

## APPENDIX 1 – REFILL CURVES

### Procedures For Determining Assured Refill Curves and Variable Refill Curves that are Consistent with an Optimum Power Generation

(Updated on December 07, 2010)

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1. **Assured Refill Curves:** The Assured Refill Curve is developed in the manner outlined in Section 2.3.B(1) of this document, except as revised to include the following.
  - a) Initialize Assured Refill Curves at project minimum release discharge requirement.
  - b) Do not perform an ARC only refill test.
  
2. **Variable Refill Curve:** The Variable Refill Curve is developed in the manner outlined in Section 2.3.B(2) of this document, except as revised to include the following.
  - a) Initialize Variable Refill Curves at project minimum release discharge requirement.
  - b) Apply a Variable Refill Curve Lower Limit at Grand Coulee for all volume runoff levels of 1225.0 ft in March and April, 1240.0 ft in May, and 1285.0 ft in June. The January and February Grand Coulee's VRCLL values would be the same as its Operating Rule Curve Lower Limit (ORCLL).
  - c) Variable Refill Curve Lower Limits apply only to individual months and do not require raising prior months by the same amount.
  
3. **Refill Study:** Each year is examined for compliance with the refill test criteria. In years when the system does not return to 98% of full and secondary energy is produced during the January-July period, the Power Discharge Requirement (PDRs) are increased at those projects that do not refill and are not on minimum flow or constrained by flood control requirements. If VRCs at all projects that fail to refill are raised to their ARCs, and the Refill Test is not satisfied, it may be necessary to raise the ARCs and/or VRCs further to pass the Refill Test. Once these adjustments are made, the refill test is repeated and adjustments made to the ARCs and VRCs as necessary. Since PDRs can be raised to cause one year to pass the refill test criteria, those new PDRs may be higher than necessary to eliminate secondary energy in another year. Hence, the PDRs that pass the refill test criteria may not be the lowest possible uniform PDRs. To achieve the lowest possible PDRs, downward adjustments are made to the PDRs to see if any reduction can be made and still allow the system to meet the refill requirements.

The word uniform is used here to denote to ARCs and VRCs that large, abrupt changes (spikes) are avoided. Uniformity is considered in a two-dimensional grid. The PDRs remain level or increase across the January-July time period, and they should become smaller as the volume runoff level at The Dalles (PDR range) becomes large.

Replaces previous pages 71-72 dated November 2003.

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