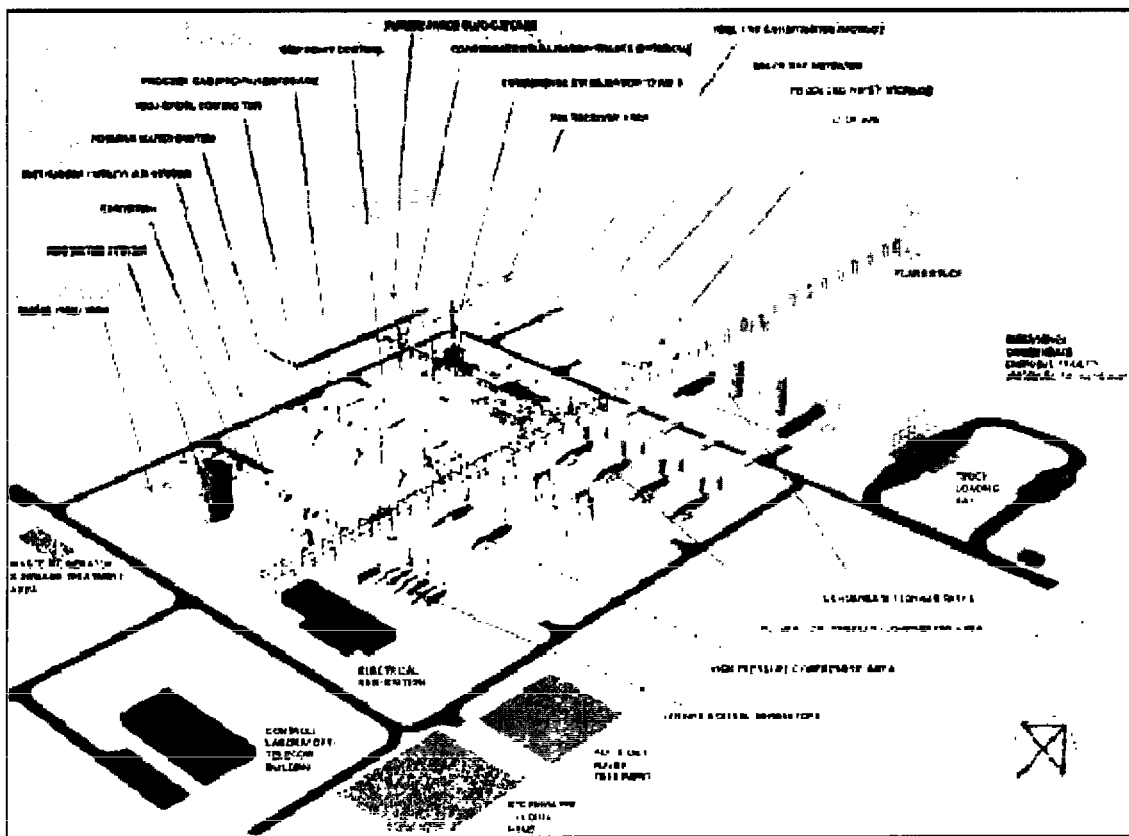


Table 5: Summary of Impacts as Foreseen in the EIA– Temane/Pande Gas Field Development (Construction)

ISSUE	KEY IMPACTS (CONSTRUCTION)
<b>Soil</b>	Sensitivity to soil erosion will vary. At the CPF, erosion risks during construction will be low. Along the flow lines, soils susceptible to erosion will be encountered in places and would need careful management to minimise risks. The concentration of water at discharge points of permanent access road drains will need to be carefully designed in these areas. Chemical amelioration of problems of soil sodicity is an option. The EIA concluded that, with good management, erosion impacts caused by construction of the CPF and ancillary facilities would be low.
<b>Terrestrial Habitats</b>	Total habitat loss was predicted as 280ha in the Temane Production Block and 257ha in the Pande Production Block (Figure 8). This represents 0,61% and 0,21% of the total areas of the two blocks respectively and 0,03% of the Exploration Area as a whole. In addition to the low impact in relation to the total area of the same habitat in Southern Mozambique, the EIA considered the significance of this impact to be low for other reasons. The production facilities will not impact on any of the eight sensitive terrestrial habitats defined in the investigation, with the exception of some flow lines in the north of the Temane Development Block that cross forest patches. The facilities will not impact on any protected areas or areas recognised as of conservation significance, and are not within any of the fourteen centres of recognised endemism. Much of the route along the flowlines to Temane, and the mainline between Pande and Temane is within the area referred to as an 'agricultural/ woodland mosaic' previously impacted by rural agriculture. The EIA considered the impact of flow lines on isolated forest patches to be significant and recommended rationalising the flow lines to use existing (previous) seismic lines, where possible, and to be aligned within the same corridor in cases where the route to the CPF could be combined.
<b>Wetlands / river systems</b>	The most important river and wetland habitats were considered to be the Save and Govuro River systems, the barrier lakes between the coast and the EN-1, and the short coastal streams. Most of the physical impacts caused by the production facilities will be in the drier areas west of the EN-1 highway. Of the total length of 177km of proposed flowlines, 12.4 km were proposed through seasonal or perennial wetlands. The EIA recommended the rationalisation of flow lines, as described under terrestrial habitats above, to minimise impacts on seasonal and permanent wetlands as far as possible. The most important potential impact was considered to be the flow line crossing the Govuro River and associated wetlands. It was recommended that final selection of the alignment across this river system be determined by detailed survey in the EMP, with consideration given to increasing the capacity of the pipe at the crossing to avoid the need for a further crossing if future production east of the EN-1 increases. It was further recommended that field reviews of the flow lines affecting seasonal and permanent wetlands be undertaken as a part of the rationalisation process, and that detailed specifications for construction management requirements be prepared in the C-EMP. Recommendations were made to check the final location of well heads in respect of flooding risk and to reposition any wells that were considered prone to flooding.
<b>Crop production</b>	Impacts on crop losses and other agriculture resources were considered to be of high significance in the EIA, but would be subject to effective mitigation subject to the necessary management procedures being implemented. The EIA recognised that communities living in the areas affected by the flow lines and production wells were extremely poor and that any disruption of family agriculture or loss of resources caused by construction could have severe impacts on families' ability to sustain themselves. A number of potential pitfalls, in respect of compensation for lost or damaged resources, were identified and evaluated based on the experience of communities affected by seismic lines by other companies in Inhambane Province. A series of recommendations were made to manage impacts on subsistence agriculture, the details of which were to be developed further in the Resettlement Planning and Implementation Programme. This programme is described in Chapter 13.
<b>Permanent land / productivity loss</b>	The EIA predicted that some 30ha of arable land would be permanently lost, predominantly as a result of access roads to flow lines. Losses will be greatest east of the Govuro River and along the EN-1 highway in the valley bottom soils that are intensively utilised. Less than 1ha of arable loss was predicted at the CPF and just over 5 hectares as a result of well head locations. The EIA recommended that where possible, the losses should be reduced by rationalising access roads to the well heads, as described above. Where permanent losses were unavoidable, it was recommended that equivalent land, in proximity, be prepared for the affected land users.
<b>Settlement</b>	The CPF is proposed in the central Temane area where settlement density is moderately low. The EIA predicted no direct impact on settlement resulting from its location, unless a safety zone around the plant was considered, in which case one household would have to be resettled. On the basis of the proposed production facility layout of flow lines and well heads, some 91 homesteads would have to be re-built in the Temane and Pande Production Blocks. This impact was considered highly significant. The EIA recommended minor shifts to flow lines, predicting that in most cases, the impact could be avoided. In the case of flow lines through areas of higher population density (such as Mamelaine) it was recommended that detailed re-examination of the flow line routes be undertaken, where necessary in consultation with the affected communities, to find a least impact alignment.



<b>Employment</b>	Most of the local socio-economic effects of the project will result from the direct impacts of jobs made available during the construction period (15-17 months). The EIA estimated that approximately 260 jobs would be available to Mozambicans. Induced impacts will result from increase in economic activity caused by local spending of income from jobs indirectly and directly created by the new project. Indirect impacts will also be generated by the ongoing construction needs. While the EIA considered the long term economic benefits of construction employment to local Mozambicans to be small, particularly because of the temporary nature of the jobs, the benefit was nevertheless deemed significant in the context of poverty and joblessness in Mozambique, particularly if measures were taken to enhance the benefits and avoid the negative side effects (refer below). The EIA recommended measures to ensure implementation of fair and equitable employment procedures, so as to benefit people in local communities as far as possible. Employment of Mozambique citizens during project operation was considered of low significance, with only maintenance personnel being employed annually to maintain the right of way. Employment disputes were considered a significant risk in the absence of appropriate employment procedures during construction. Recommendations were made in the EIA to manage this issue.
<b>In-migration</b>	The EIA forecast that in line with the experience of other large industrial projects in developing countries, there would be a high probability that, without appropriate management, people would migrate to the construction campsites in the hope of finding work. Informal squatter settlements have many negative implications, both for the squatters and surrounding populations. The EIA proposed measures to minimize the risk of in-migration, which included specific employment procedures, the prohibition of employment at the construction camp site gates, appropriate communication and agreements with local leaders concerning employment procedures and the wide dissemination of information about employment within surrounding communities.
<b>Malaria / HIV/Aids</b>	Local incidence of malaria, caused mainly during the construction phase, would be likely to increase unless managed. The EIA forecast that there would be a risk of HIV/Aids and other communicable diseases being spread as a result of the presence of the construction teams. The report recommended the preparation of detailed plans for the control of the spread of malaria and HIV /Aids, caused by the construction teams.
<b>Archaeology</b>	No archaeological sites or sites of cultural significance were found during the EIA surveys in areas affected by the proposed project infrastructure. The EIA recommended two levels of survey to be prepared during the design and construction phases. The first was an initial scan by the biologists responsible for the evaluation of the revised flow line and well head alignments during the preparation of the C-EMP. The second was an assessment by a professional archaeologist during bush clearing for the construction of project infrastructure. In the event of an accidental find, it was recommended that clearing be stopped, the site classified according to significance, and a decision taken on appropriate mitigation. It was further recommended that special provision for archaeological management be included in the C-EMP for the project, and that the protocol for accidental finds be included in this plan. Recommendations for managing impacts on graves and sacred sites were mainly through consultation with the affected communities during the course of compensation and resettlement planning for the project.

**Photograph 5: The Central Processing Facility under construction**

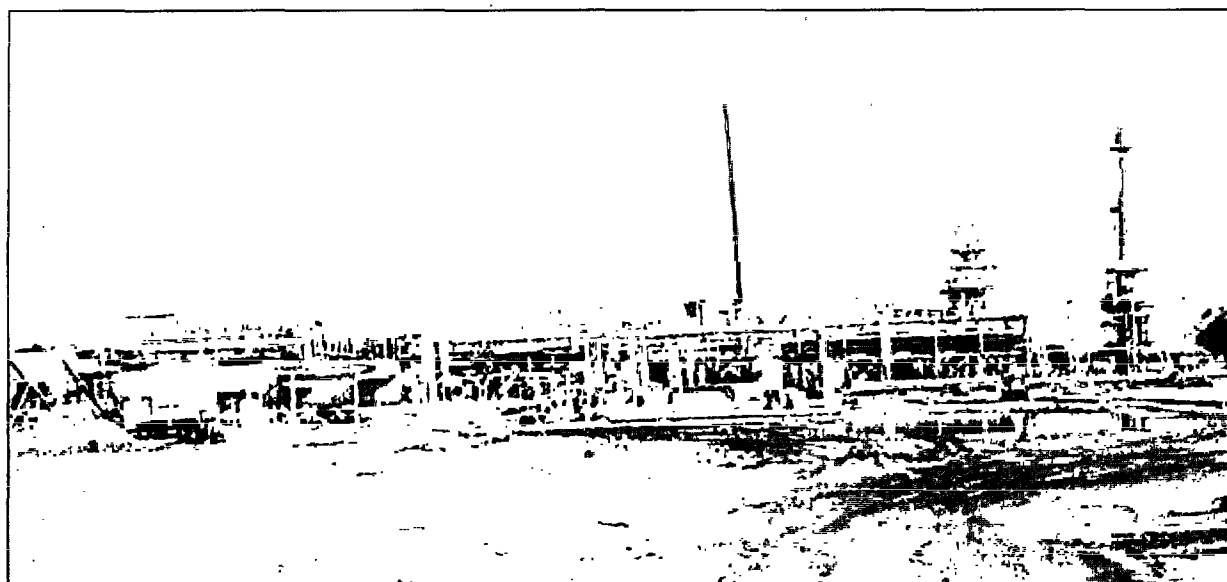


Table 6: Summary of Impacts as Foreseen in the EIA– Temane/Pande Gas Field Development (Operation)

ISSUE	KEY IMPACTS (OPERATION)
<b>Air quality</b>	Modelling of ground level concentrations of air pollutants was undertaken using the US EPA approved Industrial Source Complex prediction model. Modelling results were compared with the project guideline, based on the World Health Organization guidelines. Impacts caused by the operation of the CPF will be significant and will need to be managed through project design. Based on the emission levels of the equipment that will be installed at the CPF, and the permissible ground level concentrations of pollutants, air pollution impacts will result mainly from the emission of nitrous oxides. Other potential pollutants are carbon monoxide, methane, particulates and sulphur dioxide. None of these pollutants will reach ground level concentrations that exceed project guideline limits. With respect to NO <sub>x</sub> , under normal operating and upset conditions, ground level concentrations were predicted to exceed the guidelines. This impact could be controlled by increasing the stack height. Recommended actions included: re-calculation of ground level concentrations once detailed design information for equipment was available to re-calibrate the model, and reviewing the proposed stack heights based on this information; verification of the values for trace elements in the gas stream such as mercury and BTEX; re-examination of the proposal to vent gasses from the TEG unit rather than flare them; and various guidelines for environmental monitoring and auditing during the operation of the CPF and the installation of a full weather station at the plant.
<b>Surface and groundwater</b>	Potential impacts would result from the discharge of treated effluent from the CPF and from the disposal of solid wastes generated at the CPF. In dry conditions, the CPF will discharge small volumes of liquid effluent (approximately 15m <sup>3</sup> /day), consisting mainly of treated sewage effluent. The project standard for the effluent quality discharged from the site meets World Bank guidelines, and the EIA considered that good housekeeping should ensure that treated sewage causes no significant risks or nuisance. In the rainy season, provision is made in the CPF design to collect the first flush of potentially (mainly) oil contaminated runoff from the site (up to 300m <sup>3</sup> /day; oil contamination not expected to be large, but small spills and other minor contamination of hard surfaces at the plant anticipated), and treat this in an industrial wastewater treatment plant before release to the environment. The EIA considered the impacts to be potentially significant, but manageable with mitigation. It was recommended that more detailed evaluation of the two discharge options be undertaken in the EMP (local soakaway near the plant versus pipeline to the Govuro River) as well as further assessment of the industrial wastewater plant design to verify the capacity to deal with upset and emergency conditions. Potential groundwater contamination as a result of a proposed landfill site for project wastes was considered low, but detailed analysis was recommended in the EMP once the site location was determined and an initial disposal design prepared.
<b>Aquatic/terrestrial ecosystems</b>	The EIA considered the direct operational impact of the CPF, flow lines and wells to be of low significance. The key ecological impacts of the operation of the production facility will be indirect, and caused by the improved accessibility that permanent access roads to the well heads will bring to previously remote parts of the Production Blocks. This will increase the use of natural resources (increased wood cutting for charcoal and timber, bush and forest clearing for the purposes of permanent agriculture, more intensive harvesting of construction materials etc.). The EIA recommended that specific attention be paid to the management of this concern during the course of the EMP. (Refer to the RESA, described in Chapter 11).
<b>Risk assessment</b>	A full risk assessment was prepared for the EIA, consisting of an analysis of individual and societal risks around the CPF and along the flowlines. The modelling of risks at the CPF took into consideration the risk caused by pool fires, jet fires, explosions and the formation of a toxic cloud. Trivial risks (defined quantitatively as the acceptable limit to which the public should be exposed) were considered to extend from approximately 300m-400m from the boundaries of the CPF. In the case of the flow lines, this limit was determined to be 100m from the pipeline. The EIA recommended that consideration be given to restricting future settlement or other permanent infrastructure to specified distances around the CPF. It was estimated that one household would be affected by these restrictions. It was further recommended that the risk assessment be updated once the final design has been prepared.
<b>Noise</b>	Acoustic impacts of the operation of the project were forecast in the EIA and were considered significant. Key noise sources will include the air fan coolers that will be installed at the CPF. It was forecast that these fans could be heard 8km downwind of the CPF, which would result in sound levels that would be disturbing for people living within this area. Other nuisance affecting inhabitants near the construction sites will include dust, noise and, in some instances, temporary restriction of access.
<b>Sense of place</b>	The EIA forecast that the impacts of the NGP on sense of place in the area would be of low significance. The study recognised the importance of the coastline for tourism, particularly around Vilanculos and the Bazaruto archipelago, a site of national importance. Analysis of the visibility of the CPF showed that it would not be seen from any of the tourism destinations, being situated inland (west) of the EN-1 highway and separated from the coastal zone by a distance significantly exceeding the maximum extent of its visual impact. No other effects caused by the NGP would be likely to impact negatively on tourism and sense of place and overall, the aesthetic effects of the project were considered negligible. Recommendations were made to influence the appearance of the CPF site through landscape design, as a part of the implementation of the project.
<b>Employment/social investment</b>	There is a great need in the rural areas of Mozambique for long-term semi-skilled and skilled work. The EIA predicted that the local long-term employment benefits of Sasol's NGP would have moderately low significance due to the relatively small numbers of people required to operate the plant. At the time of the EIA, it was anticipated that some 80 jobs would be created that would be available to local people either as direct employees or on a contracted basis. The EIA forecast that for Sasol to operate successfully in the area for 25 years, it must consider strategic social investment in the local communities. This would include maximising upstream opportunities for service providers to the NGP and supporting social development projects.
<b>Condensate transport</b>	An estimated 471m <sup>3</sup> /day of condensate will be generated at peak production by the operation of the CPF. Subject to verification of its quality, the approved Development Plan proposes to sell the condensate at the factory gate. A number of transport options were under consideration at the time of the EIA including transport overland to a refinery, transport by pipeline to a refinery or transport by pipeline overland and by sea to an offshore buoy (SPM) near Bazaruto Island for further transport to a refinery by oil tanker. Because of its potential significance, and the fact that it was a preferred option for financial reasons, the EIA examined the impact of the marine pipeline option. It was concluded that while the risks of an accident were probably low, the consequences could be catastrophic for the island habitats and for tourism along the coast and Bazaruto Archipelago, particularly if the spill involved bunker fuel from the oil tanker. The EIA recommended that any further consideration of the offshore buoy option should be based on a full EIA including a comparative analysis with other options. It was further postulated that on the basis of the existing evidence, a road-based option, with the local employment that it would generate (nearly doubling the employment at the CPF), appeared to be a preferable option.

Table 7: Summary of EMP Recommendations and Mitigatory Measures – Temane/Pande Gas Field Development

### The Environmental Management Plan

Separate EMP and monitoring requirements were developed for the design, construction and operation phases of this part of the NGP and adopted by Sasol for implementation..

The **Design EMP** makes recommendations for the implementation of 53 actions. These range from general requirements to specific issues relating to the design detail of the project. With a few exceptions, mainly where compliance has been delayed for specific reasons, Sasol has implemented all of the actions described in the Design EMP. Compliance with these recommendations is summarised in Box 4 below.

The **Construction EMP** was developed as the basis for managing the activities of the construction contractors with respect to the impact of their activities on the environment. It contains environmental management requirements for all activities related to the construction and installation of the following project components within the Temane Development Block: well-heads, flowlines, access roads and CPF.

Detailed specifications were outlined for the following construction activities:

- Administration and general issues
- Community, stakeholder and government liaison
- Mosquito / vector control
- Access control
- Site preparation
- Water and effluent management
- Materials management
- Well-head site preparation and management
- Civil works
- Mechanical
- Borrow pit and quarry development
- Landscaping and painting
- Employment and labour management
- Site and camp establishment and management
- Fire prevention and management
- Demining
- Provision of utilities
- Waste management
- Logistics management
- Flowline installation and testing
- Steelwork
- Vehicle and machinery maintenance (and refuelling)
- Road construction
- Land use controls

A monitoring strategy was defined to ensure the efficacy of mitigation measures and to consider corrective action where necessary. The parameters to be monitored during the construction phase were specified as follows:

- Sewage effluent quality
- Groundwater quality
- Environmental dust
- Vegetation monitoring of rehabilitated areas
- Water quality in pans and wetlands prior to, during and after construction
- Site effluent (incl. runoff) water quality
- Leachate quality from waste site(s)
- Noise levels
- Water quality in the Govuro River

Inspections and audits are to be conducted to evaluate compliance to the requirements of the EMP. The Construction EMP also detailed requirements such as:

- Competency training and awareness creation
- Emergency preparedness and response
- Reporting requirements
- Contingency planning
- Implementation schedule and cost provisions
- Document control

The **Operational EMP** provides the tools for managing the operating impacts of the plant and will be implemented within the framework of an Environmental Management System such as ISO 14001.

A **Decommissioning EMP** will be developed, adopted and implemented in the last five years of the life of the project.

#### Box 4: Post-EIA Update of the Temane/Pande Gas Development Activities

Following is a brief outline of some of the key actions that have been taken in addressing the recommendations arising from the environmental and social impact assessment associated with the gas development activities:

- **Resettlement Activities:** Each of the different project components arising from the gas fields development have had their own specific implications in terms of resettlement: (See also Chapter 13 for a summary of the mitigatory actions taken).
  - *Central Processing Facility:* The planning of the CPF was undertaken in such a manner to avoid resettlement. Consequently there are no resettlement impacts associated with the CPF.
  - *Partial Protection Zone:* Due to security reasons and noise, a Partial Protection Zone has been established around the CPF. This zone will be 500m wide around the CPF, occupying an area of 310 ha. Resettlement impacts arising from the PPZ relate to the permanent displacement of five homesteads and 22 machambas and the associated crop losses from the 22 machambas.
  - *Main Access Road:* Access to the CPF is from the EN1 Road. This has required the construction of a new black top main access road 4.8 km in length. For resettlement purposes, a width of 15 m was applied. The alignment of the access road was selected with a view to minimising resettlement. However, complete avoidance was not possible. Resettlement impacts relate to the permanent displacement of four homesteads and 16 machambas, inclusive of crop losses from the 16 machambas
  - *Wells, Flow Lines, Access Roads and Ancillary Works:* The key resettlement impacts relate to grave exhumation and reburial, the resettlement of two homesteads, crop losses and the permanent displacement of machambas. The manner in which these impacts have been addressed is outlined in more detail in Chapter 13.
  - *Manhice Detour:* A detour around a railway bridge in the town of Manhice, Maputo Province, was constructed to enable road transport of large and bulky equipment from Maputo Harbour to the CPF at Temane. Resettlement impacts relate to crop losses and the temporary displacement of fifty machambas
- Various measures have been taken to implement the recommendations of the **Design EPM:**
  - An ecological evaluation has been undertaken of the least-impact crossing of the Govuro River, and pipelines have been enlarged at the crossing to prevent the need for future river crossings.
  - Compensation rates and procedures have been finalised and the resettlement action plan has been implemented (see above and Chapter 13).
  - An equitable employment policy and recruitment procedures has been developed for skilled and unskilled employees, and local employment has been maximised during construction; the policy includes procedures to minimise risks associated with in-migration.
  - Malarial and HIV Aids management programmes have been developed for the construction and operation of the NGP.
  - Provision has been made during the initial phase for the gas chemistry to be verified, for mercury and BTEX to be checked, and for the air pollution risk assessment to be modified as required.
  - The emissions and downstream ambient air pollutant concentrations have been re-modified on the basis of the final design. Provision has been made for the installation of a full weather station and for air quality monitors capable of measuring oxides of nitrogen, hydrocarbons, and particulate matter. Provision has also been made to flare all waste gasses from the TEG unit.
  - Proposals have been finalised for solid waste disposal, and the associated environmental risks have been assessed. Monitoring bore-holes have been installed at the CPF to monitor groundwater pollution.
  - The design details of equipment have been evaluated with a view to minimising noise emissions. Noise levels will be monitored and appropriate mitigatory measures will be taken as required.
  - A landscape masterplan for the plant is to be prepared with aesthetic criteria in mind.
  - The construction EMP has been completed and an operational EMS is currently being developed.
  - The risk assessment is being revised on the basis of the final design information.
  - A baseline monitoring programme has been developed and is under review.
- Procedures are implemented on an ongoing basis to monitor and manage the environmental aspects associated with the construction and installation of the well-heads, flowlines, access roads and the CPF. Audits and inspections are carried out on a regular basis to ensure compliance with the requirements of the EMP.

