

Agreement on H-I Model Changes to Address LAWMA's Section II Accounts, X-Y Water Right, and Spill Factors

January 2024

I. Introduction

This Agreement (“Agreement”) by the State of Colorado and the State of Kansas (“States”) to modify the Hydrologic-Institutional Model (“H-I Model”) addresses changes to how Section II accounts in John Martin Reservoir (“JMR”) owned by the Lower Arkansas Water Management Association (“LAWMA”), the X-Y Irrigating Ditch (“X-Y”) water right, and spill factors for ditches with augmentation stations located on multiple river reaches are handled in the model.

In 2017, the States agreed to use a modified version of the H-I Model as part of the 2016 H-I Model annual update that changed the handling of LAWMA’s Section II accounts as well as the X-Y Water Right. In 2018, the States agreed to incorporate additional modifications into the H-I Model as part of the 2017 H-I Model annual update that used multiple spill factors that applied to different river reaches for several ditches instead of the single spill factor for the ditch. These modifications to the H-I Model have also been used in all subsequent annual updates including the 2021 update. During this time, the H-I Model code was also modified to incorporate new elevation-area-capacity tables for JMR that are addressed in the *Agreement on Implementation of John Martin Reservoir Revised Elevation-Area-Capacity Tables in the H-I Model (2015 Agreement as amended 2024)*.

The original H-I Model code incorporated in the Judgment and Decree entered in March 2009 in *Kansas v. Colorado* (No. 105, Original) has been subsequently modified by the *Agreement on H-I Model Changes to Address Increases in Irrigation Efficiency or Pumped Groundwater (2011 Agreement as amended August 2015)* and the *2015 Agreement as amended 2024*. This Agreement modifies the H-I Model from code that has been modified by these two other agreements. The states have reviewed these changes in the H-I Model and agreed that they should be implemented. This Agreement along with the accompanying DVD reflects the changes described herein. This Agreement will be referred to as the *2024 Agreement* in other documents.

II. Background and Context

A. LAWMA Section II Accounts

LAWMA owns portions of the Lamar and Ft Bent Section II accounts in JMR. LAWMA's pro-rata portion of Section II water for these accounts is released along with water from irrigating share holders. The portion of this water that is delivered to augmentation stations should be incorporated within the spill factors that generate credit in the Historical Run of the H-I Model.

LAWMA owns all of the X-Y Graham, Keesee, Sisson-Stubbs, and Manvel Section II accounts. As this water is no longer used for irrigation and LAWMA controls when stored

Section II water for these accounts is released, the Section II water in the Historical Run of the H-I Model should be transferred into the general LAWMA account that was created in the H-I Model so that the water is not released from the reservoir to the ditch to satisfy irrigation demands. In the original H-I Model, the Sisson and Keesee Ditch Section II accounts were not transferred to the LAWMA account.

Water is no longer diverted at the X-Y Graham, Keesee, Stubbs, and Sisson ditches and the consumable portions of water from these accounts can be transferred directly to the Offset Account in JMR or released to the river for replacement of depletions. When this Section II water is transferred to the Offset Account or released to the river, in the H-I Model the total amount is removed from the LAWMA account and non-consumable return flow portions are added to the river or to other ditch accounts using special water entries. In the Compact Run of the H-I Model, Section II water continues to be stored in individual accounts and released to meet irrigation demands. The additional return flows from simulated deliveries of Section II water in the Compact Run are offset by the return flow components specified in the special water entries for the Historical Run. Credit in the 10-year compact accounting for the consumable portion of the Section II water is generated when water in the Offset Account is delivered to the stateline, while special water entries are used when Section II water from these accounts is released directly to the river.

Per decree 02CW181, the Manvel Section II water is delivered from JMR to the Lamar Canal and LAWMA’s augmentation stations to create stream credits. The decree also assesses a 17.0% loss to the Manvel water carried in the Lamar Canal. When Manvel Section II water is released, in the H-I Model special water entries are used to deliver 83% of the release from LAWMA’s account to the augmentation station river reach and transfer 17% of the release from LAWMA’s account to the Lamar Section II account.

