THE SOUTH AFRICAN COAL ASH ASSOCIATION (SACAA)

No 17, Winter 2007

ASH @ WORK

COMMUNIQUÉ OF THE SOUTH AFRICAN COAL ASH ASSOCIATION
from your Editors and President of the SACAA

Editorial

W is for **winter**, but in this issue it also stands for our council member **Wayne,** whom we congratulate on attaining his PhD. Well done Wayne ! ! Furthermore he caught some limelight during Tony Blair's recent visit to South Africa (see below).

With this winter edition of '**Ash at work**' it is the intention to increase the publication rate from three or four times a year to bi-monthly. In order to achieve this objective we would appreciate receiving any inputs from the local ash fraternity to make every issue as pertinent as possible to the industry and the SACAA.

The SACAA 2007 AGM

This year's AGM has been scheduled for Thursday, 23 August 2007, at 16:30 for 17:00. The venue is the same as we used for the Seminar in March i.e. the SAICE Auditorium, Midrand. Closer to the date, our administrator, Val Howard, will notify all members accordingly. Besides the usual official feedback of the AGM, we hope to receive feedback from the World of Coal Ash (WOCA) Conference 2007, held in May 2007 in the USA.

News Flashes

No usable ash from this technology
Samantha Enslin-Payne reports from Durban (Business Report, 19 June 2007) that Eskom will spend about R7 billion over the next five years at Majuba power station on underground coal gasification (UCG). The 3600 MW power station sits on a coalfield that is difficult to mine and thus coal is sourced from elsewhere in Mpumalanga. So far a R100 million pilot project established the characteristics of the coalfield. The particular UCG was developed by the Canadian firm Ergo Exergy Technologies, but UCG has been successfully employed at a power station in Uzbekistan since 1959.

At Majuba a small amount of electricity is produced utilizing the gas from the pilot study. "It will cost R366 million to increase output incrementally to 15MW. 250MW will cost R2,5 billion and a 350MW turbine will cost R4 billion." According to Steve Lennon, MD of Resources and Strategy at Eskom, "the final options were either a large-scale combined cycle gas turbine or to replace a third of Majuba's generating capacity from coal to gas fired or a combination of both."

Local News of Note

British Prime Minister, Tony Blair, visited the University of Pretoria on 1 June to discuss the impact of climate change on food security in Africa. [ref. : www.up.ac.za]

Mr Blair visited the Field Trial Section of the Department of Plant Production and Soil Science, at the University's Experimental Farm. He was introduced to specific research projects and discussed several important global issues with staff and post-graduate students and was shown several important research projects such as the investigation into the potential of alternative crops to produce fuel from renewable resources and the potential of sub-tropical trees and grasses to produce bio-energy on a renewable basis. He also met Wayne and was made aware of research being carried out on the use of fly ash in improving degraded soil. In the picture Wayne is standing next to Mr Blair. The other people in the photo are: Prof Johann Kirsten, Prof Anton Stroh, Prof Calie Pistorius (Rector and Vice Chancellor, UP), Prof Charlie Reinhardt and Prof Elsa du Toit.

Environmental News

Carbon Challenge (Mathabo le Roux reports in Business Day, 14 May 2007)
Growing fears about climate change and its impact on the global economy have spurred a flurry of activity to reduce the emission of greenhouse gases.

South Africa's CO_2 emission doubled from 1980 to 2004 and now exceeds that of Brazil (with a population 4x larger) and is only slightly below that of the UK.

SA companies are finding it increasingly difficult to penetrate world markets as international buyers become more environmentally aware.

The coal industry is likely to face the squeeze as Europe – its largest market – turns its back on South African coal which is deemed 'dirty' because it produces more N_2 (?) than coals from other countries.

SA exporters are already feeling the influence of environmental policy as retailers such as Marks & Spencer and Tesco have moved towards carbon labeling of commodities.

In light of this remember that for every ton of cement replaced by fly ash a ton of CO_2 emission is avoided.

Waste Plastic and Ash
At the University of Massachusetts Mr Charles Wilson has been conducting research into generating *synthetic lightweight aggregate* from 20% industrial waste (plastic electronic waste) and 80% fly ash: http://www.chelseacenter.org

Forthcoming events

EUCI New Business Opportunities in CCPs, Charlotte, NC, 16 – 17 July 2007
The two-day workshop will address CCP management strategies in the context of current market variables including increasing FGD construction, carbon allowance markets and mercury regulations.

Coal-Gen 2007 – One Hot Rock, Milwaukee, WI, 1 – 3 August 2007
Covers the latest topics affecting design, development, upgrading, operation and maintenance of coal-fired power plants as well as learning of the most critical issues affecting the coal-fired sector: http://cg07.events.pennet.com/fl

International Conference on Concrete Roads (ICCR 2007), 16 – 17 August 2007, Midrand
This conference will be held at the Bytes Technology Conference Centre, Midrand and is a joint venture by the C&CI and the International Society for Concrete Pavements (ISCP). The event has been endorsed by the South African National Roads Agency Ltd. Local experts will be joined by 12 of the world's top concrete road specialists. The latest version of C&CI's unique pavement design program, cncPave, will be launched at the conference.

