# SSARR RESERVOIR REGULATION

# SSARRESV

- SSARR-Streamflow Synthesis and Reservoir Regulation Model
  - This operation routs streamflows from upstream to downstream points through lake storage and reservoirs under free flow or controlled flow modes.

# SSARRESV APPLICATIONS

- SSARRESV operation is normally used for a single reservoir without backwater/tributary effect (SAR/ENDSAR)
- Used for a single reservoir controlled by and/or with backwater effect from tributary flow condition (LWERBKWR/ENDLWERB)
- Used as a backwater reservoir, where the outflow from the upstream reservoir is affected by backwater from the downstream reservoir (UPERBKWR/ENDUPERB)
- Used to simulate a station in the river with backwater effect from a downstream reservoir (3-VAR/ENDEND3-VAR)

# Why the NWRFC uses SSARRESV

- The Corps of Engineers, who are the regulating agency, have knowledge of and experience with the operation and its reservoir regulation options.
- The reservoir regulation is not fixed.
- The reservoir regulation of one reservoir is dependent on another reservoir.
- The reservoir regulation are constantly being re-evaluated because of the competing uses of reservoirs

# Reservoir Regulation Options (SSARREG mods)

- FREEFLOW
  - default for reservoirs with QVSEL specified if no SSARREG mods used
- SETQ
  - outflow specified (cfc or cms)
- SETH
  - reservoir elevation specified (ft or m)
- SETS
  - reservoir storage specified
- SETDQ
  - change in storage specified (cfsd/day or cmsd/day)
- SETDH
  - change in storage specified (ft/day or m/day)
- SETDS
  - change in storage specified (acft/day or tcum/day)

# Rules in Coding SSARREG Mods

- **.SSARREG validdate**
- **segid [US] {keyword [timeint date value(s) ]} / opname [DS] { [date value]}**

# Rules in Coding SSARREG Mods(2)

- 1. All SSARREG mods are identified by a validdate and opname.
- 2. If multiple SSARREG mods are entered, only one SSARREG mod can be in effect in a segment during a forecast run. The SSARREG mod that is used is the one with the closest validdate prior or equal to the LSTCMPDY.
- 3. If 2 SSARREG mods with the same validdate exists, the mod that is last entered will be used.
- 4. The validdate must be between the carryover date and the LSTCMPDY.

# Rules in Coding SSARREG Mods(3)

- 5. The date value(s) following the keyword must be after the validdate and must be in ascending chronological order. If a date value is found which is not in ascending chronological order, all keywords and date values including and following that invalid date value will be ignored. Prior keywords, if valid, will be applied.
- 6. If no valid SSARREG mod is specified, then
  - a.) If a free flow table (QVSEL) is specified, freeflow will be passed.
  - b.) If no free flow table is specified, the greater of inflow or min flow (MINQREL) will be passed.

# Rules in Coding SSARREG Mods(4)

- 7. If 2 or more date values are entered, the regulation values are linearly interpolated between the 2 valid date values.
- 8. Only date value entries that are beyond the last observed data (outflow or elevation) are applied. SSARREG mods are applied only to the operation of the reservoir during the forecast period.

# TIME SERIES USED

| | | | | | | |
|---|---|---|---|---|---|---|
| • INSTQI1 | L3/T | CMS | I | No | 3 | No |
| • INSTQI2 | L3/T | CMS | I | Yes | Any | No |
| • INSTQO1 | L3/T | CMS | O | 1 | 3 | No |
| • INSTQO2 | L3/T | CMS | O | 1 | 3 | No |
| • MEANQOUT | L3 | CMSD | O | 2 | 3 | No |
| • POOL | L | M | O | No | 3 | No |
| • STORAGE | L3 | CMSD | O | No | 3 | No |
| • OBSQO | L3/T | CMS | I | No | 3 | Yes |
| • OBSQOM | L3 | CMSD | I | No | 3 | Yes |
| • OBSH | L | M | I | No | 3 | Yes |
| • TRIBQL1 | L3/T | CMS | I | No | 3 | No |
| • TRIBQL2 | L3/T | CMS | I | No | 3 | No |
| • BACKQI1 | L3/T | CMS | O | No | 3 | No |
| • BACKQI2 | L3/T | CMS | O | No | 3 | No |
| • BACKQIM | L3 | CMSD | O | No | 3 | No |