For Section II Accounts owned and controlled exclusively by LAWMA, Table 1 lists the year the account was purchased and/or entirely controlled by LAWMA and the associated percent of conservation storage as defined in the 1980 Operating Plan for JMR.

Table 1. Information for Section II Accounts owned and controlled exclusively by LAWMA

Ditch	H-I Account	Decree	Date	Cons. Storage
Stubbs Ditch	Sisson-Stubbs (23)	02CW181	1995	1.2 % * 28.6%
Manvel Canal	Lamar-Manvel (18)	02CW181	1996	2.4%
X-Y and Graham Canals	X-Y Graham (21)	02CW181	1996	5.1%
Keesee Ditch	Keesee (16)	02CW181, 05CW052	2003	2.3%
Sisson Ditch	Sisson-Stubbs (23)	10CW085	2006	1.2 % * 71.4%

B. X-Y Water Right

LAWMA acquired 67 of the 69 cubic feet per second (cfs) X-Y Canal direct flow water right (and all of the X-Y and Graham Section II water right) in 1996. Post-compact pumping in the Historical Run of the H-I Model is increased by 0.83cfs to account for the continued use of the remaining 2 cfs starting in 1996. The remaining 2 cfs of the X-Y direct flow right was sold to LAWMA in 2015 and is no longer used for irrigation. A decree application for this 2 cfs was

submitted by LAMWA in December of 2015 and the right has been used in LAWMA's replacement plan since Plan Year 2015 (April 1, 2015 through March 31, 2016). Therefore, the additional pumping enabled in the H-I Model code should be discontinued in year 2016.

C. Spill Factors

In the original H-I Model, water diverted through augmentation stations to augment depletions is returned only to a single H-I Model river reach that is defined in the H-I Model LAND.DAT file. The Fort Lyon Canal and the Lamar Canal currently use multiple augmentation stations located on different river reaches. The H-I Model code was revised to use a portion of the UPDATE.DAT data file to associate multiple spill factors to the appropriate ditch and river reach. Although this has so far only been used for the Fort Lyon and Lamar Canals, this capability could also be used for other ditches in the future given review and approval by the States.

III. Scope

A. Section II Accounts

In the original H-I Model code, the X-Y and Graham Canals, Stubbs Ditch, and Manvel Canal Section II water is transferred after defined months to the LAWMA account in the Historical Run. The H-I Model code was modified to change the transfer date for the Manvel Canal from 1995 to 1996, and to also transfer water from the Sisson and Keesee Ditch Section II accounts to the LAWMA account. The H-I Model coding for special water types 7 and 8 was also modified to appropriately model return flows, reaches, and use of the Manvel Section II account water. A number of special water entries and data in the H-I Model UPDATE.DAT file related to past use of Section II water were also adapted or added due to the changed model code logic.

B. X-Y Graham Water Rights

In the revised H-I Model code, the additional post-compact pumping for the 2 cfs portion of the X-Y Canal direct flow water right that was not originally acquired by LAWMA was discontinued in year 2016.

C. Spill Factors

The H-I Model code and UPDATE.DAT were revised so that, for ditches with multiple ditch augmentation stations, multiple spill factors can be used so that the model will return differing portions of the ditch water to different H-I Model river reaches.

IV. H-I Model Code and Update file Revisions

A. LAWMA's Section II Accounts

The H-I Model code dealing with Type 7 and Type 8 special water entries is revised for this agreement as shown below.

