7th August 2009

Rebecca,

The commissioners are seeking a chemical or other rational basis for determining if the vegatative load retained in the reservoirs will lead to water quality issues (O2 depletion) or release of green house gases (presumably methane).

HDL's proposal is to only strip the minimum from the reservoir before inundation. HDL does not want to strip the site as we believe that stripping would lead to an unnecessary sediment load from the stripping operation and the bare soils left after stripping. It would also remove species which may tolerate the frequent inundation and will add to the completed reservoir landscape and ecology.

In response to the Commissioners' question on water quality modelling

Tim Mulliner, Environmental Scientist with URS New Zealand Limited, who undertook the modelling has responded.

To put it simply:

The predicted water chemistry for the HDL Hydro scheme did not take into account vegetation type within the scheme boundaries or vegetation decomposition within reservoirs. This would be a very complicated analysis. Bearing in mind the quantity of water likely to be flowing through the scheme, I would think it unlikely that the decay of vegetation as a result of flooding the reservoirs would have a significant effect on the overall water quality of the scheme.

In response to the Commisioners' question on greenhouse gases

HDL has sought information from Don Hammond (B.For Sci Hons) responsible for managing forestry block on the West Coast.

Don has advised that a high end figure of 800 tonnes per hectare of carbon is used for mature high yield pine forest. This figure includes the carbon contained in roots. Normally 600 tonnes of Carbon is contained in logs.

Mixed vegation grasses and scrub with no more than 10% tree cover will contain in the order of 10 % of this. 80 t / ha carbon is considered representative for the SPHP reservoirs.

The area of the combine reservoirs is approximately 70ha of which approximately 30% will remain covered by vegetation after stripping for borrow pits, access roads etc has been undertaken.

One tonne of carbon can form 1.33 tonnes of CH4 (C12 + H4) while in an oxidising environment it would make 3.5 tonnes CO2 (12 + 2*16) .

Clearing of the construction area will produce 70ha * 70% * 80 t/c/ha * 3.5 tCO2/ tC = 13720 tCO2 equivalent

Inundation of the remaining area will produce 70ha * 30% * 80 t/c/ha * 1.33 tCO2/ tC = 2234 t methane

To put this into context, when commissioned, the project will avoid approximately 39,600 tCo2e

per year through power generation (Deloittes Financial Viability Assessment p23).

O2 depletion in the lower stratifications of the reservoirs as a result of decay is expected to have no geater adverse effect on the life supporting potential of the reservoir, or the ocean at the outfall in excess of that already cause by water chemistry of inflows to the reservoir.

The release of Co2 and the depletion of oxygen due to plant decay will be progressive and reduce with each cycle of filling and lowering of water levels which can be expected to occur at the frequency shown in the scheme modeling; approx 25 cycles of per year, refer to inundation profiles in John Easther Evidence figure 10-2. Any adverse effects are expected to be exhausted in the first year or so of operation of the scheme.

John Easther
7 August 2009