

**XXIX SESIÓN DEL GRUPO ESPECIALIZADO DE MODELACIÓN**

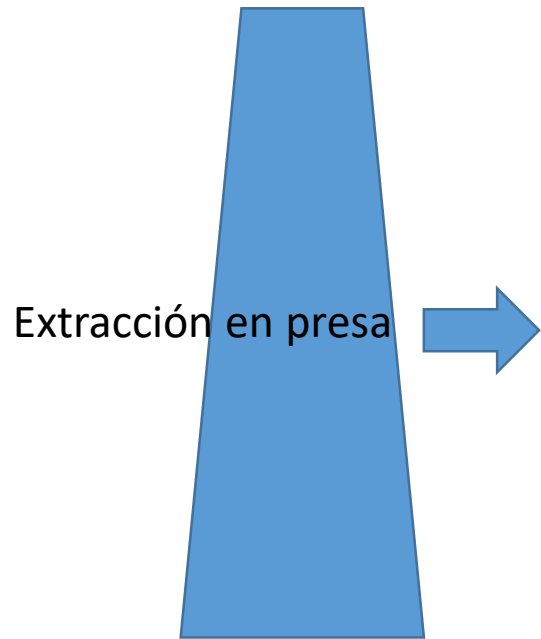
**G E M**

**Resultados de la revisión del Modelo Matemático  
Versión 5.0**

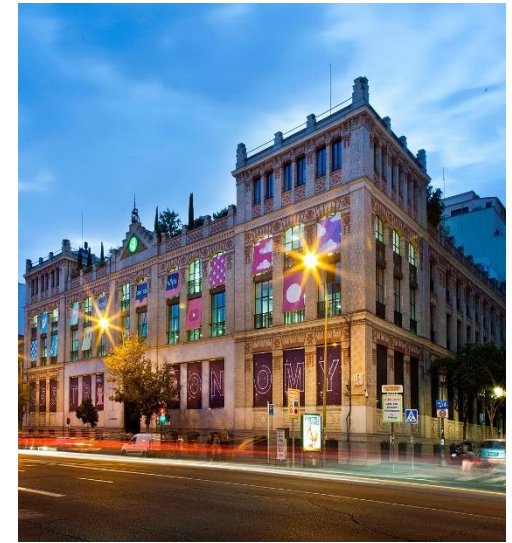
Reunión virtual; 19 de marzo de 2021

| Tipo usuario    | Extr Modelo      | Estudio disponibilidad (DOF 20/09/2021) |                  |                  |
|-----------------|------------------|---|------------------|------------------|
|                 |                  | Titulos                                 | Pérdidas         | Vol en ED        |
| DR              | 3,238.444        | 2,554.512                               | 851.572          | 3,406.084        |
| Agricola        | 1,223.705        | 1,083.831                               | 0.000            | 1,083.831        |
| Doméstico       | 392.962          | 9.675                                   | 0.000            | 9.675            |
| Otros           | 26.765           | 26.593                                  | 0.000            | 26.593           |
| Ciudades        | 483.245          | 370.202                                 | 197.771          | 567.972          |
| Otros grandes   | 255.810          | 47.464                                  | 0.000            | 47.464           |
| <b>TOTAL RH</b> | <b>5,620.930</b> | <b>4,092.277</b>                        | <b>1,049.343</b> | <b>5,141.619</b> |

**Extracción en presa = Entrega en punto de control + Pérdidas durante la conducción**



Pérdidas durante la conducción



Entrega en punto de control  
(Volumen titulado)



