

- 1.4 The various companies noted above are involved with other government, national, and international organisations in various collaborative agreements for the development of important fuels technologies.
- 1.5 In addition I am one of two founding directors of Neptune Power Ltd, which is progressing a major electrical generation harnessing the huge tidal current resource of Cook Strait, and has just acquired a Resource Consent for the initial 1MW turbine.
- 1.6 After an initial period with the Ministry of Works as a systems engineer partly involved in the Waitaki power projects, I joined the Tiwai Aluminium Smelter and over some 17 years held a variety of positions both as an engineer culminating in the position of Chief Engineer, and in positions of responsibility in the operations department of the smelter cast house both in operations management during a difficult period of reorganisation, and in technical management where development of refined products was a priority.
- 1.7 As a hobby and source of income and family enjoyment, my wife and I owned and operated a 36Ha sheep farm running 450 breeding ewes for 13 years in Southland. While not a full time farmer, I have always taken an interest in farming matters and use of the countryside, both in New Zealand and overseas.
- 1.8 I was attracted by an old boss to join a major smelter development in Bahrain as Chief Engineer (Mechanical and Electrical) for ALBA Aluminium for a new state of the art Pechiney technology expansion with a 300 MegaAmp potline rated at about 400MW power requirement. A new power station was planned using combined cycle gas/steam turbines. This project was highly successful despite the relatively untested technology and resulted in the aluminium production being raised from 235 000 to 470 000 tonnes per annum with almost no increase in natural gas consumption.
- 1.9 As a result of the success, our team was engaged to join a new smelter project in South Africa. This was to be a challenging new smelter which was the largest aluminium smelter ever built in one step. I was appointed Senior Manager for all disciplines of Mechanical. Electrical and Civil in charge of the Potlines, Casthouse, and Materials Handling areas. The power was to be supplied by Eskom from both the Highvoltage coal fired stations and part of the

recommissioned Cahora Bassa (2,075MW) hydro station on the Zambesi in Mozambique. This project exceeded expectations and the Pechiney pots were eventually able to be operated at 315,000 amps

1.10 The major investor, Billiton, was encouraged by this success and commissioned a pre feasibility study of another major Aluminium smelter this time in Mozambique itself. This was a major decision as it was not long after the civil war and South Africa was also just settling down for the new fully democratic era. I was appointed to head the pre feasibility study with the brief to develop a basic design and a fully bankable feasibility report. The first stage was to be a one full sized potline producing 295 000 tonnes per annum and using 400 megawatts of electricity. The report was accepted and regretfully I needed to return home for family reasons. The project continued and was so successful that it won the World Bank award for the best world wide development project for year 2000. The owners continued on to construct a second potline, also a success, and recently they were considering a third potline.

1.11 I was talked into being part of the specification, design, and contracting of a major expansion of the Worsley Alumina Refinery based in Western Australia. I was responsible for the interconnecting piping infrastructure and the bauxite mine expansion. In addition I was in charge of the electrical and control network for the refinery. This included a new combined cycle power station supplying electricity from a gas turbine generation set and second stage steam generation at three pressures for the refinery as well as further electricity from a steam turbine electric generating set.

1.12 Back in New Zealand, my wife and I purchased a small recycling company and developed my long term interests in sustainable energy supplies.

1.13 As a proud Engineer, I have taken the code of the profession very seriously, which is to adapt Nature and the scientific laws of Nature to the betterment of society and the overall economic good. I have always been interested in our natural environment and as a proud New Zealander I have always given conservation matters a high value. My wife and I have been members of the Royal Forest & Bird Society since joining in Wellington 37 years ago, and are presently serving on the local committee.

1.14 I am a regular member of the Christchurch Sunrise Rotary Club as well as a member of the Canterbury Employers Association and the Canterbury Employers and Chamber of Commerce.

