

Ash Development Association of Australia

THIS ISSUE - APRIL 2010

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CCPs - a valuable resource

www.adaa.asn.au

Editorial: Think Globally, Act Locally.

'Sustainability': simple enough concept, not-so-simple process for industry to achieve. Despite what the catchphrase posted on most Australian domestic garbage bins tell you, it takes a little more than simply doing "the right thing" to get this fourteen-letter noun into action. It requires substantial research, development and understanding of business process and industry resource utilisation, community co-operation and goodwill, with a dash of government support with good policy and appropriate regulation reform. But what sounds extremely difficult, should not be mistaken for impossibility.

The answer, and focus of this issue of Coal Ash Matters, is the recognition that big changes involve small steps. The NSW Government's recent exemption of Coal Combustion Products (CCPs) is an excellent example of the culmination of hard work over more than 2 years of consultation. The granting of the exemption, highly-anticipated by the Association, was a crucial step forward for industry after a sustained 24 month consultative relationship with the Department of Environment, Climate Change and Water (DECCW).

Now, by doing "the right thing", more **sustainable** business practices can realistically be achieved by our industry members with greater legal certainty for future investment.

More information about the exemption and a copy of the file can be obtained from the Association's website: **www.adaa.asn.au**.

Global and local conferences, revision of technical papers, consultative workshops and examples of effective utilisation of CCPs in local power stations: a small step for man, a giant leap for sustainability, and our cover stories in this April 2010 issue of Coal Ash Matters.

Stirling Dam Upgrade Uses "New" Collie Fly Ash By Bob Marks

As the name suggests, the Stirling Dam Upgrade project involved upgrading the existing 1940's dam to increase water supply to the southern Perth region.

The re-construction was performed by Macmahon Contractors, on behalf of the Water Corporation, WA and was completed in September 2009.

Over 4500 cubic metres of concrete was required to raise the dam wall, which was supplied by Holcim WA from their on-site batch plant, established in March 2009.

The concrete specified for the project consisted of nominal 40mm aggregates and low slumps. Furthermore, Water Corporation specified concrete mixes to contain 40% fly ash content of total cementitious. This requirement assisted in reducing the heat of hydration of the concrete; lower drying shrinkage, increased resistance to sulphate attack, enhanced resistance to alkali aggregate reaction (AAR). With a specified design life of 100 years the inclusion of fly ash helped to achieve a durable long lasting structure.

Concrete pumping, placement and finishing were made easier by the inclusion of the fly ash, with over 700 tonnes being supplied by Flyash Australia, from their modern facilities at Collie Power Station, located 200km south of Perth. Concrete-grade fly ash is being produced for use in the WA construction sector, and is readily available.

Acknowledgements: Holcim WA (Max Andrews), Macmahon Contractors, Water Corporation WA





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Membership

COMPANY MEMBERS

A primary role of the ADAA is to bring together producers and marketers of coal combustion products (CCPs). Our activities cover research and development into CCP usage, advocacy and technical assistance to CCP producers and users, as well as a forum for the exchange and publication of CCP information.

For more information on the Association, visit us as **www.adaa.asn.au**

- Adelaide Brighton Cement Limited
- Blue Circle Ash
- Cemex
- CS Energy
- D2G Alliance
- Delta Electricity
- Eraring Energy
- Flinders Power Pty Limited
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- Independent Flyash Brokers
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- Stanwell Corporation Ltd
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- Tarong North
- TruEnergy
- Verve Energy

RELATED ASSOCIATIONS

Energy Supply Association of Australia www.esaa.org.au

UK Quality Ash Association www.ukqaa.org.au

American Coal Ash Association www.acaa-usa.org

Around the Power Stations: Callide Power Station

By David Christy and Peter Heeley

Callide power station, owned and operated by CS Energy, is one of the largest stations in Queensland and a major producer of fly ash. Callide is located near Biloela, some 100km west of Gladstone and 400 km north of Brisbane. Whilst somewhat removed from the major fly ash markets of SE Queensland, it plays an important role in supplementing the fly ash supplied by closer stations. It also serves as a major supplier to the far north of the state.

Callide A station dates back to the mid 60s, and was supplemented by Callide B (2*350MW) in 1988, and Callide C (2*420MW) in 2001. The Callide A station is currently the subject of a major research project, conducted to demonstrate CO₂ capture and geo-sequestration storage technology. The project involves conversion to pure oxygen-firing, capturing the relatively pure CO₂ stream, which is then compressed for underground storage.

Commercial supplies of fly ash have been produced from B Station by Pozzolanic (now Cement Australia) for many years. These two units produce a high quality ash from their electrostatic precipitators. The B station precipitators include 5 zones of fly ash collection. Like all precipitators, the front collection zones collect the coarsest ash, whilst the ash progressing through the precipitator gets finer and finer. Commercially available ash is taken from zones 2, 3 and 4 to take advantage of this beneficial effect.

