From: Marvin Swanda
To: Alice Johns; Stephen Ronshaugen
Subject: Fwd: HCL Water Supply Procedures 2005.ppt
Date: Friday, December 09, 2011 10:48:44 PM
Attachments: HCL Water Supply Procedures 2005.ppt

This is what we are thinking about for the Bostwick Meeting.

Marv

>>> Craig Scott 7/8/2005 1:57:36 PM >>>

RECLAMATION

Managing Water in the West

Harlan County Lake Water Supply

Marv Swanda

Manager, McCook Field Office

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

HARLAN COUNTY LAKE WATER SUPPLY

- PROCEDURES FOR COMPUTING THE ANNUAL HARLAN COUNTY LAKE SHUTOFF ELEVATION

- PROCEDURES FOR DETERMINING THE HARLAN COUNTY LAKE WATER SPLIT

- COMPACT – FINAL SETTLEMENT STIPULATIONS

RECLAMATION

PROCEDURES FOR COMPUTING THE ANNUAL HARLAN COUNTY LAKE SHUTOFF ELEVATION

CONSENSUS PLAN

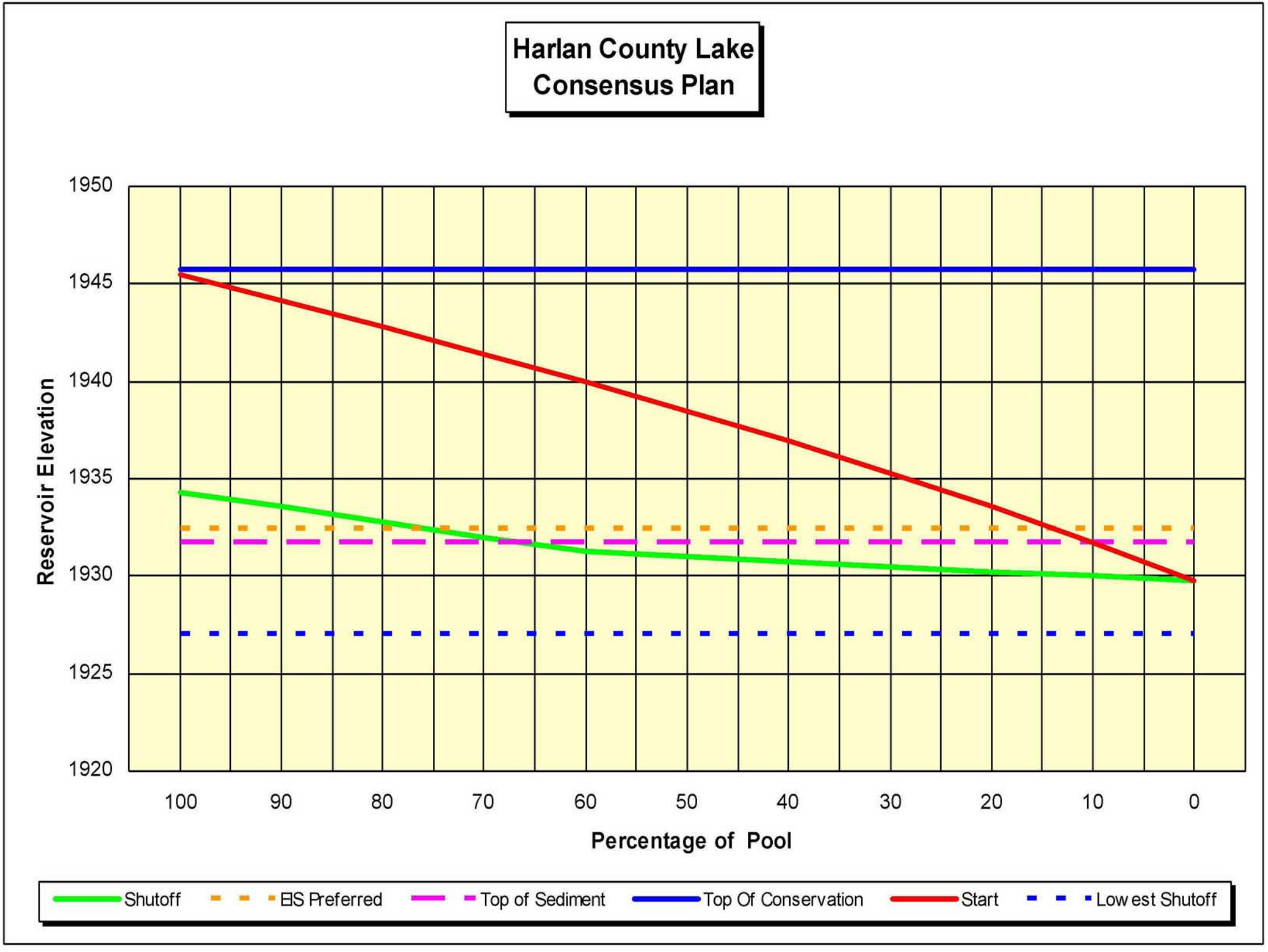
- Field Working Agreement
COE & USBR

ATTACHMENT "B"

Of New Contract

- Districts & USBR

RECLAMATION


Harlan County Lake
Consensus Plan
Reservoir Elevation
1950
1945
1940
1935
1930
1925
1920
100
90
80
70
60
50
40
30
20
10
0
Percentage of Pool
Shutoff
EIS Preferred
Top of Sediment
Top Of Conservation
Start
Lowest Shutoff

JANUARY ESTIMATE

The following is a list of procedures to calculate the annual shutoff elevation:

- Estimate the End of May storage content
  - » Actual end of Dec. content plus the estimated Jan-May inflow estimate (57,600 AF or the running average inflow for the last 5 year period) minus the Jan-May evap. Estimate (8,800 AF).
- Compute the maximum allowable release available
  - » Estimated end of May content minus the Inactive Pool content (164,111 AF) plus 20,000 AF for allowance of summer evaporation from the sediment pool

RECLAMATION

JANUARY ESTIMATE - cont'd

- Compute the maximum allowable release for irrigation

