**From:** Swanda, Marvin R
**To:** Jensen, Karen
**Cc:** Scott, Craig D; Aycock, Gordon L; Erger, Patrick J
**Subject:** FW: Closing Remarks
**Date:** Thursday, May 07, 2009 2:01:37 PM
**Attachments:** image001.jpg
Kansas Post Trial Brief.04242009.pdf
NE Post Hearing Brief.04242009.pdf
CO Post Trial Brief.04242009.pdf

---

Karen

Pls. print and assemble.

Thanks.

Marv

From: Brad Edgerton [mailto:Brad.Edgerton@fcidwater.com]
Sent: Thursday, May 07, 2009 2:23 PM
To: Swanda, Marvin R; Thompson, Aaron M
Subject: FW: Closing Remarks

FYI

==========

www.fcidwater.com

Brad Edgerton, Manager
Frenchman Cambridge Irrigation District
P.O. Box 116
Cambridge NE 69022
[cid:image001.jpg@01C9CF0F.806A77D0]

Phone 308-697-4535
Fax 308-697-3218
Cell 308-737-6221
Email: Brad.Edgerton@fcidwater.com NEW



From: Ross, Scott [mailto:Scott.Ross@KDA.KS.GOV]
Sent: Thursday, May 07, 2009 12:30 PM
To: Brad Edgerton
Subject: RE: Closing Remarks

Brad,

Attached are the final "post trial briefs". I think this is what you meant by closing comments. The "closing comments", those final comments at the trial, are included in a transcript I don't have yet.

So, if this isn't what you want, let me know.

On another matter, some of the folks in NW Kansas are talking about "draining Swanson", are you going to use Swanson this summer?

Scott

Scott E. Ross, L.G.
Water Commissioner, Stockton Field Office
Kansas Department of Agriculture, Division of Water Resources
P.O. Box 192 (820 S. Walnut St.), Stockton, KS. 67669
Phone No. 785-425-6787 FAX: 785-425-6842

e-mail scott.ross@kda.ks.gov



From: Brad Edgerton [mailto:Brad.Edgerton@fcidwater.com]
Sent: Wednesday, May 06, 2009 3:41 PM
To: Ross, Scott
Subject: Closing Remarks

Hi Scott
I've been trying to get a copy of the closing remarks provided to the Arbitration from each state.
Are these public documents and if so does Kansas have them posted on the web somewhere.
I am not having any luck north of the River.
Thanks
Brad
==========

www.fcidwater.com

Brad Edgerton, Manager
Frenchman Cambridge Irrigation District
P.O. Box 116
Cambridge NE 69022
[cid:image001.jpg@01C9CF0F.806A77D0]

Phone 308-697-4535
Fax 308-697-3218
Cell 308-737-6221
Email: Brad.Edgerton@fcidwater.com NEW

JOHN W. SUTHERS
Attorney General

CYNTHIA H. COFFMAN
Chief Deputy Attorney General

DANIEL D. DOMENICO
Solicitor General

**STATE OF COLORADO**
**DEPARTMENT OF LAW**
OFFICE OF THE ATTORNEY GENERAL

STATE SERVICES BUILDING
1525 Sherman Street - 7th Floor
Denver, Colorado 80203
Phone (303) 866-4500

April 24, 2009

Karl Dreher
Dreher Consulting LLC
10572 Hillrose St.
Parker, CO 80134

RE: Republican River Non-Binding Arbitration Initiated October 21, 2008
Post-Trial Briefs

Dear Mr. Dreher:

Enclosed is an original State of Colorado's Post-Trial Brief in the above captioned non-binding arbitration as well as hard and electronic copies of the legal authorities cited therein.

Sincerely,

FOR THE ATTORNEY GENERAL

PETER J. AMPE
Assistant Attorney General
Federal and Interstate Water Unit
Natural Resources Section
(303) 866-5032
(303)-866-3558 (FAX)
Email: peter.ampe@state.co.us

Enclosure

cc: John B. Draper
Samuel Speed
Justin D. Lavene
Don G. Blankenau

AG ALPHA LW WE UABMU

**IN RE: NON-BINDING ARBITRATION PURSUANT TO THE FINAL SETTLEMENT STIPULATION, *KANSAS v. NEBRASKA and COLORADO*, NO. 126, ORIGINAL**

**(Non-Binding Arbitration Initiated October 21, 2008)**

**BEFORE KARL J. DREHER, ARBITRATOR**

# STATE OF COLORADO'S POST-TRIAL BRIEF

For the State of Colorado:

Peter J. Ampe
First Assistant Attorney General
Federal and Interstate Water Unit
Natural Resources and Environment Section
State of Colorado, Office of the Attorney General
1525 Sherman St., 2nd Floor
Denver, CO 80203
303-866-5032

Autumn Bernhardt
Assistant Attorney General
Federal and Interstate Water Unit
Natural Resources and Environment Section
State of Colorado, Office of the Attorney General
1525 Sherman St., 2nd Floor
Denver, CO 80203
303-866-5713

## Table of Contents

## Table of Authorities

**Cases**

**Statutes**



**Other Authorities**

Pursuant to the Time Frame Designation, attached as Exhibit 2 to the Arbitration Agreement (October 23, 2008) and pursuant to the later oral agreement of the States at Trial modifying the Time Frame Designation, Colorado submits this Post-Trial Brief.

## INTRODUCTION

In this Post-Trial Brief, Colorado will address Kansas' damages claim and Nebraska's proposed changes to the RRCA Accounting Procedures. Colorado will not address the quantity of water comprising Nebraska's alleged Compact violation nor Nebraska's future Compact compliance.

## SUMMARY OF ARGUMENT

Although Kansas may have provided sufficient evidence to support its claim that Nebraska violated the Compact, Kansas has the burden to prove that it suffered damages from the violation and the amount of the damages, both direct and indirect. In Colorado's view, the Kansas methodology for proving damages, including the use of a modified crop water response model, failed to prove the amount of direct damages with reasonable certainty, failed to consider certain relevant data, and failed to use the best evidence reasonably available. Colorado does not challenge Kansas' ability to recover secondary damages for a Compact breach. In Colorado's view, however, Kansas did not prove indirect damages with reasonable certainty because of its reliance upon a flawed direct damage analysis and because of the failure of its witnesses to consider the offsetting

effects that a Nebraska damage payment would have upon the Kansas economy. For these reasons, although Kansas may be entitled to nominal damages, Kansas is not entitled to the full damage amounts it claimed during the Trial.

Nebraska has not demonstrated that its proposed changes to the RRCA Accounting Procedures are necessary or proper improvements consistent with the Compact and the Final Settlement Stipulation. The Nebraska proposal to change the current method for calculating the Computed Beneficial Consumptive Use ("CBCU") of groundwater and the Imported Water Supply ("IWS") Credit was not properly submitted to the Republican River Compact Administration ("RRCA") as a matter of course and is therefore not a proper subject matter for this arbitration. This proposal requires the RRCA Groundwater Model to be used under conditions for which it was not calibrated, would assign arbitrary coefficients to model simulations, and is inconsistent with the physical or historical reality of the Republican River basin. It would not resolve the problems that it was designed to resolve, but instead would introduce new uncertainties into the calculation of the CBCU of groundwater and the IWS Credit.

Nebraska has also failed to meet its burden of proof on its proposal to change the RRCA Accounting Procedure for computing the beneficial consumptive use for Haigler Canal diversions used for irrigation in Nebraska, accounting for return flows from that irrigation, and the computing Virgin Water Supply of the Arikaree sub-basin. This proposal is based upon unverified assumptions by the Nebraska witnesses. Nebraska's proposal to change four groundwater accounting points should also be rejected because the changes are

not necessary for the proper operation of the RRCA Groundwater Model and are not consistent with the procedure for calculating the values for sub-basins in the RRCA Accounting Procedures or the long-standing interpretation of sub-basins reflected in the RRCA Engineering Committee Reports.

## BACKGROUND AND PRIOR PROCEEDINGS

This matter involves mandatory non-binding arbitration among the States of Colorado, Kansas and Nebraska, pursuant to Section VII of the Final Settlement Stipulation (December 15, 2002) ("FSS") agreed to by the three States and approved by the United States Supreme Court in *Kansas v. Nebraska and Colorado*, No. 126, Original, resolving that Original Action involving the Republican River Compact, Pub. Law 60, 78th Congress, 57 State 86, codified at § 37-67-101 C.R.S. (2008) ("Compact").

The Repubican River Compact is an interstate agreement between the States of Colorado, Kansas and Nebraska. The purposes of the Compact are:

> to provide for an equitable division of such waters; to remove all causes, present and future, which might lead to controversies; to promote interstate comity; to recognize that the most efficient utilization of the water within the Basin is for beneficial consumptive use; and to promote joint action by the states and the United States in the efficient use of water and the control of destructive floods.

Compact, Art. I. The Compact allocates the waters of the basin among the three States by sub-basin. Compact, Art. IV. The Compact does not change or otherwise affect any State's intrastate allocation system; each State is free to develop its own intrastate system within the allocation limits of the Compact. For

example, the area of the Republican River Basin within Colorado is a "designated groundwater basin" with a modified prior appropriation system. *See* §§ 37-90-103(7); 37-90-106, C.R.S. (2008). Designated groundwater is

> ground water which in its natural course would not be available to and required for the fulfillment of decreed surface rights, or ground water in areas not adjacent to a continously flowing natural stream wherein ground water withdrawals have consituted the principal water usage for at least fifteen years preceding the date of the first hearing on the proposed designation of the basin, and which in both cases is within the geographic boundaries of a designated ground water basin.

§ 37-90-103(6), C.R.S. (2008). The Compact does not and cannot change Colorado's intrastate water allocation system and no holder of a Colorado water right may rely upon the Compact outside of, or in contradiction to, Colorado's unique water allocation system.

Unfortunately, the Compact did not finaly resolve all differences between the States. In 1998, the State of Kansas filed a Motion for Leave to File a Bill of Complaint against the State of Nebraska in the United States Supreme Court. Kansas named the State of Colorado as a party Defendant due to Colorado status as Compact State, but did not file any direct claims against Colorado. On January 19, 1999, the United States Supreme Court granted Kansas' request, accepted the Complaint and referred the matter to Special Master Vincent McKusick. At the heart of Kansas' Complaint was the question of whether or not the Compact included the groundwater of the Republican River Basin. After the three States and *Amicus Curiae* United States briefed the issue, Special Master McKusick issued a report, ultimately finding:

> The Republican River Compact restricts a compacting State's consumption of groundwater to the extent the consumption depletes stream flow in the Republican River Basin and, therefore, Nebraska's Motion to Dismiss should be denied.

