ENVIRONMENTAL IMPACT ASSESSMENT:

Proposed establishment of an aluminium smelter within the Coega Industrial Development Zone,
Port Elizabeth, South Africa

Draft Scoping Report

May 2002
ENVIRONMENTAL IMPACT ASSESSMENT:

Proposed establishment of an aluminium smelter within the Coega Industrial Development Zone, Port Elizabeth, South Africa

DRAFT SCOPING REPORT
MAY 2002

For comment by 18 June 2002

Report compiled by
Paul Lochner, Rob Hounsome, Frauke Münster and Sarah Davies, CSIR
Sandy Wren, Sandy and Mazizi Consulting
PURPOSE OF THIS REPORT

The Draft Scoping Report forms part of a series of reports and information documents that will be issued during the environmental impact assessment process for the Aluminium Pechiney PAS 2005 project, which proposes the construction and operation of an aluminium smelter within the Coega Industrial Development Zone.

This report includes the environmental issues identified by specialist consultants and Aluminium Pechiney, as well as those raised to date by the public and authorities. The report will be available in local libraries and on the Internet for a period of three weeks from release. You are invited to comment on the Report, which can be viewed at the venues shown below, and also on the Internet at http://smelter.csir.co.za.

Nelson Mandela Metropole Libraries:
Govan Mbeki, New Brighton, Motherwell, Zwide, Newton Park, Walmer, Chatty, West End, Despatch, Uitenhage, KwaNobuhle, Gelvandale, KwaMgxaki, KwaZakhele, Linton Grange, University of PE, Vista University and PE Technikon

Town: UCT Government Publications Department

PUBLIC MEETINGS

In addition to the Open Day, all I&APs are invited to attend any one of the following Public Meetings where an overview of the Draft Scoping will be given and an opportunity will be provided for comments:

3 June 2002, 5:30pm Centenary Hall, New Brighton,
4 June 2002, 5:30pm, Raymond Mhlaba Sports Centre, Motherwell
5 June 2002, 12 noon, Valentine Hall, Addo
5 June 2002, 5:30pm, Babs Madlakane Hall, Uitenhage

The Public Participation Consultants can be contacted for further information on the project, and are available on request to provide presentations on the Draft Scoping Report. Contact details are provided below.

Comments can be submitted to Sandy & Mazizi Consulting by phone, fax, email, letter or using the enclosed comments form. Comments should reach Sandy and Mazizi Consulting by 18 June 2002. Please submit your comments to:

Sandy & Mazizi Consulting cc.
C/o PAS 2005
120 Diaz Road
Acocksburg
Port Elizabeth 6000

Phone: 041 374 8426
Fax: 041 373 2002-05-10
email: sjwren@iafrica.com

OPEN DAY

An Open day will be held at the PE City Hall where all interested and affected parties (I&APs) are invited to come and view a static display of the report and interact with the EIA project team and Aluminium Pechiney representatives.

4 June 2002, PE City Hall, 12 noon to 6pm (Any time between these hours).
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## Definitions

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<tr>
<td><strong>Alternatives</strong></td>
<td>A possible course of action, in place of another, that would meet the same purpose and need (of proposal). Alternatives can refer to any of the following but are not limited here to: alternative sites for development, alternative site layouts, alternative designs, alternative processes and materials. In Integrated Environmental Management, the so-called “no go” alternative refers to the option of not allowing the development and may also require investigation in certain circumstances.</td>
</tr>
<tr>
<td><strong>Alumina</strong></td>
<td>Alumina is the name given to the raw material, aluminium oxide (Al₂O₃), which is used in the smelting process to produce aluminium. It is a white powdery oxide produced through refining of bauxite.</td>
</tr>
<tr>
<td><strong>Aluminium</strong></td>
<td>Aluminium (in metallic form) is a relatively lightweight metal which is highly corrosion resistant, an excellent thermal conductor, non-magnetic, non-toxic and highly workable. End uses of aluminium include building and construction materials, electrical products, packaging and containers, cooking utensils, the aeronautical, automotive industries and leisure goods industries. Aluminium is produced by a smelting process which separates the aluminium from alumina (aluminium oxide) through electrolytic reduction.</td>
</tr>
<tr>
<td><strong>Anchor tenant</strong></td>
<td>Anchor tenants acts as catalysts for further investment (including improvements in local infrastructure and services) and as a magnet for other economic activities. They usually involve large-scale projects and in the construction and operational phases, present major employment and other economic opportunities for local enterprises.</td>
</tr>
<tr>
<td><strong>Anode</strong></td>
<td>An anode is the name given to a positive electrode in a reduction cell. The anode used in the aluminium industry provides the positive electrical contact. The anode block is consumed during the smelting process.</td>
</tr>
<tr>
<td><strong>Assessment</strong></td>
<td>The process of collecting, organising, analysing, interpreting and communicating data that is relevant to some decision.</td>
</tr>
<tr>
<td><strong>Baking furnace</strong></td>
<td>The anodes produced at the paste plant are baked at about 1100°C in an oil-fired furnace for several weeks in order to give them mechanical and conductivity properties.</td>
</tr>
<tr>
<td><strong>Bath</strong></td>
<td>This is the name given to the electrolytic medium within the pot through which the electric current is passed in the aluminium smelting process. Bath is made up of cryolite, alumina and aluminium fluoride.</td>
</tr>
<tr>
<td><strong>Bauxite</strong></td>
<td>Aluminium ore which is refined to produce alumina.</td>
</tr>
<tr>
<td><strong>Butt crushing plant</strong></td>
<td>At the butt crushing plant the spent anodes which are recovered from the potline are crushed in order for them to be used for the production of new anodes.</td>
</tr>
<tr>
<td><strong>Casthouse</strong></td>
<td>Liquid aluminium which is extracted from the potline is transported to the casthouse where it is cast into aluminium ingots.</td>
</tr>
<tr>
<td><strong>Cathode</strong></td>
<td>A cathode is the name given to the negative electrode in a reduction cell. The cathode used in the aluminium industry provides the negative electrical contact as well as serving as the lining of the pot in which the smelting process takes place.</td>
</tr>
<tr>
<td><strong>Cryolite</strong></td>
<td>A mineral (sodium aluminium fluoride) which the main component of bath in the aluminium smelting process.</td>
</tr>
<tr>
<td><strong>Dross</strong></td>
<td>The skimmings on the surface of the molten aluminium which are removed because they contain impurities which could affect the quality of the aluminium metal produced in the smelter.</td>
</tr>
<tr>
<td><strong>Dry scrubbing</strong></td>
<td>The process whereby potential gaseous pollutants such as fluoride are attracted onto a solid substance and thereby removed from the air. An alternative approach is “wet scrubbing” but this has the disadvantage of producing additional liquid waste and may lead to corrosion.</td>
</tr>
<tr>
<td><strong>Electrolysis</strong></td>
<td>When electricity is passed through a liquid solution of an ion or an electrolyte, a chemical reaction called electrolysis occurs. The energy from the electric current breaks chemical bonds. In the aluminium smelting process this enables the separation of aluminium from alumina (aluminium oxide).</td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td>The biophysical, social, economic, cultural, political and historical context within which people live and within which development takes place.</td>
</tr>
<tr>
<td><strong>Environmental impact</strong></td>
<td>A change resulting from the effect of an activity on the environment, whether desirable or undesirable. Impacts may be the direct consequence of an organisation’s activities or may be indirectly caused by them.</td>
</tr>
<tr>
<td><strong>Environmental impact assessment</strong></td>
<td>An Environmental Impact Assessment (EIA) refers to the process of identifying, predicting and assessing the potential positive and negative social, economic and biophysical impacts of any proposed project, plan, programme or policy which requires authorisation by law and which may significantly affect the environment. The EIA includes an evaluation of alternatives, as well as recommendations for appropriate mitigation measures for minimising or avoiding negative impacts, measures for enhancing the positive aspects of the proposal, and environmental management and monitoring measures.</td>
</tr>
<tr>
<td><strong>Environmental issue</strong></td>
<td>A concern felt by one or more parties about some existing, potential or perceived environmental impact.</td>
</tr>
<tr>
<td><strong>Fume treatment centre</strong></td>
<td>The fume treatment centre (FTC) extracts and recycles fluoride, poly-aromatic hydrocarbon containing tar and dust from emissions created by the anode baking process.</td>
</tr>
<tr>
<td><strong>Gas treatment centre</strong></td>
<td>The gas treatment centres have the primary role of recycling the fluoride and dust captured from the pots.</td>
</tr>
<tr>
<td><strong>Industrial Development Zone</strong></td>
<td>An Industrial Development Zone is an area identified for industrial development. The aim is to attract domestic and foreign investment into industrial and commercial parks by providing serviced industrial sites with purpose-built infrastructure.</td>
</tr>
<tr>
<td><strong>Ingot</strong></td>
<td>Bars of aluminium metal which are produced as the final product of the primary aluminium smelting process.</td>
</tr>
<tr>
<td><strong>Integrated environmental management</strong></td>
<td>IEM provides an integrated approach for environmental assessment, management, and decision-making and to promote sustainable development and the equitable use of resources. Principles underlying IEM provide for a democratic, participatory, holistic, sustainable, equitable and accountable approach.</td>
</tr>
<tr>
<td><strong>Interested and affected parties</strong></td>
<td>Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, workforce, consumers, environmental interest groups and the general public.</td>
</tr>
<tr>
<td><strong>Key issue</strong></td>
<td>An issue raised during the Scoping process that has not received an adequate response and which requires further investigation before it can be resolved.</td>
</tr>
<tr>
<td><strong>Liquid pitch</strong></td>
<td>Pitch is a heavy, sticky, tar-like by-product derived from the coking of coal. It is used as a binding agent for the petroleum coke in the anode blocks, prior to baking.</td>
</tr>
<tr>
<td><strong>Listed activities</strong></td>
<td>Development actions that are likely to result in significant environmental impacts as identified by the Minister of Environmental Affairs and Tourism in terms of Section 21 of the Environment Conservation Act.</td>
</tr>
<tr>
<td><strong>Megawatt</strong></td>
<td>A measure of power, equal to 1 000 kilowatts or 1 million Watts. This is the unit used to quantify the electricity required by a given system.</td>
</tr>
<tr>
<td><strong>Negative impact</strong></td>
<td>A change that reduces the quality of the environment (for example, by reducing species diversity and the reproductive capacity of the ecosystem, by damaging health, or by causing nuisance).</td>
</tr>
<tr>
<td><strong>Paste plant</strong></td>
<td>At the paste plant crushed petroleum coke and spent anode butts (the remainder of the anode which was not consumed in the potline) are mixed with liquid pitch to form an anode paste which is compacted into anode blocks prior to baking.</td>
</tr>
<tr>
<td><strong>Petroleum coke</strong></td>
<td>Petroleum coke is the main carbon source for the anode blocks. It is imported from overseas and is made from oil derivatives, which are regarded as a by-product by oil refineries.</td>
</tr>
<tr>
<td><strong>Pitch fume treatment centre</strong></td>
<td>The pitch fume treatment centre (PFTC) treats PAH containing tar and dust emissions from the paste plant.</td>
</tr>
<tr>
<td><strong>Positive impact</strong></td>
<td>A change which improves the quality of life of affected people or the quality of the environment.</td>
</tr>
<tr>
<td><strong>Pot</strong></td>
<td>The pot is the steel shell within which the aluminium smelting process takes place. Otherwise referred to as electrolytic reduction cells.</td>
</tr>
<tr>
<td><strong>Potline</strong></td>
<td>Pots are electrically connected and arranged in long buildings called potrooms. Two potrooms constitute a potline.</td>
</tr>
<tr>
<td><strong>Potlinings</strong></td>
<td>Potlinings consist of the refractory bricks that are used to insulate the steel shell of the pot (to contain the heat and prevent damage to the steel shell) and the carbon blocks that form the cathode.</td>
</tr>
<tr>
<td><strong>Reduction</strong></td>
<td>Reduction is an electrochemical process that involves the transfer of electrons from one atom to another. Reduction forms part of the electrolysis process.</td>
</tr>
<tr>
<td><strong>Relevant authority</strong></td>
<td>The environmental authority on national, provincial or local level entrusted in terms of the Constitution and in terms of the designation of powers in Notice No. R. 1184 of 5 September 1997 with the responsibility for granting approval to a proposal or allocating resources.</td>
</tr>
<tr>
<td><strong>Roddling shop</strong></td>
<td>Newly manufactured anodes are attached to an electrical conducting stem in the rodding shop before being transported to the potline.</td>
</tr>
<tr>
<td><strong>Scoping</strong></td>
<td>This refers to the process of determining the spatial and temporal boundaries (the extent) for the EIA and key issues to be addressed in an environmental assessment.</td>
</tr>
<tr>
<td><strong>Smelting</strong></td>
<td>Aluminium smelting refers to the separation of aluminium from aluminium oxide.</td>
</tr>
<tr>
<td><strong>Spent Potlinings</strong></td>
<td>The potlinings which have reached the end of their useful life and which need to be replaced and disposed of.</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
</tr>
<tr>
<td>$A_2O_3$</td>
<td>Alumina (Aluminium Oxide)</td>
</tr>
<tr>
<td>AP</td>
<td>Aluminium Pechiney</td>
</tr>
<tr>
<td>$CO_2$</td>
<td>Carbon dioxide</td>
</tr>
<tr>
<td>CDC</td>
<td>Coega Development Corporation</td>
</tr>
<tr>
<td>CSIR</td>
<td>Council for Scientific and Industrial Research</td>
</tr>
<tr>
<td>DEAT</td>
<td>Department of Environmental Affairs and Tourism (National)</td>
</tr>
<tr>
<td>DEAE&amp;T</td>
<td>Department of Economic Affairs Environment &amp; Tourism (Eastern Cape)</td>
</tr>
<tr>
<td>DSR</td>
<td>Draft Scoping Report</td>
</tr>
<tr>
<td>EIA</td>
<td>Environmental Impact Assessment</td>
</tr>
<tr>
<td>EIR</td>
<td>Environmental Impact Report</td>
</tr>
<tr>
<td>FTC</td>
<td>Fume Treatment Centre</td>
</tr>
<tr>
<td>GTC</td>
<td>Gas Treatment Centre</td>
</tr>
<tr>
<td>I&amp;AP</td>
<td>Interested and Affected Party</td>
</tr>
<tr>
<td>IEM</td>
<td>Integrated Environmental Management</td>
</tr>
<tr>
<td>IDZ</td>
<td>Industrial Development Zone</td>
</tr>
<tr>
<td>KV</td>
<td>Kilovolt</td>
</tr>
<tr>
<td>MW</td>
<td>Megawatt</td>
</tr>
<tr>
<td>NMMM</td>
<td>Nelson Mandela Metropolitan Municipality</td>
</tr>
<tr>
<td>PAH</td>
<td>Poly-aromatic hydrocarbon</td>
</tr>
<tr>
<td>PFTC</td>
<td>Pitch Fume Treatment Centre</td>
</tr>
<tr>
<td>PPP</td>
<td>Public Participation Programme</td>
</tr>
<tr>
<td>ROD</td>
<td>Record of Decision</td>
</tr>
<tr>
<td>SEA</td>
<td>Strategic Environmental Assessment</td>
</tr>
<tr>
<td>SMME</td>
<td>Small, Medium and Micro Enterprises</td>
</tr>
<tr>
<td>$SO_2$</td>
<td>Sulphur dioxide</td>
</tr>
<tr>
<td>SPL</td>
<td>Spent potlining</td>
</tr>
</tbody>
</table>
1. INTRODUCTION

1.1 Background

Aluminium Pechiney, a French company listed on the French Commercial Register, is planning to construct a new aluminium smelter to meet rising demands for aluminium. The project, known as PAS 2005, would increase Aluminium Pechiney's aluminium production by approximately 485,000 tonnes per annum.

In an international site selection study, Aluminium Pechiney identified 11 potential sites for locating this smelter (The site screening process is described in more detail in section 3.2). This analysis led to more detailed investigations of three of the preferred sites, these being within the Coega Industrial Development Zone (IDZ) in South Africa, and sites in Australia and Argentina. Due to recent economic instability in Argentina, the more detailed studies for this site were stopped. At present, engineering, planning and environmental studies are underway at the South African and Australian sites.

