SECTION 1 INTRODUCTION

Marsh Environmental Services (MES) has been appointed by PPC Cement (PPC) to conduct the Environmental Impact Assessment for the proposed use of secondary materials to supplement the coal supply for the firing of the cement kilns.

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 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 and a description of the De Hoek Cement Manufacturing Plant operation 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 Program. The excluded waste streams, as published by the ACMP[6], are listed below:

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

[6] *ACMP: Secondary Materials or AFR Policy, 5 Nov 2005*

- 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.

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

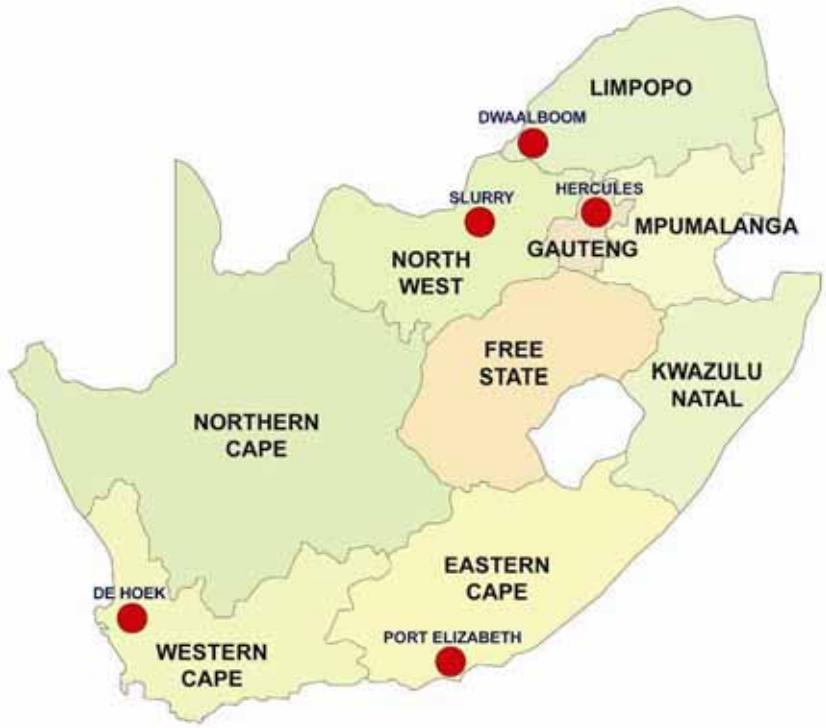

Figure 1-1: The positions of the PPC Manufacturing Plants where the use of secondary materials is proposed.

1.2 PPC DE HOEK

This application only refers to the PPC De Hoek Cement Manufacturing Plant which is located approximately 3km outside Piketberg on the N7 (as illustrated in Figure 1-2), on the West Coast of the Western Cape. Applications for the proposed activity for the other applicable PPC Plants have been submitted to the relevant provincial authorities.

1.3 PPC DE HOEK CEMENT MANUFACTURING PLANT

The De Hoek Cement Manufacturing Plant is located in the West Coast District Municipality and the Berg River Local Municipality. It was commissioned in 1921, and was previously owned by Cape Portland Cement (CPC). CPC, and subsequently De Hoek, was acquired by PPC in the 1950's. The limestone for De Hoek is mined at the adjacent Zoutkloof Quarry. Figure 1-1 indicates the De Hoek Plant as well as the Zoutkloof Quarry.

