

Thompson, Mike

From: Williams, Jim
Sent: Friday, August 10, 2007 10:37 AM
To: Bradley, Jesse; Paul Koester; Schneider, Jim; Thompson, Mike; Zheng, Shuhai
Subject: FW: Engineering Committee Accounting Manual
Attachments: RRCA accounting manual draft 8-9-07.doc

During our meeting in Topeka last week, we agreed to at least have an outline to Kansas on our portion of the accounting manual to the other states by Monday, 8/13.

Please look through the attached and make some notes as to what should be included. I would like to be brief, yet accurate. If we can provide complete details in a couple of paragraphs instead of just an outline, that would be better.

I've set a group meeting for 11 a.m. on Monday in the conference room—please come if you can.

--Jim

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Cc: Barfield, Dave; ableed@dnr.ne.gov; Ken Knox; Billinger, Mark
Subject: Engineering Committee Accounting Manual

Last year, the engineering committee made a stab at the Accounting User Manual. Here's an updated draft. This is very rough, but may help you in your efforts to put together your outline of your internal procedures. Please review and insert language or outline where appropriate. GA

George Austin
Kansas Department of Agriculture
Division of Water Resources
Interstate Water Issues
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8/10/2007

DNR 018354

REPUBLICAN RIVER COMPACT ADMINISTRATION

Engineering Committee

August 10, 2007



Accounting
Procedures Guide

REPUBLICAN RIVER COMPACT ADMINISTRATION

Accounting Procedures Guide

August 9, 2007

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shuhai? {

! →

← Why don't we calculate all CBCU in the Basin? KS gets a pass below state line.

Introduction

*an agreed representation
of a portion of the*

Under the terms of the Republican River Compact settlement, the three states have committed to annually determine the basin's water supply and consumptive use to as a means to determine of compliance with the Republican River Compact (RRC). During the 2005 Annual Meeting of the Republican River Compact Administration (RRCA), the Engineering Committee (EC) was tasked to develop a manual to document the accounting process. While various elements of the accounting process are available in various documents, there is not a cohesive description of the process. In this document, the abbreviations, YYYY or YY, will be used to represent the spaces for year for with the file name is designated. For instance, Lovewell_Ops_2006.xls designates the file for 2006. In this case, YYYY is 2006.

This document seeks to clearly establish the procedures used by the EC to make the annual computation. This includes the documentation of the data sources for the RRCA accounting spreadsheet as well as to identify supporting spreadsheets used in the EC's work of developing the accounting. While it is our intent to bring the disparate information on the accounting data and methods in one source, we will have chosen not to repeat procedures clearly laid out in the following documents:

The **Republican River Compact accounting procedures** (accounting procedures) and formulas were developed as part of the Settlement and have been updated since that time by Administration. The accounting procedures lay out the general and specific formulas by sub-basin that are to be used to develop the accounting. Conflicts between this document and the accounting procedures, are governed by the accounting procedures. This document serves only to explain the sources of data and computational methods used by the EC to fulfill the requirements of the accounting procedures.

The **Republican River Groundwater Model** (groundwater model) was developed by the States and adopted as an integral part of the Settlement and has been modified by the Administration. The groundwater model has specific input data described in the groundwater model documentation which is not addressed in this manual. The output from the groundwater model, however, is used in the accounting formulas and will be indicated in their appropriate location.

*Just as the above two documents, this
the manual must be flexible and a work-in-progress.*

Schedule of Accounting Data Collection, Exchange and Processing

The States have developed an annual schedule for when the data collected above must be exchanged and then developed for use in the Model and the Accounting formulas. These dates are considered deadlines, unless the States agree otherwise.

March 1 – Data obtained from USBR

April 15 – the initial exchange of data between the states

*No!
only April 15 is
considered that way.*

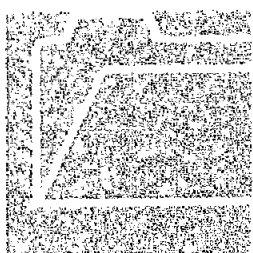
May 1 – Preliminary Model run

May 15 -- Preliminary Accounting

July 15 – Final Data and Model run

August 1 – Final Accounting

Early to mid-August – Annual meeting of the RRCA



Accounting Data Sources

Location and type of data needed for accounting purposes

The accounting data are collected from many sources for use in the accounting formulas for determining Compact compliance. The data is entered into the INPUT page of the Microsoft Excel© workbook, "RRCA Accounting for YYYY.xls".

Data categories include:

This is only approximate

- Output from the groundwater model by sub-basin and state. As has been noted elsewhere, these sources of data are documented in the groundwater model documentation.
- ✓ Surface water pumping data including non-federal canals, small pumps, M & I use. This is developed and reported by each state and is documented below.
- ✓ Non-federal reservoir evaporation data is developed by each state and is documented below.
- ✓ Stream gage data is generally collected from the U.S. Geological Survey with the exception of two gages maintained by the State of Nebraska. ... more details needed ... name of spreadsheet. Obtained by Nebraska. ... proofing process..
- Flood flow data is developed by the EC according the method described in the accounting procedures. Generally ... rare ...
- Federal reservoir evaporation and storage change – The source data is collected by the EC from the Bureau of Reclamation and Corps of Engineers and processed by the EC. ...
- Major canal data, mostly associated with the federal projects and is provided by the Bureau of Reclamation. See below.

