

Commercialisation

The CRC also seeks to generate commercially valuable techniques and products. For example, in 2009 a new *Law and Policy Directory* web site was launched that outlines legislation, guidelines and government policy on contaminated site management in selected national and international jurisdictions.

Promising early technical developments include:

- development of a field test kit for the detection of contaminants from fire-fighting foam
- a solar-powered, highly active and easily retrievable nano-photocatalyst for the treatment of wastewater

Education

In building future national capacity, the CRC maintains a vigorous tertiary training program in collaboration with its university partners. Up to 50 students are expected to complete PhDs through the CRC during its seven-year life. The CRC also runs training workshops relevant to environmental consultants and managers of contaminated sites.

Delivery

To deliver scientific advice and research results, CRC CARE relies on a variety of communication mechanisms, ranging from the 'Australian Remediation Industry Cluster' (ARIC) that it launched in 2007, to special briefings, newsletters, an extensive technical and scientific publications program, a web site and the trade and mass media.

Above all, the CRC recognises that collaboration with key partners such as the Department of Defence is a highly effective way of addressing the scientific and technical issues involved in remediation. Lessons learnt and techniques developed with the Department will be applicable in many ways and at many locations in Australia and in our region, and will make a substantial contribution to national capacity in the rapidly growing international 'clean-up' industry.

Partners

Agilent Technologies Australia Pty Ltd
Alcoa World Alumina Australia
Australian Institute of Petroleum Ltd
BHP Billiton Iron Ore Pty Ltd
Capital Technic Group Pty Ltd
Chemistry Centre (WA)
Chevron Australia Pty Ltd
CH2MHill Australia Pty Ltd
Coffey Environments Pty Ltd
Curtin University of Technology
Department of Defence
Department of Environment and Conservation (WA)
Environment Protection Authority (SA)
Environment Protection Authority (Victoria)
FibreCell Australia Pty Ltd
GHD Pty Ltd
HLM Asia Group Ltd
James Cook University
Southern Cross University
Technological Resources Pty Ltd (Rio Tinto)
The University of Queensland
The University of South Australia
University of Technology, Sydney
Victorian Urban Development Authority (VicUrban)
Worsley Alumina Pty Ltd



For further information on the structure, partners and projects of CRC CARE

CRC CARE Pty Ltd
University of South Australia
Mawson Lakes
South Australia 5095

P.O. Box 486
Salisbury South
SA 5106
Australia

Tel: +61 (0) 8 8302 5038
Fax: +61 (0) 8 8302 3124
Email: admin@crccare.com
Web: www.crccare.com



Cooperative Research Centre for Contamination
Assessment and Remediation of the Environment

A cleaner, safer future for all
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CRC CARE™

Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE)

CRC CARE is a multi-partner Australian research organisation developing cutting-edge technologies to assess, prevent and remediate contamination of soil, water and air. It provides industry with the opportunity to work with world-class researchers to solve and prevent contamination problems. Major end users engaged with the CRC's planning, advisory and delivery strategies include the petroleum and mining industries, the Australian Department of Defence and a wide range of SMEs and consultants via a purpose-built industry cluster.

The CRC is structured into several business areas, namely research, technology demonstration, commercialisation, education and delivery.

Research

The five major research programs of CRC CARE and their principal themes are:

1. Risk Assessment

- user-friendly techniques for assessing the risk when dealing with contamination of soil, groundwater, surface water and air
- cost effective and reliable techniques for quantifying contaminant bioavailability and toxicity
- a better understanding of exposure pathways and contaminant fate, and long-term exposure
- enhanced risk assessment and contaminant fate and transport models
- groups of contaminants that pose major soil, air and groundwater problems in Australia, or may pose a threat from terrorism activities.



2. Remediation Technologies

- low-cost and sustainable technologies for remediating contaminated soil that are acceptable to regulatory agencies, environmental auditors and industry
- remediation techniques for groundwater source zones that satisfy regulatory requirements, and reduce costs and risks. This includes the monitored and enhanced natural attenuation methods of free phase reduction, and permeable reactive barriers
- the development and evaluation of better containment options and better protocols for natural attenuation assessment for contaminants that may need to be left in place or need disposal
- technologies that offer a rapid and cost-effective response to biological or chemical hazards from accidents or terrorist activities.



3. Prevention Technologies

- the safe re-use of contaminated and treated soils to return maximum value without wastes
- laboratory and pilot-scale testing of manufactured soil as an alternative source of nutrients
- manufacture of slow-release nutrient-rich artificial soils from municipal and industrial wastes
- development and uptake of cleaner technologies to limit contaminant release.



4. Social, Legal, Policy and Economic Issues

- community perceptions, concerns and expectations on environmental contamination and remediation, and their role in finding solutions that are cost effective, socially acceptable and readily adoptable
- legal and policy frameworks that govern the assessment and remediation of contaminated sites, and for handling major chemical or biological incidents in Australia and the Asia-Pacific.

5. National Contaminated Sites Demonstration Program

This program provides an opportunity to demonstrate how the CRC's skills and technologies can be applied and integrated in multidisciplinary solutions to complex contamination problems. It also provides an opportunity for scientists, environmental engineers and consultants to test and validate new techniques in site assessment and remediation.

Demonstration projects within the program are co-sponsored by the Department of Defence, the Queensland Department of Natural Resources and Water, ExxonMobil, the Australian Institute of Petroleum (AIP) and BHP-Billiton Iron Ore Pty Ltd. Current applications include:

- monitored natural attenuation as a risk-based strategy for managing contaminated sites
- identifying the source of chlorinated hydrocarbons at contaminated sites, and developing remediation strategies
- national guidelines for 'health screening levels' for sites contaminated by petroleum hydrocarbons
- determining when further remediation of LNAPL (light non-aqueous phase liquids) is impracticable
- the long-term impact of fire-fighting foam at fire-drill training areas.



International activities

CRC CARE maintains close links with a number of leading overseas research organisations, agencies and industries, for example:

- China - the CRC maintains eight PhD students linked into three projects
- Germany - ongoing collaboration with the research agency RUBIN and Mull Engineering gmbh
- USA - Purdue University, Indiana
- UK - Cranfield University
- India - the Indian Institute of Technology at Kanpur, and Bharatiar University in Tamilnadu
- NZ - HortResearch NZ.