Previous H-I Model Code

```
CDRS ** SUBTRACT RELEASE OF TYPE 7 WATER FROM LAWMA'S ACCOUNT AND RELEASE 0812,141L
CDRS ** 40% OF TYPE 7 TO RIVER AND ADD 60% TO SPECIFIED USERS ACCOUNT 0812.142L
      IF (ISWTYPE(I).EQ.7) THEN 0812.15L
        II=ISWREACH(I) 0812.16L
        SWREL=AMIN1(QSW(I),JMACC0(20)) 0812.17L
      IF (SWREL.LT.QSW(I)) WRITE (*,*) 'LAWMA ACCOUNT EMPTY ',IMONTH 0812.171L
        JMACC0(20)=JMACC0(20)-SWREL 0812.18L
        JMACC0(II)=JMACC0(II)+0.6*SWREL 0812.19L
        IF (II.EQ.17) THEN 0812.191L
          QTRIB(13)=QTRIB(13)+0.4*SWREL 0812.192L
        ELSE 0812.193L
          QTRIB(11)=QTRIB(11)+0.4*SWREL 0812.20L
        ENDIF 0812.201L
        WRITE (29,404) 0.6*SWREL,ISWTYPE(I),IMONTH,II,0.4*SWREL, 0812.21L
1      JMACC0(20) 0812.22L
      ENDIF 0812.23L
CDRS ** SUBTRACT RELEASE OF TYPE 8 WATER FROM LAWMA'S ACCOUNT AND ADD 0812.231L
CDRS ** 40% TO REACH 11 AND 60% TO SPECIFIED REACH 0812.232L
      IF (ISWTYPE(I).EQ.8) THEN 0812.24L
        II=ISWREACH(I) 0812.25L
        SWREL=AMIN1(QSW(I),JMACC0(20)) 0812.26L
      IF (SWREL.LT.QSW(I)) WRITE (*,*) 'LAWMA ACCOUNT EMPTY ',IMONTH 0812.261L
        JMACC0(20)=JMACC0(20)-SWREL 0812.27L
        QTRIB(II)=QTRIB(II)+0.6*SWREL 0812.28L
        QTRIB(11)=QTRIB(11)+0.4*SWREL 0812.29L
        WRITE (29,403) 0.6*SWREL,ISWTYPE(I),IMONTH,II,0.4*SWREL, 0812.30L
1      JMACC0(20) 0812.31L
      ENDIF
```

Revised H-I Model Code

```
CDRS ** SUBTRACT RELEASE OF TYPE 7 WATER FROM LAWMA'S ACCOUNT AND 0812.141L
CKT ** ADD TO SPECIFIED USERS ACCOUNT 0812.142L
      IF (ISWTYPE(I).EQ.7) THEN 0812.15L
        II=ISWREACH(I) 0812.16L
        SWREL=AMIN1(QSW(I),JMACC0(20)) 0812.17L
      IF (SWREL.LT.QSW(I)) WRITE (*,*) 'LAWMA ACCOUNT EMPTY ',IMONTH 0812.171L
        JMACC0(20)=JMACC0(20)-SWREL 0812.18L
        JMACC0(II)=JMACC0(II)+SWREL 0812.19L
        WRITE (29,404) 1.0*SWREL,ISWTYPE(I),IMONTH,II,0.0*SWREL, 0812.21L
1      JMACC0(20) 0812.22L
      ENDIF 0812.23L
CDRS ** SUBTRACT RELEASE OF TYPE 8 WATER FROM LAWMA'S ACCOUNT AND ADD 0812.231L
CKT ** TO SPECIFIED REACH 0812.232L
      IF (ISWTYPE(I).EQ.8) THEN 0812.24L
        II=ISWREACH(I) 0812.25L
        SWREL=AMIN1(QSW(I),JMACC0(20)) 0812.26L
      IF (SWREL.LT.QSW(I)) WRITE (*,*) 'LAWMA ACCOUNT EMPTY ',IMONTH 0812.261L
        JMACC0(20)=JMACC0(20)-SWREL 0812.27L
        QTRIB(II)=QTRIB(II)+SWREL 0812.28L
        WRITE (29,403) 1.0*SWREL,ISWTYPE(I),IMONTH,II,0.0*SWREL, 0812.30L
1      JMACC0(20) 0812.31L
      ENDIF 0812.32L
```

The H-I Model code transferring Section II account amounts to the model's LAWMA account is revised for this agreement as shown below.