First Report of the Special Master (Subject: Nebraska Motion to Dismiss), *Kansas v Nebraska and Colorado*, No 126, Original (January 28, 2000) at 45. After this ruling, the State of Nebraska filed cross-claims against the State of Colorado, while Colorado filed counter-claims against the State of Kansas and cross-claims against the State of Nebraska, resulting in all three States being full parties in the litigation.

After the First Report, the three States entered into a series of complex negotiations to resolve all disputes within a very aggressive time frame imposed by the Special Master. Ultimately, the States agreed that a mathematical groundwater model would be necessary to calculate the extent to which each individual State's consumption of groundwater depletes stream flow within the Republican River Basin. The States agreed to settle all claims involved in the litigation, including waiving of all claims for damages prior to December 15, 2002, and to jointly develop a mathematical groundwater model to estimate stream flow depeletions caused by each individual State's groundwater consumption. *See generally*, Second Report of the Special Master (Subject: Final Settlement Stipulation), *Kansas v Nebraska and Colorado*, No 126, Original (April 15, 2003).

The three States entered into a stipulated settlement, known as the Final Settlement Stipulation, which resolved pending litigation and attempted to address future adminsitration and calculations under the Compact by, among other things,

crafting a complex series of equations and tables used to calculate each State's consumption of waters governed by the Compact. Accounting Procedures and Reporting Requirements, Appendix C to Final Settlement Stipulation, *Kansas v. Nebraska and Colorado*, No. 126, Original (December 15, 2003) ("RRCA Acounting Procedures"). The FSS also contained a mandatory dispute resolution process that included mandatory non-binding arbitration. Final Settlement Stipulation, § VII. The States may modify the RRCA Accounting Procedures by unanimous agreement of the RRCA; however, the FSS may only be modified by order of the United States Supreme Court.

After the States approved the FSS, they continued to work collaboratively through the Republican River Groundwater Modeling Committee and with the assistance of the United States, to develop a mathematical model to estimate the effects of groundwater consumption on surface streams. The States eventually developed a MODFLOW based model that all States adopted. State Adoption of RRCA Groundwater Model, *Kansas v. Nebraska and Colorado*, No. 126, Original, Final Report of the Special Master with Certificate of Adoption of RRCA Groundwater Model, *Kansas v. Nebraska and Colorado*, No. 126, Original (September 17, 2003) at 4-5.

Upon adoption, the States agreed and represented to the Special Master and the United States Supreme Court that:

> The RRCA Model is fully operational and calibrated to represent the physical and hydrogeological characteristics of the Republican River Basin to a reasonabe degree. The RRCA Model matches the trend and magnitude of groundwater level changes and stream baseflow targets distributed throughout the Republican River Basin, without significant bias in any region or hydrologic

> characteristic. The RRCA Model is calibrated to a sufficient degree that depletions from groundwater pumping and accretions from imported water from the Platte River System to the Republican River may be quantified and assigned to prescribed streamflow reaches in accord with the RRCA Accounting Procedures.

*Id.* at 6 – 7.

Unfortunately after signing the FSS, despite their best efforts and due to the Compact calculations now including the depletions to stream flows due to each State's consumption of ground water, the States of Colorado and Nebraska consumed more water than permitted by the Compact. Based upon this allegation and due to Nebraska being subject to Water-Short Year Administration, *see* FSS, Section V.B., Kansas submitted a demand to Nebraska for damages for Nebraska's alleged Compact violations. As Nebraska did not agree to Kansas' claim, Kansas then Submitted the matter to the RRCA pursuant to the Dispute Resolution process of the FSS. *See*, Final Settlement Stipulation at § VII. Included in this process was a plan that Kansas claimed Nebraska must follow in order to achieve Compact compliance. Nebraska also Submitted various claims to the RRCA involving proposed changes to the RRCA Accounting Procedures. The RRCA Addressed but did not resolve these disputes and both Kansas and Nebraska invoked mandatory non-binding arbitration.[1]

As part of the non-binding arbitration process, the States agreed to a Time Frame Designation setting out the time frame to proceed with the non-binding arbitration, the scope of issues in the arbitration and hired Karl Dreher as the

[1] The State of Colorado also submitted a proposed Compact Pipeline to offset its stream depletions pursuant to FSS, Section III B.1.k to the RRCA. The RRCA Addressed but did not resolve that dispute. Colorado has not waived this issue and this issue is proceeding separately from the issues in this arbitration.

Arbitrator. *See,* Arbitration Agreement (October 23, 2008). The States briefed several preliminary legal issues and the Arbitrator issued the Arbitrator's Final Decision on Legal Issues (January 22, 2009). Based upon this ruling on legal issues, the States proceeded to a non-binding arbitration Trial.

Prior to Trial, the States engaged in limited discovery and provided to each State a report from each expert witness that the State would call at trial. The States agreed that these reports would be entered into evidence at trial and would be considered the bulk of the direct testimony from each expert. Direct examination by each State was limited and each State had the opportunity to cross-examine each of the other State's witnesses.

The trial began March 9, 2009 and proceeded for nine full or partial days to March 19. In support of its case in chief and its response case against Nebraska, Kansas called Mr. Dale Book, P.E., Mr. Scott Ross (lay witness), Mr. Terry Lee Kastens, Ph.D., Mr. John C. Leatherman, Ph.D., Mr. David W. Barfield, P.E., Chief Engineer and Kansas Compact Commissioner, Mr. Steven Larson and Mr. David L. Pope, P.E. In support of its case in chief and its response case against Kansas, Nebraska called Mr. David Sunding, Ph.D., Mr. Marc Groff, P.E., Mr. James Williams, P.E., Mr. James Schneider, Ph.D., Mr. Brian Dunnigan, P.E., Director Nebraska Department of Natural Resources and Nebraska Compact Commissioner, and Mr. David Ahlfeld, Ph.D. For its response case against various portions of Kansas and Nebraska's case in chief, Colorado called Mr. James Pritchett, Ph.D., Mr. James Slattery, P.E., and Mr. Willem Schreuder, Ph.D. On March 19 the trial was stayed to allow for the depositions of

two witnesses employed by the Bureau of Reclamation whom Kansas wished to call as lay witnesses, Mr. Aaron Thompson and Mr. Marv Swanda. The trial resumed April 14 for one day of testimony from the Bureau of Reclamation witnesses. At that time the Trial was concluded and each State had the right to submit a post-trial brief to the Arbitrator.

## ARGUMENT

### I. Kansas Has Not Met its Burden of Proof to Establish the Amount of Damages.

#### A. Kansas Failed to Prove the Amount of Direct Damages with Reasonable Certainty.

Kansas has not met the burden to prove the amount of direct damages with reasonable certainty. The methodology used by Kansas' witnesses to calculate direct damages is not based upon all relevant data and is not the best evidence reasonably obtainable. Although Kansas may be entitled to nominal damages, Kansas failed to sustain its burden to prove the amount of direct and indirect damages with reasonable certainty.

The legal principle requiring the complaining party to bear the burden of proof on the issue of damages is well established. "Generally, the burden of proof is upon the plaintiff, or on the party making a claim for damages, to show the fact and extent of an injury and to show the amount and value of his or her damages..." 22 Am. Jur. 2d *Damages* § 703 (2008). Courts have repeatedly recognized that it "is axiomatic that a plaintiff bears the burden of providing evidence in support of her damages claim." *Jennings v. Rivers*, 394 F.3d 850, 853

(10th Cir. 2005); See also *Metz v. Merrill Lynch*, 39 F.3d 1482, 1493-1494 (10th Cir. 1994) ("burden is on the plaintiff to produce evidence to support her damages claim").

A plaintiff's entitlement to full damages is conditioned not only upon the plaintiff's ability to prove the fact of damages but also upon the plaintiff's ability to prove the amount of damages with reasonable certainty. In order for a trier of fact to award actual damages to the plaintiff, "the plaintiff must prove [its] case by a preponderance of the evidence" and must establish the damage amount to a reasonable certainty. *Herman & MacLean v. Huddleston*, 459 U.S. 375, 378 (1983). In *U.S. v. Penn*, the Supreme Court noted that "this Court long has recognized the right to recover damages for the loss of anticipated profits when they result from a breach of contract and when there is a sufficient basis for estimating them with reasonable certainty." 337 U.S. 198, 208 (1949). The Supreme Court additionally found in *Connecticut Ry. and Lighting v. Palmer* that:

> Judges in equitable proceedings will have the advantage of evidence in applying the usual rules as to the measure of damages. It is well understood that such **evidence must show damages to reasonable certainty**. Mere 'plausible anticipation' does not merit consideration nor are flights into the realm of pure speculation entitled to be treated as evidence. **The determination of the amount to be allowed as the damage will be based on evidence which satisfies the mind**.

305 U.S. 493, 505 (1939) (emphasis added).

Although a plaintiff is not generally required to prove the amount of damage with exact precision, the burden to prove damages with reasonable certainty is still significant. The plaintiff "must establish his damage by the most accurate basis possible under the circumstances" and "must produce the best

evidence reasonably obtainable." *Mountain State Tel. & Tel. v. Hinchcliffe*, 204 F.2d 381, 383 (10th Cir. 1953). While the "trier of fact can determine the amount of damages from a just and reasonable estimate of the damage based on relevant data", the methodology for estimating damages set forth by the plaintiff must be reliable. *Aspen Highlands Skiing v. Aspen Skiing*, 738 F.2d 1509, 1526 (10th Cir. 1984) (quoting *Bigelow v. RKO Radio Pictures*, 327 U.S. 251, 266 (1946).

The complaining party cannot suggest a particular methodology for calculating damages that is based upon either the faulty assumptions of witnesses or upon inappropriate data and expect to receive full and actual damages. "Actual damages must be calculated, not imagined, and an arithmetical calculation cannot be made without **certain** data on which to make it." *Mayor, Aldermen, and Commonalty, of the City of New York v. Franklin Ransom and Uzziah Wenman*, 64 U.S. 487, 488 (1859). An award for damages "must be established, not by conjectures or unwarranted estimates of witnesses, but by facts from which their existence is logically and legally inferable." *U.S. v. Griffith, Gornall, and Carman*, 210 F.2d 11, 13 (10th Cir. 1954)

The trier of fact is not required to work out or figure the damage calculation when the plaintiff has failed to show the amount of damages to reasonable certainty. The United States Supreme Court has ruled:

> But if he fails to furnish any evidence of the proper data for a calculation of his damage, he should not expect that a jury should work out a result for him by inferences or presumptions founded on such subtile [sic] theories.