The feasibility studies will provide information on which the investment decision will be taken by Aluminium Pechiney. In investigating the environmental feasibility of the proposed smelter at the Coega IDZ site, Aluminium Pechiney has commissioned the CSIR (Environmentek), together with Sandy & Mazizi Consulting (who will carry out the public participation process) and a team of specialists, to conduct an Environmental Impact Assessment (EIA).

1.2 Rationale for the project

Aluminium Pechiney conducted a market analysis, which indicated an anticipated rise in demand for aluminium of 2.5% per annum, up to the year 2010. In order to meet this growing demand Aluminium Pechiney is investigating the feasibility of establishing a new aluminium smelter.

1.3 The requirement for an Environmental Impact Assessment

In terms of the Environment Conservation Act (Act 73 of 1989) an Environmental Impact Assessment (EIA) is required for those activities which have the potential to have a detrimental impact on the environment. Activities requiring an EIA have been specified by regulations issued by the Department of Environmental Affairs and Tourism (Government Notice R. 1182, 5 September 1997) and include scheduled processes listed in the Second Schedule to the Atmospheric Pollution Prevention Act (Act 45 of 1965). This schedule includes aluminium processes and therefore Aluminium Pechiney's proposal to construct and operate an aluminium smelter within the Coega IDZ requires an EIA.

An EIA refers to the process of identifying, predicting and assessing the potential positive and negative social, economic and biophysical impacts of any proposed project, plan,
programme or policy which requires authorisation or permission by law and which may significantly affect the environment. The EIA includes an evaluation of reasonable alternatives, as well as recommendations for appropriate mitigation measures for minimising or avoiding negative impacts, measures for enhancing the positive aspects of the proposal, and environmental management and monitoring measures.

**Definition of the term “Environment”**

The term “environment” refers not only to the “green” environment (the biophysical components such as land, water, air, soils, plants and animals) but also to the social, economic, cultural, political and historical components of the environment.

The objective of the EIA is to provide decision-makers with relevant and objective environmental information to determine whether or not the proposal will support sustainable development and, subsequently, whether or not to accept or reject the application or proposal.

**The goals for sustainable development in the southern African region:**

- Acceleration of economic growth with greater equity and self-reliance;
- Improving the health, income and living conditions of the poor majority;
- Ensuring equitable and sustainable use of the environment and natural resources for the benefit of present and future generations.

*Source: United Nations Department of Economic and Social Affairs, 1997*

### 1.4 Objectives of the Draft Scoping Report

The Scoping Phase of the EIA refers to the process of determining the spatial and temporal boundaries (the extent) for the EIA and key issues to be addressed in an environmental assessment. This is done through a technical analysis involving the project proponent and specialists with experience in EIAs for aluminium smelters; and a consultation process with interested and affected parties (I&APs). The main purpose of Scoping is to focus the environmental assessment on a manageable number of important questions and to ensure that only significant issues and reasonable alternatives are examined.

The objective of the Draft Scoping Report is to provide information to stakeholders (including the public and the authorities) on the proposed project in order to allow stakeholders to identify any additional key issues and concerns which may not yet have been identified through the technical Scoping process.
2. INTRODUCING ALUMINIUM PECHINEY

Aluminium Pechiney is a French company listed on the French Commercial Register. Aluminium Pechiney is one company within The Pechiney Group, focussed on the production of primary aluminium and aluminium products. Other core business of The Pechiney Group includes the production of packaging materials, production of ferroalloys and international trade. The Pechiney Group has been in operation since 1898.

Aluminium Pechiney is the fourth largest primary aluminium producer in the world, and the world leader in design and supply of aluminium production technology. The company conducts bauxite mining, alumina refining and aluminium smelting operations in a total of five countries.

<table>
<thead>
<tr>
<th>Pechiney's guidelines for Environment, Health and Safety</th>
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<tbody>
<tr>
<td>1. To ensure transparency in issues concerning environmental protection, health and safety, in particular by evaluating and publishing achievements and performances measured by selected indicators applicable to the Group’s activities.</td>
</tr>
<tr>
<td>1. To ensure regulatory compliance of operations and facilities, as well as compliance with the internal standards the Group is developing to align its practices.</td>
</tr>
<tr>
<td>2. To ensure continuous improvement of employees’ health and safety conditions and those of Group subcontractors.</td>
</tr>
<tr>
<td>3. To continue to reduce the environmental impact of the Group’s past, current or future activities as well as of its products, by limiting emissions and waste, optimising processes, managing the risk of accidents, remediating any damage done, and developing partnerships with customers and suppliers.</td>
</tr>
<tr>
<td>4. To develop products that are more considerate of the environment by analysing their life cycles, from design to recycling.</td>
</tr>
<tr>
<td>5. To implement the best available and most economically viable technology in new investments and the best environmental practices throughout the Group.</td>
</tr>
<tr>
<td>6. To manage industrial risks through efficient identification and ranking procedures, as well as by the implementation of appropriate prevention and protection measures and their ongoing adaptation.</td>
</tr>
<tr>
<td>7. To organise a scientific health watch activity to detect and control new risks.</td>
</tr>
</tbody>
</table>

**Source:** Pechiney, 2001, Environment, Health & Safety Report
3. DESCRIPTION OF THE PROPOSED PROJECT

3.1 The Coega Industrial Development Zone

The Coega IDZ consists of 12 000 hectares of land 20 km north-east of Port Elizabeth, in the Eastern Cape Province in South Africa (Figure 1). It is the first IDZ to be established in South Africa, and forms part of the South African government’s vision for the country to become one of the world’s key manufacturing centres. Through the provision of serviced land and world-class infrastructure, the Coega Development Corporation (the operators of the Coega IDZ) aims to attract investors to the IDZ.

The establishment of the Coega Industrial Development Zone follows extensive economic feasibility and environmental assessment studies. A Strategic Environmental Assessment (SEA) was conducted in 1996 to assess the opportunities and constraints to developing the area as an IDZ and the development of a deepwater port at Coega. The objective was to ensure that environmental issues were focused on sufficiently early in the planning and decision-making process so as to avoid the shortcomings of project-specific EIAs which are generally unable to address the cumulative effects of large-scale development projects. The SEA included an evaluation of the “No Go” option and an assessment of whether there were any environmental considerations considered so important that industrial development should not proceed at all.

The outcome of the SEA was that no environmental fatal flaws were identified which would prohibit further planning of the Coega IDZ and the Port of Ngqura. A fatal flaw is an environmental constraint that is considered so important that development should not proceed at all, or requires significant changes to be environmentally feasible. The SEA identified a number of conditions and recommendations which should be implemented in order to ensure that viable economic opportunities are not foreclosed; the conservation status of the Algoa Bay islands and terrestrial ecosystems is secured; local labour and resources are used and negative impacts on local communities are minimised or avoided; and systems for the effective management and disposal of wastes and the control of pollution are established. Recommendations included the implementation of a Strategic Environmental Management Plan; a phased approach to building and operation; detailed measures to maintain or enhance environmental qualities and reduce pollution; ongoing public and stakeholder participation; and the recommendation that planning for the IDZ is linked to that of the Port Elizabeth-Uitenhage area and the Eastern Cape region.

An EIA was subsequently conducted in 1999 to assess the impacts associated with changing land-use from agriculture to an industrial development zone. The finding of this EIA was that, subject to the implementation of an Environmental Management System for the IDZ and the implementation of the recommendations suggested in the EIA, the positive impacts of the proposed IDZ seemed to outweigh the negative impacts. Authorisation for the rezoning of the land to allow the creation of the Coega IDZ has been granted, subject to a number of conditions being met. This Record of Decision has been appealed by various parties and is currently awaiting a decision by the national Department of Environmental Affairs and Tourism.
Figure 1: Map showing the location of the Coega IDZ relative to Port Elizabeth
The proposal to build a new deepwater port at the mouth of the Coega River has also undergone an EIA and has been authorised subject to the adherence to the conditions attached to the Record of Decision and the implementation of the recommendations made by the EIA. This Record of Decision has also been appealed and is under review with the Department of Environmental Affairs and Tourism.

3.2 Selection of the Coega IDZ as a potential site for the aluminium smelter

A screening process was undertaken by Aluminium Pechiney to identify suitable international locations for constructing and operating an aluminium smelter. Eleven potential sites were identified, located in:

- Southern Africa
- Australia
- North America
- Central America
- South America
- Arabian gulf.

Each of these sites has been subjected to an initial screening process, based on available information and informed assumptions. The main criteria used in this initial screening process were:

**Energy supply** (energy represents one third of the operating cost).
- source (hydraulic, gas, other)
- size of the energy resources
- commercially available power (including aspects such as availability, security of supply and length of supply contract).

**Site**
- topography, ground quality, climate
- port and road infrastructure.

**Environment**
- flora and fauna impact
- existing situation (other industry in the area)
- impact on employment
- social impact.

**Tax conditions**
- corporate tax, metal sale tax
- depreciation rules, exemptions.

**Raw materials and metal logistics**
- transportation cost
• market location, finished product grade and shape.

**Risks inherent to the country**
• political stability
• safety of people and goods.

Aluminium Pechiney used a model to convert the above factors into costs, which were then used as a basis for comparing the sites. At present, all 11 sites are still considered as potential sites, however, the results of the modelling exercise led to more detailed feasibility investigations at three of the sites. These are:

• Coega, South Africa
• Australia
• Argentina.

For these three sites, Aluminium Pechiney commenced with site engineering studies to obtain accurate figures that can be used in their economic model, in order to check the assumptions.

Due to recent economic instability in Argentina, the more detailed studies for this site were stopped. At present, engineering, planning and environmental studies are underway at the South African and Australian sites, with the intention of reaching a decision on the preferred site as soon as strategic agreements are reached. Ongoing negotiations and investigations are underway to source additional information to enable Aluminium Pechiney to select their preferred site.

As mentioned above, the main criterion in site selection is the energy supply and pricing agreement. For the Coega site, significant progress was made when an agreement of this nature was been reached between Aluminium Pechiney and Eskom in March 2002.

### 3.3 Proposed location of the aluminium smelter within the Coega IDZ

The aluminium smelter is proposed to be located in Zone 5 of the Industrial Development Zone, within the area identified as the metallurgical cluster (Figure 2). The area under consideration for the location of the aluminium smelter lies on the farm Swartekoppen 302. The particular portions involved are:

• 302/12
• 302/13
• 302/14
• 302/15
• 302/33
• 302/36
• 302/47.
3.4 Overview of the Aluminium Pechiney PAS 2005 project

The proposed smelter would be operated on a continuous basis (24 hours, 365 days per year) using new generation smelting technology (AP50) developed by Aluminium Pechiney. AP50 smelting technology operates at 500,000 amperes of electricity in comparison to the previous AP30 and AP18 technology which operated at 300,000 and 180,000 amperes respectively. AP50 smelting technology has been selected as it represents significant capital and operating cost advantages, and high standards of environmental performance.

The proposed smelter is being designed to produce approximately 485,000 tonnes of aluminium metal per annum.
**Summary of PAS 2005 project details**

<table>
<thead>
<tr>
<th>Plant Area</th>
<th>80 hectares</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number Potlines</td>
<td>1</td>
</tr>
<tr>
<td>Number Potrooms</td>
<td>2</td>
</tr>
<tr>
<td>Length of Potrooms</td>
<td>1200 meters</td>
</tr>
<tr>
<td>Number of electrolysis cells (“pots”)</td>
<td>336</td>
</tr>
<tr>
<td>Production Capacity</td>
<td>Approx. 485,000 tons/year</td>
</tr>
<tr>
<td>Alumina consumption</td>
<td>Approx. 931,000 tons/year</td>
</tr>
<tr>
<td>Petroleum Coke consumption</td>
<td>Approx. 180,000 tons/year</td>
</tr>
<tr>
<td>Liquid Pitch consumption</td>
<td>Approx. 38,000 tons/year</td>
</tr>
<tr>
<td>Electricity demand</td>
<td>Approx. 860 MW</td>
</tr>
<tr>
<td>Electricity supply</td>
<td>3 x 132 kV lines</td>
</tr>
<tr>
<td>Water usage</td>
<td>Approx. 600,000 m$^3$/year</td>
</tr>
<tr>
<td>Fuel Oil usage</td>
<td>Approx. 31,780 tons/year</td>
</tr>
</tbody>
</table>

The proposed smelter consists of 3 major process components:

- one Potline with 336 pots (electrolytic cells);
- one Carbon Plant and Rodding Shop for production of anodes;
- one Casthouse for pouring ingots.

There exists the potential for a second potline to be constructed at a later stage.

Figure 3 provides an aerial view of the proposed smelter reflecting its location relative to the N2 highway and the proposed Port of Ngqura. The aluminium production process, as applying to Aluminium Pechiney’s proposed operation within the Coega IDZ, is shown in Figure 4.

### 3.4.1 Import and storage of raw materials

Major raw materials required for the smelting process are:

- fresh alumina
- petroleum coke
- aluminium fluoride; and
- liquid coal tar pitch.

All of these materials would be imported by ship to dedicated port facilities within the proposed Port of Ngqura at Coega.

Fresh alumina and coke would be transported by dedicated ships, which carry loose, dry-bulk material. Alumina and coke are unloaded by vacuum onto an enclosed conveyor system. The material would be transported by a conveyer belt to the smelter site for storage in sealed vessels (possibly silos or domes) for alumina, while coke would be stored in an A-frame shed. Initially the alumina would be delivered approximately every three weeks.
Aluminium fluoride would probably be imported in 1 tonne bulker bags or 25kg layer bags and transported by truck to the site for storage and use.

Liquid pitch would be shipped to the Port of Ngqura in a dedicated, heated ship, stored at the port and, unless a heated pipe is practical, transported by truck from the port to the smelter site.

### 3.4.2 The potline

The smelting process uses electrical energy to break the bonds between aluminium (Al) and oxygen (O) in the alumina (Al₂O₃) in order to produce liquid aluminium.

\[
2\text{Al}_2\text{O}_3 + 3\text{C} \rightarrow 4\text{Al} + 3\text{CO}_2
\]

This process occurs in large steel containers called reduction pots, which are arranged in long buildings called potrooms. Two potrooms constitute a potline. The potline proposed for the Coega IDZ would consist of 2 elongated potrooms measuring 1200m x 30m. Each room would house a line of 168 pots in two groups of 84 pots, electrically connected. There would be 336 pots in total in the potline.
Figure 4: Aluminium production process
Each pot represents one large electrolytic cell. They are lined with carbon blocks and refractory bricks to insulate the pots and contain the heat. This potlining also forms the positive contact (the cathode) for the electric current which is passed through a molten “bath” of sodium aluminium fluoride (cryolite), alumina and aluminium fluoride in the pots. Carbon anodes (made of petroleum coke and pitch) are used to conduct electricity into the pots. The anode block is consumed during the smelting process. The heat generated by passing the electric current through the cell maintains the bath in liquid form at about 950°C.

A steel-reinforced structure supports the overall pot including the anodes, cathode shell, a hoisting system and the alumina supply hopper. The supply hopper automatically feeds fluoride enriched alumina from the Gas Treatment Centre into the pots where it is dissolved in the molten cryolite.

Liquid aluminium is tapped periodically from the pots by vacuum suction and transferred to the casthouse and holding furnaces in refractory lined steel crucibles.

Associated with the potline are two Gas Treatment Centres (GTC's) positioned between the potrooms to receive emissions from the pots. In addition to carbon dioxide (CO₂), emissions consist primarily of fluoride, sulphur dioxide and dust. The GTC’s are dry scrubbing units, having the primary role of recycling almost all the fluoride and dust captured from the pots. The dry scrubbing system is not efficient at SO₂ abatement. Alumina is used as a scrubbing agent to extract the fluoride from the emissions. The ‘fluorinated alumina’ is then directed into the pots.

