



THE SOUTH AFRICAN COAL ASH ASSOCIATION (SACAA)

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ASH @ WORK

COMMUNIQUE OF THE SOUTH AFRICAN COAL ASH ASSOCIATION

from your Editors and President of the SACAA

Editorial

The compilation of this second issue of 2009 took rather long but we hope it will give our members some good insights.

We report on the Council's activities and give some feedback on the last Technical Meeting, "Carbon capture and storage in South Africa", the new CDM technology, held on 1 April 2009. Then there is some cautionary advice on the use of local clinker ash. The great international development of the World-Wide Coal Combustion Products Network (WWCCPN) also receives some mention.

Council Matters

The 89th Council meeting was held at SAICE, Midrand on 1 April 2009. The main issues arising from the meeting were:

- Participation in an ECOBA/ACAA organised session at the planned International Conference on Sustainable Construction Materials, in June 2010, in Acona, Italy.
- According to new legislation the seepage from ash dumps has been classified as waste water.
- Students involved in ash-related studies and projects to be encouraged to attend SACAA Technical Meetings and Workshops/Seminars.

Developments subsequent to the Council meeting are:

- The next Council Meeting is set for 29 July 2009.
- The date for the Workshop/Seminar on Clean Development Mechanisms (CDM is the latest buzzword!) has been shifted from 17 July 2009 to a still undetermined later date.
- The date for the 2009 AGM of the Association was set for Wednesday, 26 August 2009.

Feedback - SACAA Technical Meeting 1 April 2009

Lecture: "*Carbon capture and storage in South Africa.*"

A coal-based energy economy and an increasing coal-based energy infra-structure bestows on South Africa a high per capita carbon dioxide emission rate. With few other economically exploitable energy resources, and in common with similarly placed countries, such emissions are likely to continue, in spite of renewable energy programmes and energy efficiency measures. Consequently, South Africa is investigating the use of carbon capture and storage as a green-house gas emission mitigation measure through the **Clean Development Mechanism (CDM)** - as a transition until renewable and nuclear energies can play a greater part in the South African energy economy.

After detailing past activities in the RSA, the speaker, **Dr Tony Surridge of SANERI**, enlightened us on the current situation in the global context and provided insights into the planned programme of action. To facilitate execution of the programme the **Centre for Carbon Capture and Storage** was recently established at SANERI.

A preliminary study, by M Cloete of the Council for Geosciences (CGS), has indicated that at least 100 gigatonnes of carbon dioxide geological storage could be available - more than four times the capacity required to store 240 million tonnes per year of capturable emissions for 100 years. Most of that pertains to deep saline aquifers, with some extra prospects of depleted gas fields and enhanced coal-bed methane recovery.

A detailed study to ascertain potential storage sites and their characterisation will be addressed in the form of a **carbon geological storage atlas** that commenced in September 2008 and is scheduled for completion by April 2010. The South African Geological Carbon Dioxide Storage Atlas is a partnership with financial support from PetroSA, Anglo-Coal, Eskom, Sasol and SANERI. The Atlas compilation is being undertaken by the CGS with some data from the Petroleum Agency of South Africa (PASA). The programme further envisages the test injection of carbon dioxide into South African rocks to assess the suitability of the local geology as a storage medium. It is also necessary to ascertain the dispersion and reactions of the carbon dioxide in the storage medium. Similar injection activities are currently underway elsewhere in the world. Favorable results will see the construction of a **commercial demonstration plant** that will test an integrated operating system under local conditions. This forms an essential link between feasibility trials and hopefully a full scale commercial plant.

This interesting environmental meeting, sponsored by PPC Cement Ltd, concluded with lively discussions over refreshments.

Clinker as Aggregate by Dr Japie Krüger, Honorary Member of the SACAA

Clinker ash (commonly called clinker) from grid-fired power station dumps is a valuable source of concrete aggregate, particularly for the manufacture of concrete masonry units and millions of good-quality units have been and are still being made annually with clinker in South Africa. It is, however, important that the clinker being used is sound in order to make durable units complying with the requirements of SANS 1215: **Concrete masonry units**. Guidance in this regard is given in SANS 1215, which stipulates that well-burnt clinker, complying with the requirements of SANS 794:

Aggregates of low density in respect of soundness, sulphate content and loss on ignition, should be used. Of particular importance is that:

- (a) the clinker is free from quicklime nodules that may lead to “popping” on walls as a result of expansion when they hydrate, leading to brick and/or plaster damage.
- (b) the clinker does not contain excessive amounts of sulphate (SANS 794 limits the sulphate content as sulphur trioxide to 1%, by mass). Excessive amounts of soluble sulphate causes efflorescence on wall surfaces when it is transported by moisture in the wall and deposited when the water evaporates. The crystallisation of the salts could be responsible for severe plaster and mortar joint disintegration and paint failure.