Full details and registration form can be obtained from Loré de Bernier: lore@cnci.org.za

International Conference EuroCoalAsh 2008, 5 – 9 October 2008, The Westin Warsaw Hotel, Poland
This conference is organised by the Polish Coal Combustion Union together with representatives of European countries based on coal-fired power stations. Covering all aspects of coal fly ash, especially in the European Union. Details are available on: **www.eurocoalash.org**

YOUR SACAA COUNCIL 2006/7

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Japie Krüger (Vice President)
Dieter Heinichen (Treasurer)

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Eduardo Auger, PPC Cement
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The editorial team would like to know whether the information supplied in this newsletter is useful. We welcome your comments, suggestions, and especially contributions.

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No 18, Spring 2007

ASH @ WORK

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Editorial

In the previous issue, No. 17, Winter 2007 we intimated our intention to increase the publication rate from three or four times a year to bi-monthly. Well, we did not quite make it as the end of August passed so quickly, and in case you haven't noted we modernized the title to **ASH @ WORK**. The Association's Annual General Meeting concluded successfully and some feedback is given below. In this issue we look, amongst others, at some of the developments on the environmental front.

The SACAA 2007 AGM

As scheduled the AGM ran its course on Thursday, 23 August 2007, at the SAICE Auditorium, Midrand. The existing council was re-elected with Jean-Bosco Kazrukanyo a new council member. Jean-Bosco is the Research and Development Manager of cement producer AfriSam/Holcim. The income and expenditure budget for 2007/2008 was approved, as was an approximate 5.6% rise in the membership fees.

After the official business of the AGM, Richard Kruger gave an illustrated talk summarizing the World of Coal Ash (WOCA) Conference 2007, held in May 2007 in the USA (see below). This was followed by a social gathering with snacks and liquid refreshments courtesy of Lafarge.

WOCA 2007
There were over 500 attendees of which more than 80 came from international destinations. Papers were presented over three days in 4 parallel sessions, plus extensive poster sessions. WOCA post-conference details are available on:
www.worldofcoalash.org/proceedings.html

Local News of Note

More ash for this new venture?
The Cairo-based Orascom Construction Industries (OCI), employing more than 40 000 people in 20 countries, is investing R3,2 billion in a new, 2 million tpa cement plant in South Africa. The plant equipment order was signed on 29 August with Polysius and Siemens. The plant is to be constructed in the North West province and is expected to start production in 2010. It will be built and operated by Mafikeng Cement Company, a joint venture by OCI (67,5%), the Barolong-Boo Rapulana Traditional Council, the Barolong-Boora Tshidi Traditional Council, the Osman, Bazan and Lezak family trusts and Redsun Enterprises.
(sources: Roy Cocayne, *Business Report*, 30 Aug. 2007 and OCI advert in *Business Report*, 31 Aug. 2007). However, in *Business Day* of 7 July 2007, the Trade and Industry editor, Abdul Milazi, reports that the mining empowerment company Sephaku Holdings announced its first cement project worth R2,5billion in North West, with an annual capacity of 2bn tons. The major shareholders in the development and exploration

company are Bulelani Ncguka's Vuwa Investments and Saki Macozoma's and Moss Ngoasheng's Safika Resources. It was stated that the company had acquired the rights to a substantial limestone deposit.
It appears obvious that there will not be two new cement plants, but Sephaku Holdings will source the raw materials for the new OCI plant.

Environmental News

Carbon Challenge – Tomorrows Power Stations (Interview with Professor Dr.-Ing Karl Strauss, Dept. of Biochemistry and Chemical Engineering, University of Dortmund, Germany as published in the journal "Deutschland, 3/2007, dated 18 May 2007).

Petroleum is by far the most important energy source for the major world economies, but it is a declining resource. In many countries of the world low grade coal or lignite is available in abundant quantities; South Africa and Germany are two examples. However, coal-fired power stations produce very high carbon dioxide emissions. In Germany, several companies are currently working on cleaner power stations separating greenhouse gases during the electricity generation process. Professor Strauss discusses the possibilities of this new technology in the following interview:

Q. Professor Strauss, when will the first carbon-dioxide free coal-fired power station be connected to the grid?

Karl Strauss (KS): Very probably in seven years. RWE, the German energy company plans to begin operating the first large-scale reduced carbon dioxide coal-fired power plant in 2014, I consider this plan realistic because the necessary technology is already available.
An 80% carbon dioxide reduction should be possible. The problem is cost. Electricity generation in a plant with carbon dioxide separation costs twice as much as in a conventional plant. Electricity prices will obviously rise but environmental protection costs money.

Q. What will happen to the carbon dioxide separated and captured by these new types of power station?

K.S. It has to be stored. There are a number of different possibilities here. For example, it could be stored at the bottom of the ocean. After all, the carbon dioxide to be kept in a liquid state under high pressure, and appropriate pressures are found on the seabed. Under such conditions the substance resembles a solid snowball. However, we still don't know what effects the expected enormous amounts of carbon dioxide would have on this biosphere. That's why another possibility is being considered: storage in aquiferous geological strata at depths of roughly 600 to 700 metres. These two alternatives sound complicated, and in fact we currently have little practical experience with either of them. Nonetheless, they should be technically feasible. However, carbon dioxide-free power plants have another drawback: the process of carbon dioxide separation and capture reduces their efficiency by roughly 9%. Today, we can achieve efficiency ratings of 44%. In future, this value would be reduced to roughly 35% - a level first reached 20 years ago.
More coal would then be needed to generate the same amount of electricity.

Q. Where do German energy firms stand when it comes to the development of climate-friendly power stations?

K.S. They are at the forefront of such developments world-wide. The Scandinavian countries are also well-positioned. Although, there too, German companies are contributing their technology to the construction of future carbon-free power plants.

