

GLOSSARY OF TERMS

Acre-foot - the volume of water that will cover an area of one acre (43,560 square feet) to a depth of one foot. It is approximately equal to 326,000 gallons or 0.5 second foot days.

Actual Energy Regulation (AER) - studies which determine the energy content curve (ECC) for each project. These studies are performed by the Northwest Power Pool (NWPP). When reservoirs must be drafted below the ECC to meet firm energy loads, the AER sets the proportional draft points to equally distribute the draft between each reservoirs critical rule curves (CRC's).

Annual operating plan - the yearly plan for operating reservoirs in the Columbia River system as required by the Columbia River Treaty (with Canada) and the Pacific Northwest Coordination Agreement (PNCA).

Annual storage projects - storage projects that are drafted to the same operating rule curve each year and then refill according to their CRC.

Assured Operating Plan (AOP) - a plan for the way the Columbia River system will be operated which is developed six years ahead to determine U.S. and Canadian benefits of Treaty projects.

ARC (Assured Refill Curve) – ARC's establish the lower limits to which cyclical storage projects may be drafted and expect to refill to Storage Upper Bounds (SUB) by 31 July. ARC's are based on the natural water conditions that occurred during the third lowest water year of the sixty years of historical record. For projects upstream of Bonneville Dam the third lowest water year is 1931 (1 August 1930 - 31 July 1931). Willamette projects and Westside projects may require a different water year based on each basin's third lowest runoff volume.

Arrow local method - is a method that may be used when calculating the VRC at Arrow. The method is triggered when Mica's end of month storage content is lower than Mica's computed VRC for a period. When this occurs, Mica's end of period content becomes Mica's VRC and Mica's project outflow plus any local inflow to Arrow becomes Arrow inflow. Arrow's VRC for the period is then calculated with Arrow treated as a head-water project.

Base TABOUT - the output file from a HYSSR regulation which does not contain operation for Water Budget, forced spill for fish passage, or other operations that will cause release lower bounds to be higher than a base case study. This Base TABOUT is used for the computation of ARC's and VRC's.

BECC (Base Energy Content Curve) - the higher of the Assured Refill Curve (ARC) and the 1st year Critical Rule Curve (CRC1).

Continuous study - a study which begins with all reservoirs at a certain level and a prescribed set of rule curves or operating criteria, sequentially operates each project and period in the current year, and continues the next year with the resulting reservoir elevations at which current year ended.

Control points - locations on the river where streamflow or water surface elevation targets have been established to meet a particular need.

Critical Period - the months of the historical record that will produce the least amount of energy if all reservoirs started full and were drafted empty.

Critical Rule Curves (CRC) - for each project a set of rule curves are developed which represent that project's minimum reservoir elevation to ensure that the firm energy requirements can be met under the most adverse historical streamflow condition (Critical Period). One CRC is developed for each year of the Critical Period. The CRC's are used for proportional draft of the reservoirs.

CRC1 (First year Critical Rule Curve) - the Critical Rule Curve which corresponds to the reservoir elevations of the first year of the Critical Period.

CRC2 (Second year Critical Rule Curve) - the Critical Rule Curve which corresponds to the reservoir elevations of the second year of the Critical Period.

CRC3 (Third year Critical Rule Curve) - the Critical Rule Curve which corresponds to the reservoir elevations of the third year of the Critical Period.

CRC4 (Fourth year Critical Rule Curve) - the Critical Rule Curve which corresponds to the reservoir elevations of the fourth year of the Critical Period.

Cyclical storage project - storage projects that have carry-over storage as defined in Section 7 of the PNCA.

Depleted flows - natural flows that have been adjusted to represent the appropriate diversions and withdrawals from the actual flows measured.

Depletion level - adjustments made to account for irrigation diversions (except at Grand Coulee Dam which has separate irrigation depletions) and withdrawals and other changes in conditions since the original measurements were made. The adjustments attempt to simulate natural streamflows under today's conditions.

ECC (Energy Content Curve) - the lower of the Base Energy Content Curve (BECC) and the Variable Refill Curve (VRC) for a project.

External project number - the accepted HYSSR number for a project that is used to refer to that project's input and output data in the HYSSR programs.