Even more serious is the expansion of walls due to the formation of expansive products under moist conditions when the units contain excessive amounts of sulphate. Walls, which are plastered and painted and which are not properly protected against water ingress, are particularly prone to sulphate expansion. The reason is that the brickwork behind the plaster in walls subjected to water ingress remains moist for prolonged periods, allowing the formation of the expansive products, which form when water is present.

The following photographs illustrate the cracking and spalling that could occur in a moist plastered wall built with clinker bricks, which contain excessive amounts of sulphate.



Photo 1000984. Cracking and adhesion failure of plaster next to a movement joint in an inadequately water-proofed, exposed wall, caused by expanding clinker brickwork containing excessive amounts of sulphate



Photo DSC01139. An inadequately water-proofed, plastered wall built with clinker bricks, which contained undue amounts of sulphate. Note the excessive crazing and the efflorescence in and paint failure along the cracks as well as spalling of plaster from a column due to expansion of the brickwork.

Something which is not always understood is that sulphate or moisture or both have to be present for sulphate expansion and efflorescence to take place. If one of the two was eliminated, it cannot occur. This means that it is also important that walls are properly waterproofed (refer in this regard to SANS 021: **Code of practice for the waterproofing of buildings, including damp-proofing and vapour barrier installation**).

[Editorial comment: Thanks to SACAA's founder member for some serious practical advice]

WWCCPN World-wide Coal Combustion Products Network

"The WWCCPN is the result of international collaboration to promote, coordinate and inform about the beneficial use of CCP materials." This is the core statement of the brand new website of WWCCPN [http:// www.wwccpn.org](http://www.wwccpn.org) . Further extracts from the website appear below. .

On the home page we read: "Members of the network have been consulting with each other for several years to identify common problems and more effectively communicate the results of their continuing research and implementation of new beneficial CCP applications."

SACAA's president, Richard Kruger, the prime motivator behind the formation of the WWCCPN, has been involved with the network from the onset and due to his efforts and those of his sponsors, the South African flag and SACAA feature among the other network participants. There is a web-link to SACAA's website. We still need to arrange a link from our website to www.wwccpn.org.

"Since its beginning, a number of international organizations have signed on to the WWCCPN Charter.

Signatories to date include:

- American Coal Ash Association (ACAA)
- Association of Canadian Industries Recycling Coal Ash (CIRCA)
- Ash Development Association of Australia (ADAA)
- Japan Coal Energy Center
- European Coal Combustion Products Association (ECOBA)
- Informational & Analytical Center "Ecology of Power Engineering" of Moscow Power Engineering Institute (IACEE MPEI)
- National Coal Ash Board, Israel
- South African Coal Ash Association (SACAA)
- United Kingdom Quality Ash Association (UKQAA) "



[Editorial comment: Well done Richard and congratulations to the brains behind the creation of the website]

LAST SNIPPET

- Blaine Harden reported in 'Dispatches' of The Sunday Independent of 15 March 2009, as follows: "This winter North Koreans have been told to achieve food self-sufficiency by their own efforts. As part of a government-ordered mass mobilization, they are making *toi bee*, a fertilizer in which **ash** is mixed with their own excrement. Frozen human waste is being chipped out of public toilets in cities and towns. Every factory, public enterprise and neighborhood unit has been ordered to produce two tons of *toi bee*, according to Good Friends, a Buddhist charity with informants in North Korea. In the spring it will be dried before being transported to state farms."

[Editorial comment: This makes you think, when on the other hand the same state authorities spend vast efforts on missiles and nuclear armaments!]

FORTHCOMING EVENTS

Green Building Conference 2009, Sandton Convention Centre, 7 - 8 July 2009

"In 2009 the Green Building Conference and Exhibition will come of age by becoming a fully fledged 'construction industry show.'"

Website: www.greenbuilding.co.za

SACAA Technical Meeting, SAICE, Midrand, 29 July 2009

Global Ash Kaleidoscope - Feed back by several travellers from the RSA, at 15:00.

Coal-Gen Europe Conference & Exhibition- 1-3 September, 2009, Katowice, Poland

Website: <http://cge09.events.pennnet.com/fl/index.cfm>

International Coal Ash Conference and Exhibition, Yanxiang Hotel, Beijing, China, 15 - 16 October 2009

Organiser: China Building Materials Federation

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IN THE NEXT ISSUE

We hope to look at a topic suggested by our readers. **Please send in your contribution !**

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Disclaimer: *The views expressed in this newsletter are not necessarily those of the Council of the South African Coal Ash Association*