3.4.3 The carbon plant and rodding shop

The carbon anodes are gradually consumed during the smelting process. The expected life of an anode is approximately 640 to 770 hours, so they are replaced on a rotating schedule. Due to this high demand for anodes, they would be manufactured on site in a carbon plant by a 3-stage process:

- **Paste plant** - Green (unbaked) anodes would be produced by crushing petroleum coke and spent anode butts (the remainder of the anode which was not consumed in the potline) then mixing it with liquid pitch to form an anode paste and compacting the paste into anode blocks.
- **Baking furnace** - The anodes are baked at about 1100°C in an oil-fired furnace for several weeks in order to give them mechanical and conductivity properties; and
- **Rodding shop** - Anodes are then attached to electrical conducting rods in the rodding house and transported to the potline.

Associated with the anode-baking furnace is a fume treatment centre (FTC) to extract and recycle fluoride, poly-aromatic hydrocarbon (PAH) containing tar and dust from emissions created by the anode baking process. This is a dry scrubbing unit, also utilising raw alumina.
as the scrubbing agent with the resultant ‘enriched alumina’ being recycled into the pots resulting in PAH destruction.

There is also a pitch fume treatment centre (PFTC) associated with the paste plant. This is a dry scrubbing unit that treats PAH containing tar and dust emissions from the paste plant, using particulate coke as the scrubbing agent. This ‘enriched coke’ is recycled into the paste plant.

3.4.4 The casthouse

Molten aluminium metal is extracted from the pots by a vacuum and siphoned into large ladles. Specific vehicles transport ladles to the casthouse. Metal is siphoned from the ladles into holding furnaces in preparation for casting. Various alloying elements can be added to the metal to attain specific qualities and strengths (for differing customer requirements). The metal is then cast into ingots and bundled for shipping. Aluminium dross or skimmings is a by-product of the casting step due to some re-oxidation of aluminium.

3.4.5 Export of aluminium ingots

The final product of the aluminium smelting process would be in the form of aluminium ingots. The ingots would be stacked and trucked to the port from the smelter, loaded onto ships and exported.

3.5 Associated infrastructure requirements

3.5.1 Electricity supply

The operation of an aluminium smelter within the Coega IDZ would require 860 MW. An EIA has already been conducted for the construction of powerlines for the 120km stretch between Poseidon and Grassridge. Eskom, the power supplier, are in the process of initiating an EIA for the extension of the Grassridge substation and the construction of three 132kV powerlines for the final 20km between Grassridge and the Coega IDZ. The proposed extension of the power supply includes three lines for the Pechiney smelter, as well as additional lines for Port Elizabeth and the Coega IDZ.

3.5.2 Port facilities

The decision by Pechiney to conduct more in depth feasibility studies for the construction and operation of the aluminium smelter within the Coega IDZ is based on the expectation that the proposed deepwater port will be developed at Coega. Without these port facilities the project is considered unviable. Environmental authorisation for the construction of the Port of Ngqura has been granted, though the appeal against this Record of Decision is currently under review.
Dedicated port facilities would be established for vacuum unloading of alumina and petroleum coke. Liquid pitch would also be unloaded at a dedicated unloading station and stored at the port prior to transfer to the smelter site. A metal storage site would be established adjacent to the port for interim storage of the aluminium ingots prior to ship loading.

The port facilities required for unloading and storing raw materials and storing and loading the finished products would be constructed in conjunction with the development of the Port of Ngqura.

3.5.3 Transport infrastructure

The development of the IDZ infrastructure includes the construction of additional roads and 6 conveyer belts to transport materials between the port and the IDZ. One of these conveyer belts would be used to transport alumina and coke from the port to the Aluminium Pechiney smelter. The development of this infrastructure is the responsibility of the Coega Development Corporation (CDC).

3.5.4 Water supply

The aluminium smelter would require approximately 600,000 m³/year. An agreement has been reached between the CDC and the Nelson Mandela Metropolitan Municipality (NMMM) for the municipality to supply water to the IDZ.

3.5.5 Housing

A construction village would need to be constructed to house those construction workers who would not be sourced locally. The responsibility for the construction and maintenance of this village is still to be finalised between Aluminium Pechiney and the CDC. Proposed locations for the construction village are currently at Joorst Park and Well's Estate.

3.6 Workforce required for the project

3.6.1 Construction workforce

The total number of constructions workers is still to be assessed according to the typical South African standard of construction. The workforce is expected to peak at approximately 6,000 people for a period of 12 months during the construction phase, with the average workforce during construction estimated at 2,000 workers. The workforce would be sourced locally where possible, however, it is likely that some of the semi-skilled workforce would come from outside the immediate vicinity.
3.6.2 Operation workforce

Operation of the smelter would require approximately 750 full-time, permanent, long-term employees. About 550 of these positions would be occupied by semi-skilled and skilled waged employees, spread over three shifts of 8 hours per day. The minimum educational qualification for semi-skilled positions would be Grade 10 or 11 and skilled positions would require a Matric (Grade 12) certificate or equivalent. There would be about 200 highly skilled technical and management positions. An additional 200 to 300 direct subcontractors would be employed for smelter operations.

3.7 Project schedule

Aluminium Pechiney proposes to begin feasibility studies and the approvals process in early 2002, commencing construction by early 2003 and operation in early 2005, as is detailed in the proposed project schedule below (Table 1).

<table>
<thead>
<tr>
<th>Activity</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preferred site confirmed</td>
<td>2002</td>
</tr>
<tr>
<td>Environmental Impact Assessment and approvals</td>
<td>2002</td>
</tr>
<tr>
<td>Construction</td>
<td>2003 / 2004</td>
</tr>
<tr>
<td>First metal</td>
<td>Early 2005</td>
</tr>
<tr>
<td>Full metal capacity reached</td>
<td>End 2005</td>
</tr>
</tbody>
</table>

Construction is anticipated to commence in early 2003 and last for a period of 26 months. The first metal production is planned for early 2005 and the plant is expected to operate at full capacity production 8 months later. The duration of the project from beginning of the construction to operation at full capacity is therefore expected to be 34 months. The life of the project is expected to be 30 to 40 years.

The proposed site is currently uncleared and undeveloped, so initial construction would require the development of a suitable site upon which to build the smelter and an access road to the site. Site and earthworks are scheduled to commence in late 2002. Site preparation is the responsibility of the Coega Development Corporation.
4. DESCRIPTION OF THE AFFECTED ENVIRONMENT

4.1 Introduction

This chapter provides the background information about the Coega IDZ area that may help the reader to understand the possible effects of the proposed aluminium smelter on the environment. The affected environment includes the social, economic and biophysical environment that could be affected by, or could affect the development.

Overall, the environment of the Eastern Cape coastal area is a very diverse and interesting one. Biophysically, it contains a great variety of landscapes, habitats and species that are uncommon in other regions, as well as a largely unspoilt coastline. Socio-economically it is one of the most impoverished regions of South Africa, but may have the highest potential to experience continued improvement in living conditions if the resources of the area are managed sustainably.

4.2 Location

The Coega IDZ lies at the mouth of the Coega River, between the Sundays River (to the east) and the Swartkops River (to the west), approximately 20 km north-east of Port Elizabeth, Eastern Cape province. The IDZ is situated within the Nelson Mandela Metropole, which includes the former Port Elizabeth, Uitenhage and Despatch municipalities.

4.3 The biophysical environment

4.3.1 Climate

The Coega IDZ is situated at the transition between the temperate and subtropical bioclimatic zones. Therefore, it receives rainfall throughout the year, with two peaks in autumn (May to June) and spring (August to September). The highest monthly averages from 1980 to 1996 were from the months of May, June and August (CES 2001). The annual average rainfall is about 400 mm (Coetzee et al. 1996).

The Coega IDZ area experiences topographical or gradient winds for most of the year; these may vary from westerly to west-south-westerly (41% of the time) to easterly (15% of the time). The Coega area is most windy during the day, and any dust carried by the wind would be carried for considerable distances (CSIR 1997). However, during the night the atmosphere is very stable, and this reduces the dispersion of any pollutants in the air. As a result, inversion layers can be created, with pollutants trapped beneath a layer of cooler air.

4.3.2 Geology

The Eastern Cape coastline has a complex geology, mostly consisting of sedimentary formations such as sandstone, mudstone, limestone, conglomerate and tillite (CEN 1997). A
section of the Table Mountain sandstone complex underlies Algoa Bay and its islands (Jahleel, St Croix, Bird and Brenton). The Coega IDZ is underlain by limestone and calcareous sand blown onshore by the wind.

The Swartkops River runs through quartzites of the Table Mountain Group in its upper reaches (beyond the IDZ), and across the Bokkeveld shales closer to the coast. The shales tend to be poorly drained. The lower reaches of the Coega River are composed of marine sediments deposited into a basin underlain by Table Mountain quartzites and Bokkeveld shales.

The ‘Coega Fault’ is a seismically active fault line running from the Groendal Dam and meeting the coast just west of the Coega River mouth.

In the Coega IDZ area, deep red sandy clay soils overlie the limestone substrata. These soils are deeper and better developed than the soils of the Port Elizabeth area. Further east, the soils grade into the deep coastal sands of the Alexandria Dunefield.

4.3.3 Water resources

The catchment of the Coega River covers approximately 550 km², and is 45 km long and 15 km wide (CSIR 1997). The Coega River runs through a sandy bed 400 to 1000 m wide. The river has been canalised to the north of the salt works.

The Coega Ridge Aquifer underlies the southern part of the IDZ. This aquifer was formed by Table Mountain quartzites and sandstones, and is confined by Cretaceous formations of the Coega basin near the coast. The aquifer is one of the few artesian systems in southern Africa, and the only one in South Africa. Consequently, the artesian system is protected by law under Government Proclamations No. 260 (1957) and No. 958 (1958).

4.3.4 Vegetation

The Eastern Cape is the meeting place of six of the seven biomes of South Africa (Low and Rebelo 1998). Forest, thicket, grassland, fynbos, Nama Karoo and savanna occur, and give rise to a high diversity of vegetation types. This habitat diversity is the basis for the very high conservation and tourism value of the Eastern Cape. The presence of game lodges such as Shamwari and the planned expansion of large conservation areas such as Addo Elephant National Park indicate the potential for conservation to increase in importance in the Eastern Cape.

Vegetation in the area of the Coega IDZ originally consisted of mesic succulent thicket of the thicket biome (Cowling 1984, Low and Rebelo 1998). The foredunes and hummock dunes would have been backed by dune forest, and this in turn would have been backed by a mosaic of mesic succulent thicket and bontveld. Bontveld is in itself a finer mosaic of
grassland interspersed with clumps of thicket vegetation. Bontveld is restricted to calcrete substrata, where deeper soils occur in depressions, allowing the thicket species to thrive in patches (CES 2001). A significant portion of the thicket has been cleared for farming and mining activities, but the remaining extent of thicket in the Coega area is the largest remaining in the country. CES (2001) identified sensitive portions of the ‘back-of-port’ area, extending from the foredunes to the N2 highway. In that study, the mesic succulent thicket was deemed to be moderately to highly sensitive to development, and bontveld to be highly sensitive.

4.3.5 Fauna

Invertebrates

The fauna of the Coega IDZ area is mainly important for its birds, reptiles and invertebrates. Information on the invertebrate fauna, apart from butterflies, is scarce. One endemic grasshopper and three butterflies of interest have been recorded for the Coega area. The grasshopper, *Acrotylos hirtus*, is endemic to the dunefields of Algoa Bay. Three Lycaenid butterflies (coppers and blues) have been identified as rare or have very restricted distributions in the Coega area. These are *Aloeides clarki* (a small copper), *Lepidochrysops bacchus* (a small blue) and *Peocilimitis pyroeis* (a small copper).

Vertebrates

Amphibians

It is not known how many amphibian (frog) species occur in the Coega area, but the Eastern Cape has a diverse amphibian fauna, including 34 taxa (species and subspecies – CSIR 1997). Generally, frogs are useful bio-indicator species, as their reliance on both aquatic and terrestrial habitats at different stages of their life cycle, their need for damp habitats, and their permeable skin makes them vulnerable to pollutants and other anthropogenic effluents.

Reptiles

The reptile fauna of the Coega area is particularly diverse, containing 56 species of lizards, chameleons, snakes, tortoises and sea turtles. Of these, 22 species are either Red Data or CITES listed or are endemic to the area or peripheral to the usual range of the species (CES 2001). These include eight lizards, two monitors, one gecko, one chameleon, three snakes, three tortoises and the four globally endangered sea turtle species. The most restricted range belongs to the Albany dwarf adder (*Bitis albanica*), recently described from the Coega area (Branch 1999).

Birds

Among the avifauna, coastal birds figure prominently (see below), although the thicket vegetation is home to a diversity of species. Among the large terrestrial birds, blue cranes (*Anthropoides paradiseus*), Stanley’s bustard (*Neotis denhami*), martial eagle (*Polematus bellicosus*) and the African marsh harrier (*Circus ranivorus*), secretary bird (*Sagittarius*...
serpentarius) and Knysna woodpecker (Campethera notata) are listed as Red Data species (Barnes 2000). However, none of these are known to breed in the Coega area.

**Mammals**

Only two mammal species are endemic to the Coega area: Duthie’s golden mole (Chlorotalpa duthiae) and the pygmy hairy-footed gerbil (Gerbillurus paeba exilis), which occur in dune thicket (CES 2001). The remaining 13 Red Data listed mammal species are widespread species, not restricted to the Coega area.

4.3.6 The marine ecosystem

A marine reserve has been proposed as part of the Greater Addo Elephant National Park Conservation Project. The proposed reserve would stretch from the eastern bank of the Coega River mouth (25º42' East) to just east of Cape Padrone (26º30’ East); the seaward boundary is formed by latitude 33º52’ South. This area incorporates the St Croix island group near Coega (CSIR/IECM/Albany Museum 2002).

The coastal birds and seabirds of Algoa Bay rely on the scattered special habitats provided by estuaries and river mouths, rocky shores, dunefields, reefs and the offshore islands of Bird and St Croix. The islands support globally significant populations of Cape gannets (Morus capensis), African penguins (Spheniscus demersus) and Roseate terns (Sterna dougallii); and have been identified as an important bird area (Barnes 2000).

*Anaulis australis* is a very important marine diatom that forms the foundation of the food chain in Algoa Bay. *Anaulis australis* may be dependent on the freshwater inflow from aquifers (CSIR/IECM/Albany Museum 2002), and thus could be affected by groundwater availability and quality.

Marine turtles have global distributions and travel long distances between feeding and breeding grounds. The beaches of the Eastern Cape are extremely important nesting habitats, as are the northern KwaZulu-Natal beaches around St Lucia and Cape Vidal. Turtles feed on jellyfish, including bluebottles, squid, fish, crabs and other bottom-dwelling crustaceans, shrimps, prawns, and clams, corals and urchins; juveniles feed on sargasso weed. Although turtles do not breed in the Coega area, they feed in the offshore and nearshore environments and could be affected by shipping traffic and indirectly by activities that compromise marine water quality.

Ten species of marine mammals can be seen in Algoa Bay. Southern right whales use the shallow waters of Algoa Bay to give birth and nurse their young, and 200 to 400 humpback dolphins (about 30% of SA’s population) have the core of their habitat in Algoa Bay (Wooldridge et al., 1997). Dense concentrations of dolphins are located east of the Sundays River, using the surf zone as a feeding ground. The most easterly breeding colony of Cape
Fur Seals *Arctocephalus pusillus* is located at Black Rocks in the Bird Island group (Wooldridge *et al.*, 1997).

The fish fauna of Algoa Bay is typical of the eastern Agulhus Bank and is made up of South African endemics and wide-ranging species (Wooldridge *et al.*, 1997). Levels of endemism are relatively high, with 34% of species being endemic to South Africa. The rocky reef areas around the islands of Coega, Jahleel and St. Croix are home to a host of fish species, and are also part of the nurseries of some sea breams and rock cods. Subtidal fishes of the surf zone hold key positions in the food web of Algoa Bay and are also important angling species. Algoa Bay is an important part of the nursery of juvenile fish including Kob and Elf (CSIR 1997).

