

SECTION 1 INTRODUCTION

1.1 A BRIEF DESCRIPTION OF THE PROPOSED ACTIVITY

PPC is proposing to minimise their use of coal by investigating the use of secondary materials in the cement manufacturing process. PPC Cement is currently utilising coal as their main source of energy required for the manufacturing of cement. Cement manufacture is an energy-intensive process, and therefore large amounts of coal (a non-renewable resource) are utilised. A detailed description of the cement making process is given in Section 2 of this report.

There are many waste materials that are used in cement kilns elsewhere in the world, such as paper and wood wastes, household refuse and refuse-derived fuel, used oil, plastics and rubber residues, tyres, spent pot liners (from the aluminium smelting industry), and sewage sludge. PPC propose using waste streams from the following categories as secondary fuels in the cement kilns:

- Scrap tyres and rubber waste;
- De-watered, treated sewage pellets;
- Hydrocarbon waste (such as used oil, oil-contaminated general waste, oil-contaminated soil and coal fines);
- Plastic waste; and
- Biomass (such as paper waste, sawdust, wood chips and waste from bio-fuel production).

Although this is a fairly generic list of waste streams, PPC is continually investigating potential waste streams in each of these categories, and assessing the potential for use through specialist assessments and HAZOP studies.

PPC has determined several waste streams that will not be considered at all as part of the Secondary Materials Co-Processing Programme. This list may be expanded as the specialists' findings become available during the course of the EIA process. The excluded waste streams, as published by the ACMP¹, are listed below:

- Anatomical Hospital Wastes;
- Asbestos-containing Wastes;
- Unsorted Electronic Scrap;
- Bio-hazardous Wastes;
- Entire Batteries;
- Explosives;
- Mineral Acids;
- Radioactive Wastes; and
- Unsorted Municipal Waste.

PPC is applying for the use of the identified secondary materials at 5 (five) of its cement manufacturing plants. The table (Table 1.1) and Figure (Figure 1-1) below lists the relevant PPC Plants involved in this process. :

¹ ACMP: Secondary Materials or AFR Policy, 5 Nov 2005

Table 1-1: List of relevant PPC Manufacturing Plants

Name of Plant	Address (Closest Town)	Municipality	Province	Latitude and Longitude			
				°	"	'	
Hercules	DF Malan Drive, Hercules, Pretoria (Pretoria)	Tshwane Metropolitan Municipality	Gauteng	25 28	43 10	27 12	S E
Slurry	Road between Mafikeng and Zeerust. (Mafikeng)	Central District Municipality Mafikeng Local Municipality	North West	25 25	49 50	19 7	S E
De Hoek	De Hoek Factory (Piketberg)	West Coast District Municipality Berg River Local Municipality	Western Cape	32 18	56 45	9 37	S E
Dwaalboom	PPC Schoongesicht Farm, Dwaalboom (Thabazimbi)	Waterberg District Municipality Thabazimbi Local Municipality	Limpopo	24 26	48 49	17 33	S E
Port Elizabeth	Fergusson Road, Off Old Grahamstown Road, Deal Party (Port Elizabeth)	Nelson Mandela Metropolitan Municipality	Eastern Cape	33 25	54 36	36 13	S E