## 5. Pipeline between Temane and Ressano Garcia: Mozambique

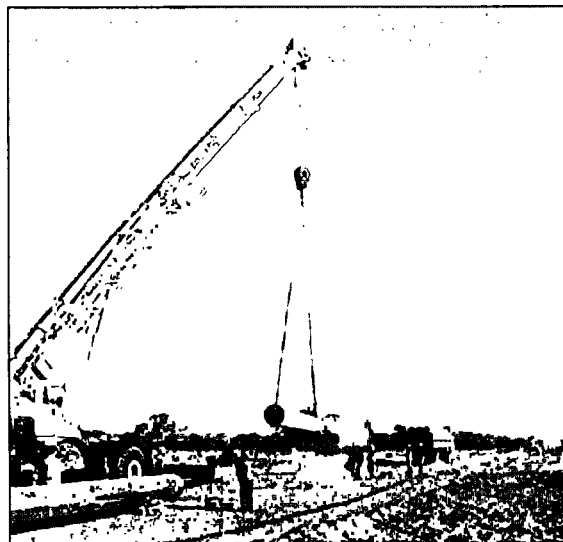
### Background

The EIA summarised in this section relates to the construction and operation of the Mozambique section of the gas pipeline for the project between Temane and Ressano Garcia.

### Project Description

The pipeline establishment entails seven main steps: route surveying and marking, vegetation clearing, trench excavation, on-site pipe welding, pipe laying, trench backfilling, and compacting and rehabilitation.

The 520 km pipeline runs in a virtually straight line from the CPF at Temane to Ressano Garcia at the South African border (see Figure 12). The pipeline, which has a diameter of 660mm, has been buried in accordance with ASME Standards. The right-of-way has not been fenced. Sasol's agreements have typically excluded the re-establishment of deep-rooted vegetation, but otherwise have permitted most agricultural activities (see Box 5).



Photograph 6: Stringing of the Pipe along the right-of-way in Mozambique

### Project Setting

The pipeline traverses the hinterland of Southern Mozambique, most of which has never been intensively settled. The war during the 1980s has led to a further reduction in rural populations. Moderately dense settlement is encountered at Ressano Garcia and at Chokwe, where the pipeline crosses the Limpopo River, but for the remainder of the route, the population is scattered.

Seven vegetation types have been affected in the study area ranging from lowland grassland to Miombo woodland. The land has been populated with subsistence farmers who have employed traditional slash and burn methods of field clearing and crop rotation. Agricultural practices in the areas of dispersed settlement are typically dependent on the availability of natural resources, such as arable land, water, pastures, forests and wildlife. Water availability is frequently problematic. Despite the extensive tracts of countryside with low population densities, large and medium sized mammal communities are remarkably depopulated.

### EIA Objectives

The key objectives of this EIA were as follows:

- To identify and evaluate the potential impacts of the construction and operation of the pipeline

#### Box 5: The Pipeline Exclusion Zone<sup>10</sup>

In Mozambique the following exclusion zones associated with the pipeline have been introduced:

- 200 m either side of the centre line: the area across which the construction of large buildings and large numbers of buildings is restricted;
- 100 m either side of the centre line: the safety zone of the pipeline, requiring no settlement of more than five dwellings per kilometre;
- 50 m either side of the centre line (known as the Partial Protection Zone (PPZ)): the area across which the construction of new buildings will be prohibited, and for which the exercise of any activity other than that for which the PPZ was defined, must be licensed;
- 15 m either side of the centre line: the area from which existing buildings and members of the local population will be resettled.

In practice, however, Sasol will not place unnecessary restrictions on land use within the zones. For the most part, once the pipeline trench has been rehabilitated, temporarily affected people will be able to return to their lands and agricultural practices. Only deep-rooted perennial trees will be prohibited from the 15m zone on either side of the pipeline. Crops such as maize, rice sugar cane, vegetables, millet, wheat, and bananas will be unaffected by any restrictions.

<sup>10</sup> Exclusion zones in terms of permanent rights of the owner and the agreement between owner and the GOM. The exclusion zones are defined partly in order to ensure a practical and enforceable process for the management of land use adjacent to the pipeline in Mozambique.

- To identify means of mitigating the negative impacts and enhancing positive spin-offs associated with the pipeline as a basis for the preparation of an Environmental Management Plan, which is to follow directly from this report;
- To ensure that Sasol's activities comply with the Mozambique regulations and policies regarding environmental impact studies and environmental protection.

### Screening of Route Corridors

Major alternatives to the proposed route were considered during the scoping phase of the project and a preferred corridor for detailed investigation in the EIA was identified. The analysis was completed and was approved by MICOA as a part of the Terms of Reference of the EIA on 29 January 2001. The study examined three corridors within a study area approximately 70 km wide between Temane and Ressano Garcia. The more direct route between Temane and Ressano Garcia was selected as an acceptable basis for the EIA investigation. The corridor deviated from a direct alignment in order to minimise impacts on the barrage and the settlements around Macarretane, at the Changane River and at other river crossings and wetlands. It was recognised that detailed investigation during the EIA and EMP would result in the development of a specific alignment within the corridor, taking environmental considerations into account.

### Key Issues and Questions Raised

The purpose of the public and authority scoping was to capture issues that required investigation in the EIA. The scoping was conducted in a number of forums established to encourage debate about the project. The following key issues were raised by I&APs during the public and authority scoping for the project:

- Employment opportunities and use of local labour;
- Degradation of the natural environment, and potential negative impacts of the construction process on the fauna, flora, soils, forest, wetlands and river systems;
- Protection of cultural heritage from potential damage by the pipeline construction crew and equipment;
- Management of transmission of STDs and HIV/Aids;

- Payment of compensation for losses incurred and damage to crops, restrictions on access to natural resources and loss of land;
- Restrictions on the use of land for future agricultural and other activities
- Post-construction utilisation of infrastructure by the local communities, including the use of temporary ports, construction roads and accommodation facilities
- Access to natural gas by the local communities
- Contributions by Sasol and provision of social services and infrastructure to communities
- Extent of risk associated with the pipeline

### Scope of Specialist Studies for EIA

The issues identified in the scoping process defined the scope of the specialist studies, which were commissioned to ascertain the impacts on:

- Habitats, Flora and Fauna
- River Systems
- Agriculture, Settlement and other Land Use
- Socio-economic impacts
- Cultural Heritage
- Public Health and Safety

### Alternatives Examined in the EIA

The alternatives considered in the EIA can be divided into route alternatives and process alternatives.

- The EIA involved the gradual refinement of **route alternatives** from widely separated corridor alternatives to a detailed route alignment with a level of accuracy of a few hundred metres. The specialist work completed for the EIS was undertaken within a corridor approximately 4 km wide. Changes that were made on the basis of the work done for the EIA included realignment to:
  - Avoid settlement along the route
  - Improve river crossings
  - Avoid wetlands and pans
  - Avoid seasonally inundated areas
- Consideration of **process alternatives** included the method of trench digging (separate stockpiling of trench topsoil recommended as opposed to methods which fail to separate topsoil and subsoil from the trench) and alternative methods of river crossings (open cut versus horizontal directional drilling). While open cut was considered to be an acceptable method for most river crossings (if constructed in winter, all but four of the sixteen rivers crossed would probably be dry), the EIA recommended that

horizontal directional drilling (HDD) should be investigated as an option for the Limpopo and Changane Rivers.

#### Codes of Practice

Sasol complies with the Code of Practice of the American Society of Mechanical Engineers for the Design, Construction, Operation and Maintenance of gas transmission pipelines (ASME B31.8).

For the purposes of an EMP, it was thus deemed unnecessary to replicate this code, particularly with respect to questions of risk and safety. The Code, for example, provides guidelines for the necessary approach to the engineering of river crossings in order to minimise safety risks due to scouring, and these are fully consistent with best international practice. The influence of the environmental team on

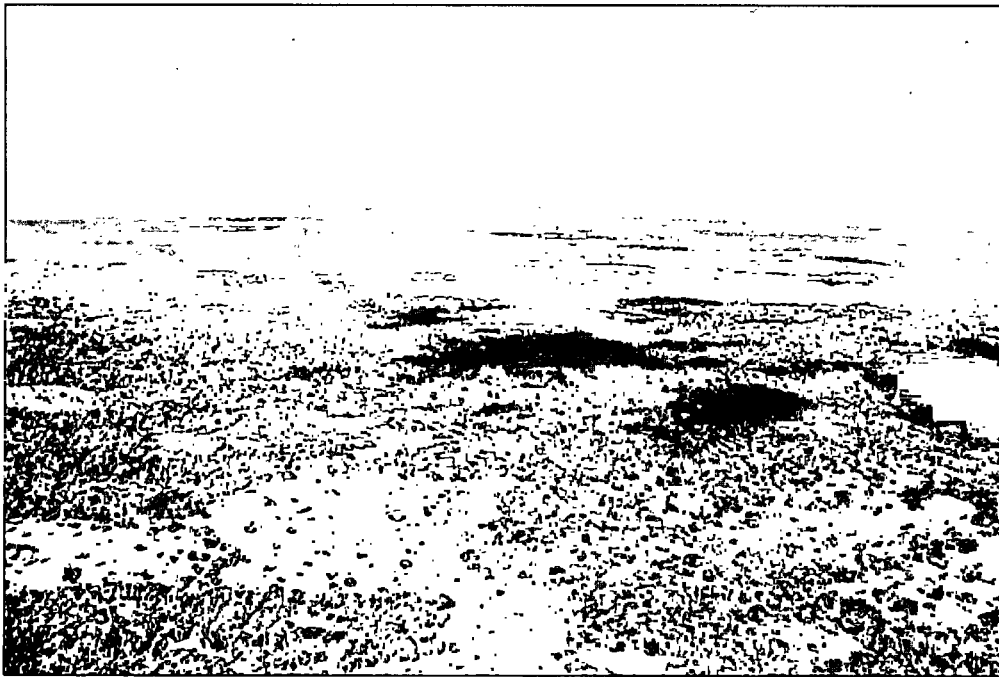
the design of the pipeline is most evident in the selection of a route and the specifics about any permanent works needed to manage impacts.

#### Summary of Key Impacts and Environmental Management Plans

A detailed summary of the main issues identified in the EIA is provided in Table 8. A summary of the key elements of the Environmental Management Plans is provided in Table 9.

#### Overall Conclusions

Most of the issues raised by the project are related to construction and the access created by construction. A general review of impacts of the extraction of gas in Mozambique and its utilisation in South Africa are covered extensively in Chapter 3 of the RESA (summarised in Chapter 11 below).



Photograph 7: Typical vegetation along the pipeline route between Temane and Ressano Garcia: Mozambique

Table 8: Summary of Impacts as Foreseen in the EIA– Pipeline between Temane and Ressano Garcia: Mozambique

ISSUE	KEY IMPACTS
<b>Soils</b>	Over much of the route the pipeline traverses soils that are moderately to highly susceptible to erosion. In particular, the duplex soils locally known as Mananga's, which cover a substantial part of the route, are often prone to erosion, even on gentle slopes. The EIA recommended careful management of topsoil and rehabilitation so as to minimise the risks of erosion during and after construction, the details of which should be specified in the construction EMP for the pipeline.
<b>Habitat</b>	The EIA considered the significance of direct habitat loss to be low for various reasons, principally because: the areas are small in relation to the total area of similar available habitat; most of the transformation is not permanent; and none of the habitats fall within the centres of plant endemism of global conservation significance identified within Southern Africa.
<b>Threatened/ sensitive flora</b>	Significant issues were identified in relation to sensitive and threatened plant communities that warranted particular attention in the final routing of the pipeline and the management of the cut line thereafter. The pipeline traverses Ironwood forest, which occurs mainly north of the Changane River. Although not a Red Data plant, it is an important commercial hardwood in Mozambique and is under local pressure as a result of harvesting for roofing timber and other purposes. The EIA estimated that construction of the pipeline would result in the loss of approximately 0,5km <sup>2</sup> of Ironwood over the 100km belt. This direct impact could be minimised by small adjustments to the route of the pipeline, reducing the area of Ironwood lost by approximately two thirds. While the managed direct impact on Ironwood and other forest species would be small, the EIA considered the potential for indirect impact on hardwoods to be significant, as a result of the improved access created by the construction cut line along the pipeline route. While it was recognised that existing hardwood exploitation was already considerable in the areas affected by the pipeline, the increased harvesting could reach unsustainable levels, resulting in accelerated depletion of the resource. The EIA recommended that specific attention be paid to this concern during the course of the EMP. (Refer below and to the Regional Environmental and Social Assessment, described in Chapter 11).
<b>Rivers wetlands</b>	At the time of the EIA, consideration was being given to crossing the Limpopo River using horizontal directional drilling methods, while the crossing of other rivers was proposed using traditional open cut methods. It was thought likely that four of the sixteen rivers to be crossed would be flowing at the time of construction. The other rivers are normally dry in the winter season and the EIA forecast that the significance of construction impacts at these crossings would be low. The Changane River channel and fringing wetland consist of deep, fine sediments, derived from the poorly drained Mananga soils. This will result in high and persistent turbidity during open cut construction. Given the remote location of the pipeline crossing and the pristine condition of this river system, the EIA recommended consideration of horizontal directional drilling for this crossing also. The EIA forecast that the pipeline's direct impact on wetlands over the length of the route would be small. The pipeline route avoids all of the small circular pans that are common between the Limpopo River and twenty kilometres north of the Changane River. Indirect impact on the hydro-dynamics of these systems would, however, be possible where the natural sequence of the duplex 'Mananga' soils in the pipeline trench is inverted, resulting in a decrease in permeability of the soils near the surface of the trench and the damming of water flowing in the surface sands on its upstream side. This could cut off the sub-surface flow feeding the nearby pans in these areas. The EIA considered this impact to be potentially significant but, subject to appropriate mitigation to ensure the continuity of the flow across the pipeline trench, the effects could be reduced to negligible levels. It was recommended that details of the methods to be used and the specific locations in which they should be implemented should be considered in the EMP.
<b>Threatened fauna</b>	The risk of pipeline construction to animal species was considered to be generally small. The usual factor of concern, habitat loss, was not a significant issue in the present case. Direct impacts as a result of mortality caused by heavy equipment and by poaching were the main concerns for construction contract management. The EIA considered all of these impacts to be avoidable with appropriate management during construction.
<b>Settlement</b>	Approximately 57 rural dwellings were estimated to be within the path of construction for the pipeline and would have to be relocated in the event that the route were not adjusted to accommodate them. Slight realignment of the pipeline in the final design to avoid these homesteads was recommended in the EIA.
<b>Agriculture</b>	The EIA forecast that the pipeline would impact on agriculture primarily as a result of construction damage done to crops and natural resources, and loss of labour inputs in the case where construction prevented people from planting the crops for which the ground was already prepared or delayed the preparation of fields for ploughing. Without soils management during construction there would be a risk of erosion and loss of soil productivity in the areas where erosion hazard is high. With appropriate management of soil stripping, handling, treatment and replacement, the EIA anticipated that this risk could be minimised and few areas of permanent impact on soil productivity should result. The EIA recognised that communities living along the pipeline route in Mozambique were extremely poor and that any disruption of family agriculture or loss of natural or other resources caused by construction could have severe impacts on families' ability to sustain themselves. A number of potential pitfalls, in respect of compensation for lost or damaged resources, were identified and evaluated based on the experience of communities affected by seismic lines by other companies in Inhambane Province. A series of recommendations were made to manage impacts on subsistence agriculture, the details of which were to be developed further in the Resettlement Planning and Implementation Programme. (See Chapter 13).



<b>Employment</b>	Local benefits flowing from job creation during construction were assessed as limited and short term (an estimated 100-200 construction jobs for a period of 18 months), but are nevertheless significant in the context of poverty and joblessness in Mozambique, particularly if measures were taken to enhance the benefits of employment and avoid the negative side effects (refer below). The EIA recommended a series of measures to ensure the implementation of fair and equitable employment procedures, so as to benefit people in local communities to the greatest extent possible. Employment of Mozambique citizens during operation of the project was considered to be of low significance, with only maintenance personnel being employed annually to maintain the right-of-way. Employment disputes were considered to be a significant risk in the absence of appropriate employment procedures during construction and recommendations were made in the EIA to manage this issue.
<b>In-Migration</b>	The EIA forecast that in line with the experience of other large industrial projects in developing countries, there would be a high probability that, in the absence of appropriate management, people would migrate to the construction campsites in the hope of finding work. Informal squatter settlements have many negative implications, both for the squatters and surrounding populations. The EIA proposed measures to minimise the risk of in-migration. These included: specific employment procedures, the prohibition of employment at the construction camp site gates, appropriate communication and agreements with local leaders concerning employment procedures, and the wide dissemination of information about employment within surrounding communities.
<b>Malaria / HIV/Aids</b>	Local incidence of malaria, caused by pipeline construction, would be likely to increase unless managed. The EIA forecast that there would be a risk of HIV/Aids and other communicable diseases being spread as a result of the presence of the construction teams. The report recommended the preparation of detailed plans for the control of the spread of malaria and HIV /Aids, caused by the construction teams.
<b>Nuisance</b>	Dust, noise and, in some instances, temporary restriction of access were considered to be the main nuisance issues affecting inhabitants in proximity to the pipeline construction train. The EIA proposed preliminary measures for mitigation of impacts and recommended that detailed specifications be included in the EMP for construction.
<b>Archaeology</b>	No archaeological sites or sites of cultural significance were found by the archaeological survey of the pipeline route during the EIA. Further work at two levels was recommended to verify these conclusions: the first by the biologists responsible for the detailed walk-through of the alignment during the EMP, and the second by professional archaeologists during the bush clearing. In addition, it was recommended that the teams responsible for the consultation with communities during resettlement and compensation planning should verify the absence of sacred sites on the route.
<b>Public health &amp; safety</b>	The public safety risks associated with the operation of the pipeline were considered in a detailed risk assessment during the EIA. On the basis of the design information and the surrounding land use and settlement information, the risk assessment found individual risk associated with the operation of the pipeline to be within internationally recognised limits. Key risk areas identified in the EIA for which detailed geotechnical assessment was required during the design were the major river crossings and areas of seasonal inundation. In addition, the EIA recommended that the pipe classification be verified once the details of the surrounding population densities could be more accurately determined. Measures were also recommended to ensure that sound communication channels were developed and maintained with local communities during operation of the pipeline. These communications should ensure that local people understood the hazards of damaging the pipeline unintentionally by excavating over it or other inappropriate activities. They should also ensure that safety agreements between the GOM and the pipeline operating company were respected and complied. These agreements limit the amount of future settlement permitted within the pipeline safety zone.

**Table 9: Summary of EMP Recommendations and Mitigatory Measures – Pipeline between Temane and Ressano Garcia: Mozambique**

### Environmental Management Plans

Separate EMPs were developed for the design, construction, operation and decommissioning phases of this part of the NGP and adopted for implementation by Sasol.

The **Design and Construction EMPs** are supported by the field investigations carried out as a part of the EMP. The fieldwork served a number of functions, including:

- The verification of conclusions drawn in the EIA, at a higher level of detail;
- The basis for recommendations for further adjustments in the route alignment, where these were considered to be necessary;
- The basis for specific and general recommendations for impact management during construction.

On the basis of the recommendations of the Draft EIA, the following specialist investigations were commissioned as a part of the Design and Construction EMPs for the project:

- An assessment of erosion hazard along the route
- A detailed field review of the proposed river crossings along the route with respect to the potential for riparian and in-stream impacts and the potential impact of the pipeline on the hydraulics of the perennial and seasonal pans
- A detailed field review of the habitats along the route alignment with specific reference to habitats of special importance and the occurrence of threatened species

A series of nine re-routes were recommended in the **Design EMP**. Five of these changes involved optimisation of the river crossings at the Incomati, Sabie, Zuene, Mazimchopes and Changane Rivers. The remaining four re-routes examined changes in the alignment to minimise impacts on Ironwood. While complete avoidance of Ironwood was not possible, the changes resulted in a reduction of the Ironwood directly affected over a linear distance, from 13.5 km to 5.1 km. All of the route changes were accepted by Sasol and were included in the final design.

The purpose of the **Construction EMP** was to set environmental standards for the construction of the gas pipeline. The objective of the environmental standards was to minimise the risk of damaging or impairing (a) the health or well being of the public, (b) land use and capability and (c) natural ecosystems and environmental quality. In terms of the commercial agreement with Sasol, the construction Contractor is legally required to comply with the standards set out in the C-EMP. The document is organised for the Contractor's use and does not deal with issues relating to compensation and resettlement. Management of these issues is not the construction contractor's responsibility and is handled by other Sasol teams (refer to Chapter 13 for details).

#### Project management and personnel

- Quality Management
- Training of Contract Teams

#### General conduct and site management

- Campsite Selection and Management
- Non-Hazardous Construction Waste
- Polluted Site Drainage
- Introduction of Invasive Alien Plants
- Complaints Register
- Trespassing, Poaching and Protection of Plants and Wildlife
- Domestic (Bio-Degradable) Waste
- Fuels and other Hazardous and Toxic Substances
- Fire Prevention
- Community Nuisance and Hazard
- Community Health

#### Pipeline routing

- Route Changes

#### Pipeline construction

- Access
- Vegetation Clearing
- Borrow Areas
- Blasting
- Drainage Lines, Approaches to Pans and Depressions
- Archaeological Sites
- Compensation for Damages
- Warranty of Re-vegetation
- Threatened Species
- Topsoil and Subsoil
- Stone and Rock Waste
- River Crossings
- Groundwater
- Graves and Sacred Sites
- Rehabilitation

#### Pipeline testing

- Hydro-testing

The Operation and Decommissioning EMP describes the following:

Operational impact management

- Legal Requirements and Standards
- Pipeline Maintenance and Surveillance
- Maintenance of the Right-of-way
- Liaison with Authorities and Local Communities
- Emergency Preparedness
- Management of Forest Resources

Pipeline decommissioning

- Abandonment Plan
- Development and Implementation of Abandonment Plan
- Land Use Management
- Soil and Groundwater Contamination
- Water Crossings
- Abandonment Options
- Post-Abandonment Responsibilities
- Ground Subsidence
- Pipe Cleanliness
- Creation of Water Conduits

Some of the key elements in the Operational and Decommissioning EMP are as follows:

- Requirements to comply with standards and codes of practice for pipeline design, construction, operation and maintenance
- Requirements for liaison with authorities and local communities during the life of the project
- Preparation of a detailed Maintenance Plan and an Emergency Plan for the operation of the pipeline
- Requirements for maintenance of the vegetation cover along the pipeline right-of-way, including responsibilities of the maintenance teams, right-of-way maintenance, training of teams, revision of the maintenance plan, and record keeping.
- Requirements for managing forest resources (subsequently been considered in more detail in the RESA - Chapter 11)
- Requirements for pipeline decommissioning. This includes an Abandonment Plan for submission to the regulatory authorities at least three years ahead of abandonment. The Decommissioning EMP specifies that Sasol shall examine alternatives to abandonment during the course of this investigation, which are to include options for re-use of all or sections of the pipeline for other purposes. Opportunities for meaningful input into the plan by stakeholders must be provided for. The EMP specifies that after abandonment, Sasol may retain a number of responsibilities for ensuring the pipeline remains free of problems. If required, Sasol to prepare a right-of-way monitoring programme. In developing this programme, any specific environmental or social issues that require management are to be evaluated. Finally, Sasol is to comply with all applicable regulations that have a bearing on pipeline abandonment at the time of decommissioning.

