

Republican River Compact Administration
Engineering Committee Report
August 15, 2007

OK ✓
MTT
8-13-2007

Kansas Draft of August 13, 2007
Nebraska Comments August 13, 2007

Assignments

At the 2006 annual meeting of the Republican River Compact Administration, the Commissioners assigned the Engineering Committee the following tasks:

1. Complete the user's manual for accounting procedures and provide a resolution for its adoption.
2. Complete the accounting for 2006 using the preliminary information provided by April 15, 2007 and the final exchange by July 15, 2007.
3. Continue to work to resolve different recharge and return flow methods.
4. By November 15, 2006, develop a resolution regarding the Harlan County Lake evaporation split when only one state takes a release.
5. Add documentation requirements of acreage retirement to the user's manual.
6. Retain Principia Mathematica to perform maintenance of the groundwater model.

Comment [JW1]: Where is this in the annual report?

Work activities related to these assignments

The Engineering Committee and technical representatives from the States of Colorado, Kansas, and Nebraska participated in numerous collaborative work activities and phone conferences as well as a face-to-face meeting on July 31, 2007. The following assignments and work activities were completed:

1. **Complete the user's manual for accounting procedures and provide a resolution for its adoption** - An initial draft of the users' manual was developed by Kansas' committee representatives in 2005. The draft consists of chapters on: 1) data sources, 2) data processing including the spreadsheets used by the committee, and 3) accounting results. As the committee envisions it, the user's manual will not repeat the accounting procedures nor the content of the groundwater model documentation which includes procedures used by each state to assemble its data for the groundwater model.

The accounting spreadsheet includes an input page which is a listing of all the data used in the subsequent computations. Besides the model outputs, each input cell is the responsibility of one of the states, with the state of Nebraska compiling much of the federal data. The Engineering Committee representatives agreed that each state will develop documentation for the data it inputs into the spreadsheet noting where the data is obtained and how the data is processed prior to input into the spreadsheet.

The assignment was not completed. Each state developed an outline of its data which was shared with the other states. The assignment should be continued next year.

2. Complete the accounting for 2006 using the preliminary information provided by April 15, 2007 and the final exchange by July 15, 2007.

- a. As per the settlement's requirements, each state exchanged its model data sets and supporting data and other accounting data by April 15 or shortly thereafter. A preliminary run of the RRCA groundwater model was developed by Willem Schreuder and posted on the RRCA web site he maintains for the Administration.
- b. The states exchanged final model data sets and supporting data by July 15 or shortly thereafter and Willem completed a "final" run after all the states final data was delivered to him. On August 9, Colorado reported that it had discovered a minor error in its data and as a result, Willem did an updated run which is considered final by the Engineering Committee. Willem posted the updated run on the RRCA web site and has created CD's of this final run for each of the States.
- c. Nebraska reported that in 2006 its computations relied on meter data collected by the Republican River basin Natural Resources District. ^{Power data was used only outside of the Republican River boundary. New methods had to be employed to use the power records where part of the power service area was estimated using meter data and part using power data.} *x type*
- d. Final data sets were collected by the Committee for streamflow, climatological information, diversion records, and reservoir evaporation records of the three states and in cooperation with the U.S. Geological Survey, U.S. Bureau of Reclamation, and U.S. Army Corps of Engineers for 2006.
- e. Last year the committee refined the RRCA accounting spreadsheet with respect to the multi-year compliance tests. One correction was made this year for Kansas water-short year test to allow Kansas to use 51.1% of any unused portion of Colorado's allocations as per Settlement Stipulation.
- f. The 2006 accounting of the virgin water supply, the computed water supply, and the beneficial consumptive uses in the Republican River Basin were completed, including the ground water impacts computed by the RRCA Ground Water Model in conformance with the procedures described in the RRCA Accounting Procedures and is considered final except for the following matters:

Comment [JW2]: See draft of procedure provided 8/13/2007 by email

Deleted: Nebraska has not fully documented its new procedures to the committee but the committee is willing to accept it for this year

Deleted:

Comment [JW3]: Two comments: 1) We see this in the FSS, but not in appendix C. Therefore, we probably cannot add this to the spreadsheet without a formal vote of the RRCA; 2) Why did KS add this in for KS, without also including the 48.9% to be added to the NE allocation?

