

**IN THE MATTER** of the Resource Management Act  
1991

**A N D**

**IN THE MATTER** of submissions and further  
submissions by **SOLID ENERGY NEW  
ZEALAND LIMITED** (Submitter No.  
68) to the **MINISTER FOR THE  
ENVIRONMENT'S BOARD OF  
INQUIRY** on the Proposed National  
Policy Statement for Freshwater  
Management.

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**STATEMENT OF EVIDENCE OF IAN KENNETH GRANT BOOTHROYD**

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## **1. INTRODUCTION**

- 1.1 My name is Ian Kenneth Grant Boothroyd. I am a Director and Principal Environmental Scientist at Golder Associates (NZ) Limited, Auckland. I have over twenty years experience in aquatic ecology and resource management issues. I hold the qualifications of BSc (Manchester), MSc (Wales) and PhD (Waikato). I am a chartered member of the Institute of Biology (CBIOL, MIBIOL) and a member (and former Councillor) of the Royal Society of New Zealand (MRSNZ). I am a past-President of the New Zealand Limnological Society (New Zealand Freshwater Sciences Society), and a past-Councillor of the Royal Society of New Zealand.
- 1.2 Previously I have worked for the University of Auckland (Senior Lecturer, School of Geography, Geology and Environmental Science), the National Institute of Water and Atmospheric Research (NIWA) (Project Director), the Hawke's Bay Regional Council (Manager Environmental Monitoring), Waikato Regional Council (Environmental Scientist) and Hauraki Catchment Board (Water Quality Biologist). I established the 'Biodiversity of Freshwater Organisms of New Zealand' national research programme.
- 1.3 My areas of expertise are in aquatic ecology and entomology, especially the biodiversity of freshwaters, assessments of the effects of developments on aquatic and terrestrial resources, biological monitoring of freshwaters, and state of the environment monitoring. I have undertaken ecological surveys and site assessments throughout New Zealand for the past 20 years.
- 1.4 I have experience in working across the range of freshwater resources from large rivers to small streams throughout the North and South Islands, including high to low-altitude streams and waterways, geothermal and glacial streams, and have been involved in numerous investigations and research projects on the fauna and flora of streams and rivers including investigations associated with coal and gold

mining, energy generation, urban catchment sustainability, stormwater management, and land development, projects.

1.5 I have been provided with a copy of the Code of Conduct for Expert Witnesses in the Environment Court Consolidated Practice Note 2006. I have read and agree to comply with that code. I confirm that my evidence is within my area of expertise and that I have not omitted to consider material facts known to me that might alter or detract from my expressed opinions.

1.6 I have been engaged by Solid Energy (NZ) Limited in support of its submission on the Proposed National Policy Statement on Freshwater in New Zealand (hereafter referred to as the Proposed NPS).

## **2. SCOPE OF EVIDENCE**

2.1 The Board of Inquiry has received the submission from Solid Energy NZ Limited. It is not my intention to repeat the matters addressed in the submission; rather I will elaborate on the key themes and allude to case studies in support of the submission.

2.2 My evidence deals with the following matters:

- General comments on the Proposed NPS.
- The practicality and effectiveness of requiring Regional Councils to establish within Regional Plans freshwater quality standards and environmental flows for ALL Freshwater resources.
- The practicality and effectiveness of prescribing “notable values” to freshwater resources.

2.3 In presenting this evidence I will draw on:

- My experience of the implications of policy on the management of freshwater resources.
- My experience of assessing the effects of large and small-scale developments on freshwater resources.

- Findings of my own and others' studies in respect of aquatic ecological resources and their management.

