

5 March 2010

Ref: CO6C/18965

## MEMORANDUM

**FROM: DR. ADRIAN MEREDITH (SURFACE WATER SCIENTIST)**  
**TO: ANGELA DEAN**  
**SUBJECT: CENTRAL PLAINS WATER RESOURCE CONSENT APPLICATIONS TO TAKE AND USE WATER**

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You have asked me to comment on further detail of proposed conditions or monitoring programmes for the proposed Central Plains Water Resource Consents. In particular, you have asked me to comment on wording and content relating to (i) Fishing intake screening (exclusion), and (ii) surface water quality monitoring programmes in the lower plains and Lake Ellesmere/Te Waihora.

### **1. Intake Fish (exclusion) screening.**

(a) I believe the draft conditions proposed by commissioners (and arising from ACWT consents), are pretty comprehensive, logical, and consistent with current local and international guidelines and science with respect to proposed construction of a "conventional" engineered fish "screen". Therefore, if the final agreed approach is to stay within the bounds of an above ground 'concrete and passive or mechanical screen' facility, then I consider the draft consent conditions to be broadly appropriate.

In that regard, I note that the proposed conditions do not allow for consideration of other approaches such as submerged gravel galleries and permeable embankments that have been proposed and/or approved for schemes such as North Otago Irrigation Co, Rangitata South etc... Should the applicants subsequently consider that they wanted to progress designs in that direction, and then it would necessitate a change/variation to consent following discussion with F&G and DoC etc. and other submitters.

In terms of the detail of the proposed consent conditions (from the ACWT consents), I suggest some clauses could be worded a little more clearly to state the full intent of the recent NIWA/ECan guidelines, and/or more carefully use the terminology of the guidelines (that are similarly drawn from careful consideration in international literature).

These include:

6(a) (ii) could be tightened up to the terms in the guidelines by stating "mesh with maximum 3mm dimension (side of square or maximum diameter of aperture), and maximum slot width of 2mm". The mention of "wedge wire", while a preferable modern material, is possibly overly specific and unnecessarily restrictive on material choice for subsequent designers. There are particular design types that wedge wire materials are not suited too. It could be a little overly constraining upon subsequent designers.

6(a) iii approach velocity design criteria should be specified clarified as "perpendicular to the screen surface"

6(a) v - 'connect' should really state '...provide unrestricted passage to and from ...'

6(f)i(a) specifically refers to "slot size" that again is more specific and limiting than the original breadth of 6(a)ii that allows for mesh or slotted materials..

These suggestions are not critical, but are a refinement of the previous ACWT conditions, and so largely are just the result of proofing and adjustment to address either potential looseness or overly restrictiveness in the consent clauses. They should not change the intent or effectiveness of the conditions, but would be tidier for all parties and use by subsequent designers.

**(b)** I would make the following comments on the alternative approach for fish screening management offered by Mr Lewthwaite (URS for CPWL).

Mr Walter Lewthwaite (URS - for CPW) raises some philosophical issues with Fish screen (exclusion) conditions and proposes a number of alternative conditions and approaches. In justifying these he draws extensively on the Ngai Tahu Properties Ltd (NPL) consent conditions at Browns Rock on the Waimakariri River, generated from resolution of appeal. I note that I do not totally agree with his description of the resolution of that process. It is one where parties (such as himself and myself) could/should be somewhat constrained in discussing some components of the resolution, because they were largely derived from lengthy discussion in formal Environment Court mediation, so are somewhat confidential to the parties then present, as per the conditions of "Alternative dispute resolution" (Environment Court Practice Note July 2006).. However, subsequently, there has been considerable discussion and circulation of elements of that process by the different parties in open processes such that I do not believe such confidentiality is necessarily relevant any longer. Suffice to say, that I would not consider the NPL outcome to be a simple or clear cut resolution that could be precedent setting on subsequent applications or consent conditions.

Firstly, It was acknowledged in the NPL mediations that a screen "as applied for" was very unlikely to be constructed in the near future (or at all), as a number of other existing and proposed abstractions at the same site were likely to influence any subsequent composite agreed and constructed intake. Therefore, it was agreed and acknowledged by the parties to the resolution, that in reality it was inappropriate to specify a firm design at that point in time. Also given expected considerable delay in actioning any intake, then philosophical and engineering developments were likely to evolve considerably over the intervening years. It was therefore for these primary reasons that firm engineering design specifications were unusually NOT specified or agreed in that resolved consent appeal. Further it was expected that such a future composite design would likely depart so greatly from the application, that a formal variation would most likely be required with active participation in the approvals by all of the dispute parties.

Secondly, I recall that Fish and Game NZ was the only significant submitter in opposition that was a formal party to the NPL appeal. Therefore, they (FGNZ) argued for (and agreed to) a resolution that acknowledged ONLY "salmonid fisheries" and consequent effects upon it. The CPWL process has a number of other active submitters who have argued for much wider fish community and fishery issues. Also the CPW intake is considerably larger than NPL and could potentially affect a much larger proportion of the river/fish community than say the NPL intake. Therefore, I believe it is NOT appropriate for CPW fish screening conditions to relate only to "salmonids", and only to a "fishery", and "needs of that fishery" as per the NPL consents. The CPW screening issues should consider effects on all components of the ecological community discussed throughout the hearing and, I assume, subsequently considered significant by the CPW commissioners.