Previous H-I Model Code

```

CDRS ** USE USER 20 ARTICLE 2 STORAGE ACCOUNT TO ACCUMULATE LAWMA'S          0812.61L
CDRS ** ACCOUNT WATER WHEN LAWMA'S REPLACEMENT PLAN IS BEING SIMULATED.      0812.62L
CDRS ** ACCOUNT CONSISTS OF X-Y GRAHAM, MANVEL AND STUBBS ARTICLE 2 WATER    0812.63L
C ***** ADD MANVEL AND STUBBS ARTICLE II IN JAN 1995 *****              0812.631L
  IF (ITER.EQ.1. AND. IMONTH.EQ.541. AND .JTM.EQ.1) THEN                      0812.64L
    JMPERC(20)=0.027432                                                         0812.65L
    JMACC0(20)=0.10811*JMACC0(18)+0.286*JMACC0(23)                            0812.66L
    JMACC0(18)=(1.0-0.10811)*JMACC0(18)                                       0812.67L
    JMACC0(23)=(1.0-0.286)*JMACC0(23)                                          0812.68L
CDES *** CHANGE FRACTION OF JMACC0(23) AFTER 2004 ****                       0812.681SS1
  JMPERC(18)=0.198                                                             0812.69L
  JMPERC(23)=0.008568                                                         0812.70L
  ENDIF                                                                        0812.71L
C ***** ADD X-Y GRAHAM ARTICLE II IN JAN 1996 *****                      0812.711L
  IF (ITER.EQ.1. AND .IMONTH.EQ.553. AND .JTM.EQ.1) THEN                    0812.72L
    JMPERC(20)=0.078432                                                         0812.73L
    JMPERC(21)=0.0                                                             0812.74L
    JMACC0(20)=JMACC0(20)+JMACC0(21)                                          0812.75L
    JMACC0(21)=0.0                                                             0812.76L
  ENDIF                                                                        0812.77L

```

Revised H-I Model Code

```

CDRS ** USE USER 20 ARTICLE 2 STORAGE ACCOUNT TO ACCUMULATE LAWMA'S          0812.61L
CDRS ** ACCOUNT WATER WHEN LAWMA'S REPLACEMENT PLAN IS BEING SIMULATED      0812.62L
CKT ** ACCOUNT CONSISTS OF MANVEL(2.4)+XYG(5.1)+SS(1.2)+KEESEEE(2.3) ART2    0812.63L
C ***** ADD STUBBS ARTICLE II IN JAN 1995 (0.012*.286) *****            0812.631L
  IF (ITER.EQ.1. AND. IMONTH.EQ.541. AND .JTM.EQ.1) THEN                      0812.64L
    JMPERC(20)=0.003432                                                         0812.65L
    JMACC0(20)=0.286*JMACC0(23)                                                0812.66L
    JMACC0(23)=(1.0-0.286)*JMACC0(23)                                          0812.67L
    JMPERC(23)=0.008568                                                         0812.68L
  ENDIF                                                                        0812.69L
C ***** ADD MANVEL AND X-Y GRAHAM ARTICLE II IN JAN 1996 *****            0812.70L
  IF (ITER.EQ.1. AND .IMONTH.EQ.553. AND .JTM.EQ.1) THEN                    0812.71L
    JMPERC(20)=0.078432                                                         0812.72L
    JMPERC(18)=0.198                                                            0812.73L
    JMPERC(21)=0.0                                                             0812.74L
    JMACC0(20)=JMACC0(20)+0.10811*JMACC0(18)+JMACC0(21)                    0812.75L
    JMACC0(18)=(1.0-0.10811)*JMACC0(18)                                       0812.76L
    JMACC0(21)=0.0                                                             0812.77L
  ENDIF                                                                        0812.78L
C ***** ADD KEESEE ARTICLE II IN JAN 2003 *****                          0812.79L
  IF (ITER.EQ.1. AND .IMONTH.EQ.637. AND .JTM.EQ.1) THEN                    0812.80L
    JMPERC(20)=0.101432                                                         0812.81L
    JMPERC(16)=0.0                                                             0812.82L
    JMACC0(20)=JMACC0(20)+JMACC0(16)                                          0812.83L
    JMACC0(16)=0.0                                                             0812.84L
  ENDIF                                                                        0812.85L
C ***** ADD SISSON ARTICLE II IN JAN 2006 *****                          0812.86L
  IF (ITER.EQ.1. AND .IMONTH.EQ.673. AND .JTM.EQ.1) THEN                    0812.87L
    JMPERC(20)=0.110                                                           0812.88L
    JMPERC(23)=0.0                                                             0812.89L
    JMACC0(20)=JMACC0(20)+JMACC0(23)                                          0812.90L
    JMACC0(23)=0.0                                                             0812.91L
  ENDIF                                                                        0812.92L