# INPUT SUMMARY

- '$' is a comment indicator
- Abbreviations are indicated by underscores beneath the letters, for PARMS, the abbreviation is P
- Optional keywords are indicated by brackets ([ ])
- When not supplied, default information usually is stored for that keyword

# INPUT FORMAT

- SSARRESV
  - Required keyword to start input for the operation
- [TITLE]
  - Optional 20 character description of operation definition. The 20 character field may contain blanks or commas. If used, it must be enclosed by quotes (' text, text1 '). Default to all blanks.
- [UNITS]
  - Optional units used for input in this SSARRESV definition; followed by: [ENGLISH] or [METRIC]. Default is ENGLISH (See Note 1).
- SECTION/ENDSECTION
  - Input information for a specific application
- END

# SECTION/ENDSECTION

- INFLOW/ENDINFLW
  - Input inflow time series and carryover
- UPERBKWR/ENDUPERB
  - Upstream reservoir with backwater effect from a downstream reservoir
- 3-VAR/END3-VAR
  - Station with backwater effect from a downstream reservoir
- LWERBKWR/ENDLWERB
  - Downstream reservoir with backwater/tributary effect
- SAR/ENDSAR
  - Reservoir have no backwater effect

# INFLOW/ENDINFLW

- INFLOW
  - TIME-SERIES
  - [INSTQI1]
    - Instantaneous inflow time series at period start. Only needed if the outflow is from another SSARR operation. Suggested data type = SQIB.
  - INSTQI2
    - Instantaneous inflow time series at period end. Suggested data type = SQIE.
  - ENDTS
  - CARRYOVER
  - [Q-INST] Instantaneous inflow at start of run.
  - ENDCO
- ENDINFLW

# SAR/ENDSAR PARAMETER

- PARMS
- ELVSSTOR
  - Elevation vs storage curve for reservoir; N values of elevation followed by N values of storage contents (maximum N = 50)
- [QVSEL]
  - N values of outflow corresponding to elevations specified in ELVSSTOR. If QVSEL is not entered, inflow will be passed.
- [MAXEL] Maximum elevation to pass inflow
- [MINEL] Minimum allowable elevation
- [MINQREL] Minimum reservoir release. Default to zero release.
- ENDP

# SAR/ENDSAR TIMESERIES

- TIME-SERIES
- [INSTQO1] Simulated instantaneous outflow time series at period start Suggested data type = SQIB.
- [INSTQO2] Simulated instantaneous outflow time series at period end Suggested data type = SQIE.
- [MEANQOUT] Simulated mean outflow time series. Must be used if the outflow is used by a NON-SSARR operation.
- [POOL] Simulated pool elevation time series
- [STORAGE] Simulated storage contents time series
- [OBSQO] Observed instantaneous outflow time series. Suggested data type = RQOT.
- [OBSQOM] Observed mean outflow time series Suggested data type = RQME.
- [OBSH] Observed pool elevation time series. Suggested data type = PELV.
- [BACKQI1] Inflow time series at period start back-computed from the observed pool elevation and discharge
- [BACKQI2] Back-computed inflow time series at period end from observed
- [BACKQIM] Back-computed mean inflow time series at period end from observed
- ENDTS

# SAR/ENDSAR CARRYOVER

- CARRYOVER
- Q-INST Instantaneous discharge at start of run
- [POOL] Pool elevation at start of run. If omitted, STORAGE must be entered
- [STORAGE] Storage contents at start of run.  If omitted, POOL must be entered.
- ENDCO