Figure 1-2: Aerial photograph of the PPC De Hoek and the Zoutkloof Quarry

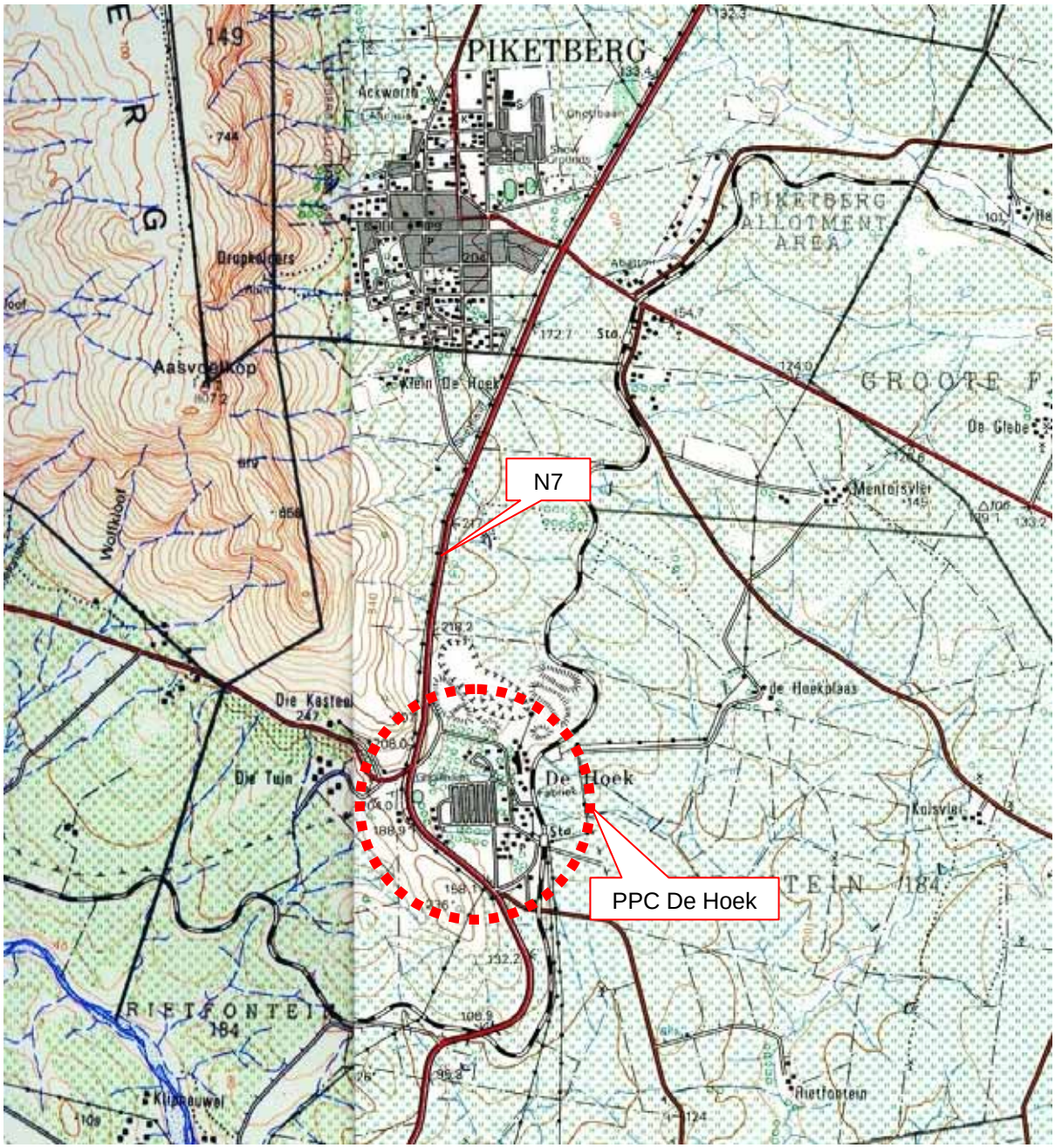

Figure 1-3: Topographical Map showing the PPC De Hoek factory

1.4 THE LEGAL FRAMEWORK

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 at which time PPC and MES conducted a project initiation meeting with the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) to discuss the requirements to be included in Plan of Study for Scoping (PoSS). The application and PoSS was submitted in November 2005. Response to the PoSS was received in February 2006. The provisions of the PoSS and the requirements included in the DEA&DP response the PoSS are recorded in the Sections 1.4.2 and 1.4.3 below.

1.4.1 Other Legislation Considered

The following national legislation was considered during the assessment process.

Environmental Rights
The Constitution of the Republic of South Africa Act, No. 108 of 1996
Section 24 states that: ▪ *Everyone has the right to an environment that is not harmful to their health or well-being* ▪ *Everyone has the right to have the environment protected for the benefit of present and future generations.*

Environmental Management Guiding Principles
National Environmental Management Act, No. 107 of 1998
Comments or findings pertaining to the principles are not included specifically though all sections in this report but have been applied with these principles in mind.

The National Environmental Management principles, listed at Section 2 of the National Environmental Management Act 107 of 1998 (NEMA), which provide for the social, environmental and economic sustainability of activities, apply "*to the actions of all organs of state that may significantly affect the environment*".

