Sustainability: A Pathway for Balancing Carbon Dioxide Emission Reductions and the Protection of Jobs and Economic Activity

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Photograph of smoke stack at Milwaukee, Wisconsin, USA
www.nowpublic.com/environment/man-made-gas-emissions
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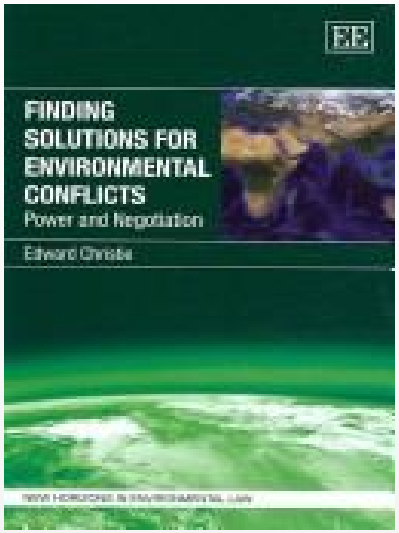

This document is an update, consolidation and revision of two earlier articles dealing with finding a sustainable solution for global warming that were published on the web site of the Australian legal publisher, LexisNexis (Butterworths), *LexisNexis Electronic Professional Development Newsletter – Hot Topics Papers* on 27 February, 2009 (Part 1) and 25 March , 2009(Part 2) and then consolidated into a submission (#508) for the Commonwealth of Australia's Inquiry: "*Senate Select Committee on Climate Policy" (*April 2009).

The first part of the LexisNexis articles was titled "*Reducing carbon dioxide emissions and climate change 1. Regulatory control of emissions as an alternative pathway to the Emissions Trading Scheme*" can be found at the following link:-
http://pd.lexisnexis.com.au/liveassets/images/488/newsletter/2009/hottopicpaper_climatechangefeb09.pdf
The second part titled "R*educing carbon dioxide emissions and climate change 2. Is a sustainable solution an effective alternative to the Emissions Trading Scheme?"* can be found at the following link:-
http://pd.lexisnexis.com.au/liveassets/images/488/newsletter/2009/hot_topic_paper_part2_climatechange.pdf

An "*Overview*" and "*Summary of Key Conclusions*" from the *full , updated and consolidated article* was posted on the web site of the Institute of Green Professionals ("*IGP*") - a global organisation, founded in the United States that links sustainable development professionals and academics across disciplines. The link for the IGP web site is: http://www.instituteofgreenprofessionals.org/
The IGP blog, posted on 7 October 2009, can be found on their web site under "Links" - 'Consilience: The Blog' - and then under the IGP heading that leads to the article titled, "*Strategy for Obama? Global Environment vs. Job Loss".*

Science and uncertainty

- **Contrary to a long-held misconception, science does not generate exact knowledge with precise certainty.**
- ***As a result, divergent scientific opinion arises – especially where an environmental problem, such as global warming, is controversial, awkward or difficult.***
- **Information conflicts and divergent opinion are caused through scientific uncertainty and are complicated by different interpretations of the same information base. The result: problems for environmental decision-making.**

Understanding scientific uncertainty

A scientist's viewpoint

"A new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because the opponents eventually die, and a new generation grows up that is familiar with it." (trans. Frank Gaynor, 1950)

Max Planck (1858–1947), an influential German physicist acknowledged as the founder of the 'quantum theory'. Awarded the "Nobel Prize in Physics" in 1918 (2)

Understanding scientific uncertainty

A politician's viewpoint

"Reports that say something hasn't happened are always interesting to me because as we know, there are known knowns; *there are things we know, we know.*

We also know there are known unknowns; that is to say, *we know there are some things we do not know.*

But there are also unknown unknowns – *the ones we don't know, we don't know*"[emphasis added].

Donald Rumsfeld (3)

Scientific uncertainty and global warming

The 'known knowns'

"We have high resolution atmospheric carbon dioxide records back 80000 years; we know that 100 parts per million* ("ppm") *of the ...385 ppm atmospheric carbon dioxide level* (in 2008) *is from human activities since the industrial revolution..." (4).

Scientific uncertainty and global warming

The 'known unknowns'

"The new projections, published this month* [May 2009] *in the American Meteorological Society's Journal of Climate, indicate a median probability of surface warming of 5.2 degrees Celsius by 2100, with a 90% probability range of 3.5 to 7.4 degrees Celsius (5).