  » This can be computed by using the straight line interpolation of the following:

Maximum Allowable Release	Irrigation Water Release
0	0
17000	15000
34000	30000
54000	45000
68000	60000
85000	75000
102000	90000
119000	100000
136000	110000
153000	120000
170000	130000

JANUARY ESTIMATE - cont'd

- Subtract Irrigation Water Release from End of May content. Result is shutoff content.

- Convert computed shutoff content to shutoff elevation.

JUNE ESTIMATE

For June Adjustment using actual end of May data:

- Compare the estimated end of May to the actual end of May content. If the actual end of May content is less than the estimated end of May content lower the shutoff content by using this equation:
  - » **shutoff content = estimated shutoff content – (estimated end of May content – actual end of May content)**

- If the actual end of May content is equal to or greater than the estimated end of May content, there is no adjustment to the estimated shutoff content.

JUNE ESTIMATE cont'd

- Convert computed shutoff content to shutoff elevation.

- If the shutoff elevation is below the bottom of the irrigation pool, releases will be discontinued at the shutoff elevation or whenever 119,000 AF has been released and the reservoir is below the bottom of the irrigation pool, whichever occurs first.

PROCEDURES FOR DETERMINING THE HARLAN COUNTY LAKE WATER SPLIT

Attachment "B" of the Districts' O&M agreement.

RECLAMATION

PROCEDURES FOR DETERMINING THE HARLAN COUNTY LAKE WATER SPLIT

- First, the shutoff elevation is computed following the procedures described in the "District Operating Plan" (Attachment B of the new contract). This establishes the amount of water available for irrigation release from HCL.

- Once the amount of water available for irrigation is computed the water supply is split based on the following procedures and assumptions:

RECLAMATION

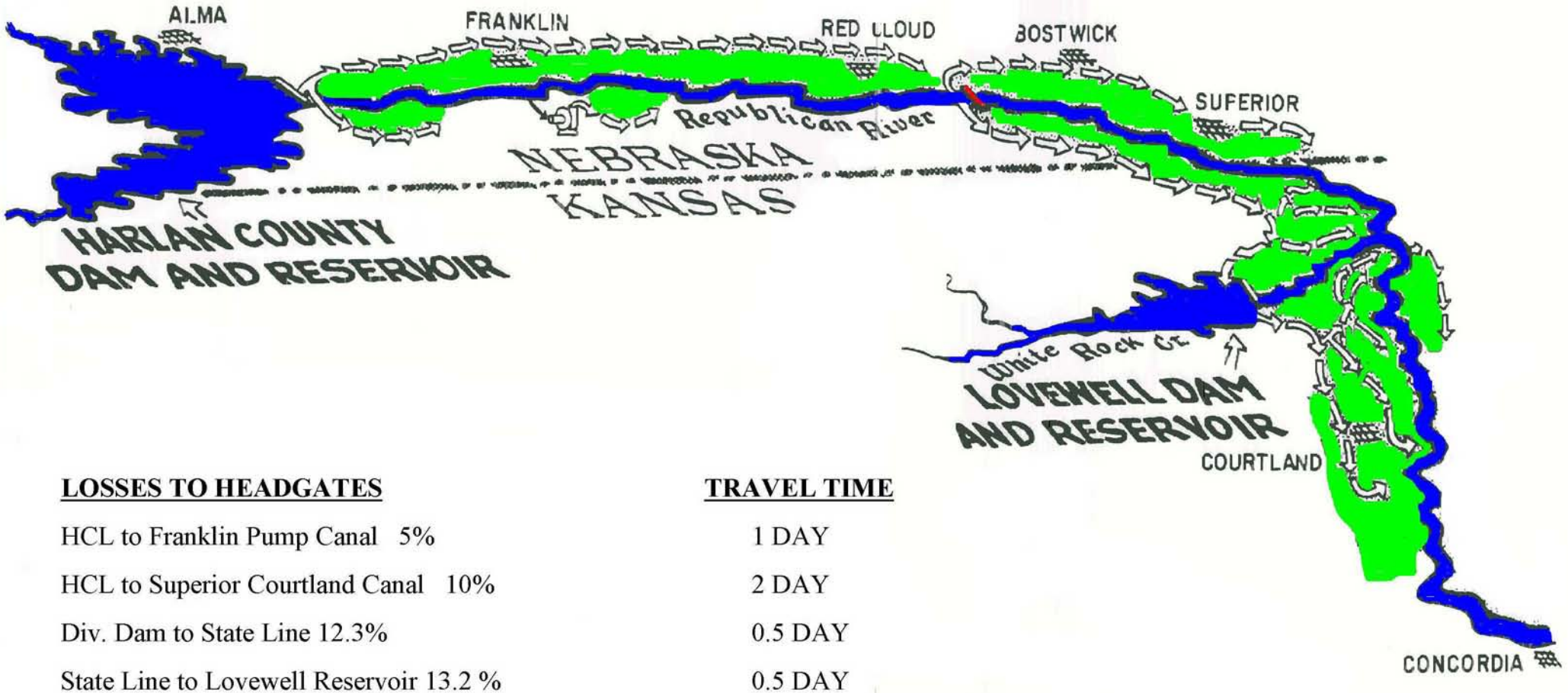
PROCEDURES FOR DETERMINING THE HARLAN COUNTY LAKE WATER SPLIT

The following is a list of procedures for determining the Harlan County Lake water supply for each district:

- First, the shutoff elevation is computed following the procedures described in the "District Operating Plan" (Attachment B of the new contract). This establishes the amount of water available for irrigation release from HCL.

- Once the amount of water available for irrigation is computed the water supply is split based on the following procedures and assumptions:

BOSTWICK DIVISION



LOSSES TO HEADGATES	**TRAVEL TIME**
HCL to Franklin Pump Canal 5%	1 DAY
HCL to Superior Courtland Canal 10%	2 DAY
Div. Dam to State Line 12.3%	0.5 DAY
State Line to Lovewell Reservoir 13.2 %	0.5 DAY

Gain is back calculated using these losses.

PROCEDURES FOR DETERMINING THE HARLAN COUNTY LAKE WATER SPLIT

cont'd

Assumptions

- Inflows will offset evaporation during the summer months.
- Estimated usable pickup below HCL and the diversion dam will average about 80 cfs.
- Using the improved efficiencies, an equal amount of water would be delivered to all acres in both districts.

Procedures

1 - Determine inches of farm delivery that can be delivered to the lower Courtland Canal from Lovewell Reservoir.