- *Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental and cultural and social interests equitably (Section 2(2)).*
- *Pollution and degradation of the environment must be avoided, or, where they cannot be altogether avoided, are minimised and remedied (Section 2(4)(ii).*
- *The use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource (Section 2(4)(v).*
- *A risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions (Section 2(4)(vii).*
- *The participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, and participation by vulnerable and disadvantaged persons must be ensured (Section 2(4)(f)).*
- *Decisions must take into account the interests, needs and values of all interested and affected parties, and this includes recognising all forms of knowledge, including traditional and ordinary knowledge (Section 2(4)(g)).*
- *The social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment (Section 2(4)(i)).*

The National Environmental Management Act (No. 107 of 1998) requires the use of the "best practicable environmental option" (BPEO) in environmental management; meaning "the option that provides the most benefit or causes the least damage to the environment as a whole, at a cost acceptable to society, in the long term as well as in the short term".

Duty of Care and Remediation of Environmental Damage

The duty of care principle is overtly regulated in sections 28 (1) and (3) of the National Environmental Management Act of 1998, and the National Water Act, Section 1:

(1) Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment.

(3) The measures required in terms of subsection (1) may include measures to-

- Investigate, assess and evaluate the impact on the environment;
- Inform and educate employees about the environmental risks of their work and the manner in which their tasks must be performed in order to avoid causing significant pollution or degradation of the environment;
- Cease, modify or control any act, activity or process causing the pollution or degradation;
- Contain or prevent the movement of pollutants or the cause of degradation;

- Eliminate any source of the pollution or degradation;
- Remedy the effects of the pollution or degradation, or
- Remedy the effects of any disturbance to the bed and banks of a watercourse.

Section 28 is applicable to all areas of pollution and environmental impact.

Access to Environmental Information
Promotion of Access to Information Act of 2000 Section 70 and NEMA Section 31
Anyone has the right to request information of an environmental nature from the Client and cannot be refused on grounds that are not compliant with the legal requirements.

Ambient Air Quality
National Environmental Management Air Quality Act, No 39 of 2004
It is proposed that emission standards in this document be formalized in terms of Section 21 of the NEMAQA, which provides for the listing of activities resulting in atmospheric emissions: Section 26 of NEMAQA provides for the Minister to declare certain substances as Controlled Fuels, when used as fuel in a combustion process and which may result in atmospheric emissions. Section 27 further provides for the prohibiting the manufacture, use or sale of certain Controlled Fuels, and the establishment of standards or specifications for, among others: • The use of the controlled fuel in combustion processes; • Manufacture or sale of the controlled fuel; and • Maximum or minimum levels or concentrations of the constituents of substances or mixtures of substances, for the composition of controlled fuels. AFR also includes various substances that would be used as raw materials, thereby substituting conventional mineral materials.

Proposed Air Emissions Standards for Hazardous Waste Treatment and AFR Co-Processing in Cement Kilns – Legislative Framework and Approach
Proposed National Policy High Temperature Thermal Waste Treatment and Cement Kiln Alternative Fuel Use
Some of the key recommendations for the National Policy Development Process for High Temperature Thermal Waste Treatment and Co-processing of AFRs in Cement Kilns, are: 1. Adoption of a Phased Approach to Emission Standard Setting: A stepped approach to emission standard setting is recommended: • *Consultation with industry, trade bodies and other affected parties;* • *Collation of sector guidance documents comprising information on best available technology, including associated emission standards and monitoring requirements international BAT documentation and industry-specific information, and* • *Draft emission standards in consultation with stakeholders for consideration by DEAT. The current proposed standards forms part of the larger consultative policy process, and hasbeen developed considering Best Available Technology (BAT) and Best Environmental*

Practice (BEP).

2. Selection of Industry Sector Sub-set for Initial Listing: Based on the conclusions reached in the Interim project, a list of industry types are proposed for inclusion in the initial list of activities requiring prioritised national emission standard setting. The cement industry and waste incineration are included in the list of activities identified.

3. Restriction of Emission Standard Setting to Priority Pollutants

   - *It is recommended that only those pollutants recognised to pose a potential health threat be selected for the setting of emission standards for each industry type selected (with the exception of incineration for which an extended number of substances should be regulated in line with current local and international experience). A complete, detailed list of emission standards are proposed in line with international approach, specifically the EU.*
   - *Adopt Best Available Technology (BAT) as the Basis for Emission Standards. In addition to this, the use of environmental impact assessments for informing emission standards for new and modified facilities is widely accepted. This provides a safety net in cases where minimum emission standards best on BAT are not sufficient to protect local environments.*

4. The emission limits proposed, based on the European Communities' Directive 2000/76/EC of 4 December 2000 ('EC Directive') on the incineration of waste, are considered to be stringent, and together with the provisions of the Guidelines for Treatment of Hazardous Wastes and Co-processing of AFRs in Cement Kilns (Karstensen, 2008), the South African regulatory framework for this activity would be the most stringent in the world.

