

V.3.3-RES-SNGL-SPEC-STPOOLQ SINGLE RESERVOIR REGULATION OPERATION
SCHEME OUTFLOW BASED ON POOL ELEVATION
AND STAGE AT DOWNSTREAM CONTROL POINTS

Purpose

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

A maximum of two gaging stations may be used as control points to operate the reservoir. A maximum of four release schedules are available for modeling different operation rules in each gaging stations. The gaging stations may either be located at the main stem or at the tributary. The maximum permissible dam outflow is determined based on the downstream flow condition from previous period. If there are two control points, the lesser of the two permissible values is used. After each time period, outflows from the reservoir are routed and added to the ordinates of the hydrograph for the local areas and any tributary flow to obtain the forecast discharge and stage at the control points.

Input Summary

<u>Keyword</u>	<u>Definition and Format</u>
STPOOLQ	Input opening keyword for scheme
<u>PARMS</u>	Parameter opening keyword for scheme
[QDIST]	Daily distribution curve (if discharge relations are for daily releases): <ul style="list-style-type: none">- real- values between 0.0 and 1.0- values must sum to 1.0- number of values = 24/dt (dt is the Operation data time interval)
GAGE1	Opening keyword for gage #1 specifications for gage located at the main stem; for gage located at the tributary it must be followed by [TRIB]
[LAG]	Not used; retained for old segment definition; equal to and will be overwritten by the LAG time in the LAG/K operation; flood wave travel time from dam to GAGE1 in hours; number ff hours in future to check the downstream stages/discharges: <ul style="list-style-type: none">- integer
[RATING]	Rating Curve name; only needed if stage control is used in release schedule: <ul style="list-style-type: none">- 8-character name- if entered Rating Curve must be defined

Keyword

Definition and Format

by program FCINIT command DEF-RC

CONTROL1

Release schedule #1:

- 'j' values of stage/discharge followed by 'j' values of discharge for either a main stem gage or a tributary gage
- stage/discharge values:
 - real, positive
 - ascending order
- discharges if gage is located at main stem:
 - omit if not a main stem gage
 - real, positive
 - descending order
 - consecutive values may be equal
- discharges if gage is located at tributary:
 - omit if not a tributary gage
 - real
 - enter -999.0 or -1041.0 to compute release from the RULECURVE scheme or -1071.0 to compute release from the POOLQ scheme 1/
 - consecutive values may be equal

[CONTROL2]

Release schedule #2:

- if entered same format as CONTROL1

[CONTROL3]

Release schedule #3:

- allowed only if CONTROL2 was entered
- if entered same format as CONTROL1

[CONTROL4]

Release schedule #4:

- allowed only if CONTROL3 was entered
- if entered same format as CONTROL1

RISING

Relation to be used during rising stage/flow at GAGE1:

- 'j' values of pool elevations followed by 'j' values of release schedules to use for the elevation ranges
- elevations:
 - real
 - ascending order
 - within ELVSSTOR curve 2/
 - enter -999.0 to use rulecurve value 3/
- release schedule values:
 - integer
 - must correspond to release schedules (i.e. - CONTROLn's) defined previously

FALLING

Relation to be used during falling stage/flow at GAGE1:

- same format as RISING

Keyword

Definition and Format

[CURVE]

Rule curve definition; needed if any pool elevations are entered as -999.0 in the RISING or FALLING cards or if any discharges in the CONTROL1, CONTROL2, CONTROL3, CONTROL4 cards are entered as -999.0; only one rulecurve is allowed for both GAGE1 and GAGE2 and must be entered in GAGE1 herein:

If defined here:

- 'j' dates followed by 'j' values of elevation
- dates
 - integer
 - ascending order
 - between 1 and 366
- elevations
 - real
 - within ELVSSTOR curve

if referenced to original definition:

- name and version number of scheme in which it was originally defined

[RULETIME]

Time of hydrologic day rulecurve is set:

- needed only if CURVE is defined in this scheme
- integer
- between 0 and 24, inclusive

LAG/K

Keyword to initiate input for LAG/K operation

Input for the LAG/K Operation (See V.3.3-LAG/K).