**En el modelo se toma el volumen de extracción en presa (ENPC+Perd) en los embalses, pero:**

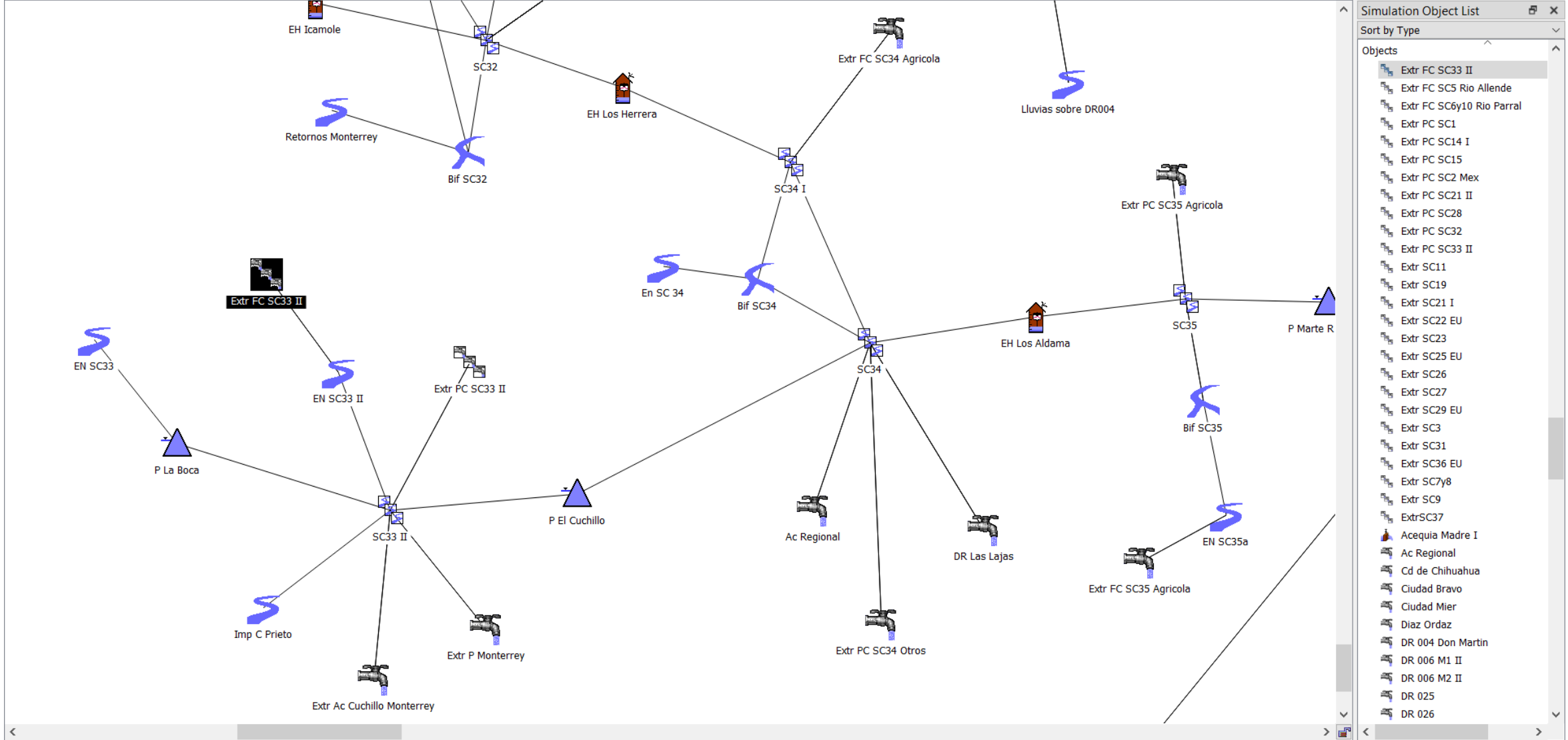
**Las pérdidas no están bien definidas**

**En el punto de control se entrega el mismo volumen extraído, sin reducir el volumen de pérdidas**

|      | A         | B       | C      | D                                      | E  | F                               | G | H                          | I | J                                     |
|------|-----------|---------|--------|--|--|---------------------------------|---|----------------------------|---|---------------------------------------|
| 4    | Ano Calen | Año Agr |        | Extr DR 05 Conchos.Diversion Requested | Extr DR 05 San Pedro.Diversion Requested | DR 05 SC6y7.Diversion Requested |   | DR 090.Diversion Requested |   | DR 004 Don Martin.Diversion Requested |
| 5    | 1950      | 1949    | ene-50 | NaN                                    | NaN                                      | NaN                             |   | NaN                        |   | NaN                                   |
| 6    | 1950      | 1949    | feb-50 | 0.000                                  | 0.000                                    | 0.000                           |   | 5.571                      |   | 17.360                                |
| 7    | 1950      | 1949    | mar-50 | 107.561                                | 11.750                                   | 3.449                           |   | 10.345                     |   | 17.360                                |
| 8    | 1950      | 1949    | abr-50 | 120.900                                | 13.207                                   | 3.876                           |   | 13.529                     |   | 21.080                                |
| 9    | 1950      | 1949    | may-50 | 120.002                                | 13.109                                   | 3.848                           |   | 11.141                     |   | 17.360                                |
| 10   | 1950      | 1949    | jun-50 | 131.281                                | 14.341                                   | 4.209                           |   | 13.529                     |   | 21.080                                |
| 11   | 1950      | 1949    | jul-50 | 129.273                                | 14.122                                   | 4.145                           |   | 12.733                     |   | 12.400                                |
| 12   | 1950      | 1949    | ago-50 | 120.979                                | 13.216                                   | 3.879                           |   | 10.345                     |   | 0.000                                 |
| 13   | 1950      | 1949    | sep-50 | 102.720                                | 11.221                                   | 3.293                           |   | 2.387                      |   | 0.000                                 |
| 14   | 1950      | 1950    | oct-50 | 0.000                                  | 0.000                                    | 0.000                           |   | 0.000                      |   | 0.000                                 |
| 15   | 1950      | 1950    | nov-50 | 0.000                                  | 0.000                                    | 0.000                           |   | 0.000                      |   | 0.000                                 |
| 16   | 1950      | 1950    | dic-50 | 0.000                                  | 0.000                                    | 0.000                           |   | 0.000                      |   | 18.818                                |
| 1534 | 2060      | 2060    |        | 393.032                                | 59.711                                   | 17.525                          |   | 79.580                     |   | 7.017                                 |
| 1535 | 2061      | 2061    |        | 478.377                                | 84.807                                   | 24.891                          |   | 79.580                     |   | 0.000                                 |
| 1536 | 2062      | 2062    |        | 238.017                                | 55.259                                   | 16.219                          |   | 79.580                     |   | 112.786                               |
| 1537 | 2063      | 2063    |        | 355.547                                | 65.993                                   | 19.369                          |   | 79.580                     |   | 172.781                               |
| 1538 | 2064      | 2064    |        | 703.091                                | 90.966                                   | 26.699                          |   | 79.580                     |   | 167.422                               |
| 1539 | 2065      | 2065    |        | 832.716                                | 90.966                                   | 26.699                          |   | 79.580                     |   | 6.509                                 |
| 1540 | 2066      | 2066    |        | 591.719                                | 90.966                                   | 26.699                          |   | 79.580                     |   | 172.781                               |
| 1541 | 2067      | 2067    |        |  |  |                                 |   |                            |   |                                       |
| 1542 |           |         |        |  |  |                                 |   |                            |   |                                       |
| 1543 |           |         | MAX    | 832.716                                | 90.966                                   | 26.699                          |   | 79.580                     |   | 172.781                               |
| 1544 |           |         |        |  | 950.381                                  |                                 |   |                            |   |                                       |