5. Format for Expressing Emission Standards: The NEMAQA stipulates that emission standards "must include the permissible amount, volume, emission rate or concentration of that substance or mixture of substances that may be emitted and the manner in which measurements must be carried out". It is recommended that emission standards be expressed either as an emission concentration or a performance standard (i.e. amount of pollutant emitted per unit of activity) or, where appropriate, a combination of both with the actual concentration or level of performance taken from BAT. Total masses of emissions permissible can be included in the Atmospheric Emissions Licenses of Listed Activities. The proposed standards are given as concentration values for individual elements.

6. Emission Monitoring Specified on the Basis of Best Practice: The emission monitoring required depends on the nature of the source, the pollutant and the emission standard. Emission standards expressed as emission concentrations require direct stack monitoring. The sector-specific monitoring method and frequency should be taken from the best practice documentation (e.g. EU's Monitoring BREF).

7. Emission Standards should be varied to account the Age of Facilities: The setting of less stringent emission standards for older facilities is common in the regulatory processes in most countries. These emission standards are not static, and there are timeframes within which facilities are expected to meet firmer standards. Generally, this is to allow for improvements and major plant modifications and to take advantage of industry cycles.

8. Compliance Schedules should be Informed by Industry Cycles: The proposed standards provide for a transitional period to achieve compliance, based on international experience and the South African context (limited to emissions that are not expected to be significantly affected by AFR use or hazardous waste treatment).

9. Provision for Extensions to Compliance Timeframes on a Case-by-case Basis: It is recommended that provision be made for industries to apply for possible extensions to compliance timeframes. Any application for exemptions would be subject to the provisions of the National Air Quality Management Framework.

10. Considerations during Emission Standard Implementation: In the implementation of emission standards, best practice necessitates comprehensive compliance monitoring and enforcement functions and the regular review of such standards in line with BAT developments. Provision should be made for these functions to be implemented and maintained after the initial standard setting activity has been completed.

Proposed Air Emissions Standards and Requirements

Proposed National Policy High Temperature Thermal Waste Treatment and Cement Kiln Alternative Fuel Use

The development of the specific emission standards as proposed have considered, among others:

- *Relevant existing local and international standards and best practice;*
- *Current emission requirements imposed on cement kilns;*
- *Current emissions from cement kilns in South Africa;*
- *Proposed local emission standards for cement kilns, and*
- *Technical aspects related to hazardous waste treatment and AFR co-processing in cement kilns.*

Proposed Emissions Limits

Emissions	Proposed Air Emission Standard	
PM (Total Particulate Matter)	80 mg/Nm^3 *	For new plants, the limit is set at 20 mg/Nm^3
TOC	10 4 mg/Nm^3	
HCl	10 mg/Nm^3	
HF	1 mg/Nm^3	
SO_2	50 mg/Nm^3	
NOx	800 mg/Nm^3 *	For new plants, the limit is set at 500 mg/Nm^3
Hg	0.05 mg/Nm^3	
Cd + Tl	0.05 mg/Nm^3	
Sb, As, Pb, Cr, Co, Cu, Mn, Ni, V (Sum total)	0.5 mg/Nm^3	
PCDD/PCDF (ng/Nm^3 I-TEQ)	0.1 ng/Nm^3	

** Limits for existing plants until 2018, upon which time the new plant limits will apply*

Regulatory Measures

1. Interim regulatory measures until finalisation of NEMAQA S21 Listed Activities and Minimum Emission Standards Programme include the consideration of Policy provisions, and standard conditions developed as part thereof, for inclusion into Atmospheric Emission Licences as relevant.

2. Baseline monitoring of all emissions in the standard is required as part of EIA process.

3. Measurement equipment shall be installed and acceptable techniques used in order to accurately monitor the parameters, conditions and mass concentrations relevant to the co-processing of AFR or hazardous wastes.

4. All emission monitoring results to be reported as a Daily Average concentration expressed as mg/Nm3, or ng/Nm3 I-TEQ for PCDD/PCDF, and at 'normalised' conditions of 10% O2, 101.3 kPa, 273 K / 0 ºC, dry gas.

5. Exit gas temperatures to be maintained below 200 ºC.

6. Pollution control devices (exhaust gas cooling and bag filter or ESP) to be available 98% of the time each day (i.e. maximum downtime of 2% or 30 minutes per day). The cumulative annual downtime (total downtime over a one year period) may however not exceed 60 hours.