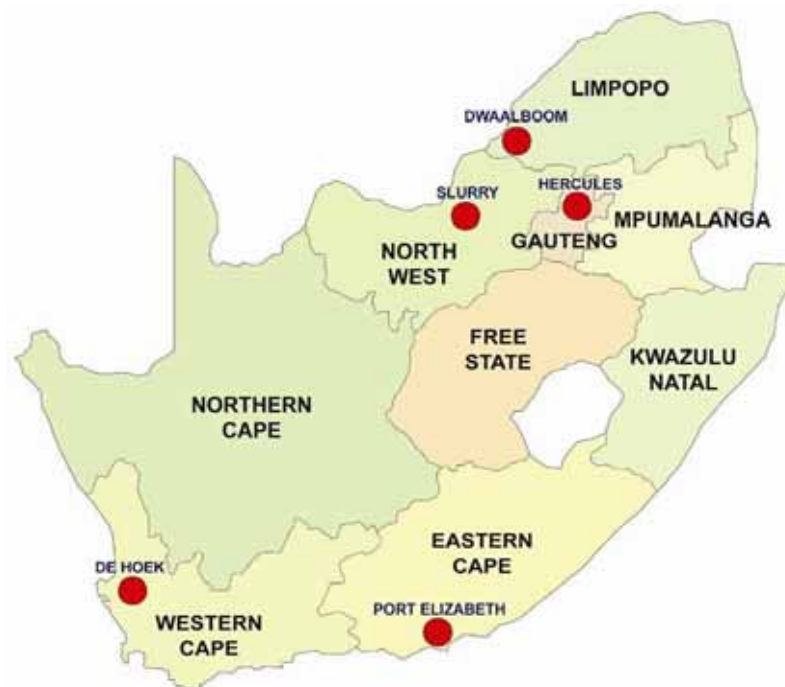


Figure 1-1: The positions of the PPC Manufacturing Plants where the use of secondary materials is proposed.

1.2 PPC DWAALBOOM

This application only refers to the PPC Dwaalboom Cement Manufacturing Plant situated east of Thabazimbi in the Thabazimbi Local Municipality. Applications for the proposed activity for the other applicable PPC Plants have been submitted to the relevant provincial authorities.

1.3 PPC DWAALBOOM CEMENT MANUFACTURING PLANT

The Dwaalboom Cement Manufacturing Plant is located in the Limpopo Province in the Thabazimbi Local Municipality of the Waterberg District Municipality. PPC Dwaalboom is the most recent plant to be commissioned by PPC. It was commissioned in 1985 and thereafter it was mothballed due to a market turndown. Eleven years later in 1996 the cement factory commenced production.

Dwaalboom produces OPC and Surebuild cement. The raw materials are mined at the quarry adjacent to the Dwaalboom factory. There is currently one kiln in operation at Dwaalboom, and a second kiln and associated infrastructure is under construction through the implementation of the Batsweledi Programme.



Figure 1-2: Aerial photograph of the PPC Dwaalboom Manufacturing Plant



Figure 1-3: Aerial photograph of the future PPC Dwaalboom Manufacturing Plant, once construction has been completed; the positions of each kiln are indicated in red

1.4 THE LEGAL FRAMEWORK

Marsh Environmental Services (MES) has been appointed by PPC to conduct the Environmental Impact Assessment relating to the proposed use of secondary materials to supplement the coal supply for the firing of the cement kilns. The proposed project is identified as an activity, which may have detrimental effects on the environment, thus requiring environmental assessment (Section 21: Listed Activity 1(c), 8 and 9 of the Environment Conservation Act, 1989 (ECA)).

Regulation 1182 promulgated in terms of Section 21 of the Environmental Conservation Act (Act 73 of 1989):

1. *The construction, erection or upgrading of-*
 - (c) *with regard to any substance which is dangerous or hazardous and is controlled by national legislation-*
 - (i) *infrastructure, excluding road and rails, for the transportation of any such substance; and*
 - (ii) *manufacturing, storage, handling, treatment or processing facilities for any such substance.*
8. *The disposal of waste as defined in Section 20 of the Act, excluding domestic waste, but including the establishment, expansion, upgrading or closure of facilities for all waste, ashes and building rubble.*
9. *Scheduled processes listed in the Second Schedule to the Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965).*

A preliminary site investigation was undertaken by MES in October 2005. PPC and MES conducted a project initiation meeting with the Limpopo Department of Economic Development, Environment and Tourism (LEDET) in October 2005 to discuss the requirements to be included in Plan of Study for Scoping (PoSS). The application and PoSS was duly submitted in November 2005. Approval of the PoSS was received in March 2006. The provisions of the PoSS and the additional requirements included in the letter of approval thereof are recorded in the Sections 1.4.1 and 1.4.1 below.