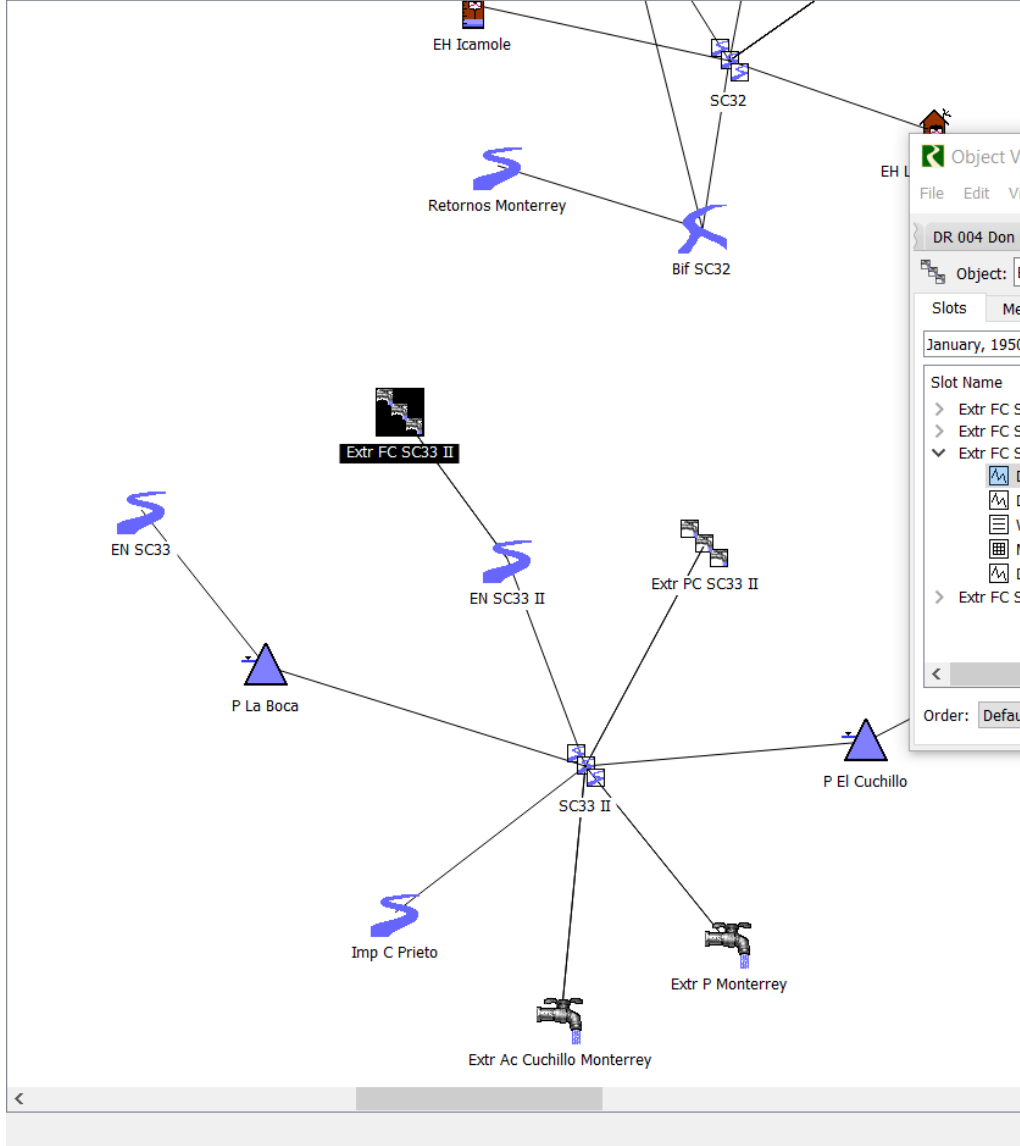
| COMISION NACIONAL DEL AGUA |  |                     |  |          |
|----------------------------|--|---------------------|--|----------|
| No. DEL DR                 | PRESA                                  | EXTRACCIÓN EN PRESA | CONCESION EN PUNTO DE CONTROL (TITULO) | PÉRDIDAS |
| 004                        | Venustiano Carranza                    | 171.074             | 109.487                                | 61.587   |
| 113                        | Boquilla                               | 117.583             | 117.583                                | 0.000    |
| 005                        | Boquilla y Madero (Incluye AP Camargo) | 968.000             | 863.828                                | 104.172  |