7. Continuous, on-line measurement of the following emissions and operating parameters:
   - *Particulate matter (total particulate);*
   - *O_2;*
   - *CO;*
   - *NOx;*
   - *SO_2;*
   - *HCl;*
   - *HF;*
   - *VOC/TOC;*
   - *Emission exhaust volume (e.g. Nm^3/hr) and flow rate (e.g. m/s);*
   - *Water vapour content of exhaust gas (humidity);*
   - *Exhaust gas temperature;*
   - *Kiln temperature;*
   - *Pressure; and*
   - *Availability of air pollution control equipment (exit gas cooling and ESP/bag filter).*

8. Appropriate installation and functioning of automated, continuous monitoring equipment for emissions to air, which are subject to quality control and to an annual surveillance tests. Independent calibration by means of parallel measurements with the reference methods at least every three years.

9. Periodic measurements of heavy metals and dioxin and furan emissions (quarterly or biannually depending on baseline measurement and continuous performance) by independent/external, accredited specialists during the first 12 months of AFR coprocessing and organic hazardous waste treatment, and bi-annually (annually) thereafter.

10. Average emission values for heavy metals to be measured over a minimum sample period of 30 minutes and maximum of 8 hours, and average values for dioxins and furans (expressed as I-TEQ) over a sample period of a minimum of 6 hours and maximum of 8 hours.

11. Periodic measurements of air emissions to be carried out representatively to provide accurate and scientifically correct emission data and results, and sampling and analysis must be carried out by independent, accredited laboratories.

12. To ensure valid monitoring results are obtained, no more than five half-hourly average values in any day, and no more than ten daily average values per year, may be discarded due to malfunction or maintenance of the continuous measurement system.

13. All measurement results to be recorded, processed and presented in an appropriate manner in order to enable verification of compliance with permitted operating conditions and air emission standards. Quarterly Emission Monitoring Reports must include, amongst other:
    - *Daily average results of all continuous, on-line emission monitoring parameters, reported on line graphs that include individual, daily average data points, and indicating the relevant air emission limit if applicable;*
    - *Results of all continuous, on-line operational monitoring parameters, reported on line graphs that correspond in scale with the emission monitoring results;*
    - *Results of periodic emission measurements of heavy metals, and dioxins and furans;*
    - *Confirmation of residence times and temperatures of specific wastes coprocessed as determined by the specific feed points, kiln dimensions and material and gas flow rates;*
    - *Discussion on availability or air pollution control equipment, together with reasons for and management of downtime;*
    - *All relevant results must be compared with baseline measurements taken prior to the co-processing of AFR or hazardous waste; and*
    - *Detailed evaluation and discussion of any non-compliance during the reporting period.*
14. Co-processing of High Level POPs Containing Waste (as defined by the Stockholm and Basel Conventions)to be preceded by an independently monitored Performance Verification Test to determine the Destruction Efficiency (DE) and Destruction and Removal Efficiency (DRE) of principal organic hazardous compounds (POHC).
15. A detailed, independent report documenting and interpreting the results of the Performance Verification Test must be compiled. As a minimum, a DE/DRE of 99.9999% would be required, as well as compliance with Air Emission Standards.
16. Development of an Air Quality Improvement Plan for achieving emission limits over time (if transitional arrangements apply).

Pollution of Water Resources
National Water Act, No. 36 of 1998: Section 19
Measures must be undertaken by the Developer/Proponent to: • Cease, modify or control any act or process causing pollution; • To contain or prevent the movement of pollutants, and • To remedy the effects of pollution.

Water Wastage
National Water Act of 1998, Section 22(2)(d)
Water wastage is prohibited under this section. The developer/proponent must therefore be able take account for all the water received and be able to demonstrate the optimal use of water.

Governing Principles for Waste Management
Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste, 2nd Edition (DWAF, 1998)

The following principles, many of which are considered internationally as being essential for the management of Hazardous Waste, are acknowledged in the Minimum Requirements and will also be acknowledged in future regulations.

'Duty of Care Principle' – whereby the **generator** of the waste is ultimately responsible for ensuring that the waste is handled, stored, transported and disposed of according to the legislation and in an environmentally sound and responsible manner.

'Polluter Pays Principle' – the person or organisation causing pollution is liable for any costs involved in remediation or rehabilitating its effects. The generator of the waste is thus liable unless able to prove that the transferral of management of the waste was a responsible action.

'Precautionary Principle' – All waste is assumed to be both highly hazardous and toxic until proven otherwise

Waste Collection and Storage

Section 20(1) of the Environmental Conservation Act, 1989 (Act No. 73 of 1989) states that no disposal site may be established or operated without a permit issued by the Department of Water Affairs.