Scientific uncertainty and global warming

The 'unknown unknowns'

The extent of the contribution to the causation of global warming between human activities *(e.g. the burning of fossil fuels)* and natural sources has not been defined.

Dealing with scientific uncertainty and global warming

- ***At the very least, it could be argued that there is reason to assume that atmospheric carbon dioxide emissions*** contribute ***to global warming.***
- ***Given the projected probability for climate change over time, a risk management approach is warranted to reduce the risk of global warming to an "acceptable level of risk".***

Scientific uncertainty, risk-management and global warming

A guide to environmental decision-making where scientific uncertainty exists – as in the case for global warming - is to adopt a precautionary approach based on risk management.

A failure to act now and allowing atmospheric carbon dioxide concentrations to continue to increase – or by Governments setting 'minimal' targets - could lead to the adverse environmental impacts of global warming becoming irreversible.

What action is the Federal Government taking to combat global warming?

- **The primary focus is a 'cap-and –trade system' – the Emissions Trading Scheme (or "ETS") on greenhouse gas emissions.**
- **A 'carbon tax' has also been raised as a possible alternative to the ETS.**
- ***There has been little constructive debate whether a 'sustainable' solution is an effective alternative to the ETS to combat global warming.***

What are some of the concerns raised about the proposed ETS for Australia?

Uncertainty whether the environmental need to reduce CO_2 emissions is on a collision course with potential adverse socio-economic impacts, such as:

i. ***Reductions in overseas exports***
ii. ***Significant increases in power costs for the manufacturing sector and the community***
iii. ***Job losses in regional Australia***
iv. ***An increase in the cost of living***
v. ***Possible closure of mines and flow on effects on the regional, State and national economy***

What measures or means does the *Kyoto Protocol* provide for Australia to limit or to reduce carbon dioxide emissions?

- **Under the Kyoto Protocol, targets "*to limit or reduce greenhouse gas emissions*" is primarily achieved through "*national measures*" that are required "*to promote sustainable development*"; and**
- **The Kyoto Protocol also has "*additional means*" to reduce emissions creating what are known as '*carbon market mechanisms*'. The "*Emissions Trading Scheme*" is one such Kyoto mechanism.**

What "*national measures*" to "*promote sustainable development*" does the *Kyoto Protocol* provide for limiting or reducing greenhouse gas emissions?

These include:-

1. ***Enhancing energy efficiency in relevant sectors of the national economy;***
2. ***Promoting sustainable forest management practices e.g. afforestation and reforestation; and***
3. ***Research, promotion, development and increased use of:***

- ***new and renewable forms of energy;***
- ***carbon dioxide sequestration technologies; and***
- ***advanced innovative environmentally sound technologies.***

Why sustainability? What are some of its objectives?

- ***Conserving and enhancing the resource base;***
- ***Meeting essential needs for jobs, food, energy, water and sanitation;***
- ***Ensuring a sustainable level of population;***
- ***Reorienting technology and managing risk;***
- ***Merging environment and economics in decision-making;***
- ***Maintaining or enhancing international competitiveness; and***
- ***Changing the quality of growth (6).***

What are the origins of the concept of sustainability?

- **The release of "*Our Common Future*" by the World Commission on Environment and Development in 1987 (the "Brundtland Report") and its subsequent acceptance by the UN General Assembly.**
- **The United Nations Conference on Environment and Development , Brazil, 1992 and the two texts: the '*Rio Declaration on Environment and Development*' and '*Agenda 21*'.**

Why is the concept of sustainability significant for environmental management and protection ?

"[A] *fundamental bottom line has emerged: A country cannot achieve economic development when its environment is degraded;*

nor can it restore its environment in the absence of economic development" (7).

What action has Australia taken to pursue sustainability as a national goal?

During the "Hawke-Keating era", Australia led the world by introducing a draft policy for sustainable development in 1989 - followed by an innovative, national environmental policy for sustainable development in December, 1992.

Policy on sustainability was subsequently incorporated into domestic environmental protection legislation, throughout Australia, from 1993.

What is the connection between sustainability and climate change?