1.15 I have been a keen tramper and enjoy the open unspoilt landscapes we have left in New Zealand.

1.16 I am a long term yacht owner and am a member of the Lyttelton Inner Harbour Cruising Club.

2.0 Engagement

2.1 I am appearing as a witness because of concern that there is a considerable disruption of society out of the intended intensive development of water diversion. In my opinion there is no likelihood of this project bringing greater added value to the community. There are other better ways of proceeding and we should not be wasting the country's scarce financial and engineering resources on schemes that disrupt society without a net improvement to the general farming community, the environment, and society as a whole.

2.2 I have read the Code of Conduct for Expert Witnesses in the Environment Court set out in Consolidated Practise Note (2006). I agree to comply with this Code of Conduct. This evidence is all within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.

2.3 In preparing this evidence I have reviewed and had regard to, among other material:

- a) The Briefs of Reports and letters for the Central Plains Water Trust as published in the media.
- b) Various reports by URS and in particular project general description titled Assessment of Environmental Effects for Resource Consent Applications to Canterbury Regional Council. Generally dated November 2005.

- c) The reports published by the Ministry for the Environment on Climate Change and effects in Canterbury in particular.
- d) The oncoming serious nature of Peak Oil and rising shortages in other essential resources such as phosphate fertilizer. The report to the US Department of Energy published February 2005 by Robert Hirsch is a good summary.
- e) Various papers from Southern African sources. One is International Trends and Challenges Workshop 19th March 2007

3.0 Peak Oil

The onset of peak oil is already causing changes to the world economy. These trends will spread from the immediate usages of fuel for transport and affect adversely most products made from metals, plastics, and building supplies. The immediate effect on the CPW project will be a major increase in capital cost of at least 250% due to the high proportion of diesel fuel required for construction. This will not be able to be recovered from any matching increase in high value boutique foods such as dairy products. Farming methods will change as oil, energy and fertiliser raw material costs continue rising. Higher costs of at least another 200% will be demanded for fertilizer and all forms of mechanization. These much higher costs will not be able to be readily passed on to the consumers. There will be a move back to agricultural production with lower demands on available resources. Farmers with a continuous commitment to a CPW scheme will be heavily overcommitted and are likely to require support from ratepayers or taxpayers.

The proposed dam and canal system is a financial commitment for 30 to 50 years. The benefits must be seen to be realizable for the next 50 years into an age where economic conditions will be vastly different.

The financial loss to the province as well as the backers will be embarrassing and if the councils are involved, the ensuring arguments will be divisive.

4.0 Fertilizer usage

High levels of irrigation on light Canterbury soils require a high usage of fertilizers because of nutrient loss into lower ground levels. This will become expensive with the increasing world shortage of phosphate in particular. Costs for mitigation of possible nutrient contamination to water supplies, remaining waterways, and coastal waters will also need to be met.

5.0 Climate Change

Climate change with probable global warming will increase even further the evaporative loss of stored water from both the dam and the canals. Evaporative

loss is a problem even now in the present climate and has caused a rethink about dams in other similar climates such as the Vaal river system in South Africa, and the Murray Darling basin in Australia. Dams will only be sensible up in the high country where the rainfall is greater than the evaporation.

As a good example, the huge Vaal dam construction has only operated at half design level since the first five years of completion when it was discovered the evaporative loss was several times greater than the total Johannesburg usage.

While dairy farming is not the only major benefactor of the proposed CPW scheme, it should be pointed out that the emissions from cattle will be a heavy cost, and especially when carbon costs rise substantially after general international agreement on the future carbon saving measures.

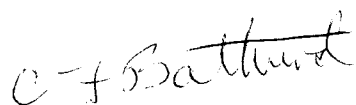
6.0 Present Farming Methods.

The possible CPW scheme with high capital investment cannot be compared with the benefits of sensible irrigation from bores direct from the aquifers. Canterbury is very lucky having a large aquifer where water can be stored and replenished without the loss by evaporation. The present bore system is of low capital cost and can be curtailed without serious loss in the future when or if it is found that the net benefits become outweighed by the adverse effects.

7.0 Conclusion.

This CPW scheme is not acceptable.

I ask the commissioners to withdraw the Notices of Requirement and decline all associated resource consent applications.



Chris Bathurst

15 July 2008