**Environmental Impact Monitoring**

The purpose of Environmental Impact Monitoring is to verify that the standards set for environmental impact management are complied with and to monitor and implement remedial measures in the operational phase of the pipeline. The monitoring of impacts associated with the construction and operation of the gas pipeline consists of three types:

- *Compliance monitoring:* to verify that the specifications and agreed procedures governing the environmental management of the pipeline construction are implemented by the responsible parties.
- *Baseline monitoring:* to evaluate how effective the environmental management has been, independently of whether the specifications in the project EMP have been complied with. The purpose of the baseline monitoring requirements is to verify that a stable non-eroding vegetation cover is sustained on the pipeline construction right-of-way and to ascertain the extent to which there is a gradual recovery of the naturally occurring species diversity in adjoining areas. The monitoring involves fixed-point photography and annual field surveys of five sites in each of the seven vegetation types for five years, after which the frequency and extent of monitoring may be reviewed.
- *Hardwood and Natural Resource Monitoring:* to monitor the use of the pipeline construction right-of-way for access to extract natural resources. The recommendations include a procedure according to which this monitoring should be done and reported. Further detail about hardwood and natural resource monitoring is provided in Chapter 3 of the RESA (summarised in Chapter 11 below).

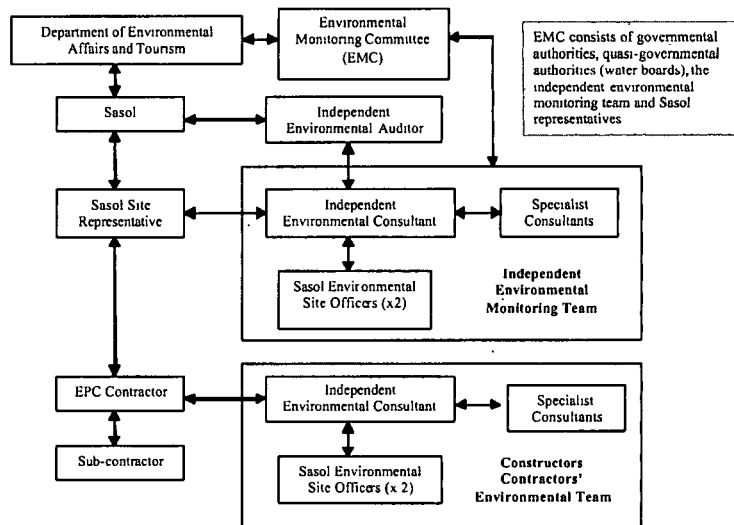


Figure 11: Organisation of Environmental Teams for Construction Monitoring

**Box 6: Post-EIA Update of the Pipeline between Temane and Ressano Garcia: Mozambique**

At the time of compiling this Executive Summary, significant progress has been made in constructing the pipeline. The expected completion date January 2004. Following is a brief outline of some key actions that have been taken in addressing the recommendations arising from the environmental and social impact assessment :

- The construction of the pipeline has involved de-mining and bush-clearing the entire route, thereby establishing a legitimate right-of-way for the project. This right-of-way is 30 m wide and is the area in which all pipeline construction activities occur. In addition, there are four base camp and lay down areas, requiring an additional 64 ha. In practice, there have not been unnecessarily burdensome conditions on land use within the pipeline servitudes. The pipeline alignment has been modified during the detailed design, land survey and bush clearing to avoid homesteads along the route. The predicted impact of 57 directly affected households along the route has been reduced to an actual impact of zero. Further details on the resettlement activities are provided in Chapter 13.
- Sasol's Public Liaison team has permanent staff members in the field. The Public Liaison team, the Resettlement and Compensation team and the project ESOs communicate directly with each other in respect of the management of community issues during construction.
- An archaeological survey of the route has been conducted by a professional archaeologist during the construction phase of the project, as required by the C-EMP. Stone age implements were found at two locations, along the Sabie River banks and in a borrow pit excavated by the contractor. Early iron age pottery was found at a site between Magude and Sabie. The small collection of stone and Iron Age artifacts is now stored in the archaeology department of the Eduardo Monlane University. Sasol is considering a request to further investigate the Early Iron Age Site which is considered to be important and worthy of official classification in terms of Mozambican law (Act 10/88);
- All of the river crossings along the route completed to date have been done using open cut trenching in dry (no flow) conditions. This includes the Changane River, for which horizontal drilling (HDD) was recommended in the EIA in the event of a wet crossing. The Sabie River is still flowing and has been crossed using HDD. The Limpopo crossing, using HDD is due to be started in the near future. The crossing of the Incomati River will be done in open cut.
- The geo-fabric recommended to ensure the continuity of sub-surface drainage around the pans north of the Limpopo River is in the process of being installed.
- Thirteen Baobabs that were directly affected by the alignment of the pipeline have been transplanted into adjacent areas.
- Efforts have been made to prevent the persecution of wild animals during the construction programme and regular toolbox talks are held to reinforce employee education in this regard.



**Photograph 8: Pipeline re-routed to minimise impacts. Thirteen Baobabs that could not be avoided were transplanted (Mozambique).**

## 6. Pipeline between Komatipoort and Secunda: South Africa

### Background

This component of the project investigated the South African section of pipeline, which is to transport natural gas from Komatipoort to the Sasol plant in Secunda. The construction of the pipeline started in June 2000 with commissioning being undertaken from 2003 to 2004.

### Project Description

The pipeline project entails seven principal activities: route surveying and marking, vegetation clearing, trench excavation, on-site pipe welding, pipe laying, trench backfilling, and compacting and rehabilitation.

The 336 km pipeline runs from Komatipoort on the South African border to the Sasol plant in Secunda. (see Figure 12). The pipeline, which has a diameter of 660 mm, has been buried in accordance with ASME Standards. The construction servitude for the pipeline is 20-25 m, while the permanent servitude is 6m. Sasol's servitude agreements have excluded the re-establishment of deep-rooted vegetation, but otherwise have permitted most agricultural and grazing activities.

### Initial Corridor Selection

In the initial assessment of corridor options, those options that affected the Kruger National Park and that passed through Swaziland were eliminated. The investigation showed that all options under consideration would need to cross the Mozambique border at a point somewhere between Komatipoort and the Mlumati River. Relief was the most immediate determining constraint affecting feasible access through the Upper and Lower Escarpment, and possible routes were limited to corridors that generally followed the course of river valleys. Two main corridors emerged, with possible variants along each alignment. (See Figure 12).

Starting in the east, various options presented themselves in the Lowveld Plains, where land use (mainly game farming and eco-tourism), were likely to influence detailed route selection. From Kaapmuiden westward, terrain became an important influence and the corridors separated, following widely different routes before rejoining north of Bethal. The separate corridors were referred to as the Northern and Central corridor alternatives.

From this point, a single corridor was proposed from the Highveld to Secunda. The study area was divided into three main zones for discussion:

1. Komatipoort to Malelane
2. Malelane to Bethal
3. Bethal to Secunda

Each of these sections was assessed in terms of constraints and opportunities, and a comparative assessment was undertaken for the two corridor alternatives (Northern and Central corridor alternatives). Relevant selection criteria were ranked and a simple preferred/not preferred categorisation was adopted.

On the basis of these investigations, it was recommended that the northern alternative be excluded from further investigation in the EIA. It was further recommended that route options be defined in more detail within the Central corridor and that these route options be taken through a full public participation process, including the involvement of the potentially affected landowners, as a part of the EIA.

It was also recommended that if consultation with I&APs raised possible alternatives within the corridor that deviated from the proposed route, then these should be defined and investigated as part of the EIA. As outlined below, alternatives were investigated, and changes in alignment have been undertaken (Box 7).

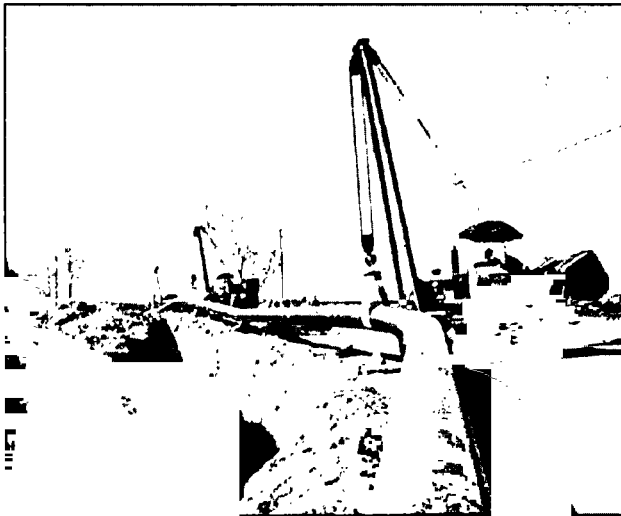
### Project Setting

Most of the study area is drained by the Crocodile River in the north and the Komati River in the south. There are 12 main river crossings along the proposed pipeline route. Two of these are on the Komati River, two are on the Suid Kaap River and eight are on the Kaap River. A large number of small streams will be crossed, particularly in the Highveld region. Several types of wetland are encountered in the study area and a total of 19 potential wetland crossings have been identified along the pipeline route.

A wide diversity of mammals occurs in the project area. Many of them are protected within the many game reserves, nature reserves, conservancies and Natural Heritage Sites found in the area.

Land use ranges from mixed farming, to grain, pastures and livestock, to afforestation, grazing, game

farming and eco-tourism. In the alluvial soils of the Lower Escarpment, and in the Lowveld Plains, high agricultural potential exists. Irrigation farming is practised in all of the major river valleys and their tributaries. Nelspruit is the largest town within the study area, with a relatively high growth rate of between 4.6% and 6.3% per annum.



Photograph 9: Laying of the pipe between Komatipoort and Secunda: South Africa

### EIA Objectives

The EIA for this section of the gas pipeline was undertaken with the following underlying objectives:

- To meet all of the requirements of the National Regulations concerning activities that could have a detrimental effect on the environment, and any other relevant legislation affecting the environment;
- To follow the Integrated Environmental Management (IEM) procedures promulgated by the Department of Environmental Affairs and Tourism and to test the approach to the EIA with key authorities and other I&APs before starting the study;
- To provide a thorough, objective and independent analysis of the impacts affecting the development, as a basis for informed decision-making by the relevant authorities;
- To encourage an open and constructive debate with I&APs and to determine the scope of work of the specialist studies taking into consideration the issues raised during this debate, and
- To identify ways to avoid or minimise negative impacts of the proposed activities.

### Scoping Process

Briefing Documents were circulated to I&APs, inviting comment and invitations to comment were placed in numerous newspapers. Open days, workshops and meetings were held with I&APs. The key issues identified during the Scoping phase of the project served to determine the scope of work for the EIA, and included:

- Disruption of agricultural activities and loss of arable land
- Damage to rivers and wetland systems
- Risks and losses for the commercial forestry sector
- Impact on historical sites and national monuments
- Loss of grassland habitats
- Impacts on game farming and private conservancies
- Impacts on State nature reserves and natural heritage sites

### Scope of Specialist Studies for the EIA

The issues identified in the scoping process defined the scope of the specialist studies, which were commissioned to ascertain the impacts on:

- Vegetation and soils
- River systems, seasonal wetlands and streams
- Selected terrestrial habitats
- Threatened plant species
- Threatened mammals
- Threatened birds
- Threatened reptiles and amphibians
- Arable agriculture
- Cultural heritage
- Public health and safety

### Servitude Policy for Landowners

The South African section of the pipeline is routed through private property. Some 256 landowners were identified as being potentially affected by the route at the start of the EIA. Sasol continued negotiations with these landowners throughout the course of the EIA process. Landowners were notified of the opportunities to participate in the EIA and were also informed that they were under no obligation to enter into voluntary servitude agreements (i.e. that Sasol did not have expropriation rights and would negotiate with all landowners on a willing buyer/willing seller basis). At the time of the completion of the final EIA, servitude agreements had been signed with all but four of the landowners.

An independent valuator was appointed by Sasol and its partners to assess the value of affected private properties. These independent valuations were used to calculate the reasonable commercial value payable for servitudes and formed the basis of negotiations about servitudes to be registered and compensation payable for damaged caused with landowners. The EIA forecast no resettlement along the pipeline, either of

landowners themselves or of farm labourers. This forecast subsequently proved to be accurate.

**Summary of Key Impacts and EMPs**

A detailed summary of the main issues identified in the EIA is provided in Table 10. The key elements of the EMP are summarised in Table 11.

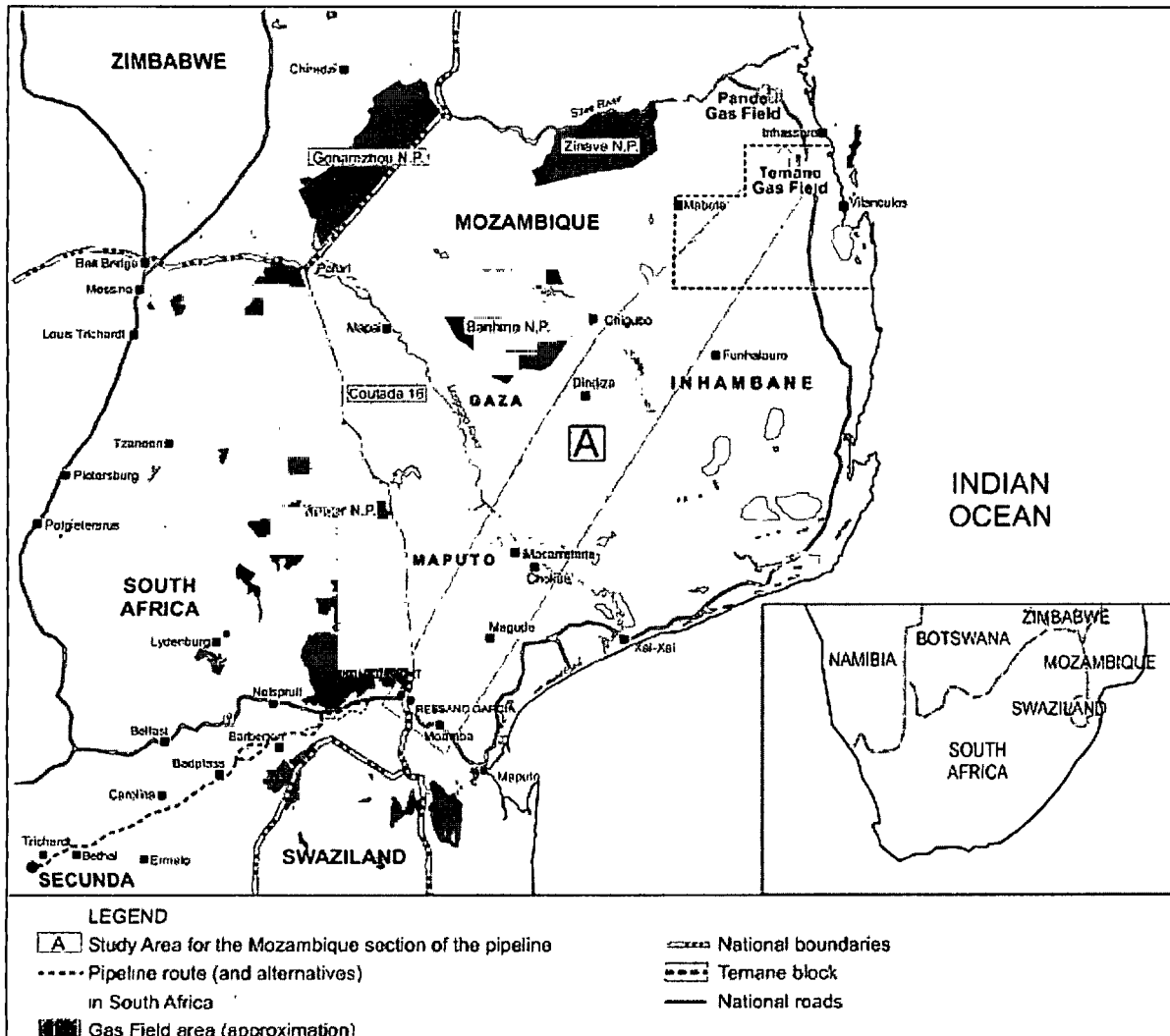


Figure 12: Various Route Corridors were examined in the EIA Scoping Phase for the Mozambican and South African pipeline sections

Table 10: Summary of Impacts as Foreseen in the EIA– Pipeline between Komatipoort and Secunda

ISSUE	KEY IMPACTS
<b>Soils</b>	Areas through which the pipeline is routed are moderately to highly sensitive to erosion. Weed encroachment and invasive plant infestation are a major problem in the project area. Various mitigation and management measures were prescribed in the EIA, including limitations in access to certain areas, careful reinstatement of natural ground contours after construction, rehabilitation of the right-of-way with selected perennial grasses, and careful post-establishment pasture management.
<b>River systems</b>	The assessment examined the twelve major river crossings along the pipeline route as well as numerous smaller seasonal drainage lines. While some of the rivers contained threatened fish species, most had been significantly impacted by agricultural and other land use practices and none was in pristine condition. The EIA concluded that sediment impacts during construction would be the major concern for which careful management would be required. All impacts were considered to be manageable subject to appropriate impact mitigation during construction. Various management recommendations were made.
<b>Wetlands</b>	There are 19 wetland crossings along the route. Realignment has been undertaken at five of these to avoid pipeline crossings. The provision of stable vehicle access while crossing, removal of material post construction to avoid flow impairment, and allowing natural re-establishment of wetland species have been implemented to ensure mitigation.
<b>Selected Terrestrial Habitats</b>	<p><i>Grasslands</i> along the pipeline route were identified as veld types of considerable conservation importance. The EIA established that grassland conservation was generally poor along the alignment with slightly over 8.2% of the 200 km route being pristine or minimally transformed. The EIA considered the impacts to be of high significance, but reducible to medium significance with management. It was recommended in particular that the pipeline route through the marginally transformed grasslands on the forest plantations be moved from firebreaks into the nearby plantations, to reduce impacts on untransformed grasslands. Further changes to the route to reduce impacts on grasslands were not considered practical since pristine grassland patches occur between arable lands and across rivers and are mostly unavoidable along the route. The EIA recommended restrictions to the servitude width, re-establishment of indigenous grass cover and minimising road construction in these areas.</p> <p><i>Sensitive habitats in the Carolina district</i> were investigated on the basis of discussions with Mpumalanga Parks Board. An analysis of three alternative routes over a distance of some 35 km was undertaken, based on the extent of habitat transformation of each route and other key features. It was found that the original route had the least impact on untransformed vegetation. The EIA recommended that the route remain as originally proposed.</p> <p><i>A proposed Natural Heritage Site east of Badplaas</i> was investigated as the basis of a route change. The pipeline route did not directly affect the heritage site, but its proponent was attempting to purchase the farms over which the pipeline was proposed in order to expand the core area committed to conservation. While the pipeline's immediate impact on land use was negligible its future opportunity cost was more significant. The EIA recommended that further discussions should be held by the relevant stakeholders in an attempt to find a mutually acceptable solution to the problem. Discussions were held post-EIA and a final decision was taken to re-route the pipeline along the main road so as to minimise future opportunity costs.</p> <p><i>A natural heritage site (Boondocks) near Kaapmuiden</i> was identified as a sensitive site affected by the pipeline route. On the basis of discussions with the landowners and an evaluation of the potential impacts, the EIA recommended that the route be altered to avoid these sites, and that a new and longer alignment along the main road should be selected.</p> <p><i>Sensitive habitats on Groenvaly farm</i> were identified during the EIA, where pristine grasslands would be affected and where the University of Pretoria had a grassland monitoring project. The EIA recommended a revised route to avoid this area.</p> <p><i>Devils Knuckles</i> is the location where the proposed pipeline crossed the escarpment. The crossing consists of a short very steep section that would be prone to visual scarring and erosion in the absence of appropriate management. The EIA specified measures to manage the impacts of the crossing, including temporary and permanent drainage control, construction techniques to minimise the risk of accelerated erosion during and after construction, and rehabilitation with indigenous grassland species.</p> <p><i>Private game farms between Komatipoort and Malelane</i> were identified as sensitive locations. Various sites within these farms were examined and evaluated. In all cases, recommendations (including route re-alignment) were made in the EIA.</p>
<b>Threatened flora</b>	The generic database of the occurrence of threatened (Red Data) plant species in South Africa showed that forty-three Red Data plants have been recorded in the vegetation types within which the pipeline is situated. No Red Data plants were found along the route during EIA surveys. Analysis of the specific habitat preferences in which the threatened species are known to occur, compared with habitats along the pipeline route, showed that their probability of occurrence was low to moderate. In light of the high degree of habitat disturbance along the pipeline route, the EIA considered the probability of impact on threatened plants to be low, and the likelihood of population level impacts caused by the pipeline to be very small. Verification of the absence of threatened plant species at a higher level of confidence was recommended as a task in the EMP.
<b>Threatened fauna</b>	The EIA found few specific concerns relating to the pipeline's impact on threatened animal species. The narrow footprint of the pipeline was considered to pose little threat to most animal species, which would simply move away during the period of construction. The known locations of threatened mammals (particularly Oribi and Red Duiker) were identified. Threatened bird breeding sites were also considered, with particular reference to species of very restricted distribution such as the Wattled Crane, Blue Swallow, and Striped Flufftail. An adjustment to the pipeline route was made to increase the distance from a Martial Eagle nest. Recommendations in the EIA included verification of occurrence of specific threatened species potentially occurring at known locations along the pipeline route, training programmes for construction employees to minimise the risk of persecution or poaching of wild animals and monitoring during construction to ensure the absence of impact.



<b>Commercial agriculture &amp; forestry</b>	Sasol places few restrictions on agriculture over its pipeline servitudes. Only deep-rooted crops are prohibited over the permanent servitude (6m wide) due to the risk that root damage could impact on the corrosion protection around the pipeline. Most annual crops, rice, sugar cane, vegetables and tropical fruits are permitted over the pipeline servitude. Typically, nuts, citrus and forestry plantations are prohibited. The EIA assessed the impact of the pipeline on commercial agriculture in respect of the loss of productivity caused by overturning of soils and the loss of production caused by prohibition of specific agricultural products over the servitude. Little significant impact was found as a result of construction damage to soils. The EIA examined examples of existing pipelines through arable areas. No evidence of loss of productivity was found in the cases examined. In a review of Sasol's policy restricting deep-rooted agricultural products over the pipeline servitude, it was found that modern clonal varieties of citrus could be removed from the list because of the shallow rooting structure of these plants. Overall, the pipeline's permanent impact on arable agriculture was considered to be small. Temporary impacts could be managed largely through negotiations concerning damage compensation with the affected land owners.
<b>Archaeology</b>	A desktop survey undertaken in the EIA found no sites registered along the pipeline route. It was considered probable that some sites would be found once detailed aerial photography was flown and ground-truthing could be done. The EIA recommended that an archaeological survey be undertaken once photography was available as a part of the EMP for the project. Small adjustments to the route or mitigation of impacts by collection of artefacts, mapping of the site or, in a very significant case, excavation, should minimise the risk of significant impacts on heritage resources.
<b>Public health &amp; safety</b>	A comprehensive risk assessment was undertaken as a part of the EIA for the project. Risks were evaluated on the basis of knowledge of local conditions, population densities near the pipeline and incident frequency data for natural gas pipelines published by the European Gas Incidence Group and other authorities. Risks were evaluated in accordance with the acceptability criteria defined by the United Kingdom Health and Safety Executive. In terms of the British land use criteria, no restrictions on land use would be required adjacent to the pipeline except for those uses considered to be highly vulnerable (eg hospitals) that should be located a minimum of 100m from the pipeline. Recommendations for social risk management included requirements for liaison with local authorities, preparation of necessary documentation to support the submission under the Major Hazards Installation Regulations, preparation of a written Emergency Plan, requirements for information to the public, and regular aerial monitoring to check for pipeline damage and potential third party interference with the pipeline.