1.4.1 Plan of Study for Scoping

The PoSS (attached as Appendix A-A1) outlines the approach and contents of the study and is recorded in this section of the report, and this was approved by the LEDET in their letter dated 25 April 2006 (attached as Appendix A-A2). The requirements as set out in the approval of the PoSS

- a) The Consultant will conduct a preliminary site investigation in order to collect sufficient background information for the investigation.
- b) The consultant will:
 - i) Engage in discussions with the relevant authorities to establish the way forward and confirm the required deliverables.
 - ii) Undertake site visits to obtain all base line information.
 - iii) Prepare all the application documentation as detailed below.
 - iv) Register the project with LEDET.
 - v) Collate all baseline information pertaining to the proposed development.
 - vi) Identify the environmental status quo in terms of the baseline information that has been obtained.
 - vii) Conduct the following specialist investigations in support of the application:

- Environmental Technical Review;
 - Air Dispersion Modelling; and
 - Community Health Risk Assessment.
- viii) Identify the potential environmental impacts of the proposed project.
- ix) Assess the potential environmental impacts in terms of the following:
- Extent;
 - Duration;
 - Frequency;
 - Probability; and
 - Significance of the impact.
- x) Make recommendations as to mitigation measures.
- xi) Document the process and the findings in accordance with Regulation GN. R1183 of 5 September 1997 (as amended), in terms of the Environment Conservation Act, 1989, Act 73 of 1989.
- xii) Ensure that the comments and concerns that may have been received during the public participation are sufficiently addressed in the report.
- xiii) Submit the Scoping Report to the relevant authorities.
- xiv) Liaise with the relevant authorities in order to obtain the Record of Decision.
- c) Public Participation Process:
- The following will be conducted by the Consultant during the Public Participation Process:
- i) Included as part of the site investigation visits, the consultant will identify the key stakeholders and obtain their contact details as a start to the development of a comprehensive stakeholder database.
 - ii) The initial stakeholder database will be augmented through networking and advertising. I&APs will be identified and registered. Both a 'vertical' (institutional) and 'horizontal' (geographical) approach will be used to achieve this. Geographically, those I&APs (e.g. residents, community groupings and businesses) located around the proposed site, etc. and are directly affected, will be included in the process. A 'vertical' approach is used to identify those institutions or individuals that might be affected by, or could make a contribution to the project, but who are not necessarily in its direct sphere of impact.
 - iii) Carry out the required advertising and notification processes once the plan of study has been approved:
 - iv) Advertise on site and in the local newspaper; and
 - v) Distribute notices and Background Information Documents (BID) to the identified Interested and Affected Parties (I&APs).
 - vi) Conduct focus group meetings. Typically these meetings are held with key individuals or organizations in the area by invitation and it is envisaged that the following institutions or organisations will form part of this phase of the Public Participation Process:
 - Governmental:
 - The relevant Provincial Environmental Authority;
 - Department of Environmental Affairs & Tourism – CAPCO;
 - Department of Water Affairs & Forestry;
 - Department of Minerals and Energy;

- Department of Labour;
- Department of Health;
- Representatives from relevant departments within Regional and Local Councils; and
- Any other relevant governmental department as identified in the process or as required by the authorising authority.
- Other:
 - Local and national environmental organisations;
 - Adjacent land-owners;
 - The surrounding communities;
 - Civic/public interest groups;
 - Grassroots/community-based organisations;
 - Homeowner/rate payers associations;
 - Labour/Trade unions;
 - Schools and other educational facilities; and
 - Any other relevant institution as identified in the process or as required by the authorising authority.
- vii) An Open Day will be held for the broader public where the project will be introduced to them and to provide a platform where they can voice their issues and concerns. The registered I&APs will be directly informed of the proposed Open Day, whilst additional advertisements may be placed announcing the Open Day, depending on the responses received during the first round of advertisement.
- viii) Prepare and distribute accurate minutes of all public and focus group meetings that are held.
- ix) Keep a record of all correspondence and discussions with I&APs.
- x) Capture all issues and concerns raised throughout the Scoping process by I&APs and develop an Issues and Response register.
- xi) Prepare a description of the entire public participation process for inclusion in the Scoping Report.
- xii) Inform the registered I&APs of the Record of Decision.

1.4.2 Provisions of the approval of the Plan of Study for Scoping

The LEDET letter of approval of the PoSS listed further requirements; which are recorded below.