*Mayor, Alderman, and Commonalty, of the City of New York v. Franklin Ransom and Uzziah Wenham* at 491.

Nominal damages are the appropriate damage award "when actual loss or injury is shown, but the plaintiff fails to prove the amount of damages." 22 Am. Jur. 2d *Damages* § 8 (2008). Nominal damages are designed to recognize that the plaintiff party has suffered loss from the breach even when the plaintiff did not satisfy the burden of proof standard. The case of *Roth v. Speck* provides:

> It is established law that where a plaintiff proves a breach of a contractual duty he is entitled to damages; however, when he offers no proof of actual damages or the proof is vague and speculative, he is entitled to no more than nominal damages.

126 A.2d 153, 155 (Mun. App. D.C. 1956). Nominal damages are "a token award, compensatory in nature." *Griffin v. Steeltek*, 261 F.3d 1026, 1028 (10th Cir. 2001) (quoting *Griffith v. Colorado*, 17 F.3d 1323, 1327 (10th Cir. 1994). They are "by definition, minimal monetary damages." 22 Am. Jur. 2d *Damages* § 8 (2008). The Colorado Supreme Court, by means of example, holds that "one dollar is nominal damages, as a matter of law." *Colorado Investment Services v. Hager*, 685 P.2d 1371, 1375 (Colo. App. 1984).

In this case, Kansas attempts to use an IPYsim or crop water response model to calculate Kansas Bostwick Irrigation District ("KBID") agricultural productivity as a function of both irrigation water and nitrogen fertilizer. Crop productivity values derived from the model are then used to calculate direct monetary damages from compact breach. Colorado argues that Kansas' version of the IPYsim model ("Kansas model"), as well as the Kansas application of the IPYsim model, does not reliably prove that Kansas suffered direct damages of $2,286,708 in 2005 and direct damages of $2,873,784 in 2006. The Kansas model and the Kansas methodology for proving the direct damage amount do not

consider the best evidence available or consider all relevant data. The results produced by the Kansas model are distorted by inappropriate model protocol, inappropriate data, and the reductionist assumptions of the Kansas modelers.

During the Trial, Kansas expert Terry Kastens implied that the proffered Kansas model was based upon the work of Loyd Stone. Trial Transcript, March 9, 2009, Pg. 179, Line 7 – 16. Loyd Stone was a rebuttal expert for Kansas in the *Kansas v. Colorado* litigation. His work focused on the relationship between water available for consumptive use, which was referred to as ET (evapotranspiration) in the Special Master Report, and crop yields. On this issue, Colorado does acknowledge that the Special Master in *Kansas v. Colorado* recommended that "Kansas damages should be determined on the basis of the analyses used by the Kansas experts." Third Special Master Report, *Kansas v. Colorado*, No. 105 Original at 120. Colorado does not believe, however, that Kansas' claimed reliance upon Loyd Stone's work automatically legitimizes the current Kansas model or immunizes the Kansas model from all critical review. Third Special Master Report, *Kansas v. Colorado*, No. 105 Original at 120.

IPYsim and crop water response models are designed and applied as farm-level models. Applying a farm level model to a regional level, as Kansas is attempting to do in the Republican River Arbitration, is inherently problematic and creates a risk that any errors in the input data will be magnified when applied to a regional level. Experts from Kansas, Colorado, and Nebraska have all acknowledged that the IPYsim model is designed to serve as a farm-level model. Colorado expert James Pritchett testified:

> I think that at a farm or a field level, it makes sense to use a crop model -- a water crop response model and to be able to pick a shortage in bushels. I'm not certain that that can be aggregated across all acres or all farms. I think I would want to do more research and learn more about the representativeness of the model, how variable the farms and the acres are within KBID before I can make that determination.

Trial Transcript, March 12, 2009, Pg. 290, Line 17 – 25. Nebraska expert David Sunding testified:

> First of all, I think it's basically an improper use. What they have done in this instance is an improper use of a crop budget model. A model that was intended to make recommendations to farmers is now being used for policy analysis or for damage calculation, more accurately. And that, I think, is improper

Trial Transcript, March 10, 2009, Pg. 311, Line 7 – 13.

When asked whether the Kansas model was actually a farm-level model scaled up to a regional level, Dr. Kastens responded in the affirmative by saying:

> Well, sure. But there is -- you know, KBID is almost a farm in size, you know, really. And then it's a little hard to think about where, you know -- the scaling is an interesting issue, as we know as I already discussed heavily; but 40,000 acres, a couple farms, you know, could be. We know it's a lot more than that in that particular area; but what I'm saying is, we don't really know on -- we assume that KBID kind of behaves as a farm, if you will.

Trial Transcript, March 9, 2009, Pg. 218, Line 5 -- 12.

In Colorado's view, the use of a farm-level model to calculate regional damages is an area of major concern and raises significant doubts as to the reliability of the damage calculation. In *Kansas v Colorado*, the regional crop yield predictions of Loyd Stone and the inherent problems associated with applying farm level data to a regional level were substantially mitigated by the fact that Kansas and Colorado had entered into numerous agreements to facilitate

estimating crop production losses. Kansas and Colorado agreed to the amount of surface water shortage, had agreed to crop prices, agreed on the annual water requirements on an acreage basis taking into account rainfall, and agreed to crop mix as it varied over time. Third Special Master Report, *Kansas v. Colorado*, No. 105, Original at 46.

Kansas and Colorado had also agreed that the region harmed by the breach was a water-short region. *Id.* In recommending that the analysis of the Kansas experts be used to calculate damages, the Special Master noted that "estimating production losses was greatly aided by a number of agreements between the states." *Id.* Unlike in *Kansas v. Colorado*, the estimation of crop production losses in the Republican River basin has not been facilitated by agreements between Nebraska and Kansas. The input data used in the Kansas model is either in dispute amongst the states or could not be verified by Nebraska and Colorado experts. The amount of shortfall caused by compact breach is specifically challenged by Nebraska.

Although Colorado does not take a position on the amount of shortfall, the amount of shortfall affects the damage calculation. The Kansas experts also made a number of simplifying assumptions in applying the model, which compromises the credibility of the numbers that Kansas uses to calculate crop production. In this Arbitration, there were substantial disagreements concerning soil type and crop productivity, the years that are averaged in the model for irrigable acreage, realistic model input factors, and model calibration.

In Colorado's view, the Kansas model is based upon unrealistic assumptions that treat both soil type and crop water response as uniform. These simplifying assumptions, as they were described by Dr. Kastens, may inflate the number of irrigable acres and may inflate the productivity of irrigable acres. Kansas modelers assumed that the impact of soil type upon crop productivity is uniform between Western and North Central Kansas and also assumed that the impact of soil type on crop productivity is uniform within the KBID acreage, even though neither assumption has a basis in reality. In this Arbitration, Kansas attempts to prove damages using a model developed using data primarily derived from Western Kansas. This data is presumably derived from the Arkansas River basin and is clearly not applicable to the Republican River basin. Dr. Kastens admitted during his testimony that:

> The original Stone model from which our IPYsim model was developed was developed principally from data in western Kansas, not totally. There was some data actually from Manhattan, some from Belleville and some scattered around, but principally it was developed in western Kansas. And though it's said that, you know, it makes a point, for example, about soil types mattering, we don't believe that the difference in the silt loam soils of western Kansas and those of the KBID area, for example, are sufficiently large that they would diminish our efforts of using this model specifically for KBID.

Trial Transcript, March 9, 2009, Pg. 182, Line 9 – 22.

In addition to applying a model based on Western Kansas data to the North Central Kansas region, Dr. Kastens also admitted that the Kansas modelers assume "all acres would be same productivity." Trial Transcript, March 9, 2009, Pg. 196, Line 18 – 19; See also Trial Transcript, March 9, 2009, Pg. 195, Line 1 – Pg. 197, Line 20. The assumption that the all acres within KBID are equally

productive is unrealistic. Dr. Pritchett critiqued this assumption when he said, "I don't know how appropriate it was to adapt that to that particular area, if we understand that the underlying crop water response model fits that area." Trial Transcript, March 10, 2009, Pg. 287, Line 2 – 5. Kansas modelers also admitted that they "did not do anything specifically within our report to look at the issue of abandoning or not irrigating those less productive" and did not thoroughly examine whether "applying the KBID district yields to the fallowed acres may overstate the potential productivity and profitability of the fallowed acres." Trial Transcript, March 9, 2009, Pg. 198, Line 11 – 14; Exhibit CO 1, Pritchett, *Reviewing the Assumptions, Methods and Results of Economic Impacts on Kansas of Diminished Surface Water Supplies to the Lower Republican River Basin Caused by Nebraska in 2005 and 2006* (February 16, 2009) at 5. The failure of the Kansas modelers to consider the variability of soil conditions and crop water response between Western Kansas and North Central Kansas, the failure of the Kansas modelers to consider the variability of soil conditions and crop water response amongst farms in the KBID area, and the failure of the Kansas modelers to consider the fallowing of agricultural land under conservation programs calls Kansas' claimed damage calculation into question.

In *Kansas v. Colorado*, Kansas stipulated that the area damaged by Colorado's compact violations was typically water short. Third Special Master Report, *Kansas v. Colorado*, No. 105 Original at 46. In the Republican River Arbitration, however, Kansas did not address the issue of water shortness when

computing dryland acres that would have been irrigated if Nebraska had complied with the Compact.

Kansas' methodology inflates the number of acres that would have been irrigated by failing to consider the water short status of 2005 and 2006 and failing to include other water short years in calculating its acreage average. 2005 and 2006 were identified in the KBID Annual Report as water short years that were subject to water short restrictions at the beginning of the irrigation season. Trial Transcript, March 9, 2009, Pg. 203, Line 18 – 20. In order to calculate irrigable acres, Kansas relied upon a 7 year average of acres classified as irrigable from 1994-2000. The years 1994-2000 used for the average were not water short years and were not subject to water short year restrictions. Other water short years, beyond those spanning from 1994 to 2000, were deliberately excluded from the years used to average irrigable acreage.