**Table 11: Summary of EMP Recommendations and Mitigatory Measures – Pipeline between Komatipoort and Secunda: South Africa**

The EMP for the RSA section of the pipeline comprises the Design EMP, Construction EMP, Operational EMP and Decommissioning EMP that have been adopted, committed to an implemented by Sasol.

The **Design and Construction EMPs** are supported by a systematic Environmental Data Base. The fieldwork for the database served to verify conclusions drawn in the EIA, at a higher level of detail; provide a basis for recommendations for further adjustments in the route alignment; and to guide specific and general recommendations for impact management during construction. Forty three changes to the route alignment were recommended in the **Design EMP**. These were typically to:

- Minimise erosion hazards, particularly in the vicinity of active erosion gulleying common in the Sandy Highveld;
- Improve the crossing points over wetlands and streams so as to minimise risks of long term damage to these systems;
- Avoid archaeological sites and graveyards (some thirty-five archaeological sites were found during the EMP survey). Recommendations were made to alter the route around some of these sites but in some cases, where they were very broken down, the recommendations were to apply to SAHRA for a permit to construct the pipeline through the site;
- Avoid threatened plant species (found in one location along the pipeline route near Carolina);
- Avoid, where possible, areas of pristine grasslands, natural bush patches and rocky outcrops.

The purpose of the **Construction EMP (C-EMP)** was to set environmental standards for the construction of the gas pipeline. The objective of the environmental standards was to minimise the risk of damaging or impairing the health or well being of the public; land use and capability; and natural ecosystems and environmental quality. In terms of the Record of Decision published by the regulatory environmental authority, Sasol is required to comply with the standards set out in the C-EMP. The C-EMP gives detailed consideration to each of the following issues, and provides a set of project standards and recommendations for each activity or component of the construction phase as follows:

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>• Quality Management</li> <li>• Management of Construction Campsites</li> <li>• Management of the Construction Right-of-way</li> <li>• Emergency Preparedness</li> <li>• Management of Dust and Noise Nuisance</li> <li>• Community Health Management</li> <li>• Access</li> <li>• Threatened Species</li> <li>• Vegetation Clearing</li> <li>• Borrow Areas</li> <li>• Blasting</li> <li>• Wetland Crossings</li> <li>• Archaeological Sites and Graves</li> <li>• Warranty of Re-vegetation</li> </ul> | <ul style="list-style-type: none"> <li>• Training of Contract Teams</li> <li>• Management of Fuels and other Hazardous Materials</li> <li>• Land Owner and Occupier Relations</li> <li>• Fire Prevention and Management</li> <li>• Complaints Register</li> <li>• Route Changes</li> <li>• Areas of Special Sensitivity</li> <li>• Gates and Fences</li> <li>• Topsoil and Subsoil</li> <li>• Stone and Rock Waste</li> <li>• River Crossings</li> <li>• Groundwater</li> <li>• Reinstatement</li> <li>• Hydro-testing</li> </ul> |
|---|---|

A selected sample of some of the more important specifications in the C-EMP is as follows:

- Requirements for the preparation of method statements for key construction activities prior to the activity taking place
- Specific requirements to manage and monitor sediment, oil and other pollution risks at stream and wetland crossings
- Requirements to manage HIV/Aids in the workplace and minimise the risk of spread of HIV/Aids and other STDs
- Management of nuisance and maintenance of a comprehensive complaints log for the purposes of auditing
- Detailed requirements for topsoil management and rehabilitation
- Requirements for professional archaeological surveys to verify absence of sites and, if needed, to guide mitigation actions
- Specifications for the management of hazardous materials and wastes
- Requirements for the approach to investigations necessary to plan and evaluate the impact of hydro-testing of the pipeline
- Requirements for the ongoing training of employees on the contract site in respect of environmental considerations.

Some of the key elements in the **Operational and Decommissioning EMP** included:

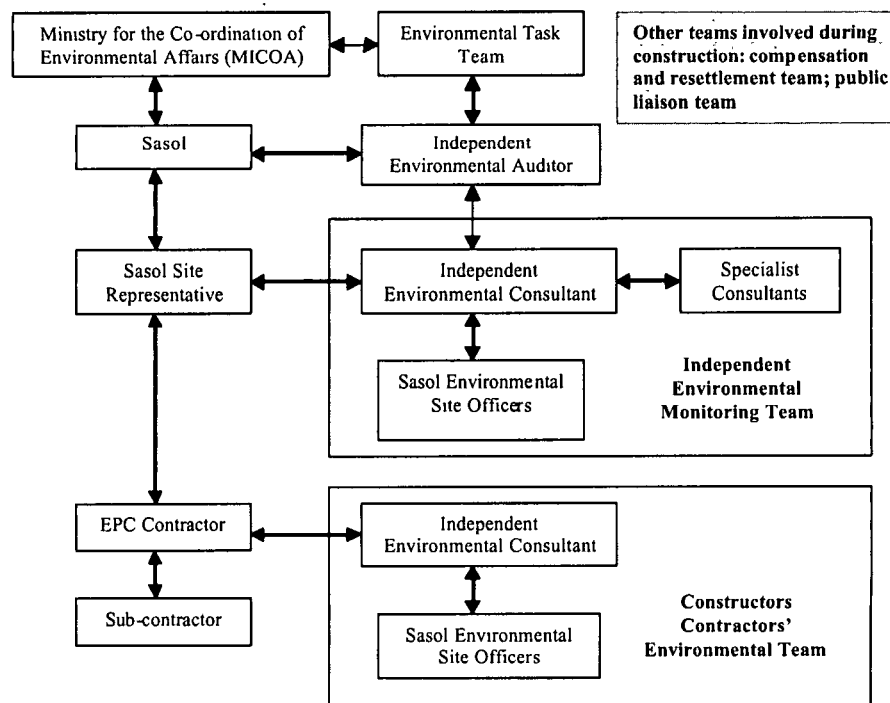
- Requirements to comply with standards and codes of practice for pipeline design, construction, operation and maintenance
- Requirements for liaison with authorities and local communities during the life of the project
- Preparation of a detailed Maintenance Plan and an Emergency Plan for the operation of the pipeline
- Requirements for pipeline decommissioning, including a detailed Abandonment Plan for submission to the regulatory authorities, before abandonment of the pipeline. All appropriate laws, applicable at the time, shall be complied with.
- An Environmental Assessment to be prepared in accordance with current legislation as a part of the Abandonment Plan. Compliance with the requirements for the development and the implementation of the Abandonment Plan to be included in the EMP.

**Environmental Impact Monitoring**

The purpose of Environmental Impact Monitoring is to verify that the standards set for environmental impact management are complied with and to monitor and implement remedial measures in the operational phase of the pipeline. The monitoring of impacts associated with the construction and operation of the gas pipeline consists of two types:

- *Compliance monitoring:* to verify that the specifications and agreed procedures governing the environmental management of the pipeline construction are implemented by the responsible parties.
- *Baseline monitoring:* to evaluate how effective the environmental management has been, independently of whether the specifications of the project EMP have been complied with. Baseline monitoring is also intended as a means of longer term (post-construction) verification of biophysical conditions along the pipeline route, and to critically evaluate such issues such as erosion, weed/alien infestation and habitat recovery along the pipeline right of way.

**Figure 13: Organisational Arrangements for Construction Monitoring: South African sections of the pipeline**



**Box 7 : Post-EIA Update of the Pipeline between Komatipoort and Secunda: South African**

At the time of compiling this Executive Summary, significant progress has been made in constructing this part of the pipeline. The expected completion date is January 2004. Following is a brief outline of some key actions that have been taken in addressing the recommendations arising from the environmental and social impact assessment::

- Changes in alignment were made to avoid impacting the proposed natural heritage site near Badplaas.
- A route change was made following agreement with landowners to avoid four intended crossings of the Kaap River. This change was supported by an independent environmental review.
- The construction management procedure is being implemented as specified by the Record of Decision for this part of the NGP also involving the Construction EMP. Environmental capability during construction includes: an environmental manager and two full time site officers (contractors' staff); a senior independent environmental co-ordinator and two full time environmental monitors (environmental monitoring staff); and specialist consultants appointed by the contractor and the environmental consultant as required. Specialists have included wetland, river, archaeological and rehabilitation experts.
- Quarterly independent audits of construction activities are being undertaken.
- The MHI regulations have been complied with and discussions with local authorities regarding emergency response and management have been completed.
- An EMS for the operation of the project and the implementation of the relevant EMP is being prepared in accordance with the requirements of the RoD.
- Specialist archaeological input has been obtained from a professional archaeologist along each section of the route during clearing and a number of minor route adjustments have been made to avoid 17<sup>th</sup> century Iron Age sites and grave sites. No damage to heritage sites requiring permit approval has occurred.
- Final checks for threatened species (wetland and terrestrial) have been made. No threatened species have been found.
- Post construction monitoring of sedimentation impacts in the drainage lines and streams crossed by the pipeline has shown low levels of downstream impact and no impact which will be irreversible with time. The assessments have been undertaken by aquatic specialists. The 2002 summer season was a drought year and flushing of construction sediment from the stream channels downstream of the works has not been as great as would normally be expected
- Specialist bio-assays (Daphnia screening) of the water used to hydro-test the pipeline are currently being undertaken as a basis for a recommendation about the disposal of the effluent. The additives to the water have been altered from the original formulation proposed by the contractor in order to avoid the use of biocides;
- The appointment of a rehabilitation expert by the contractor is currently being finalised; once appointed, the expert will advise as to appropriate rehabilitation methods to meet the project standard in the EMP.

## 7. Secunda Interface

### Background and Project Description

This component of the project covers the interconnection of the natural gas pipeline from Mozambique with the pipeline that will be routed from the Sasol Secunda plant to Unit 42 in the primary area. The scope of the project includes the installation of a Pressure Protection System (PPS) and tie-ins to the existing flare system.

The PPS will:

- Include shut-down valves as appropriate
- Have two flow meter runs
- Have a cyclone separator and filters to remove dust particles
- Require a gas heating system that will counteract the effect of pressure reduction
- Include a gas heating system that will prevent further condensate formation
- Require pressure control valves with an independent shut valve

### Alternatives Examined

In implementing this section of the NGP, Sasol considered three different options for routing the pipeline (namely, entering Sasol from an easterly, northerly or westerly direction), and two different options for constructing the PPS (either outside the secondary area or within Unit 42 within the Sasol complex). The preferred options were to enter the Sasol complex from a northerly direction and to situate the PPS at Unit 42 within the Sasol Secunda complex.

Photograph 10: Sasol Secunda Plant



### Application for Exemption

Due to the minimal and non significant nature of the impacts, the fact that these impacts are mainly on-site and the proposed implementation of mitigatory measures, an application was submitted, as provided for in law, to the Mpumalanga Department of Agriculture, Conservation and Environment (DACE) for exemption from EIA requirements.

### Record of Decision

In December 2001, DACE granted authorisation to construct the Sasol Interface without requiring an EIA, subject to certain conditions relating to the construction and operation, as outlined below. The decision was made based on the following:

- The environmental impact of the overall NGP project has been addressed separately
- Provision has been made for public participation in the decision making process of the overall NGP
- The pipeline route within the complex follows existing pipe tracks as stipulated in the motivation for exemption documents
- The PPS is very low maintenance and low impact
- The process involved at the interface is not considered a scheduled process

Aside from a suite of general conditions specified in the RoD a number of construction and operation conditions are stated regarding the following:

- Raw materials and proximity to runoff water
- Treatment of hazardous materials
- Avoidance of soil contamination
- Sourcing of fill material
- Soil erosion and soil treatment measures
- Waste management
- Water pollution prevention

**Table 12: Summary of Foreseen Impacts – Secunda Interface**

ISSUE	KEY IMPACTS
<b>Solid waste</b>	The excavated material and construction waste from the PPS could impact on the environment. The identified mitigatory measure is that the topsoil be stripped and used for rehabilitation at the borrow pits.
<b>Liquid effluent</b>	Possible impacts associated with the disposal of water used for hydro-testing and flushing during construction. It is recommended that only clean water be used for this.
<b>Emissions</b>	Venting of purge gas and off-spec gas. To be mitigated through optimised control measures and the authorised flaring of off-spec gas.

**Table 13: Summary of EMP Recommendations and Mitigatory Measures – Secunda Interface**

<p><b>Environmental Management Plan</b> Provisions of the Environmental Management Plan for the RSA pipeline (summarised above in Table 11) are applicable to the Secunda Interface, with the important proviso that many of the sections are redundant due to the fact that this pipeline and the associated infrastructure are built within the Sasol Secunda plant.</p> <p><b>Environmental Monitoring</b> Environmental Impact Monitoring measures implemented to verify that the standards set for environmental impact management are complied with and to monitor and implement remedial measures in the operational phase of the pipeline.</p>
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**Box 8: Post-EIA Update of the Activities of the Secunda Interface**

At the time of compiling this Executive Summary, the construction phase of the Secunda Interface was well underway. Currently monitoring is taking place on a three-weekly basis to ensure environmental compliance during the construction phase. Any observations and non-conformities on aspects and issues found during the environmental verification inspections are recorded. A verification report is then issued to the relevant project team members following each verification inspection.

## 8. Secunda Plant Expansion

### Background

The Sasol plant in Secunda produces synthetic gas (syngas) from coal. In turn the syngas is used to make a variety of fuel and chemical products. Over the past few years, two large EIAs have been conducted for proposed expansions in gas production at the Sasol Secunda plant. The first of these EIAs was the Medium Term Gas Expansion (MTGE), which assessed a 6% increase in petrochemical operations. MTGE was subsequently approved by the authorities subject to a number of conditions.

In August 1998 a second EIA was initiated on a potential further 15% increase in gas production above MTGE. This expansion was dubbed 'Sky-High' and required 'de-bottlenecking' across the plant rather than an expansion of the plant itself. The Sky-High EIA assessed an expansion based on coal use (the current situation), the possible use of natural gas from Mozambique, or a combination of gas and coal.

In March 1999 on completion of the specialist studies, market conditions forced the proposed Sky-High project to be shelved. However at the beginning of 2000 following a significant improvement in market conditions, Sasol Limited decided to revisit their initial proposed 15% increase in gas loads focusing only on the natural gas route. The revamped project has been called 'Natural Gas Expansion' or NGE. Sasol have opted also to complete the EIA that was started on Sky-High but in keeping with NGE, focusing only on the gas option, and used the potential 15% gas load increase as basis for approval. Subsequently the gas load increase has been estimated to be in the region of 3%.<sup>11</sup> The NGE Project aims to further de-bottleneck the existing Secunda plant in phases over time in order to obtain higher gas loads over and above what has been achieved with MTGE. The main components of the Secunda plant will remain mostly unaffected.

### Project Description

The first point at which the gas will be used is in providing the feedstock for a 3% increase in gas load at the Secunda plant. Existing coal use will remain unchanged with coal to gas conversion remaining a central activity. The natural gas requires some processing to give it the same properties as the synthetic gas used for liquid fuels production.

### Project Setting

The Sasol Secunda plant and the Sasol Mining operation in Secunda is situated in a rural area in the Highveld Region. Although the area has been modified by industrial activity such as mining and power generation, it also supports agricultural activities, various small towns and rural settlements.

### Scoping Process

The public participation process conducted for this EIA began in August 1998 and ran until April 1999 with the distribution of the Draft EIR. Thereafter the process was re-initiated in March 2000 for reviews of the draft EIR. Scoping was conducted between August and December 1998. Extensive public participation was also undertaken during the EIA for the MTGE project between October 1997 and June 1998. Initial stakeholders' comments on the proposed Sky-High Project were also obtained during meetings in October/November 1997. Most of the issues raised were also applicable to the Sky-High EIA. For these reasons, and in order not to waste the time of I&APs, the Scoping Phase for the Sky-High EIA focused on confirmation of the issues already raised.

### Scope of Specialist Studies for the EIA

The issues identified in the scoping process defined the scope of the specialist studies, which were commissioned to ascertain the impacts on: air quality, human health, surface water environment, and solid waste, as well as assessing the macroeconomic and socio-economic implications.

### Alternatives Examined

During its pre-feasibility studies, Sasol considered several alternative ways of increasing the gas loads at the Sasol Secunda plant. These included: using coal from own coal mines at Secunda, using coal from other coal mines, use of natural gas from Mozambique (feasible), using alternative technologies (not feasible). The technically and financially most feasible is the use of natural gas from Mozambique as raw material to generate the increase in gas loads.

### Summary of Impacts/Mitigation Recommendations

Table 14 summarises the main issues identified in the EIA, as well as the key mitigation recommendations.

<sup>11</sup> The EIA has been done based on a 15% gas load increase. The initial feed rate will be 3% of baseload.

Table 14: Summary of Impacts and Mitigation Measures as Foreseen in the EIA – Secunda Plant Expansion

ISSUE	KEY IMPACTS
<b>Air quality and Human Health</b>	Very low impact. Refer to Table 15 below.
<b>Surface water environment</b>	The project will only influence the water balances of the ash water, process water and raw water preparation systems. The net effect on these systems is favourable bar a slight worsening of 0,09 ml/day in excess water in the ash water system.
<b>Solid waste</b>	The use of natural gas only as a feedstock will result in a low relative increase in waste production. Impacts due solely to the project are negligible. Rehabilitation of the Black Products area will be a significant improvement in the environmental management performance at the Sasol Secunda plant.
<b>Socio-economics</b>	Some 6500 people are currently employed directly by the Sasol Secunda plant, with another 6000 contract workers who, at any stage, may be active in the Secunda plant. Permanent employment at the Secunda plant and Sasol in general is in a state of decline. NGE will not significantly reduce unemployment in the area in the long term. Unemployment is projected to grow to 50% should no new major developments take place, and the active labour force remains stable. While permanent jobs as a result of the project will not relieve unemployment, new temporary jobs have the potential to impact positively on between 1000 and 3000 families. It is recommended that local content is maximised during the construction and development phases by developing a policy of preference to the local labour force, together with the implementation of a skills-training programme. In addition, Sasol should link the Secunda plant developments to existing support for SMMEs indicating existing joint ventures between larger contractors and black entrepreneurs.
<b>Macro-economics</b>	New developments will provide opportunities for a variety of suppliers, engineering services, building and other contractors. For the expansion option, an estimated R647 million will be invested locally. It can be expected that a substantial portion of these funds will go to local contractors. Local businesses will gain significantly from spending during the construction phase of the project. Some R10 million will be spent locally. Should the 30 permanent jobs be new jobs, another R2 million or more could be spent locally. Between 12-33 additional jobs could be created in the service sector, through a multiplier effect. Sasol contributes almost 62% of the gross geographical product of the region. It is unlikely that the income base will change until the local economy becomes more diversified.

Table 15: Recommended Management Measures – Secunda Plant Expansion

Issue/Aspect	Recommended Management Measures
<b>Air quality and Human health</b>	Fugitive emissions will be mitigated by applying the correct gaskets and flanges to minimise these emissions. Regular inspections to be carried out on all seals and flanges. All flanges and pumps will be contained within a bunded area. The above are incorporated in the final engineering design and the ISO 14001 procedure is amended accordingly. During a plant trip or a power failure, all the gases are channelled to the flare system.
<b>Surface water environment</b>	Most of the effluent streams are recycled back to the process plants and currently the plant has a negative water balance because of low rainfall.
<b>Solid waste</b>	Waste is separated into recyclable, non-recyclable, hazardous and general. All non-usable general waste is disposed at a licensed general waste disposal site whilst the hazardous waste is disposed of at a licensed hazardous waste disposal site. Inert catalysts such as those made up of alumina molecular sieves are deposited at a licensed landfill site once in 12 years. Other catalysts have contracts in place with the suppliers to be returned and regenerate at their regeneration facilities.
<b>Socio-economics</b>	This is a positive impact. The contractors are advised to use local labour during the construction and maintenance of the plants. The labourers are trained in construction activities thereby increasing the skills base of the community. The contractors are also advised in the contracts to use local products if available.

**Box 9: Post-EIA Update of the Secunda Plant Expansion**

As detailed information on the various Sasol Secunda plant implementation phases of the project was not available at the time of completing the EIA further investigations on the environmental aspects and impacts are required to be undertaken as this information becomes available. The Mpumalanga Department of Agriculture, Conservation & Environment (DACE) agreed that an internal scoping exercise is to be conducted and an EMP compiled for each of the various components of the natural gas expansion project. These EMPs are to be submitted to DACE for information without requiring additional authorisation. These EMP's will be implemented and monitored via verification inspections and audits. This will be done in conjunction with the Project Manager and other members of the Project Team. Any observations and non-conformities on aspects and issues found during the environmental verification inspections are recorded on the Environmental Database under the close-out register. A verification report is then issued to the relevant project team members. Any changes in the documented procedures resulting from the corrective and preventative action(s) are recorded and tracked in detail.

## 9. Sasolburg Plant Conversion

### Background

The conversion of the Sasolburg plant from coal to natural gas as feedstock would create an anchor market for natural gas, enabling the overall NGP to be economically viable, whilst the South African market for natural gas is developing.

### Project Setting and Description

The Sasolburg facility is a large industrial complex, established in 1950. Since then Sasolburg town and Zamdela residential area have been established to the north and south of the complex respectively. Most of the plant is concreted over or has been constructed on in the past. The area inside the plant is approximately 200 ha in size and is completely fenced. Sasol proposes converting its current coal-based operations at the Sasolburg facility from using coal as a raw material to using natural gas. Although the raw material would change, the plant would continue to produce the same products as at present. The conversion at the Sasolburg plant will entail the closure or scaling down of certain existing plants and the construction of a number of new plants.

### Objectives of the EIA

The objectives of the EIA were to:

- Provide the Free State Department of Tourism, Environmental and Economic Affairs with sufficient information to produce a record of decision regarding project authorisation;
- Assist the project engineering team from an environmental planning perspective;
- Ensure the consideration of public and authority concerns in project planning;
- Provide a conceptual EMP to provide management measures to mitigate significant negative impacts of the Sasolburg conversion.

### Project Process

The nature and quantity of raw materials would change; in particular, natural gas would replace coal. In addition, several current processes, such as the production of gas from coal and the purification of gas, would no longer take place. Several new processes, such as the natural gas reforming process, would be required. Products such as methanol, ammonia and waxes would continue to be produced at the Sasolburg plant but would be manufactured from gas produced from natural gas rather than gas from coal.

### Alternatives Examined

The key project alternatives were identified and considered as follows:

- Power generation alternatives
- Process alternatives
- Location alternatives
- Input alternatives

### Scoping Phase

The scoping study, which was undertaken between June 2000 and January 2001, involved an issues-gathering stage in which I&APs were encouraged to raise environmental issues and alternatives requiring further investigation in the EIA stage. The issues and alternatives raised by I&APs and authorities include the following:

- Loss of job opportunities at the Sasolburg plant and amongst service providers and suppliers;
- Socio-economic implications on the community as a result of the job losses;
- Improvement in quality of atmospheric emissions;
- Implications of the project on the health of the community;
- Safety issues associated with the transport and use of natural gas at the Sasolburg plant;
- Reduction in the production of solid waste;
- Reduction in water use and improved quality of liquid effluent;
- Cumulative and strategic aspects of the overall Natural Gas Programme;
- Public involvement programme.