4.4 Socio-economic environment

The population of the Nelson Mandela Metropole is about 1.2 million people, nearly 80% of whom live in Port Elizabeth and the remainder in the Uitenhage area. This makes the Metropole South Africa's fifth largest city. Forty-five households live in the Ngqura port area, and a further 43 at Salnova to the north of the N2, adjacent to the port area. Most of the Coega households are on privately owned land. An initial assessment for the Ngqura port indicated that the population of Motherwell may be growing at up to 4.5% per year (CES 2001).

Fifty-four percent of the Coega community is Xhosa-speaking, and 43% Afrikaans. Less than 2% have other home languages. Almost half of the heads of household are functionally illiterate.

4.4.1 Employment and human development

The unemployment rate in the Nelson Mandela Metropole is estimated at around 40%. This is exacerbated in the urban areas, where 50% to 60% of adults are unemployed. The human development index (HDI) for the Eastern Cape is the second lowest in the country, at 0.51. This is split very unevenly between the white community (0.94) and the black community (0.32) (CES 2001).

4.4.2 In-migration

The search for employment is a major factor driving migratory movements in South Africa. In the Eastern Cape, there is a growing trend of people moving towards the cities from farms and communal areas. This is largely based on the perception that better employment opportunities exist in the urban centres. The Nelson Mandela Metropole is the recipient of many of these migrants.
4.4.3 Infrastructure and services

Generally speaking, services are inadequate in the former township areas of the Eastern Cape. Particularly in the Motherwell area, access to schools, health and recreational facilities is scarce. A similar situation exists in many rural districts, and this situation almost definitely contributes to the steady migration of people to the cities in search of better living conditions.

Water
Water from the Orange River is supplied through a transfer tunnel to the Fish River, and thence to the metropolitan area. However, the IDZ area lies over the Coega Ridge Aquifer, which supplies both industrial and household water needs in the area.

Energy supply
Paraffin is the most common multi-use energy source for households in the Coega area. Other fuels are used for specific tasks, such as heating (wood), lighting (candles) and cooking (wood). Electricity is also used by those who have access to it.

Transport
Most public transport is supplied by taxis, private vehicles and a bus service. Although there is a railway line entering the area, this does not seem to be used much for public transport.

Health care facilities
The metropolitan area of Port Elizabeth has seven public and three private hospitals, and 21 clinics. At Coega a small clinic serves the needs of the community.

Recreation facilities
A community hall, restaurant and camping and accommodation is provided at Joorst Park Resort. The construction of the IDZ could affect the recreational functioning of the beaches at Joorst Park and St Georges Strand, which are currently used for shore angling, swimming and general recreation (CES 2001). Recreational angling from boats and from the shore is an important pastime of local communities. The reefs between St. Croix and Brenton and between St. Croix and Jahleel are regularly fished by private skiboat owners. Good catches of Kob and Reds are made just offshore east of Coega by private and commercial line fishermen (CSIR 1997).

4.5 Economic activities

The economy of the Eastern Cape has traditionally been reliant on heavy industry such as the motor industry. In the Coega area, however, other activities also play a large part in people’s livelihoods:

- 14% of the household heads in the Coega area, and 26% of the total workforce resident in the area are employed at the Markman industrial area;
• The Marine Growers Abalone Farm employs 30 – 60 people, and is producing in the region of 50 tonnes of abalone per year (with a view to expanding output to 200 t/y) for export to the Far East, and supplying brood stock to other local abalone farms (Common Ground 2001);

• Commercial chokka fishermen have recently begun to exploit spawning concentrations of *Liligo vulgaris* east of St. Croix (Wooldridge *et al.* 1997). Good catches of Kob and Reds are made just offshore east of Coega by private and commercial line fisherman;

• The Coega salt works currently employ about 100-150 people;

• Commercial farming in the Coega area is focused on Angora goats (mohair), boer goats and dairy production;

• In a financial analysis, Kerley *et al.* (1995) clearly showed that ecotourism/conservation in valley thicket (including mesic succulent thicket), is sustainable, can generate more income than a comparable pastoral operation, and is generally profitable.
5. DESCRIPTION OF THE ENVIRONMENTAL ASSESSMENT PROCESS

The EIA for Aluminium Pechiney's proposed aluminium smelter within the Coega IDZ is being conducted in accordance with the EIA Guidelines issued by the Department of Environmental Affairs and Tourism (April 1998). This EIA is being prepared in close consultation with authorities and I&APs, and has been structured to meet the regulatory requirements (Figure 5). Furthermore, the EIA will be prepared in accordance with international best practice, to meet the EIA process requirements of organisations such as the World Bank.

The EIA process incorporates three overlapping, interactive processes, namely a technical process, a process with the lead agents and authorities, and a public participation process.

The technical process includes development of an understanding of the technical issues involved in the project, development of terms of reference (ToRs) for specialist studies, undertaking the specialist studies and integration of the specialist findings into an Environmental Impact Report (EIR).

The Eastern Cape provincial Department of Economic Affairs, Environment & Tourism (DEAE&T) has been given the responsibility for issuing the decision on whether or not to authorise Aluminium Pechiney’s application to construct and operate an aluminium smelter within the Coega IDZ. Over the course of the EIA the CSIR will engage with DEAE&T and other relevant authorities in order to ensure that issues and concerns raised by the authorities can be integrated and addressed at an early stage of the EIA process and to contribute towards the authorities’ understanding of potential environmental impacts and mitigatory measures.

The public participation process is being run by Sandy & Mazizi Consulting and is conducted concurrently with the technical and lead agent/authority processes.

As reflected in the Figure 5 a key component of the EIA is to ensure that stakeholder’s knowledge and concerns inform the environmental assessment. The EIA follows a step-by-step process, in consultation with stakeholders and specialists, to identify key issues and concerns related to the proposed development and to thoroughly investigate these. In this way it is possible to maximise the potential benefits of the proposed project for stakeholders as well as for Aluminium Pechiney; to mitigate the potentially negative impacts; and to identify any potential fatal flaws that may render the project environmentally unacceptable.
Figure 5: EIA process flow diagram (based on South African EIA Regulations)
5.1 Roles and responsibilities of roleplayers in the EIA process

In order to conduct an effective, efficient and equitable EIA process it is important to clarify the responsibilities of the various roleplayers.

Aluminium Pechiney (Applicant):

- Appoint suitable, independent consultants
- Ensure adequate resources are available to conduct an effective, efficient & equitable EIA
- Ensure that consultants are provided with all relevant information to conduct the EIA effectively
- Ensure that consultant provides all relevant information to authorities

CSIR (Consultant):

- Be independent with no vested interest
- Have the necessary qualifications and experience
- Responsible for EIA process, info and reports
- Provide relevant & objective info to authorities, the I&APs and the applicant
- Ensure Public Participation is undertaken - Sandy & Mazizi Consulting cc
- Ensure all issues raised are addressed or responded to

Interested and Affected Parties (I&APS):

- Provide input and comment during various stages of the process
- Identify issues and alternatives
- Review of reports:
  - Draft Scoping Report (DSR)
  - Draft Environmental Impact Report (DEIR)
- Provide input and comment within specific timeframes

Relevant Environmental Authority (Provincial DEAE&T):

- Efficient and expedient in evaluating proposals
- Compliance with regulatory requirements
- Inter-departmental co-operation and consultation
- Consultation with applicant and consultant
- Evaluation/review and decision-making
- Requiring sufficient detail to make informed decisions
5.2 The focus of the EIA

Primary aluminium smelting comprises one stage of the aluminium life cycle. This life cycle starts with the mining of bauxite. Bauxite is refined to produce alumina, which is the raw material used in primary aluminium smelting. The final product of the smelting process (the aluminium ingots) are processed further prior to being used in the production of manufactured goods. At the end of the manufactured product’s life, the scrap can be collected and recycled by a secondary smelting process. Secondary smelting process consumes up to 95% less energy than that required for the primary smelting process and aluminium can be repeatedly recycled without its quality being impaired.

A range of environmental impacts are associated with different stages of the life cycle. Although impacts associated with different stages may be highly significant, it is beyond the scope of this EIA to conduct an environmental assessment of the full aluminium life cycle. The focus of the EIA is therefore confined to the construction and operation of a primary aluminium smelter within the metallurgical cluster in the Coega IDZ (Figure 6).

The EIA does not include an assessment of occupational health and safety risks for employees working within the smelter. For example, the EIA will assess the impact of noise of the smelter on the surrounding area (measured from the boundary of the site) but not on employees working within the smelter. However, it must be pointed out that Aluminium Pechiney undertake, as a minimum, to meet the requirements of South African labour legislation, for example, the Occupation Health and Safety Act.
5.3 Consideration of alternatives

Alternative sites were assessed comprehensively by Aluminium Pechiney prior to the selection of the Coega IDZ as one of three sites at which to conduct further indepth studies (refer to section 3.2). With regard to technology alternatives, the new generation AP50 smelting technology has been chosen by Aluminium Pechiney because of the significant capital and operating cost advantages, and high standards of environmental performance.

In terms of the EIA process the following alternatives have currently been identified:

- The “no-go” option
- Design and mitigation alternatives, for example, stormwater management systems, water recycling/reuse options, materials handling systems, waste management systems, corporate social responsibility programmes and landscaping design options

Smelter designs have not yet been finalised and therefore the results of the specialist studies and the public participation process can be used to inform the final design.

5.4 The Scoping phase

The EIA has now entered the Scoping phase which aims to identify key issues for more detailed assessment and to focus the EIA. The Scoping process has been designed to incorporate two complementary components: a technical process involving the environmental consultants, the technical specialists and Aluminium Pechiney; and a public participation process which includes I&APs and the relevant authorities.

5.4.1 Objectives of the Scoping phase

The objectives of the Scoping Phase of an EIA are to:

- identify the key issues of concern that should be addressed in the EIA Specialist Studies;
- design the required work to understand and evaluate these issues, and to address shortcomings in existing information;
- define the scope of the project and the studies to be done in a way which would result in a thorough and scientifically defensible Environmental Impact Report (EIR) and, if the project proceeds at the end of the EIA, to ensure that the proposed development will be executed in an environmentally sound manner.
Sub-objectives of Scoping, which are directed at laying the foundation for the EIA, are as follows:

- identify and inform a broad range of stakeholders about the proposed development, to empower them with sufficient information to be able to identify issues and concerns for further investigation in the EIA process, and to provide ample opportunity to all parties to exchange information, and express their views and concerns;
- obtain the buy-in of the stakeholders for the EIA process *per se*, so that they will accept the ultimate findings of the EIA;
- understand and fully document the issues underlying the concerns and questions raised by stakeholders to focus the study on reasonable alternatives and relevant issues.

5.4.2 Key components of Scoping

As mentioned above, the Scoping phase includes both public participation as well as a technical process. These are described in more detail below.

Public Participation

Public participation in the Scoping Phase of the EIA is a vehicle to provide sufficient and accessible information to I&APs in an objective manner to assist I&APs identify issues of concern, identify alternatives, and suggest opportunities to reduce potentially negative or enhance potentially positive impacts. Arising from the above, it is clear that public involvement is not a public relations exercise or part of a development proponents corporate social responsibility/community neighbour relations programmes. The primary function of public involvement is to provide a process of improved decision making whereby I&APs, technical specialists, the authorities and the development proponent work together to produce better decisions than if they had worked independently.

At the outset it is important to highlight two key aspects of public participation:

- There are practical and financial limitations to the involvement of all individuals within a public participation programme (PPP). Hence, public participation aims to generate issues that are representative of societal sectors, not only that of individuals. The PPP will therefore be designed to be inclusive of the broadest possible range of sectors.
- The PPP will aim to raise a diversity of perspectives and is not designed to force consensus amongst I&APs. Indeed, diversity of opinion rather than consensus, is likely to enrich ultimate decision making. Therefore, where possible, the public involvement process will aim to create awareness amongst all stakeholders (I&APs, the authorities, technical specialists and the development proponent) of the trade offs with regard to economic growth, social equity and ecological sustainability.
As public involvement is an integral part of Integrated Environmental Management (IEM), IEM principles apply. The Department of Environmental Affairs and Tourism (DEAT) has listed those most relevant to public involvement as follows:

- Meaningful and timeous participation of I&APs.
- Focus on important issues.
- Due consideration of alternatives.
- Accountability for information used for decision-making.
- Inclusivity (the needs, interests and values of I&APs must be considered in the decision-making process).
- Encouragement of co-regulation, shared responsibility and a sense of ownership.
- Dispute resolution.

To the above, one can add universally recognised public participation principles:

- Inclusive consultation that enables all sectors of society to participate in the consultation and assessment processes.
- Information is easily accessible (physically, in a language that I&APs can understand and non-technical) and sufficient to enable meaningful participation.
- Grassroots people are actively empowered and capacitated to understand concepts and information with a view to active and meaningful participation.
- Information accessibility is achieved by the use of a variety of dissemination vehicles, for example, by way of discussion documents, meetings, workshops, focus group discussions, and the printed and broadcast media.
- Information is accurate and I&APs are afforded sufficient time to study material, to exchange information, and to make contributions at various stages during the assessment process.
- I&APs are afforded the opportunity to input via a range of methods, for example, during briefing sessions, during public meetings or at public open days, written submissions and direct contact with members of the EIA Team.

The public involvement consultants are keeping meticulous records of public involvement activities, comments received and responses to comments. Furthermore, proceedings of meetings are recorded, all of which enable the compilation of a comprehensive I&AP issues trail.

The public involvement process is being undertaken in English and Xhosa, with selected documents, summaries and advertisements translated into Xhosa. I&APs will be welcome to use the language of their choice during meetings, with translations into Afrikaans, Xhosa or English being undertaken by the public participation team.

Technical process
A set of specialist studies considered necessary for this EIA has been identified. This was considered reasonable on the basis of Pechiney’s world-wide aluminum industry experience, CSIR’s experience in undertaking EIAs for aluminium smelters in southern Africa, baseline information provided by existing studies for the Coega IDZ, and the CSIR’s experience from
the Strategic Environmental Assessment for the Coega IDZ. The specialist studies have been initiated in parallel with the public Scoping process. This enables the specialists to analyse baseline information and set-up model studies that will assist the EIA team in understanding the issues raised during the public Scoping phase. The findings of the Scoping process with the public and the authorities will inform the specialist studies, which will only be completed after the public Scoping process is finalised.

The specialist studies identified at the outset of the EIA are listed in the table below, together with the specialist(s) for each study. Several of the specialists have direct experience in undertaking technical studies for aluminium smelters.

Table 2: Specialist studies

<table>
<thead>
<tr>
<th>Specialist study</th>
<th>Specialist(s) and their affiliation</th>
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</thead>
<tbody>
<tr>
<td>1) Air quality</td>
<td>Dr Mark Zunkel, CSIR</td>
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<tr>
<td></td>
<td>Yvonne Hong, CSIR</td>
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<tr>
<td></td>
<td>Riëtha Oosthuizen, CSIR</td>
</tr>
<tr>
<td></td>
<td>Dr Amanda Botha, private consultant</td>
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<td></td>
<td></td>
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<tr>
<td>2) Water resources and liquid waste management</td>
<td>Grant Mackintosh, CSIR</td>
</tr>
<tr>
<td></td>
<td>Philip de Souza, CSIR</td>
</tr>
<tr>
<td>3) Materials handling and solid waste management</td>
<td>Sanjeev Raghubir, CSIR</td>
</tr>
<tr>
<td></td>
<td>Dr Sibbele Hietkamp, CSIR</td>
</tr>
<tr>
<td>4) Water discharges to the marine environment</td>
<td>Stephen Luger, CSIR</td>
</tr>
<tr>
<td></td>
<td>Dr Pedro Monteiro, CSIR</td>
</tr>
<tr>
<td></td>
<td>Dr Allan Connell, CSIR</td>
</tr>
<tr>
<td></td>
<td>Roy van Ballegoozen, CSIR</td>
</tr>
<tr>
<td></td>
<td>Susan Taljaard, CSIR</td>
</tr>
<tr>
<td>5) Socio-economics</td>
<td>Johan van der Walt, ACER Africa</td>
</tr>
<tr>
<td></td>
<td>Xolisa Ngwadla, ACER Africa</td>
</tr>
<tr>
<td></td>
<td>Dr Dieter Heinsohn, ACER Africa</td>
</tr>
<tr>
<td>6) Traffic and transportation</td>
<td>Dave Jones, CSIR</td>
</tr>
<tr>
<td></td>
<td>Theuns Lamprecht, CSIR</td>
</tr>
<tr>
<td>7) Macro-economics</td>
<td>Prof James Blignaut, University of Pretoria</td>
</tr>
<tr>
<td>8) Noise</td>
<td>Klaus Weber, Vibracoust</td>
</tr>
<tr>
<td>9) Visual impacts</td>
<td>Bernie Oberholzer, Bernard Oberholzer Landscape Architects</td>
</tr>
<tr>
<td></td>
<td>Quinton Lawson, Meirelles Lawson Architects</td>
</tr>
</tbody>
</table>

5.4.3 Steps in the Scoping phase

Scoping will be driven by public participation as well as technical inputs from the EIA team and the proponent. The eleven key steps in the Scoping process are described below and shown in Figure 7.
**Figure 7: Detailed Scoping process showing key roles and interactions between the proponent, the consultant, the authority and I&APs.**
Step 1
Pre-application consultation and submit Plan of Study for Scoping

A pre-application consultation was held with Mr Leon Els and Mr Andries Struwig of the Department of Economic Affairs, Environment and Tourism (DEAE&T) on 7 March 2002, where it was established that DEAE&T is the relevant authority for this EIA process. This informed the preparation and submission of this Plan of Study for Scoping.