The connection is that the *United Nations Framework Convention on Climate Change (1992)* and the *Kyoto Protocol* (1998) include an obligation that measures to reduce or limit greenhouse gas emissions, either are consistent with - or promote - sustainable development.

Is sustainability a feature of the proposed *Carbon Pollution Reduction Scheme* ("CPRS") in Australia?

The *CPRS Bill* introduced into the Commonwealth Parliament in 2009 has as its first object:-

"...to give effect to Australia's obligations under:

(a) the UN Framework Convention on Climate Change; and

(b) the Kyoto Protocol"

See CPRS Bill, section 3(2)

Sustainability and the proposed *Carbon Pollution Reduction Scheme* ("CPRS") in Australia

As the first object of the CPRS Bill is to give effect to Australia's obligations under the *United Nations Framework Convention on Climate Change* and the *Kyoto Protocol*,

actions taken under the CPRS Bill to reduce or limit greenhouse gas emissions are required to promote or be consistent with sustainability.

Kyoto Protocol "*national measures*" to reduce or to limit carbon dioxide emissions and to promote sustainability

1. ENHANCED ENERGY EFFICIENCY

- CO_2 emissions arising from using fossil fuels for energy production account for around 70% of Australia's greenhouse gas emissions (8).
- Other major point sources of emissions vary globally e.g. in California, passenger vehicles and light trucks account for about 40 % of the State's total greenhouse gas emissions (9).
- ***Regulatory control as a measure for enhancing energy efficiency emerged in the USA but has yet to be considered in Australia. Regulatory control is based on the "polluter pays" principle. The costs of pollution are borne by those who are responsible for it.***

Regulatory control as a "*national measure*" to enhance energy efficiency

THE UNITED STATES MODEL

- **In a landmark decision in 2007 (*Massachusetts et al. v Environmental Protection Agency*) the Supreme Court of the United States ruled that the greenhouse gases came within the meaning of "air pollutant" as this term is defined in the 'Clean Air Act' (42 U.S.C.); and**
- **That the US Environmental Protection Agency had the power for regulatory control; in this case, the subject of the action being the regulation of greenhouse gas emissions from passenger vehicles and light trucks.**

Regulatory control as a "*national measure*" to enhance energy efficiency

APPLICATION OF THE US MODEL IN AUSTRALIA

- **Legislative amendment is required to prescribe carbon dioxide as a substance or pollutant, that comes within the legal meaning of "environmental harm", as this term is defined in the environmental protection statute for each State and Territory – not whether carbon dioxide causes climate change.**
- **The States and Territories would then have the authority to regulate carbon dioxide emissions through the Commonwealth legislative framework provided for as a "*National Environmental Protection Measure*".**

Regulatory control as a "*national measure*" to enhance energy efficiency

THE SCOPE OF THE US MODEL FOR AUSTRALIA

- **Adoption of regulatory control as a measure would facilitate a uniform Australia-wide standard for CO_2 emissions being set, that would be specific for each industry, or activity, and applied nationally.**
- **Any national air quality standard for "lowest achievable CO_2 emissions" would need to be initially based on existing technology / best practice environmental management - specific for each trade or industry that emits CO_2 – pending the proven development of new technologies e.g. CCS.**
- ***Setting a national standard for "lowest achievable CO_2 emissions", requires a bi-partisan approach between Government and industry to ensure that the national standard was both climate change-effective and cost-effective.***

Regulatory control as a "*national measure*" to enhance energy efficiency

ARE THERE ANY OTHER NATIONAL AIR QUALITY STANDARDS IN AUSTRALIA?

- ☑ **National air quality emission standards exist for carbon monoxide, nitrogen dioxide, ozone, sulphur dioxide, lead and particulates.**
- ☑ **For compliance purposes, activities that emit these substances require a permit, licence… issued under the environmental protection statutes of the States and Territories.**
- ☑ ***A similar requirement would be imposed should a national emission standard for air quality be prescribed for carbon dioxide.***

Regulatory control as a "*national measure*" to enhance energy efficiency

BENEFITS FOR THE COAL INDUSTRY, GOVERNMENT AND SCIENCE

i. **Maintenance and operation of coal-fired power stations by the energy industry could continue - subject to compliance with the national air emission standard.**

ii. **Flexibility for Government to change the target set for reducing emissions - from the "*transition phase*" of regulatory control to the "*application phase*" of proven clean coal technology.**

iii. **Validation of research into clean coal technology as being environmentally sound would act as a trigger for Government to increase the emission target over time.**

iv. **Scientific research into clean coal technology would have more effective timelines. The link between scientific and policy needs would be optimized.**