```

H-I Model Update File Revisions for LAWMA's Section II Accounts

As part of this agreement, a number of entries in the H-I Model UPDATE.DAT file were added or modified. For the H-I Model Update file, the tables on the following page list a) additional Type 7 and Type 8 special water entries needed for past releases of Manvel Section II water in 2005, 2006, 2011, and 2012, b) related revisions to annual spill factors for the combined Lamar-Manvel Canal H-I Model User, c) revision of the user number of the special water entries for the Sisson Section II account, and d) revision of the user number of the special water entries for the Keesee Section II account.

For future H-I Model updates, releases of Manvel Section II water from John Martin Reservoir to the Lamar Canal augmentation stations will require "Type 7" and "Type 8" special water entries in the H-I Model Update File. The "Type 7" entry is entered in Dataset 27 of the update RD file to transfer the carriage loss water from the LAWMA account to the Lamar Canal and should consist of the H-I Model month, the Lamar Canal user number of 18, and 17% of the reservoir release amount. The "Type 8" entry is entered in Dataset 28 to release water from the LAWMA account to the augmentation station river reach and should consist of the month, the augmentation station river reach, and 83% of the reservoir release amount. The West Farm and Center Farm augmentation stations deliver to river reaches 14 and 15, respectfully; while new augmentation stations may deliver to different reaches. The amounts of diversion of the Manvel Section II water through the Lamar Canal augmentation stations should not be included in calculation of the spill factor for the combined Lamar-Manvel Canal H-I Model User.

B. X-Y Graham Water Rights

The H-I Model code related to the X-Y Graham Canal water right is revised for this agreement as shown below.

Previous H-I Model Code

```
CDRS ***** TREAT RETURN FLOWS INTERCEPTED BY X-Y ***** 3614.51XY
CDRS ***** GRAHAM CANAL (summer only) ***** 3614.52XY
  XYINTER=0.83 3614.53XY
  IF (IMONTH.GT.552 .AND. JTM .EQ.1) THEN 3614.54XY
    IF (JMONTH.GT.3. AND .JMONTH.LT.11) THEN 3614.55XY
      PUMP(21)=PUMP(21)+XYINTER*NDAY*CFSAFD 3614.56XY
    ENDIF 3614.57XY
  ENDIF 3614.58XY
```