### Specialist Investigations

Key issues raised during the scoping phase, which would be the subject of specialist investigations, were agreed in the review of the Plan of Study for the EIA. Studies were undertaken in the level of detail required to address the issues raised. Full specialist studies, including the collection of baseline data, were undertaken to assess the socio-economic impacts, as well as the impacts on air quality, health, and groundwater surface-water. The following issues required a confirmation of information provided by Sasol, rather than a full impact assessment: human resources, risk and noise.

### Summary of Key Impacts

A detailed summary of the main impacts identified in the EIA, and the recommended management measures, is provided in Tables 16 and 17.



Table 16: Summary of Impacts as Foreseen in the EIA – Sasolburg Plant Conversion

ISSUE	KEY IMPACTS
<b>Economic</b>	The closure of plants at the Sasolburg plant would lead to direct job losses. It would also reduce the income of many of the Sasolburg plant's service providers and suppliers. During ongoing operations, the project would contribute approximately R325 million less to the Free State's Gross Geographic Product (value of all goods and services produced in the Free State) compared to the no-go option of continued use of coal as feedstock. Although it is difficult to calculate the exact impact on Sasolburg's economy, it is clear that the impact would be significant.
<b>Employment / income</b>	As a worst case, the project would lead to approximately 1 135 job losses in the Vaal Triangle Industrial Area. 970 of those would be in Sasolburg. These job losses are significant in light of the already high and steadily increasing unemployment in the Sasolburg area. The project would increase the current unemployment rate of 47% by 4,1%. The project would reduce the already low average household income. This is a significant, negative impact. The Sasolburg plant would seek to minimise the number of jobs lost by redeploying employees within the Sasol Group, preferably in Sasolburg. The Sasolburg plant would also assist retrenched employees in securing an income by providing outplacement services. Here staff was educated through financial courses with regards to the investment of their pension funds. The monitoring of the impact is currently being done on an on going basis through consulting and communication forums. Sasol has, at an additional cost of R50 million, sited the Butanol Complex and the Acrylates Complex in Sasolburg rather than Secunda to provide job opportunities in light of the job losses due to the Sasolburg Natural Gas Project. Sasol is planning a Rejuvenation of Sasolburg initiative that will stimulate economic development. This is not planned specifically as a result of the Sasolburg Natural Gas Project but would assist in solving the social and economic problems of the project. The mission of the initiative is to facilitate the rejuvenation of Sasolburg through committing, mobilising and energising the resources of all stakeholders. It will focus on economic, physical, social and institutional development. This will be done through a number of programmes that will be implemented through partnerships with, among others, community stakeholders.
<b>Property values</b>	The job losses and lost income in the area may devalue property in Sasolburg. Although it is difficult to measure this impact, it is unlikely to be significant.
<b>Sasolburg communities</b>	Most of the employees to be retrenched are white and about 30% of employees represent the designated groups as identified in the Employment Equity Act. Many of the employees to be retrenched are older than 55 years. Zamdela has a high level of unemployment (58%) and residents depend on each other by sharing resources. This means that the effects of job losses would be felt by the surrounding community. The unemployment rate in Sasolburg town and Vaalpark is 25%.
<b>Air quality</b>	The project would reduce levels of sulphur dioxide, nitrogen oxides, particulates and hydrogen sulphide. The concentration of these pollutants at Sasol's monitoring stations would decrease by 17% for sulphur dioxide and nitrogen oxides, 1-6% for particulates and almost 100% for hydrogen sulphide. The Sasolburg plant has improved the way in which air quality monitoring is managed and will publish the results of the monitoring. The results of the air monitoring are discussed at the Sasolburg open days and with the Sasolburg Committee Working Group. Sasol has initiated, in partnership with government, a Strategic Environmental Assessment for the Vaal Triangle industrial area. One of the intentions of the SEA is to develop a framework for air quality management in the Vaal Triangle industrial area. With mitigation in place, air quality data will be available for the assessment of air quality impacts of future projects. Mitigation will ensure that the Sasolburg plant addresses existing air quality problems.
<b>Odour</b>	The project would decrease the Sasolburg plant's hydrogen sulphide emissions by almost 100%. This would mean that there would no longer be a rotten egg smell from the Sasolburg plant.
<b>Water quality</b>	The project would reduce the amount of water that the Sasolburg plant takes from the Vaal River. This would be a positive impact on the Vaal River. The Sasolburg plant also releases treated water into the Vaal River. The project would decrease the amount of wastewater and improve its quality by reducing the total dissolved solids, sodium, fluoride and ammonia. In the past there were instances of overflows from the effluent dams into the Leeuspruit, but this has not happened since the Sasolburg plant reduced the volume of effluent 3-4 years ago. The project would further reduce the chance of an overflow because it reduces the volume of effluent. The impact on ground water is not significant because potential sources of ground water pollution will not change. With mitigation in place, legal compliance will be ensured for increased water abstraction during commissioning and for increased sodium concentration in effluent. Mitigation will ensure that solid waste will be disposed of responsibly and in compliance with the DWAF's minimum requirements for waste management.
<b>Safety / risk</b>	An independent risk specialist reviewed the Sasolburg plant's assessment of the risk to the public from the Sasolburg Natural Gas Project. The specialist concluded that the risk assessment was done according to accepted international standards. Sasol's risk assessment shows that even according to the worst case possible, there would be no impact beyond the Sasolburg plant boundary. For example, if there were an explosion, the impacts would be within the Sasolburg plant. This means that the project would pose no threat to the public.
<b>Noise</b>	The project would not significantly change the noise levels at any point outside the boundary of the Sasolburg plant. Noise would be monitored by Sasol to ensure that the project does not increase noise levels. Mitigation in the form of monitoring will be undertaken to confirm the results of the specialist opinion and, if necessary, action will be taken to ensure that noise levels are not disturbing to the community.
<b>Traffic</b>	The project would have a positive impact on road traffic volumes. One million tonnes of coal is currently transported by road to Sasolburg from outside the area. This traffic will be removed. Coal from Sigma Colliery is transported to the Sasolburg plant by conveyor and solid waste is not transported by road. There may be a reduction in the number of passenger vehicles if the number of staff at the Sasolburg plant reduces.
<b>Humans resources</b>	Independent human resources experts reviewed Sasol's capacity and concluded that Sasol has the capacity to manage the processes involved in retrenchment and redeployment. The review provided recommendations to ensure best practice and these form part of the environmental management plan. A human Resource Strategy change was implemented to address the issues concerning retrenchment, redeployment and early retirement.

**Table 17: Recommended Management Measures – Sasolburg Plant Conversion**

ISSUE	KEY IMPACTS
<b>Air Quality</b>	An air quality monitoring network to be established that will consider the following: types of pollutants to monitor, monitoring equipment, siting criteria, calibration requirements, logging and communication, data verification, data storage and retrieval system, and reporting.
<b>Water Quality</b>	Application scenarios for before and after natural gas need to be reviewed and approval sought from the Department of Water Affairs & Forestry (DWAF)
<b>Socio-Economic</b>	Sasol will adhere to the mandatory requirement of applicable laws in terms of its immediate retrenchment plans. Sasol has shown commitment to preventing job losses by siting the Butanol Complex and the Acrylates Complex in Sasolburg

**Box 10: Post-EIA Update of the Sasolburg Plant Conversion**

Following is a brief outline of some key actions that have been taken in addressing the recommendations arising from the environmental and social impact assessment procedures associated with the feedstock conversion at Sasolburg.

- *Environmental Reporting:* A copy of the Environmental Report from the Sasolburg facility is submitted to the Free State Department of Tourism, Environmental and Economic Affairs on a quarterly basis. The following issues are discussed in the report:
  - Air quality monitoring,
  - Waste monitoring
  - Complaints received from I&AP's and corrective actions taken place
  - Feedback on EIA projects
  - Feedback from the Safety, Health and Environmental forms.
- *Human Resources:* A Human Resource Strategy change has been implemented to address the issues concerning retrenchment, redeployment and early retirement.
- *Air Quality:* The results of the air monitoring activities are discussed at the Sasolburg plant open days, and with the Sasolburg Committee Working Group.
- *Employment / Income:* Staff have been provided with financial courses to assist them in the investment of their pension funds. The impact is currently being monitored on an ongoing basis through consulting and communication forums.



**Photograph 11: Foundation of the Reformer in Progress at the Sasolburg plant**

## 10. Natural Gas Network Conversion

### Background

Sasol currently supplies hydrogen-rich gas from its plant in Sasolburg to about 500 gas users in the province of Gauteng through an underground pipe network. The NGP will enable Sasol to supply its gas users in Gauteng province with natural gas instead of hydrogen rich gas.

### Project Description

Sasol distributes about 160 000 m<sup>3</sup> of hydrogen-rich gas per hour to gas users, such as industries, hotels, restaurants and Egoli Gas. Egoli Gas operates their own network and supplies some 13000 domestic users in Johannesburg. In order to supply these users with natural gas, instead of hydrogen-rich gas, the gas distribution network has to be converted. Natural gas is methane-rich. The two types of gases are different and cannot be mixed. As a result customers will require different kinds of burners and different instruments to measure how much gas they use. Meters and pressure valves on the high-pressure and low-pressure pipelines will have to be re-calibrated.

The network will be converted in three stages:

- **Preparation work:** The planning took approximately seven months and was completed by April 2002. The preparation of the gas network will take approximately seven months and should be complete by the end of 2003. Before converting the gas network from hydrogen-rich gas to natural gas, an audit of the pipeline and customer's equipment and fitting of valves and meters will be undertaken.
- **Conversion process:** The actual conversion will be done in twelve weeks between February 2004 and May 2004. This will entail installation of temporary vents and replacement or re-calibration of valves, meters and burners for Sasol customers.
- **Removing the temporary vents:** Once the network has been converted, there will no longer be a need for the temporary vents, and they will be removed. This will be done immediately at each venting point during the conversion process and will be completed by May 2004.

### Conversion of Egoli Gas

Egoli Gas will require at least 12 months to convert their network to natural gas. This means that their conversion process will be out of sync with the Sasol gas network conversion. A pipeline is being built

between Sasolburg and Johannesburg for this purpose. A separate EIA was undertaken for this project.

### Project Setting

Most of the vents are located in open veld areas, close to industrial development and five are located fairly close to developments, including for example a post office, a medical facility, and a residential area.

### Alternatives Examined

Due to the nature of the existing infrastructure, there is little room for the consideration of alternatives for the conversion process. Some technical options were, however, identified in order to ensure safe engineering practice during the conversion process.

The following alternatives were considered:

- Slow conversion of the network to minimise venting of left-over hydrogen-rich gas.
- Duplication of the high-pressure network (500 km of piping) to allow both natural gas and hydrogen-rich gas to be supplied at the same time. This option was considered to be fatally flawed because it would make the project economically unfeasible.
- 12-Week conversion to minimise disruption to customers, with venting of left-over hydrogen-rich gas. This option minimises the disruption to the customers. This process was considered the most feasible alternative.
- No action.

### Scope of the EIA

The EIA for the proposed project covers the following activities for the proposed Sasol Network Conversion Project:

- Review of the dispersion study undertaken by a UK-based consultant from an environmental perspective.
- Potential impacts around the venting points related to social developments such as residential areas, social facilities (clinics, hospitals, offices, parks, etc).

The EIA Regulations make provision for the authorities to consider the potential impacts of a proposed project based on the scoping phase alone. This process is proposed for the Sasol network conversion project for the following reasons:

- It is an existing pipeline, thus no major construction work will take place.
- Construction of bypass pipelines and rehabilitation of disturbed areas will be undertaken in terms of the ASME Code and local authority requirements.
- A risk assessment is being carried out by Sasol in terms of the Major Hazard Installation Regulations for the Sasol network.

- An air dispersion study has been conducted by Sasol and the results were reviewed as part of this EIA Scoping.

**Summary of Key Impacts and Management Recommendations**

A detailed summary of the main issues identified in the EIA, and the recommended management measures, is provided in Tables 18 and 19.

**Table 18: Summary of Impacts as Foreseen in the EIA – Natural Gas Network Conversion**

ISSUE	KEY IMPACTS
<b>Groundwater</b>	All venting points are located above ground, whilst the existing network of pipelines is underground. The few meters of pipeline that will be laid for the bypass valves will be located in the existing pipeline servitude and construction and rehabilitation will be carried out in terms of the ASME Code as well as local authority requirements. Therefore, no impacts of significance to groundwater were identified.
<b>Soils</b>	Soils will be excavated for the installation of the bypass lines and block valves at the venting points. Excavations will take place within the existing pipeline servitude and rehabilitation will be undertaken in terms of the ASME Code and local authority requirements. For each of the venting points an area of about 10 meters by 4 meters will be disturbed. These areas will be rehabilitated in terms of local authority requirements. This means that topsoils will be stockpiled separately for re-use during rehabilitation of the disturbed areas and residual fill material will be removed for disposal to a local municipal waste site. Given the above current measures to minimise the impact on soils and the General Exemption applicable to this work, no impacts of significance to soils were identified.
<b>Surface water</b>	No construction work will take place in or close to a river course since this is an existing pipeline. Erosion control measures during the installation of block valves and temporary vents at these points will be put in place during construction in terms of the ASME Code and local authority requirements. Thus, no significant impact on surface water was identified.
<b>Flora and fauna</b>	The establishment of new venting points will be undertaken within the existing servitude for the pipeline and the ASME Code and local authority requirements currently applicable to Sasol will be applied. Most of the vents are located within or adjacent to industrial areas and to other infrastructure such as roads and railways. These areas are therefore already impacted on and therefore no significant impact to fauna and flora was identified.
<b>Risk of fire</b>	The EIA evaluated the explosive limit of the hydrogen-rich gas in terms of the concentration of the gas at various distances from the venting point. Very close to the venting point, the gas will not ignite, since there is not enough air mixed in with it.
<b>Vent ignition</b>	It must be noted that burning of vents are not being considered by Sasol unless this EIA recommends such action. The EIA does not predict any significant risk of burning to people in nearby development.
<b>Odour</b>	Hydrogen-rich gas does not have a smell and as such Sasol adds an odorant to the gas to ensure that leaks are detected quickly (this can be detected at low concentrations). It is estimated that the gas may be detected at downwind distances of about 300 m under day-time conditions. Based on the short venting times and the likelihood of dispersion as the sun comes up, the gas odour around each vent may be detected for a short period of time in the morning. The impact of odour as a nuisance effect is considered to be a low impact. The odour can be considered a positive impact from a human safety and health perspective (acts as a warning when detected). Local authorities have indicated that the smell of gas sometimes lingers even after the gas has dispersed.
<b>Noise</b>	The noise level study results reveal that noise levels will be above the accepted occupational limit of 85 decibels. As a result, this EIA recommends that the workers on the conversion team close to the vent must be supplied with hearing safety equipment. In addition, vents within 100m of roads must have traffic control to ensure people do not slow down or stop their cars due to curiosity.
<b>Aircraft</b>	Johannesburg International Airport has raised a concern that the venting of hydrogen-rich gas may pose a risk to aircraft flying over the venting point or within the plume of the gas, where it could be set alight. The EIA makes several recommendations to minimise this risk.

**Table 19: Summary of Recommended Management Measures – Natural Gas Network Conversion**

The following management measures have been recommended for implementation during the conversion process:

- If ignition is to be avoided, any ignition sources (e.g. veld fire, workshops, human and vehicle activity) should be kept at least 24 m from the vents. A firebreak of 200 m to 300m should be considered in areas of wild grass so that veld fires do not pose a risk to the venting process.
- For those venting points close to roads, traffic control should be considered to control the curiosity of passing motorists and to ensure proactive management should there be a fire.
- Extensive venting at night, or during early morning hours, should be avoided for the vents close to development due to the distances that the lower risk level of carbon monoxide (30 ppm) concentrations extends over. Venting during day-time conditions will reduce this risk. Alternatively, these vents should be ignited to reduce the carbon monoxide impact (burning of the gas will convert carbon monoxide to carbon dioxide).
- In the case of an ignited vent, a control area of 40 m by 40 m around the vent should be kept clear.
- Each of the above areas should be contacted 4-6 weeks prior to the venting to inform management and staff about the proposed project. Signboards should be put up at the venting points at least 4 to 6 weeks prior to the venting to inform local residents and workers about the proposed project.
- Signboards or posters should also be put up at local garages, cafés, shops, schools and libraries. The signboards and posters must provide a telephone number for technical queries as well as an emergency number.
- The local emergency services facility, clinics and hospitals should be notified of the proposed venting and the risks should be outlined so that staff is prepared for any possible emergencies during this time.
- A temporary control area of 40 meters by 40 meters should be established a few days before the venting for the new venting sites.
- Workers close to the vents must be supplied with hearing safety equipment.

**Box 11: Post-EIA Update of the Activities of the Natural Gas Network Conversion**

At the time of compiling this Executive Summary, the preparation phase of the network was well underway. Following is a brief outline of some key actions that have been taken in addressing the recommendations associated with the Natural Gas Conversion Project:

- The EMP has been completed for the Sasol Network Conversion project and procedures have been implemented aimed at ensuring effective implementation of the recommended management measures.
- An independent Environmental Auditor has been appointed to conduct the audits for the preparation phase. The audits are done on a weekly basis on the preparation sites of the pipeline.
- Reports are issued on a weekly basis to the contractor and the project team for the Network Conversion.

## 11. Regional Environmental and Social Assessment (RESA)

### Background

In December 2002 the World Bank Mission<sup>12</sup> held discussions with Sasol to determine whether there were any social and environmental information gaps to be closed before finalising the application for World Bank financing. The Mission visited the site in South Africa and Mozambique and met with a range of people from Sasol and other organisations, including the consultants who were responsible for preparing several of the project-specific EIAs.

On the basis of this visit, the Mission prepared a document – the “Safeguard Recommendations” – issued to Sasol in December 2002, in which they required, *inter alia*, the preparation of a Regional Environmental & Social Assessment (RESA), in the format and based on the requirements as specified in the document. Sasol subsequently prepared the document and submitted and disclosed the document, as required.

### Objectives of the RESA

The purpose of the RESA was to look beyond the immediate zone of direct social and economic impacts of the project components, and to address induced and cumulative impacts in the geographic areas affected by the eight project components. A number of these impacts have already been identified by the independent project-specific EIAs but have not been assessed, either cumulatively or in detail.

The RESA:

- Broadens rather than deepens the findings of the existing EIAs
- Does not attempt to solve all issues that could be considered at a regional level, but provides dimension to the issues, and indicates appropriate steps to be taken
- Has relied on the existing scoping effort and consultation outcome
- Provides a framework according to which these impacts can be tracked and managed, and allocates the responsibilities for doing so
- Proposes time frames for the implementation of all recommended actions.

The RESA is intended only as a *regional* assessment and does not re-evaluate issues that are directly project-related and that have already been assessed in the project-specific EIAs. The purpose is therefore, *inter alia*, to identify potential areas of management responsibility, directly linked to Sasol’s activities in the NGP, over which Sasol has control, and agree to take such responsibility.

Sasol’s commitment to the recommendations made in the RESA is explained in the foreword of the RESA and quoted later in this chapter. The RESA also contains observations with regard to other areas of responsibility, where parties other than Sasol could be identified as possible responsible parties. The RESA will form the basis for further discussions with such parties by the World Bank, if necessary and required.

### Scope of Work

The RESA has been divided into two main areas of investigation in each of the two countries affected by the NGP. Specifically, the report investigates the regional biophysical and social impacts of the NGP in the context of Mozambique and South Africa respectively. In accordance with the scope agreed with the World Bank, the main focus of the report is on Mozambique.

### Regional Impacts in Mozambique

#### *Biophysical Environment*

The RESA found that the NGP would have a range of impacts on the local natural environment that need to be managed using the tools defined in the project-specific EIAs. At a regional scale, the key concerns relate to the indirect consequences of opening lines of access into previously remote areas, as a result of pipeline cut lines, permanent access roads and seismic lines. This opening of access could result in the escalation of natural resource use and exploitation, particularly in respect of hardwoods, but also in terms of bush meat and medicinal plants.

The RESA nevertheless acknowledges that very significant (pre-NGP) resource harvesting takes place in most areas affected by the project, even in the apparently remote localities. Access therefore already exists and it is uncertain to what extent the improvement caused by the NGP will accelerate resource extraction. It is possible that the improved access may also result in increased settlement and

<sup>12</sup> Represented by Ms Charlotte Bingham, Mr Robert Robelus and Ms Rosa Orellana.

associated bush clearing for arable use, although the RESA deems this to be unlikely.

The RESA recommends that there is an integrated effort to bring hardwood harvesting and natural resource management in the Province under effective control. Sasol will need to play its part in this by monitoring the use of its access roads for resource extraction and by improving knowledge about the areas of greatest natural resource sensitivity in the places that could be indirectly affected by the project. This knowledge will assist in formulating management objectives and actions in the future. Protocols with the GOM will need to be developed, which formalise how information provided by Sasol's monitoring of access lines will be followed up and acted upon.

The design philosophy that Sasol has committed to regarding the discharge of liquid effluent from the CPF is sound. With the necessary management, water pollution risks that may be caused by the plant should be minimised. Sasol has accepted that no significant impact whatsoever will be permissible on the Govuro River system as a result of effluent discharges from the factory. The final design, operation, management and monitoring of the water treatment plants will be based on compliance with this requirement.

Sasol proposes to contain and proof all effluent before discharge into a wetland east of the EN-1, approximately one kilometre from the Govuro River. Design and operating mechanisms have been established that will ensure that this system is fail safe. The criteria used for the evaluation of effluent discharge quality will be benchmarked against the World Bank Effluent discharge guidelines for domestic wastewater and for industrial wastewater from oil and gas facilities. In addition, the RESA recommends that Sasol undertakes a long term programme of biodiversity monitoring around the discharge point and in the Govuro River itself in order to verify the absence of direct impacts on the Govuro river system.

Apart from the issues raised above, the RESA found few significant regional concerns about the impact of the NGP on the natural environment in Mozambique. The NGP's impacts do not combine spatially with any other large industrial or mining developments planned in the foreseeable future. The project will, however, together with the growth of other mining industrial projects, and economic and tourism growth in general,

impact on the capacity of the environmental authorities responsible for industrial evaluation and management (MICOA). The RESA thus recommends that consideration is given to ways of assisting MICOA. While assistance and training by Sasol in some of the company's plants in South Africa might be considered to result in conflicts of interest, the experience would be invaluable in building environmental capacity in MICOA. Other industry-wide options could be considered in order to remove the stigma of assistance from one donor only.

#### **Social Environment**

The main socio-economic benefit that Mozambique will derive from the NGP will be the government's receipt of taxes and royalty payments. The geographical areas in which the royalty benefit is experienced will depend on decisions made by the GOM. On the basis of the agreement with Sasol, the GOM will receive 6MGJ/annum of natural gas from the project, at peak production. This may be taken in kind or as the cash equivalent. Any royalty payment taken in cash will accrue to the Central Government and will be spent in accordance with national priorities.

The amount taken in kind is more likely to hold some direct benefit for the communities in proximity to the project. Provision for five take-off points along the main pipeline between Temane and the Mozambique border town of Ressano Garcia has been included in the agreement. One of these is allocated to the field area to upgrade ENHs existing gas turbine driven supply of electricity to the communities between Inhassoro and Vilanculos. A further possibility is the use of the gas to generate bulk power supply in Inhambane Province. The GOM is currently identifying a preferred concessionaire to investigate the feasibility of a 30-40MW gas fired power station. There has also been a request by the Limpopo Valley SDI to investigate the opportunities for gas use in the Limpopo valley, where there is a drive to restore agricultural production to pre-war levels and to rebuild several agricultural processing plants. A take-off point has been situated at this location.