Regulatory control as a "*national measure*" to enhance energy efficiency

FINDING THE NATIONAL EMISSION STANDARD: CONFLICT RESOLUTION CONCEPTS

For regulatory control of CO_2 emissions to be part of any sustainable solution to combat climate change, Government must effectively involve **affected industries and science using a process based on established principles for conflict resolution, such as:**

- shared responsibility,
- joint problem-solving; **and**
- ownership in the outcome.

Kyoto Protocol "*national measures*" to reduce or to limit carbon dioxide emissions and to promote sustainability
2. SUSTAINABLE FOREST MANAGEMENT

- **Reafforestation has long been advocated and used as a desirable strategy to offset CO_2 emissions e.g. in 1988, a new coal fired power station in the USA funded a reafforestation project, over an area of 1000 square kilometres in Guatemala, to absorb its CO_2 emissions;**
- ***Estimates for the area of land required to stabilise the total CO_2 emissions for Australia are enormous (10);***
- **Reafforestation should be seen as a sound cost-effective option for reducing emissions – but only as part of any sustainable solution.**

Kyoto Protocol "*national measures*" to reduce or to limit carbon dioxide emissions and to promote sustainability
3. RENEWABLE ENERGY

- It is clear that the future will bring a much more efficient system of energy generation with 'renewables' *e.g. solar, wind, geothermal and tidal energy* , having a key role as part of any sustainable solution to reduce CO_2 emissions.
- The spatial dimension is significant as locations of land in Australia need to be both technically and commercially feasible for large scale renewable energy generation.
- US experience indicates the likelihood of litigation where potential locations may impact on the critical habitat of listed threatened species.

Kyoto Protocol "*national measures*" to reduce or to limit carbon dioxide emissions and to promote sustainability

3. *ENVIRONMENTALLY SOUND TECHNOLOGIES*

- **Clean coal technology such as "*Carbon Dioxide Capture and Permanent Geological Storage*" (or "CCS") has the potential to enhance regulatory control as a "national measure". It could provide industry with the means for achieving greater future reductions in CO_2 emissions.**
- **The capture, or separation of carbon dioxide are not in issue. But there is an element of uncertainty – the long-term fate of carbon dioxide following geological storage .**
- ***Agreement on introducing any new technology, such as CCS becoming part of any sustainable solution to combat global warming, should depend on any scientific uncertainty and risk being resolved and validated.***

Kyoto Protocol "*national measures*" to reduce or to limit carbon dioxide emissions and to promote sustainability

4. FURTHER ALTERNATIVES

i. "Bio-char Technology" (or *biosequestration*) has been advocated as having significant potential to reduce CO_2 emissions. Some form of cost/benefit analysis (*for global warming and food security*) would be advantageous for identifying soil types and land areas within Australia where bio-char could be part of any future, sustainable solution for global warming.

ii. LNG and nuclear energy are also future alternative energy sources and warrant constructive debate as part of a sustainable solution. However, they must satisfy the Kyoto Protocol requirement as representing *"environmentally sound technologies".*

THE SPECIAL CHALLENGE TO COMBAT GLOBAL WARMING

To reduce or limit carbon dioxide emissions and to promote sustainable development

The goal is to find a sustainable solution:-

(i) that represents the optional energy mix of "national measures" provided for in the Kyoto Protocol;

(ii) that will meet the national emission reduction target prescribed in the CPRS Bill;

(iii) that will promote sustainable development; and

(iv) that is "flexible and cost-effective" - *an object of the CPRS Bill [See section 3(4)(c)].*

What is meant by a sustainable solution to combat global warming?

- **A sustainable solution balances the multiple and competing objectives for sustainability - *ecological, economic, social and cultural.***
- **A sustainable solution does not focus inordinately on one objective *e.g. such as the focus of the ETS on economics.***
- **A sustainable solution secures as much available value as possible for Government, industry and the community.**

Has the CPRS Bill set targets to reduce greenhouse gas emissions for Australia?