|     | B    | C  | D            | F             | G               | H               | I           | J        |
|-----|------|----|--------------|---------------|-----------------|-----------------|-------------|----------|
| 127 | SC15 | 15 | Río Bravo 5  |               |                 |                 |             |          |
| 128 | SC17 | 17 | Río Bravo 6  | DR            |                 |                 |             |          |
| 129 |      |    |              | Agrícola      |                 |                 |             |          |
| 130 |      |    |              | Doméstico     |                 |                 |             |          |
| 131 |      |    |              | Otros         |                 |                 |             |          |
| 132 |      |    |              | Ciudades      | Extr Cd Acuna   | R_GrandesLoca   | 67.14       | 3.73     |
| 133 |      |    |              | Otros grandes |                 |                 |             |          |
| 185 | SC25 | 25 | Río Bravo 10 | DR            | DR 050 SC25     | cODR            | 11.670355   | 14.149   |
| 186 |      |    |              | Agrícola      | Extr Ar DR PC S | cAgricola       | 3.97042883  | 6.38228  |
| 187 |      |    |              |               | Extr FC SC25 Ag | Agricola        | 2.41187117  |          |
| 188 |      |    |              | Doméstico     | Extr SC25 Mex   | Domestico       | 0.59022     | 0        |
| 189 |      |    |              |               | Extr Ar DR PC S | Domestico       | 0.00978     |          |
| 190 |      |    |              | Otros         |                 |                 |             | 0.6      |
| 191 |      |    |              | Ciudades      | Extr SC25 Mex   | Nuevo Laredo    | 54.15       | 36.10    |
| 192 |      |    |              | Otros grandes |                 |                 |             |          |
| 266 | SC36 | 36 | Río Bravo 12 | DR            | DR 025          | cODR            | 1183        | 860.54   |
| 267 |      |    |              |               | DR 026 SC36     | cODR            | 45.82       | 41.24    |
| 268 |      |    |              | Agrícola      |                 |                 |             | 0        |
| 269 |      |    |              | Doméstico     | Extr Ab DR PC S | Domestico       | 8.3283342   |          |
| 270 |      |    |              |               | Extr FC SC36 Dc | Domestico       | 1.53525876  |          |
| 271 |      |    |              | Otros         | Extr Ab DR PC S | Otros           | 0.01580704  | 9.88     |
| 272 |      |    |              |               | Extr Ab DR PC S | Perdida por cre | 0           |          |
| 273 |      |    |              | Ciudades      | Ciudad Mier     | R_GrandesLoca   | 1.182599997 | 0.7884   |
| 274 |      |    |              |               | Diaz Ordaz      | R_GrandesLoca   | 3.784320001 | 2.52288  |
| 275 |      |    |              |               | M Aleman        | R_GrandesLoca   | 4.210056    | 2.806704 |
| 276 |      |    |              |               | Nva Cd Guerrer  | R_GrandesLoca   | 9.4608      | 0.7884   |
| 277 |      |    |              |               | Reynosa         | R_GrandesLoca   | 72.6        | 48.4     |
| 278 |      |    |              | Otros grandes |                 |                 |             |          |
| 279 | SC37 | 37 | Río Bravo 13 | DR            |                 |                 |             |          |
| 280 |      |    |              | Agrícola      | ExtrSC37        | cAgricola       | 0.42000042  | 0        |
| 281 |      |    |              | Doméstico     |                 |                 |             |          |
| 282 |      |    |              | Otros         | ExtrSC37        | Otros           | 2.6238      | 2.62     |
| 283 |      |    |              |               | Perdida por cre | cZ_OTROS        | 0           |          |
| 284 |      |    |              | Ciudades      | Ciudad Bravo    | R_GrandesLoca   | 17.1        | 11.4     |
| 285 |      |    |              |               | Matamoros       | R_GrandesLoca   | 72.15       | 48.1     |
| 286 |      |    |              | Otros grandes | ExtrSC37        | cC Retamal      | 208.34      |          |