The most significant demand for gas in the short to medium term will almost certainly be in Maputo. Potential users of the gas include the Mozal Aluminium Smelter and a number of smaller industries. Advanced planning of a pipeline to Maputo from the take-off point at Resanno Garcia has already started. However, the RESA considers that for gas use

to grow in Mozambique as a whole, there would need to be large anchor projects to carry the cost of the major gas supply infrastructure. Once an anchor is in place, gas distribution to surrounding users becomes a more realistic commercial prospect and opportunities increase for the development of small and medium size enterprises (SSMEs), both linked to the anchor (as service providers) and independently of it. Given the existing levels of industrial activity in Mozambique, and the lead time required for the planning and implementation of 'mega-projects', it is unlikely that gas use will grow in the short to medium term in urban areas other than Maputo.

The RESA indicates that a possible mechanism to make gas more affordable for small and medium enterprises would be to cross-subsidize them through the use of carbon credits. An initiative is currently underway to investigate revenue generation by means of carbon credits that may accrue with the development of the gas industry.

For communities living around the NGP project, the socio-economic benefits resulting directly from the operation of the plant will be low. Apart from the possibilities referred to above, in respect of power supply, the NGP will employ only 50 people with a further 100 on contract, supplying the plant with services. While Sasol has committed to source and train all of these people over a period of time from Mozambique, the numbers are small and are roughly one order of magnitude less than other projects of comparable capital investment, such as Mozal and Corridor Sands. Economic multipliers in the towns nearest to the production facility will be very limited.

Some additional employment may be created by the transport of condensate. Sasol estimates that at peak production, about 470 cubic meters of condensate will be produced per day. Sasol favours road transport of this condensate to a local port, probably Beira. Approximately one tanker every twenty minutes to half-an-hour during daylight hours would be necessary to transport this quantity. Should the option of road transport be chosen, then a full EIA will be conducted, which will include investigation of the pavement capacity of the road to Beira and a transport risk assessment. Sasol will participate in the determination of the terms of reference of this EIA in order to ensure that these issues are systematically addressed, although the responsibility for preparing the EIA itself will lie with the selected tenderer for the condensate.

The RESA concludes that social disruption caused by the operation of the project will be small. In summary:

- Only 14 homesteads have been resettled for the entire project, including the gas field development and the pipeline to South Africa
- The numbers of staff and contracted personnel (a total of 150) for service requirements are too low to create significant demands on local or regional infrastructure.
- The project will be almost totally self sufficient in respect of all services, including power supply, water supply, solid waste disposal, sewerage treatment, health care, emergency services and accommodation
- Risk management limitations determining the use of land near the CPF and pipelines are not onerous and should not restrict future development in any material way.

### Regional Impacts in South Africa

#### **Biophysical Impacts**

The introduction of natural gas will result in significant air pollution emission reductions at the Sasolburg plant, as a result of the decommissioning of the gasifiers. In addition, possible increased emissions at the Sasol Secunda plant will be prevented as a result of using natural gas as the feedstock for that expansion, rather than coal. The emission reductions at Sasolburg will include 10,300 tonnes per annum of sulphur dioxide, 8,500 tonnes per annum of nitrogen oxides, 20,600 tonnes per annum of hydrogen sulphide (emissions of H<sub>2</sub>S reduce to nil) and 1,400 tonnes per annum of particulate matter. These reductions will serve to significantly reduce the Sasolburg plant's contribution to air pollution in the Vaal Triangle industrial area.

The introduction of natural gas to South Africa will also result in fuel substitution in other industries, which will reduce air pollution emissions and/or prevent increases in emissions. The conversion of a number of industries to Sasol's coal-based gas has already demonstrated the effectiveness of gas as a clean burning alternative to fuel oils in heavily industrialised areas where air pollution issues are a source of concern and conflict with local communities. Out of the total of 40 MGJ per annum currently sold for the purpose, up to 30 MGJ per annum will be replaced with natural gas.

Natural gas will have the added advantage of generating insignificant air pollution at source.



Estimated air pollution reductions or savings that will result from this would be in the order of 114 000 tonnes per annum of particulate matter, 32 000 tonnes per annum of sulphur dioxide and 14 000 tonnes per annum of nitrogen oxides. Greenhouse gas emissions, specifically CO<sub>2</sub>, will be reduced by some 3.5 million tonnes at Sasolburg. A potential 3% increase in CO<sub>2</sub> emissions at Secunda will be prevented by the use of natural gas as a feedstock for the proposed increase in gas loads. Collectively the reduced emissions, together with the saved emissions, imply carbon emission reduction credits of some 4.7 million tonnes per annum which can be credited to the project. The coal gasification process is a significant consumer of water. Water savings that will be achieved by the conversion to natural gas amount to at least 6,5 Ml per annum. This excludes the quantity of ground water that is pumped from coal mining operations, where a total saving of some 3,712 Ml per annum will be realised with the conversion to natural gas.

In terms of biodiversity and land potential, some 52 hectares a year, which would otherwise have been affected by coal mining, will remain unaffected as a result of the introduction of natural gas. The development of the natural gas supply infrastructure will also affect a significant land area, but no direct comparisons have been drawn here because of the difference in impacts between the land affected by mining versus that affected by the installation of the natural gas supply infrastructure.

#### **Social Impacts**

The conversion of the Sasolburg plant to natural gas will result in some 600 jobs becoming redundant. Since the announcement of the NGP, Sasol's strategy has been to accommodate as many of the affected employees as possible in alternative positions through redeployment. At present, it appears likely that all of

the affected employees should be able to be re-deployed. The conversion from coal to natural gas will also reduce the demand for coal at the affected Sasol colliery. Sasol estimates that some 700 positions could be lost as a result of the switch. Approximately 30 percent of the affected employees can potentially be re-deployed. Sasol has prepared an Action Plan to minimize the impact of job losses at Sigma Collieries, and is working with the respective unions to minimise actual losses.

#### **Policy Considerations**

Various policies exist for the Southern African Development Community (SADC), Mozambique and South Africa which have a bearing on the NGP. The project will contribute positively to the objectives of all of these policies to a greater or lesser degree. In Mozambique, relevant policy objectives that will be supported by the NGP include absolute reduction in poverty and rapid and sustainable growth of the economy. Relevant South African policy objectives that will be met by the NGP include an increase in energy supply diversity and the realisation of the environmental benefits of clean energy sources. An important policy objective common to the SADC, Mozambique and South Africa, but which is unlikely to be directly supported by the NGP, is greater access by the general population to affordable energy.

#### **Recommendations**

A summary of recommendations for the purposes of further discussion between Sasol and the World Bank is contained in Table 20. A summary of observations with regard to recommended actions beyond the potential control of Sasol is explained in Table 21. Box 12 outlines Sasol's commitment to the recommendations directly impacting Sasol.

**Box 12: Sasol's Commitment to the Recommendations Contained in the RESA**

Sasol welcomes the opportunity to have participated in and to have made resources available for the development of the RESA. Sasol considers the contents of the RESA to provide a framework for and information according to which the cumulative and regional impacts of the Natural Gas Project can be managed.

Sasol takes note of the contents of the RESA and the proposed recommendations, findings and observations made in the document. Sasol recognises that the NGP's operations and activities, as well as those of its partners, may have cumulative and regional impacts, as indicated in the RESA. As a responsible global company, operating both locally and internationally through various business units, Sasol accepts responsibility to manage the regional and cumulative impacts directly associated with the NGP, that are within its control, in order to ensure the long term sustainability of the project during its lifecycle.

Sasol further recognises that this commitment will require a dynamic approach, which will be adaptable, adjusting to changing circumstances and including the availability of new information and the sharing of knowledge and further consultation with stakeholders, including partners and the governments concerned.

**Table 20: RESA – Summary of Actions for Sasol**

	Description of Actions	Responsibility
<b>Impacts on natural resources in Mozambique</b>		
Accelerated hardwood exploitation		
1	Prepare and implement a long term programme to manage and monitor third party use of the pipeline right of way and other access created by the NGP (refer to Box 3-1 for an outline of a management/monitoring approach).	Sasol
2	Reach agreement with responsible Government ministries about procedural steps in the event that logging vehicles begin to use NGP cut lines and roads for access.	Sasol, GOM
Accelerated wildlife and other natural resource exploitation		
3	Prepare a natural resource inventory for the Exploration Area. Define areas of natural resource sensitivity. Plan future development of the gas field infrastructure to minimize impact on these areas.	Sasol
4	Evaluate and, where necessary, close all lines of access created for the project that are (a) not permanent (seismic lines) and which (b) open access into sensitive and remote habitats. Do this in consultation with local communities in accordance with the procedure established in the Exploration EMP.	Sasol
5	Encourage sustainable resource use in local communities around the NGP by assisting local NGOs involved in community education.	Sasol
Habitat loss and ancillary effects due to increases in settlement		
6	Prepare baseline-monitoring report of land cover along NGP lines of access in the Exploration Area and along the pipeline to South Africa. Prepare monitoring report after three years. If no significant change is measured over a decade, then consider altering the frequency or extent of the monitoring programme.	Sasol
7	Assess the risk, caused by any areas of increasing settlement activity, to the known areas of natural resource sensitivity (refer to Item 3 above). Notify MICOA in the event of an increasing level of risk to areas of conservation significance.	Sasol
Pollution effects caused by discharge of effluent into the Govuro River system		
8	Develop baseline records in the receiving water (Govuro River) before operation of the CPF begins.	Sasol
9	Employ a method of monitoring that establishes the impact of the CPF effluent discharge on the biodiversity of the Govuro River System and associated wetland and which verifies that any changes are localized and of limited magnitude and significance.	Sasol
10	If material/significant changes are identified that are directly linked to the contaminants from the effluent system of the CPF, then modify the design and/or operating conditions of the waste water treatment plant(s) to produce a higher standard of treated effluent. The definition of material/significant changes in river biodiversity to be determined with reference to a point of departure that biological and social impacts should be negligible.	Sasol
11	Prepare annual independent audits of all aspects of effluent management and disclose the findings to MICOA and Ara Sul.	Sasol
<b>Socio-economic effects in Mozambique</b>		
Upstream and downstream economic growth opportunities		
12	Sasol to declare in its annual statements the royalties and taxes paid to the GOM in Mozambique.	Sasol
13	Maximize up-stream service provider opportunities in all facets of the Mozambican gas production operations at Temane.	Sasol
Combined (Cumulative) Effects of the NGP and Other Development on Existing Infrastructure and Institutional Capacity in Southern Mozambique		
14	Include requirements for a full EIA and risk assessment of road-based condensate transport options in the tender documents of bidders for use of the condensate.	Sasol
15	Support a capacity building programme to assist MICOA to train environmental officers. This could, among other things, include experience at Sasol installations in South Africa or elsewhere.	Sasol, GOM

Impacts on tourism in and around Vilanculos		
16	Implement a task team to monitor the closing phase of the construction contracts and to ensure the smoothest possible transition due to employment layoffs.	Sasol
17	Continue social development spending in the local communities around the CPF during the construction layoff phase so as to help offset perceived grievances about temporary job losses. <sup>13</sup>	Sasol
18	Maximize local opportunities for SMMEs to provide services to the Field Production Operations. <sup>14</sup>	Sasol
19	Contribute to capacity building of MICOA staff through secondment to Sasol environmental units in South Africa and other appropriate means of assisting to capacitate the Mozambican environmental authority. <sup>15</sup>	Sasol, GOM
Impacts on agricultural development around the Temane and Pande gas fields		
20	Involve NGO's, as part of the SDAP, in planning and implementation of subsistence farming programmes in the areas made more accessible by NGP access.	Sasol
Combined (Cumulative) Effects of the NGP and Other Development on Existing Infrastructure and Institutional Capacity in Southern Mozambique		
21	Incoming investors in SDI's close to the pipeline are to be made aware of the alignment and the restrictions on development in proximity to the pipeline (particularly important for land intensive investments/ developments such as commercial agricultural estates, agricultural processing plants and conservation areas).	Sasol, GOM
Impacts of Safety Restriction Zones around the Pipelines on Settlement		
22	Sasol's Public Liaison Team (PLT) to develop the post-construction communication strategy. The PLT to ensure that it includes the necessary ongoing communication with relevant stakeholders in areas where the risk of illegal settlement and of agricultural development over the pipeline are more likely.	Sasol
23	Sasol to develop a monitoring strategy to check that settlement or other actions that could compromise the safety of people or the efficient functioning of the pipeline are timeously identified and managed.	Sasol
24	Sasol and the Government of Mozambique to agree on remedial protocols should the integrity of the exclusion zones be compromised.	Sasol, GOM
25	Continue to participate and assist in the HIV forum in Inhambane Province	Sasol
26	Develop and implement a long term HIV/AIDS awareness programme in conjunction with the Mozambican authorities and NGOs.	Sasol
Impacts on natural resources in South Africa		
Effects on air quality		
27	Further investigate and promote the possibility of carbon credits under CDM with a view to encouraging wider use of natural gas rather than other fuels.	Sasol
28	Promote the use of natural gas as a replacement for coal and/or fuel oil. Sasol to initiate discussions with the Air Pollution Directorate of the National Department of Environmental Affairs and Tourism, with a view to promoting fuel substitution as a means of emissions abatement in industries where the presence of piped gas make this economically feasible.	Sasol, DEAT
Effects on consumption of natural resources		
29	Continue to investigate water savings so as to ensure that the savings brought about by natural gas are realised to the full.	Sasol
Socio-economic effects in South Africa		
Impacts on job creation		
30	Implement the planned labour re-deployment strategy.	Sasol
31	Provide assistance to employees who may be redundant between old plants being de-commissioned and new plants being commissioned.	Sasol
32	Continue to publicize Sasol's efforts to prevent job losses as a result of the NGP and pro-actively manage media attention in this regard.	Sasol
Social interventions planned by Sasol		
33	Continue to develop and refine the procedures and approach to social development spending in areas affected by the project. Document changes to the procedures, based on experience.	Sasol
34	Continue consultation with NGOs and other community representatives in the sub-region and make specific attempts to reach agreement with them about approaches to community development that satisfy all party's needs. Develop a protocol for working with NGOs and community representatives.	Sasol
35	Continue to involve NGO's in the SDAP.	Sasol
36	Implement an annual workshop dealing with lessons learned in social development, to which key Government, NGO and community stakeholders should be invited.	Sasol
37	Fund some projects that are strategically driven.	Sasol

<sup>13</sup> It is noted that of the \$5 million allocated to Social Development spending by Sasol, only \$600 000 has been spent or approved for spending to date (refer to Section 6 of the RESA).

<sup>14</sup> Refer also to Recommended Action 13.

<sup>15</sup> Refer also to Recommended Action 15.

**Table 21: RESA – Summary of Observations to be noted by the World Bank for purposes of further discussions with third parties if applicable and required**

	Description of Recommended Actions	Recommended Responsibility
<b>Impacts on natural resources in Mozambique</b>		
Management of Hardwoods (Provincial Level)		
A	Complete the hardwood resource inventory for Inhambane Province.	GOM, World Bank
B	Estimate (using independent field checks) the existing extent of harvesting in excess of official quotas and consider ways of managing this.	GOM, World Bank
C	Evaluate ways of ensuring that the benefits of sustainable hardwood use are not alienated from local communities as a result of the concession system.	GOM, World Bank
D	Review existing capacity to manage hardwood extraction in the province and implement capacity building and training programmes.	GOM, World Bank
<b>Socio-economic effects in Mozambique</b>		
Upstream and downstream economic growth opportunities		
E	Promote large-scale developments in Maputo/southern Mozambique and elsewhere that can act as a base load user/anchor for the supply of greater quantities of gas into the local market.	GOM
F	Present information on the planned and actual use of gas royalties and taxes in a transparent manner.	GOM
Combined (Cumulative) Effects of the NGP and Other Development on Existing Infrastructure and Institutional Capacity in Southern Mozambique		
G	Examine ways of strengthening the institutional capacity of the government agencies with environmental mandates (MICOA, DWFF, Ara Sul).	GOM, World Bank
Impacts on tourism in and around Vilanculos		
H	Periodically review the strategic plans for tourism and other development in and around Vilanculos. Encourage balanced growth which promotes opportunities in the key development sectors, particularly tourism. Monitor and categorize any significant changes in settlement patterns and other land use that do not meet the criteria for the promotion of sustainable development in the area.	GOM
Spatial development initiatives		
I	The LVSDI and ENH/MGC devise a strategy for the multi-use of gas for LVSDI initiatives.	GOM
<b>Impacts on natural resources in South Africa</b>		
Effects on air quality		
J	National DEA&T to consider initiating a process to establishing a national emissions database in the immediate future (information on national air pollution emissions is extremely limited).	DEAT
K	Re-consider the possibilities for the promotion of natural gas use in the domestic environment, particularly in the former townships, taking into consideration the possibility of carbon credits as an incentive scheme.	DME, DEAT
<b>Regional policy related Issues</b>		
L	Re-examine the feasibility of domestic gas use in South Africa, including means of overcoming barriers to more widespread domestic use.	DME

**Photograph 12: Charcoal being manufactured along the pipeline right-of-way**

## 12. Summary of Public Consultation and Disclosure Activities

### Background

This Chapter provides, *inter alia*, a brief consolidated summary, in the format as required by the World Bank in their Safeguard Recommendations issued to Sasol in December 2002, of all of the various public consultation and disclosure (PCD) activities that have been applied thus far during the course of the NGP. These PCD activities were undertaken as an integral part of the various EIA processes, as well as during the development and implementation of the Resettlement Planning and Implementation Programme (RPIP) and the Social Development Action Plan (SDAP).

In terms of Sasol's Safety, Health and Environmental Policy (see Box 1), Sasol is committed to entering into dialogue with stakeholders. Communication and interaction with relevant stakeholders forms an important element of all Sasol's projects. Sasol submits that effecting such commitment will ensure improved safety, health and environmental performance and continuous improvement in this regard. Sasol's communication structure and grievance mechanisms, explained below, are geared towards meeting this goal. Sasol is specifically committed to implementing a post-construction communication strategy, as recommended in the RESA, to address community safety risks that might arise from the gas pipeline.

For the purposes of the NGP, Sasol has had the additional specific goal of implementing relevant World Bank requirements regarding public consultation and disclosure.

In its PCD activities, Sasol has used culturally sensitive means of communicating with stakeholders in both Mozambique and South Africa. These methods included:

- Use of Portuguese (including, where necessary, the presence of translators) for communication with public officials in Mozambique;
- Use of local translators from villages in the study area to translate from Portuguese to local dialects;
- Communication with figures and simple graphics for illiterate stakeholders;
- Personal communication with stakeholders as frequently as possible in order to build relationships and trust between the study team and interested and affected parties; and

- Use of English, Sesotho and Afrikaans (mainly for land owners) in South Africa.

### Communications Structures

For the purposes of the NGP, Sasol, in collaboration with relevant stakeholders, established a holistic three-tier liaison structure that includes the following institutional arrangements:

- *At a strategic level:* the Mozambican Ministerial Task Group comprising ministerial representatives of the government of Mozambique and Sasol's Executive Management.
- *At a planning and co-ordinating level:* the Project Liaison Committee comprising 26 members representing Mozambique and Sasol (operational management level).
- *At an implementation level:* Seven individual Task Groups, covering the following issues: employment and training of labour resources; environmental rehabilitation; public liaison; social development; resettlement and compensation; local content; and complaints management.

All levels of government are involved, from national, and provincial level, through to the local government and community level, including village chiefs. Specific provision has also been made for NGO involvement in the liaison and consultation process.

### Phases of Consultation and Disclosure Activities

The public participation process for the NGP may be broadly categorised into three distinctive phases, as follows:

- *1998 to 2000:* Prior to the exploration and development of the gas fields, and the construction of the pipeline, the PCD activities have been primarily associated with the various EIA processes, informing government representatives and other I&APs of the nature and possible implications of the project, and negotiating development, resettlement and compensation agreements and procedures with the government authorities. Communities in and around the gas field and along the pipeline route have been consulted as part of the EIA.
- *2001 to 2004:* During this phase an important focus has been on consulting affected individuals and communities about resettlement and compensation activities, and on informing

affected communities in and around the gas field and along the pipeline route of the project progress, identifying complaints or grievances, and monitoring community attitudes. An important element of PCD activities during this phase related to the development and implementation of the SDAP.

- **After 2004:** Once the gas pipeline and CPF have been commissioned, the intention is to continue to maintain open communication with stakeholders with the aim of maintaining the positive relationships that have been developed between Sasol and its partners and stakeholders thus far.

### Consultation and Disclosure in the EIA Process

The public consultation processes for the initial phases of the various elements of the NGP were undertaken separately. For each consultation activity, a method was selected that was most appropriate for the stakeholders concerned, taking into consideration the diversity of the participants, their interest in the project and their level of literacy.

In accordance with the approach to EIAs as explained in Chapter 2, the following methods were used at various times during the course of the study:

- Key stakeholder and authority workshops;
- Public open days (with graphic and other displays and demonstrations);
- Public meetings;
- Personal (one on one) meetings;
- Community meetings and focus group discussions with local government and community leaders, NGOs and influential people in the study area;
- Semi-structured interviews with local leaders, farmers, fishermen, hunters and other community role players;
- Formal questionnaire surveys; and
- Distribution of background information material.

In Mozambique the communication at Central Government level was primarily through the Project Liaison Committee (PLC), which met monthly and was briefed by the environmental consultants.

The stakeholders were identified in the early phases of the pipeline and gas field EIAs, and were kept informed during the course of the studies. Open days/public meetings with graphic illustrative displays were held in a number of venues along the pipeline route and at the gas field. Transport assistance was provided for local and provincial Government officials to attend

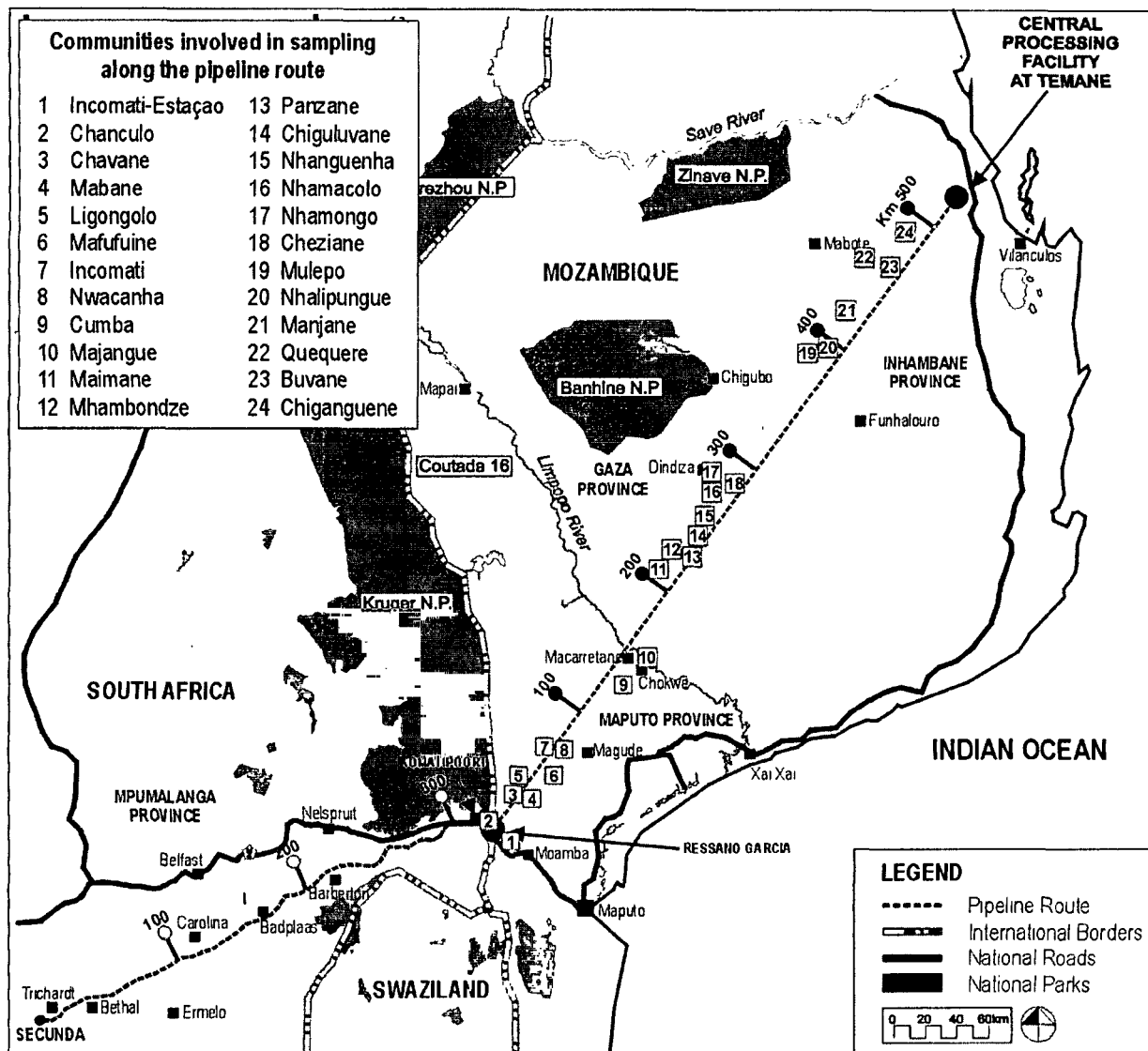
these meetings. In addition, communication with directly affected communities was initiated and was continued through the course of the EIA. At the gas field, 270 families were interviewed in 12 villages that were selected on the basis of their proximity to proposed gas field infrastructure. Meetings with communities were held with local translators in order to facilitate communication and building of trust.

