

**CSRP Conference 2010
Brisbane / Perth**



Centre for
Sustainable
Resource
Processing

Stevan Green
CEO

February 2010

Welcome



Centre for
Sustainable
Resource
Processing

Welcome to the CSRP Conference 2010

Safety and other issues...

Program



Introduction

What's New? (Achievements to Date)

Summary by Stevan

Highlights by Research Leaders

What's Next?

Beyond CSRP -

Opportunities for advancing CSRP outputs

Discussion and plans for going forward

[CSRP'10 Agenda 16Feb.doc](#)

CSRP'10 Conference, February 2010

CSRP Participants



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CSRP Vision and Mission



Vision

The sustainable processing of minerals and metals –
contributing to the global material needs of society
with a fraction of current ecological impacts

Mission

To progressively eliminate waste and emissions in the
minerals cycle, while enhancing business
performance and meeting community expectations

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Since 2003, CSRP has carried out research of relevance to the minerals industry in:

- Sustainable Development**
- Low GHG Metal Production**
- Energy Efficient Liberation and Comminution**
- Bauxite Residue Utilisation**
- Geopolymer Concretes**
- Zero Waste and Minor Elements**
- People Resources**

Achievement Highlights

- some examples (1)

JKRBT (Rotary Breakage Tester)

- Demonstration unit built at JKMRC
- Pre-commercial plant commissioned at site
- Several more built and delivered



Geopolymer Concrete

- Tri-scale analysis (macro, micro, nano)
- Small scale fabrication
- Larger scale trials planned to demonstrate significant utilisation of industrial residue
- Establishment of the Geopolymer Alliance



Achievement Highlights

- some examples (2)



Dry Slag Granulation and Heat Recovery

- Concept development
- Techno-economic evaluation
- Lab-scale test and CFD modelling
- Design and construction of prototype
- Small-scale demonstration plant
- Site plant trial planned



People and Research Capacity

- Research capacity development
- Postgraduate and undergraduate students
- Professional development
- Community outreach
- Analytical equipment purchases



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Achievement Highlights

- some examples (3)



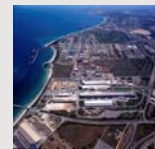
ReSand®

- Installation of a 15 t/hr pilot plant for sand production
- Planning for larger scale plant is underway
- Road-based trials are underway



Sustainable Development Tools & Techniques

- **SUSOP®** – **SUS**tainable **OP**erations – a developing management tool for incorporating sustainability principles into plant design and operation
- Development of an internationally renowned SD-focussed regional synergies program in the Kwinana Industrial Area, Western Australia



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What else is New?



Sustainable Development

- SUSOP® (with various case studies)
- University level SD textbook
- Regional Synergies – award winning contribution to Kwinana Industrial Area “Sustainability Roadmap”
- Global database of industrial ecological practices
www.csrp.com.au/database
- Regional Synergies Opportunity Toolkit
- Other Regional Synergy studies including Gladstone and Rustenberg, South Africa

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What else is New?



Low GHG Metal Production

Biomass

- Collection, analysis and pyrolysis testing of biomass samples at the Corrimal coke ovens of the Illawarra Coke Company.
- Completion of plant trial at OneSteel on recarburisation of liquid steel using biomass-derived charcoal.

Heat recovery from metalliferous slags using dry granulation

- A new pilot scale facility has been built and used to successfully demonstrate the concept of integrated dry granulation and heat recovery process.
- An independent assessment of the potential economic impact of dry granulation has confirmed the net present value of the technology to be very large for the Australian steel industry.

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What else is New?



Energy Efficient Liberation and Comminution

The JK Rotary Breakage Tester (JKRBT) is enabling the collection of the most detailed and complete breakage database ever established.

With CSRP's support, the world's most sensitive Positron Emission Particle Tracking (PEPT) facility has been established at the University of Cape Town in South Africa. Our research Program Leader has been appointed to the steering committee.

More fundamental understanding of size reduction equipment (including HPGRs, Ball and Tower mills). This has important implications for the design of grinding circuits.

The coupling of a fluid phase (Smoothed Particle Hydrodynamics) with the particle phase (Discrete Element Method) in modelling is allowing wet processes to be realistically modelled.

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What else is New?



Bauxite Residue Utilisation

- ReSand[®] pilot plant construction complete, commissioned and operating. Development of a project for the construction of a larger ReSand[®] plant is underway.
- Stockpiles of ReSand[®] produced and used in road trials.
- Trials of soil conditioning agents from bauxite residue have been conducted with good results. Further demonstrations will be developed.
- Geopolymers with impressive physical properties have been successfully manufactured from Bayer residue. This new material opens up opportunities for utilisation of significant amounts of industry by-product.
- Laboratory spectral studies indicate that Alkaloam[®] is spectrally separable from soils and that measurement of mixtures down to 10% Alkaloam[®]-soil weight mixtures is likely.