Step 2
I&AP identification, registration and the creation of an electronic database

The identification and registration of I&APs has been based on the existing Coega database (as of the 10 April 2002 this included 1184 I&APs) and will be ongoing for the duration of the study. Stakeholders from a variety of sectors, geographical locations (local, provincial, national, international) and/or interest groups can be expected to show an interest in the development proposal, for example:

- National, Provincial and Local Government.
- Local interest groups, for example, rate payers associations and health groups
- Agriculture (formal and informal)
- Industry and mining
- Commerce
- Tourism
- Labour
- Environment
- Grassroots communities
- Non Government and Community Based Organisations
- International organisations such as key Aluminium Pechiney stakeholders and environmental and developmental Non Government Organisations.

Although the list of potential I&APs appears inexhaustive, the establishment of an electronic database and the customization of existing information to suit the needs of this project assists in conducting the Public Participation Programme (PPP).

The key stakeholders for this EIA will be identified. These include the authorities, I&APs who act as sectoral representatives, I&APs with whom Aluminium Pechiney may have ongoing contact, and individuals who have previously expressed sentiments (positive or negative) regarding the IDZ, Aluminium Pechiney or its activities. An easy way to identify key stakeholders is to ask other stakeholders during the course of networking and referral in the compilation of the database. Key stakeholders will receive all project documentation (whether they request it or not) and all I&APs on the database will be personally invited to attend public meetings, public open days and will be notified of the availability of reports for their
comment and input. Communication with I&APs will be an ongoing activity for the duration of the EIA process.

**Step 3**
**Project announcement**

The development proposal and associated environmental assessment process has been widely announced, with an invitation to the general public to register as I&APs and to actively participate in the PPP. This has been achieved via the following:

- A letter of invitation to all I&APs captured on the database (1184)
- Print media advertisements in local and regional newspapers:
  - Die Burger
  - East Cape Weekender
  - The Herald
- The dissemination of a Briefing Paper (with letters of invitation, to key stakeholders and also to I&APs who register as a result of advertising) covering:
  - A simplified rationale for and description of the development proposal.
  - A description of the environmental assessment process, including public involvement and, importantly, milestones where stakeholder input is critical.
  - An invitation to I&APs to participate, especially to attend public open days.
- Provision of information on the website for the Aluminium Pechiney EIA, which is hosted by the CSIR ([http://smelter.csir.co.za](http://smelter.csir.co.za))
- A “Question and Answer Booklet” to facilitate communication and understanding on the proposed project. This will be distributed to all I&APs on the database.

**Step 4**
**Consultation with I&APs (including authorities)**

Networking meetings will be held with authorities and key stakeholders. The purpose of these meetings is to provide I&APs with background information on the project, EIA and Public Participation Process in order for them to identify issues and concerns for investigation in the EIA. A public meeting was held on 24 April 2002 in Port Elizabeth, where I&APs had the opportunity to find out more about the EIA process and the proposed project, and to raise issues and concerns. Aluminium Pechiney’s technical manager and environmental manager for the PAS 2005 Smelter project were present at this meeting.

Meetings will be arranged by the CSIR (as the independent consultant) with the authorities at local, regional and national level throughout the environmental assessment process, particularly when milestones are reached. It should be noted that all public involvement documents will also reach the authorities in their capacity as I&APs.

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1 The involvement of the authorities is not in a decision making capacity. Rather, the authorities will be invited to participate and contribute issues/provide guidance in relation to Scoping and the EIA.
Step 5  
Compile issues trail

The public participation consultant has compiled a draft issues trail that will include all comments provided at meetings or submitted via fax, email or telephone. The issues trail will be updated regularly during the Scoping process and will give insight into the issues and concerns raised by other stakeholders.

Step 6  
Prepare and distribute Draft Scoping Report

This document is the Draft Scoping Report and has been prepared based on issues identified thus far through both the specialist's input and the public participation process. The CSIR will obtain inputs from the EIA specialist team when evaluating and responding to issues raised through the public Scoping process. These technical inputs are important to understanding the nature and scope of issues to be addressed either through the Scoping Report or in the EIA.

The Draft Scoping Report will be made available to the public through:

- Announcing the availability of a Draft Scoping Report via letters to all I&APs on the database, as well as advertisements in local and regional newspapers.
- The distribution of the Draft Scoping Report by mailing or direct delivery to key stakeholders; providing copies at public libraries in the Port Elizabeth-Despatch-Uitenhage area and Cape Town; and placement on the EIA website [http://smelter.csir.co.za](http://smelter.csir.co.za)

Step 7  
Obtaining comments on the Draft Scoping Report

A 21-day comment period is provided for the Draft Scoping Report. Public meetings and an Open Day will be held, with the primary purpose being to discuss the report and obtain detailed comments from the general public and identify additional issues and concerns. I&APs will be invited to participate in Community-based Capacity Building Sessions, an Open Day and Public Meetings.

The public meetings will be advertised in the local and regional press and are open for all members of the public to attend. They will be audio-recorded, with summary notes provided on the proceedings. These notes will be available to I&APs on request, as well as being hosted on the EIA website and included as an Appendix to the Final Scoping Report. Community based stakeholder capacity building sessions will be held with the purpose of developing the understanding of I&APs on the project process and issues raised in order to facilitate comments on the report and the identification of additional issues for consideration.
in the EIA. These meetings will entail a site visit to the metallurgical cluster in the Coega IDZ.

The terms of reference for the specialist studies or later stages of the EIA may be revised based on comments on the Draft Scoping Report.

**Step 8**
**Updated Issues Trail**

The Issues Trail will be updated by the Public Participation consultant, based on the feedback received during the comments period. This will form part of the Final Scoping Report.

**Step 9**
**Final Scoping Report**

A Comments Report will be prepared as an appendix to the Scoping Report. This will be cross-referenced with the Response Report to be produced at the completion of the EIA, in order to enable I&APs to check how their issues have been addressed in the EIA. The Final Scoping Report will be placed in public libraries, hosted on the EIA website and submitted to key stakeholders and authorities. All I&APs on the database will be informed via written correspondence of the availability of the report.

**Step 10**
**Authority review of Final Scoping Report**

The Final Scoping Report is submitted to the authority for review and decision-making. A meeting is proposed where the EIA team presents the results of the Scoping process to the authority.

**Step 11**
**Finalise Terms of Reference for specialist studies**

Once the key issues requiring investigation have been identified and all comments from I&AP’s received, the EIA team will review whether any additional issues need to be added to the specialist’s Terms of Reference, or whether any additional specialist studies are required. The finalized list of specialist studies and Terms of Reference will be compiled into the Plan of Study for the EIA.
6. ENVIRONMENTAL ISSUES ASSOCIATED WITH THE CONSTRUCTION AND OPERATION OF AN ALUMINIUM SMELTER

6.1 Identification of key environmental issues

An important element of the Scoping exercise is to sift through the issues that are raised during the public participation and technical processes and ensure that those that are identified as key issues are included within the scope of the assessment. In order to identify key issues, all issues are subjected to three screens:

1) Issues or concerns which can be addressed without further assessment: These may include those which have been addressed in previous studies, or which are based on incorrect information and assumptions.

2) Permitting requirements: Issues within the scope of the EIA that have associated permit or authorisation requirements are automatically included as key issues.

3) Application of professional judgement: This takes into account - in a highly qualitative manner - factors such as the nature, extent, duration, intensity and probability of occurrence of potential impacts and issues raised, as well as the context within which the project is proposed.

In addition to the above screening process several important principles are maintained throughout. These include:

- Maximum use of existing information.
- Adoption of an impacts-driven approach. For example, as opposed to focussing on issues of air quality, the assessment should focus on the impacts of changes in air quality such as adverse health effects and visibility. An impacts-driven approach is an important element in ensuring that issues are properly scoped in the EIA process.

6.2 Issues and responses

The purpose of this section is to identify the main issues associated with the proposed project. This is done firstly by providing a summary of the issues identified through the technical scoping process, and then listing the issues raised by I&APs and authorities through the various consultations and inputs to the Scoping phase. For many of these issues, the aluminium industry has developed strict controls and management actions. However, we have not mentioned them in this report, as they will be described thoroughly in the mitigation measures and management actions that will be provided in a later stage of the EIA.
Details of what will be considered by the specialists are reflected in the terms of reference provided in Section 7. The reader is reminded that the results of the specialist studies (listed in section 5.4.2) will be available to the I&APs.

6.2.1 Air quality (including effects on human health, plants and agriculture) issues

In the aluminum smelter, air emissions include alumina dust from handling facilities; coke dust from coke handling; gaseous and particulate fluorides; sulphur and carbon dioxides and various dusts from the electrolytic reduction cells; gaseous and particulate fluorides; sulphur dioxide; tar vapor and carbon particulates from the baking furnace; coke dust, tars, and poly-aromatic hydrocarbons (PAHs) from the green carbon and anode-forming plant; carbon dust from the rodming room; and fluxing emissions and carbon oxides from smelting, anode production, casting, and finishing. The electrolytic reduction cells (potline) are the major source of the air emissions, with the gaseous and particulate fluorides being of prime concern. The anode effect associated with electrolysis also results in emissions of carbon tetrafluoride (CF₄) and carbon hexafluoride (C₂F₆), which are greenhouse gases, of concern because of their potential contribution to global warming.

The atmospheric emissions that have been identified as the main concern in EIAs of aluminium smelters in southern Africa are fluorides and sulphur dioxide (SO₂).

Gaseous fluorides evaporate from the molten electrolytic liquid in the form of hydrogen fluoride, which is a colourless, pungent liquid or gas that is highly soluble in organic solvents and in water. In nature, fluorides occur throughout the environment, but at very low levels that are not believed to be harmful to humans and may even be beneficial. Fluorides are released into the environment naturally through the weathering and dissolution of minerals, in emissions from volcanoes and in marine aerosols (tiny droplets of seawater picked up from the sea surface by wind). Anthropogenic sources of fluoride include industrial processes and manufacturing, use of fluoride-containing pesticides, as well as the controlled fluorination of drinking-water supplies. Virtually all foodstuffs contain at least trace amounts of fluorides. Fish and tea are particularly high in fluoride. Long-term exposure to high levels of fluoride may result in detrimental effects on human health, for example, effects on teeth and bones. However, fluorides and hydrogen fluoride have not been classified for carcinogenic effects. High dosage of fluorides on plants can result in the discoloration of the leaves and a reduction in plant production. Fluorides can work their way through the foodchain, for example from the atmosphere, to plants, to plant-eating animals.

Sulphur dioxide would be released from the petroleum coke and fuel oil used in the reduction process. Sulphur dioxide is a colourless, acrid gas formed by the burning of sulphur or sulphur-containing substances such as coal, coke and oil. It combines with water vapour or dust particles in the atmosphere to form rain droplets, which may result in acid rain. Rain is normally slightly acidic (pH 5.0-5.6) but the term “acid rain” is used when acidity reaches levels as high as pH 3. Acid rain has negative effects on vegetation and buildings. Sulphur is a micronutrient for plants but as soon as its concentrations reach beyond tolerance levels, it
becomes toxic and dangerous to most living things. Sulphur dioxide can aggravate the state of health of people with existing health conditions, such as asthma, bronchitis, emphysema and other respiratory complaints. In extreme conditions, it can cause severe respiratory distress and result in heart failure. The acidic nature of the gas has an irritant effect at lower concentrations that can cause infections of the respiratory tract and general discomfort, mainly of the nose and throat.

Carbon dioxide gases are generated during the electrolysis process as the carbon in the anode reacts with oxygen in the molten electrolytic liquid, and from the combustion of fuels. Carbon dioxide is a greenhouse gas, which means that it absorbs the re-radiated long-wave radiation from the earth, thus resulting in the warming of the atmosphere.

<table>
<thead>
<tr>
<th>ISSUE</th>
<th>RESPONSE</th>
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<tbody>
<tr>
<td>1.1 Cumulative Impacts</td>
<td>The approach adopted for managing cumulative effects of air emissions in the IDZ is to set limits for air quality for the entire IDZ. A recommended set of air quality limits was developed based on national and international standards. CDC has followed a precautionary approach and adopted 50% of these limits as the initial guidelines for the IDZ. CDC will move to the South African standards or guidelines as and when these match those of the World Health Organisation. The CDC already has three operational monitoring stations and good baseline data on current levels of air pollution.</td>
</tr>
<tr>
<td>1.2 Assessment of Impacts</td>
<td>This EIA will focus on emissions from the proposed Pechiney smelter, and it is not within the scope of the EIA to evaluate emissions from other smelters. It must also be pointed out that when comparing data from other smelters it is important to understand their different smelting technologies, receiving environments and industrial contexts. Regarding availability of information, the air quality specialist study will be made available for public scrutiny.</td>
</tr>
<tr>
<td>Will the information from the Coega Monitoring Stations be made available to the public?</td>
<td>Meteorological and air quality data for the Coega area has been collected by CDC and the National Ports Authority (NPA). The information has been provided to the CSIR for the air quality specialist study. This study will be available to I&amp;APs and include a summary of the local climatological conditions, existing local pollution sources, and background air quality prior the smelter project. If members of the public want access to the monitoring data, it is suggested they contact CDC and/or NPA.</td>
</tr>
<tr>
<td>Will the plant have chimneys as none appear in visualisation diagrams presented? What kind of emissions will be produced and in what quantities?</td>
<td>Yes, the smelter would have stacks (chimneys). There would be two stacks for the Gas Treatment Centres (GTC), one for the Fume Treatment Centre (FTC) and five stacks for the casthouse</td>
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<td>(refer to section 3.4). The main types of emissions are summarised in the introduction above, and will be described further in the specialist studies. The quantities of emissions will be confirmed by a mass-balance calculation done as part of the materials handling and solid waste management specialist study. These results will be incorporated into the air quality specialist study.</td>
<td></td>
</tr>
<tr>
<td>What will be the impact of emissions on the Addo National Park expansion project, especially with regards to visible plumes?</td>
<td>This will be assessed in the air quality specialist study. Under normal operating conditions, no visible plumes would occur.</td>
</tr>
<tr>
<td>If there is a reduction in the air quality in Bluewater Bay, this project will drive people away from this area?</td>
<td>The air quality specialist study will show the effects, if any, of emissions from the smelter on air quality in the surrounding area, including Bluewater Bay.</td>
</tr>
<tr>
<td>1.3 Health Impacts</td>
<td></td>
</tr>
<tr>
<td>What will be the impacts on the health of people as a result of emissions, especially in Motherwell?</td>
<td>A human health risk component is included as part of the air quality specialist study.</td>
</tr>
<tr>
<td>In terms of international best practice, how far does a smelter have to be from residential areas?</td>
<td>As far as international best practice is concerned, there is no restriction on the distance between residential areas and an aluminium smelter. The key criterion is to confirm that the smelter meets the air quality standards for human health. The assessment of potential impacts on human health (in the air quality specialist study) will take into account the distance from the smelter to the nearest residential areas.</td>
</tr>
<tr>
<td>Where will the Motherwell residents go if this project impacted negatively on their health?</td>
<td>The air quality specialist study will assess the potential impacts on human health, if any, including surrounding areas such as Motherwell. Relevant international (eg. World Bank) and national health standards will be used.</td>
</tr>
</tbody>
</table>

6.2.2 Water resource and liquid waste management issues

The water usage for the plant is approximately 600,000 m³/year, which includes both industrial and domestic water requirements. Key issues related to water utilization are the availability of water and the optimization of on-site water recycling.