Dr. Kastens explained the use of the 1994-2000 average by saying that this average is "our best estimate of what would be irrigated if water were -- you know, if water were available." Trial Transcript, March 9, 2009, Pg. 203, Line 12 – 13. He also claimed that "my assumption is that Nebraska's compliance would have been -- would have led them to be nonwater-short years..." Trial Transcript, March 9, 2009, Pg. 205, Line 8 – 11. The assumption that Nebraska's compliance would have made 2005 and 2006 into years that were not water short is not appropriate given that the KBID Annual Report declared them to be water short years at the beginning of the irrigation season. The simplifying assumption that water short years should be excluded when determining irrigable acres is

unjustifiable, inflates Kansas' direct damage amount, and compromises Kansas' ability to prove damages with reasonable certainty.

The Kansas model does not take into account all realistic and relevant factors affecting crop productivity or discount crop productivity values based upon all realistic and relevant factors. In the Republican River Arbitration, Kansas modelers have attempted to compute crop productivity on the basis of both irrigation water and nitrogen fertilizer, but other important and practical factors that might impact crop productivity are specifically excluded from the model. Realistic factors, including high temperatures, winds, insects, and other stressful conditions, are not used as model inputs.

Dr. Kastens acknowledged the predictive limitations of the Kansas model during his testimony. When questioned as to how many relevant factors were not included in the model, Dr. Kastens replied that the number of relevant factors that were not included in the model were "infinite, probably." Trial Transcript, March 11, 2009, Pg. 506, Line 2 – 6. When asked which relevant factors were not included in the model, he answered "temperature, if you think about the important ones" and "insect infestation." Trial Transcript, March 11, 2009, Pg. 506, Line 7 – 14. In order to account for the impact that insects, winds, temperatures, and other stresses might have on crop productivity, the Kansas modelers could have either included these conditions as factors in the model or they could have discounted the amount of crop productivity by a certain percentage to account for these factors. The Kansas modelers did not attempt either approach. The evidence Kansas has produced to show its damage quantity

is not reasonably certain. The Kansas claim for damages, by the admission of Dr. Kastens, excludes relevant and realistic factors affecting crop productivity.

The Kansas model does not factor in the practical behavior of farmers. It presumes that farmers' behave optimally in all circumstances and operate on the basis of all relevant information in all circumstances. Although Kansas bears the burden of proving damages, Kansas modelers admitted that they did not investigate the actual behavior of farmers against the model presumptions. Dr. Pritchett stated:

> It is an optimal sort of model, so it is solving out for optimal choices of inputs and optimal levels of irrigation. Not all farmers would act optimally and would necessarily fit that model. So we would have to ask the question about whether or not we could aggregate that to the area and across the 40,000 or so acres that are involved.

Trial Transcript, March 10, 2009, Pg. 287, Line 16 – 27. Dr. Pritchett further testified:

> I think that it's true that farmers, when they make decisions about planting, may choose to take actions that lead to negative profits when they realize prices can go up later. I also think it's true that farmers for a short time will produce at negative profits, as long as they can cover what their variable costs are, even though they may not be able to service their debt. That's part of the cycle of ag economics."

Trial Transcript, March 10, 2009, Pg. 297, Line 2 – 10.

The understanding that farmers do not always behave optimally is an accepted principle in agriculture economics. Non-optimal and less than optimal behavior is a realistic consideration when determining crop yield values and yet Kansas did not consider this type of behavior. Predicted yields under full irrigation were not discounted by the foreseeable non-optimal behavior of

farmers. Kansas' unwillingness to consider this important feature of farmer behavior discredits its direct damage calculation.

The Kansas model includes factors impacting crop productivity that the model cannot actually calculate. Kansas experts have suggested that its model is an improvement to more basic crop water response model because it considers the effect of nitrogen fertilizer upon crops yield. As admitted by Professor Kastens, however, the exact impact of nitrogen fertilizer as an input into the model is unknown. When Professor Kastens was questioned by the Arbitrator about the impact of phosphate fertilizer in the most recent version of the IPYsim model, Professor Kastens acknowledged that he did not even know what the relationship between nitrogen fertilizer and moneys owed for damages was. Dr. Kastens testified that:

> Actually, I can't even answer the effect the nitrogen has on the analysis in terms of the magnitude, say, of the moneys owed. I have not done that. Too me -- and I'm not even sure that I have the intuition, without going back and studying it and analyzing it, what that would do."

Trial Transcript, March 9, 2009, Pg. 201, Line 6 – 11.

The fact that Kansas' lead expert on direct damages could not generally or even intuitively state the relationship between nitrogen input into the model and damages is troubling given the fact that nitrogen is one of only two inputs into the model. It is also troubling given the fact that this version of the model is being offered by Kansas as a valid means to calculate damages. Dr. Kastens' testimony on this matter creates the impression that Kansas' version of the IPYsim is simply a black box model that spits out results that cannot be predicted even by its own

modelers. Nitrogen fertilizer is a basic input into the model but the operators of Kansas' model have not fully researched and cannot reasonably articulate the general effect of nitrogen fertilizer upon damages calculated by the model.

The process that Kansas experts refer to as calibration of the model undermines Kansas' attempt to prove the damage amount with reasonable certainty. This so-called calibration process distorts the amount of damages that may be owed by Nebraska and deviates from standard modeling protocol. *See* Trial Transcript March 18, 2009, Pg. 2145, Line 26 – Pg. 2146, Line 44. In the Kansas' damage calculation, Kansas experts divided the IPYsim model predicted yield under actual irrigation by the IPYsim yield with full compact water delivery in order determine that the IPYsim actual yield is approximately 90% of what the IPYsim predicted yield under full compact water delivery would have been.

When the Kansas modelers discovered that the IPYsim yield prediction was actually lower than the KBID reported yield, the modelers decided to amplify the yield results. Although Kansas expert witnesses refer to this process as a calibration of the model, Dr. Pritchett referred to this process during his testimony as the "booting-up effect" or the boot-strapping of yields. Trial Transcript, March 10, 2009, Pg 288, Line 18. For 2005 corn yields, Kansas experts "assume that the KBID report yield of 187 bu. per acre (Table 10 of the EIA) is 90% of what might have resulted with full water delivery" which results in "a full delivery yield of 206 bu. per acre, and this yield is (presumably) used in the remainder of the EIA analysis." Exhibit CO 1 (Pritchett) at 6. The process that Kansas modelers used to boot strap the yields and produce the phenomenal 206 bushels

per acre value was heavily criticized by both Colorado and Nebraska economic experts. Colorado expert Dr. Pritchett noted that the 206 bushel per acre yield produced by this calibration of the Kansas model "seems very outstanding given the historical nature in what trend yields are." Trial Transcript, March 10, 2009, Pg. 288, Line 21 – 22.

Dr. Sunding also explained the booting up effect as follows:

> So now the next step in what they describe as their calibration procedure, we have Stone down here. We have the quote/unquote, calibrated IPYsim to hit their assumptions about the 2005 trend yield. Well, as you just pointed out, actual yield was somewhere up here, again off the front tier. So how do we deal with that? And the way they deal with that is simply by taking the ratio between these two points and applying it up here. So whatever this vertical distance is, they take the actual observed yield and boost it up by that amount. That was what Dr. Pritchett referred to as this boot-trapping procedure. So this is the 187. And this is, I believe, 206, which is, as Dr. Kastens described, 10 percent higher than the highest observed yield ever; and I think, frankly, lacking credibility. So that's the second step in their calibration procedure, which is really kind of a postprocessing economic kind of analysis.

Trial Transcript, March 10, 2009, Pg. 322, Line 4 – 23.

The Kansas calibration process has the effect of magnifying the slope of the line plotting the relationship of irrigation water to crop yield in a way that defies the biological relationship between irrigation water input and crop yield and in a way that ignores the diminishing returns between irrigation water application and crop yield. Dr. Pritchett explained the underlying problem with the Kansas calibration:

> Implicitly, at higher base yield generates increasingly larger incremental yield with additional water. I believe this to be inaccurate as the accepted relationship between applied water and crop yield is one of diminishing returns.

Exhibit CO 1 (Pritchett) at 6.

Dr. Sunding elaborated on this criticism of the model by testifying:

> So this would be the optimum predicted by the IPYsim Model. You hit exactly this trend yield at these price ratios, but the biology is distorted entirely to hit this point. And that, to me, goes beyond calibration. This is a physical relationship, but it's tweaked to produce a particular economic result.

Trial Transcript, March 10, 2009, Pg. 320, Line 21 – 25.

Dr. Kastens attempted to justify the outstanding calibrated yields as simply as matter of it being a good farm year or a bad farm year in response to the critical reviews rendered by both Colorado and Nebraska experts regarding the calibration of Kansas model. Dr. Kastens' attempted to address Dr. Pritchett's point about diminishing returns by commenting:

> That was not an issue of diminishing returns, but it's this issue about good year, bad year, other factors that we don't include in a model and how to think about point estimates that we're trying to make some sense out of. We want to use that point estimate. I guess that's about all I can say.

Trial Transcript, March 11, 2009, Pg. 505, Line 11 – 15.

The ad hoc explanation provided by Dr. Kastens for the exceptionally high yield predictions does not adequately resolve concerns raised by either the Colorado or Nebraska experts. The Kansas yield prediction is higher than any yield reported in the KBID area and is the result of an abnormal modeling procedure. Also, as noted earlier, realistic conditions that might make a year particularly good or particularly bad in terms of farming, such as temperature, wind, and insects, are explicitly ignored in the Kansas model and in the Kansas methodology. Kansas therefore attempts to explain its exceptional yield

predictions on the basis of factors that it admits it has completely ignored in its analysis. The Kansas yield predictions under full irrigation are integral to the calculation of Kansas' direct damages. The Kansas crop model yields are not supported by evidence that is reasonably certain and therefore the direct damages are not supported by evidence that is reasonably certain.

Kansas has failed to prove the amount of direct damages with reasonable certainty. According to established legal standards, Kansas has the sole responsibility to provide evidence proving its case. Nebraska is not required to establish an alternative to Kansas' methodology for proving damages or to prove that any alternative offered by Nebraska (or Colorado) is better than the Kansas' methodology. Kansas did not establish the damage amount "by the most accurate basis possible under the circumstances," does not utilize the "best evidence reasonably obtainable," and does not consider all relevant data.

