Republican River Compact Administration
Engineering Committee Report
August 15, 2007

Exhibit
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Patterson Reporting & Video
Larson 4/9/12

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.

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 it 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. 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 Districts. 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.
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. The 2006 model input and accounting data is considered final. The accounting of the virgin water supply, the computed water supply, and the beneficial consumptive uses in the Republican River Basin was not completed due to dispute regarding following matters:

    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 provide clear and fair guidance on this split in this case. Nebraska believes that the current accounting methods clearly take into account the situation where only one state utilizes 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.
    iii. 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.

The Committee was not able to reach consensus on these three matters.

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. The Engineering Committee further recommends continuing this 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 Committee has not yet reached agreement.

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.

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

In the course of the Engineering Committee's work, it was discovered that Table 5B does not allow Kansas to use 51.1% of any unused portion of Colorado's allocations as per Settlement Stipulation in the water-short year test. The Engineering Committee recommends that this change be made in the accounting spreadsheet.

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.

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.

The Engineering Committee requests the Administration determine steps to resolve accounting disputes noted above.

The Engineering Committee Report will be posted on the web at www.republicanrivercompact.org.

Attachment

Input page from the accounting spreadsheet

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David W. Barfield
Engineer Committee Member for Kansas

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Megan Sullivan
Engineer Committee Member for Colorado

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James R. Williams
Engineer Committee Member for Nebraska