Simulation Object List

- Sort by Type
- Extr FC SC33 II
  - Extr FC SC5 Rio Allende
  - Extr FC SC6y10 Rio Parral
  - Extr PC SC1
  - Extr PC SC14 I
  - Extr PC SC15
  - Extr PC SC2 Mex
  - Extr PC SC21 II
  - Extr PC SC28
  - Extr PC SC32
  - Extr PC SC33 II
  - Extr SC11
  - Extr SC19
  - Extr SC21 I
  - Extr SC22 EU
  - Extr SC23
  - Extr SC25 EU
  - Extr SC26
  - Extr SC27
  - Extr SC29 EU
  - Extr SC3
  - Extr SC31
  - Extr SC36 EU
  - Extr SC7y8
  - Extr SC9
  - ExtrSC37
  - Acequia Madre I
  - Ac Regional
  - Cd de Chihuahua
  - Ciudad Bravo
  - Ciudad Mier
  - Diaz Ordaz
  - DR 004 Don Martin
  - DR 006 M1 II
  - DR 006 M2 II
  - DR 025
  - DR 026



**Object Viewer**

DR 004 Don Martin | Extr FC SC33 II

Object: Extr FC SC33 II

Slots | Methods | Accounts | Accounting

January, 1950

| Slot Name                  | Value | Unit  |
|----------------------------|-------|-------|
| Extr FC SC33 II            |       |       |
| Extr FC SC33 II: Agricola  |       |       |
| Extr FC SC33 II: Domestico |       |       |
| Diversion Requested        | NaN   | 1e+06 |
| Depletion Requested        | NaN   | 1e+06 |
| Water User Groups          | 0     |       |
| Minimum Diversion Request  |       |       |
| Depletion Shortage         | NaN   | 1e+06 |
| Extr FC SC33 II: Otros     |       |       |

Order: Default

**Slot Viewer**

File Edit View TimeStep I/O Adjust

Value: | Alt Units | Jan 1950

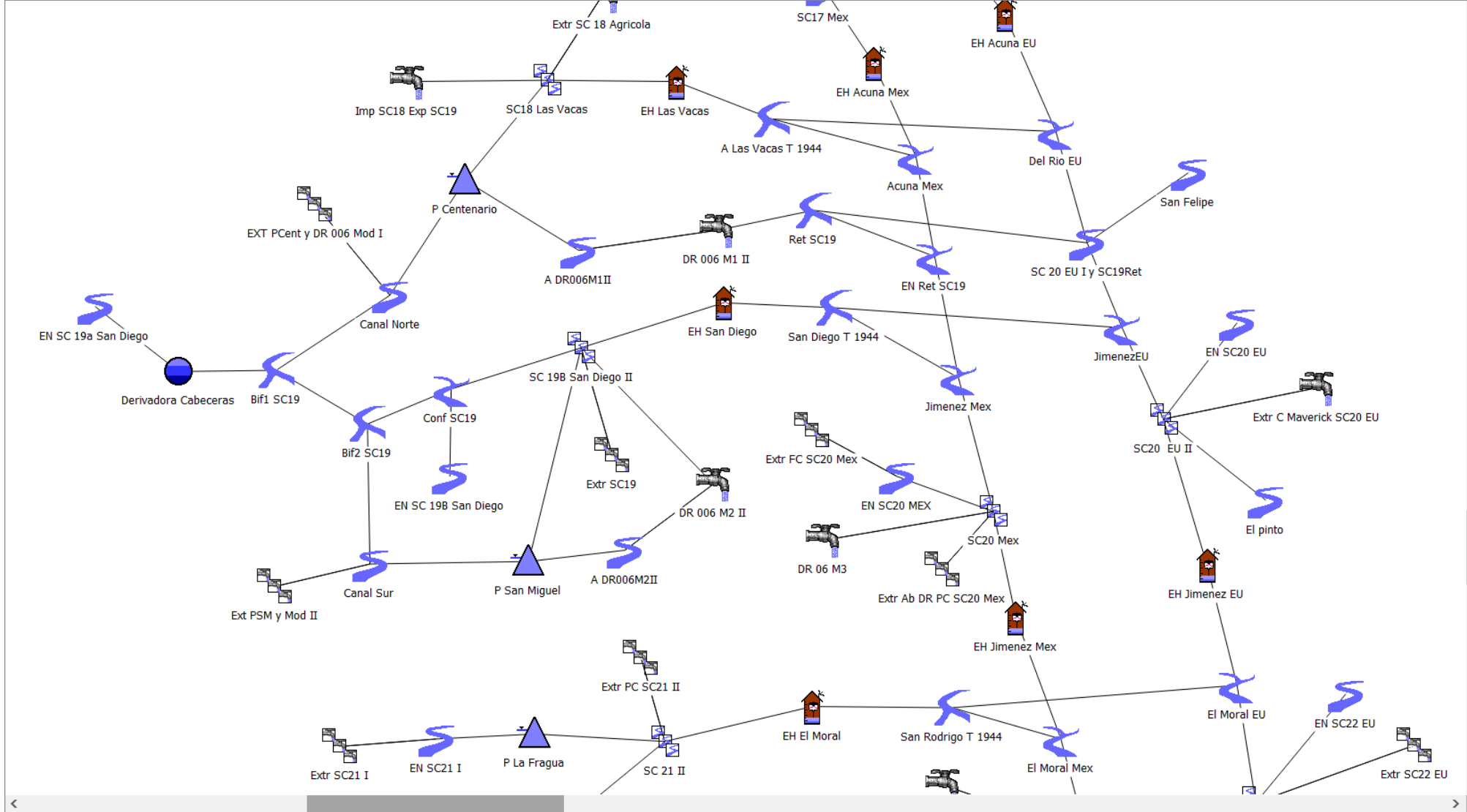
| TimeStep | Value | Unit  |
|----------|-------|-------|
| 01-1950  | NaN   | O     |
| 02-1950  | 29.26 | R 218 |
| 03-1950  | 29.26 | R 218 |
| 04-1950  | 29.26 | R 218 |
| 05-1950  | 29.26 | R 218 |
| 06-1950  | 29.26 | R 218 |
| 07-1950  | 29.26 | R 218 |
| 08-1950  | 29.26 | R 218 |
| 09-1950  | 29.26 | R 218 |
| 10-1950  | 29.26 | R 218 |
| 11-1950  | 29.26 | R 218 |
| 12-1950  | 29.26 | R 218 |
| 01-1951  | 29.26 | R 218 |
| 02-1951  | 29.26 | R 218 |