Revised H-I Model Code

```
CDRS ***** TREAT RETURN FLOWS INTERCEPTED BY X-Y ***** 3614.51XY
CDRS ***** GRAHAM CANAL (summer only) ***** 3614.52XY
  XYINTER=0.83 3614.53XY
  IF (IMONTH.GT.552 .AND. IMONTH.LT.793 .AND. JTM .EQ.1) THEN 3614.54XY
    IF (JMONTH.GT.3. AND .JMONTH.LT.11) THEN 3614.55XY
      PUMP(21)=PUMP(21)+XYINTER*NDAY*CFSAFD 3614.56XY
    ENDIF 3614.57XY
  ENDIF 3614.58XY
```

Table 2. Additional Special Water Entries for H-I Model Update file for Release of Manvel Section II Water from John Martin Reservoir

7	668	18	21.	0.
7	669	18	63.	0.
7	670	18	69.	0.
7	680	18	12.	0.
7	737	18	176.	0.
7	740	18	15.	0.
7	741	18	71.	0.
7	742	18	43.	0.
7	752	18	55.	0.
8	668	15	105.	0.
8	669	15	307.	0.
8	670	15	338.	0.
8	680	15	58.	0.
8	737	15	861.	0.
8	740	15	74.	0.
8	741	15	348.	0.
8	742	15	212.	0.
8	752	14	266.	0.

Note: Total number of Special Water Entries increased from 5194 to 5212

Table 3. Revisions to Lamar-Manvel Canal Spill Factors in the H-I Model Update file

Year	User	Previous Factor	Revised Factor
2005	18	0.1849	0.1682
2006	18	0.2139	0.2121
2011	18	0.1294	0.1132
2012	18	0.1924	0.1857

Table 4. Revisions to H-I Model Update file for the Sisson Section II account

Type	Year	Month	Date Code	Previous User	Revised User	AF
13	2007	7	691	23	20	608
13	2009	3	711	23	20	284
13	2010	4	724	23	20	-2
13	2010	6	726	23	20	317
13	2011	3	735	23	20	184
13	2011	4	736	23	20	11

Table 5. Revisions to H-I Model Update file for the Keesee Section II account

Type	Year	Month	Date Code	Previous User	Revised User	AF
13	2003	6	642	16	20	239
13	2004	4	652	16	20	57
13	2004	7	655	16	20	270
13	2005	5	665	16	20	680
13	2005	5	665	16	20	419
13	2006	4	676	16	20	80
13	2006	7	679	16	20	201
13	2007	3	687	16	20	91
13	2007	5	689	16	20	184
13	2007	6	690	16	20	227
13	2007	7	691	16	20	66
13	2008	4	700	16	20	593
13	2008	8	704	16	20	227
13	2008	10	706	16	20	80
13	2009	3	711	16	20	404
13	2009	4	712	16	20	70
13	2009	5	713	16	20	7
13	2009	6	714	16	20	14
13	2010	3	723	16	20	366
13	2010	4	724	16	20	81
13	2010	4	724	16	20	-6
13	2010	5	725	16	20	359
13	2010	6	726	16	20	39
13	2011	3	735	16	20	491
13	2011	4	736	16	20	31
13	2012	6	750	16	20	130
13	2012	8	752	16	20	356
13	2013	4	760	16	20	50
13	2013	6	762	16	20	46
13	2013	8	764	16	20	43
13	2013	8	764	16	20	156
13	2013	9	765	16	20	29
13	2014	3	771	16	20	195
13	2014	4	772	16	20	16
13	2014	6	774	16	20	21
13	2014	8	776	16	20	319
13	2014	8	776	16	20	41
13	2015	4	784	16	20	26
13	2016	3	795	16	20	778

C. Spill Factors

The H-I Model code related to the Spill Factors is revised for this agreement as shown below.