In addition to this data the accounting Microsoft Excel© workbook has the following supporting worksheets:

- CourtlandAvLovewell – From the Bureau of Reclamation. Used to determine the split in losses in the Courtland Canal between Kansas and Nebraska. ..
- BureauT2 – Bureau Table 2.

Some data is collected by each of the three states and others by various Federal agencies. The data sources are unique to each state or agency and consequentially are documented in this manual. The members of the EC are responsible for the acquisition of the information utilized in the accounting formulas. The data that is collected may be processed through spreadsheet programs or other preprocessing programs with the outputs from those programs being used in the accounting formulas.

State Surface Water Use Data

Each state provides data of surface water use for different beneficial uses as provided by the Compact (groundwater use is determined as an input to the groundwater model and documented in its separate documentation). The process of collecting the data varies and the current collection processes are documented here along with verification procedures implemented by the states.

Colorado surface water use

The State of Colorado collects water use information from surface water users based on the diversions reported by the users.

Kansas surface water use

The State of Kansas collects water use information through its annual water user reporting system. This is a mandatory reporting system requiring users by March 1 of each calendar year to report the use of water, whether surface or groundwater. The reports contain annual quantities of water diverted through pumping or canal headgates or other means. The reports also contain information of about crops being irrigated, irrigation system type, type of diversion works and the land where the water is being used.

Since these are self-reported usage, the Kansas Division of Water Resources, State Department of Agriculture, verifies the information on reported uses that (1) are significant above normal usage rates or volumes,(2) exceed the water right authorized amount, (3) report no usage without cause, or (4) fail to file a report.

The information from the water use reports is entered into the Water Rights Information System (WRIS) database. WRIS contains information of the individual water rights, their authorized use, amount of use, and place of use. By querying WRIS, Kansas is able to provide a listing of type of beneficial use, place of use, crop type, system type and diverted amounts. The queries are made using a SQL program. The file in which the various scripts used in these queries is titled: /* RRCS_Overlap_Groups.sql. The surface water outputs from these

queries are then placed into Microsoft Excel© workbook, KS_SW_Use_YYYY.xls , which places the surface water data into an appropriate subbasin and accumulates the amounts. The groundwater portion of this data is applied to the Model for determination of the depletions to be used in the Accounting formulas. The surface water portion of this data is applied to the appropriate Accounting formulas.

Nebraska surface water use

Mike

The surface water use data is collected by the Natural Resource Department in the Republican River basin.

State non-federal reservoir data

Colorado non-federal reservoir data

Kansas non-federal reservoir data

The base information for non-Federal reservoirs is contained in the Water Structures Inventory (WSI) database. WSI contains information on dams of a jurisdictional size established by statute. Queries of WSI are conducted to determine the size and location of non-Federal reservoirs within the Republican River basin and its subbasins in Kansas. A Microsoft Excel© workbook database entitled; KS_nonfed_dam_inv_up_YYYY.xls of just those RRC reservoirs has been created and is annually updated if needed according to the results of the queries of WSI.

Nebraska non-federal reservoir data

Jesse + Shuhai

Federal Reservoir Data

The U.S. Bureau of Reclamation, Department of Interior (USBR) and Corps of Engineers provide information regarding the operation of Federal reservoirs in the basin, including evaporation and change in storage.

Federal Irrigation District data

The U.S. Bureau of Reclamation, Department of Interior, (USBR) provides information regarding the operation of irrigation districts and their canals.

The following spreadsheets are provided related to the operation of canals.

- C07-dly.xls, daily discharge for the Courtland Canal at the headgates.
- C151-dly.xls, daily discharge for the Courtland Canal at the Kansas-Nebraska Stateline.

*Related To
Harlan Evap
Split*

- C348-dly.xls, daily discharge for the Courtland Canal into Lovewell Reservoir.
- C38-dly.xls, daily discharge for the Courtland Canal at its headgate from Lovewell Reservoir.
- Cout wrk sht 05.xls, annual worksheet for the Courtland Canal operations for a particular year, in this case, 2005.
- Fp-dly.xls, daily discharge for the Franklin Pump diversion.
- Frk-dly.xls, daily discharge for the Franklin Canal.
- Nap_dly.xls, daily discharge for the Naponee Canal.
- Sup-dly.xls, daily discharge for the Superior Canal.

Related to Harlan Evap. Split

return flow appointment?

Related to Harlan Evap. Split

Are the following used?

- KS Bost 2006 Water Supply Estimate.xls, provides the projected water supply for a specific year, in this example 2006.