Thirdly, NPL argued for an agreement on an "acceptable" degree of fish loss (or pre-determined level of screen effectiveness) as a starting point for screen design. This was vigorously disagreed by both FGNZ and ECan throughout that appeal process. FGNZ disputed it on the basis that they could not simply agree to an *ad hoc* incremental destruction of their mandated resource (salmon and trout), especially without substantial mitigation or compensation. ECan argued that that approach ran counter to the overlying philosophy of the Fish Screen Working Party derived guidelines, where guidelines strove to agree on appropriate design features and agreement such that expensive and onerous litigation on agreeable degree of effect, and/or similarly onerous monitoring of screen effectiveness for compliance purposes would not become necessary. The resolution of this NPL

process did NOT (in my opinion) agree in any way to embracing such a philosophy of predetermined or agreed level of screen effect/effectiveness. I am further, not aware of any other subsequent process where such an approach has been agreed in Canterbury for a new operation (only the Rangitata Diversion Race (RDR) embraced such a philosophy and then only as a side agreement with FGNZ and in acknowledgement of an existing operation and over 50 years of previous ongoing (unscreened) effect). While Mr Lewthwaite refers to the Hunter Downs and Wairau consent processes as precedents also, I am not aware that these two consent processes have been resolved or granted, as Hunter Downs is still an application under way, and the Wairau consents are under current sitting appeals at the Environment Court. Therefore, I do not consider them to be in any way useful "precedent setting" examples, if indeed they do provide any resolution of the approach.

Therefore, for these three reasons I cannot lend any constructive or serious support to the screening conditions and philosophy suggested by Mr Lewthwaite on behalf of CPWL, and do not consider them an appropriate basis for screening design and conditions for the CPW proposed installation. I continue to agree with the broad basis of the previously circulated ACWT consent conditions, and small refinements or review of them I have previously suggested. I further agree a further refinement I note in Mr Lewthwaite's suggestion such - that design plans should be certified by BOTH an engineer AND fisheries biologist (not either/or).

## **2. Surface Water Quality Monitoring Programme.**

You asked me to broadly consider the scope and intensity of surface water quality monitoring programmes to monitor the potential and likely effect of the CPWL scheme and appropriate approaches for setting targets that the monitoring should be responsive too.

In considering this I also take considerable awareness of the existing long term monitoring conducted by Environment Canterbury in this area over the past 17 or more years. It is entirely appropriate that such monitoring programmes are coordinated or incorporated into one another.

### **1. Lake edge stream sites:**

Ecan has 7 lowland stream surface water quality monitoring sites which are sampled monthly with some rated sites (continuous flows available) and others gauged when water quality sampled. These sites are primarily maintained to enable assessment or calculation of MASS LOADS of nutrients and other contaminants being exported to Lake Ellesmere/Te Waihora.

I would envisage a requirement to assess the comprehensiveness of that programme for achieving the same purpose for CPWL effects on the lake. A coordination to include similar monitoring with the ECan monitoring would be needed to ensure all input streams to L Ellesmere are covered (I am aware that there are some (3-4) further significant waterways to the south of the current sites that are not currently monitored).

### **2. Spring zone stream sites:**

I would also envisage a need to monitor a suite of sites (say another 10) upslope of the lake inflow sites (also monitored monthly) nearer the spring zones where the lowland springfed streams arise from springs, and where groundwater nutrient and other contaminant concentrations into surface waters can be more clearly differentiated from combined groundwater and surface sourced (i.e. overland flow) contaminants. These sites and monitoring are therefore necessary to assess water quality of spring zones where they are reflecting (state and trends) in CONCENTRATIONS of contaminants actually arising from regional groundwater. While contextually useful, there is therefore lesser explicit requirement for gauging and flow assessment at this second suite of sites.

### **3. Lake Ellesmere sites:**

ECan routinely samples 4 water quality sites in Lake Ellesmere monthly by boat. I am aware that there has recently been a suggestion of requirements to sample two further sites in the lake (arising from more recent research). Therefore, as in the above programmes, there would be a requirement

to "coordinate" with ECan monitoring so that unnecessary duplication doesn't occur, but that the appropriate information on the state and trends in lake water quality were continued to be collected.

4.Triggers:

Similarly trigger conditions should be integrally linked into the three monitoring programmes and philosophies above. These would include with CONCENTRATION triggers developed as either (% or concentration) increases from a specified mean background (as of a specified date) or increases from an agreed trigger concentration say from NRRP tables (Schedule WQL1), and similarly mass load triggers of a similar philosophy to above (% or absolute increase from annual average as at 2009?) or above an pre- agreed annual load (suggested by CPW?). Without any explicit trigger conditions monitoring would just be an information gathering exercise without clear purpose.