The amount of direct damages claimed by Kansas rests upon several unrealistic assumptions. In order to establish the amount of direct damages, Kansas' experts presume that all acres in the KBID area are equally productive, presume homogeneity of soil conditions and crop response function between Western Kansas and North Central Kansas, and presume crop conservation programs do not affect the number of irrigable acres. Kansas modelers also presume high temperatures, winds, insects, and the non-optimal behavior of farmers do not impact crop yields. They presume that Nebraska's compliance with the compact would have resulted in both 2005 and 2006 becoming non-water short years. Kansas modelers presume that the model can be used to reach

reliable damage calculations even though the actual relationship between nitrogen fertilizer and damages cannot be articulated by Kansas modelers

The proof that Kansas has offered to prove the damage amount is based solely upon the conjectures and unwarranted estimates of Kansas witnesses and experts. The Kansas model and Kansas damage analysis do not provide a just and reasonable estimate of damages. The model calibration process distorts model results and produces crop productivity values that are not consistent with biological reality. While Kansas may be entitled to nominal damages for Compact breach, it has failed to sustain the burden of proof necessary to receive actual damages.

B. Kansas has Failed to Prove the Amount of Secondary Damages with Reasonable Certainty.

Kansas claims that the indirect damages to the Kansas economy were $1,019,625 in 2005 and $1,276,281 in 2006. Kansas is not entitled to receive these alleged damage amounts because it has not sustained its burden of proof and has not provided evidence of these amounts with reasonable certainty. Kansas has also not adequately considered the mitigating effects that a damage payment by Nebraska will have upon the Kansas economy.

In order to calculate the amount of secondary damages, the team of Kansas experts responsible for calculating the direct damage amount provided Kansas expert John Leatherman with estimates of farm profits and losses deemed attributable to the compact breach. Utilizing the Social Accounting Matrix ("SAM"), Dr. Leatherman then calculated a multiplier for agricultural household spending of 1.44. The 1.44 multiplier was achieved by dividing the total impact

by the direct loss in household income. Exhibit CO 1 (Pritchett) at 13. Direct economic losses were then reached by multiplying the SAM multiplier by the direct economic losses calculated by the Kansas experts. The secondary damage amount proposed by Kansas should be rejected because they are inherently dependent upon the simplifying assumptions and errors that characterize the Kansas approach to crop production losses, farm losses, and overall direct damages. Kansas' ability to prove the amount of secondary damages with reasonable certainty is compromised because of its reliance upon faulty direct damage calculations.

While Colorado does not challenge the theoretical legitimacy of Kansas' claim for secondary damages, Colorado does believe that any potential impact to the Kansas economy by Nebraska's payment of direct damages must be taken into consideration in figuring secondary damages. Considering the indirect effects of a damage payment is a relevant factor to incorporate into the analysis when a state is attempting to meet its burden of proof and show a just and reasonable estimate of indirect damages. Furthermore, both Kansas and Nebraska experts are in agreement that the payment of compact damages will actually create offsetting effects in the Kansas economy. When questioned as to whether he agreed that the payment of damages will conceptually have some effect on the Kansas economy, Dr. Leatherman responded "yes." Trial Transcript, March 10, 2009, Pg. 265, Line 9 – 13. He also admitted that he did not take the effect that a compact damage payment might have on the Kansas economy into consideration in his report.

Trial Transcript, March 10, 2009, Pg. 265, Line 17 - 19 Dr. Sunding expressed his view that:

> Well, the obvious point is that if Nebraska makes a cash payment to Kansas to compensate for direct losses, that payment will generate its own indirect effects. It will ripple throughout the economy in very much the same way that the direct losses did, and that was not accounted for at all in Kansas' analysis.

Trial Transcript, March 10, 2009, Pg. 329, Line 21 - Pg. 330, Line 1

Colorado believes that Kansas has not proven the amount of secondary damages with reasonable certainty. The secondary damage calculation was based upon a flawed direct damage analysis and did not take into account the offsetting effect that a compact damage payment by Nebraska may have upon the Kansas economy. While Kansas may be entitled to receive nominal damages, it is not entitled to receive the damages amount that it has claimed in the Republican River Arbitration.

## II. Colorado Will Not Address the Testimony Regarding Nebraska's Future Compact Compliance Measures.

In its prior briefs on legal issues, Colorado has fully explained its position that Kansas cannot unilaterally impose its preferred compact compliance measures upon Nebraska as a co-equal sovereign. Colorado will not, however, address in this brief the evidence provided by either Kansas or Nebraska on Nebraska's future compliance.

## III. Nebraska's January Proposal was not Submitted to the RRCA nor Addressed by the RRCA in Accordance with the FFS. Moreover, Nebraska has not Met its Burden of Proof for its Proposed Changes to the RRCA Approved Accounting Procedures.

As the proponent of changes to be made to the Accounting Procedures, Nebraska must meet a high burden of proof in order to force changes to the RRCA Accounting Procedures over the objections of Colorado and Kansas.

### A. Nebraska's Proposed Changes for Computing Consumptive Use and Imported Water Supply do not Represent an Improvement to the Current Accounting Procedures and Should be Rejected.

Nebraska proposes a scheme of model runs in its January Proposal that would change the way the Computed Beneficial Consumptive Use ("CBCU") and Imported Water Supply ("IWS") Credit are calculated under the current Accounting Procedures. The current approved procedures are contained in section III.D.1 of the RRCA Accounting Procedures:

> Computed Beneficial Consumptive Use of groundwater shall be determined by the use of the RRCA Groundwater Model. The Computed Beneficial Consumptive Use of groundwater for each State shall be determined as the difference in streamflows using two runs of the model:
>
> The "base" run shall be the run with all groundwater pumping, groundwater pumping recharge, and surface water recharge within the model study boundary for the period 1940 to the current accounting year "on".
>
> The "no State pumping" run shall be the run with the same model inputs as the base run with the exception that all groundwater pumping and pumping recharge of that State shall be turned off.

This method satisfies the requirement that the pumping impacts assigned to the State cannot exceed the amount of additional baseflow that will be generated by curtailing all groundwater withdrawals governed by the Compact within that

State. Exhibit CO 7 (Schreuder) at 3. The IWS Credit is calculated in a similar manner. *See* Section III.A.3 of the RRCA Accounting Procedures.

As the complaining party on this issue, Nebraska bears the burden of proof. The burden of proof is generally defined as "the duty of the person alleging the case to prove it." *Director, Office of Workers Compensation v. Greenwich Colleries*, 512 U.S. 267, 275 (1994). It is the obligation of the complaining party to persuade the trier of facts "of the truth of a proposition which he has affirmatively asserted by the pleadings." *Id.* Counsel for Nebraska admitted that Nebraska would have a very high burden to prove its factual case. Hearing Transcript, December 10, 2008, Pg. 102, Line 2 – 6.

Although Nebraska vigorously argued that the its proposal is an improvement to the Accounting Procedures, former members of the RRCA Modeling Committee[2] offered consistent testimony that the Nebraska Proposal will introduce new uncertainties into the calculation of CBCU and IWS. Nebraska has failed to meet its burden to prove that the January Proposal will necessarily improve the Accounting Procedures.

1. Nebraska did not Submit its January Proposal to the RRCA and the RRCA has not had an opportunity to Address the January Proposal.

The Nebraska proposal now before the Arbitrator is actually Nebraska's third attempt to change the manner in which the RRCA applies the RRCA Groundwater Model. First, was Nebraska Department of Natural Resources,

[2] A more complete description of the Modeling Committee is provided in Exhibit KS 31, Hearing Transcript, Kansas v. Nebraska and Colorado, No. 126, Original, Pg. 41, Line 6 – Pg. 42, Line 20 (January 6, 2003) and *Final Report of the Special Master with Certificate of Adoption of RRCA Groundwater Model*, Kansas v. Nebraska and Colorado, No. 126 Original (September 17, 2003).

*Calculation of Computed Beneficial Consumptive Use and Imported Water Supply Credit Using the RRCA Ground Water Model* (March 2008). Then Nebraska Submitted the Nebraska Department of Natural Resources, *et al.*, *Analysis of Current Methods Used to Calculate Groundwater Impacts for the Republican River Compact* (August 6, 2008). Finally, Nebraska provided the proposal now before the Arbitrator, Ahlfeld, *et al. Estimating Computed Beneficial Consumptive Use for Groundwater and Imported Water Supply under the Republican River Compact* (January 20, 2009), Exhibit NE 30 ("January Proposal"). Each of these three proposals advocated a different combination of RRCA Groundwater Model runs to solve what Nebraska purported was a problem with the current accounting. Exhibit CO 7, Schreuder, *Report in Response to: Estimating computed Beneficial Consumptive Use for Groundwater and Imported Water Supply under the Republican River Compact*, Ahlfeld, *et al.* (January 20, 2009) at 19 - 20. Dr. Schreuder summarized each of the different proposals and explained the differences between each. *Id.* at 19 – 21; Trial Transcript, March 18, 2009, Pg. 2142, Line 40 – Pg. 2143, Line 18. Dr. Schreuder further testified that he found the difference between the August 6, 2008 proposal and the January Proposal to be significant. Trial Transcript, March 18, 2009, Pg. 2143, Line 20 – 24.

In order for a State to submit an issue to non-binding arbitration, the issue must "first be submitted to the RRCA as a matter of course." Second Report of the Special Master, Kansas v. Nebraska, No. 126 Original at 69; *see also Arbitrator's Final Decision on Legal Issues* (January 22, 2009) at 21 - 25. Only

the August 6, 2008 proposal was Submitted to the RRCA and Addressed by the RRCA in accordance with Section VII.A of the Final Settlement Stipulation. *See* Section II of the FSS for definitions of these terms. The January Proposal was first presented to the States of Colorado and Kansas as part of the expert reports and disclosures in this arbitration process on January 20, 2009. It has not been Submitted to the RRCA and, therefore, is not the proper subject of arbitration.

As Dr. Schreuder testified, the January Proposal differs significantly from both the March and August 2008 proposals. Trial Transcript, March 18, 2009, Pg. 2143, Line 20 – 24. Although the January Proposal relies on a combination of 16 model runs similar to the August 2008 proposal, the coefficients to the different simulations are not uniform as they had been in the earlier August 2008 proposal. By changing the coefficients, the January Proposal changes the relative weight given to certain runs in relation to other runs. Trial Transcript, March 18, 2009, Pg. 2142, Line 40 – Pg. 2143, Line 18. For example, as Dr. Schreuder testified,

> the coefficients used in the January Proposal double the importance of the difference from a predevelopment condition. This increases the reliance on the model predictions as different from the conditions to which the model was calibrated as is possible. This in turn increases the uncertainty in the predicted results. Furthermore, it increases the weight of impacts that would have occurred only in Nebraska had never developed wells.