Similarly, along the pipeline route, some 287 households were consulted during the EIA in 24 villages. In addition, semi-structured interviews were held with key people in these communities, including traditional and religious leaders, farmers, businessmen, fishermen and other key members of the communities. Discussions included issues that were of concern to communities potentially affected by the pipeline and gas field projects and other information requested by the study team, including community knowledge about the location of any important cultural and sacred sites in proximity to the pipeline and gas field infrastructure.

In South Africa, stakeholders (excluding landowners) were identified through initial consultations and through newspaper advertisements inviting participation. For Secunda and Sasolburg, many stakeholders had already been identified from consultation processes associated with previous projects, and new stakeholders were simply included in this list. Stakeholders were notified by mail of opportunities to participate in the project and of the availability of reports. After an initial workshop with key stakeholders including government and non-government participants, open days were held in various venues along the route and around the affected site.

Since the South African section of the pipeline was routed almost exclusively in privately owned land, communication with landowners was an important component of the study. Documentation concerning the project was distributed directly to all affected farmers during the scoping and specialist study phases of the EIA. After disclosure of the Draft EIA, personal communication with key stakeholders was undertaken, as necessitated by comment received.

A summary of the key issues raised during these consultation processes, and an indication of the implications of these for the subsequent design, construction and operational requirements of the project, is provided in previous chapters of this report.



Note For cross referencing with the project EIAs and EMPs, kilometre distances in South Africa and Mozambique are independent and as stated in the project level EIA & EMP report

**Public Disclosure**

The project has complied with the South African, Mozambican and World Bank Guidelines for public disclosure of the EIAs. In Mozambique, announcements about the location of the reports and the venues for the public hearings were made in the national and local press and on local radio, and key stakeholders were invited directly. Key stakeholders were provided with full sets of reports.

informed in national and local press and on local radio stations where applicable. Reports were lodged at convenient locations for public review.

Table 23 provides a summary of the public participation statistics during the EIA activities. All environmental documentation for the project, including the Terms of Reference and EIA documents, is available at: [http://w3.sasol.com/natural\\_gas/](http://w3.sasol.com/natural_gas/)

Similarly in South Africa, information was made available to landowners, communities surrounding the pipeline and associated infrastructure, and other I&APs at different stages though the process. Stakeholders were informed, in writing of the availability of the full reports at convenient venues, and were provided with a copy of the Executive Summary for comment. Stakeholders were also

**Consultation and Disclosure in the RPIP**

The second broad category of PCD activities relates to the systematic and detailed consultation activities that have taken place with community leaders and directly affected parties with the aim, *inter alia*, of ensuring compliance with the World Bank standards and directives regarding the RPIP (examined in Chapter 13 below). Further details on the nature of these

consultation activities are provided in Appendix 4 of Volume One of the RPIP. A brief summary of these activities is presented below in Table 24.

For the purposes of the RPIP, liaison with government is achieved primarily through the Joint Task Group, which comprises representatives from Sasol and GOM and which reports to the Project Liaison Committee. In addition, Sasol has deployed a full-time Community Liaison Team that has on-going discussions at all levels within the government of Mozambique and amongst affected communities.

Parallel with this RPIP process, Sasol has begun the implementation of a long-term liaison and communication strategy in local communities. Field officers are presently engaged in consultation in areas affected by the construction sites. These field officers interact directly with the teams implementing the RPIP and Sasol's Environmental Site Officers (ESOs) on the construction sites.



Photograph 13: Member of the Sasol Community Liaison Team in discussion with local inhabitants of Maimelane at their mashamba

### Consultation and Disclosure in the SDAP

In addition to the various PCD activities relating to the short-term intensive resettlement assistance that has been provided to affected communities, there has also been a very participative process regarding the implementation of the resettlement "after-care" process, and the associated broader community initiatives. Overall management and guidance for these community initiatives is provided through Sasol's Social Development Action Plan (SDAP), funded from its Social Development Fund (SDF). (See Chapter 14).

The SDF's primary focus is the communities that are affected by the Project. These communities have been at the centre of a comprehensive and highly participative consultation process to identify their

needs. Since the launching of the Fund during the first quarter of 2002, before construction commenced, more than 150 communities have been consulted in the culturally correct manner and are continued to be consulted as social upliftment projects are being scoped and implemented. (See Tables 25 and 26).

Other interested parties, specifically NGO's and Government, are consulted and involved, not only to ensure optimum utilisation of funds but most importantly to deliver sustainable projects. To this end Sasol participates in a NGO forum in the Gas Field and have already involved CARE International as well as FDC (Graça Machel Foundation) in drinking water and cattle breeding projects. Further joint projects are being considered.

Effective co-ordination and communication with the GOM is crucial for the effective implementation and ongoing operations of this project. Formal liaison and communication structures have therefore been developed and implemented at ministerial, national and provincial level. In addition to these institutionalised co-ordination structures, seven joint task teams were established for each area or function that required co-ordination between the Project and the GOM. These institutionalised structures proved to be very effective in ensuring that all levels of the government are timeously consulted and kept abreast with the project progress. It also greatly assisted with alignment at the various levels and between the different ministries and state departments.

### Disclosing the Executive Summary, RESA and the RPIP

An important additional aspect of the PCD activities relates to the distribution and disclosure of overarching project documents, such as the RESA, the RPIP, and the Consolidated Executive Summary and Update (this document).

To ensure that all interested parties have an opportunity to access these documents, steps have been, and will be, taken to disseminate them broadly to I&APs. These documents will be disclosed for comment in the following ways:

- Through newspaper advertisements in the national Mozambique and South African newspapers;
- By publication at the World Bank Infoshop (<http://www.worldbank.org/infoshop/>) and at the following Sasol project Internet site: [http://w3.sasol.com/natural\\_gas/](http://w3.sasol.com/natural_gas/)



- By lodging the documents in various venues in Mozambique and South Africa for public viewing. (These venues are listed in Table 22 below).

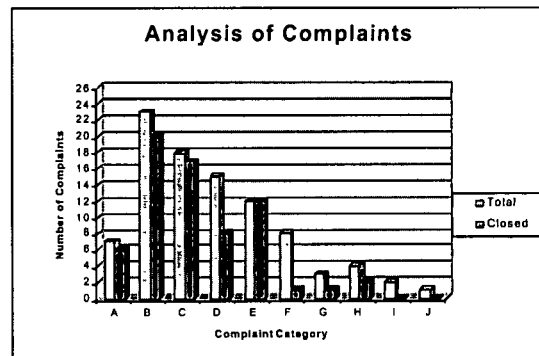
**Ongoing Public Interaction**

Sasol and its partners recognise the need to implement the necessary mechanisms for the identification and management of grievances and complaints raised by the public. Special efforts are thus made to ensure that any grievances and complaints from local people and communities are properly managed. Complaints registers are prepared and analysed to identify trends proactively (See Figure 14). Remedial action is taken on the basis of information provided by personnel in each of these teams. The issues and how they have been resolved are discussed at the monthly Environmental Task Team meetings for the gas field and pipeline. These meetings include personnel from various Government departments and are chaired by a Director of MICOA.

A similar process is followed on the pipeline in South Africa. Regular written communication is maintained with affected landowners and a complaints register is kept for review at the monthly Environmental Monitoring Committee meeting, which is attended by key Government authorities.

All the communities affected by the project have different needs and priorities, and most have expectations that the project could have benefits for them. Many of these expectations fall outside the ambit of the SDF, such as employment, compensation for damage to crops, housing in the case of relocation and restoration of the affected environment. A

Community Liaison Forum (CLF) has thus been established to manage and co-ordinate the various interface areas. Sasol champions have been appointed for each interface area (namely: communication, labour, resettlement and compensation, environmental management, local content and social development), as well as representatives from the main contractors serve on this forum which meets monthly. A community complaints register and monitoring system has been implemented under the auspices of the CLF and has proved to be an effective management and control mechanism.



Category	Description
A	Water resources
B	ROW affecting properties and people
C	Labour related issues
D	Compensation payment
E	Transport of heavy equipment on roads
F	Damage to infrastructure
G	Environmental
H	Traffic accidents
I	Social development projects
J	Local content

Figure 14: Analysis of complaints

VENUE	LOCATION
<b>Mozambique</b>	
World Bank Offices	Maputo
Impacto Lda	Maputo
Ministry for the Coordination of Environmental Affairs (National Department – Mozambique (MICOA)	Maputo, Xai Xai, Inhambane, Matola
Direcção Nacional de Carvão e Hidrocarbonetos (DNCH)	Maputo
Sasol Temane Lda	Maputo
Municipal Offices Matola, Inhassoro, Governors Offices	Vilanculos
District Administrators Offices	Matola, Xai Xai, Inhambane
Public Libraries	Vilanculos, Inhassoro, Funhaloro, Mabote, Chokwé, Moamba, Chigubu, Maputo, Vilanculos,
	Maputo, Matola
<b>South Africa</b>	
Public Libraries	Bethal, Badplaas, Barberton, Kanyamazane, Komatipoort, Malelane, Nelspruit
Mark Wood Environmental Consultants	Honeydew, Johannesburg
Sasol Petroleum International (Pty) Ltd	Rosebank, Johannesburg
Sasol Technology (Pty) Ltd	Secunda

Table 22: Venues at which the Consolidated Executive Summary, the RESA and the RPIP are available for review

Table 23: Approval Timelines and Disclosure for EIAs and EMPs

Natural Gas Project Component	Consultation and Disclosure	Language	Approval Date	Approval Authority
<b>Temane / Pande Gas Field Exploration</b>	<p>Invitations for comments on the Briefing Document were sent out to I&amp;APs (May 2000).</p> <p>Three public and authority meetings were held in Vilanculos, Massinga, and the City of Inhambane. Others that were invited to meetings included Inhassoro, Mabote, Govuro and Funhalouro districts (August 2000). An open day was held at the Polana Hotel in Maputo (July 2000).</p> <p>Approximately 290 people in total attended these meetings.</p>	English Portuguese	Feb-02	MICOA
<b>Temane / Pande Gas Field Development</b>	<p>Invitations for comments on the Briefing Document were sent out to I&amp;APs (May 2000).</p> <p>Three public and authority meetings were held in Vilanculos, Massinga and the City of Inhambane. Others that were invited to meetings included Inhassoro, Mabote, Govuro and Funhalouro Districts (August 2000). An open day was held at the Polana Hotel in Maputo (July 2000). All stakeholders (approximately 250) on the database were notified directly of the open day in Maputo and of the public meetings.</p> <p>The villages that were potentially affected by the project were consulted. These consultations included semi-structured interviews, question and answer forums, group meetings and one on one meetings.</p> <p>Two advertisements were placed in the Noticias (official Government newspaper).</p> <p>Four public hearings were held in Chokwe, Inhambane, Vilanculos and Maputo/Matola.</p> <p>Approximately 290 people in total attended these meetings.</p> <p>The full EIA document was placed at the meetings and executive summaries were distributed to key stakeholders. Advertised in the Noticias, local newspapers and local radio. Direct communication with key stakeholders took place.</p>	English Portuguese	Feb-02	MICOA
<b>Pipeline between Temane &amp; Ressano Garcia: Mozambique</b>	<p>Invitations for comments on the Briefing Document were sent out to I&amp;APs (May 2000).</p> <p>One open day was held in Maputo (October 2000).</p> <p>Meetings were held with provincial government and district administrators of Maputo and Inhambane. Meetings with Governors of Maputo, Gaza and Inhambane Provinces were held.</p> <p>Six public meetings in Matola, Inhambane, Xai Xai, Vilanculos, Massinga and Chokwe were held.</p> <p>All stakeholders (approximately 250) on the database were notified of the open day in Maputo and of the public meetings.</p> <p>The villages that were potentially affected by the project were consulted. These consultations included semi-structured interviews, question and answer forums, group meetings and one on one meetings.</p> <p>Two advertisements, inviting comments on the Terms of Reference, were placed in the Noticias (official Government newspaper).</p> <p>Four public hearings were held in Chokwe, Inhambane, Vilanculos and Maputo/Matola on the draft EIA.</p> <p>Approximately 300 people in total attended these meetings.</p> <p>Notification of the draft EIS were placed in the Noticias, a local newspapers and a local radio. Direct communication with key stakeholders took place.</p>	English Portuguese	Apr-02	MICOA

Natural Gas Project Component	Consultation and Disclosure	Language	Approval Date	Approval Authority
<p><b>Pipeline between Komatipoort &amp; Secunda: South Africa</b></p>	<p>Invitations for comments on the Briefing Document were sent out to I&amp;APs (Mar 1999). The I&amp;APs consisted of approximately 283 people and 180 landowners. The briefing document and the Corridor Screening Report were available at seven libraries along the pipeline route.</p> <p>Five open days were held in Bethal, Badplaas, Nelspruit, Barberton and Malelane. The stakeholders were notified of the open days in writing. It was advertised in two national newspapers, two regional newspapers and one local publication.</p> <p>Approximately 70 people in total attended these meetings.</p> <p>The Summary Draft Scoping Report was distributed to all stakeholders on the database for comment. The full Scoping Report was sent to the key stakeholders. The Scoping Report was placed for comment at venues along the route.</p> <p>The EIA Executive Summary was distributed to all the stakeholders on the database including the landowners. Personal meetings with key stakeholders were held. An authority workshop was held in Nelspruit. Full document sets were placed at seven libraries along the route.</p> <p>Notification was sent of availability of EMP for comment to all stakeholders and landowners on database. Documents were lodged with seven libraries along the route.</p>	<p>English Afrikaans</p>	<p>Apr-02</p>	<p>DEAT</p>
<p><b>Secunda Interface</b></p>	<p>No advertisements were placed and no public meetings were held. No public involvement was required by DACE.</p>	<p>English</p>	<p>Dec-01</p>	<p>DACE</p>
<p><b>Secunda Plant Expansion</b></p>	<p>I&amp;APs nationwide were sent personalised invitation letters to be involved in the EIA. In October 1998, media announcements were made in local and national newspapers.</p> <p>A public meeting was then held to discuss the draft report. Copies were sent to I&amp;AP on request during November 1998 and submitted to the authorities in December 1998.</p> <p>A summary document of the draft EIR was distributed in May 1999, an open day was held in May 2000 and a draft EIR document was made available on request.</p> <p>Approximately 160 people in total attended these meetings.</p> <p>The draft Scoping Report was placed in 16 public places for I&amp;APs to comment.</p> <p>The draft EIR was made available in the Secunda Public Library in May 1999.</p>	<p>English Afrikaans</p>	<p>Jun-01</p>	<p>DACE</p>
<p><b>Sasolburg Plant Conversion</b></p>	<p>The Briefing Document was distributed to I&amp;APs. A toll free telephone number was available for the project. The project was advertised on Radio Lesidi (Radio Station in Sasolburg). It was also advertised in Sasol's Internal Newspaper. A loudhailer announcement advertising the project was read in Sesotho and English to the Zamdela Community.</p> <p>Four public meetings were held in Sasolburg.</p> <p>Approximately 300 people in total attended these meetings.</p> <p>The documents were placed at Zamdela and Sasolburg libraries, at the Sasol offices and on the Sasol intranet.</p> <p>The Record of Decision was advertised in the Sasolburg Bulletin.</p>	<p>English Sesotho</p>	<p>Sep-02</p>	<p>FS-DTEEA</p>
<p><b>Network Conversion</b></p>	<p>The Briefing Document was distributed to I&amp;APs. It was advertised in ten local and three national newspapers. Individual telephonic key stakeholder consultation took place.</p> <p>Five workshops were held in Germiston, Olifantsfontein, Roodepoort, Springs and Vereeniging.</p> <p>Approximately 120 people in total attended these meetings.</p> <p>The Scoping Report was placed at libraries along the route and emailed to those I&amp;APs that requested copies. Copies of the reports are at the Sasol Sasolburg offices.</p> <p>The Record of Decision was advertised in the Star (a national newspaper) and in ten local newspapers. It was also distributed to I&amp;APs.</p>	<p>English</p>	<p>Dec-02</p>	<p>DEAT</p>

Table 24: Summary of Consultation and Disclosure Activities relating to the RPIP

Natural Gas Project Component	Consultation Period	Number of Government Consultations	Number of Public Consultations	Document Disclosed	Type of Consultation	Consultation Language	
Temane / Pande Gas Field Exploration	Jan 01 - Jun 01	8		Procedures and formulae	PLC and Task Group meetings. Meetings with local authorities	English, Portuguese	
			5	Procedures and process	Community members	Portuguese, Changane, Xitswa, Nda	
	Jul 01 - Dec 01	7		Procedures and process	PLC and Task Group meetings. Meetings with local authorities	English, Portuguese	
			12	Procedures and process	Community members	Portuguese, Changane, Xitswa, Nda	
	Jan 02 - Jun 02	5		Registration Information	Local authorities	English, Portuguese	
			7	Registration and payment matters	Community members	Portuguese, Changane, Xitswa, Nda	
	Jul 02 - Dec 02	2		Procedures and information	Task Group and local authorities	English, Portuguese	
			2	Registration and payment matters	Community members	Portuguese, Changane, Xitswa, Nda	
	Jan 03 - Jun 03	2		Replacement trees	Task Group and local authorities	English, Portuguese	
			5	Replacement trees	Community members	Portuguese, Changane, Xitswa, Nda	
	Temane / Pande Gas Field Development	Jan 01 - Jun 01	3		Procedures and formulae	PLC and Task Group meetings. Meetings with local authorities	English, Portuguese
				5	Procedures and process	Community members	Portuguese, Changane, Xitswa, Nda
Jul 01 - Dec 01		8		Procedures and formulae	Task Group and local authorities	English, Portuguese	
			3	Procedures and process	Community members	Portuguese, Changane, Xitswa, Nda	
Jan 02 - Jun 02		7		Procedures and RAP. Blue carding/pre-registration	Task Group and local authorities	English, Portuguese	
			4	Procedures and RAP	Households to be relocated	Portuguese, Changane, Xitswa, Nda	
Jul 02 - Dec 02		5		Procedures and RPIP	Task Group and local authorities	English, Portuguese	
			8	RPIP and relocation process	Affected households	Portuguese, Changane, Xitswa, Nda	
Jan 03 - Jun 03		5		Procedures and RPIP	PLC and Task Group meetings. Meetings with local authorities	English, Portuguese	
			5	RPIP and relocation process	Affected households	Portuguese, Changane, Xitswa, Nda	

Natural Gas Project Component	Consultation Period	Number of Government Consultations	Number of Public Consultations	Document Disclosed	Type of Consultation	Consultation Language
Pipeline Between Temane and Ressano Garcia: Mozambique	Jan 01 - Jun 01	3		Procedures and formulae	PLC and Task Group meetings. Meetings with local authorities	English, Portuguese
			5	Procedures and process	Community members	Portuguese, Changane, Xitswa, Ndaú
	Jul 01 - Dec 01	7		Procedures and formulae. Blue carding/pre-registration	PLC and Task Group meetings. Meetings with local authorities	English, Portuguese
			10	Procedures and process. Blue carding/pre-registration.	Community members	Portuguese, Changane, Xitswa, Ndaú
	Jan 02 - Jun 02	6		Procedures and formulae. Blue carding/pre-registration	Task Group and local authorities	English, Portuguese
			12	Procedures and process. Blue carding/pre-registration.	Affected communities	Portuguese, Changane, Xitswa, Ndaú
	Jul 02 - Dec 02	4		Procedures and RPIP	Task Group and local authorities	English, Portuguese
			6	RPIP and relocation process	Affected households	Portuguese, Changane, Xitswa, Ndaú
	Jan 03 - Jun 03	5		Procedures and RPIP	Task Group and local authorities	English, Portuguese
			5	RPIP and relocation process	Affected communities	Portuguese, Changane, Xitswa, Ndaú

Table 25: Inventory of Key Stakeholders Consulted for the Purposes of the SDAP

National government	Provincial government	Local government	Community	Other
<p>State President.</p> <p>Prime Minister.</p> <p>Cabinet Ministers.</p> <p>Directors General.</p> <p>Empreca Nacional de Hidrocarbonetos (ENH).</p> <p>Ministerio Para a Co-ordenacao Accao Ambiental (MICOA).</p> <p>Instituto Nacional de Investigacao Agronomica (INIA).</p> <p>Universidade Eduardo Mondlane (UEM).</p> <p>Instituto Nacional de Planeamento Fisica (INPF).</p> <p>Direcao Nacional de Geografica e Cadastral (DINAGECA).</p> <p>Railway authorities.</p> <p>Harbour authorities.</p> <p>Traffic authorities.</p>	<p>Governors of Sofala, Gaza, Inhambane and Maputo.</p> <p>Provincial traffic Chiefs.</p>	<p>Mayors of all towns along the pipeline route and near the gas field.</p> <p>District Administrators.</p> <p>Local village Chiefs.</p> <p>Local traffic Chiefs.</p>	<p>Individual households along the pipeline route from Ressano Garcia to Vilanculos.</p> <p>Communities in the Temane and Pande gas fields.</p> <p>Landowners in South Africa.</p> <p>Members of Business Chambers along the pipeline route in South Africa.</p>	<p>Sasol.</p> <p>International Finance Corporation (IFC) of the World Bank.</p> <p>Foster Wheeler (EPCM contractor for the gas field development).</p> <p>GLMC (EPC contractor for the pipeline construction).</p> <p>Acer Africa.</p> <p>Codemo.</p> <p>Pay Roll Bureau.</p> <p>Compensation auditor.</p> <p>Non-governmental organisations (NGOs).</p> <p>Center for the Promotion of Investment (CPI).</p> <p>Labour Union.</p> <p>News reporters in Maputo, Beira and along the pipeline route.</p>

**Table 26: Public Disclosure and Consultation Timeframe and Approach for the purposes of the SDAP**

Timing	Approach to Public Disclosure and Consultation
1998 - 2000  Pre-construction Phase	<ul style="list-style-type: none"> <li>• Regular distribution of news releases to media in Mozambique, RSA &amp; internationally</li> <li>• Consultation with local communities regarding EIA of gas pipeline and CPF</li> <li>• Consultation through personal visits regarding servitude rights (South Africa) and resettlement and compensation (Mozambique)</li> <li>• Negotiations between Sasol, its partners and the governments of Mozambique and South Africa</li> <li>• Open days for local suppliers of goods and services, in Beira, Inhassoro, Inhambane and Maputo</li> <li>• Personal visits to key Ministers in Mozambique government</li> <li>• Personal visits to key business people in Mozambique</li> <li>• Broadcasting infomercials on national television in Mozambique</li> <li>• Briefing sessions with Mozambique news reporters in Maputo</li> <li>• Establishment of Project Liaison Committee</li> <li>• Establishment of Task Groups</li> <li>• Roadshow</li> <li>• Visits to NGOs in Inhambane, Gaza and Maputo</li> <li>• Establish the Sasol Social Development Fund in Mozambique</li> </ul>
2001 - 2004  Construction Phase	<ul style="list-style-type: none"> <li>• Official project launch ceremony at the CPF</li> <li>• Payout of compensation claims</li> <li>• Information sessions along the pipeline route &amp; gas field</li> <li>• Visits to government officials</li> <li>• Visits by the news media of Mozambique &amp; South Africa</li> <li>• Visit by RSA investment analysts</li> <li>• Ministerial visits to communities in the gas field</li> <li>• Visit to communities along the pipeline route &amp; in the gas field by WB officials</li> <li>• Broadcasting of a video on national television in Mozambique</li> <li>• Distribution of newsletters in Mozambique and South Africa</li> <li>• Distribution of video to stakeholders</li> <li>• Regular meetings with MICOA and other representatives re. environmental compliance</li> <li>• Implementation of an emergency communication plan</li> <li>• Continuous liaison with the village chief in the gas field</li> </ul>
2001 - 2004  Operational Phase	<ul style="list-style-type: none"> <li>• Continuous liaison with village chief</li> <li>• Regular meetings with Mozambique media</li> <li>• Adequate safety measures &amp; community education measures in place</li> <li>• Compliance with the Petroleum Production Agreement and the Pipeline Agreement</li> <li>• Regular reporting to the Sasol Boards</li> <li>• Institutionalised Liaison structures:                         <ul style="list-style-type: none"> <li>• National level</li> <li>• Provincial level</li> <li>• District level</li> </ul> </li> <li>• NGO Forum in the gas field area</li> <li>• Communication Plan for all other stakeholders i.e. business, universities &amp; embassies</li> </ul>

### 13. Resettlement Planning and Implementation Programme

#### Background

In November 2000, Sasol commenced discussions with the government of Mozambique (GOM) to determine any requirements they may have regarding resettlement and compensation matters. A formal meeting was held on 6 April 2001 to discuss these requirements, and to agree the process to be followed.