# UPERBKWR/ENDUPERB PARAMETER

- PARMS
- ELVSSTOR
  - Elevation vs storage curve for reservoir; N values of elevation followed by N values of storage contents (maximum N = 50)
- BACKTABL
  - Backwater table is entered via a series of three variable points (maximum 200 points, 600 total values).
- BACKWATR Backwater control indicator
  - [FLOW] = Controlled by discharge of the downstream reservoir.
  - [FLOW] [TRIB] = Controlled by discharge of downstream tributary.
  - [ELEV] = Controlled by elevation of the downstream reservoir
  - [ELEV] [TRIB] = Controlled by stage of the downstream tributary
- [MAXEL] Maximum elevation to pass inflow
- [MINEL] Minimum allowable elevation
- [SHUTRESV] Maximum tributary flow to shut down reservoir release .
- ENDP

# UPERBKWR/ENDUPERB TIMESERIES

- TIME-SERIES
- [INSTQO1] Same as SAR/ENDSAR
- [INSTQO2] “
- [MEANQOUT] “
- [POOL] “
- [STORAGE] “
- [OBSQO] “
- [OBSQOM] “
- [OBSH] “
- [TRIBQL1] Local flow between upstream and downstream reservoir
- [TRIBQL2] at period start and period end
- [BACKQI1] Same as SAR/ENDSAR
- [BACKQI2] “
- [BACKQIM] “
- ENDTS

# UPERBKWR/ENDUPERB CARRYOVER

- CARRYOVER
- Q-INST  Instantaneous discharge at start of run
- [POOL]  Pool elevation at start of run. If omitted, STORAGE must be entered
- [STORAGE] Storage contents at start of run.  If omitted, POOL must be entered.
- [TRIBQL] Instantaneous tributary and local inflow between the upstream and downstream reservoir
- ENDCO

# LWERBKWR/ENDLWERB PARAMETER

- PARMS
- ELVSSTOR
  - Elevation vs storage curve for reservoir; N values of elevation followed by N values of storage contents (maximum N = 50)
- [QVSEL]
  - N values of outflow corresponding to elevations specified in ELVSSTOR. If QVSEL is not entered, inflow will be passed.
- BACKTABL
  - Backwater table is entered via a series of three variable points (maximum 200 points, 600 total values).
- BACKWATR Backwater control indicator
  - [FLOW] = Controlled by discharge of the downstream reservoir.
  - [ELEV] = Controlled by elevation of the downstream reservoir
- [MAXEL] Maximum elevation to pass inflow
- [MINEL] Minimum allowable elevation
- [MINQREL] Minimum reservoir release. Default to zero
- [SHUTRESV] Maximum tributary flow to shut down reservoir release
- ENDP

# LWERBKWR/ENDLWERB TIMESERIES

- TIME-SERIES
- [INSTQO1] See SAR/ENDSAR
- [INSTQO2] “
- [MEANQOUT] “
- [POOL] “
- [STORAGE] “
- [OBSQO] “
- [OBSQOM] “
- [OBSH] “
- [TRIBQL2]
  - Instantaneous tributary inflow time series at period end for use as control parameter in the backwater routing using the backwater table
- [BACKQI1] See SAR/ENDSAR
- [BACKQI2] “
- [BACKQIM] “
- ENDTS
- See SAR/ENDSAR for carryover input

# 3-VAR/END3-VAR PARAMETER

- PARMS
- BACKTABL
  - The three variable relationship table is entered via a series of three variable points (maximum 200 points, 600 total values). For the purpose of table lookup, the first independent variable (X) may be either flow or elevation of the downstream reservoir; the second independent variable (Z) is the flow at the upstream station; and the dependent variable (Y) is the elevation at the upstream station
- BACKWATR Backwater control indicator
  - [FLOW] = Controlled by discharge of the downstream reservoir.
  - [ELEV] =Controlled by elevation of the downstream reservoir
- ENDP

# 3-VAR/END3-VAR TIMESERIES

- TIME-SERIES
- [INSTQO1] Same as SAR/ENDSAR
- [INSTQO2] “
- [MEANQOUT] “
- [POOL] “
- [STORAGE] “
- [OBSQO] “
- [OBSQOM] “
- [OBSH] “
- [TRIBQL1] Local flow between upstream station and downstream reservoir
- [TRIBQL2] at period start and period end
- [BACKQI1] Same as SAR/ENDSAR
- [BACKQI2] “
- [BACKQIM] “
- ENDTS