Additional H-I Model Code for Variable Declaration and Dimensioning

1	MAXRES=8,MAXDVT=33,MAXSW=15000,MAXSPLI=100,MAXSPLJ=18)	0006D KT/SPLKT
7	QALJ(MAXSTP),SPLFACT(MAXSPLI,MAXSPLJ)	0014.1RF/SPLKT
1	ISPLUSER(MAXSPLI),ISPLYEAR(MAXSPLI)	0014.3SPLKT
5	NSPL,ISPLUSER,ISPLYEAR,SPLFACT)	0027.21SPLKT
4	PUMPSOLE,IIYR,QALJ,AMTYIN,NSPL,ISPL,ISPLUSER,ISPLYEAR,SPLFACT)	0030.2D/RF/AM/SPLKT
	ISPL=1	0041.1SPLKT
5	AMTYIN,NSPL,ISPLUSER,ISPLYEAR,SPLFACT)	0053.2AM/SPLKT
4	QSW2,JPUMP,ISTRUP,PUMPSOLE,IIYR,QALJ,AMTYIN,NSPL,ISPL,	0057.1D/RF/AM/SPLKT
5	ISPLUSER,ISPLYEAR,SPLFACT)	0057.2SPLKT
5	NSPL,ISPLUSER,ISPLYEAR,SPLFACT)	0289.2SPLKT
2	MAXSPLI=100,MAXSPLJ=18,MAXJM=20)	0293.1SPLKT/JMRKT
1	SPLFACT(MAXSPLI,MAXSPLJ),JMRACA(MAXJM),JMRSTR(MAXJM)	0320.1SPLKT/JMRKT
5	ISPLUSER(MAXSPLI),ISPLYEAR(MAXSPLI),MJMRAC(MAXJM),MJMRST(MAXJM)	0325.1SPLKT/JMRKT
5	PUMPSOLE,IIYR,QALJ,AMTYIN,NSPL,ISPL,ISPLUSER,ISPLYEAR,SPLFACT)	3740.2D/RF/AM/SPLKT
2	MAXSW=15000,MAXSPLI=100,MAXSPLJ=18)	3743.1D/KT/SPLKT
5	TAILSS(50,24),TAILC(50,24),SPLFACT(MAXSPLI,MAXSPLJ)	3754.5ABS/KT/SPLKT
1	ISWMONTH(MAXSW),ISWREACH(MAXSW),ISPLUSER(MAXSPLI),	3755.1D/SPLKT
2	ISPLYEAR(MAXSPLI)	3755.2/SPLKT

Additional H-I Model Code to Read Multiple Spill Factors

CKT	READ MULTIPLE SPILL FACTORS	0807.14201SPLKT
	READ (25,*)	0807.14202SPLKT
	READ (25,3894) NSPL	0807.14203SPLKT
	WRITE (29,*) ' NUMBER OF MULTIPLE SPILL FACTORS=',NSPL	0807.14204SPLKT
	DO 3893 I=1,NSPL	0807.14205SPLKT
	READ (25,3895) ISPLYEAR(I),ISPLUSER(I),(SPLFACT(I,J),J=1,18)	0807.14206SPLKT
	WRITE (29,3895) ISPLYEAR(I),ISPLUSER(I),(SPLFACT(I,J),J=1,18)	0807.14207SPLKT
3893	CONTINUE	0807.14212SPLKT
3894	FORMAT (I10)	0807.14213SPLKT
3895	FORMAT (I5,I3,18F7.4)	0807.14214SPLKT

Original H-I Model Code for Spill Factors

C--SPILL is amount lost by canal spills to river	4136
SPILL=SPILLF(IUSE)*DIVERT	4137
SWRET(IRTRCH(IUSE))=SWRET(IRTRCH(IUSE))+ SPILL	4484

Revised H-I Model Code for Spill Factors

```

C--SPILL is amount lost by canal spills to river
IF (IUSE.EQ.ISPLUSER(ISPL) .AND. IIYR.EQ.ISPLYEAR(ISPL)
1 .AND. JTM.EQ.1) THEN
    SPILL=0.0
    DO 3896 J=1,18
    SPILLI=SPLFACT(ISPL,J)*DIVERT
    SWRET(J)=SWRET(J) + SPILLI
    SPILL=SPILL + SPILLI
3896 CONTINUE
    IF (JMONTH.EQ.12 .AND. ISPL.LT.NSPL) ISPL=ISPL+1
ELSE
    SPILL=SPILLF(IUSE)*DIVERT
    SWRET(IRTRCH(IUSE))=SWRET(IRTRCH(IUSE))+ SPILL
ENDIF
CKT SWRET(IRTRCH(IUSE))=SWRET(IRTRCH(IUSE))+ SPILL