- ☑ **Specific targets prescribed , over time, to reduce net greenhouse gas emissions - below 2000 levels – vary.**
- ☑ **The actual targets vary, depending on whether or not Australia is a party to a comprehensive international agreement capable of stabilising greenhouse gas concentrations at around 450 parts per million CO_2 or lower.**

  See CPRS Bill section 3(4)(a)(b)

- ☑ ***The prescribed targets in the CPRS Bill remain a source of controversy.***

The conflict resolution process for finding a sustainable solution to combat global warming

- **The process requires a number of *scenarios* to be defined along a continuum of sustainability.**
- **A *scenario* is a hypothetical construction of different mixes of "national measures" in the Kyoto Protocol that will meet the target for reducing CO_2 emissions as prescribed in the CPRS Bill.**

The conflict resolution process for finding a sustainable solution to combat global warming

- **An innumerable number of scenarios could be constructed. But the process requires a finite number of scenarios - with one proviso: all feasible "national measures" for reducing emissions are to be included in at least one scenario.**
- **Measures where *scientific uncertainty* exists e.g. CCS and bio-char technology, would only be included in a scenario when any uncertainty on their application had been resolved.**
- ***The continuum of scenarios is not fixed - but may change after evaluation commences.***

The conflict resolution process for finding a sustainable solution to combat global warming

- **Scenarios having different mixes of "national measures" for reducing or limiting carbon dioxide emissions are** systematically **evaluated, in terms of their *ecological, economic, social and cultural impacts.***
- The same objective criteria are used to evaluate all scenarios.
- ***A common emission reduction target and time scale applies to all scenarios e.g. action directed at meeting a target of "reducing net greenhouse gas emissions to between 5% and 15% below 2000 levels by 2020":*** **See CPRS Bill section 3(4)(b)(ii).**

Examples of some scenarios to combat global warming

Scenario 1*: "The rights of one option to prevail over all others"*

- ***Regulatory control through a national emission standard applying uniformly to all point sources of CO_2 emissions to predominate.***
- ***Compliance with the national air quality emission standard requires a permit, license… to be issued under the environmental protection statute of the relevant State or Territory.***
- ***Limited use of the renewable energy and reafforestation options.***

Examples of some scenarios to combat global warming

Scenario 2: "*Steady growth in the use of all options over time*"

- ***Regulatory control through a national emission standard applying uniformly to coal-fired power stations, high scale industrial emitters (e.g. iron or steel and cement production) under a permit, license... issued by a State or Territory – and for new motor vehicles.***
- ***The reduction in the regulatory control measure in Scenario 1 is balanced by greater use of the renewable energy and reafforestation measures.***

Examples of some scenarios to combat global warming

Scenario 3: "*Alternative options to fossil fuels as an energy source to prevail*"

- ***All locations of land - that are technically and commercially feasible - used for large scale renewable energy generation***
- ***Increased reafforestation. Reafforestation programmes provided through financial incentives by Government - or through private investment in "carbon forest sink" contracts.***
- ***All new industrial/energy producing facilities to be LNG based;***
- ***Burning of fossil fuels as an energy source prohibited.***

Examples of some scenarios to combat global warming

Scenario 4: "*The proposed CPRS for Australia (i.e. an ETS) to prevail over all others. The "ETS scenario" is objectively evaluated against the "National Measures Scenarios 1, 2 and 3"*

- ***Less than 1000 businesses will have to account for their emissions and buy or be allocated free permits.***
- ***$4.8b of assistance in the form of free permits for the most polluting electricity generators.***
- ***Financial assistance to compensate low and middle income families from increased costs.***
- ***Free permits to emissions intensive, trade exposed industries businesses e.g. aluminium (11)***

Evaluation of scenarios using objective criteria

- ☑ **Agreement on appropriate criteria to evaluate each of the multiple objectives is paramount.**
- ☑ **Some examples for possible objective criteria for use in the evaluation of scenarios follow:**
- ☑ **Ecological Objective (Resource Management):** ***Impacts on (i) biodiversity (ii) ecologically critical habitat of threatened species***
- ☑ **Ecological Objective (Heritage Preservation):** ***Protection and maintenance of (i) World Heritage Listed Properties (ii) cultural heritage sites***
- ☑ **Economic Objective (National and State):** ***Impacts on (i) gross domestic product (ii) balance of payments of nation (iii) mineral exports***