"**Disposal site**" means a site used for the accumulation of waste with the purpose of disposing or treatment of such waste, and as such covers any permanent (> 90 days) on-site waste accumulation areas on Client's premises.

Common law principles form the basis of current neighbour law and the law of nuisance. It protects an individuals use and enjoyment of property, but limits the use of property so such use does not interfere with the rights of other people (i.e. Neighbours).

Delict, nuisance & neighbour law

Nuisance and neighbour law are both fall under the law of delict. Nuisance law means to cause a disturbance to another person. This means that the requirements for a successful delict as outlined below apply to neighbour law and the law of nuisance.
The common law rules of delict, nuisance and neighbours can be used to protect your client's environmental rights relating to:

- Noise Pollution;
- Air Pollution, and
- Water Pollution.

The law of delict - actions of other people that cause harm to your clients

The common law of delict allows an individual to claim compensation from someone who does something that causes harm.

Requirements for a successful delictual claim

For such a claim to succeed the person making the claim (the claimant) must prove:

- That the action of the other person was wrong;
- That the person doing the action was negligent, i.e. That the other person was at fault;
- That the claimant suffered a loss which can be given a monetary value;
- That the action of the negligent person caused the monetary loss, and.
- The requirements of wrongfulness and negligence are very important here.

Was the action wrong?

In deciding whether an action was wrong the law tries to determine which actions are seen as wrong by the community as a whole. The action must be wrong because it violates a legal duty to take care (e.g. NEMA, Section 28: 'Duty of Care') or because it results in an unjustified infringement of the legally protected rights of another person. Generally speaking it is wrong to cause harm to another person or their property through negligent conduct.

Was the action negligent?

A person's liability to pay a claim (their guilt) usually depends on whether or not the court finds that they were at fault - i.e. Whether they acted negligently or not. In order to test whether the person doing the action was negligent, the courts apply the test of the "reasonable man". In applying this test the court asks:

- Would the reasonable man, in the position of the person doing the action, have foreseen that the action would cause harm?
- Would the reasonable man have taken steps to avoid the harm?
- The court may find the action of a person caused the damage to the claimant and he or she will have to pay the claimant a sum of money equal to the amount of damage that the claimant suffered to compensate the claimant for his loss, if the court finds:
  - That the reasonable person would have foreseen that the action would cause harm;
  - That the reasonable person would then have taken steps to avoid the harm, and
  - That the person who actually did the action did not take steps to avoid the harm.

The law of nuisance

The law of nuisance is divided into three categories:

- Public nuisance - where someone's action causes an inconvenience to the general public;
- Private nuisance - where an action by one person interferes with another person in the ordinary use of his or her property, and
- Statutory nuisance - where a legislative authority declares an action or process to be a nuisance.

The law of private nuisance

The law of private nuisance recognises the right of an owner of land to enjoy their land in physical comfort, convenience and well-being without unreasonable interference from others. Due to the fact that we have to make some allowances for the actions of the people with whom we share our society, each landowner must be prepared to put up with some interference with their right to enjoy their land. It is therefore possible for this right to enjoy land to be interfered with by smoke, gas, fumes or noise generated by another person, as long as it is not unreasonably interfered with. If the interference is unreasonable then the landowner can take legal action to protect his right to enjoy his land under the law of private nuisance. In the case of private nuisance the person who is usually liable is the person who owns the land from which the nuisance originates. The following people may be liable:

- The owner or occupier of the land who actually causes the nuisance, and
- The person who did not cause the nuisance in the first place, but who has control of the land or has taken over control of the land.

The person who has taken over the land is only liable if that the nuisance is on-going, he or she became aware of the nuisance, and failed to take reasonable steps to stop or limit the nuisance.

The law of neighbours

It is a general rule of our law that a landowner may not use his or her property in a way that causes harm to another person. This means that a landowner's right to use the property is limited and that

there is an obligation on him or her not to act in a way that will infringe the rights of a neighbour.

The test of whether the landowner's use of his property fails to comply with this obligation is one of reasonableness and fairness. This principle of reasonableness is relevant to all forms of polluting activities.

1.4.2 Plan of Study for Scoping

The PoSS (attached as Appendix A-A1) outlines the proposed approach and contents of the study and is recorded in this section of the report; the PoSS was accepted (with conditions) by the DEA&DP in their letter dated 10 February 2006 (attached as Appendix A-A2).

The PoSS proposed the following approach to the study:

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 DEA&DP.