Exhibit 7 (Schreuder) at 21.[3]

Nebraska has not followed the appropriate Dispute Resolution procedures necessary to submit the dispute concerning the January Proposal to arbitration. The January Proposal has not been Submitted to the RRCA, nor has the RRCA

[3] The problem inherent in using the Groundwater Model in a manner to which it was not calibrated is addressed in more detail below

Addressed the January Proposal, as required by Section VII of the FSS. Therefore, the January Proposal presented at hearing and relied upon by Nebraska does not qualify as a matter properly before the Arbitrator and the Arbitrator should therefore dismiss the claim.

2. Even if the Arbitrator were to rule on the merits of Nebraska's proposed changes, Nebraska has failed to meet its burden of proof and the overwhelming weight of the evidence shows that Nebraska's proposal is not a valid application of the RRCA Groundwater Model.

Despite the fact that Nebraska's January proposed change to the application of the RRCA Groundwater Model is not properly before the Arbitrator, Colorado will address the deficiencies of the January Proposal itself. Colorado's view is that, even if the Arbitrator considers the January Proposal properly part of this Arbitration, Nebraska has not met its burden of proof and the overwhelming weight of the evidence before the Arbitrator shows that Nebraska's proposed changes are fundamentally flawed.

Nebraska has suggested that the January Proposal be adopted as an alternative to the procedures in the RRCA Accounting Procedures because under the current Accounting Procedures, the model results of individual impacts of each States' pumping and the IWS Credit do not always add up to the difference obtained when the RRCA Groundwater Model is run with all stresses on versus when the model is run with all stresses off. For this reason, Nebraska argues that the VWS that is being used in the current Accounting Procedures is incorrect and that the individually computed values of the CBCU of groundwater and IWS Credit are incorrect as well. The current Accounting Procedures "evaluate state

pumping impacts by making paired model runs which evaluate the difference in stream flow both with and without pumping within the state in question." Exhibit CO 7 (Schreuder) at 5. Nebraska's January Proposal instead attempts to compute VWS by subtracting the model run with all stresses off from the model run with all stresses on. It would then attempt to determine CBCU of groundwater and IWS Credit by the use of 16 model runs with different combinations of stresses turned on and off.

a. Nebraska is incorrect in asserting that there is a problem with the manner in which the RRCA Groundwater Model and the accompanying Accounting Procedures are used.

Nebraska contends that the use of the RRCA Groundwater Model as prescribed by the approved RRCA Accounting Procedures is in error because the impacts computed for individual States do not equal the impacts for the three States combined for each sub-basin for each year. In support of this proposition, Nebraska cites three examples from the model outputs for the year 2003, which Nebraska contends are indicative of errors in the current procedure. *See generally* Exhibit NE 30 (Ahlfeld). However, these model results are not indicative of a problem; instead they are the result of a necessarily non-linear model that represents a non-linear physical system to a reasonable degree. Exhibit CO 7 (Schreuder) at 4. Further, Nebraska concentrates solely on the single year of 2003, which was both a very dry year, but also as Dr. Schreuder testified,

> ... there is another problem with 2003 in that it was kind of a transition period in the Nebraska team. So there were a few anomalies in the data generated by Nebraska, the data of Nebraska during that period

> So we saw a few strange things that were, perhaps, as a result of the transition in the data analysis that was going into Nebraska.

Trial Transcript, March 18, 2009, Pg. 2164, Line 36 – 50.

Nebraska experts David Ahlfeld and Jim Schneider, co-authors of the January Proposal who testified for Nebraska, were not members of the Modeling Committee that developed the RRCA Groundwater Model, *see* FSS, Section IV.C.3; *Final Report of the Special Master with Certificate of Adoption of RRCA Groundwater Model*, Kansas v. Nebraska and Colorado, No. 126, Original (September 17, 2003), and are not authorities on the architecture, parameters, calibration targets, history, and operation of the RRCA Groundwater Model. The January Proposal and Nebraska's testimony during the trial characterized the nonlinearities of the RRCA Groundwater Model as a newly discovered problem that needs immediate resolution.

To the contrary, the non-linear behavior identified by Nebraska was recognized and accepted by the Modeling Committee and all three States in approving the RRCA Groundwater Model. Exhibit CO 7 (Schreuder) at 4; *See also, Final Report of the Special Master with Certificate of Adoption of RRCA Groundwater Model*, Kansas v. Nebraska and Colorado, No. 126, Original (September 17, 2003). Kansas experts David Barfield, Steve Larson, and Dale Book were all members of the RRCA Modeling Committee. Colorado expert Willem Schreuder was also a member of the RRCA Modeling Committee and is currently charged with the responsibility of maintaining the RRCA Groundwater Model. Trial Transcript, March 18, 2009, Pg. 2141, Line 28 – 34.

During the trial, all four of the former RRCA Modeling Committee members from both Kansas and Colorado testified that the nonlinearities of the model were fully known and appreciated by the RRCA Modeling Committee when the RRCA Model was agreed to by the States pursuant to the FSS. Trial Transcript, March 18, 2009, Pg. 2070, Line 30-34; Trial Transcript, March 18, 2009, Pg. 2158, Line 18 – 22.

Nor does this non-linear behavior evidence an error in the RRCA Groundwater Model itself. Nebraska witness Dr. Schneider admitted that the physical Republican River system is "actually very non-linear." Trial Transcript, March 13, 2009, Pg. 912, Line 25 – Pg. 913, Line 1. As Dr. Schreuder testified, "by necessity, this is a nonlinear system, and so the model, by necessity, has to be nonlinear." Trial Transcript, March 18, 2009, Pg. 2158, Line 18 – 22. Thus, the "problem" identified by Nebraska is in fact a necessary feature of the RRCA Groundwater Model that represents a non-linear system. *Id.; see also* Exhibit KS 28, Barfield, *et al.*, *Kansas's Expert Response to Nebraska's Expert Report, "Estimating Computed Beneficial Use for Groundwater and Imported Water Supply under the Republican River Compact"* (February 17, 2009) at 6, 8 – 10

Nebraska has failed to meet its burden of proof that the current RRCA Groundwater Model or the application of the Model under the approved RRCA Accounting Procedures to calculate the CBCU of groundwater or the IWS Credit constitutes any type of "error" and the vast weight of the evidence before the Arbitrator establishes that there is no such error or other problem with the Model or its application under the approved RRCA Accounting Procedures.

b. Even if Nebraska is correct in its definition of a problem, Nebraska's proposed solution does not properly address the alleged problem.

Even if the nonlinearities are significant enough to represent some sort of error in the RRCA Groundwater Model or the application of the Model, Nebraska's solution is both illogical and untenable.

At its most basic, the January Proposal's goal is to match the sum of the State impacts to the total directly computed impacts, or "additivity," and eliminate the "residual."[4] Nebraska did not provide any evidence that this goal of additivity was necessary or even desirable for purposes of the Republican River Compact. However, if that goal must be met, Dr. Schreuder demonstrated another, more elegant, manner to achieve that goal. Exhibit CO 7 (Schreuder) at 7 – 8. However Dr. Schreuder's example would not provide the same windfall to Nebraska that the January Proposal would. Exhibit CO 7 (Schreuder) at 9.

To achieve Nebraska's additivity goal, the January proposal consists of 16 model runs, with weights of 1/4 to 1/12 assigned to each run. For example, the January Proposal assigns a 1/4 weight to the difference between a simulation where there is no development at all in the basin and a simulation where pumping in only one State is developed, or only surface water imports occur, while six other terms evaluate different combinations of development in well pumping or surface water imports. Exhibit CO 7 (Schreuder) at 7.

[4] Model residuals are typically described as the difference between model predictions and observed data. In the January Proposal, Nebraska expert David Ahlfeld instead defines the model residual as the difference between the method prescribed by the January Proposal and the method currently prescribed by the Accounting Procedures

One of the predominant flaws with the Nebraska proposal is that it uses coefficients or weighing factors for model simulations that do not have any relation to the physical reality that the model is attempting to simulate. In order to calculate Nebraska CBCU, the January Proposal adds a 1/4 weight to the original equation measuring the difference between all stresses on and Nebraska pumping off and adds a 1/4 weight to the simulation where there is no development in the basin and a simulation where pumping in only Nebraska is developed. The remaining model simulations in the January proposal are assigned a coefficient of 1/12. Exhibit CO 7 (Schreuder) at 7.

Nebraska was unable to provide any physical rationale for the assigned coefficients; instead Nebraska applied these coefficients, in its third try at the problem, simply to make the mathematics work out. Dr. Schreuder focused on the arbitrary assignment of these coefficients to individual model simulations when he remarked that there "is no physical explanation for these coefficients." Trial Transcript, March 18, 2009, Pg. 2177, Line 50 – 52; Exhibit CO 7 (Schreuder) at 7. Nebraska "simply tries to make the math work and throws reality to the wind." Trial Transcript, March 18, 2009, Pg. 2177, Line 52 – 54. As Dr. Schreuder testified,

> [t]he sixteen runs can be combined as weighted pairs in numerous different ways. Mathematically, manipulating these averages can be made to have different interesting results, but just because mathematical manipulation of the results provides a desirable outcome, it does not mean that it produces a 'better' result.

Exhibit 7 (Schreuder) at 7.

Dr. Schreuder demonstrated another method showing by which the results of various runs can be mathematically manipulated to produce Nebraska's desired additivity. Trial Transcript, March 18, 2009, Pg. 2152, Line 38 – Pg. 2156, Line 48; Exhibit CO 13. Dr. Ahlfeld admitted as much during his testimony. Trial Transcript, March 19, 2009, Pg. 2210, Line 12 – 18. In effect, the January Proposal is simply a method for Nebraska to take what it terms a residual, and allocate that residual between the States, regardless of the actual impacts from pumping in any State.

The Arbitrator noted that the Nebraska coefficients do not reflect the physical reality of the system:

> ARBITRATOR DREHER: That may not have much bearing here; but the point is that the algebraic derivation of those coefficients is not able -- at least I haven't been able to figure it out yet, doesn't reflect physical reality of what happened, necessarily. And I tried to construct the hypothetical where it would fail

Trial Transcript, March 18, 2009, Pg. 2214, Line 28 – 42; *see also* Trial Transcript, March 18, 2009, Pg. 2211, Line 36 – Pg. 2212, Line 10. Dr. Ahlfeld never adequately responded to the Arbitrator's proposition that the Nebraska proposal is simply a mathematical construct to split the residual between States regardless of the amount of impact from groundwater withdrawals in each State. Under cross examination, Dr. Ahlfeld admitted that, as he was not able to determine which State was responsible for groundwater depletions, his method simply divides the "residual" between the States regardless of the actual extent to which a State's consumption of groundwater actually depletes streamflow. Trial Transcript, March 18, 2009, Pg. 1529, Line 14 – Pg. 1530, Line 20. Nebraska's

proposal is fundamentally flawed and unfair to Colorado and Nebraska, but, not surprisingly, very advantageous to Nebraska. Exhibit 7 (Schreuder) at 11 – 19.