Callide C has a slightly different arrangement. It is jointly owned by CS Energy and Intergen, and instead of precipitators, the two units are fitted with fabric filters. Consequently the natural classification process is not available and to secure the best grades of fly ash it is necessary to use a mechanical classification process.

In 2009 Cement Australia constructed a new classification plant and truck loading facility to allow increased use of the fly ash from Callide C. A number of new contracts for long term fly ash supplies from Callide to different companies have been developed over the past year and supplies of quality fly ash are now available commercially from several sources within the plant.

Given the high quality fly ash produced at Callide it will continue to be a widely sought material throughout Queensland and beyond.

Coal Ash M By Garry Craig

Increase CCP Reuse at Eraring Power Station

Eraring Energy has recently completed construction of a new fly ash collection, transfer, storage and pumping plant at Eraring Power Station known as the Coal Combustion Product (or CCP) Plant. The CCP Plant was commissioned between October 2009 and February 2010.

The storage and pumping plant (photograph 1) was commissioned and proven before any unit was connected to the system. Over a period of approximately three months, each unit was then connected to the system. Only Unit 4 was connected during a planned full unit shutdown. All other units were connected piecemeal whilst the units were in service without affecting unit output. A timeline of the development of the Units is summarised below:

- Unit 1: the first unit to be connected on line and was completed prior to Christmas, 2009 (photograph 2).
- Unit 4: connected during the unit shutdown and was fully commissioned in early December, 2009 using larger collection vessels (photograph 3).
- Unit 3: commenced prior to Christmas, 2009 and was completed by mid February, 2010 requiring installation of the largest collection vessels (photograph 4).
- Unit 2: commenced in early January, 2010 and completed by mid February, 2010 using similar sized vessels as Unit 1.



Photograph 1: Main Storage Silos and Control Building



Above: New Compressor House & Cooling Towers



Photograph 2: Unit 1



Photograph 3: Unit 4



Photograph 4: Unit 3

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What was the aim of this new plant?

Eraring Energy owns and operates the largest thermal power station in NSW. One of the by-products from the coal-fuelled generation of electricity are Coal Combustion Products or CCPs. A power station the size of Eraring produces more than 1.5 million tonnes of CCPs per annum. Some of the CCPs produced are reused through contracts with external parties (approximately 500,000 tonnes or approximately 33%) whilst the remainder is stored for possible future use in an onsite storage facility or ash dam. The existing ash dam was filling quickly and was expected to be full by 2011/12.

Eraring Energy required a new method of CCP placement that would allow the power station to reach its maximum life expectancy estimated to be beyond 2030. The new CCP plant included the installation of large piston diaphragm pumps that allowed the CCP to be pumped to the ash dam in a more dense form of slurry that could then be placed using gravity and would assist in extending the life of the ash dam.

Additionally, Eraring Energy required access to the dry fly ash so that new markets could be opened up for its reuse. This system was not available to Eraring Energy under the previous method of CCP collection. It is a requirement of the approval for the project that Eraring Energy reaches a target of 80% reuse of CCP by the end of 2015.

What was included?

The CCP plant consists of three distinct areas. These areas are: -

- **1**. The storage and pumping plant
- 2. The pneumatic transfer system and
- 3. The fly ash collection system

1. The storage and pumping plant

This plant included the construction of two large storage silos (photograph 1) each of 1,000 cubic metres in capacity. These silos received the excess fly ash not used by the third party with a processing plant at Eraring Power Station. Underneath each silo are the outlets to a dry (photograph 5) and conditioned (or slightly wetted – photographs 6 and 7) fly ash truck loading facilities as well as outlets to pug mills where the fly ash not to be reused is mixed with water, ready for pumping to the ash dam. The pug mill then feeds into a mixing tank before two large pumps are used to pump this dense phase slurry to the ash dam some 3 kilometres away. A new slurry pipeline was also constructed to transfer the dense phase slurry to the ash dam for placement. The main control building for the CCP plant was constructed in this area.







Photograph 6 & 7: Conditioned Fly Ash Loader

Photograph 5: Dry Loader

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Photograph 7

INSIDER

2. The pneumatic transfer system

The fly ash collected in the fabric filter hoppers is transferred to various plant areas using air. For this to be successful a new compressor house was constructed (photograph 8) which contains $4 \times 33\%$ duty compressors (each some 1.1MW in power consumption), dryers, new cooling towers for the compressors and a new switch room. These compressors deliver the air for transport of fly ash to the main silos, intermediate silos (for Units 1 and 2) and to the third party who reuses fly ash. Additionally, several pipe bridges were constructed (photograph 9). New transfer vessels have been installed under the intermediate silos to pneumatically transfer the dry fly ash to the third party or the main storage silos.