- a) Three Environmental Scoping Reports must be submitted compiled in the format as outlined in the PoSS.
- b) The following information must be included in the Scoping Report:
 - i) The alternatives of the proposed listed activities;
 - ii) The comments captured during the Public Participation Process;
 - iii) The proof of the newspaper advertisements done in the predominant languages spoken in the development area;
 - iv) A list of the fauna and flora on the site and surrounding areas where development will occur;
 - v) A locality map and site layout map; and

- vi) An Environmental Management Plan to be used during the development and operation phases.

1.4.3 Process background and programme

In terms of the approved PoSS submitted to LEDET in November 2005 and approved by the Department proposed the following timeframes (Table 1.2) for the completion of the Scoping Report.

Table 1-2: Schedule included in the PoSS

Activity	Timing
Preliminary Environmental Analysis	September – October 2005
Preliminary Consultation with Authorities	September – October 2005
Submission of Application	4 November 2005
Submission of POS	4 November 2005
Approval of Plan of Study	30 November 2005
Specialist Studies	November 2005 – March 2006
Public Participation	
<i>Preparation of Background Information Document (BID)</i>	<i>14 – 18 November 2005</i>
<i>Placement of Advertisement and Notices</i>	<i>18 November 2005</i>
<i>Focus group meetings</i>	<i>19 January 2006 – 16 February 2006</i>
<i>Second round of advertisement</i>	<i>30 January 2006</i>
<i>Potential dates for Open Days</i>	<i>21 April – 11 May 2006</i>
Draft Scoping Report	21 April – 30 May 2006
Amendment of Draft Scoping Report to include findings of the PP Process	01 June – 7 July 2006
Submission of final Scoping Report	10 July 2006
Approval by Authority	October 2006
Approval Period	60-90 days from submission

Various delays during the course of the assessment were experienced. The reasons for these delays are recorded below:

- a) Timeframes allocated for specialist studies undertaken in terms of the approved PoSS proved not to be sufficient due to the continuous identification of further potential impacts that may be expected as a result of the said activity.
- b) During the required Public Participation Process comments from the public and Non-Governmental Organisations included concerns regarding the cumulative / compounded health impacts on the communities living near PPC factories. In order to assess this, a Baseline Community Health Risk Assessment needs to be undertaken to establish the current potential health impacts of the current PPC emissions. The results of this study will form the baseline against which the impacts of secondary materials will be measured.
- c) Further, a request from key stakeholders to investigate the alternative waste disposal and treatment options for the various waste streams was received. As a result MES has also commenced with a Waste Disposal Study to determine the feasibility of waste treatment and disposal alternatives the findings of this study will be included with the Extended Scoping Report.

- d) These studies are in addition to the studies identified in the PoSS for Scoping and time was not allocated in the initial project programme for this assessment. Agreement was reached with LEDET for amended timeframes. Correspondence relating to these amended timeframes is attached in Addendum A-A3.

1.5 SCOPING REPORT

1.5.1 Methodology

The purpose of the scoping process is to identify the range of issues and alternatives to be considered as well as the approach to the assessment that will follow, (DEA, 1992b, p.5)². The content of the Scoping Report is dictated by the Regulations (Regulation 1183) promulgated in terms of the ECA. The Scoping Report is extended to include:

- a) a description of the need and desirability of the proposed activity and identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity;
- b) a description and comparative assessment of all alternatives identified during the environmental impact assessment process;
- c) a summary of the findings and recommendations of any specialist report or report on a specialised process;
- d) a description of all environmental issues that were identified during the environmental impact assessment process, an assessment of the significance of each issue and an indication of the extent to which the issue could be addressed by the adoption of mitigation measures;
- e) an assessment of each identified potentially significant impact, including –
 - i) cumulative impacts;
 - ii) the nature of the impact;
 - iii) the extent and duration of the impact;
 - iv) the probability of the impact occurring;
 - v) the degree to which the impact can be reversed;
 - vi) the degree to which the impact may cause irreplaceable loss of resources; and
 - vii) the degree to which the impact can be mitigated;
- f) a description of any assumptions, uncertainties and gaps in knowledge;
- g) an opinion as to whether the activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;
- h) an environmental impact statement which contains –
 - i) a summary of the key findings of the environmental impact assessment; and
 - ii) a comparative assessment of the positive and negative implications of the proposed activity and identified alternatives;
 - iii) a draft environmental management plan.