RECLAMATION

BOSTWICK DIVISION

Constants — **Water Supply Shares--2002**

Above Lovewell from HCL	6629						
Above Lovewell from PU	3613						
Below Lovewell from HCL	5975						
Usable Pickup(cfs)	80	80	NB cfs	26	KB cfs	54	
Estimated Length of Season(days)	90						
Pickup Supply(inches)	3.95			Irr. Supply			
Bel. Lovewell fr. Lovewell	4092		Lovewell +	24022			
			Lovewell +	27085			
Lovewell Irrigation Water	30299		Lovewell +	30299			
Harlan County Lake	116804						

Lovewell Irrigation Water	Inches from Lovewell	Inches From Harlan+PU	Estimated Pickup PU	Storage Used Harlan	Storage Used Harlan	HCL Inches To All	HCL Storage Used	Total Inches Available	NE Share HCL	KS Share HCL
Franklin		7.40	0.00		15389	6.63	13785	14.04	29174	0
Naponee		7.40	0.00		1755	6.63	1572	14.04	3328	0
F. Pump		7.40	0.00		2217	6.63	1986	14.04	4203	0
Superior		7.40	3.95	3726		6.63	7163	14.04	10889	0
Courtland		7.40	3.95	769		6.63	1478	14.04	2248	0
Total NB									**49841**	
U. Courtland		7.40	3.95	9354		6.63	17980	14.04	0	27334
L. Courtland	7.40					6.63	39629	14.04	0	39629
Total KB										**66963**
Totals				13850	19361		83594			

Calculation of Canal Constants

	Acres	CUIW Adj.		Loss to Headgate	Loss to Headgate	Trans. Loss	Farm Loss	From HCL	From Lovewell	From Pickup
Franklin	11262	1.052	11848	0.00	0.00	0.525	0	2079	-	-
Naponee	1628	1.052	1713	0.00	0.00	0.398	0	237	-	-
F. Pump	2106	1.052	2216	0.05	0.00	0.351	0	299	-	-
Superior	5972	1.000	5972	0.10	0.00	0.488	0	1080	-	972
Courtland	1967	1.000	1967	0.10	0.00	0.183	0	223	-	201
Total NB	22935							3918		
U. Courtland	13378	1.000	13378	0.10	0.123	0.479	0	2711	-	2440
L. Courtland	29122	1.000	29122	0.10	0.239	0.407	0	5975	4092	-
Total KB	42500							8686		
						Totals		12604	4092	3613

PROCEDURES FOR DETERMINING THE HARLAN COUNTY LAKE WATER SPLIT

Procedures - cont'd

2 - Determine the storage required to deliver 1 inch of water from the different sources to all the land under each canal using the improved contract efficiencies.

3 – Estimate the length of season and compute delivery from pickup to the lands served by Superior, Courtland (NE) and Upper Courtland (KS).

4 – Determine the storage required from HCL by canal so that the deliveries can be equal to the inches delivered to the Lower Courtland Canal from Lovewell.

BOSTWICK DIVISION

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Harlan County Lake		116804							

Lovewell Irrigation Water	Inches from Lovewell	Inches From Harlan+PU	Estimated Pickup PU	Storage Used Harlan	Storage Used Harlan	HCL Inches To All	HCL Storage Used	Total Inches Available	NE Share HCL	KS Share HCL
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F. Pump		7.40	0.00		2217	6.63	1986	14.04	4203	0
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Naponee	1628	1.052	1713	0.00	0.00	0.398	0	237	-	-
F. Pump	2106	1.052	2216	0.05	0.00	0.351	0	299	-	-
Superior	5972	1.000	5972	0.10	0.00	0.488	0	1080	-	972
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Total KB	42500							8686		
						Totals		12604	4092	3613

PROCEDURES FOR DETERMINING THE HARLAN COUNTY LAKE WATER SPLIT

Procedures - cont'd

5 - Divide up the remaining storage water available in HCL to all the lands so that the amount of farm delivery is equal for all lands.

6 -Calculate the total storage water in HCL that is assigned to each District.

DAILY ACCOUNTING

RECLAMATION

BOSTWICK DIVISION

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Total KB	42500							8686		
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PROCEDURES FOR DETERMINING THE HARLAN COUNTY LAKE WATER SPLIT

Procedures - cont'd

7 – An account will be established for both NE and KS. During the season daily accounting is be performed based on uses reported by the Districts. At the end of each month several adjustments will be considered:

- Adjust the accounts to reflect the official (COE) inflow, outflow, and evaporation records.
- Adjust for overuse or underuse at the Diversion Dam.
- Adjust for pickup variation from 80 cfs at the diversion dam.
- Adjust for inflows in excess of evaporation loss and HCL and Lovewell Reservoir.

After the adjustments are made, new values will be input into the calculation process and the previous month's accounting will be rerun as necessary. The adjusted end of month account values will be used as the carryover balances to begin the next month's accounting.