Following this meeting, a Joint Task Group was formally constituted (in May 2001), and a draft Resettlement and Compensation Procedure was developed. The Task Group, which comprises representatives from Sasol and GOM, is still active. The main purpose of the Task Group is to compile procedures for resettlement and compensation, to determine the formulae to be used in the calculation of compensation, and to monitor resettlement activities.

At the outset, a primary aim of Sasol was to minimise the social impacts arising from the NGP, thereby minimising resettlement and compensation as far as practically possible. To this end, as part of integrated project planning, Sasol undertook a number of key activities to minimise social impacts. Baseline surveys were undertaken at the gas field and along most of the pipeline corridor. People living in areas to be affected by project components were registered and issued a project identification card. Relevant personal details were noted and the locations of homesteads, machambas and graves were geo-referenced. The resultant data were plotted on maps to give a spatial distribution of affected entities. In addition, the entire pipeline route in Mozambique was flown and a video filmed. The video material was interpreted thereby enabling the confirmation of field data already collected as well as the filling in of data for inaccessible areas. All information was fed through to the engineering team to enable the alignment of project infrastructure in a socially optimum manner.

Although complete avoidance of social impacts has not been possible, they have been minimised to the greatest practical extent. Indeed, impact minimisation continues to be implemented to the present, with the realignment of project infrastructure in-field during construction.

The details of the various activities associated with resettlement and compensation are presented in the

Resettlement Planning and Implementation Programme (RPIP). The RPIP comprises four volumes: a resettlement planning and implementation report, two detailed land-use planning reports (for replacement housing and replacement machamba lands), and a report for an on-going monitoring and evaluation programme to follow existing compliance monitoring.<sup>16</sup>

#### Objectives of the RPIP

The purpose of the RPIP is to facilitate the equitable and fair treatment of all people affected by the NGP insofar as resettlement and related aspects (such as property rights infringements) are concerned. The RPIP also makes provision for everyone to be treated in the same manner and assists in achieving consistency between various NGP-related resettlement activities in Mozambique.

The RPIP has been designed to ensure compliance with the requirements of the Mozambican government, as well as with the relevant policies, procedures, directives and standards of the World Bank Group. These include Operational Policy 4.12: Involuntary Resettlement, Bank Procedure 4.12: Involuntary Resettlement, and Operational Directive 4.30: Involuntary Resettlement. (These requirements are briefly described in Box 2).

In implementing the RPIP, Sasol has adopted the following resettlement objectives:

- To avoid resettlement where ever feasible through integrated and iterative planning;
- Where resettlement is unavoidable:
  - To minimise the scope, magnitude and impact of resettlement;
  - To treat all persons affected by resettlement (resettlers) with respect, dignity and fairness;
  - To pay resettlers fair and equitable compensation to the extent that they are affected by resettlement;
  - To assist resettlers to adapt to their new environment;

<sup>16</sup> Volume 1 has been completed and is available in the public domain via the World Bank Group's InfoShop (<http://www.worldbank.org/infoshop/>) and at Sasol's project web page [http://w3.sasol.com/natural\\_gas/](http://w3.sasol.com/natural_gas/). It is expected that Volumes 2, 3 and 4 will be completed by the end of August 2003. These documents will also be available in the public domain via the forementioned web addresses.

- To monitor the effects of resettlement for a period of four years and to take the necessary actions to address resettlement problems that may arise; and
- To promote resettler socio-economic development through the formulation and implementation of a comprehensive Social Development Action Plan (SDAP).

### Compensation Methodology and Principles

A comprehensive methodology for compensation has been developed and implemented. At the earliest opportunity, areas that would be impacted are identified and annotated on maps and aerial photographs. After issuance of land-use authorisation, these areas are demarcated on the ground.

Thereafter, baseline surveys are undertaken to:

- Identify affected persons, parties or homesteads and to register names and record details;
- Identify local community leaders and representatives to assist in this process;
- Estimate the magnitude of the impacts relative to the need for resettlement and / or compensation;
- Compile a land register; and
- Value compensatable assets.

As soon as possible thereafter, compensation offers are formulated and agreements signed with affected people.

The following general compensation principles, which are consistent with the relevant World Bank policies and procedures, are applied:

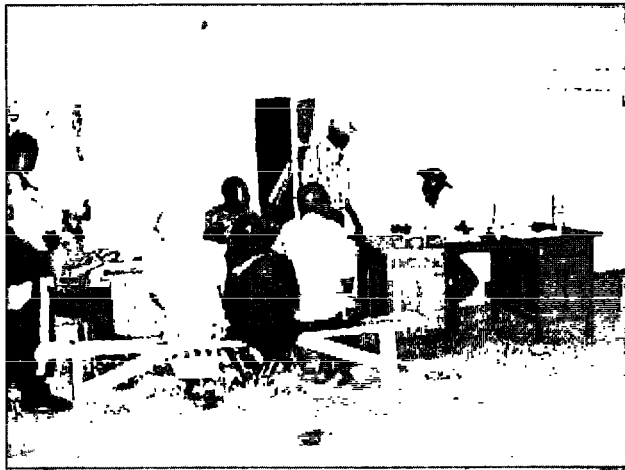
- *Replacement of homesteads*: Homesteads will be replaced by a new brick house (or as otherwise indicated by and agreed with the affected homestead owner).
- *Land for resettlement*: New land will be identified by the Authorities and the Owner, developed and made available to the parties to be resettled.
- *Alternative machambas*: If total or partial loss of land-use opportunities and rights occurs, alternative machambas will be identified, surveyed and developed, and made available to those losing land.
- *Transitional support*: This will be provided to those moved off their land as a result of resettlement or during construction, and during the period of re-establishment.
- *Crop losses*: Compensation for loss of crops and trees will be determined at the time of

resettlement or construction and paid as soon as possible thereafter.

- *Graves*: The exhumation and reburial of graves will be treated in accordance with the wishes of the next of kin, with activities and compensation negotiated on an individual basis.

The Joint Task Group has approved these principles as fair and equitable. Only people resident in the demarcated project area prior to commencement of survey activities are eligible for material compensation arising from their resettlement.

Following resettlement, Sasol monitors and evaluates the resettlement process and the re-establishment of sustainable livelihoods by those affected by resettlement. Affected people residing within a project-affected area are eligible for compensation in so far as their rights have been affected or infringed upon due to project related activities.



Photograph 14: Local residents receiving compensation for damage to their machambas

### Description of Key Resettlement Impacts and Activities

The RPIP covers each of the three principal project components within Mozambique, namely the exploration area of the Pande and Temane gas fields, the development area of these gas fields, and the area for the construction and operation of the underground pipeline.

Following is a brief summary of the status of resettlement activities as of 6 May 2003. A more detailed review is presented in Volume 1 of the RPIP, available from [http://w3.sasol.com/natural\\_gas/](http://w3.sasol.com/natural_gas/).



**Gas Field Exploration:**

- Despite the precautions taken, there were instances where graves and gravesites were affected by machinery. Fourteen next-of-kin have received compensation to facilitate exhumation, reburial and associated ceremonies.
- At the completion of exploration, a total of 1,533 machambas had been registered and valued to the amount of US\$ 265,570.64. Perennial or tree crops comprised 93.7% of the total value, annual crops 3.9%, with the balance (2.4%) comprising crops such as bananas, sugar cane and pineapples. Damage caused to machambas was of a temporary nature and compensation was based on the loss of a single season's produce for annuals and the time required for tree crops to come into production following replanting. No replacement land was required as individuals were able to return to their land following the completion of seismic testing.
- No homesteads *per se* were affected by exploration activities. However, one individual registered damage caused to a structure erected for cooking, another individual reported cracks in his house and a third reported damage to a fence. In all three cases, the damage was evaluated, compensation agreed with the affected individuals, and compensation paid. There was also one incident of a goat being killed for which the owner was compensated.

In each of the above cases the impacts have been enumerated and valued, and compensation (cash and in kind) has been paid, and replacement trees have been distributed.

**Gas Field Development:**

- Despite all attempts to align flow lines around obstacles, three gravesites were accidentally uncovered by machinery. Compensation has been negotiated and paid on a family-by-family basis.
- A total of 384 machambas have been registered and valued. Perennial or tree crops comprise 85% of the total value, annual crops 12%, with the balance (3%) comprising crops such as bananas, sugar cane and pineapples. Where machamba land is lost permanently, affected individuals are provided with replacement land of at least the same area (hectares). This land is/will be bush cleared and demined. Also, each land-user will be provided with a Crop Starter Pack. At this stage, 140 individuals (55%) have received replacement

land (61.0725 ha) that has been demined and cleared. The provision of replacement land to affected individuals is on-going and attended to as land is lost. The Land-use Plan (Volume 3 of the RPIP) provides further detail with regard to physical resettlement of machamba land users.

- Where possible, resettlement of homesteads has been avoided through realignment of the main access road and flow line routes. However, complete avoidance was not possible and 11 homesteads have been registered for resettlement. In each case, compensation was negotiated and agreed with the affected household head.

In each case of resettlement impacts arising from the development of the gas field, impacts have been enumerated and valued, and compensation (cash and in kind) has been paid or payment is planned. However, cognisance must be taken of the on-going nature of this work. Still outstanding at the time of drafting is the provision of replacement trees to those who lost trees as a result of the gas field activities.



Photograph 15: The pipeline right-of-way in Mozambique

**Pipeline:<sup>17</sup>**

Activities pertaining to the construction and operation of the pipeline commenced in April 2002. Prior to this, however, a pre-registration exercise was carried out along most sections of the route.

- Where feasible, graves and gravesites have been avoided. However, complete avoidance through realignment has not been possible, and six

<sup>17</sup> With specific reference to the pipeline, the agreement between Sasol and GOM stipulates that Sasol is responsible for the resettlement and compensation of those people residing within 50m either side of the centre line of the pipeline. However, in the approval of the Pipeline Development Plan it was recommended that the area of influence be reduced to 30 m. The Mozambique Council of Ministers approved the Pipeline Development Plan during November 2001. This is in addition to other

gravesites have been affected. Compensation has been negotiated and paid on a family-by-family basis.

- A total of 164 machambas had been registered and valued. Perennial or tree crops comprise 76% of the total value, annual crops 12%, crops such as bananas, sugar cane and pineapples comprise 2%, with commercial agriculture comprising 7% (only one commercial farm was encountered). The remaining 3% is allotted to agricultural infrastructure damaged. No replacement land was required, as individuals will be able to return to their land following the completion of pipeline construction. Forty registrations have been made for damage to timber trees owned by the GOM. Compensation will be paid to the State Treasury
- Where feasible, homesteads have been avoided. However, complete avoidance was not possible and at the time of drafting, three homesteads have been registered for resettlement. Physical resettlement of all three homesteads is complete.

Registration and compensation of affected individuals is largely complete, but as construction activities are still continuing, *ad hoc* registrations may be necessary. Still outstanding at the time of drafting is the provision of replacement trees to those who lost trees as a result of the construction of the pipeline.

Up to the drafting of the Final Revision of the RPIP, payment of compensation to affected persons has been effected as soon as is practically possible. This relates to logistical arrangements along a linear development located, in part, in remote areas of the country. In some instances, affected persons have lodged complaints that the payment of compensation is too slow. However, on most occasions it has been determined that affected persons could not be traced at the time of compensation payments and that, therefore, their payment of compensation had to stand over until the next payment session.

#### **Resettlement After-Care**

Resettlement after-care refers to the medium- to long-term, low intensity support aimed at assisting resettled families to reasonably sustain themselves, and is distinct from the short-term intensive resettlement assistance described in more detail above.

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restrictions stipulated by GOM relating to the construction of buildings and land use within specified distances of the pipeline.

#### **Monitoring, Evaluation and Auditing**

During the construction phase, there has been ongoing compliance monitoring by officials of the Government of Mozambique. This monitoring has been in place since the commencement of resettlement activities, and will continue for the duration of the implementation of the RPIP. Reporting is to the Joint Task Group for remedial actions (if applicable) by Sasol. Furthermore, the Joint Task Group has undertaken direct in-field inspections and has held personal interviews with affected individuals. Up to the present, no serious non-compliance has been observed or reported.

In addition to this monitoring by GOM, an independent environmental auditor undertakes twice-yearly audits of compliance with the Resettlement and Compensation Procedures for the gas field development projects and the pipeline, as well as of implementation of the RPIP. These will be undertaken for the duration of the construction period. Reporting is to Sasol for attention to remedial actions where applicable.

Monitoring and evaluation (M&E) will be undertaken for what is envisaged will be a four-year period, commencing immediately following resettlement. The exact duration and frequency of M&E will be addressed in Volume 4 of the PRIP (Monitoring and Evaluation Programme).

#### **Cost Estimate**

An initial cost estimate has been calculated for the four compensatable entities (homesteads, machambas, graves, and replacement trees), and for the activities associated with implementation of the RPIP (namely, the preparation of host areas and the fees for support services to Sasol). It has been projected that up until 2004, resettlement will cost in the order of US \$1 579 447 inclusive of a 10% contingency.

#### **Ongoing Resettlement and Compensation Activities**

There are a number of ongoing and remaining activities associated with the RPIP. These include:

- Completion of the first round of pipeline compensation and completion of compensation payments for gas field impacts;
- A second round of pipeline compensation payments that arise from the NGP requiring the right-of-way through to the end of 2003, and thereby impacting on affected machamba users for a second growing season;

- Development of land settlement and land use plans;
- Physical resettlement of homesteads in the gas field; and
- Development of an M&E management system, and the commencement of M&E activities.

It is anticipated that the resettlement and compensation activities will be completed by March 2004, other than for M&E, which will be ongoing for an estimated four years thereafter. As the NGP is an evolving process, it is recognised that additions and changes to the programme and schedule may occur.

Table 27: Summary Resettlement Table (as at May 2003)

Project component	Graves		Machambas			Homesteads			Other	
	No	Value (USD \$)	No	Area (ha)*	Value (USD \$)	No	Value (USD \$)	No	Value (USD \$)	Description
Seismic	14	1,756.81	1,533	47.00	265,570.64	0	0	4	165.91	Structural damage, livestock
Gas Field	3	600.91	384	97.74	154,223.03	11	70,000.00	1	22.73	Structural damage
Pipeline	6	781.10	164	10.99	29,886.21	3	1,431.82	40	31,742.13	Government-owned timber (9,445.273 m <sup>3</sup> )
<b>Total</b>	<b>23</b>	<b>3,138.82</b>	<b>2,081</b>	<b>155.73</b>	<b>449,679.88</b>	<b>14</b>	<b>71,431.82</b>	<b>45</b>	<b>31,930.77</b>	

## 14. Social Development Action Plan

### Background

Sasol recognises the importance of sustainable community development in the regions where it conducts its business operations. Social investment implemented in a very specific pattern and in tandem with project execution has become an internationally recognised prerequisite for large infrastructure projects. As part of the NGP, Sasol is implementing Social Development Action Plans (SDAP) in Mozambique and South Africa. These activities that are being undertaken as part of these SDAPs are briefly summarised below.

### SDAP for Mozambique

Sasol has approved US\$5 million for a Social Development Fund (SDF) to cover the end of the construction phase of the project. Thereafter, funds will be provided on an annual basis through Sasol's Corporate Social Investment grants for the continuation of community development. The SDF was publicly launched as a community focused fund in 2002 prior to the commencement of the construction activities. The communities most affected by the project are those in the Pande and Temane Gas fields, around the CPF operations and along the pipeline route, and these are to be the primary beneficiaries of the fund.

A management committee, steering committee, country manager and SDF manager ensure that the most efficient structures and procedures are in place to channel the funds to projects. In addition, five community liaison officers have been deployed to interact with the communities. This team also assists the manager of the SDF in consulting with community leaders and other stakeholders, playing a critical role in the identification of community needs.

The communities affected by the project have different needs and priorities, but they all have expectations that the project could have benefits for them. According to Sasol, many of these expectations fall outside the ambit of the SDF, such as employment, compensation for damage to crops, housing in the case of relocation and restoration of the affected environment. A Community Interface Forum (CIF) has therefore been established to co-ordinate Community Interface matters.

The SDF management team has developed a project-specific work methodology to deliver sustainable

community upliftment projects. This methodology involves the following steps: identifying and defining needs; generating solutions; approving projects; implementing projects; and ensuring after-care.

The opportunities (needs) that have been identified are summarised in Table 28. An analysis of the needs reflects that:

- The single biggest generic need is for fresh drinking water
- The need for assistance with agricultural projects for subsistence and commercial farming is widespread. This is not surprising, since most of the communities are directly involved in, and are dependant on, agriculture for their livelihood
- The shortage of clinics and schools are important and feature prominently in the hierarchy
- Although small in monetary terms, the need for garments to wear during cultural and sport events is widespread and generic.

Table 28: Needs identified for the SDAP

Need/Projects	Number of times identified	Province		
		Inhambane	Gaza	Maputo
Drinking water	40	20	15	5
Cultural events (garments)	40	20	10	10
Agriculture	10	5	3	2
Education: Schools	6	4	1	1
Health: Clinics	3	1	1	1
Roads	2	2	-	-
Skills training	1	1	-	-
Community bakeries	3	3	-	-
Women's sewing groups	2	2	-	-
Sport	5	5	-	-

### Projects Approved

To date, 32 community projects to the value of approximately \$248 000 have been implemented, 24 of which are for drinking water (refer to Table 29). A further twelve projects to the value of approximately \$1,5 million have been identified and approved.<sup>18</sup> A further 35 projects are currently under consideration. Five of these projects, comprising a value of \$1,28 million, have already been submitted for approval. Sasol forecasts that the full budget of \$5 million will be committed within the next six months.

<sup>18</sup> Sasol Social Development Action Plan.

PROJECT DESCRIPTION	Value (\$)
<b>Projects Completed</b>	
24 bore holes for fresh drinking water benefiting approximately 3000 people	79 000
Cashew Nut Spraying programme – Pande	5 900
Macarretane Agricultural Project	64 000
Roof repairs to Vilanculos hospital	11 000
Soccer development programme for Inhambane Province	5 000
Community bakeries – Temane and Maimelane	1 800
VHF Radio for Nalazi Community	2 425
Garments for cultural group	871
Earthworks for informal shops – CPF	5 000
Administration costs to date	73 000
<b>Projects being implemented</b>	
Rehabilitation of the water reticulation system of Ressano Garcia	450 000
6 x boreholes for fresh drinking water	27 000
Vilanculos sports stadium	900 000
Cattle breeding programme for Sabie	72 000
Mpunguine Dam rehabilitation	110 000
<b>TOTAL (US\$)</b>	<b>1,806,996</b>

Table 29: Existing and future project deliveries (June 2003)

**Social Developments Action Plan for South Africa**

The only difference between the process followed in Mozambique and that in South Africa is that in place of the Mozambique Country Manager, the individual Business Unit Managers for the Transmission Pipeline portion, the Distribution Portion, and SCI have their teams identify needs in consultation with the communities and the authorities in the regions in which they operate. The remainder of the processes and governance structure remains the same.

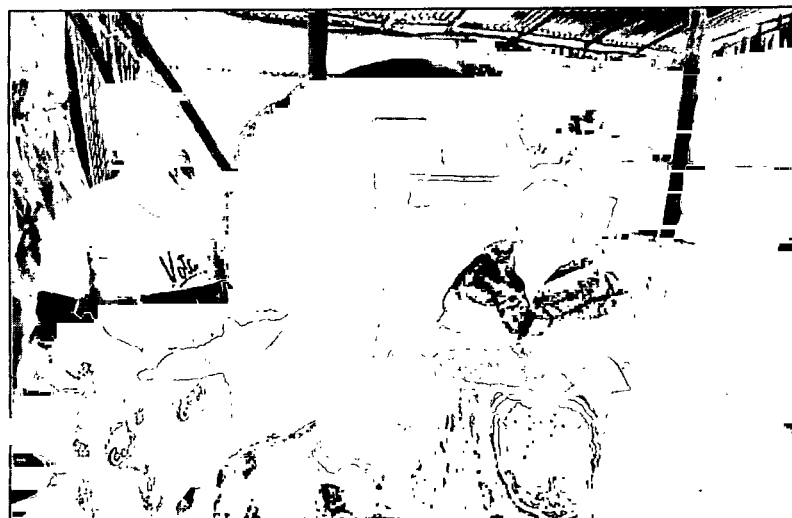
An amount of R10million as been earmarked for the South African portion of the NGP of which R2.5million has been allocated to the section of the

transmission pipe from Komatiepoort to Secunda. Communities along the pipeline route will be targeted for social development purposes with the focus on education, job creation, health, environment, and community upliftment.

Projects in progress and completed on this portion of the NGP include market stalls at a cost of R330000, a hostel upgrade to be used as a clinic R500000 and Primary School classrooms R21000; total R851000.



Photograph 16: Children drinking fresh water from a new borehole and pump donated to the Maimelane community (Mozambique)



Photograph 17: Women from the Maimelane community (Mozambique) with bread baked in an oven donated by Sasol