# 3-VAR/END3-VAR CARRYOVER

- CARRYOVER
- [TRIBQL] Instantaneous tributary and local inflow between the upstream station and the downstream reservoir. Must be used if TRIBQL2 is used and TRIBQL1 is not used.
- ENDCO

# Example1 (1) Reservoir without backwater effect

- SSARRESV
- TITLE 'DWORSHAK RES. TEST'
- UNITS ENGLISH
- INFLOW
  - TIME-SERIES
    - INSTQI2 INFLOWND SQIE 6
  - ENDTS
  - CARRYOVER
    - Q-INST 9500.
  - ENDCO
- ENDINFLW
- SAR
  - PARMS
  - ELVSSTOR 1000.00 &
  - 1200.00 1250.00 1300.00 1350.00 1400.00 1410.00 &
  - 1590.00 1595.00 1600.00 1605.00 &
  - 0. &
  - 193000. 328000. 520000. 765000. 1098000. 1174000. &
  - 3287000. 3377000. 3468000. 3562000.
  - MAXEL 1600.00
  - MINEL 1200.00
  - MINQREL 3500.0
  - ENDP

# Example1(2)

- TIME-SERIES
  - INSTQO1 INSTQST SQIB 6
  - INSTQO2 INSTQND SQIE 6
  - POOL DWRPOOL SPEL 6
  - STORAGE DWRSTOR RSTE 6
  - OBSQO DWROQO RQOT 6
  - OBSQOM DQROQM RQME 6
  - OBSH DWROH PELV 6
  - BACKQI1 BACKQI1 SQIB 6
  - BACKQI2 BACKQI2 SQIE 6
  - BACKQIM BACKQIM SQME 6
- ENDTS
- CARRYOVER
  - Q-INST 10000.
  - POOL 1585.94
  - STORAGE 3216355.
- ENDCO
- ENDSAR
- END

# Example2(1)

- SSARRESV
- TITLE 'ARROW LAKE -- JUNE'
- UNITS ENGLISH
- INFLOW
  - TIME-SERIES
    - INSTQI2 UNAKB9 SQIE 12
  - ENDTS
  - CARRYOVER
    - Q-INST 62500.
  - ENDCO
- ENDINFLW
- UPERBKWR
  - PARMS
    - ELVSSTOR 1000.00 1400.00 &
    - 2898878. . 6922010.
    - BACKTABL .0 1360.00 1360.00 .0 1450.00 1450.00 &
    - 900000. 1424.00 1411.00 900000. 1455.00 1450.00
    - BACKWATR ELEV
    - MAXEL 1440.00
    - MINEL 1365.00
  - ENDP

## Example2 (2) Backwater due to reservoir and tributary flow

- TIME-SERIES
  - INSTQO1 UNAKBQO1 SQIB 12
  - INSTQO2 UNAKBQO2 SQIE 12
  - POOL UNAKBPOL SPEL 12
  - STORAGE UNAKBST RSTE 12
  - TRIBQL2 FRQB8Q2 SQIE 12
  - OBSQO UNAKBOQO RQOT 12
  - OBSQOM UNAKBOQM RQME 12
  - OBSH UNAKBOH PELV 12
  - BACKQI1 BACKQI1 SQIB 12
  - BACKQI2 BACKQ12 SQIE 12
  - BACKQIM BACKQIM SQME 12
- ENDTS
- CARRYOVER
  - Q-INST 62500.
  - POOL 1392.45
  - TRIBQL 3370.
- ENDCO

- ENDUPERB
- LWERBKWR
  - PARMS
    - ELVSSTOR 1000.00 1360.00 1370.00 1380.00 1390.00 1400.00 &
    - 1907862. 2321437. 2745330. 3178978. 3621923.
    - BACKTABL .0 1367.00 0.0 .0 1367.00 20000. &
    - 400000. 1447.10 300000. 400000. 1448.40 400000.