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 PoSS has been approved:

- Advertise on site and in the local newspaper; and
- Distribute notices and Background Information Documents (BID) to the identified Interested and Affected Parties (I&APs).
- 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.

iv) 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.

v) Prepare and distribute accurate minutes of all public and focus group meetings that are held.

vi) Keep a record of all correspondence and discussions with I&APs.

vii) Capture all issues and concerns raised throughout the Scoping process by I&APs and develop an Issues and Response register.

viii) Prepare a description of the entire public participation process for inclusion in the Scoping Report.

ix) Inform the registered I&APs of the Record of Decision.

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

The DEA&DP letter of approval of the PoSS listed further requirements; which are recorded below.

a) The main purpose of the scoping process is to identify all environmental issues that are of concern and will require further investigation as well as to establish the terms of reference for the Environmental Impact Assessment.

b) The findings of the specialist studies and assessment (e.g. significance of impacts, effectiveness of mitigation measures) must be recorded in the EIR and not the Scoping Report.

c) The Scoping Report and the Environmental Impact Report must be submitted as two separate documents and may not be submitted simultaneously.

d) The letter of approval draws specific attention to the guidelines for involving specialists in the EIA process.

1.4.4 Plan of Study for Environmental Impact Assessment

The Scoping Report (SR) was submitted to DEA&DP on 5 October 2007 which included the following terms of reference for conducting the Environmental Impact Assessment.

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 –

- *cumulative impacts;*
- *the nature of the impact;*
- *the extent and duration of the impact;*
- *the probability of the impact occurring;*
- *the degree to which the impact can be reversed;*
- *the degree to which the impact may cause irreplaceable loss of resource, and*
- *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 –

- *a summary of the key findings of the environmental impact assessment; and*
- *a comparative assessment of the positive and negative implications of the proposed activity and identified alternatives, and*
- *a draft environmental management plan.*

i) That the following specialist studies will be undertaken as part of the EIR:

- Environmental Technical Review

  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.

- Air Dispersion Modelling

  i. A baseline study, and

  ii. Calculation of ground-level concentrations of criteria pollutants.

- Community Health Risk Assessment

  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.

- Waste Disposal by Cement Kiln – A Comparative Assessment

  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.

- 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.

- 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.*

1.4.5 Approval of the Scoping Report and Plan of Study for Environmental Impact Assessment

As previsously stated, the SR and Plan of Study (PoS) were submitted on 5 October 2007 and approval of the PoS for Environmnetal Impact Assessment (EIA) was received on 20 November 2008. The SR and PoS was accepted with the following amendments:

- *The precautionary approach is called for and must be adopted in the EIA.*
- *The concerns raised by Interested and Affected Parties (I&APs) must be addressed in the EIA Phase.*
- *Any gaps in knowledge, uncertainties and assumptions must be clearly stated.*
- *The contents and measures of the National Policy for High Temperature Waste Incineration and AFR Co-Processing in Cement Production must be considered.*
- *The impact of introducing Secondary Materials on dust composition must be discussed.*
- *The frequency of Electrostatic Presipitator (ESP) trips must be reported.*
- *The use of bag houses instead of ESPs must be discussed as a technology alternative.*
- *The mitigation measures for the potential increase in volatile element must be discussed.*
- *A report on dust emissions and the impacts of the planned disposal thereof must be discussed in the EIA.*
- *Benzene and ammonia must be included in the emissions inventory and the EIR Report must include clear monitoring standards for heavy metals and dioxins and furans.*
- *The EIA Report must consider the efficiency of the scrubbing effect and methods for improving this effect.*
- *The EIA must specifically consider the combustion of organics and indicate the assumption, gaps in knowledge and uncertainties associated with such levels.*
- *The frequency of measurement of dioxin levels must be addressed.*
- *The likely impacts of secondary materials on the make-up of settled dust and the expected pollution impacts resulting from the transportation and storage of such materials must be assessed.*
- *The environmental impacts due to product leaching or direct water contamination through the usage of secondary materials must be investigated.*