Q. We will therefore have to wait a number of years before the advent of clean power stations. Until then, conventional stations will emit millions of tones of carbon dioxide. How can we reduce these emissions?

K.S. Improving their efficiency would be the most effective measure. Pilot power plants already exist in Germany that aim to achieve efficiency ratings of 50% using high-temperature processes.

Q. How long will economies continue to be dependent on power from coal?

K.S. An end of coal is not foreseeable at the present. It will certainly remain one of the most important energy sources for a long time to come. It is therefore all the more important that energy companies put a lot of effort into developing cleaner technology.

Q. When will we see entirely new types of power stations that are no longer dependent on fossil fuels like coal or lignite?

K.S. Even several decades from now, the energy mix will still be structured very much as it is today. However, the proportion of renewable energies will definitely increase further. Nuclear fusion would be something completely new. Fusion plants would emulate the energy production of the sun and draw energy from the fusion of atomic nuclei. The ITER global research project aims to provide new knowledge in this area. Nevertheless, I only envisage commercial installations in three or four decades at the earliest.

Professor Strauss is the author of "Kraftwerkstechnik" (Power Plant Technology)

A groundbreaking pilot project will be launched next year by Vattenfall, the energy company. They will begin building the world's trial installation for a carbon-free lignite-fired power plant in the Lausitz region of Saxony. The centrepiece of the installation is the carbon dioxide processing plant in which the gas is captured after which it is stored in liquid form in rock strata 600-700 metres below the surface.

Snippets

The ACAA Educational Foundation is in the process of preparing a new version of the publication: *Soil Stabilization and Pavement Recycling with Self Cementing Coal Fly Ash.* Publication is expected later this year.

Eskom has successfully achieved the first stage of their investigation into the underground combustion of coal. The gas from the mine close to Majuba power station was recently flared. Successful implementation of this technology would eliminate the cost of mining coal, and all the ash would remain underground – do we call this "automatic backfill"?

Forthcoming events

Breakfast Talk "Global Warming" by Clem Sunter, The Westcliff Hotel, Johannesburg, 20 September 2007. The talk will also be given at other venues in the Western and Eastern Cape and in KwaZulu Natal. Details are available from EnviroServ's website: www.enviroserv.co.za

Agricultural and Industrial Uses of FGD Gypsum, Perimeter Hotel,Atlanta, Georgia 23-24 Oct. 2007 (www.FGDProducts.org)

International Conference EuroCoalAsh 2008, 5–9 October 2008, The Westin Warsaw Hotel, Poland
This conference is organised by the Polish Coal Combustion Union together with representatives of European countries based on coal-fired power stations. Covering all aspects of coal fly ash, especially in the European Union. Details are available on: www.eurocoalash.org

WOCA 2009, Lexington, Kentucky, 4-7 May 2009.

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No 19, Yearend 2007

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Editorial

Hard to believe, but the year 2007 is just about gone! Some newsworthy items have reached us since publication of the previous issue and we are keen to share these with our members before the year is completely gone. All that remains is to wish you all a most enjoyable festive season and for 2008 health and prosperity!

Some technical discussion on acid resistance of concrete

In the Concrete Technology section of the August 2007 issue of the journal *Concrete Plant International (Cpi)* [www.cpi-worlwide.com] under the heading "**Development of high-performance concrete with increased resistance to acids"** authors Lasse Petersen [petersen@ipi-ing.de] and Ludger Lohaus [lohaus@baustoff.uni-hannover.de] describe their experimental experiences. The need for their investigation arose from an air pollution abatement procedure adopted by some thermal power plants where the cooling towers were not only used to cool water, but also to scrub the exhaust gases. This procedure resulted in acid attack of the concrete of the cooling tower shells. The subtitles of their paper are:

- **Basic principles of the resistance of concrete to acid**
- **Design of a test set up for parameter studies of acid resistance**
- **New knowledge with regard to the combination of blast furnace cement and fly ash**
- **Summary**

The latter concludes as follows:
"As an example this report presented examinations of the acid resistance of the well-known bonding agent combination of Portland cement, fly ash and micro silica in comparison with bonding agent combinations of blast furnace cement with fly ash and fine fly ash. The results of these examinations show that the use of blast furnace cement in combination with fly ash and fine fly ash can by all means lead to comparable or even higher resistance to acids."

SACAA's vice-president, Dr Japie Krüger, sourced the above paper for us and we subsequently elicited the following comments from him:
"The authors do not produce anything new that is not known about the acid resistance of cement-bonded products such as

concrete, but the article is a good review of it.

The rotating exposure jig they use is similar to one, which **Everite** used to **study** the durability of fibre-cement sheets.

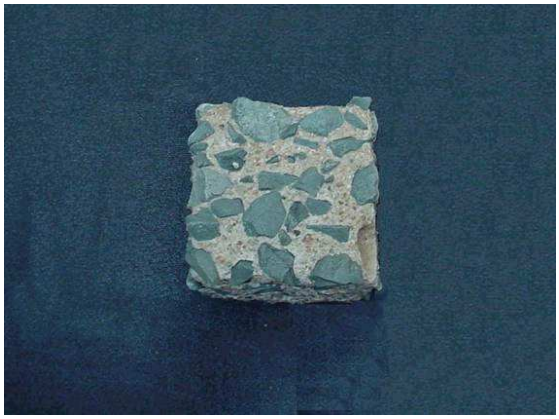
A misconception is that a dense concrete is resistant to acid attack because acid cannot easily penetrate it. Within limits acid does not penetrate concrete like salts, because it gets neutralised by alkaline material (cement or calcareous aggregate) in the concrete as it tries to penetrate. It, therefore, attacks concrete along a moving front lying between the attacked and unattacked concrete. A dense concrete helps, however, in that more alkaline material is introduced per volume compared with a porous concrete.