Show:  Description

- Simulation Object List**
- Sort by Type
- Extr FC SC33 II
  - Extr FC SC5 Rio Allende
  - Extr FC SC6y10 Rio Parral
  - Extr PC SC1
  - Extr PC SC14 I
  - Extr PC SC15
  - Extr PC SC2 Mex
  - Extr PC SC21 II
  - Extr PC SC28
  - Extr PC SC32
  - Extr PC SC33 II
  - Extr SC11
  - Extr SC19
  - Extr SC21 I
  - Extr SC22 EU
  - Extr SC23
  - Extr SC25 EU
  - Extr SC26
  - Extr SC27
  - Extr SC29 EU
  - Extr SC3
  - Extr SC31
  - Extr SC36 EU
  - Extr SC7y8
  - Extr SC9
  - ExtrSC37
  - Acequia Madre I
  - Ac Regional
  - Cd de Chihuahua
  - Ciudad Bravo

|     |      |    |                |               |                  |               |                         |
|-----|------|----|----------------|---------------|------------------|---------------|-------------------------|
| 244 | SC33 | 33 | Río San Juan 1 | DR            |                  |               |                         |
| 245 |      |    |                | Agrícola      | Extr FC SC33 II  | Agricola      | 177.8315785 271.8306461 |
| 246 |      |    |                |               | Extr PC SC33 II  | Agricola      | 93.99902148             |
| 247 |      |    |                | Doméstico     | Extr FC SC33 II  | Domestico     | 351.070772 139.19       |
| 248 |      |    |                | Otros         | Extr FC SC33 II  | Otros         | 6.1880024 1.7559845     |
| 249 |      |    |                |               | Extr PC SC33 II  | Otros         | 0.4292256               |
| 250 |      |    |                | Ciudades      | Extr Ac Cuchillo | R_GrandesLoca | 105.8703152 150.742     |
| 251 |      |    |                |               | Extr P Monterrey | R_GrandesLoca | 45.11383957 37.19       |
| 252 |      |    |                | Otros grandes |                  |               |                         |