1.5.2 Specialist Studies

In terms of the approved PoSS the following specialist studies were undertaken as part of the environmental assessment process:

² DEA (1992b) *Guideline for Scoping, Department of Environmental Affairs, Pretoria*

a) Environmental Technical Review (**Appendix D1**)

In principle this study attempts to define a relationship, if any, between the inputs and outputs of the process and associated process risks following the addition of secondary materials.

b) Air Dispersion Modelling (**Appendix D2**)

- i) A baseline study; and
- ii) Calculation of ground-level concentrations of criteria pollutants.

c) Community Health Risk Assessment (**Appendix D3**)

The paradigm that is followed by the consultant essentially divides human health risk assessment into a number of logical steps, from the emissions leaving the stack and plant, their impact on ground level air quality and community health. The study distinguishes between cancer and non-cancer risks and assesses exposure as central tendency and reasonable maximum exposure scenarios.

d) Waste Disposal by Cement Kiln – A Comparative Assessment (**Appendix D4**)

This specialist study included a Life Cycle Assessment (LCA), which is an environmental management tool that evaluates the environmental impact of a product or activity across its entire life cycle.

e) HAZOP Investigations

The objective of the HAZOP studies is to anticipate the operational hazards from the use of secondary materials, and to ensure these hazards are thoroughly addressed as part of the planning for use of secondary materials.

f) Additional Information

PPC are conducting further studies, which are not required for the Environmental Impact Assessment Process. The findings of these studies will assist in the development of risk and impact management.

- i) Alternative transport routes for secondary materials;
- ii) On-site storage of secondary materials;
- iii) Disaster management;
- iv) Training of drivers, operators and workforce; and
- v) Monitoring and reporting.

1.5.3 General Terms of Reference

- a) The activities undertaken as part of the Environmental Assessment Process is dictated by the EIA regulations promulgated in terms of the Environmental Conservation Act (Act 73 of 1989).
- b) Reference is made to the DEAT IEM³ Information Series to ensure that activities undertaken as part of the EA Process conforms to the principles of Integrated Environmental Management.
- c) Suitably qualified specialists are appointed as part of the EA Process to provide specialist input regarding issues that falls out of the ambit of MES's specialist field.

1.5.4 The Environmental Consultant

Marsh Environmental Services (a division of Marsh Vikela (Pty) Ltd) is an environmental, health and safety service provider to South African government, business and industry, and is committed to enhancing profitability through pro-active risk management. MES utilises a wide network of specialist services allowing a comprehensive solution to any environmental problem to be offered. Marsh Environmental has a particularly strong focus on project management, technical solution

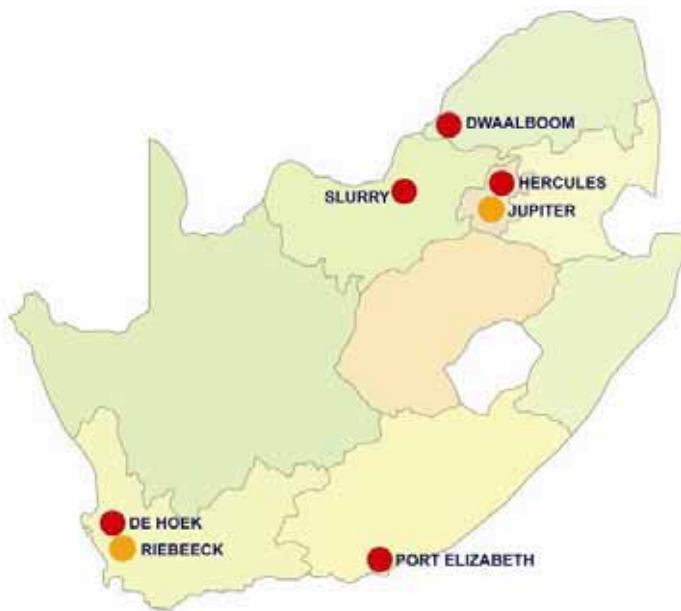
³ DEAT (2002), *Integrated Environmental Management Information Series*, Department of Environmental Affairs and Tourism, Pretoria

generation and review, and strategic environmental management. Marsh Vikela is an Empowerdex A-rated company.