### **3. GENERAL COMMENTS ON THE PROPOSED NPS FRESHWATER**

- 3.1 In considering the Proposed NPS Freshwater, I have some opening remarks regarding the overall concept, design and content of the NPS.
- 3.2 In considering the Proposed NPS, there is nothing within the Proposed NPS document that convinces me of the need for an NPS Freshwater for New Zealand at this time. Many of my concerns and reservations have been presented by Maree Drury in her evidence. However, as a practitioner involved in the sustainable management of freshwater resources in New Zealand, and with considerable experience of managing freshwater resources within the legislative framework of the RMA, and existing planning and plan frameworks within many regions, I fail to see how the Proposed NPS provides any additional value to the management of freshwaters.
- 3.3 In my opinion the RMA (especially Part 2 of the Act) and existing Regional Council policies and plans adequately provide the scrutiny, flexibility and 'checks and balances' necessary for the purpose of sustainable management of freshwaters in New Zealand.
- 3.4 In my opinion, the current Proposed NPS is poorly written and conceived. It is not clear how the document was developed, who was involved and what process was used in its conception and development.
- 3.5 In my opinion, the Proposed NPS does not contain the depth of reasoning, reference to literature and critique of ideas that I would expect to be articulated in the development of such a document. I have read the 'Proposed NPS Section 32 Evaluation', but this essentially focuses on alternatives and would benefit from a greater risk analysis and critique of the policies employed. I note that a second S32 evaluation is planned once the board of inquiry has conducted its investigation.

3.6 Indeed, in my opinion, the management of freshwater resources of New Zealand will be better served by a NPS or similar that is more visionary in scope than the current Proposed NPS but with specific directives as outlined in my evidence below.

3.7 Notwithstanding my thoughts on the overall concept, design and content, in the sections below I make more specific comments on the Proposed NPS.

#### **4. FRESHWATER QUALITY STANDARDS AND ENVIRONMENTAL FLOWS**

##### ***Terminology***

4.1 Policy 1(a) of the Proposed NPS requires Regional Councils to set Freshwater Quality Standards and Environmental Flows for all Freshwater Resources of the Region.

4.2 I will first reflect on the terminology used. The Proposed NPS uses the word ‘standards’ and defines a freshwater quality standard as “a regional rule on water quality which gives effect to this National Policy Statement”. As such, the definition differs from the traditional use of the word standard when applied to water quality, and is a term not typically used when referring to the ecological and biophysical quality and condition of freshwaters.

4.3 In developing a ‘National Environmental Standard’, the Ministry for the Environment defines national environmental standards as regulations issued under the Resource Management Act 1991 (RMA). They prescribe technical standards, methods and other requirements for environmental matters.

4.4 We currently have National standards for drinking water quality as defined by the Ministry of Health and we also have National Environmental Standards for Human Drinking-water Sources which

came into force on 20 June 2008 and which manage effects on human drinking water sources.

- 4.5 When receiving environment water quality is discussed in terms of numeric values that are used to protect water quality resources, uses and values, there are several terms used and each has quite a different meaning. These terms include guidelines, trigger values, criteria and standards. In the context of this submission on the proposed NPS, I will comment further on the potential establishment of water quality standards as numeric values.
- 4.6 Water quality standards (WQS) are legally binding numeric values that describe the desired ambient condition (i.e., level of protection) for a water body.
- 4.7 The USEPA uses water quality criteria for the protection of freshwater organisms from the effects of contaminants. Criteria specify the amounts of various pollutants, in either numeric or narrative form, that may be present in those waters without impairing the relevant values for which the resource is managed.
- 4.8 ANZECC (Australian and New Zealand Conservation Council, ANZECC 2000) has developed Trigger Values as guidance for the protection of freshwater biota at different levels dependent upon the condition of the receiving environment.
- 4.9 New Zealand has over the years utilised all of these terms in different situations. Currently there are few national water quality 'standards' for receiving environments. The recreational water quality standard for contact recreational activity is probably our most utilised.
- 4.10 Most commonly, 'standards' as applied to ecological, ecosystem, biophysical and habitat condition of freshwaters have been in the form of a narrative content, although a narrative that may be supported by numeric standards. For example, regional plans may make reference

to the Third Schedule of the RMA which informs narrative standards with some (limited) numeric standards to be met.