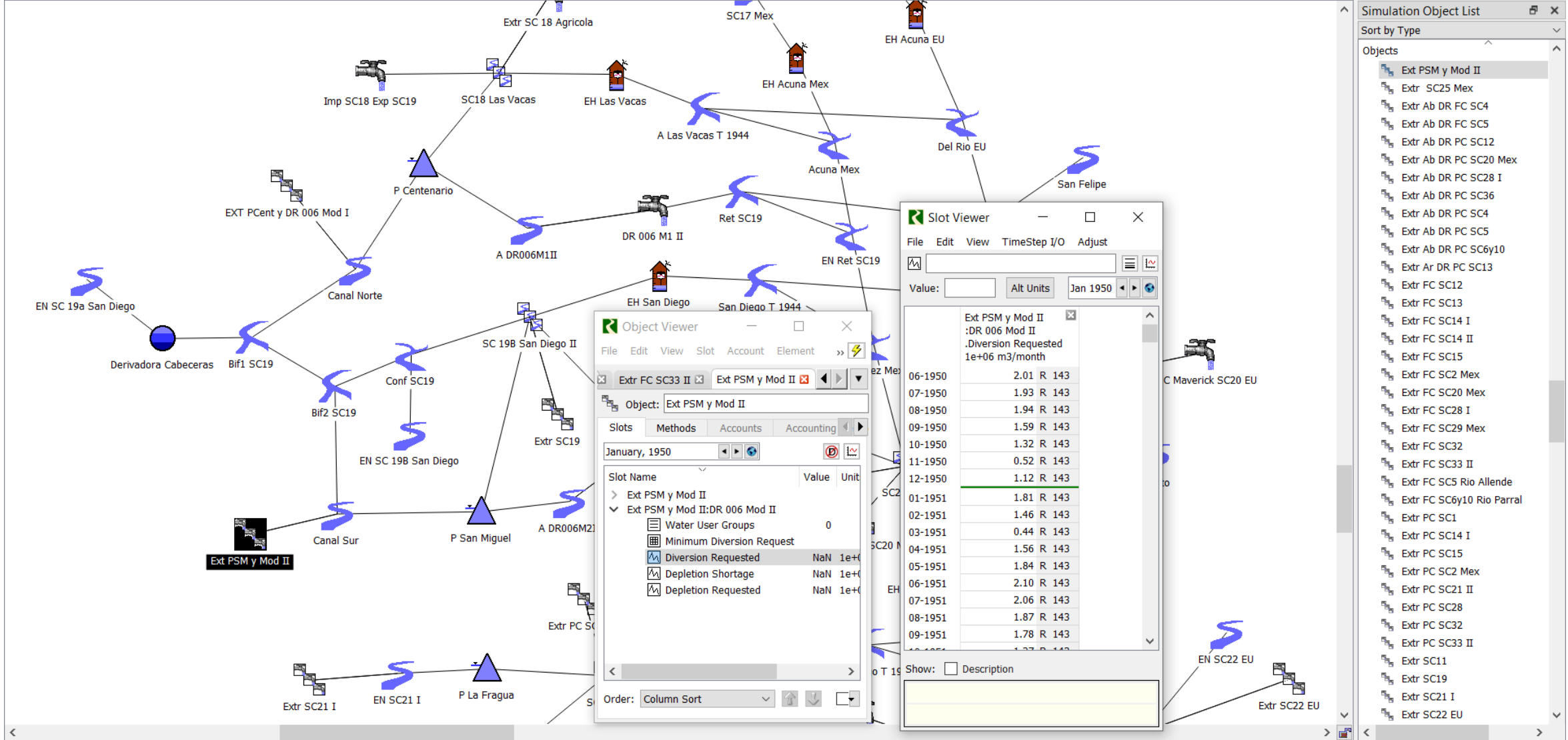




Simulation Object List

- Sort by Type
- Extr FC SC33 II
  - Extr FC SC5 Rio Allende
  - Extr FC SC6y10 Rio Parral
  - Extr PC SC1
  - Extr PC SC14 I
  - Extr PC SC15
  - Extr PC SC2 Mex
  - Extr PC SC21 II
  - Extr PC SC28
  - Extr PC SC32
  - Extr PC SC33 II
  - Extr SC11
  - Extr SC19
  - Extr SC21 I
  - Extr SC22 EU
  - Extr SC23
  - Extr SC25 EU
  - Extr SC26
  - Extr SC27
  - Extr SC29 EU
  - Extr SC3
  - Extr SC31
  - Extr SC36 EU
  - Extr SC7y8
  - Extr SC9
  - ExtrSC37
  - Acequia Madre I
  - Ac Regional
  - Cd de Chihuahua
  - Ciudad Bravo
  - Ciudad Mier
  - Diaz Ordaz
  - DR 004 Don Martin
  - DR 006 M1 II
  - DR 006 M2 II
  - DR 025
  - DR 026





### Object Viewer

Object: Ext PSM y Mod II

Slots: Methods Accounts Accounting

January, 1950

| Slot Name                      | Value | Unit |
|--------------------------------|-------|------|
| Ext PSM y Mod II               |       |      |
| Ext PSM y Mod II:DR 006 Mod II |       |      |
| Water User Groups              | 0     |      |
| Minimum Diversion Request      |       |      |
| Diversion Requested            | NaN   | 1e+  |
| Depletion Shortage             | NaN   | 1e+  |
| Depletion Requested            | NaN   | 1e+  |