The three main liquid discharges from the site are sewage, process wastewater and stormwater. A key issue related to water discharges from the smelter site is the risk of pollutants reaching the Coega River and possibly the marine environment via stormwater run-off. In particular, the “first flush” (i.e. first rain run-off after a dry period) carries a higher concentration of potential pollutants. For example, the atmospheric deposition of fluoride may result in elevated levels of fluoride in the stormwater.
Erosion from construction areas and increased turbidity and downstream sedimentation is likely to be the main issue during construction. Once the site is operational, erosion, should be minimal and the management of spills and general contamination more important.

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<th>ISSUE</th>
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<tbody>
<tr>
<td><strong>2.1 Water Utilisation</strong></td>
<td>The aluminium smelter would require approximately 600,000 m$^3$/year of water. An agreement has been reached between the CDC and the Nelson Mandela Metropolitan Municipality for the municipality to supply water to the IDZ.</td>
</tr>
<tr>
<td><strong>2.2 Water Quality</strong></td>
<td>The water resource and liquid waste management specialist study will identify and investigate the types of potential water pollution from the smelter, and assess the potential impacts on groundwater. Groundwater monitoring has been initiated by CDC prior to construction activities in the IDZ, to provide a baseline.</td>
</tr>
</tbody>
</table>

6.2.3 **Materials handling and solid waste management issues**

The handling of raw materials has the potential to cause dust impacts or pollution from spillage (refer to section 3.4.1 describing the import and storage of raw materials).

Solid wastes produced by the aluminium smelter include spent potlinings, miscellaneous industrial waste (wood, metals, etc), laboratory wastes and domestic waste. A key environmental concern is the disposal of the spent potlinings. Potlinings consist of the refractory bricks that are used to insulate the steel shell of the pot (to contain the heat and prevent damage to the steel shell) and the carbon blocks that form the cathode. The potlinings have a useful life of about 5 to 6 years, after which they have to be disposed off. Spent potlinings are impregnated with aluminium and silicon oxides, fluorides, sodium and cyanide compounds. Specific care must be taken during handling, storage, disposal or recycling.

Another key issue is that the smelting process provides several opportunities for waste recycling and minimization. For example, spent potlinings can be recycled by the cement industry through being added to raw materials to manufacture cement.
### ISSUE 3.1 Waste Generation

<table>
<thead>
<tr>
<th>Response</th>
<th>How much waste will be generated by the development and how will it be disposed of?</th>
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<tbody>
<tr>
<td></td>
<td>The <em>materials handling and solid waste management</em> specialist study will identify the different types and volumes of waste produced. A key focus of this study will be to identify additional opportunities for waste minimisation and recycling. Appropriate means of disposing of waste, in accordance with national regulations, will be proposed. Calculations of the mass of waste produced per tonne of product will be provided.</td>
</tr>
<tr>
<td></td>
<td>A breakdown of the waste is required, indicating what is recyclable, what is hazardous, and how much waste is produced for each ton of aluminium to be produced.</td>
</tr>
<tr>
<td></td>
<td>How will the development impact on the Integrated Waste Management Plan being developed by the Metro?</td>
</tr>
<tr>
<td></td>
<td>The CDC is being consulted as part of the development of the Integrated Waste Management Plan.</td>
</tr>
</tbody>
</table>

### ISSUE 3.2 Assessment of Imported Materials

<table>
<thead>
<tr>
<th>Response</th>
<th>From where will the raw material be sourced? Will it be local or will they be imported?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Raw materials such as alumina, coke and pitch would be imported from South America, Northern America, Asia, Europe or Australia. These materials are not available locally.</td>
</tr>
<tr>
<td></td>
<td>Will the impacts of spillage of imported raw materials be assessed?</td>
</tr>
<tr>
<td></td>
<td>Impacts of potential spillage of raw materials at the Port of Ngqura or during transport from the port to the smelter will be investigated in the EIA.</td>
</tr>
</tbody>
</table>

#### 6.2.4 Issues related to water discharges to the marine environment

Stormwater from the smelter site would ultimately reach the marine environment. Key issues related to the effect of discharges on the marine environment are the rate of dispersal of pollutants, sedimentation, accumulation of toxic compounds in sediments in close proximity to the discharge points, and risks of pollutants reaching sensitive receptors (such as mariculture activities).

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<thead>
<tr>
<th>ISSUE</th>
<th>RESPONSE</th>
<th>4.1 Marine Discharges</th>
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<tbody>
<tr>
<td></td>
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<td>What will be the impact on the marine environment from water discharges?</td>
</tr>
<tr>
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<td></td>
<td>This will be assessed in the specialist study on water discharges to the marine environment.</td>
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<tr>
<td></td>
<td></td>
<td>Discharges to the marine environment would negatively impact on the abalone farm, Marine Growers. This potential impact, with regards to stormwater run-off and discharges to the marine environment, needs to be assessed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The specialist study on water discharges to the marine environment will include modelling the fate of pollutants and potential risks to other marine users, including the Marine Growers abalone farm.</td>
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<tr>
<td></td>
<td></td>
<td>The Coega Development Corporation has stated that they will utilise the spare capacity of the Fish Water Flats sewage treatment works for the discharge of sewage. Fish Water Flats discharges to the marine environment. Will the impact of this additional capacity on the marine environment be assessed?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The provision of infrastructure (such as sewage treatment services) is a shared responsibility between the Metro and the CDC. Initially the CDC's effluents will be sent to the Fish Water Flats treatment works which has the spare capacity to treat this effluent. Later, as CDC's volumes increase a new treatment works will be built within the CDC. The impacts associated with sewage treatment were identified in the Rezoning EIA (CES, 2000). An EIA will be required for the new CDC treatment works.</td>
</tr>
</tbody>
</table>
4.1 Marine Discharges

With regard to the Pechiney EIA, the volumes of sewage which would be produced by the smelter will be quantified in the materials handling and solid waste management specialist study. This information will be made available to I&APs.

6.2.5 Socio-economic issues

Socio-economic considerations take into account the implications of the project on people’s livelihoods and quality of life. The employment opportunities created during construction and operation would have a range of implications for the local community. The perception of increased job opportunities could lead to in-migration of people to the Port Elizabeth area with attendant social problems, for example, a lack of housing or unaffordable housing settlements, leading to the development of squatter settlements, increased spread of diseases, and increased pressure on social services (especially welfare services such as clinics). On the other hand, the project creates opportunities for sustainable job creation and local skills development, for example, through training programmes and the promotion of side- and downstream industries, both large-scale as well as Small, Medium and Micro Enterprises (SMMEs).

<table>
<thead>
<tr>
<th>ISSUE</th>
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<tbody>
<tr>
<td>5.1 Social Impacts</td>
<td>The socio-economic specialist study will assess both positive and negative social impacts of the project.</td>
</tr>
<tr>
<td>5.2 In-migration</td>
<td>The issue of in-migration related to the establishment of the Coega IDZ was assessed in the Coega Rezoning EIA. In so far as it relates to Aluminium Pechiney, the issue of in-migration will be assessed in the socio-economic specialist study.</td>
</tr>
<tr>
<td>5.3 Employment Equity</td>
<td>The recruitment process for the Pechiney aluminium smelter has not yet started, as a decision has not yet been made whether or not the project will proceed. If the go-ahead is given for the project, recruitment will be jointly managed by the CDC and Aluminium Pechiney.</td>
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<tr>
<td>How will Uitenhage benefit from the project and how would you ensure that not only Motherwell residents benefited from job opportunities.</td>
<td>as well as industry-specific agreements. The CDC will facilitate and provide a service for itself and investors but it will not actually recruit labour for any third parties. All contractors will hire their own labour, within the guidelines given by the CDC. There is no general restriction on the employment of woman in an aluminium smelter. The project would strictly comply with national and international regulations with regards to child labour.</td>
</tr>
<tr>
<td>Will the project employ woman, and what will be the targets for gender equity?</td>
<td>The employment of historically disadvantaged individuals is supported.</td>
</tr>
<tr>
<td>The employment of historically disadvantaged individuals is supported.</td>
<td></td>
</tr>
<tr>
<td>What will be the age limit for employment? There is a concern about the number of multinational companies that have been caught practising child labour in the country.</td>
<td></td>
</tr>
<tr>
<td>5.4 Training</td>
<td>The socio-economic specialist study will describe the training plan which is being developed by the CDC in conjunction with the Department of Labour and local training institutions and boards.</td>
</tr>
<tr>
<td>Should the jobs be high-tech in nature, what training opportunities will there be for local historically disadvantaged individuals and does Pechiney have a programme geared towards empowerment and training of historically disadvantaged individuals?</td>
<td>Specific training programme would be implemented by Aluminium Pechiney for all categories of employee to meet both the technical and managerial skills required.</td>
</tr>
<tr>
<td>Are there enough training facilities in the Metro to meet the technical training expertise requirements of the development?</td>
<td>The CDC is currently establishing exactly which skills are required for the various investments (including the proposed aluminium smelter), and determining the available skills base in the Eastern Cape. A training plan is being developed by CDC, in conjunction with the Department of Labour and local training institutions and boards, in order to ensure the right skills are available to investors in the zone and port.</td>
</tr>
<tr>
<td>When training is provided it should reflect a bias towards institutions that have been historically disadvantaged.</td>
<td></td>
</tr>
<tr>
<td>Planning is required to ensure that the Metro is ready and that it benefits from the project and from the expansion of the skills base.</td>
<td>This comment has been noted.</td>
</tr>
<tr>
<td>5.5 Employment Process</td>
<td>The socio-economic specialist study will describe the recruitment process which is planned for the project.</td>
</tr>
<tr>
<td>How will the recruitment process work and who will be responsible it?</td>
<td>A comprehensive strategy for recruitment and placement of personnel within the zone is being developed by the CDC to manage the requirements and expectations of both investors and job-seekers. These policies will be based on agreements with organised labour, and will take account of existing South African labour legislation as well as industry-specific agreements. The CDC will facilitate and provide a service for itself and investors but it will not actually recruit labour for any third parties. All contractors will hire their own labour, within the guidelines given by the CDC.</td>
</tr>
<tr>
<td>How accessible will the recruitment process be, especially to the unemployed in the Metro?</td>
<td>The socio-economic specialist study will consider the accessibility of the recruitment process to disadvantaged communities.</td>
</tr>
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</tr>
<tr>
<td>The Kwazakhele community objects to the use of labour brokers in the project.</td>
<td>This comment is noted and will be investigated further in the socio-economic specialist study.</td>
</tr>
</tbody>
</table>

5.6 Potential for SMME Development

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<tbody>
<tr>
<td>Efforts should be made to involve SMME’s in the project, as this will bolster the local economy. To what extent is this planned for in the project?</td>
<td>These comments have been noted. Opportunities for supporting SMMEs will be assessed in the socio-economic specialist study and recommendations provided.</td>
</tr>
</tbody>
</table>

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<tbody>
<tr>
<td>SMMEs need to be empowered and be made aware of opportunities. They are often not aware of the opportunities that are there to assist them.</td>
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<tbody>
<tr>
<td>Motherwell Community Development Forum has small businesses affiliated to it; these have to be looked after.</td>
<td>These comments have been noted. Opportunities for supporting SMMEs will be assessed in the socio-economic specialist study and recommendations provided.</td>
</tr>
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5.7 Social Investment Programme

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<tr>
<td>Pechiney’s social investment programme will have to be needs driven and responsive. It will have to be visible and one that the recipients of the programme can relate to. Its primary objectives should be to eradicate poverty and address unemployment.</td>
<td>This comment has been noted. Aluminium Pechiney is committed to developing a corporate social responsibility/ investment programme. Aluminium Pechiney’s social responsibility programme would cover matters such as: partnerships in education programmes; SMME development; community foundation projects; charitable health &amp; welfare projects; biodiversity conservation.</td>
</tr>
</tbody>
</table>

5.8 Impact on Tourism

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<tbody>
<tr>
<td>The Motherwell community has a lot of tourism potential and there are a number of projects that are being planned for this area, will this project not impact negatively on these initiatives?</td>
<td>The socio-economic specialist study will assess the potential impacts of the project on the tourism potential of the Motherwell community.</td>
</tr>
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</table>

5.9 Labour Legislation

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<tr>
<td>The project must comply with SA labour legislation, this is non-negotiable to the labour movement.</td>
<td>This comment is noted and agreed upon. Aluminium Pechiney would comply with SA labour legislation.</td>
</tr>
</tbody>
</table>

6.2.6 Traffic and transportation issues

The smelter would be operating 24 hours per day and 365 days per year. Consequently, frequent trucking of finished product (ingots) and some trucking of raw materials (pitch and aluminium fluoride) would take place between the smelter and the port. Other transportation related issues during both construction and operation include the transport of personnel to and from the workplace, effects of increased traffic load on road safety and pedestrians, increased noise levels associated with trucking activities, and impacts of heavy vehicles on the road surface.
6.1 Transportation of Goods

How will Pechiney haul material between the smelter and the Harbour? Has rail been considered? There is a definite over utilization of roads and under utilization of rail in South Africa and the maximum use of rail will be preferable to roads.

The majority of raw materials would be transported by conveyor from the port to the smelter; and finished products (ingots) transported by truck from the smelter to the port (see section 3.4.1). Rail is not considered a feasible option for the transport of raw materials or finished product between the port and smelter due to the short distances involved.

6.2.7 Macro-economic issues

Macro-economics issues are those related to the broader economic costs and benefits of the project (e.g. jobs, income, taxes, investment) at a local, provincial and national scale. The proposed project would entail an investment of US $1.7 billion which would have economic implications for both the local, provincial and national economy. One of the immediate effects would be the creation of direct employment during both construction and operation (refer to section 3.6 for details), as well as upstream and downstream opportunities associated with the proposed project. Aluminium Pechiney would be an anchor tenant for the Coega IDZ. Anchor tenants acts as catalysts for further investment (including improvements in local infrastructure and services) and as a magnet for other economic activities. They usually involve large-scale projects and in the construction and operational phases, present major employment and other economic opportunities for local enterprises (CES, 2000, EIR, pp xix). The project would therefore have implications for the South African economy, for example, contributions to tax revenues, the national Gross Domestic Product (GDP) and the national balance of payments.

7.1 Employment Opportunities

What will be the total number of jobs created by the project, what types of jobs and during what phases of the project? How many technical jobs will be required by the project and how many of these will be for the Nelson Mandela Metropolitan people?

On average, construction would provide 2000 jobs. Employment opportunities would peak at 6 000 workers for approximately 12 months during construction. The operation of the smelter would provide long-term employment for 550 semi-skilled (Grade 10 or 11) and skilled employees (Grade 12) and 200 highly skilled employees. A strategy for recruitment and placement of personnel within the zone is being developed by the CDC to manage the requirements and expectations of both investors and job-seekers. AP and the CDC would jointly manage recruitment and training during both construction and early operation. The CDC will facilitate and provide a service for itself and investors but it will not actually recruit labour for any third parties. All contractors will hire their own labour, within the guidelines given by the CDC. AP would use the services provided by the CDC.