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Summary spreadsheets:

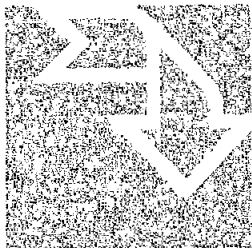
- Table_2.xls provides the annual operation of each of the ditches in the Republican River basin. The text version of this table may be obtained from the website address:

http://www.usbr.gov/gp/aop/nk/0506/table2_4.cfm

Link doesn't work

- KS-BOST3MWD.XLS
- NE-BOST3MWD.XLS
- F-CAMB3MWD.XLS
- F-VAL3MWD.XLS
- BOST-MISC3MWD.XLS

Attach 7



Data Processing

Processors and Programs used to provide data for the Accounting process

Federal Reservoir Evaporation and Storage Change

In the case of evaporation, the committee takes the monthly gross evaporation data and determines the annual net evaporation in the Microsoft Excel© workbook, NetEvap sheet of ReservoirNetEvapYY.xls, which is prepared by the State of Nebraska. For change in storage, the EC uses the Microsoft Excel© workbook, Summary sheet of ResStorChangeYY.xls, which is prepared by the State of Nebraska.

Split in Courtland Canal Losses

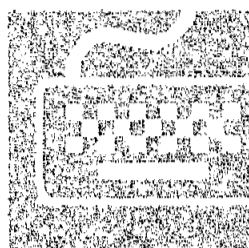
Harlan County Lake Evaporation Split between Kansas and Nebraska

Kansas and Nebraska use water supply from Harlan County Reservoir in differing degrees based on the USBR contracts with the irrigation districts in each state. The States use from a common irrigation pool and the distribution of the evaporation from Harlan County Reservoir is based upon the amount of diversions each district makes during the irrigation season. This proportioning applies each year with two exceptions: (1) In years when neither state is able to irrigate from the irrigation pool, then the evaporation is distributed according to the average of the last three years of use and; (2) In years when only one state is able to irrigate from the irrigation pool. In the first instance, the RRCA has approved the use of a volumetric-weighted average diversion percentage for the previous three years when releases were made. This procedure first

used for the accounting for 2005. The second circumstance, remains under discussion between the states.. In the case of Harlan County reservoir, the evaporation is split between Kansas and Nebraska. This computation is done in the Microsoft Excel© workbook HC_Split_YYYY .xls.

Lovewell Reservoir Evaporation and Consumptive Use Split between Republican River water supply and White Rock Creek water supply

Lovewell Reservoir stores water for later release from two sources, the Republican River via diversion at Guide Rock, Nebraska, and White Rock Creek, natural source of inflows to Lovewell. The use of Republican River water supply in the upper Kansas Bostwick Irrigation District (KBID) is via a direct diversion in the Republican River and may be either natural flows or a reservoir release from Harlan County Lake. In either case, this is simply a use of surface water and returns attributable to the Republican River. The Republican River water supply is also stored in Lovewell Reservoir and subsequently used in the lower KBID along with White Rock Creek water supply. The consumptive use of Republican River water supply through irrigation and evaporation in Lovewell reservoir must be determined. The method for making this determination is written in a Microsoft Excel© workbook entitled, Lovewell_Ops_YYYY.xls.



Accounting results

Formulas by Subbasin apply the Data to determine the Consumptive Use and the Allocation for each State

The Accounting Formulas apply to each subbasin and contain basic components for determining the consumptive use for each subbasin and the allocation to each state according equitable division of the Republican River Compact. The components in each subbasin formula include streamflow depletions from groundwater pumping as determined by the groundwater model, the surface water diversions and computation of their returns, the change of storage of Federal Reservoirs, the assignment of evaporation as a consumptive use from Federal and non-Federal reservoirs, imported water credits, and streamflow gage values.

Basic Formulas

The basic formulas for calculating Virgin Water Supply, Computed Water Supply, Imported Water Supply, Allocations and Computed Beneficial Consumptive Use are set out in the Accounting Procedures. The files, programs or workbooks used to compute the results of the formulas are described below.

Tables for computing sub-basin compliance and 5-year, 2-year or 3-year compliance values

Table 3A: Table to Be Used to Calculate Colorado's Five-Year Running Average Allocation and Computed Beneficial Consumptive Use for Determining Compact Compliance

Table 3B. Table to Be Used to Calculate Kansas's Five-Year Running Average Allocation and Computed Beneficial Consumptive Use for Determining Compact Compliance

Table 3C. Table to Be Used to Calculate Nebraska's Five-Year Running Average Allocation and Computed Beneficial Consumptive Use for Determining Compact Compliance

Table 4A: Colorado Compliance with the Sub-basin Non-impairment Requirement

Table 4B: Kansas Compliance with the Sub-basin Non-impairment Requirement

Table 5A: Colorado Compliance During Water-Short Year Administration

Table 5B: Kansas Compliance During Water-Short Year Administration

Table 5C Nebraska Compliance During Water-Short Year Administration

Table 5D: Nebraska Compliance Under a Alternative Water-Short Year Administration Plan

Table 5E: Nebraska Tributary Compliance During Water-Short Year Administration