Order: Column Sort

### Slot Viewer

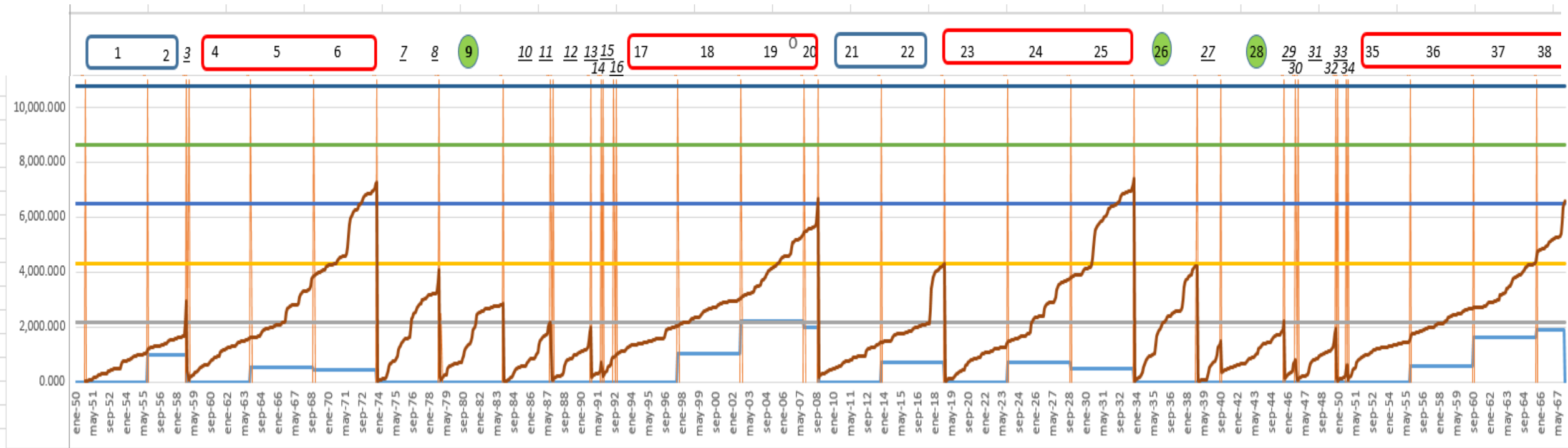
Value: [ ] Alt Units Jan 1950

| Time    | Value | Unit  |
|---------|-------|-------|
| 06-1950 | 2.01  | R 143 |
| 07-1950 | 1.93  | R 143 |
| 08-1950 | 1.94  | R 143 |
| 09-1950 | 1.59  | R 143 |
| 10-1950 | 1.32  | R 143 |
| 11-1950 | 0.52  | R 143 |
| 12-1950 | 1.12  | R 143 |
| 01-1951 | 1.81  | R 143 |
| 02-1951 | 1.46  | R 143 |
| 03-1951 | 0.44  | R 143 |
| 04-1951 | 1.56  | R 143 |
| 05-1951 | 1.84  | R 143 |
| 06-1951 | 2.10  | R 143 |
| 07-1951 | 2.06  | R 143 |
| 08-1951 | 1.87  | R 143 |
| 09-1951 | 1.78  | R 143 |

Show:  Description

- ### Simulation Object List
- Sort by Type
- Objects
- Ext PSM y Mod II
  - Extr SC25 Mex
  - Extr Ab DR FC SC4
  - Extr Ab DR FC SC5
  - Extr Ab DR PC SC12
  - Extr Ab DR PC SC20 Mex
  - Extr Ab DR PC SC28 I
  - Extr Ab DR PC SC36
  - Extr Ab DR PC SC4
  - Extr Ab DR PC SC5
  - Extr Ab DR PC SC6y10
  - Extr Ar DR PC SC13
  - Extr FC SC12
  - Extr FC SC13
  - Extr FC SC14 I
  - Extr FC SC14 II
  - Extr FC SC15
  - Extr FC SC2 Mex
  - Extr FC SC20 Mex
  - Extr FC SC28 I
  - Extr FC SC29 Mex
  - Extr FC SC32
  - Extr FC SC33 II
  - Extr FC SC5 Rio Allende
  - Extr FC SC6y10 Rio Parral
  - Extr PC SC1
  - Extr PC SC14 I
  - Extr PC SC15
  - Extr PC SC2 Mex
  - Extr PC SC21 II
  - Extr PC SC28
  - Extr PC SC32
  - Extr PC SC33 II
  - Extr SC11
  - Extr SC19
  - Extr SC21 I
  - Extr SC22 EU

## Escenario 23066: Comportamiento de entregas de agua al Tratado de 1944



| Tipo   | Eventos   | Ciclos    | %            |
|--|-----------|-----------|--------------|
| Ciclos que se cumple la entrega              | 3         | 3         | 7.9          |
| Ciclos seguidos que se cumplen en el segundo | 2         | 4         | 10.5         |
| Ciclos que se cumplen por cierre anticipado  | 17        | 17        | 44.7         |
| Ciclos donde no se cumple el Tratado         | 4         | 14        | 36.8         |
| <b>TOTALES</b>                               | <b>26</b> | <b>38</b> | <b>100.0</b> |