```

Revisions to UPDATE.DAT file for Multiple Spill Factors

The H-I Model UPDATE.DAT was revised to incorporate the multiple spill factor information. The new data block is inserted after the special water data block. The total number of entry lines is listed first below the block title, and entry lines include the year, the H-I Model User, and a line of 18 spill factor values corresponding to the value for each of the main stem river reaches 1-18. Below shows the block headings and the block of data that was included in the 2021 H-I Model annual update (single lines in the file are displayed on two lines here).

```

SPECIAL WATERS - RELEASES FROM MEREDITH ETC. (3I4 2F10.0)
.....
MULTIPLE SPILL FACTORS BY RIVER REACHES - (I5 I3 18(F7.4))
10
2017 10 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0117 0.0106 0.0018 0.0031 0.0025 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
2017 18 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000 0.1475 0.1017 0.0000 0.0766 0.0000
2018 10 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0023 0.0084 0.0019 0.0025 0.0003 0.0000 0.0000 0.0000 0.0000 0.0000
2018 18 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000 0.1201 0.1336 0.0000 0.0775 0.0000
2019 10 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0144 0.0142 0.0031 0.0070 0.0063 0.0034 0.0000 0.0000 0.0000 0.0000
2019 18 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000 0.0849 0.1031 0.0000 0.0725 0.0000
2020 10 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0148 0.0147 0.0032 0.0072 0.0065 0.0035 0.0000 0.0000 0.0000 0.0000
2020 18 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000 0.1096 0.0911 0.0000 0.0691 0.0000
2021 10 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0134 0.0103 0.0013 0.0044 0.0036 0.0025 0.0000 0.0000 0.0000 0.0000
2021 18 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000 0.1838 0.0844 0.0000 0.0756 0.0000
FRACTION OF WW WHICH WAS CONS. WATER PLACED IN UNDIST. POOL (1F10.8)

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IX. General Terms

The States agree to modify the H-I Model code and the H-I Model UPDATE.DAT file, as described in this Agreement, so that the X-Y Graham, Keesee, Sisson-Stubbs, and Manvel Section II accounts that are owned and controlled by LAWMA are handled similarly in the model, and that Manvel Section II account water delivered to Lamar Canal augmentation stations is acknowledged using special water entries.

The States agree to modify the H-I Model code, as described in this Agreement, so that the additional post-compact pumping generated by the code for the 2 cfs portion of the X-Y Canal direct flow water right that was not originally acquired by LAWMA is discontinued in year 2016.

The States agree to modify the H-I Model code and the H-I Model UPDATE.DAT file, as described in this Agreement, so that, for ditches with multiple augmentation stations, multiple spill factors can be used to enable the model to return differing portions of the ditch water to different H-I Model river reaches.


The States agree that the changes will be implemented with the 2023 H-I Model annual update performed in 2024. The results of the ten year Compact compliance for years prior to the 2023 H-I Model annual update will remain unchanged.

This Agreement shall become effective when both States have approved it by the signatures of their Engineers as provided for below or on counterpart copies, and after electronic versions of the same have been received by the other State.

STATE OF COLORADO
Tracy L.
Kosloff
Tracy Kosloff
Colorado State Engineer

Digitally signed by Tracy
L. Kosloff
Date: 2024.01.15
09:58:40 -07'00'

Date: _____

STATE OF KANSAS

Earl Lewis
Kansas Chief Engineer

Date: January 26, 2024