# Example2(3)

    - MAXEL 1443.85
    - MINEL 1361.00
  - ENDP
  - TIME-SERIES
    - INSTQO1 UFQRBQO1 SQIB 12
    - INSTQO2 UFQRBQO2 SQIE 12
    - POOL UFQRBPOL SPEL 12
    - STORAGE UFQRBST RSTE 12
    - TRIBQL2 UCOSL5Q2 SQIE 12
    - OBSQO UFQRBOQO RQOT 12
    - OBSQOM UFQRBOQM RQME 12
    - OBSH UFQRBOH PELV 12
    - BACKQI1 BACKQL1 SQIB 12
    - BACKQI2 BACKQL2 SQIE 12
    - BACKQIM BACKQLM SQME 12
  - ENDTS
  - CARRYOVER
    - Q-INST 62500.
    - POOL 1389.40
  - ENDCO
- ENDLWERB
- END

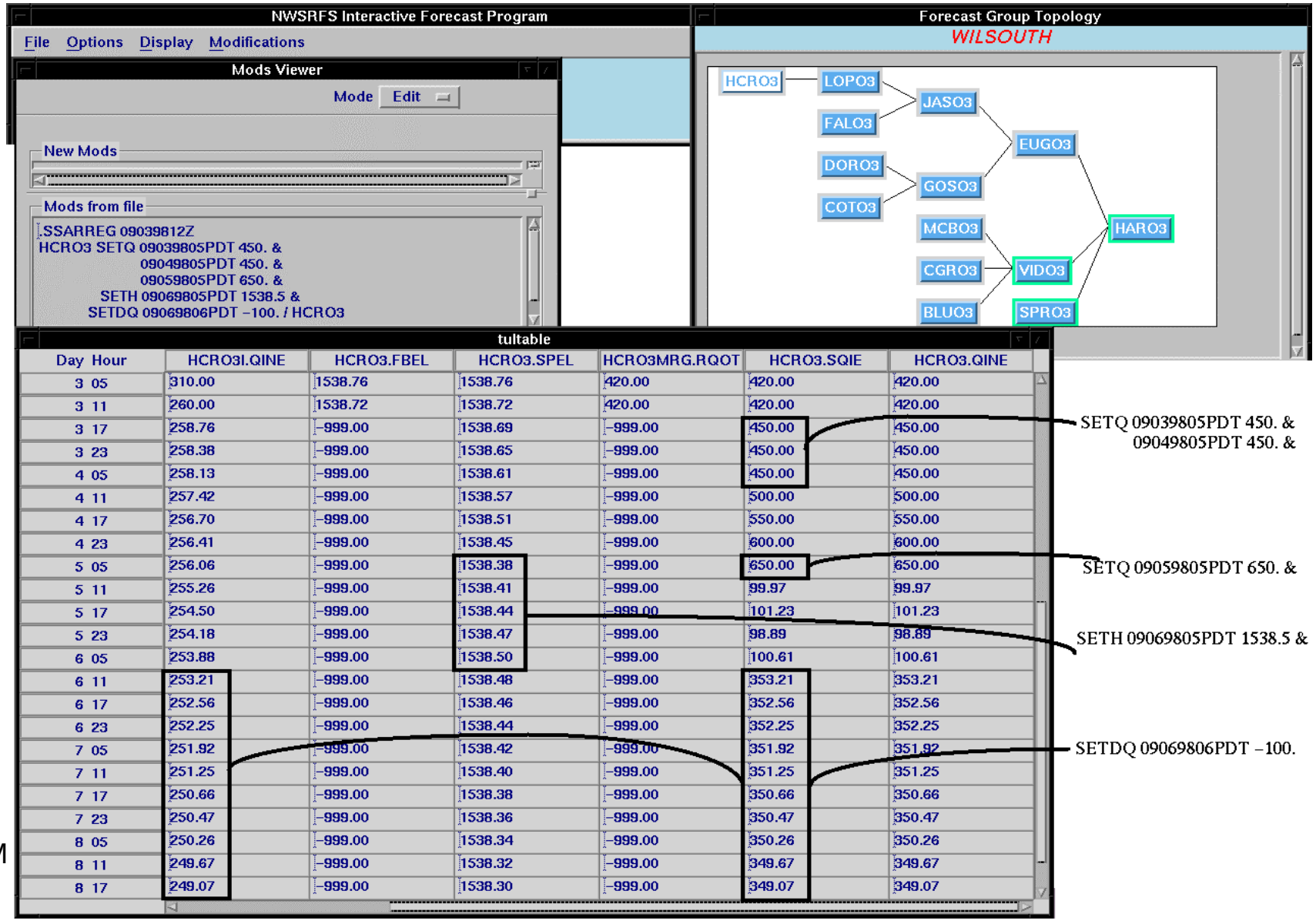
# Example3 (1) Upstream station regulated by a downstream reservoir