I am surprised that the authors make no mention of the use of calcareous aggregate to increase the acid resistance of concrete.

The authors report some improvement in acid resistance of concrete by using fly ash, but the results they show indicate that the improvement is marginal. This finding is in agreement with the results obtained at the CSIR on cement-bonded products containing fly ash and which were cured at ambient conditions, namely that no improved resistance to attack by soft water is obtained by replacing part of the cement with fly ash (see p 146 of SACAA CD *South African Fly Ash: A Cement Extender*). In fact the resistance of fly-ash concrete to soft water attack was somewhat worse than that of OPC concrete. This is attributed to the fact that a large proportion of the fly ash remains insoluble in acid for a long time because of the low rate at which the pozzolanic reaction takes place and consequently cannot neutralise acid.

A similar result was obtained with fly-ash concrete exposed to dilute sulphuric acid. However, a substantial improvement in acid resistance of cement-bonded products containing fly ash is obtained if these were autoclaved at steam pressures around 1 MPa and temperature of 184 °C. This is due to the formation of acid-resistant hydrogarnet in the binder (p 146 of CD).

Below is a photograph of a 100 mm concrete cube made with acid-insoluble aggregate and which had been exposed in a 1% (v/v) sulphuric acid solution for 6 months and brushed with a stiff nylon brush at two-weekly intervals. Many people may not know what concrete attacked by acid looks like."



International News of Note

In the previous issue of **ASH@WORK** we asked "**More ash for this new venture?"** when we reported on the Cairo-based Orascom Construction Industries (OCI), investing R3,2 billion in a new, 2 million tpa cement plant in South Africa. In *Business Report*, 11 Dec. 2007 Sudip Kar-Gupta and Aziz El-Kaissouni of Paris and Cairo report: **Lafarge buy Orascom Cement in €8.8bn deal"** The report further states: "Lafarge stock surged 11% to €119,47, its highest level since early October, giving it a market value of €21 billion just above Swiss rival Holcim."

The question now arises whether the proposed new local plant will go ahead as a Lafarge venture or will it be abandoned?

Massive concrete cast

The Salt River Materials Group of Arizona, USA, reports in its February 2007 flyer *Refining Concrete Quality*, that as part of the $415 million upgrade of Golden Eagle Refinery in Martinez, California, a massive concrete cast was required. The contractor, Rinker Materials, produced and delivered 6500 cubic yards (790 truck loads) in a 23-hour period of continuous concrete production. They used 3 production facilities.

Reader Feedback

SACAA's former treasurer, Ray Kelly, who emigrated to New Zealand responded to the previous issue of **ASH@WORK** to our administrator, Val Howard by e-mail as follows;

"……..Many thanks for the newsletter. The interview with Prof K. Strauss was very interesting as I've been involved with energy issues here. I agree that coal will be used for power generation for a long time yet. The following comments support his stance.

I assisted the Centre for Advanced Engineering NZ in studying electricity generation coupled with synthesis of ammonia and fuels via Integrated Gasification and Combined Cycle (IGCC) technology using Southland Lignites. Carbon capture and sequestration options were included in the study. Solid Energy has now taken the project further to the pre-feasibility stage. It is a multi million $ project which could produce liquid fuels (up to 40 000 barrels/day of high quality diesel), urea and electricity. A low-carbon slag would be a by-product.

Also I am looking at smallscale pyrolysis of waste and biomass to recover energy and reduce landfill. This would produce a carbon-rich char that might be useful as a fertiliser for certain types of soil. "

Forthcoming events

ICCX, Sun City, 19 – 21 February 2008

The International Concrete Conference and Exhibition will include 20 presentations by local and overseas experts. *Details are available from Dr. Hans Beushausen of UCT [ICCRRR@eng.uct.ac.za]*

3rd Biannual Coal Ash Professionals Training Course, San Antonio, Texas, USA, 11 – 13 March 2008

The University of North Dakota, in conjunction with the Energy and Environmental Research Institute will be running this course. Main topics are:

- how CCBs are viewed from a coal company, electric generating company, marketer, and regulatory perspective
- implications of environmental initiatives and emerging specifications on coal ash
- updates on the industry's latest hot topics including IGCC by-products and FGD materials
- tricks of the trade from those who successfully utilise coal ash
- options for recovery disposed coal ash and disposal site development

For further details contact Richard Kruger: richonne@mweb.co.za

Excellence in Concrete Construction - through Innovation, Kingston University, London, 9 – 10 September 2008
Full details at http://cmrg2008.kingston.ac.uk

International Conference EuroCoalAsh 2008, Warsaw, Poland, 6 – 9 October 2008
This conference is organised by the Polish Coal Combustion Union in conjunction with the European Coal Combustion By-products Association (ECOBA). The conference covers all aspects of coal fly ash, especially in the European Union. *Details are available on:* ***www.eurocoalash.org***

ICCRRR 2008, Cape Town, 24 – 28 November 2008
Website: www.civil.uct.ac.za/iccrrr

World of Coal Ash (WOCA) 2009, Lexington, Kentucky, USA, 4 - 7 May 2009
Watch this space in the New Year for further information

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	Wayne Truter, UP

The SACAA Council wishes you all everything of the best for the festive season and the coming year.

