

II.4-RES-SNGL-A-STPOOLQ SINGLE RESERVOIR REGULATION OPERATION SCHEME OUTFLOW BASED ON POOL ELEVATION AND STAGE AT DOWNSTREAM CONTROL POINTS

Description

Scheme STPOOLQ determines outflow based on the pool elevation and the flow condition of the downstream gaging stations.

Outflow of some reservoirs is restricted to a maximum value that is defined by various combinations of pool elevations and stages at one or two downstream control points. There may or may not be a significant drainage areas between the dam and the control points. If there is a significant drainage areas the hydrograph for the areas must have been computed prior to the Reservoir Operation. After each time period outflows from the dam (through the time period) are routed and added to the ordinates of the hydrograph for the local areas to obtain the forecast discharge and stage at the control points. The maximum permissible dam outflow for the next time period is determined from the pool elevation and a stage at the downstream control points. If there are two control points the lesser of the two permissible values will be used. If an outflow has been determined from a previous Scheme the minimum of that outflow and the maximum permissible outflow will be used.

Reservoir operating plans specify maximum permissible discharges for a 24 hour period. If the time period is anything greater than but an even multiple of the operation time interval the discharge must be proportioned into its fractional components. This is done through the use of a set of values describing the breakdown into time interval frequencies. Also some plans optionally allow for higher releases for short durations or for smaller releases over a longer period of time. This Scheme will only use the maximum specified for the operation time interval. A shorter operation time interval must be specified to utilize the finer release specifications.

Certain regulating plans call for different releases for falling stages than for rising. In this case either a different specification chart or a different future period to check on allowed flow is utilized for falling stages.

If two flow points are to be used complete parameter sets must be entered for both points.

For routing the discharges to the flow points a routing Scheme must be specified. One of the NWSRFS routing Schemes can be used. Although these routing methods are normally considered at the Operation level they are imbedded within the Reservoir Operation. Parameter input for the chosen routing method is the same as if the method were being specified on its own as an operation. Input descriptions for routing methods are in Section V.3.3.

Parameters

- (QDIST) - If the curves specify maximum 24 hour releases distribution factors (one per time interval) must be entered
- (LAG) - Number of hours in the future to check the downstream stages or discharges
- (RATING) - A reference to a rating curve is needed if the curves are specified using downstream stages
- (CONTROL1) - Release schedule curve of downstream stages or discharges versus permissible outflows for a number of specified intervals; 3 additional release schedules (CONTROL2, CONTROL3, CONTROL4) can also be entered
- (RISING) - Curve indicating pool elevation intervals and what release schedule to use for each interval
- (FALLING) - If requirements differ for falling stages a second curve (similar to RISING) may be entered
- (CURVE) - A rulecurve which is needed only if any of the pool elevations (in RISING) are based on a rulecurve elevation
- (RULETIME) - Time of day rulecurve is set
- (LAG/K) - Parameters necessary to define the selected routing method must be input

A second set of the limiting discharge curves (variables LAG through LAG/K) must be entered if stages (or discharges) are to be checked at a second downstream flow point.

Time Series

- (LOCAL1) - The local runoff for the intervening area(s) between the dam and the downstream control point(s) for gage 1
- (LOCAL2) - The local runoff for gage 2 if two gages are used

Carryover

- (GAGE1) - Previous period discharge for local flow at first gage
- (RATING1) - Four values needed for stage discharge conversion at first gage (only needed if stages used in release schedule); the values needed are the previous stage, previous discharge, previous rate of change in stage and number of previous missing values
- (RATING2) - Four values needed for stage discharge conversion at second gage (only needed if two gages are used and stages are used); values needed are same four as RATING1

above