- SSARRESV
- TITLE 'Coeur dAlene Lake'
- UNITS ENGLISH
- INFLOW
  - TIME-SERIES
    - INSTQI2 INFLOWND SQIE 6
  - ENDTS
  - CARRYOVER
    - Q-INST 5500.
  - ENDCO
- ENDINFLW
- 3-VAR
  - PARMS
    - 3VARTABL 0. 2120.00 2120.00 0. 2150.00 2150.00 &
    - 100000. 2122.00 2147.00 100000. 2145.00 2150.00
    - BACKWATR ELEV
  - ENDP
  - TIME-SERIES
    - POOL SJMIPOOL SPEL 6
    - TRIBQL2 SJMILOCL SQIN 6
  - ENDTS
  - CARRYOVER
    - TRIBQL 5500.
  - ENDCO
- END3-VAR

- SAR
  - PARMS
    - ELVSSTOR 2120.00 2124.00 2125.00 2126.50 2127.00 2128.00 &
    - 288100. 339700. 446000. 554400. 609300. 890200.
    - QVSEL 10. 5700. 7900. 11400. 12700. 15300. &
    - 18100. 21100. 27500. 34600. 38200. 57500.
    - MAXEL 2133.00
    - MINEL 2120.00
  - ENDP
  - TIME-SERIES
    - POOL COELPOOL SPEL 6
  - ENDTS
  - CARRYOVER
    - Q-INST 5500.
    - POOL 2126.07
  - ENDCO
- ENDSAR
- END

Example3 (2)

# Hills Crk Reservoir




| Day Hour | HCRO3I.QINE | HCRO3.FBEL | HCRO3.SPEL | HCRO3MRG.RQOT | HCRO3.SQIE | HCRO3.QINE |
|---|---|---|---|---|---|---|
| 3 05 | 310.00 | 1538.76 | 1538.76 | 420.00 | 420.00 | 420.00 |
| 3 11 | 260.00 | 1538.72 | 1538.72 | 420.00 | 420.00 | 420.00 |
| 3 17 | 258.76 | -999.00 | 1538.69 | -999.00 | 450.00 | 450.00 |
| 3 23 | 258.38 | -999.00 | 1538.65 | -999.00 | 450.00 | 450.00 |
| 4 05 | 258.13 | -999.00 | 1538.61 | -999.00 | 450.00 | 450.00 |
| 4 11 | 257.42 | -999.00 | 1538.57 | -999.00 | 500.00 | 500.00 |
| 4 17 | 256.70 | -999.00 | 1538.51 | -999.00 | 550.00 | 550.00 |
| 4 23 | 256.41 | -999.00 | 1538.45 | -999.00 | 600.00 | 600.00 |
| 5 05 | 256.06 | -999.00 | 1538.38 | -999.00 | 650.00 | 650.00 |
| 5 11 | 255.26 | -999.00 | 1538.41 | -999.00 | 99.97 | 99.97 |
| 5 17 | 254.50 | -999.00 | 1538.44 | -999.00 | 101.23 | 101.23 |
| 5 23 | 254.18 | -999.00 | 1538.47 | -999.00 | 98.89 | 98.89 |
| 6 05 | 253.88 | -999.00 | 1538.50 | -999.00 | 100.61 | 100.61 |
| 6 11 | 253.21 | -999.00 | 1538.48 | -999.00 | 353.21 | 353.21 |
| 6 17 | 252.56 | -999.00 | 1538.46 | -999.00 | 352.56 | 352.56 |
| 6 23 | 252.25 | -999.00 | 1538.44 | -999.00 | 352.25 | 352.25 |
| 7 05 | 251.92 | -999.00 | 1538.42 | -999.00 | 351.92 | 351.92 |
| 7 11 | 251.25 | -999.00 | 1538.40 | -999.00 | 351.25 | 351.25 |
| 7 17 | 250.66 | -999.00 | 1538.38 | -999.00 | 350.66 | 350.66 |
| 7 23 | 250.47 | -999.00 | 1538.36 | -999.00 | 350.47 | 350.47 |
| 8 05 | 250.26 | -999.00 | 1538.34 | -999.00 | 350.26 | 350.26 |
| 8 11 | 249.67 | -999.00 | 1538.32 | -999.00 | 349.67 | 349.67 |
| 8 17 | 249.07 | -999.00 | 1538.30 | -999.00 | 349.07 | 349.07 |