The editorial team would like to know whether the information supplied in this newsletter is useful. We welcome your comments, suggestions, and especially contributions.

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Obituary

Our dear Val, SACAA's efficient administrator for many years, passed away in December last year, after a long illness, bravely borne. Thanks to her efforts the Association's administration was always up to date and on many occasions she, together with her partner Peter, treated members to some excellent fare after their meetings and at the social events. She made a point to personally get to know most members and her caring attitude was a strong factor in the fine fellowship within SACAA.
Rest in peace Val - we thank you and will surely miss you!

Editorial

Due to this sad loss there was a hive of activity at the start of the New Year in order to maintain continuity in SACAA's affairs. Feedbacks from the most recent Council meeting are given below. The big news is that Council has representatives from ESKOM & the C&CI: **"Welcome Tyrone Singleton and Santie Gouws!"** The Council likewise welcomes Claudene Moorgas as alternate to Jean-Bosco Kazirukanyo of Afrisam/Holcim. Members are also advised that already for some time Walter Wirth of PPC is the alternate to Eduardo Auger. On the environmental/health side we have a look at chromium VI in this issue of **Ash@Work**. Finally, there is the invitation to a non-ash outing.

Council Meeting

At the 84th Council meeting, held on 22 January 2008, the functionality of the association was modified and the following actions were approved:

- The Honorary Treasurer, Dieter Heinichen, has stepped in as Acting Administrator/ Secretary assisted by Yvonne Kruger. This combination proved itself with the 2006 conference and more recently with the compilation and distribution of our newsletter, **Ash@Work**.
- With the shift of the administration to Pretoria, the Cresta postal address will only run until the end of 2008, while a new postbox has been applied for at Moreleta Village (a brand new Post Office with boxes still under construction).
- The association's bank account will be moved from Cresta to Woodlands. The account number will remain the same.
- Council member, Wayne Truter, has accepted the task of organising and running the one-day seminar on ash applications in agriculture and in the rehabilitation of mine dumps. This will be staged at the University of Pretoria, in March 2008 (more details below under Forthcoming Events).
- SACAA's website is to get urgent attention.

International News of Note

The Worldwide Coal Combustion Products Network (WWCCPN) is in the process of establishing a website to which the websites of all member organisations will be linked. A draft of this website has been generated by the AACA and comments have been requested from SACAA. This is another reason for the necessity to speedily update SACAA's website.

Environmental and Health

Chromium (VI) Directive

(Source BCA and Chromium VI Handbook, by James A. Jacobs and Jacques Guertin, published by Elsevier)

The EU Chromium (VI) Directive was implemented in the UK in January 2005 via amendments to the COSHH Regulations. It reduces the risk of chromium-related allergic dermatitis by restricting the chromium (VI) content of cement, and products containing cement. When hydrated the product must not contain more than 0,0002% (2 ppm) of soluble chromium VI of the total dry weight of the cement. This restriction is not applicable when there is no chance of skin contact, such as in enclosed automated systems.

Chromium occurs naturally in some of the raw materials used in the manufacture of cement:

Material	***Total Cr mg/kg***
Coal	15
Coal ash	152
Bituminous	172
Sub-bituminous	50
Lignite	43

(*Source: Adriano et al, 1980 in Table 4.1.9 in Chromium VI Handbook*)

South African fly ash contains 100-200 mg/kg of Cr. Manufacturers control soluble chromium VI levels by the addition of reducing agents, such as ferrous- or stannous sulphate. The lifespan of these reducing agents is limited and manufacturers are obliged to indicate the date of manufacture, storage conditions and expected shelf-life.

Maybe there are some knowledgeable readers who can enlighten us on the current legislative position in the RSA?

Potential non-ash event

Our Vice President, Japie Krüger, suggested that we join the Tree Society's outing to the University of Johannesburg on Saturday, 26 July 2008 to a presentation by Dr Michelle van der Bank, Department of Botany and Plant Biotechnology, on the topic "Plant DNA". Together with Dr Vincent Savolainen [Royal Botanic Gardens/Imperial College London], she is leading a team of five University of Johannesburg senior researchers in an ambitious project that aims at using DNA sequencing and barcoding techniques in the study of local plants. Of specific interest is the entire flora of the Kruger National Park. The diagnostic technique uses the DNA sequence of a single gene for species identification. *(More information is available in the UJ once-off newspaper "The DNA Barcoding Herald", Jan. – Dec 2008).*

Please advise Dieter (contact details at end of this newsletter) who and how many persons would like to attend so that appropriate arrangements can be made.

Forthcoming events

ICCX, Sun City, 19 – 21 February 2008

The International Concrete Conference and Exhibition will include 20 presentations by local and overseas experts. *Details are available from Dr Hans Beushausen of UCT [ICCRRR@eng.uct.ac.za].*

Workshop on Ash, University of Pretoria, March 2008

A workshop entitled "Can Fly Ash make a Contribution to Solving Agricultural and Environmental Challenges in South Africa" is to be held at the University of Pretoria during March 2008.
The current plan is to schedule this as a one-day event. During the morning all the researchers involved in the challenge will "workshop" the topic.
The afternoon will see a mini-symposium being held under the auspices of the SACAA.
Dr Wayne Truter, Prof Norman Rethman, Ms Juanita Rossouw, and an environmental lawyer Mr Morne Viljoen, are among the invited speakers.
Date and programme will be available as soon as all arrangements have been confirmed.
For further information and sponsorship opportunities please contact: Wayne Truter [wayne.truter@up.ac.za] or 083 470 3964.