Further, Nebraska's January Proposal introduces new uncertainty to the calculation of CBCU of groundwater and IWS Credit because it would require the RRCA Groundwater Model to simulate conditions to which the RRCA Model was never calibrated. Originally, the RRCA Groundwater Model

> was calibrated to historical conditions based on a steady state simulation to provided initial conditions for January 1, 1918, followed by a transient simulation from 1918 to 2000. The study period was selected to cover the period over which the basin was developed which spanned approximately 1940 to 2000 . . . The model was not calibrated to pre-1918 conditions. Instead, the model was calibrated in transient mode based on observed water levels and baseflow in the streams. Gaged stream flows records extend from approximately 1940 to 2000, although individual gage records may be for much shorter periods. Ground water levels for calibration extend to 1909, but most groundwater levels are from 1950 onwards.

Exhibit CO 7 (Schreuder) at 9 - 10. The uncertainties in the RRCA Groundwater Model results are least under the conditions to which the model was calibrated. *Id.* at 10.

The January Proposal relies upon the use of a run with all States' pumping and surface water imports turned off. This, in effect, means the January Proposal "considers all of these alternative realities that never did occur and tries to evaluate what would the impacts have been." Trial Transcript, March 18, 2009, Pg. 2178, Line 30 – 36. Nebraska claims that the use of this "all off" run is a proper modeling technique as the RRCA Groundwater Model was calibrated to predevelopment conditions, i.e. no pumping and no imported water supply.

Despite Nebraska's claims, the RRCA Groundwater Model was not and has never been calibrated to such conditions; as such conditions have never existed. First, there has been some level of groundwater withdrawals within the basin, although the amounts may have been small. Second, the RRCA Groundwater Model begins to simulate some significant groundwater withdrawals in all states as of 1940. *Republican River Compact Administration Groundwater Model* (June 30, 2003), Appendix D (attached to *Final Report of the Special Master with Certificate of Adoption of RRCA Groundwater Model*, Kansas v. Nebraska and Colorado, No. 126, Original (September 17, 2003)). The RRCA Groundwater Model also represents significant imported surface water in Nebraska beginning in 1940. *Republican River Compact Administration Groundwater Model* (June 30, 2003), Appendix I (attached to *Final Report of the Special Master with Certificate of Adoption of RRCA Groundwater Model*, Kansas v. Nebraska and Colorado, No. 126, Original (September 17, 2003)). Therefore, Nebraska's contention that the RRCA Groundwater Model was calibrated to some significant portion of time where there was no groundwater pumping in any State and no imported surface water is directly contradicted by the evidence. Therefore, the January Proposal requires operating the RRCA Groundwater Model in a manner that further removes it from the conditions to which it was calibrated will result in more uncertain calculations. Exhibit CO 7 (Schreuder) at 10. The Arbitrator should not accept a method that increases uncertainty for determining the very real consequences of CBCU of groundwater and IWS Credit among the States.

The January Proposal is a contrived solution designed to increase Nebraska's IWS Credit and disregard all other considerations. Model residuals are typically described as the difference between model predictions and observed data. In the January Proposal, Nebraska expert David Ahlfeld instead defines the model residual as the difference between the method prescribed by the January Proposal and the method currently prescribed by the RRCA Accounting Procedures. The January Proposal then seeks to eliminate this self-defined residual in a way that actually spreads it around and divides it among the States without due consideration of the individual State's contribution to stream drying. The January Proposal is not a unique solution. If certain nonlinearities in the RRCA Groundwater Model do need to be addressed, other solutions can be developed and appropriately presented to the RRCA. Any solution to the perceived errors in the Accounting Procedures must accurately compute the CBCU of groundwater and IWS Credit under the conditions that the model was calibrated, must use non-arbitrary terms, and must recognize the necessary non-linear features of the Republican River system. Nebraska's January Proposal does not meet these conditions and does not meet the burden of proof necessary to replace the current Accounting Procedures.

Finally, the January Proposal will result in inaccurate calculations of the IWS Credit. As Dr. Schreuder testified,

> The Imported Water Supply (IWS) calculation is intended to subtract imported water from the actual flow measured at the surface water gages. The purpose of this calculation is to correct the observed surface flows for imported water. As in the case of estimating pumping impacts, Nebraska's proposed method calculates the IWS as a weighted average. Half of these

> differences included in the weighted average will consider the situation where wells in Nebraska had never been pumping. As demonstrated in Figures 9 and 10, the amount of imported water that reaches the gage is greater in the absence of Nebraska pumping than when Nebraska pumping is present. The average would therefore overestimate the amount of imported surface water at the gage.

Exhibit CO 7 (Schreuder) at 19. The amount of this increase is significant. For the years 2001 through 2006, the January Proposal would result in an increase of Nebraska's IWS Credit from 12,800 acre-feet per year to 20,400 acre-feet per year. Exhibit KS 28 (Barfield, *et al.*) at 8. Nebraska did not provide any persuasive evidence to rebut Dr. Schreuder's statements. As the January Proposal will result in inaccurate Compact accounting, the Arbitrator should reject the proposal.

c. Nebraska's proposal continues to charge States for consumption of imported water, contrary to the intention of the Final Settlement Stipulation.

One of the intentions of the States in entering into the Final Settlement Stipulation and designing the RRCA Groundwater Model and associated procedures was to avoid "charging" any State for consumption of water imported into the Republican River basin. At hearing on the Final Settlement Stipulation, Mr. Cookson, counsel for Nebraska at the time, represented to Special Master McKusick:

> Your Honor, you've hit on something that was the subject of much discussion.
> Our agreement is that if you are consuming imported water and not virgin water supply, it shouldn't count, and that if after that consumption occurs, there's still imported water supply getting into the streams, we should get a credit.
> The practical reality is the way the model's constructed, you don't make two separate determinations. You make a net determination,

> which is how much extra water is getting in. So we expressly determined the latter. By implication, we have eliminated the former, the consumption by the well.
> So in order to reflect that, we reached a compromise language, which was, Whether it was determined expressly or by implication. So it's determined, but not expressly determined. It comes out in the wash.

Exhibit KS 31, Hearing Transcript, Kansas v. Nebraska and Colorado, No. 126, Original, Pg. 79, Line 14 – Pg. 80, Line 7 (January 6, 2003); *see also* Trial Transcript, March 18, 2009, Pg. 2167, Line 30 - 44.

Despite this intention of the FSS, the January Proposal does include consumption of imported water, and thus cannot be permitted. Exhibit CO 7 (Schreuder) at 19, Figure 10.

d. <u>The Arbitrator should reject Nebraska's proposed change to the RRCA Groundwater Model Procedures.</u>

Nebraska failed to Submit the January Proposal to the RRCA and the RRCA did not Address the January Proposal, therefore the January Proposal is procedurally barred from consideration as part of this Arbitration. Even if the January Proposal is properly part of this Arbitration, Nebraska has utterly failed to meet its very high burden of proof regarding its proposed changes involving application of the RRCA Groundwater Model. Nebraska provided no credible evidence to support its claims that there is a problem with the current procedures, nor that the January Proposal will properly address the claimed problem. Despite many opportunities, Nebraska could only justify its January Proposal by claiming the math works out. However, as shown above, the January Proposal is not a unique solution and other solutions may also make the math work. Those

members of the Republican River Groundwater Modeling Committee who testified were unanimous that Nebraska's claimed problem was known at the time the States approved the RRCA Groundwater Model and, in any event, the non-linearities shown by Nebraska were not errors but a necessary part of the Model to represent a non-linear system with a reasonable degree of accuracy. These witnesses helped develop and calibrate the Model and are very familiar with the Model itself and the manner in which the RRCA applies the Model.

As Nebraska witness Dr. Ahlfeld testified: "...ultimately, it's a matter of the professional judgment..." Trial Transcript, March 19, 2009, Pg. 1517, Line 19 – 20. The Arbitrator should rely on the professional judgment of those who are most experienced with the design, maintenance and implementation of the RRCA Groundwater Model, Dr. Schreuder and Mr. Larson, who were unanimous in opposing Nebraska's January Proposal.

B. The Arbitrator Should Reject Nebraska's Proposed Changes to the Haigler Canal Accounting Procedures.

Nebraska argues that certain changes must be made to the approved Accounting Procedures regarding the Haigler Canal. Specifically, Nebraska claims that flows recorded at the Haigler Canal wasteway gage should be subtracted from the Haigler Canal flows passing the state line gage, thereby changing the beneficial consumptive use of Haigler Canal diversions used for irrigation in Nebraska and Virgin Water Supply ("VWS") calculations for the Arikaree River sub-basin. Nebraska also claims that the Accounting Procedures should reflect that 51% of the Haigler Canal return flows pass the Arikaree sub-basin gage. *See* Exhibit NE 31, Schneider, et al. *Expert Report on Accounting*

*Issues: Haigler Canal and Groundwater Model Accounting Points* (January 20, 2009) at 2 – 3, 4 – 5.

The Haigler Canal diverts water from the North Fork of the Republican River within Colorado and carries water into Nebraska. Exhibit NE 31 (Schneider) at 1. Historically, the canal, known as the Pioneer Canal within Colorado (and so referred to in Article V of the Compact), has served lands both in Colorado and Nebraska. There is a gage installed on the canal at the Colorado-Nebraska Stateline and the canal continues into Nebraska, crossing the slight topographical divide between the North Fork and Arikaree sub-basins and terminating at a wasteway gage some distance from the Arikaree channel. Exhibit NE 31 (Schneider) at 2; Exhibit CO 11, Slattery, *State of Colorado's Response to Nebraska's "Expert Report on Accounting Issues: Haigler Canal and Groundwater Model Accounting Points"* (February 16, 2009) at 2.

The Accounting Procedures that are applicable to the Nebraska Haigler Canal diversions should not be changed in favor of a Nebraska proposal that is not supported by engineering analysis or data.