[GAGE2]

Opening keyword for gage #2 specifications for gage located at the main stem, if a second gage is defined for this scheme; maximum number of gages is 2; for gage located at the tributary it must be followed by [TRIB]

If GAGE2 entered input from LAG through LAG/K is repeated for gage #2.

ENDPARMS

Parameter ending keyword for scheme

[TIME-SERIES] 4/

Time series opening keyword for scheme:

- need only if any time series are entered

[LOCAL1]

Local runoff plus tributary flow time series for gage #1; if LAG time in the LAG/K operation is greater than zero last value at ENDRUN will be repeated for the LAG time beyond ENDRUN

S data time interval = Operation data time interval

<u>Keyword</u>	<u>Definition and Format</u>
	<ul style="list-style-type: none"> - dimensions L3/T - units CMS - no missing values allowed
[LOCAL2]	<p>Local runoff plus tributary flow time series for gage #2:</p> <ul style="list-style-type: none"> - allowed only if GAGE2 entered - if entered same format as LOCAL1
[<u>ENDTS</u>]	<p>Time series ending keyword for scheme:</p> <ul style="list-style-type: none"> - needed only if TIME-SERIES was entered
[<u>CARRYOVER</u>]	<p>Carryover opening keyword for scheme; if omitted defaulted all carryover values to zero</p>
[GAGE1]	<p>Not used; retained for old segment definition; previous period discharge for local plus tributary flow at gage number 1:</p> <ul style="list-style-type: none"> - only needed if local flow time series at gage 1 used - real, positive - defaulted to 0.0
[RATING1]	<p>Four values of carryover for 1st gage; four spaces are reserved for ease of programming in the multiple scheme-level application; if omitted all carryover values are defaulted to zero:</p> <p>Values:</p> <ol style="list-style-type: none"> 1. Previous stage: <ul style="list-style-type: none"> - real - enter 0.0 if RATING is not entered 2. Previous flow: <ul style="list-style-type: none"> - real, positive - defaulted to 0.0 3. Previous rate of change in stage/flow <ul style="list-style-type: none"> - real 4. Number of previous missing values in stage-flow conversion: <ul style="list-style-type: none"> - positive, integer - defaulted to 0
[RATING2]	<p>Four values of carryover for 2nd gage; four spaces are reserved for ease of programming in the multiple scheme-level application; if omitted all carryover values are defaulted to zero:</p> <ul style="list-style-type: none"> - If 2nd gage is entered and RATING2 is omitted defaults all carryover values to zero - if used same format as for RATING1
[<u>ENDCO</u>]	<p>Carryover ending keyword for scheme (only</p>

needed if carryover entered)

ENDSTPQ Input ending keyword for scheme

Notes:

- 1/ If a discharge is entered as -999.0, the reservoir release will be computed using the RULECURVE scheme specified by the CURVE cards. The discharge values should be entered so that no interpolation occurred between a positive discharge and -999.0 to assure meaningful reservoir release. If a discharge is entered as -1041.0, the reservoir release will be computed using the RULECURVE(1) scheme. Use -1042.0, -1043.0, for RULECURVE(2), RULECURVE(3), ... etc. If a discharge is entered as -1071.0, the reservoir release will be computed using the POOLQ(1) scheme. Use -1072.0, -1073.0, for POOLQ(2), POOLQ(3), ... etc.
- 2/ ELVSSTOR is the elevation versus storage curve defined in the general parameter section.
- 3/ If an elevation is entered as -999.0, the elevation from the rulecurve specified by the CURVE cards will be used as the target level, the bounds of the rulecurve must be between the previous and following elevations of the stage relation.
- 4/ See 'Time Series Definition' in Section V.3.3-RES-SNGL-SPEC.

Input Example

Reservoir is to be operated according to the POOLQ(2) curve based on the tributary flow condition at downstream:

```
STPOOLQ
PARMS
GAGE1  TRIB
CONTROL1  0.0      2999.0    3000.0  19999.0  20000.0  &
          3000.0    0.0      -1072.0 -1072.0    0.0
RISING      730.00    771.00  &
           1          1
FALLING      730.00    771.00  &
           1          1
CURVE RULECURVE(1)
LAG/K
RES-SNGL  QINE
          1.000
          .000
          0
ENDP
TIME-SERIES
LOCAL1    HDYN6HUD  QINE 2
ENDTS
ENDSTPQ
STPOOLQ
```