Q. Re: Pre-filed Testimony of Mr. P. Bowman, page 19, lines 10 to 12:

"...the rate regime can far more readily carry the costs of accruing for removal in the latter years of an asset's life, once the original price has been significantly depreciated..."

Please provide all calculations and workpapers prepared by Mr. Bowman in the determination of a revised removal rate based upon the above assertion.

A. Mr. P.Bowman did not calculate nor determine a revised removal rate for NLH. In fact, other than for hydraulic generation and major transmission, Mr. Bowman supports NLH's proposal. For hydraulic generation and major transmission, Mr. P.Bowman's revised removal rate is determined by the fact that no "interim retirements" have been justified, not a theoretical consideration of timing to "carry the costs".

Further, the cited reference was intended to address regulatory practice generally, not Mr. P.Bowman's position on Hydro's proposals. The issue of "carry the costs" is related to the economic concept of what real value a ratepayer is getting for the services provided by the asset in different years. The full quote referenced in the RFI question reads as follows [Mr. P.Bowman's evidence, page 19, lines 7-15]:

> A number of regulators have not supported the inclusion of future removal costs in rates as part of depreciation, due to the high degree of rate impacts early in an asset's life, when asset affordability is at its most challenging. This is particularly true for large fixed cost assets (e.g., hydraulic generation or transmission). In contrast, the rate regime can far more readily carry the costs of accruing for removal in the latter years of an asset's life, once the original price has been significantly depreciated, rate base values are lower, load may have grown, the asset may be more heavily loaded for utility service (meaning the asset is providing greater value to ratepayers, despite having a lower cost profile in revenue requirement), and inflation has helped decrease the real economic impact of asset depreciation.

As to calculations, see Attachment 1 to this response for illustrative calculations:

- Figure 1 shows the revenue requirement, by year, for a traditional straight-line depreciation without salvage of a hypothetical $10,000 asset with a 20 year life. Cost of capital is assumed at 8%. This figure shows that ratepayers in the early years pay more for the asset in nominal terms for revenue requirement than those in the later years. Assume the asset serves 100 MW.h.
- Figure 2 shows what happens when the Figure 1 values are turned into the real (after inflation) unit costs paid by ratepayers for this asset given an assumed 2% inflation rate and 2% annual load growth. Figure 2 also shows what the cost profile would need to be to achieve a result where ratepayers in year 20 paid the same as ratepayers in year 1, on a real basis in $/MW.h – i.e., to achieve a level real unit cost (in this case $7.5/MW.h).
- Unfortunately for any effort to levelize depreciation, the approach that would be need to be taken to achieve this depreciation method is shown in Figure 3, which is clearly unworkable as a depreciation methodology (e.g., leads to slightly negative depreciation in the first year). As a result, this cost profile is rarely achieved in utility ratemaking.

The issue of when ratepayers can “carry the costs” of salvage is cited in relation to Figure 2, which shows the highest unit costs for the facility itself are already burdened into the early years for ratepayers, and the back end is a much lower real cost for the facility.

In contrast, the concept of salvage, which is not mandated to be on a straight-line basis, could in theory permit some movement towards helping achieve a level cost profile somewhat closer to Figure 2, an example of this concept (though not a proposal nor methodology that Mr. P.Bowman advocates) is shown in Figure 4. Figure 4 illustrates that when Net Salvage is loaded onto straight-line asset depreciation (the blue line) consistent with Hydro’s form of proposal, it serves to drive up costs throughout the life of the asset. Figure 5 shows this compares the “no salvage” and “with salvage” straight line depreciation methodologies to show how this straight-line approach to net

salvage (the blue line) drives revenue requirements higher to ratepayers in the early years (i.e., compared to the red line). In contrast, accruing for net salvage nearer the end of the asset's life (such as waiting to accrue for an ARO until the asset retirement is built into utility plans and can be costed and scheduled) would lead to the salvage showing up much later in the asset cost profile (the dotted red line). This approach to timing the asset salvage collection, on a real unit cost basis, is shown in Figure 6. As noted, though this concept may be alleged to "back end" the collection of salvage, it much more closely aligns with a concept that with inflation and load growth, the system can more readily carry the costs of the salvage.