Evaluation of scenarios using objective criteria

- ☑ **Economic Objective (Regional):** ***Household income; employment/unemployment; range of employment options***
- ☑ **Economic Objective (Fiscal Consequences):** ***Net fiscal consequences for Government and industry***
- ☑ **Social Objective (National Security):** ***Probability of catastrophic bush fires; impacts on food security and primary production***
- ☑ **Social Well-Being Objective:** ***Continuity of production and costs of energy for the community***
- ☑ **Cultural Objective:** ***Promotion of Indigenous traditional knowledge for biodiversity***

The Preferred Scenario

- ***The 'Preferred Scenario' is one that most effectively balances the multiple and conflicting objectives for sustainability and which secures as much available value as possible for Government, industry and the community.***
- ***It may be one of the original scenarios evaluated. Or, it could be a new Scenario based on the best features of all the Scenarios evaluated - or even a 'new mix' of the "national measures" in Scenarios 1, 2, 3.***
- ***All Scenarios must meet the prescribed target set by Government to reduce CO_2 emissions.***
- ***The national emission standard arrived at by industry and Government must meet the prescribed target for reducing CO_2 emissions in the 'regulatory control' Scenarios i.e. the national emission standard is not an arbitrary and capricious one - but an integral link for reducing CO_2 emissions to combat global warming.***

Conclusions

- **Continuing uncertainty and concerns expressed about the effectiveness of the ETS to combat global warming should facilitate – not inhibit - alternative solutions being put forward to address the most pressing problem facing the globe.**
- ***Australia now has an opportunity to build on the foundations for sustainability set in the "Hawke-Keating" era and to become a catalyst for the world to consider the effectiveness of a sustainable solution as the basis for combating global warming.***

END NOTES

- (1) See Ferrey, S (2004) *Environmental Law. Examples & Explanations (3rd Edition)*, Aspen Publishers, New York.
- (2) Gaynor, F. (1950), MAX PLANCK, *Scientific Autobiography and Other Papers,* 33 -34. 'Respectfully Quoted: A Dictionary of Quotations, 1989'.
- *www.bartleby.com/73/1665.html* (accessed 2 October 2006).
- (3) Donald Rumsfeld Quotes-Funny Rumsfeld Quotations-Rumsfeldisms
- *politicalhumor.about.com/cs/quotethis/a/rumsfeldquotes.htm* (accessed 8 May 2008)
- (4) Pease, CM 'Will "peak coal" limit warming?' (2008) 25[5] The Environmental Forum (*Journal of the United S4ates Environmental Law Institute*) 18.
- *(5) Chandler, David 'Climate change odds much worse than thought. New analysis shows warming could be double previous estimates'. Massachusetts Institute Technology News. May 19, 2009 http://web.mit.edu/newsoffice/2009/roulette-0519.html/ (accessed 27 June 2009)*
- (6)World Commission on Environment and Development (1987), *Our Common Future*, Oxford University Press, Oxford, UK.
- (7) Halpern, S. (1992), 'The United Nations Conference on Environment and Development: Process and Documentation', Academic Council for the United Nations System. *http://www.ciesin.org/docs/008-585/unced-intro.html* (accessed 29 September, 2006)
- (8) Environment Protection and Heritage Council and the Ministerial Council on Mineral and Petroleum Resources , 'Draft Paper on Environmental Guidelines for Carbon Dioxide Capture and Geological Storage – November 2008'. http://www.nepc.gov.au/taxonomy/term/25 (accessed 6 February 2009).
- (9) See Sec. 1(e) *Assembly Bill 1493 (signed into law in 2002).* Commencing in 2009, the California Air Resources Board was required to adopt a regulation requiring carmakers to reduce global warming emissions from new passenger cars and light trucks. http://www.newrules.org/environment/climateca.html/ (accessed 6 March 2009).
- (10) See Christie, E. 'The greenhouse gases and environmental law' (1990) *Environmental and Planning Law Journal* 7, 114-126.
- (11) See Miles, Robert (2009) 'Practitioners Workshop for Managing Climate Change', *Sustainable Economic Growth for Regional Australia Conference*, Kalgoorlie, 26 October 2009.