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What else is New?



Geopolymer Concretes

Two geopolymer paths, the first in Australia, have been laid with the collaboration of CSRP, Curtin, Rocla, CSIRO and Boral. Other demonstration projects are under development.

The formation of the Geopolymer Alliance (www.geopolymers.com.au) aims to bring together research, industry, community and government stakeholders to cooperatively develop mutually beneficial applications for geopolymer technology.

Encapsulation:

- Lead, chromium III, barium and silver have been encapsulated in geopolymers to pass the US Environmental Agency recommended toxicity characterisation leaching procedure (TCLP) test for landfills.
- Caesium, strontium and uranium have been immobilised in geopolymers to pass regulatory tests for radioactive nuclear waste.

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What else is New?



Zero Waste and Minor Elements

- New flowsheets developed for the early removal of As from copper ores with positive techno-economic analysis.
- Identified strategies for recovering valuables from waste sulfide tailings streams and rendering major portions of tailings streams benign.
- Good flotation separations were achieved for arsenic/copper ores. Good selective roasting results were obtained using the high arsenic material produced in flotation.
- Established the potential of geopolymers as a base for stabilising arsenic wastes.

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What else is New?

People Resources

- Created and expanded capability in many areas of mineral processing research
- Fantastic science teachers program – over 1,000 teachers Australia wide
- Over 70 postgraduate students – PhD, Masters and Honours
- Four multi-CRC student symposia held in three states

Achievements to Date – Summary

New research capability development

New research facilities / equipment

Three new pilot plants established with good prospects of large scale trials in the next few years

More than 500 publications, including technical reports, refereed journal articles and conference proceedings

More than 70 postgraduate students – PhD, Masters, Honours

A successful Teacher Professional Development Program involving over 1,000 secondary school teachers across Australia

CSRP – A Successful CRC



*“The CRC Committee commented on the performance and achievements of CSRP (sic) ... including the continued strong performance of the CRC in all programs;
the strong financial position of the CRC with contributions well above contract;
the high level of participation in the CRC’s PhD program; and
the high level of engagement with end users.”*

– Peter Johnson, Chair CRC Committee, January 2010

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CSRP – A Successful CRC



Congratulations to all involved!



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Presentation



Highlights by Research Leaders

Refer to other presentations at www.csrp.com.au/events/csrp10.html

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What's Next?



Following the non-selection of our bid for an extension of the CRC a **number of options** have been considered for winding up or continuing the work of CSRP.

These include:

- Another bid in Round 13 (July 2010) or Round 14 (July 2011)
- Develop one or more state-based Centres of Excellence (either new or extensions of existing CoEs)
- Establish an industry-funded research group – could seek industry organisation support (eg AMIRA, Aust Slag Assoc, Aust Ash Development Assoc)
- Seek other grants (eg ARC grants or Commercialisation Australia)
- Establish commercial ventures

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The Bid that was...



The CRC for By-product Utilisation

[CBU bid summary of Canberra presentation.ppt](#) (confidential)

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What's Next?



Discussion of Options

- Another bid in Round 13 (July 2010) or Round 14 (July 2011)
- Develop one or more state-based Centres of Excellence (either new or extensions of existing CoEs)
- Establish an industry-funded research group – could seek industry organisation support (eg AMIRA, Aust Slag Assoc, Aust Ash Development Assoc)
- Seek other grants (eg ARC grants or Commercialisation Australia)
- Establish commercial ventures

The CSR10 Board will discuss the options on 18 February.

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What's Next?



Round 13 option (July 2010)

The proposition is this: We will confirm support for a second formal CBU bid (due 2 July) from all Core Participants plus *at least* two major power companies by 31 March:

- Alcoa
- BHP Billiton
- Rio Tinto
- Blue Circle Southern Cement / Boral
- University of Queensland
- Curtin University of Technology
- Power Company 1
- Power Company 2

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What's Next?



Round 13 option (July 2010)

If, at the end of March, we have good faith commitments from eight Core Participants, then we will develop the full bid with all Participants (21 from the original CBU bid plus power companies and others).

If not, we will continue with the wind-up plan and cease operations on 31 October 2010.

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What's Next?



Wind-up Plan

In accordance with our CRC agreements, we are preparing a Wind-up Plan which will include:

1. Governance and Management
2. Closing out and continuation of research activities
3. Commercialisation, Technology Transfer and Intellectual Property Management
4. Education and Training
5. Financial Management
6. Residual Activities, and
7. Final Annual Report

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Discussion, Questions, Comments



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