RECLAMATION

COMPACT – FINAL SETTLEMENT STIPULATIONS

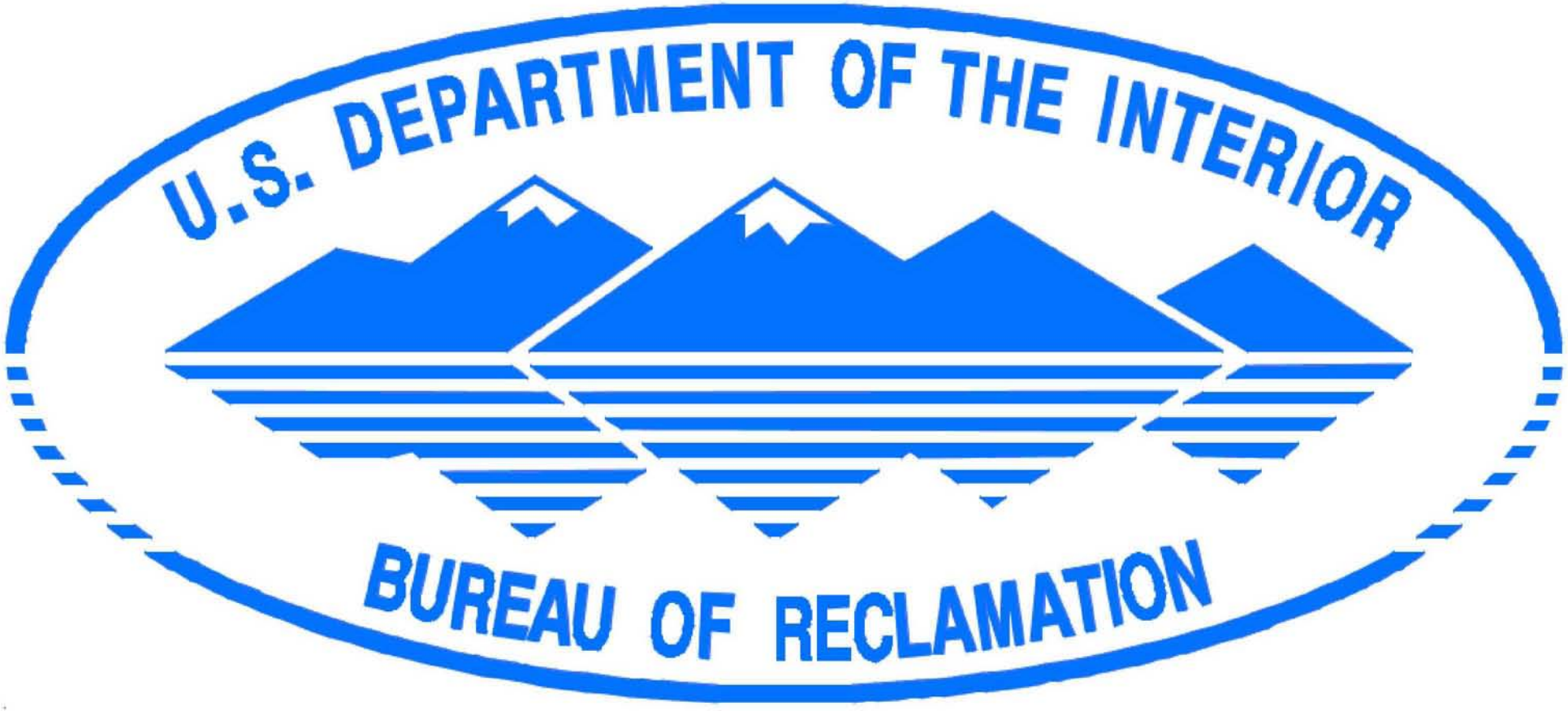
ADDITIONAL +WATER ADMINISTRATION AT GUIDE ROCK

- KS Bostwick reconginzed with a priority date of Feb. 26, 1948
- When water is needed for diversion and HCL supply is less than 130k AF, NE will close junior natural flow diverters
- NE will protect storage releases from HCL
- NE and KS agree minimize bypass flows

WATER-SHORT YEAR ADMINISTRATION

- Water-Short year administration will be in effect in years the irrigation supply from HCL storage is less than 119,000 AF
- Reclamation will provide the States with a projected water supply based on the methodology provided in the Consensus Plan

RECLAMATION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