M

```
•   > CHANGE-T    RQIM
•   >   HCRO3    RQIM   24  HCRO324  RQIN    6          -999.00000-999.00000
•   > CHANGE-T    RQOT
•   >   HCRO3    QME    24  HCRO324  RQOT    6          -999.00000-999.00000
•   > MERGE-TS    INFLOW
•   >     2  HCRO3MRG RQIN    6    0
•   > HCRO36     RQIN
•   > HCRO324    RQIN
•   > MERGE-TS    OUTFLOW
•   >     3  HCRO3MRG RQOT    6    0
•   > HCRO3      QIN
•   > HCRO36     RQOT
•   > HCRO324    RQOT
•   > ADJUST-Q    HCRO3I
•   > HILLS CK INF            1    0    0
•   > HCRO3MRG   RQIN    6
•   > HCRO3I     SQIN    6
•   > HCRO3I     QINE
•   >   150
•   >     1
•   > CHANGE-T    FBEL
•   >   HCRO3    FBEL    1  HCRO3    FBEL    6
•   > CLEAR-TS
•   >   HCRO3    SQIB    6
•   > CLEAR-TS
•   >   HCRO3    SPEL    6
```

```
•   > SSARRESV    HCRO3
•   > SSARRESV
•   > TITLE  'HILLS CRK RESERVOIR '
•   > UNITS  ENGLISH
•   > INFLOW
•   > TIME-SERIES
•   > INSTQI2   HCRO3I    QINE   6
•   > ENDTS
•   > CARRYOVER
•   > Q-INST        370.
•   > ENDCO
•   > ENDINFLW
•   > SAR
•   > PARMS
•   > ELVSSTOR    1247.00   1260.00   1280.00   1300.00   1320.00   1340.00&
•   >             1360.00   1380.00   1384.00   1400.00   1408.75   1414.00&
•   >             1420.00   1440.00   1448.00   1460.00   1480.00   1495.50&
•   >             1520.00   1541.00   1543.00   1544.49   1560.00          &
•   >                  0.      175.     2194.     7616.    17178.    30651.&
•   >              47079.    66558.    70833.    89149.    99946.   106672.&
•   >             114589.   143043.   155373.   174918.   210970.   242244.&
•   >             297223.   350014.   355574.   359898.   414079.
•   > MAXEL    1543.00
•   > MINEL    1414.00
•   > MINQREL        10.
•   > ENDP
```

```
> TIME-SERIES
> INSTQO1   HCRO3     SQIB   6
> INSTQO2   HCRO3     QINE   6
> POOL      HCRO3     SPEL   6
> STORAGE   HCRO3     RSTE   6
> OBSQO     HCRO3MRG  RQOT   6
> OBSH      HCRO3     FBEL   6
> ENDTS
> CARRYOVER
> Q-INST        420.
> POOL       1538.94
> STORAGE    344835.
> ENDCO
> ENDSAR
> END
> PLOT-TUL    ZELV
>     0    1   51    0    1    6    6    7    6    !    -    0    0    0
> ANALYSIS OF SIM AND SNOTEL WATER EQUIV
>  SWE U  SWE L  SASC   RSEL   UPR-MAT LWR-MAT
> HCRO3IU   SWE  LIST      F7.1,       6
> HCRO3IL   SWE  LIST      F7.1,       6
> HCRO3I    SASC LIST      F7.1,       6
> HCRO3I    RSEL BOTH R    F7.1,       6
> HCRO3FZL  ZELV PLOT Z                6
> HCRO3IU   MAT  LIST      F8.1,       6
> HCRO3IL   MAT  LIST      F8.1,       6
> END
```

```
•   > PLOT-TUL    IN-OUT
