C&R CONSULTING
Geochemical & Hydrobiological Solutions Pty Ltd
ABN 72 077 518 784

Underground Coal Gasification / Coal Seam Gas Investigations
Mineralogical, Geological, Petrographic and Soils Services
Hydrogeomorphic and Palaeogeomorphic Evaluations
Terrestrial and Aquatic Fauna and Flora Surveys
Climate History and Extreme Events Analysis
Contaminated Site and Mine Water Analysis
Environmental Compliance and Monitoring
Estuarine and Marine Water Assessments
Surface and Groundwater Investigations

PO Box 1777
Thuringowa, Qld, 4817, AUSTRALIA
Tel: +61 (0) 7 4725 3751
Mob: +61 (0) 417 635 032
info@candrconsulting.com.au
www.candrconsulting.com.au

South African Underground Coal Gasification Association Workshop
24th August, 2015, Secunda, South Africa

ABSTRACT

Application of UCG interaction zone concepts to inform legislators and regulators

Cuff, CC; Rasmussen, CE; Corkeron, M; Bush, A

Findings from the southeast Queensland Underground Coal Gasification (UCG) pilot projects give a better understanding of altered physical rock properties, hydrogeothermal reaction zones and pressure/temperature gradients in and around deep subsurface coal seams undergoing combustion and gasification. A clearer picture now emerges of two temporally dynamic, overlapping zones of material and fluid reactivity, referred to as a Material Active Zone (MAZ) and a Fluid Active Zone (FAZ). The MAZ is characterised by the zone of impacted rock material by reactions and processes such as metamorphism, metasomatic rock alteration and brecciation. The FAZ refers to the spatial extent of fluid reactions and processes around the gasifier, where use of the term 'fluid' acknowledges the indistinct definition of gas and liquid phases at operating UCG pressures and temperatures. The two zones interact dynamically and evolve through the lifecycle phases of UCG operation.

Application of these concepts is advantageous for the UCG operator in modelling subsurface processes more realistically and predicting and monitoring for subsurface impacts more appropriately. Importantly, application of these concepts to site specific settings to inform valid monitoring arrays in conjunction with controlled chamber operation can almost totally limit the migration of potential pollutants from beyond the immediate zone around the cavity. For the regulator and legislators, the concepts of MAZ and FAZ can form the basis of an informed Levels of Protection framework that targets all risk points during the UCG lifecycle. That is, the MAZ and FAZ concepts allow for a clearer understanding of the processes likely to impact subsurface environments, how they will evolve over the lifecycle of a UCG project, and how best to evaluate and regulate to mitigate real environmental risk associated with each operation.