***Application of ANZECC trigger values***

- 4.11 My experience of assessing environmental effects for applications for resource consents (for a variety of uses including discharge of treated and untreated contaminated discharges (i.e., wastewater, stormwater, leachate), water takes for human and industrial use, land developments, has involved the use of ANZECC Guidelines. The ANZECC Guidelines are often the commonly used ‘default’ criteria for regional (and national) standards; or ANZECC trigger values are often established as ‘regional standards’.
- 4.12 Regional Councils around the country have developed their Freshwater Plans and have included receiving environmental standards in various forms. However in doing so, many Councils have utilised the ANZECC (1996) or ANZECC (2000) water quality trigger values and included them as ‘standards’. This transfer of trigger values from ANZECC (2000) directly into Plans as standards is not in my view an appropriate or effective use of the ANZECC numeric values as those values come with a ‘package’ that includes an overall approach that is not embodied in the Freshwater Plans in which they are included.
- 4.13 Several Councils are putting significant effort into the development of technically robust water quality frameworks for management in their regions. One example is Environment Canterbury (ECan) which is developing standards through the pNRRP. However, ECan are incorporating numeric values from ANZECC (2000) as standards without the supporting ANZECC framework and that has been the subject of evidence presented to ECan through the pNRRP hearings.
- 4.14 The key point that I am making in this section of evidence is that should the proposed NPS encourage Councils to incorporate numeric water quality standards (or indeed any numeric values) into their Regional Plans and include them as standards, the NPS should

provide an appropriate framework within which that can be undertaken. The Proposed NPS would benefit from a directive to provide a framework within which the use of numeric values is set.

- 4.15 Furthermore, Regional Councils have no mechanism for changing 'standards' easily when they embody values into their Plans. This is particularly important in the case of ANZECC (2000) values which have been adopted by many Councils. ANZECC values were last revised and republished in 2000. Subsequently there has been discussion about their validity. Within New Zealand this discussion has been in many cases fronted by Golder staff who have undertaken a range of work on the ANZECC (2000) numeric values on behalf of clients. Several years ago a rework of the ANZECC (2000) trigger values revealed a significant number of errors and omissions in the calculation of the values. The work associated with the re-evaluation of the values is extensive. For example, a re-evaluation of the boron trigger values has been undertaken on behalf of Solid Energy and the revised values included in the resource consent process in the Waikato region.
- 4.16 Another example was the re-evaluation of the zinc trigger values for Christchurch City Council which was then put to ECan as part of evidence on the pNRRP. In both cases, the evaluations highlighted the need to be able to update values used in freshwater standards that are designed to be part of a framework to protect freshwater values and uses. At present once embodied in Plans, I understand that Councils have no simple means of amending water quality standards.
- 4.17 In addition to the above, I would note that a process has commenced in Australia for the revision of the ANZECC (2000) water quality trigger values. This process will take several years. As such any trigger values incorporated into Regional Plans as a requirements of the NPS (if that approach to Water Quality Standards is used rather than narrative rules) will be out of date when the revised ANZECC values are released.

- 4.18 The establishment of consent or regional standards using the trigger values is something of a misapplication of these values. The trigger is a threshold value which if breached requires further investigation and site-specific evaluation, a feature that is not applied in the contemporary use of the trigger values as ‘regional standards’ or standards used in ‘resource consent’.
- 4.19 In my opinion, the Proposed NPS needs to provide for clear and specific guidance on how freshwater quality standards should be incorporated and implemented within a regional plan.