- i. Non-federal reservoir evaporation below Harlan County Lake. Nebraska has noted that Section VI.A. of the Final Settlement Stipulation prescribes that only non-federal reservoir evaporation above Harlan County Lake should be included in the annual accounting. Kansas disagrees and believes non-federal reservoir evaporation should be included for the entire basin. At last year's annual meeting the matter was referred to a legal committee created to resolve the issue. The matter is still unresolved.
- ii. Division of Evaporative Loss from Harlan County Lake when only one state utilizes reservoir storage for irrigation. Kansas believes that the FSS and currently approved accounting procedures did not anticipate this condition and therefore do not clearly provide clear and fair guidance on this split in this case. Nebraska believes that the current accounting methods take into account the situation where only one state utilizes

Deleted: believes the

Deleted: it

← to much clear "fair" is in the eye of the beholder

reservoir storage for irrigation. Last year the Administration asked the Engineering Committee to seek a resolution to the matter prior to November 15, 2006. Consensus had not been reached. See the discussion below for the States' positions.

As the Committee was not able to reach consensus on these two matters, nor has any resolution been found otherwise, the Engineering Committee has completed the computations under both Kansas' preferred interpretations and Nebraska's preferred interpretations.

3. **Continue to work to resolve different recharge and return flow methods** – Kansas continues to believe that with the limitations placed on irrigation diversions in Nebraska in recent years, continued use of an irrigation efficiency of 80% applied to all diversions in Nebraska results in an overestimation of irrigation recharge. While the Engineering Committee had discussion on this matter, little effort was given to the assignment.
4. **By November 15, 2006, develop a resolution regarding the Harlan County Lake evaporation split when only one state takes a release.** – Kansas offered a proposal by the November 15, 2006 deadline set by the Administration for resolution of the matter. The Kansas proposal is as follows: the AP's Section IV.A.2.e.1 should be amended as follows (with Kansas' additions in italics):

The total annual net evaporation (Acre-feet) will be charged to Kansas and Nebraska in proportion to the annual diversions made by the Kansas Bostwick Irrigation District and the Nebraska Bostwick Irrigation District during the time period each year when irrigation releases are being made from Harlan County Lake. For any year in which no irrigation releases were made from Harlan County Lake, the annual net evaporation charged to Kansas and Nebraska will be based on the average of the above calculation for the most recent three years in which irrigation releases from Harlan County Lake were made *to both Districts.*

For any year in which irrigation releases from Harlan County Lake were being made on behalf of only one of the Bostwick Districts, the net evaporation will be charged as follows:

- *Evaporation from Harlan County Reservoir will be divided between the pool below the annual shut-off elevation, and the pool above said elevation based on the volume of water stored in each pool.*
- *Evaporation from the pool below the annual shut-off elevation will be charged 51.1% to Kansas and 48.9% to Nebraska.*
- *Evaporation from water stored above the annual shut-off elevation will be divided between the States in proportion to the annual diversions made by the Kansas Bostwick Irrigation District and the Nebraska Bostwick Irrigation District during the time period that year when irrigation releases are being made from Harlan County Lake.*

Notwithstanding the problems with the imported water consumptive use that Nebraska

Deleted: The Engineering Committee further recommends continuing this assignment.

Views as a significant flaw in our current GW computations.

In the event Nebraska chooses to substitute supply for the Superior Canal from Nebraska's allocation below Guide Rock in Water-Short Year Administration years, the amount of the substitute supply will be included in the calculation of the split as if it had been diverted to the Superior Canal at Guide Rock.

Nebraska has not formally responded to this proposal but indicated that the current procedures could be interpreted to require Kansas to pay all the evaporation in year's when it is the only state taking water. Kansas provided Nebraska with an outline of its rationale for believing that both states must share evaporation from Harlan County. Nebraska believes in terms of Compact Accounting, the only benefit of the reservoir is due to the irrigation water provided, and therefore the entire evaporation amount should continue to be charged to the states receiving this benefit. As the Committee has not yet reached agreement, two accountings were developed one based on Kansas proposal and the second assigning all evaporation to Kansas.