Internal project number - the project number given a project during the development of the Study Characteristics file (STCHAR) which assigns a number to a project based on the project's location in the river system. This internal project number for a project is maintained internally by the program in the Study Characteristics file, the TDDATA file, the TDMODS file, and the TABOUT file.

LLVECC (Lower Limit Variable Energy Content Curve) also called LLECC - represents the limit for a reservoir's draft in January, February, March, and recently the first half of April to protect the system's capability to meet firm loads until the spring runoff begins. Limits are determined by using 1936-37 historical water to meet the system's firm energy loads.

MRC (Mandatory Rule Curve) - the level in the reservoir above which the project must not be to insure proper flood control protection downstream. These rule curves are also known as Upper Rule Curves (URC's) and flood control rule curves.

Operating Rule Curve (ORC) - the level to which a project may be drafted to serve secondary loads. During low runoff years, drafts to serve firm loads may cause reservoirs to be below the ORC. During the 1 August through 31 December period, the ORC is defined as the higher of the CRC1 and the ARC, unless the MRC is lower, then it controls. During the 1 January through 31 March period, the ORC is the higher of the ARC and the CRC1, unless the VRC is lower, then it controls. The ORC, however, may not be higher than the MRC, unless the Rockwood Amendment is being used. Also during this period the ORC may not be lower than the LLVECC. And finally, during the 1 April through 31 July period, the ORC is the higher of the ARC and CRC1, unless the VRC is higher, then it controls. The ORC may not be higher than the MRC, unless the Rockwood Amendment is being used..

Operating year - in the Columbia River Basin the year for planning and operating purposes begins on 1 August and continues through 31 July. Each month is a period, except April and August are each divided into two periods because streamflows differ greatly from the first half of these months to the second half. For PNCA studies an operating year generally has fourteen periods.

PDR (Power Discharge Requirement) - a minimum flow requirement at a project in CFS. PDR's are used to develop ARC's and VRC's and are a means of changing these rule curves to improve a project's refill.

Proportional Draft - all reservoirs in the system are drafted between rule curves in the same proportion to meet firm loads.

Refill study - a study which begins with all reservoirs at a certain elevation and with a prescribed set of rule curves or operating criteria; sequentially regulates each project and period in the current year; resets the next year to the initial reservoir elevations, and repeats this process each year through the historical record.

Release Lower Bounds (RLB) - the minimum project flow in CFS.

Release Upper Bounds (RUB) - the maximum project flow in CFS.

Rockwood Amendment - an option which may be used to determine the Operating Rule Curve (ORC) for a project. During a period when the VRC is the controlling rule curve for the ORC, the Rockwood Amendment allows the ORC to be higher than the Mandatory Rule Curve (MRC) which is the flood control rule curve.

Rule curves - represent reservoir water levels and provide guidance in meeting project purposes such as flood control, hydropower, and refill for wildlife and recreation. In some cases the rule curves are upper or lower elevations that should not be violated.

Run-of-River Reservoirs - projects which have limited storage and were developed primarily for hydropower and navigation. At run-of-river projects water enters (inflow) at approximately the same rate as it exits (outflow). The pond (lake) behind the dam generally remains at a fairly constant elevation all year.

Storage Lower Bounds (SLB) - the reservoir level (usually expressed as a content in AF or KAF) which represents project empty. There is generally storage below SLB but it is not used in project regulation.

Storage Reservoirs - projects which capture and hold water from snowmelt and rainfall until it is needed downstream. Storage reservoirs are generally upstream at the headwaters of a basin.

Storage Upper Bounds (SUB) - the reservoir level (usually expressed as a content in AF or KAF) which represents project full.

Thermal resources - non-hydro based power-generating plants; usually nuclear, coal, and natural gas plants.

Water Budget - established in 1984 by Northwest Power Planning Council to achieve minimum flow targets in the spring at Priest Rapids Dam on the Columbia River and Lower Granite Dam on the Snake River. These flow targets were established to assist anadromous fish passage.

VECC (Variable Energy Content Curve) - see the definition of VRC.

VRC (Variable Refill Curve) - also referred to as the VECC, defines the reservoir contents necessary to refill the reservoir by July 31. The VRC is determined by reducing the inflow volume forecast by a forecast error such that there is a 95% probability that the reduced forecast will be equaled or exceeded. The VRC is developed for each year of the historical record or from the actual forecast during an operating year.