Making information on employment opportunities accessible to people is critical. The Ward Councillor’s offices should be considered as distribution points when information is required to go to the public. This comment is noted and will be brought to the attention of the socio-economic specialist.
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<tr>
<td>critical. The Ward Councillor’s offices should be considered as distribution points when information is required to go to the public.</td>
<td></td>
</tr>
<tr>
<td>What will be the skills levels required for the various jobs?</td>
<td>The 550 operating positions would require skilled (grade 12) and semi skilled (grade 10 or 11) employees. Specific technical training would be given with regards to aluminium smelting process activities. The 200 managing positions would require skilled people with supervisory experience or highly skilled employee, specific technical training would be given including practical training in other AP smelters for key positions.</td>
</tr>
<tr>
<td>There are 550 lower level jobs. Why this number and is the opportunity for promoting labour-intensive practices being optimised?</td>
<td>The number of operational positions required is defined by the technology basis of the project. The 550 positions would compose the team which would have to control the normal operation of the equipments and to correct deviations. The aluminium smelting process is mainly computer controlled from distant control rooms and most of the operations are done using multi-purpose specialized overhead cranes with cabins. Non-core operational requirements would be sub-contracted.</td>
</tr>
<tr>
<td>What will be the production targets per shift and how long will each shift be?</td>
<td>The production process would run continuously, 24 hours a day. The plant would operate three 8-hour shifts per day.</td>
</tr>
<tr>
<td>What will be the ratio of foreign technical expertise to local expertise when the project is up and running?</td>
<td>Foreign technical expertise would primarily be provided to coordinate start-up operations and training. The need for this expertise would decrease after the project has achieved full and stable production. After industrial completion of the smelter the foreign work force will make up approximately 5% of the total.</td>
</tr>
<tr>
<td>There is a concern that foreign skills will be imported and large numbers of people outside of the Metro will benefit from the project.</td>
<td>This concern has been noted. The project provides significant opportunities for skills transfers to local people. Foreign expertise would be brought in for commissioning and early operation of the smelter in order to give the unexperienced workforce time to develop the specific skills required for the aluminium smelting process. The CDC is currently establishing exactly which skills are required for the various investments (including the proposed aluminium smelter), and determining the available skills base in the Eastern Cape. A training plan is being developed by CDC, in conjunction with the Department of Labour and local training institutions and boards, in order to ensure the right skills are available to investors in the IDZ and port.</td>
</tr>
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</table>

### 7.2 Economic Impacts

Besides employment what other benefits will the Metro derive from the project? The *macro-economic* specialist study will describe and assess the positive and negative impacts of the proposed project on the local, provincial and national economy.
<table>
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<tbody>
<tr>
<td>What will be the upstream and downstream economic impacts and forward and backward links into the country, especially in the rural areas?</td>
<td>national economy.</td>
</tr>
<tr>
<td>How will SA benefit if all the raw materials are imported and the finished product is exported?</td>
<td></td>
</tr>
<tr>
<td>A percentage of the finished product should be used locally to boost and sustain local markets as opposed to exporting 100% of the finished product.</td>
<td>Aluminium ingots are a world traded commodity. Local market demand will determine the level of finished product used locally. Developing downstream aluminium activities is an independent strategy which could be undertaken irrespective of the presence or absence of a smelter.</td>
</tr>
</tbody>
</table>

### 7.3 Impact on Surrounding Businesses

The 8CR property was acquired with the specific intent and use for development of five (5) abalone farms. The property has very limited pre-existing land use as abalone farms and was successfully marketed as that. This has been stated in early studies on the Coega project. Due to the Harbour and IDZ development, proposed transactions have lapsed and the best land use option for the area has been affected.

This issue was included in the Subsequent Port EIR (issue no. 1.6 of the Issues Trail), which identified that construction of the port would create a risk of pollution for mariculture activities in the area.

With regard to the Pechiney EIA, the water discharges to the marine environment specialist study will consider the potential impacts of stormwater discharges originating from the Pechiney smelter on the marine environment and mariculture.

### 6.2.8 Noise issues

Experience from EIAs for aluminium smelters in southern Africa show that the main sources of noise relate to:

- Construction activities
- Transport of raw materials and finished products to and from the port
- Operational noise from the smelter (e.g. from the electrical sub-station).

During operation of the smelter, the significance of noise impacts on the surrounding communities is reduced by the location of the proposed smelter within the Industrial Development Zone. No residential development is planned for within the IDZ, and the nearest residential areas (Motherwell) are located some 3 km from the Pechiney site. Therefore, the impact of noise from the smelter relates mainly to the effect on other future tenants in the IDZ and whether noise levels at the boundary of the smelter site meet relevant national and international standards.

### 6.2.9 Issues related to visual impacts

The smelter would occupy a site of approximately 80 hectares (approximately the extent of 160 soccer fields) with the potrooms being 1200m long and 22.8m to the top of the roof. Consequently, due to its size, the smelter would result in changes to the current landscape.
and “sense of place”. Additional infrastructure directly associated with the smelter that would also be particularly visible includes the dedicated materials handling facilities at the port and the conveyer belt between the port and the smelter. Issues related to the visual impact of the smelter include the effect of the smelter on the development of tourism in the area and its visibility from key tourism routes or view sites.

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>9.1 Addo National Park</td>
<td>As the plant will be operating 24 hours, what will be the visual impact on Addo, especially at night with regards to lighting? These issues will be addressed in the visual impact specialist study. Visual guidelines are being developed by CDC in conjunction with South African National Parks for the IDZ, which will also be integrated into the EIA when available.</td>
</tr>
<tr>
<td></td>
<td>South African National Parks are proposing to have an entrance at Colchester to the Addo Park including setting up rest camps, how will these be impacted?</td>
</tr>
<tr>
<td></td>
<td>What will be the visual impact of the plant from the camp sites at the Park.</td>
</tr>
<tr>
<td></td>
<td>Buildings will have to blend in with the environment and take colour into account.</td>
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<tr>
<td></td>
<td>Will there be building height restrictions to limit the visual impact on Addo?</td>
</tr>
<tr>
<td></td>
<td>How will lighting at night time impact on the St Croix Islands and the breeding of birds. This issue relates the overall operation of the proposed Port of Ngqura and has been dealt within in detail in the Subsequent Port EIR (refer to issue 5.5 of the Port EIR Issues Trail).</td>
</tr>
</tbody>
</table>

6.2.10 Additional environmental issues

The proposed aluminium smelter would require 860 MW of electricity. This is approximately the consumption of the cities of Port Elizabeth and East London combined. The amount of electricity required to operate the smelter raises the issue of the impacts associated with electricity generation elsewhere in South Africa. Although South Africa currently has spare capacity to meet the energy demands of the project, approximately 90% of this electricity is currently generated through burning low-grade coal. Impacts related to this form of electricity generation include problems associated with coal mining (such as acid mine drainage and increased risk of respiratory diseases and cancer amongst humans), as well as with the electricity generation itself as this releases large volumes of SO$_2$ and CO$_2$ into the atmosphere. The impacts of these gases have been described in section 6.2.1. A detailed assessment of the impacts associated with electricity generation is, however, beyond the scope of this EIA. Issues associated with South Africa’s energy supplies are more appropriately addressed at a strategic, policy level by the Department of Minerals and Energy and, for example, as part of Eskom’s Integrated Strategic Energy Planning.
Energy Planning and the Environment

The Department of Minerals and Energy’s responsibility on energy and the environment follows a two-tier approach, namely:

• evaluation of the effect of energy activities on the environment, and
• evaluation of the effect of environmental legislation and standards on the supply and cost of energy.

These evaluations are currently performed on three levels, namely the local, regional and global levels. The local level includes aspects such as smoky coal and cheap paraffin stoves, the regional level aspects such as the impact of power stations and chemical plants and the global level aspects of global climate change.

Source: Department of Minerals and Energy

6.2.11 Issues related to the EIA and public participation process

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<tr>
<td>11.1</td>
<td>Environmental Impact Assessment</td>
</tr>
<tr>
<td>Is the CSIR an independent consultant? What does ”not having vested interests in the project” mean and will the CSIR not receive further work from Pechiney meaning that they have vested interests?</td>
<td>Yes, the CSIR is an independent consultant. The CSIR is not a shareholder in Pechiney and has no vested interest in the smelter project going ahead. In accordance with the EIA Regulations, the CSIR has completed a “declaration of independence” for this EIA, which has been submitted to the provincial environmental authorities.</td>
</tr>
<tr>
<td>How is the CSIR structured, is it a Public or Private Sector Institution and who are its shareholders? Is the CSIR Profit or Non-Profit driven?</td>
<td>The CSIR is a parastatal Science Council, established by an Act of Parliament. Its only shareholder is Parliament, which provides core funding in the form of a Parliamentary Grant for research through the “Science Vote” of the Department of Arts, Culture, Science and Technology. Current income is derived both from normal business operations (60%) and the Parliamentary Grant (40%). Surplus income (profit) is managed in accordance with the mandate under which the CSIR operates. This mandate is to serve the nation and the private sector through directed research and technological innovation, and to contribute to improving the quality of life of the people of South Africa.</td>
</tr>
<tr>
<td>Why is the EIA Process spread out over a year, this seems like a long time?</td>
<td>The EIA is being undertaken over a ten month period, from March to December 2002. The process is very comprehensive, and this length of time is required in order to include extensive public consultation, detailed technical studies, and authority review and approval stages.</td>
</tr>
</tbody>
</table>

11.2 Public Participation

Public involvement and participation is critical in these types of developments. Agreed. For this reason the CSIR has appointed Sandy and Mazizi Consultants to undertake the
### 6.2.12 Issues related to Aluminium Pechiney project management and communication

<table>
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<tr>
<td>The Northern Areas of the Nelson Mandela Metropole should be more involved in this project.</td>
<td>The Northern Areas form an integral part of the public participation process for this EIA.</td>
</tr>
<tr>
<td>The information provided at networking meeting with the Kwazakhele, Zwide Councillors Forum and Ward Committee was viewed as critical and encouraging. Councillors and local structures committed themselves to communicating the project information to their constituencies, and requested the participation consultants to attend public meetings that will be organised by the local structures to encourage public participation and information dissemination on the project.</td>
<td>Thank you for this positive feedback. Please contact Sandy and Mazizi Consultants if you need further information or inputs on the project.</td>
</tr>
<tr>
<td>The Motherwell Councillors Forum is happy with the public participation process and will ensure that their constituencies are kept informed.</td>
<td>Thank you for this feedback. Regular information will be provided to the I&amp;APS during the course of the EIA.</td>
</tr>
<tr>
<td>The update on the Coega project is appreciated and there is satisfaction with the proposed public participation process.</td>
<td>Thank you for this positive feedback. Please contact Sandy and Mazizi Consultants if you need further information or inputs on the project.</td>
</tr>
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**12.1 Project Construction Process**

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<tr>
<td>When will the project commence and how long will construction last? What are the total project timeframes?</td>
<td>Aluminium Pechiney plans to have the EIA completed and to reach a decision on the preferred site by end of 2002 following the issue of the Record of Decision for the EIA. If the Coega site is selected, construction would then commence early 2003, with operation starting in early 2005, reaching full operational capacity by the end of 2005 (refer to section 3.8).</td>
</tr>
</tbody>
</table>
| What is the expected life span of the project? | The currently anticipated life of the plant is 30-40 years. Thereafter, based on Aluminium Pechiney’s international experience, options include:  
1. Extension of the lifespan of the smelter through technology upgrade  
2. Alternative use of the buildings and facilities by other industries  
3. Removing structures and full site rehabilitation  
The financial provision for decommissioning is made from the outset. |
<p>| From where will the building materials be sourced? | Building materials would be sourced by the engineering firm that would undertake the construction of the plant. This would be undertaken according to normal procurement practices. |</p>
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<tr>
<td><strong>12.2 Communication on the Project Progress</strong></td>
<td>This is a good point which will be considered in the overall communication programme. With assistance from the CDC, Aluminium Pechiney would seek opportunities to inform and educate the local community on progress of the project.</td>
</tr>
<tr>
<td>How will Aluminium Pechiney communicate project progress to the surrounding community, especially with regard to opportunities that arise? As statutory ward representative structures, the Ward Committees should be involved in this process.</td>
<td></td>
</tr>
<tr>
<td><strong>12.3 Site Selection Criteria &amp; Facilities</strong></td>
<td>Nobody can predict the impact with any degree of certainty. Interest rates, currency, inflation and depreciation rates have combined effects on the economics of the project.</td>
</tr>
<tr>
<td>If political instability was a selection criterion for a site, how will the depreciation of the Rand impact on SA’s position in the race/bid for the project?</td>
<td>Coega has already been selected as a preferred site by Pechiney. This triggered the EIA process. The final decision on whether to construct and operate a smelter within the Coega IDZ is subject to contractual, legal and financial frameworks being confirmed. The timeframe to have all agreements in place and financial closing will be early 2003.</td>
</tr>
<tr>
<td>When will a decision be made on a preferred site?</td>
<td>Coega satisfies many of the required site selection criteria. In particular, South Africa and Eskom have power generation capacities which are available in a time frame which is difficult to meet in other countries at this stage.</td>
</tr>
<tr>
<td>How was SA selected as one of the preferred sites and was Canada considered as a potential site as it has hydroelectric power and produces one of the cleanest energies? Why has it not been short-listed?</td>
<td>Argentina, Australia and South Africa were identified as preferred sites for the location of the smelter. Due to recent economic instability in Argentina, the more detailed feasibility studies for this site were stopped. At present engineering, planning and environmental studies are underway at the South African and Australian sites, with the intention of reaching a decision on the preferred site as soon as strategic agreements are reached. South Africa is currently the most promising location, but business development is actively pursued elsewhere.</td>
</tr>
<tr>
<td>What is meant when talking about Argentina and Australia?</td>
<td></td>
</tr>
<tr>
<td>Is the project dependent on the Coega Harbour being built or can Pechiney use the existing Port Elizabeth Harbour?</td>
<td>The Coega harbour (Port of Ngqura), as well as the IDZ, contribute to securing and accelerating the project development. One could say that without the port or the IDZ, Aluminium Pechiney will not have a smelter in operation at Coega by 2005.</td>
</tr>
<tr>
<td>If the area for the smelter were not an IDZ, would Pechiney still be interested in the area?</td>
<td></td>
</tr>
<tr>
<td>Is the land available where the proposed plant will be built and how do you know if it is available? When will Pechiney acquire the land, and will they purchase the land or lease it?</td>
<td>CDC has indicated that a suitable site within the metallurgical cluster is available to Pechiney and details are currently under discussion between CDC and Pechiney.</td>
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### 6.2.13 General

<table>
<thead>
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<tr>
<td><strong>13.1 Project Support</strong></td>
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<tr>
<td>The Bloemendal, KwaNokoxolo Community Structures &amp; Ward Committees support the project, delivery in the Coega Industrial Development Zone is long overdue and has been long awaited.</td>
<td>This support for the proposed smelter is noted.</td>
</tr>
<tr>
<td>There is unwavering support for the project from the Kwantshakhele Councillors Forum and Ward Committees and a request to encourage Pechiney to intensify its studies and efforts.</td>
<td>This support for the proposed smelter is noted.</td>
</tr>
<tr>
<td>The Zwide community structures support the initiative and are excited about the project. There is definite support for Coega and the Aluminium Smelter and the information presented is encouraging.</td>
<td>This support for the proposed smelter is noted.</td>
</tr>
<tr>
<td>The New Brighton Councillors Forum and Ward Committee supports the initiative and can be relied upon to provide any form of support to the project.</td>
<td>This support for the proposed smelter is noted.</td>
</tr>
<tr>
<td>The Motherwell Councillors Forum has stated their support for the project.</td>
<td>This support for the proposed smelter is noted.</td>
</tr>
<tr>
<td><strong>13.2 Registration of Service Providers</strong></td>
<td></td>
</tr>
<tr>
<td>How is the registration process proceeding? What will be the duration of this process?</td>
<td>CDC is currently registering service providers for the provision of infrastructure and services for the IDZ.</td>
</tr>
<tr>
<td>What kind of businesses is the Coega Development Corporation registering?</td>
<td>Any organisation that wish to register believing that it may be able to provide a service to the CDC or its tenants.</td>
</tr>
<tr>
<td><strong>13.3 Issues related to the Rezoning</strong></td>
<td></td>
</tr>
<tr>
<td>Does the Record of Decision for the Rezoning EIA cover all the property portions that will be included in the Pechiney site?</td>
<td>The whole Pechiney site is covered by the Rezoning EIA, however only those sites owned by the CDC at the time of the Record of Decision (ROD) were covered by the ROD. Once the outstanding properties are owned by the CDC, then they too will be rezoned, using the same EIA and having the same final ROD conditions applied to them. CDC plan to have control of all properties for the Pechiney site before the Pechiney EIA has been completed.</td>
</tr>
<tr>
<td><strong>13.4 Other issues</strong></td>
<td></td>
</tr>
<tr>
<td>Who is the initiator of this project, the Coega Development Corporation or Government?</td>
<td>Aluminium Pechiney has initiated this project to meet anticipated increasing demand for aluminium metal.</td>
</tr>
<tr>
<td>Are there other aluminium smelters in South Africa, how many and where are they located?</td>
<td>The only two primary aluminium smelters are located in Richards Bay (the Bayside and Hillside smelters), which are operated by BHP Billiton. The only other primary aluminium smelter in southern Africa is the Mozal smelter, located outside Maputo.</td>
</tr>
</tbody>
</table>
6.3 Linkages between key environmental issues

It is clear from the above discussion that many of the key issues (and hence the respective specialist studies) are closely related in terms of impacts, mitigation measures, benefit enhancement measures and information requirements.