1.6 THE PROPONENT

1.6.1 History of PPC

PPC was founded in 1892, with the first cement plant at Hercules in Pretoria. PPC has since expanded its cement operations to Slurry (near Mafikeng), Jupiter (Germiston), Port Elizabeth, Riebeeck, De Hoek (near Piketberg) and Dwaalboom (near Thabazimbi). The total cement market in South Africa is currently at 14 million tons per year, of which PPC has the largest share. Outside South Africa, PPC owns Portland Holdings in Zimbabwe, and a milling plant in Botswana.



PPC currently operates seven cement manufacturing facilities in 5 provinces in South Africa. Altogether 13 cement kilns are currently in operation at these sites. PPC is audited annually to ensure that there is ongoing compliance with the ISO 14001:2004, 9001-2000 and 18001 OSH Management Systems.

Table 1-3: PPC's Plants in South Africa⁴

Name of Plant	Closest Town/City	Municipality	Province
Hercules	Pretoria	Tshwane Metropolitan Municipality	Gauteng
Slurry	Mafikeng	Central District Municipality Mafikeng Local Municipality	North West
De Hoek	Piketberg	West Coast District Municipality Berg River Local Municipality	Western Cape
Dwaalboom	Thabazimbi	Waterberg District Municipality Thabazimbi Local Municipality	Limpopo
Port Elizabeth	Port Elizabeth	Nelson Mandela Metropolitan Municipality	Eastern Cape
Jupiter	Germiston	Ekurhuleni Metropolitan Municipality	Gauteng
Riebeeck	Riebeeck West	Swartland District Municipality	Western Cape

The following exclusions were made for the respective reasons:

- a) The Riebeeck EIA application was withdrawn in November 2006 due to the fact that the PPC board had approved the construction of a new cement kiln and associated infrastructure, which would be designed with the ability to handle Secondary Materials. A

⁴ Note: Separate EIA processes are being run for each of these plants and shall be submitted to the relevant provincial authority.

separate EIA approval process for this expansion commenced in August 2006 excluding Secondary Materials processing.

- b) Jupiter, in Germiston, which was the site of the original Secondary Materials research work (i.e. test and trials burns, as described in Section 9.9), was moth-balled for the period 1998 to 2006. At the time of the commencement of this national SM project (August 2005), the future of Jupiter was still being determined, and PPC's decision is to revisit this strategically-placed plant at a later date pending the outcome of the EIA process for the 5 plants listed in Table 1.5.

1.7 PROPONENT'S MOTIVATION AND OVERALL COMMITMENT FOR THE USE OF SECONDARY MATERIALS

PPC Cement is currently utilising coal as their main source of energy required for the manufacturing of cement. Cement manufacture is an energy-intensive process, and therefore large amounts of coal (a non-renewable resource) are utilised. PPC has been seeking means of minimising their use of coal by investigating the use of secondary materials in the cement manufacturing process, which is an internationally accepted practise.

Many wastes generated in South Africa contain significant energy, allowing them to be used as suitable substitutes for coal, thus recovering the energy value of the waste. PPC intends to substitute some coal and raw materials with secondary materials (if the wastes contain the appropriate minerals) at the five sites mentioned previously.

The actual amounts of secondary material used in each kiln will depend on various factors including:

- a) Safety, health and environmental impacts;
- b) Cement product quality;
- c) Energy values of waste fuels;
- d) Proximity of the plant to acceptable secondary material sources;
- e) Modification of certain kilns to accept secondary materials; and
- f) Economic considerations.