5. **Add documentation requirements of acreage retirement to the user's manual.** Both Colorado and Nebraska reported significant reduction in irrigation acreage estimate via either field work or retirement of acreage associated with incentive-based programs. Kansas has also had some limited retirements using such programs. Nebraska and Kansas have provided documentation to the other states as either GIS coverage (preferred) or a listing of legal tracts. The Kansas and Nebraska data is provided in sufficient detail to provide an opportunity for any state to determine compliance. Colorado is also working to collect and tabulate its data. This data could be exchanged annually and the requirement should be added to the accounting procedures.

Deleted: sh

6. **Retain Principia Mathematica to perform maintenance of the groundwater model.** Each state separately contracted with Principia Mathematica for the groundwater model services.

Other discussions

On June 20, 2007, Nebraska provided the Engineering Committee with a proposed change in the accounting procedures and attached paper titled Calculation of Computed Beneficial Consumptive Use and Imported Water Supply Using the RRCA Ground Water Model, which provided the rationale for the proposed change. While Nebraska believes that the current method of model runs properly calculates the mound credit, it believes it improperly includes, in its consumptive use computation, some consumption of the imported water. Subsequent discussions were held seeking to clarify the proposal. Kansas and Colorado have requested model runs using the same data sets as the current accounting procedures prescribe so the proposal can be fully evaluated. While some outputs were provided, the input sets and model runs have not yet been provided to the Committee.

Deleted: ing

Deleted: mound imports

Recommended assignments for the coming year

The Engineering Committee recommends the Republican River Compact Administration assign the following tasks to be completed by the indicated dates:

1. Finalize work on a user's manual for the RRCA Accounting Procedures and provide a recommendation to the Administration for adoption at next year's annual meeting.
2. Exchange by April 15, 2008 the information listed in Section V of the Accounting Procedures and Reporting Requirements, all data required by the Republican River Compact accounting procedure, and use these data to complete the preliminary accounting of the virgin water supply, the computed water supply, and the beneficial consumptive uses in the Basin for the calendar year 2007. By July 15, 2008 exchange any updates to this data to complete the final accounting of the virgin water supply, the computed water supply, and the beneficial consumptive uses in the Basin for the calendar year 2007.
3. Continue efforts to resolve concerns related to varying methods of estimating ground and surface water irrigation recharge and return flows within the Republican River Basin and related issues. This discussion should include consideration of a rainfall-runoff model for the basin, and advanced crop use calculations based on recent research. This discussion will also include recalibration of the ground water model.
4. Retain Principia Mathematica to perform on-going maintenance of the ground water and periodic updates requested by members of the Engineering Committee for calendar year 2007. The billable costs shall be limited to actual costs incurred, not to exceed \$12,000.00 in total and will be apportioned in equal 1/3 amounts to the States of Colorado, Kansas, and Nebraska respectively.
5. Review Nebraska's proposed correction of the Accounting Procedures for removing imported water from the calculation of Computed Beneficial Consumptive Use.

Deleted: ¶
 <#> Amend the accounting procedures to include requirements for documenting irrigated acreage retirements. ¶

Formatted: Bullets and Numbering

Formatted: Bullets and Numbering

The Engineering Committee requests the Administration determine steps to resolve accounting disputes related to non-federal reservoir evaporation below Harlan County and the split in Harlan County evaporation when only one states takes water.

The Engineering Committee Report and final accounting spreadsheet will be posted on the web at www.republicanrivercompact.org.

Attachments

Two sets of the following, one with Kansas interpretation on non-federal reservoir evaporation below Harlan County and the Harlan County reservoir evaporation split and the other with Nebraska's interpretation:

- Table 1, Accounting spreadsheet
- Table 3A, 3B, 3C, Accounting spreadsheet
- Table 5B, 5C, 5E, Accounting spreadsheet

David W. Barfield
Engineer Committee Member for Kansas

Megan Sullivan
Engineer Committee Member for Colorado

James R. Williams
Engineer Committee Member for Nebraska

Deleted: Jim