***Framework for freshwater quality standards***

- 4.20 In my opinion, the establishment of regional freshwater quality standards requires a robust framework for delivering such standards. Although such frameworks do currently exist, caution is required because the existing frameworks were not necessarily developed with a view to the application of regional quality standards.
- 4.21 In my opinion the Proposed NPS would benefit from additional guidance and direction that includes a requirement that councils establish a framework for freshwater standards, rather than any ‘blanket’ or across-region suite of the *same* standard as the Proposed NPS appears to anticipate.
- 4.22 Examples of existing frameworks that ‘type’ freshwaters are:
- The River Environment Classification (REC) is a GIS-based classification of New Zealand’s rivers as a tool for ecosystem-based resource management.
  - Freshwater Environments of New Zealand (FWENZ) is a comprehensive stream variable dataset.
- 4.23 Such frameworks or classifications group similar freshwater types within a region together in the same class and differentiate between different groupings or classes of freshwater types. This has been used

to give effect to the 'protection of 'life supporting capacity' and intrinsic values' of ecosystems (e.g., Horizons Regional Plan).

- 4.24 Establishing the same standard (water quality, ecological, habitat) as a single regional standard for such varying stream types would not do justice to the variation between freshwater types, nor provide for sustainable freshwater outcomes, unless vastly conservative standards are implemented. Clearly, implementing standards based on a typing framework or classification is preferable to a 'one size fits all standard', whether numeric or narrative or a combination of both.
- 4.25 The Proposed NPS provides for the establishment of notable values (especially outstanding and degraded freshwaters, Policy 1(b) for freshwaters). I discuss the practicality of 'notable values' in Section 5 of my evidence.
- 4.26 However, it is possible that an expanded 'values' framework could form the basis of the establishment of regional standards. Given inherent variability in freshwaters, even utilising a framework will likely lead to extensive conservatism in establishing standards for use at specific locations.
- 4.27 In my opinion, the Proposed NPS would be better served with a directive to establish a framework within which any freshwater quality standards will be implemented. The framework need not be detailed but rather the vision, purpose and criteria for establishment of a framework may be detailed in the proposed NPS.

### ***Site-specific standards***

- 4.28 I have been involved in a number of cases where environmental (numeric water quality) standards have been developed for a specific location or site. In these cases, the actual water quality, biota and habitats at the specific location are taken into consideration in the development of standards.

- 4.29 For example, I have assessed and monitored the effects of elevated levels of boron in a heavily modified lowland stream which resulted in resource consent conditions that applied a higher level of boron in the receiving waters than previously applied; no effects on the stream biota occurred resulting from the elevated boron levels. This work was used in the development of a regional boron standard.
- 4.30 I have also been involved in the establishment and long-term monitoring of site-specific discharge criteria for treated gold mine wastewater discharges to a small rocky bottom stream in the Coromandel Ranges. This discharge resulted in elevated levels of several heavy metals with no effect on the stream biota, and set a standard by which mining activities could operate.
- 4.31 With respect to river and stream flows, I have been involved in the successful establishment of ecological flows with resultant minimum flows (i.e., 50% MALF) varying significantly from contemporary standards (70% MALF) based on specifically-derived data from the actual site of the potable water take, which resulted in significant social and economic benefits to the community.
- 4.32 It is my experience that site-specific derived freshwater criteria better provide for the sustainability of freshwaters than blanket regional (or national) standards. The ability to derive site-specific standards prevents the need to defend conservatism and allows for the implementation of realism.
- 4.33 In my opinion, the Proposed NPS needs to provide guidance and direction not only on the establishment of freshwater quality standards and an associated framework (as discussed in my evidence above) but also on the flexibility to establish standards specific to locations and a transparent process to provide for this to occur.
- 4.34 The use of ANZECC trigger values as freshwater standards continues in practice and increases the conservatism applied to standards. In my experience the increased conservatism in standards results in a

greater unwillingness to accept site-specific assessments, no matter how rigorously they may have been carried out.

- 4.35 Of course it will not be possible for a regional plan to provide for specific standards at every site within a region; rather it is my opinion that freshwaters will be better served if the Proposed NPS provides for the flexibility for the (best practice) establishment of site-specific standards to supersede regional (or national) standards.

## **5. NOTABLE VALUES**

- 5.1 Policy 1(b) of the Proposed NPS provides for Regional Councils to specify objectives, policies and methods which identify notable values (including potential values) of:

- (i) Any Outstanding Freshwater Resource; and
- (ii) Any Degraded Freshwater Resource.