Since PPC began investigating the use of secondary materials by means of trials and surveys (in line with their ISO 14001 (environment), OSHAS 18001 (safety) and ISO 9001 (quality) management systems), they have developed the Secondary Materials Policy, as a guideline to minimise possible health, safety and environmental impacts which may arise from the use of secondary materials.

PPC Secondary Materials Policy

The seven principles used in the policy are aligned with international best practice for the cement industry and will assist in decreasing the environmental impact of wastes, promote the safe disposal of hazardous wastes, decrease CO₂ emissions; decrease waste handling costs, and reduce energy cost in the cement industry. It will contribute to achieving the targets set in Agenda 21 of the "Earth Summit" in Rio de Janeiro (1992), the Johannesburg Declaration on Sustainable Development (2002), the Kyoto Protocol, and the Millennium Development Goals.

Principle I: When using Secondary materials we strive to ensure occupational health & safety

- a) *We will provide appropriate data sheets, equipment, training, controls, procedures, health monitoring, facility design, emergency response planning, and other precautionary measures to ensure the health & safety of all our employees and the communities we are operating in.*
- b) *We will provide relevant safety information to our sub-contractors and visitors to our*

premises.

Principle II: When using Secondary Materials we strive to keep our environment safe

- a) *Our use of Secondary Materials should contribute to the preservation of natural resources, and to the reduction of the global environmental impact.*
- b) *We will not increase the overall impact of our emissions beyond that due to the use of traditional natural resources.*
- c) *We will control volatile heavy metals.*
- d) *We will control emissions within "Maximum allowable emission limits"*
- e) *We will ensure that our effluents do not degrade water quality.*
- f) *Storage and handling of Secondary Materials will be done in a manner to prevent spillage, leaching, fugitive dust, volatiles, odours, and noise.*

Principle III: When using Secondary Materials we will refuse the listed "banned wastes" as per the ACMP Waste Charter dated 5 November 2004

- a) *Anatomical Hospital Wastes; Asbestos-containing Wastes; Bio-hazardous Wastes; Electronic Scrap; Entire Batteries; Explosives; Mineral Acids; Radioactive Wastes; Unsorted Municipal Waste.*
- b) *PPC will refuse the aforementioned wastes as Secondary Materials for one or more of the following reasons: health & safety issues; to promote adherence to the waste management hierarchy; other treatment options or processes must be used.*

Principle IV: When using Secondary materials we will guarantee the quality of our products

- a) *We will ensure that our product quality remains within the SANS 50197 specifications.*

Principle V: When using Secondary Materials we will act as a partner offering waste management solutions to society

- a) *We will take the initiative, when appropriate, to cooperate with authorities to develop environmentally, economically and socially sound waste-management solutions.*
- b) *When using wastes that do not contribute either energy or material to the manufacturing process, their disposal in our cement kilns must be the best available South African solution.*

Principle VI: When using Secondary Materials we will comply with the relevant regulations and promote best practices

- a) *We will obtain all permits required by South African legislation and will comply with their conditions.*
- b) *We will promote best practices and EU standards even when local regulations do not exist.*
- c) *We will assess the health & safety and environmental risks prior to using Secondary Materials, even if the regulations or authorities do not request it.*

Principle VII: When using Secondary Materials we will communicate transparently

- a) *We will ensure transparent communication about all relevant aspects of Secondary Materials utilization.*
- b) *Our message will be consistent to all stakeholders and relevant to our relationships with them.*
- c) *We will consult with our stakeholders, from the beginning, when developing Secondary Materials initiatives.*

The principles of this policy are considered to be in line with international best practice for the cement industry and will:

- a) Assist in minimising the environmental impact of wastes;
- b) Promote the safe disposal of hazardous wastes;
- c) Decrease CO₂ emissions;
- d) Decrease waste handling costs, and
- e) Reduce energy costs in the cement industry.

The objective of the policy is to achieve the targets set in Agenda 21 of the “Earth Summit” in Rio de Janeiro (1992), the Johannesburg Declaration on Sustainable Development (2002), the Kyoto Protocol, and the Millennium Development Goals, as well South Africa’s National Waste Management Strategy (as published by DEAT and DWAF) and the Polokwane Declaration on Waste Management of 2001.