3rd Biannual Coal Ash Professionals Training Course, San Antonio, Texas, USA, 11 – 13 March 2008

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IN THE NEXT ISSUE

Biofuels and Human Feeding. A discussion of the outlook for growing energy and food crops. Is there sufficient land?

YOUR SACAA COUNCIL 2007/8

Office Bearers:		**Council members [& alternates]:**
		Jean-Bosco Kazirukanyo, Afrisam
		[Claudene Moorgas, Afrisam]
Richard Kruger (President)		Matthew Reynolds, Ash Resources
Japie Krüger (Vice President)		[Graeme Smith, Ash Resources]
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and Acting Administrator)		Tyrone Singleton, Eskom
		Stanley Moeketsi, Lafarge SA
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		Eduardo Auger, PPC Cement
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		Wayne Truter, UP

The editorial team would welcome any information for publication in forthcoming **Ash@Work** newsletters.

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THE SOUTH AFRICAN COAL ASH ASSOCIATION (SACAA)

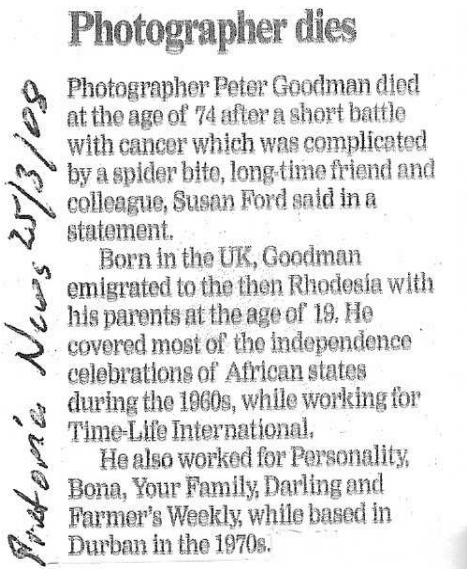
No 21, May 2008

ASH @ WORK

COMMUNIQUÉ OF THE SOUTH AFRICAN COAL ASH ASSOCIATION
from your Editors and President of the SACAA

Editorial

In our previous issue we had an obituary for Val Howard, SACAA's administrator for many years. We now learned (SAPA report) that her partner, Peter Goodman, who regularly supported Val at our social events also passed away. To Val's and Peter's families and friends our sincere condolences.



Photographer dies

Photographer Peter Goodman died at the age of 74 after a short battle with cancer which was complicated by a spider bite, long-time friend and colleague, Susan Ford said in a statement.

Born in the UK, Goodman emigrated to the then Rhodesia with his parents at the age of 19. He covered most of the independence celebrations of African states during the 1960s, while working for Time-Life International.

He also worked for Personality, Bona, Your Family, Darling and Farmer's Weekly, while based in Durban in the 1970s.

Pretoria News 25/3/08

The highlight in SACAA's activities during the last quarter was the successful workshop/seminar held at the University of Pretoria at the end of March. For details please see the university's press release elsewhere in this issue.

In the previous issue of ASH @ WORK we had stated that we would look at **Biofuels and Human Feeding - Is there sufficient land?** We note that the topic currently receives wide coverage in the general press. Therefore we scrapped the topic but like to make you aware of the following statement in *Engineering News* of 18 April 2008:

"Bad policy, not biofuel, drive food prices - Merkel Bad agricultural policies and changing eating habits in developing nations are primarily to blame for rising food prices, not biofuel production as some critics claim, German Chancellor Angela Merkel said on Thursday. Environmentalists and humanitarian groups have stepped up campaigning against biofuels, arguing they divert production away from food and animal feed while contributing to sharp rises in the price of cereals and milk products. "

Council Meeting

The 85th Council meeting was held at ESKOM Megawatt Park, on 8 May 2008. The main issues arising from the meeting are:

- SACAA's new postal address is: PO Box 50172, Moreleta Village, 0097. It has been tested and is functioning! The Cresta postal address will cease at the end of 2008.

- SACAA's website, www.coalash.co.za has been rejuvenated with financial support from Ash Resources (Pty) Ltd, who also agreed to sponsor its running for a year. We are grateful for the splendid support and this is the reason why their logo features on each web page. SACAA members can log in, with the help of a PIN (see e-mail accompanying the distribution of this issue) to look at the last four issues of ASH @ WORK and to find links to ash-related global websites.

- After a 4 year wait SACAA has finally been granted tax and duties exemption status by SARS.

- SACAA's constitution has been "modernised" and will be submitted for approval by members at the forthcoming AGM, which has been scheduled for Friday, 29 August 2008.

- ECOBA. The SACAA has submitted an application for membership of ECOBA (The European Coal Combustion By-Products Association). Membership will allow access to ECOBA's considerable database of knowledge and experience (more details in the next issue of Ash@Work).

Media Release (26 March 2008):

UNIVERSITY OF PRETORIA HOSTS SOUTH AFRICAN COAL ASH ASSOCIATION (SACAA) WORKSHOP as part of its centenary celebration.