- 5.2 Definitions of Outstanding and Degraded Freshwater Resource are provided in the proposed NPS and Notable Values in relation to any Freshwater Resource includes:

- (a) Scientific, ecological and biodiversity values.
- (b) Cultural values.
- (c) Recreational (including contact recreational; e.g., swimming) values.

- 5.3 I support the establishment of 'notable values' of freshwater resources and consider such an approach to overcome some of the issues associated with the use of other frameworks (as outlined in Section 4 of my evidence). In her evidence, Maree Drury has discussed a variety of matters associated with the establishment of 'notable values'; in general I concur with her views and will not repeat the matters here. However, I draw the Board's attention to the following matters.

- 5.4 As with the establishment of regional standards, there is a risk that the method(s) that Councils use to establish their 'notable values' may differ considerably around New Zealand resulting in differing outcomes

for similar 'values' or freshwater types. In my opinion, the proposed NPS would benefit from directives to the use of a scientifically rigorous and defensible method for establishing values.

- 5.5 Likewise, I am concerned about the potential for a 'notable values' framework to become a 'protectionist' framework, and fail to relate to the potential or actual effects of freshwater resource use. In this, it is possible that the 'protection' will be interpreted as not available for use. Such protectionism does not provide for the sustainable management of resources and has the potential to limit initiatives that enhance freshwater resources and increase their ecological resilience.
- 5.6 In this it is my opinion that the use of notable values would be best served by the establishment of higher benchmarks, perhaps including a higher threshold of use, or higher and specific freshwater standards of the receiving waters to be met when assessing the potential effects of land and water resources which have the potential to affect outstanding freshwater resources.
- 5.7 The 'notable values' framework provides no intensity of scale (of outstanding or degradation) thus allowing for a highly subjective assessment of values. This begs the questions: At what threshold would a freshwater resource be deemed outstanding or degraded?; how much of a catchment, lake or wetland will carry the same 'value?', are all questions relevant to establishing 'values' and their use in management of freshwaters? In my opinion the proposed NPS would benefit from a directive to guide the spatial, temporal extent and the magnitude of the notable values.
- 5.8 It may be known to the Board but the Auckland Regional Council (ARC) have already commenced the implementation of establishing 'notable values' of freshwaters of the Auckland region as part of its review of the Regional Policy Statement and in anticipation of the implementation of the Proposed NPS.

- 5.9 I have been providing independent advice to the process of establishing ecological criteria for freshwater resources so I have developed some experience in the establishment of a 'notable values' framework. This experience has given me confidence that an expanded 'notable values' framework is workable.
- 5.10 For the benefit of the Board, the ARC expanded 'notable values' include 'high value', 'degraded with high potential for restoration or enhancement' and 'low potential for enhancement' as well as 'outstanding' levels of value.
- 5.11 The approach adopted by ARC for identifying notable ecological values utilises existing databases and/or threshold values known to be significant in sustaining freshwater resources. Such an approach means that substantive new data does not need to be collected but is based on sound scientific rigour.
- 5.12 Thus, in my opinion, the proposed NPS would benefit from some directive on the methods by which a 'notable values' framework can be established.

## **6. CONCLUSIONS**

- 6.1 In considering the Proposed NPS, there is nothing within the Proposed NPS document that convinces me of the need for an NPS Freshwater for New Zealand at this time. In my opinion the NPS needs a significant improvement so that it is more visionary in scope than the current Proposed NPS but with specific directives as to how to achieve the vision.
- 6.2 In my opinion, the Proposed NPS would be better served with a directive to establish a framework within which any freshwater quality standards will be implemented.

- 6.3 It is my opinion that freshwaters would be better served if the Proposed NPS provides for the flexibility for the (best practice) establishment of site-specific standards to supersede regional (or national) standards.
- 6.4 In my opinion, the proposed NPS would benefit from some directive on the methods by which a 'notable values' framework can be established.

Ian Boothroyd  
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