A workshop for all specialists was held at the end of April 2002 to identify information requirements and linkages between the various specialist studies. One of the main objectives of the workshop was to ensure that information would be exchanged timeously between specialists as required for their respective studies and, where there was an overlap between studies, to minimise the potential for the duplication of efforts.

The linkages between the key issues and specialist studies has been summarised in Figure 8.
Figure 8: Linkages between key environmental issues associated with the proposed aluminium smelter

Two-way linkages may exist either in terms of:
- Negative/positive impacts of one issue on another
- Opportunities for mitigation + benefit enhancement

ALUMINIUM PECHINEY PAS 2005 SMELTER

PROPOSED ALUMINIUM SMELTER WITHIN THE COEGA IDZ, PORT ELIZABETH, SOUTH AFRICA
SCOPING STUDY FOR EIA : DRAFT SCOPING REPORT

PAGE 54
7. PRELIMINARY TERMS OF REFERENCE FOR THE SPECIALIST STUDIES

The initial identification of key environmental issues through the technical Scoping process has enabled the initiation of nine specialist studies. The preliminary terms of reference for these specialist studies have been included in section 7.2, however, these will be finalised based on the outcome of the public Scoping process.

7.1 Generic Terms of Reference for all specialist studies

The following methodology for assessing impacts and assigning significance to the issues identified through the Scoping process is to be applied in all of the specialist studies.

Assessment of impacts

The significance of potential impact should be described as follows:

- **Low**: Where the impact would not have an influence on the decision or require to be significantly accommodated in the project design;

- **Medium**: Where it could have an influence on the environment which would require modification of the project design or alternative mitigation;

- **High**: Where it could have a ‘no-go’ implication for the project regardless of any possible mitigation.

The assessment of impact significance should be based on the following convention:

- **Nature of impact** - this reviews the type of effect that a proposed activity would have on the environment and should include “what would be affected and how?”

- **Extent** - this should indicate whether the impact would be local and limited to the immediate area of development (the site or the servitude corridor); limited to within 5km of the development; or whether the impact may be realised regionally, nationally or even internationally.

- **Duration** - this should review the lifetime of the impact, as being short term (0 - 5 years), medium (5 - 15 years), long term (>15 years but where the impacts would cease after the operation of the site), or permanent.

- **Intensity** - here it should be established whether the impact is destructive or innocuous and should be described as either low (where no environmental functions and processes are affected), medium (where the environment continues to function but in a modified manner) or high (where environmental functions and processes are altered such that they temporarily or permanently cease).
Probability - this considers the likelihood of the impact occurring and should be described as improbable (low likelihood), probable (distinct possibility), highly probable (most likely) or definite (impact would occur regardless of prevention measures).

The status of the impacts and degree of confidence with respect to the assessment of the significance, must be stated as follows:

Status of the impact - A description as to whether the impact would be positive (a benefit), negative (a cost), or neutral.

Degree of confidence in predictions - The degree of confidence in the predictions, based on the availability of information and specialist knowledge.

Other aspects to take into consideration in the specialist studies are:

- Impacts should be described both before and after the proposed mitigation and management measures have been implemented.
- All impacts should be evaluated for the full-lifecycle of the proposed development, including construction, operation and decommissioning.
- The impact evaluation should take into consideration the cumulative effects associated with this and other facilities which are either developed or in the process of being developed in the region.
- The specialist studies must attempt to quantify the magnitude of potential impacts (direct and cumulative effects) and outline the rationale used. Where appropriate, national standards are to be used as a measure of the level of impact.

Mitigation and monitoring

- Where negative impacts are identified, specialists should set mitigation objectives (i.e. ways of reducing negative impacts), and recommend attainable mitigation actions. Where no mitigation is feasible, this should be stated and the reasons given. Where positive impacts are identified, actions to enhance the benefit must also be recommended.
- The specialists should set quantifiable standards for measuring the effectiveness of mitigation and enhancement. In addition, specialists should recommended monitoring and review programmes to assess the effectiveness of mitigation.

7.2 Specific Terms of Reference for the specialist studies

7.2.1 Air quality study

The specialists should address the generation and subsequent dispersion of air pollution arising from the proposed AP smelter. The changes in air pollution predicted for the project should be evaluated in the context of existing air pollution from projects planned for the
Coega IDZ, the air pollution load in the Coega area, relevant legislation and international guidelines.

The study should specifically:

- Describe the aluminium production process with respect to the pollutants released into the atmosphere.
- Discuss the human health and general environmental implications of the pollutants released (with a particular focus on hydrogen fluoride, sulphur dioxide and deposition of particulates).
- Prepare an emissions inventory for normal operation of the AP Smelter quantifying the existing and projected future emissions, together with all data needed for dispersion modelling, such as, gas flows, temperatures, heights of release etc.
- Discuss the meteorology of the Coega area and identify possible abnormal or upset atmospheric conditions, their effect on emissions, and their likely frequency. This will require the collection of appropriate meteorological data for air quality modelling from all available and relevant sites. This should include wind speed and direction, temperature, cloud cover, sea surface temperature, and land use. The Specialist should also prepare topographical input for the model that includes large buildings and features such as piles of wood chips.
- Dispersion modelling for the AP smelter, both alone and as part of the Coega IDZ suite of industries (so far as this is possible). Modelling should use one year’s worth of data and should predict the annual average as well as 24-hour and 1-hour episodes. Where possible, measured pollution concentrations will be compared with the model predictions for the current suite of industries.
- Present the modelled predictions as maps showing isopleths on a base map of the Coega IDZ.
- Discuss the predictions in terms of existing South African air pollution guidelines, as well as international standards (in particular those of the World Health Organisation).
- Evaluate the risk to human health of atmospheric emissions.
- Evaluate the effects of atmospheric emissions on plants and agriculture, in particular agricultural activities in the area (e.g. citrus farming in the Sundays River valley).
- Model possible “upset” scenarios over appropriate time periods, probably 24-hours or 1-hour. Present and discuss “upset” scenarios and their implications on human health.
- All model inputs should be recorded in the Specialist Report.
- Evaluate the impacts associated with dust that might result from the construction process.
- Consider the impacts of “greenhouse gas” emissions in relation to South Africa’s contribution to the overall load and the country’s international commitments.
- Identify and discuss any needs for pollution abatement and mitigation that are apparent from the study. This should be linked with recommendations for a monitoring programme of either in-stack or ambient concentrations.
• The Atmospherics Study should assess whether the proposed expansion could impact on flora and fauna in the surrounding areas through increased atmospheric deposition. Deposition on land use characteristics should be considered.

7.2.2 Water resource management and liquid waste management study

The water resource and liquid waste management specialist study will address a range of factors associated with water use and the handling of liquid waste generated on-site. The study will therefore include confirmation and assessment of water sources, pre-treatment requirements, liquid wastewater characterization (in terms of both volumes and quality) and the management of all liquid wastes generated on-site for discharge from the smelter site. Consideration of water recycling and re-use within the system will be included in the study. The study will include the following:

Water use
• Confirmation of water sources
• Confirmation of quantities of water required
• Recycle/re-use options
• Waste management quantification, qualification and management considerations.

Liquid waste
• Effluent discharge water quality requirements in terms of local/national regulations including National Water Act (Act 36 of 1998) and other legislation identified as pertinent.
• Qualification and quantification of effluent including:
  o Location, identification and confirmation of sources of impact on water quality [on-site wastewater production and effect of discharge on receiving water quality, atmospheric fallout, effects of non-point sources (run-off) and seepage from stormwater retention dam]
  o Identification of constituents of concern in effluent
  o Effect of effluent water quality on future water uses and the natural aquatic environment, in particular the Coega River.
  o Identification of effluent water treatment/remediation requirements or opportunities.

The Water Study will be collated as a Water Management Plan that includes consideration of:
• The potential for water recycling and re-use.
• Water quality monitoring and performance management.
• Any infrastructural requirements to reduce the risk of water contamination (e.g. seepage into groundwater aquifers).
7.2.3 Materials handling and solid waste management study

The specialist study will consider the environmental impacts associated with the handling of raw materials and products onto and off the site, as well as the waste products that could be generated through the aluminium smelting and associated process. In particular, the study will:

- Provide a detailed examination of the chemical process used to smelt aluminium in terms of the potential risk to the environment under normal conditions, start-up and shut-down, maintenance operations, and upset plant conditions.
- Provide a comprehensive mass-balance to ensure that all waste streams have been identified and characterised in terms of quantities generated, composition and disposal options.
- Review the technology to be used (e.g. unit operations) in terms of the “best practicable environmental option” principle.
- Evaluate the environmental risks associated with the movement of materials associated with the manufacturing process, in particular the transport of raw materials from the proposed Port of Ngqura to the site.
- Evaluate the environmental risks associated with the storage and movement of materials on-site.
- Provide a detailed account of waste management opportunities and threats with particular emphasis on any hazardous waste that is identified.
- Provide a detailed review of legislative requirements pertaining mainly to waste and effluents of the proposed smelter (e.g. Minimum Requirements for Waste Disposal, Hazardous Installations Act, National Water Act, etc).
- The specialist study will identify all permits required for waste management and materials handling on and off the Aluminium Pechiney site.
- Identify and discuss any remedial and mitigation measures that could be employed to reduce any of the impacts identified through the above studies. This should include an evaluation of the potential for recycling and reuse of materials.
- Provide and discuss potential monitoring and measuring plans that would be needed by Aluminium Pechiney to assist in managing the environmental impacts identified in the specialist study.
- Provide and discuss “sustainability indicators” for the Aluminium Pechiney smelter. This includes indicators such as solid waste produced per ton of product. These sustainability indicators will be compared to similar local and international operations where information is available.

7.2.4 Study of water discharges to the marine environment

The study should consider the impacts associated with the discharge of contaminated waste water and stormwater into the marine environment. In particular, the study should:

- Provide an examination of the fate of discharges from alternative sites to the marine environment, in terms of the potential risk to the environment under normal conditions, start-up and shut-down, and maintenance operations.
Perform transport and fate modelling to address the fluoride, suspended solids and Poly-Aromatic Hydrocarbon (PAH) constituents in both stormwater and waste water discharges.

- Based on the results of the surface water study, model the dispersion rates in the selected discharge areas, and compare predicted levels with national or relevant international standards.
- Evaluate the environmental risks associated with the discharge of the liquid waste to the marine environment. This will include:
  - a brief overview of biota in the affected marine;
  - an assessment of the impact on biota in the areas of high concentrations (i.e. where concentrations approach/exceed recommended guidelines).
- Provide recommendations on site selection, which optimise cost and water quality compliance considerations.
- Provide recommendations on the long term monitoring programme, which will ensure that predictions and assumptions remain valid.
- Provide a detailed review of the permit/licence requirements in terms of the marine legislation.
- Identify and discuss any remedial measures that could be employed to reduce any of the impacts identified through the above studies.

- Socio-economics study

The specialist study shall address all issues of social and socio-economic concern. The terms of reference are as follows:

- Identify the nature and number of new employment opportunities, including upstream and downstream opportunities (for example the additional jobs associated with increased harbour usage and other industrial potential) – this will be based on calculations from the macro-economics study.
- Evaluate the infrastructure requirements necessary to meet the demands of an increased labour force. This should include inter alia:
  - Housing.
  - Clinics and hospitals.
  - Domestic waste management facilities.
  - Water demand and competition for resources.
  - Transport.
- Consider employment opportunities related to the development and further downstream industrial development potential.
- Consider the implications of outsiders arriving in the Coega area in search of employment opportunities. Specific reference to the potential for increased crime in the areas should be evaluated.
- Identify benefits that might broadly accrue to the Port Elizabeth-Despatch-Uitenhage-Coega community both directly and indirectly through the proposed construction. Specific reference to current and potential social investment opportunities and projects should be considered.
Evaluate the impact that the proposed construction may have on current and future tourism opportunities in the area.

Identify and discuss any opportunities to maximise or reduce the positive or negative impacts identified through the above studies.

Bear in mind and make reference to possible cumulative impacts. It can be assumed that the development of the aluminium smelter within the IDZ would not happen in isolation. Therefore, there may be one, or a number of other developments taking place simultaneously, which increases the intensity of the potential impacts.

Traffic and transportation study

The traffic and transportation specialist study should consider the following aspects:

- Perform a basic analysis on the effect of materials and personnel transport on the road traffic patterns in the PE-Despatch-Uitenhage-Coega sub-region.
- Evaluate the risks associated with the transportation of materials associated with the manufacturing process, in particular, the transport of raw materials from the proposed Port of Ngqura harbour to the site.
- Identify any fatal flaws along the major road and rail routes for the transport of AP’s raw materials and products (in particular during the construction phase, when materials are transported from PE harbour to the smelter). This should include an assessment of the effect of the various modes of transport on the safety of other users.
- Perform a basic assessment on the effect of road transportation on infrastructure and propose remedial measures that may be required. This should include the potential increase in vibrations associated with transport.

Macro-economics study

This specialist study will address the following macro-economic aspects:

- Provide a brief overview of the respective roles of investments and exports in the South African economy.
- Quantify the macro-economic impact of the smelter project both regionally (in the province) and nationally. This will be done in terms of generic macro-economic variables, including employment, and its contributions to the gross domestic product (GDP), for example in terms of profits, remuneration, tax revenues) and the balance of payments (foreign exchange reserves).
- The evaluation will consider both the proposed development and upstream and downstream opportunities associated with the proposed project.
• Noise study

The specialist study on noise impacts will address:

- The impact of the proposed PAS 2005 project on noise levels, both at the proposed site in the Coega IDZ, at the proposed Coega harbour, at the PE harbour (during construction only) and for the proposed transport routes from the Coega harbour to the smelter.
- For noise levels at the IDZ site, place the predicted noise levels from the AP smelter within the context of current and potential future ambient noise levels.
- Provide comparisons of predicted noise levels to relevant national and international standards (e.g. World Bank).
- The study should propose remedial measures to reduce the potential noise impacts.

• Visual impact study

The specialist study on visual impacts will address the following:

- The visual impact of the proposed aluminium smelter both at the proposed site in the Coega IDZ and at the proposed Coega harbour.
- The visibility and visual impact of the smelter from important tourist routes, both during the day and at night (taking into consideration new initiatives such as the creation of the Greater Addo Elephant National Park).
- For visual impacts at the IDZ site, place the predicted impacts from the smelter within the context of current and potential future developments.
- The study should propose remedial measures to reduce the potential visual impacts.
- Potential permit applications must be identified and guidelines provided for satisfying these requirements (e.g. for aviation lights on tall structures).

REFERENCES