The South African Coal Ash Association (SACAA) held a workshop at the University of Pretoria's Conference Centre on 26 March 2008. Local and international organisations, academic institutions and students attended the workshop entitled:

"Can fly ash make a contribution to solve environmental and agricultural challenges in South Africa?"

Dr Wayne Truter (University of Pretoria), Graeme Smith (Managing Director of Ash Resources) and Prof Richard Kruger (SACAA President).

The President of SACAA, Prof Richard Kruger along with Prof Charlie Reinhardt from the Department of Plant Production and Soil Science, University of Pretoria, welcomed workshop dignitaries. "The resolution of South Africa's current energy crisis will require additional capacity". Despite the noble intentions of proponents of renewable energy sources and nuclear power, the immediate energy demand will, as Eskom has already indicated, largely be met by Fossil Fuel," declares Prof Kruger, President of the SACAA.

Founded in 1987 the SACAA has since played a pivitol role in establishing an ash industry in South Africa by providing the platform for the exchange of scientific and technical information.

According to Prof Kruger, there are many environmental pro's of using fly ash, one being that 1 ton of CO_2 is saved for every ton of ash used to replace cement in concrete.

"I believe we can turn coal ash into an asset. Coal has botanical origins. We have mined it, extracted the energy and have been left with the mineral matter. Let us return this to the soil from where it came. Fortunately we have young and eager researchers to explore the opportunities and come up with solutions," continues Prof Kruger.

The workshop's main organiser, Dr Wayne Truter from the Department of Plant Production and Soil Science, University of Pretoria presented an interactive talk on the "Progress in the utilisation of coal ash in agriculture and the mining environment."

According to Dr Truter South Africa has become one of the leading countries in terms of research in using coal ash in agriculture and the environment.

Dr Truter's research team has been involved in coal ash research for the past 13 years, and has made a number of significant breakthroughs in understanding the dynamics of coal ash when used to counteract other environmental issues, such as the reclamation of acidic and infertile soils. "Coal ash has many beneficial properties that can be used to reclaim these degraded soil environments and ultimately ensure sustainable plant growth" says Dr Truter. The growing science of coal ash in agriculture and the environment has just started, and Dr Truter believes we still have much to learn.

Only with the collaboration of other research teams, such as the University of Western Cape (UWC), University of Stellenbosch and University of KwaZulu Natal that also attended and presented at the workshop, will we be able to get a better understanding of the role which coal ash can play in agriculture and the environment.

According to Dr Truter, the objective of the workshop had definitely been achieved which was to highlight the research progress made in this field, and identify the new challenges and opportunities that exist.

WORKSHOP SPEAKERS: Mr Ikenna Mbakwe (University of Stellenbosch), Mr Ojo Fatoba (University of Western Cape) and Dr Wayne Truter (University of Pretoria).

In this regard the UWC have, under the leadership of Ms Leslie Petrik developed techniques to produce zeolites by neutralising acid mine drainage with fly ash. The properties of these zeolites make them commercially exploitable.

For more information on the workshop, contact Dr Wayne Truter **(012) 420 3226 / wayne.truter@up.ac.za**.

(Photographs kindly supplied by Phindiwe Nkosi)

Fly ash in concrete

(submitted by Japie Krüger)

Fly ash in concrete remains topical as evidenced by articles published in **Concrete Plant International**.

(b) In an article titled **Ultra High Performance Concrete with Ultra Fine Particles other than Silica Fume** in the December 2007 issue, Rougeau (CERIB) and Borys (COFRAC), France, compare the performance of metakaolin, phonolith, milled fly ash, limestone microfiller and siliceous microfiller with that of silica fume and show that these ultra fines could be used instead of silica fume for making Very High Performance and Ultra High Performance Concretes.

(c) In the February 2008 issue, Nielson, et al discuss Danish experiences with self-compacting concrete (SCC) in which fly ash, along with silica fume, features as a valuable supplementary cementitious material.

(d) An article in the April 2008 issue Perry, C & CI, RSA discusses new developments in concrete and makes the interesting observation that concrete is the most widely used construction material in the world. It is estimated that it is second only to water as the world's most utilised material (in 2006 the estimated consumption of concrete worldwide was about 11 billion tonnes). In dealing briefly with supplementary cementitious materials used in the RSA, he refers to the current revision of the SANS 50197 series of specifications for these materials to include materials other than the traditionally used ground granulated blast-furnace slag, fly ash and silica fume.

The Mercury issue

(submitted by Richard Kruger)

Human assimilation of mercury is of great concern since many of the detrimental health effects are permanent and non-reversible. Of special concern is the consumption of fish containing methylmercury. Mercury finds its way into aquatic life via the airborne release of water soluble species of mercury.

In response to the mercury issue all USA power utilities are required to develop and submit plans to the EPA to reduce their level of Hg emissions by 70% by the year 2010.

In a startling finding, Drs Laura Raymond and Nick Ralston have shed light on some of the contradictory findings reported in the literature where people were exposed to elevated levels of mercury without any adverse effect.

They found the effect of mercury exposure is related to selenium-dependant physiology and suggested that Se can provide protection within the brain by "blocking" sites where mercury can be absorbed.

This highlights the need for revising the risk assessment to incorporate Se and Hg measurements rather than focussing on the latter alone.

Paste backfill at Lisheen Mine

(submitted by Japie Krüger)

Anglo American TechnoNews, December 2007, discusses the development work to produce a low binder-content paste backfill with the mine tailings to maximise the abstraction of the zinc/lead ore body at the Lisheen Mine, Ireland. The work indicated that a fly ash extended Portland cement binder content of 6% to 8% was required to produce the backfill paste with the required strength and slump (flow properties).