•   >     0    1   51    0    1    6    6    8    7    !    -    0    0    0
•   > HILLS CK IN-OUT
•   >  OBS   SIM    SIM
•   > HCRO3MRG  RQIN BOTH I    F7.0,       6
•   > HCRO3I    SQIN BOTH I    F7.0,       6
•   > HCRO3I    QINE BOTH I    F7.0,       6
•   > HCRO3     FBEL LIST      F7.2,       6
•   > HCRO3     SPEL LIST      F7.2,       6
•   > HCRO3MRG  RQOT BOTH O    F8.0,       6
•   > HCRO3     QINE BOTH O    F8.0,       6
•   > MFOO3     QIN  PLOT U               6
•   > END
•   > PLOT-TUL    POOL
•   >     1    1   51    0    1    6    6    7    7    !    -    0 1410    0
•   >     2   25    F    U    R  HILLS       0    0    0
•   >  OBS     SIM    ADJ
•   > HCRO3MRG  RQIN LIST      F7.0,       6
•   > HCRO3I    SQIN LIST      F7.0,       6
•   > HCRO3I    QINE LIST      F7.0,       6
•   > HCRO3     FBEL BOTH O    F7.2,       6
•   > HCRO3     SPEL BOTH *    F7.2,       6
•   > HCRO3MRG  RQOT LIST      F8.0,       6
•   > HCRO3     QINE LIST      F8.0,       6
•   > END
•   > STOP
```

```
•   > ADJUST-Q    COEI1I
•   > COEUR DALENE INFLOW     1    0    0
•   > COEI1      RQIN    6
•   > COEI1I     SQIN    6
•   > COEI1I     QINE
•   >    20
•   >     1
•   > CHANGE-T    FBEL
•   >   COEI1    FBEL   24  COEI1    FBEL    6          647.617676-999.00000
•   > CLEAR-TS
•   >   COEI1    SQIB    6
•   > CLEAR-TS
•   >   COEI1    SPEL    6
•   > SSARRESV    COEI1
•   > SSARRESV
•   > TITLE  'COEUR DALENE        '
•   > UNITS  ENGLISH
•   > INFLOW
•   > TIME-SERIES
•   > INSTQI2   COEI1I    QINE   6
•   > ENDTS
•   > CARRYOVER
•   > Q-INST       3415.
•   > ENDCO
•   > ENDINFLW
```

```
•   > SAR
•   > PARMS
•   > ELVSSTOR    2120.00   2124.00   2125.00   2126.50   2127.00   2128.00&
•   >             2129.00   2130.00   2132.00   2134.00   2135.00   2140.00&
•   >                  0.   107900.   135200.   177900.   195300.   238500.&
•   >             288100.   339700.   446000.   554400.   609300.   890200.
•   > QVSEL           10.     5700.     7900.    11400.    12700.    15300.&
•   >              18100.    21100.    27500.    34600.    38200.    57500.
•   > MAXEL    2133.00
•   > MINEL    2120.00
•   > MINQREL        10.
•   > ENDP
•   > TIME-SERIES
•   > INSTQO1   COEI1     SQIB   6
•   > INSTQO2   COEI1     QINE   6
•   > POOL      COEI1     SPEL   6
•   > STORAGE   COEI1     RSTE   6
•   > OBSQO     COEI1     RQOT   6
•   > OBSH      COEI1     FBEL   6
•   > ENDTS
•   > CARRYOVER
•   > Q-INST       4934.
•   > POOL       2124.73
•   > STORAGE    127828.
•   > ENDCO
•   > ENDSAR
•   > END
```