Photograph 8: New Compressor House & Cooling Towers



Photograph 9: Pipe Bridge



3. The fly ash collection system

In actual fact there are four separate collection systems with one for each unit. Each unit required the installation of new collection vessels under each fabric filter hopper (40 per unit). The Unit 1 and 2 collection systems feed a common set of intermediate silos whilst Units 3 and 4 feed either the third party or the main storage silos. The fly ash collected in the intermediate silos at units 1 and 2 was due to go directly to the third party or to the main storage silos. The third party was not in a position to make this happen and so an interim facility has been included where the third party has connected their own equipment to the intermediate silo (photograph 11). The third party plant will be connected to the CCP plant at a later time. The third party has constructed a new storage silo and this has been connected to a new intermediate silo located within the CCP plant (photograph 10).



The fly ash collected during the fabric filter shake cycle is the finest fly ash and is the material required by the third party. This fly ash is separated from the non shake or coarser fly ash. The fine fly ash is sent to the third party whilst the remainder (known as mixed fly ash) is sent to the main storage silos.

Photograph 10: New Silo

Has it been successful?

Although in the early stages of operation, results of the system to date are very promising.

- The collection systems have proven capable of segregating fine and coarse fly ash which is advantageous to the third party.
- The transfer, storage and pumping facilities are able to remove all fly ash produced by the power station and place it in the ash dam.
 Access to fly ash before pumping (both dry and conditioned) has created interest in the market and Eraring Energy is exploring opportunities in regard to increased reuse of mixed fly ash.

ADAA Sustainability Project: Building capacity in the brown coal combustion products supply chain

With the support of Sustainability Victoria, the Ash Development Association of Australia (ADAA) has been delivering a targeted "sustainability capacity building program". The aim is to increase the effective utilisation of Coal Combustion Products (CCP) including Fly Ash & Furnace Bottom Ash products across the whole supply chain. CCPs are a valuable resource.

Victoria generates more than 1,300,000 tonnes of CCPs, which is NOT effectively utilised due to many factors, e.g. awareness and understanding of the resource properties and characteristics, unidentified areas for reuse and associated benefits (commercial & environmental) that can be derived. Effective utilisation by associated industries of these resources has the potential to provide long term sustainability benefits including significant carbon reduction when new products are used to displace other finite natural resources with associated 'larger carbon footprint.'

About the project

ADAA with the specialist support of Link Strategy, a sustainability policy and strategy consultancy, has engaged Victorian association members in a variety of activities taking a supply chain approach to increase utilisation of CCP in existing and new product applications. TRUenergy, Loy Yang Power, International Power and industry stakeholders in the brown coal CCP's sector are participating along with numerous Victorian government agencies. These ADAA member companies recognised that real benefits could accrue from the program only if they tackled inherent complexity of the supply chain; and challenged old assumptions and practices about utilising the CCP's – rather than just storing these resources in ash dams (unsustainable practice).

Sustainability Victoria: Modules

Sustainability Engagement Survey to determine attitudes, awareness, interest, current level of engagement and level of commitment towards achieving sustainability amongst members of our industry sector.

Assessment & Benchmarking processes will measure the resource impact of CCP and set benchmarks for resource use across the industry. Sustainability Workshops with industry and strategic supply chain partners to explore building partnerships about new products from CCP.

Building Networks A communication strategy to build relationships and the foundation for future cooperation both among industry and with supply chain generators, producers and consumers.

Progress to date:

Delivered over some 18 months (June 2009 – December 2010), two workshops and two webinars have been conducted with 37 participants attending representing several sectors of the ash supply chain including resources, producers, value adders, customers, researchers and the government .

Several new, low carbon product opportunities are under investigation and case studies are in development. The ADAA continues to look for opportunities to expand the capacity of its members to increase the effective utilisation of CCP in new products and or applications.







If you any questions about the program please contact Craig Heidrich, CEO, ADAA Tel: 02 4228 138

'Paving the Way' with the RTA

A first for the RTA, a two-day inaugural biennial Pavements Conference was held to support State-wide skills networks and knowledge management within the pavements community at the Sydney Showground in Homebush.

With an audience of 175, including 30 external participants, over 21 technical papers were presented to practitioners from regional and metropolitan areas.

Zoran Skoric of Blue Circe Ash and incidentally, Chair of the Association's Technical Committee, attended the afternoon sessions of the Pavement Conference on day two. In these seminars, aspects of "how to achieve sustainable pavements" were discussed and Coal Combustion Products (CCPs) were mentioned extensively.



When asked to share his thoughts on the Conference, Zoran

replied, "the event was extremely positive, with the greatest benefit being, perhaps, the establishing of the pavement community's thoughts and challenges on meeting the goals for greater reuse of recovered resources, such as CCPs".