Potential non-ash event

Our Vice President, Dr Japie Krüger, suggested that we join the Tree Society's outing to the University of Johannesburg on Saturday, 26 July 2008 to a presentation by Dr Michelle van der Bank, Department of Botany and Plant Biotechnology, on the topic "Plant DNA". Together with Dr Vincent Savolainen (Royal Botanic Gardens/Imperial College London), she is leading a team of five University of Johannesburg senior researchers in an ambitious project that aims at using DNA sequencing and barcoding techniques in the study of local plants.

Of specific interest is the entire flora of the Kruger National Park. The diagnostic technique uses the DNA sequence of a single gene for species identification. *(More information is available in the University of Johannesburg's once-off newspaper "The DNA Barcoding Herald", Jan. – Dec 2008).*

Please advise Dieter Heinichen should you want to attend.

Creamer Media's Mining Weekly at www.miningweekly.com

MINING&THE ENVIRONMENT

Environment

Coal ash cleaning up

Fatima Gabru | *Features Reporter*

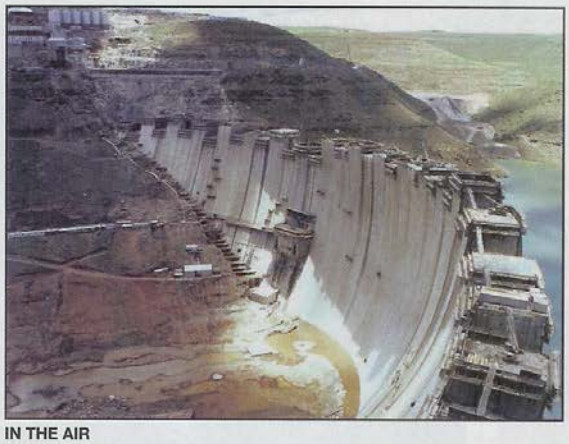
The rapid industrial expansion in South Africa during the late 1970s and early 1980s, created a surge in the demand for electricity. Given the vast coal reserves South Africa possesses, the additional capacity was provided by the erection of large – from 3 000 MW to 3 600 MW – pulverised coal fired power stations.

These stations used coal of relatively low calorific value and high ash content, which resulted in vast quantities of coal ash at individual power stations. Current figures for coal ash produced in South Africa are 38-million tons a year to 40-million tons a year, mainly from State-owned power utility Eskom.

When coal is burned for electricity production, it produces two types of coal ash. One is a fine material called fly ash. The other is bottom ash, which is the heavier residue that falls to the bottom during the burning process.

Fly ash has the biggest use, with bottom ash being used mainly in the manufacture of bricks and blocks for housing.

South African Coal Ash Association (Sacaa) president **Richard Kruger** is passionate about the use of coal combustion products (CCPs).



IN THE AIR
CCPs clean up the environment as well as create a value-added industry around what was essentially a waste product

He says that not only do these products clean up the environment but that they create a value-added industry around what was, essentially, a waste product.

"When power stations first came on line, the residue was a major pollutant. Government and then other research institutions put extensive research into cleaning up the environment. What has come out of this research and development over the years is a growing industry that has developed out of nothing."

Fly ash plays a significant role in preventing global warming and improving the quality of the environment. It is used to improve cement, make better and more cost-effective concrete and is applied to mine spoil to restore the terrain to its agricultural potential.

In the quest to reduce the emission of greenhouse gases like carbon dioxide (CO_2), a by-product of cement manufacturing, the addition of fly ash to cement during production makes the manufacture of this strategic commodity environment friendly.

These new binders or extended cements are widely used in South Africa and are saving the country at least one-million tons of CO_2 annually.

Fly ash can also be added to acidic soil to improve its fertility. Once the energy content of coal is used for power generation, the resultant ash contains alumina, silica, calcia and iron oxide.

It has been shown that the restoration of mine spoil with fly ash provides better results than conventional fertilisers.

Along with a little lime, fly ash can be used to pasteurise sewage sludge. When applied to soil this mixture enhances the agricultural yield.

"Between 24-million tons a year and 25-million tons a year of coal ash being produced . . . is still not being used in ways that have been shown to be productive and beneficial to the environment, as well as for the growth of the CCP industry," Kruger says of the challenge facing Sacaa.

Kruger sees the processing and beneficiation of CCPs as the way forward for the research and development of the product. The environmental research has come quite far and practical validation of the technology is now required."

Article in Mining Weekly, Vol 14 No 17, May 9-15 2008

Forthcoming events

Excellence in Concrete Construction - through Innovation, Kingston University, London, 9 – 10 September 2008
Full details at http://cmrg2008.kingston.ac.uk

International Conference EuroCoalAsh 2008, Warsaw, Poland, 5 – 9 October 2008
This conference is organised by the Polish Coal Combustion Union in conjunction with the European Coal Combustion By-products Association (ECOBA). The conference covers all aspects of coal fly ash, especially in the European Union.
Website: www.eurocoalash.org

ICCRRR 2008, Cape Town, 24 – 28 November 2008
Website: www.civil.uct.ac.za/iccrrr

World of Coal Ash (WOCA) 2009, Lexington, Kentucky, USA, 4 - 7 May 2009
Website: www.worldofcoalash.org

IN THE NEXT ISSUE

We hope to look at a topic suggested by our readers. **So, how about it?**

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