- *An adequate baseline against which the potential health impacts of secondary materials on surrounding communities must be investigated, assessed and measured.*
- *A Waste Disposal Study to determine the feasibility of waste treatment and disposal alternatives must be conducted.*
- *Specialist consideration and verification must be given to alternative routes and modes of transport (road or rail).*
- *Alternative technologies and designs to reduce and prevent negative impacts must be investigated.*
- *The "no-go alternative", in addition the above, must be assessed.*
- *The proposed content of the EIA Report as depicted in the Scoping Report must be supplemented by including the following:*
  - *The public participation process followed during the EIA phase of the project, including a list of interested parties, their comments and the environmental consultant's responses to such comments.*
  - *Any media coverage given to the proposed activity.*
  - *Any other information included in the Plan of Study for EIA, and*
  - *Content requirements as prescribed by the DEA&DP.*
- *The following studies must be conducted as part of the EIA phase of the project and the findings of such studies must be incorporated into the EIA report:*
  - *Waste Disposal Study.*
  - *Alternative transport routes and modes of transport for secondary materials.*
  - *The on-site storage of secondary materials.*
  - *Disaster Management Plan.*
- *The terms of reference for each of the proposed specialist studies must be detailed in the EIA report.*
- *Interested and affected parties must be notified of the EIA phase and be afforded an opportunity to participate and provide comment on the EIA report and relevant specialist studies by:*
  - *Placing advertisements in the local newspapers, and*
  - *Giving written notice to potential and registered interested and affected parties.*
- *Comments on the EIA report and relevant specialist studies must be obtained from the following stakeholder:*
  - *Department of Health;*
  - *Department of Agriculture;*
  - *Department of Water Affair and Forestry;*
  - *Cape Nature;*
  - *Department of Environmental Affairs and Tourism;*
  - *Department of Labour;*
  - *The local authority, and*
  - *DEA&DP's Pollution and Waste Management division.*

The approval letter is attched to this document Appendix A-A2.

1.4.6 Process background and programme

In terms of the PoSS submitted to DEA&DP in November 2005, it was expected that the EIR Report would have been submitted by July 2006. However, various delays were incurred during the execution and the processing of the project. 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 program for this assessment.

e) The approval of the SR and PoS for EIA was issued 12 months after the submittal of the required documentation.

Correspondence to DEA&DP with regard to the extended timeframes is attached to this document Appendix A-A3.

1.5 ENVIRONMENTAL IMPACT ASSESSMENT REPORT

1.5.1 Methodology

The Environmnetal Impact Report (EIR) has been conducted in accordance with the guidelines as set out in the DEAT Integrated Environmnetal Management Series[3].

The function of the EIR is to help the responsible authority in making informed decisions, the public in understanding the likely impacts of the proposal, and the proponent in managing these impacts.

a) The EIR documents and communicates clearly and impartially.

- *The context of the proposed activity;*
- *The probable impacts and risks associated with the proposed activity and its alternatives;*
- *Measures to mitigate and manage negative impacts and enhance benefits associated with the proposed activity and its alternatives, and the residual significance of impacts if mitigation measures were to be implemented effectively;*
- *The concerns of the interested public, authorities and the communities affected by the proposal, and*

- *The level of confidence in predicting and evaluating impacts, any gaps in knowledge and areas of uncertainty which could substantially influence the findings.*

b) The EIR forms the basis for stakeholder review.

c) The EIR forms a sound basis for informed decision-making. The EIR enables the decision-maker to decide on an action in the best interests of society and the environment, and where appropriate, set relevant conditions of authorisation.

d) For any chosen alternative, the EIR provides a sound point of departure for the proponent in managing the impacts of the proposal in an environmentally and socially responsible way.

1.5.2 General Terms of Reference

a) The activities undertaken as part of the Scoping Report 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 IEM[7] Information Series to ensure that activities undertaken as part of the Process conforms to the principles of Integrated Environmental Management.

c) Suitably qualified specialists are appointed as part of the process to provide specialist input regarding issues that falls out of the ambit of MES's specialist field.

1.5.3 The Environmental Consultant

Marsh Environmental Services (a division of Marsh (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 generation and review, and strategic environmental management. Marsh was awarded level 4 certification from the BEE Registry. This is the equivalent of the Empowerdex "A" rating and earns all of our clients 100% of their contributions under the procurement element of their scorecard.

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

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

ensure that there is ongoing compliance with the ISO 14001:2004, 9001-2000 and 18001 OSH Management Systems.

Table 1-2: PPC's Plants in South Africa[8]

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 Secondary Materials Co-Processing Programme is proposed for 5 of the 7 PPC cement manufacturing plants. 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 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 10.9), 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.

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

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 CO_2 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 CO_2 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.

1.8 THE PRECAUTIONARY APPROACH

A conservative approach and gradual implementation to this project has been designed, based on international research but also the principles of the National Environmental Management Act of 1998 (NEMA). PPC shall embark on a gradual process of detailed baseline studies, trial burns, independent audits and reporting to government before commencing with full implementation of the use of the secondary materials applied for (subject to approvals from government). Detailed sampling and analysis of waste streams shall be performed prior to acceptance of waste streams by PPC, and environmental assessments shall be conducted for each new waste stream.