Confident from the success and positive feedback they received from the first, the RTA intend to continue hosting the Pavements Conference every two years.

Done and dusted.

The task of revising three of the Association's outdated Technical Notes and one Reference Data Sheet has been officially crossed off the 'to-do' list. The 6-or-so month project was delegated to Dr Dak Baweja, who, guided by feedback and comments from various members of the ADAA Technical Committee, thoroughly revised the old data sheets and brought them up to scratch with current research.

So without further adieu, the ADAA presents the new and improved:



Reference Data Sheet 1: Guide to the Use of Fly Ash in Concrete in Australia

- Fly Ash in Australian Standards
- Specification and Design
- The Role of Fly Ash in Portland and Blended Cements in AS3972
- Opportunities with Using Fly Ash in Concrete

http://www.adaa.asn.au/docs/ADAA_RDS1_09.pdf



Technical Note 4: Fly Ash Concrete in Marine Environments

- Australian Standards Covering Marine Concretes
- Chloride Diffusion, Service Life and Fly Ash
 - Fly Ash in Marine Concrete

http://www.adaa.asn.au/docs/ADAA_RDS1_09.pdf



Technical Note 8: Australian Experience with Fly Ash in Concrete: Applications and Opportunities

- Australian Experience with Fly Ash in Concrete
- Current Applications of Fly Ash in Concrete
 Opportunities with the Use of Fly Ash in Concrete
- opportainties with the ose of thy Ash in concrete

http://www.adaa.asn.au/docs/ADAA_Technical_Note_8.pdf



Technical Note 9: Amendment of Australian Soils by Fly Ash AdditionsRegulations and Guides Covering Soil Amendment

- The Role of Fly Ash in Soil Amendment
- Soil Amendment Mechanisms and the Influence
- of Fly Ash
 - Future Opportunities

http://www.adaa.asn.au/docs/Technical_Note_9.pdf

A copy of the data sheets (downloadable as PDF files) may be obtained by visiting the link provided.

The Association wishes to convey a warm thank you to Dak for all his hard work and patience, and likewise to those members of the Technical Committee who contributed their feedback and comments.

e-CAM

The ADAA has decided to finally practice what it preaches and opt for a more 'sustainable' method of disseminating its biannual Coal Ash Matters. With a growing readership of over 1,500, the ADAA has acknowledged that continuing to issue glossy hardcopies to a large portion of our readers is simply not the greenest option.

As such, the Association is proud to announce that from our October 2010 issue, Coal Ash Matters will be e-published only. And we promise you, with this change, everybody wins.

Whilst the environment is the most obvious winner, our readers likewise benefit by receiving their issue of Coal Ash Matters faster, and as for the Association, the saving on postage and time will ultimately allow for the addition of a third issue per year.

To those subscribers who are not currently on our e-copy list, rest assured that our Office will contact you in the upcoming weeks for an email address contact. However, feel free to make the first move by calling our office on (02) 4225 8466.

See you next time, on your screen.

QA Specification RTA 3051

The RTA is looking to revise and release an updated version of QA Specification RTA 3051 'Granular Base and Sub-Base Materials for Surfaced Road Pavements' in April 2010. Currently in the process of consulting with regional geoscientists in regards to the finalisation of some technical matters, the RTA hopes to prepare a draft following these deliberations and circulate a version for comment amongst industry members by early April.

The 2010 Global Ash Conference

There is some good news and bad news in regards to this year's Global Ash Conference. The bad news is that the Conference has been postponed due to the recently announced dates of the EuroCoal Ash Conference 2010.



However, those interested in attending the Conference can keep up to date with announcements or register by visiting the Conference's official site at www.propubs.com/gac/.

The good news is that, as expected, this year's Conference promises to be another impressive and insightful event, offering an exhibition of major ash products and services, technical and market papers, fantastic networking opportunities and a chance to meet new customers.

The topics to be addressed at this year's Conference include:

- Ash handling options
- Ash beneficiation technology
- Adding value to ash
- Ash as a valuable raw material; and
- Increasing ash usage in the cement industry

David Farah Joins Flyash Australia

In June 2009, David Farah joined Flyash Australia in the role of General Manager.

Prior to taking this role, David spent eight years with Cement Australia where he initially held the position of Technical Services Manager before serving as the Product Performance Manager. Prior to that, David spent seven years with Boral and Blue Circle Southern Cement, serving in a variety of roles in areas involving quality assurance, technical services and operations.



David holds an Honours Degree in Chemical Engineering and is a recognised industry expert in matters relating to cement technology, supplementary cementitious materials, and concrete technology.

David is happily married and has three daughters. In his spare time, David likes to maintain a good level of physical fitness and enjoys singing and playing guitar.

The ADAA wishes David all the best in his new role with Flyash Australia.

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