1. <u>The Arbitrator should reject Nebraska's request to change the calculations to determine Haigler Canal diversions attributed to Nebraska.</u>

The current approved RRCA Accounting Procedures and Nebraska's proposal can be summarized as follows: (1) Approved RRCA Accounting Procedures: NE diversions for Haigler Canal = Haigler Canal Stateline gage; (2) Nebraska's Proposal: NE diversions for Haigler Canal = Haigler Canal Stateline gage minus Haigler Wasteway gage. Exhibit CO 11(Slattery) at 2; Exhibit NE

31(Schneider) at 3. Nebraska did not undertake any engineering study to investigate what portion of these wasteway flows actually contribute to the flow at the Arikaree sub-basin gage, nor did Nebraska attempt to determine what portion of that water flowing past the Haigler wasteway gage came from precipitation rather than water diverted from the North Fork, nor did the Nebraska experts even perform a field visit to investigate the actual physical conditions of the Canal in this area.

First, as Mr. James Slattery testified, the Accounting Procedures currently take these wasteway flows into account as part of the return flows that are accounted for by the provision that return flows shall be 40 percent of total diversions for all non-federal canals. Exhibit CO 11 (Slattery) at 2. Therefore, as Mr. Slattery testified, if the amounts returned passing the wasteway gage were subtracted from the flows recorded at the Stateline gage, it would effectively be subtracting the returns twice. *Id.* It would also result in underestimating the CBCU that should be charged to Nebraska from such diversions. *Id.*

Second, Mr. Slattery testified that precipitation runoff must also be accounted for in any proposed change to the Accounting Procedures regarding Haigler Canal diversions. Mr. Slattery testified:

> In addition, a portion of the water returned at the Haigler Canal wasteway is the result of inflow to the Haigler Canal from rainfall runoff downstream of the measuring flume on the Haigler Canal at the state line. It would not be appropriate to subtract the amounts returned to the Arikaree River at the Haigler Canal wasteway from the flows recorded at the Haigler Canal stateline flume without accounting for rainfall runoff below the stateline flume.

Exhibit CO (Slattery) 11 at 2. Although Mr. Williams testified that he believed that there were berms to prevent precipitation runoff from entering the Canal, he also testified that he was not particularly familiar with this area or the Canal itself. Trial Transcript, March 17, 2009, Pg. 1210, Line 24 – Pg. 1211, Line 1. In contrast, Mr. Slattery testified that he was personally familiar with the area and the Canal and in fact had walked along significant portions of the Canal and it was, in fact, not bermed to prevent the inflow of precipitation runoff. Trial Transcript, March 18, 2009, Pg. 2134, Line 26 – Pg. 2135, Line 18.

As the Nebraska proposal does not take these factors into account, Nebraska has not met its burden of proof to force a change to the Accounting Procedures.

2. The Arbitrator should reject Nebraska's proposed changes to return flows from irrigation from the Haigler Canal

Similarly, Nebraska has not met its burden of proof to support its claim that certain return flows from irrigation under the Haigler Canal within Nebraska return to the Arikaree River and are measured at the Arikaree sub-basin gage. Exhibit NE 31 (Schneider) at 4. Once again, Nebraska's theory is not supported by any engineering or other physical analysis as to what actually occurs to these return flows, instead Nebraska's "study" consists solely of looking at USGS topographical maps and estimating the approximate drainage basins of the North Fork and the Arikaree River. Trial Transcript, March 17, 2009, Pg. 1209, Line 14 – 22.

The limited topographical research conducted by Nebraska is not sufficient to sustain its burden of proof on this issue as topography is not the sole or determinative factor in dictating the location where return flows will occur and

whether return flows, including irrigation wastewater, will show up at the Arikaree sub-basin gage. Nebraska simply assumes that return flows representing 40% of diversions from these acres accrue to the Arikaree River and appear at the Arikaree sub-basin gage. Trial Transcript, March 17, 2009, Pg. 1213, Line 12 – 19.

However, Mr. Slattery's testimony shows that Nebraska's hypothesis is not correct. Mr. Slattery's testimony sets out 10 reasons that Nebraska's proposed change is incorrect. Exhibit CO 11 (Slattery) at 4-5. In summary, the gage records at the Arikaree sub-basin gage do not support the theory that return flows from acres irrigated within the Arikaree sub-basin appear at the Arikaree sub-basin gage. *Id*; see also *id*, at Figure 1. The gage records give strong indication that a considerable percentage of the flow that may appear at the Arikaree River sub-basin gage is actually rainfall runoff that has been "generated from the 1,700 square mile drainage basin upstream of the gage." Exhibit CO 11 (Slattery) at 5. Nebraska's proposal does not reflect the fact that a substantial portion of the streamflow recorded at the Arikaree River sub-basin gage may be rainfall runoff rather than return flow or wastewater flow from the Haigler Canal diversions.

In fact, applying Nebraska's proposed change results in calculated gage flows that exceed the total gaged streamflow since 2001. *Id* at 5. As Mr. Slattery explained, this is likely because return flows from irrigation of these lands percolates to the water table and flow generally north, into the Main Stem of the Republican River, not the Arikaree River. This hypothesis is supported by the general ground water flow directions in the approved RRCA Groundwater Model.

Nebraska presented no evidence to contradict Mr. Slattery's engineering studies. The sole Nebraska witness to offer testimony in support of Nebraska's proposed changes, James Williams, conceded that if the return flows are not appearing at the Arikaree sub-basin gage, it is possible that such flows trend generally north and appear in the Main Stem of the Republican River. Trial Transcript, March 17, 2009, Pg. 1212, Line 4 – Pg. 1213, Line 3. Therefore, the evidence presented show that the current RRCA Accounting Procedures accurately account for return flows from lands irrigated under the Haigler canal within the Arikaree sub-basin and should not be changed.

3. The Arbitrator should reject Nebraska's proposed changes to Virgin Water Supply Calculations for the Arikaree sub-basin.

Nebraska proposes that the Accounting Procedures for determining the Virgin Water Supply of the Arikaree sub-basin be modified by subtracting the gaged flow at the Haigler Canal wasteway gage from the gaged flow recorded at the Arikaree sub-basin gage. Nebraska claims this is necessary as the entirety of the flows passing the Haigler Canal wasteway gage appear at the Arikaree sub-basin gage and, therefore, are double counted. Exhibit NE 31 (Schneider) at 7. Nebraska presented no engineering or other hydrologic analysis of the actual fate of waters passing the Haigler Canal wasteway gage; it simply assumes that all such water will appear at the sub-basin gage, regardless of physical stream conditions.

However,

> . . .the majority of the Haigler Canal wasteway returns soak into the Arikaree River streambed and become groundwater that flows

> north toward the Main Stem. Therefore, it is not appropriate to subtract Haigler Canal wasteway flows from the streamflows measured at the Arikaree River gage to determine the virgin water supply for the Arikaree sub-basin.

Exhibit CO 11 (Slattery) at 6, *see also* Trial Transcript, March 18, 2009, Pg. 2114, Line 32-42. This is based on Mr. Slattery's investigation and previous knowledge of that area. That area, and especially that the Arikaree River Channel, is dominated by sandy soils and the Arikaree streambed is typically a dry streambed. Trial Transcript, March 18, 2009, Pg. 2113, Line 48 – Pg. 2114, Line 44; Pg. 2126, Line 34 – 36.

In order for the Haigler Canal wasteway returns to reach the Arikaree sub-basin gage, this water would have to pass through the wasteway gage, down a slough and then down the channel of the Arikaree, without losing any water to evaporation, evapotranspiration or percolation. Nebraska did not perform any engineering or hydrologic analysis to determine whether such losses occur or the extent of such losses. However, as shown above Mr. Slattery did perform an investigation and testified that in his opinion, water passing the Haigler Canal wasteway gage do not even make it to the Arikaree River channel, much less the Arikaree sub-basin gage. Trial Transcript, March 18, 2009, Pg. 2126, Line 6 – 12

The engineering and hydrologic evidence in this Arbitration contradicts Nebraska's claims, and Nebraska has presented no engineering or hydrologic evidence to support its proposed changes to the Accounting Procedures. Therefore, Nebraska has failed to meet its burden of proof.

C. The Arbitrator Should Reject Nebraska's Proposed Changes to the Accounting Point Locations.

Nebraska has submitted a proposal to change the location of four ground water model accounting points to match the location of related sub-basin stream gages. Nebraska has not done sufficient analysis to demonstrate that the changes are necessary for the proper operation of the RRCA Model or that the changes are consistent with the prior agreements between the States and the prior applications of the Compact.

The location of certain physical stream gages for various sub-basins should not be taken to define the extent of the sub-basin for purposes of the Compact. All testimony agreed that in many cases a stream gage simply cannot be placed at the confluence of the sub-basin and the Main Stem due to the reality of physical constraints. Exhibit CO 11 (Slattery) at 7; *See also* Trial Transcript, March 17, 2009, Pg. 1203, Line 16 – Pg. 1204, Line 1. However, such physical constraints do not apply to the RRCA Groundwater Model and the Compact accounting locations in the Model can and should reflect the proper definition of a sub-basin. As shown below, the term sub-basin includes the entire drainage basin of a sub-basin to the confluence with the Main Stem of the Republican River and the RRCA Groundwater Model accounting points should, and currently do, reflect that definition. Further, in spite of the non-confluence locations of streamflow gages, the RRCA Groundwater Model is still "capable of summarizing the total groundwater depletions and accretions in each sub-basin upstream of the confluence with the Main Stem." Exhibit CO 11 (Slattery) at 7.

The Compact allocates the VWS according to certain drainage sub-basins. Although the Compact does not explicitly define a drainage sub-basin, the RRCA Engineering Committee Reports, which go back to the 1960's, clearly indicate that "the Engineering Committee understood that the allocation was clearly upstream of the confluence between the mainstem of the subbasin." Trial Transcript, March 18, 2009, Pg. 2110, Line 38-42.

However, Nebraska's proposed accounting point changes would "re-define a sub-basin as the portion of the sub-basin upstream of a stream gage, thereby excluding groundwater depletions and accretions that occur downstream from the stream gage, but upstream of the confluence of the sub-basin with the Main Stem." Exhibit CO 11 (Slattery) at 6. Nebraska's proposed changes to the RRCA Groundwater Model accounting point locations also deviate from the States' prior agreements, as seen in the FSS, that the values for each sub-basin include groundwater depletions and accretions upstream of the confluence with the Main Stem. Exhibit CO 11 (Slattery) at 6. Both Subsection III.A.2. and Subsection III.D.1. of the RRCA Accounting Procedures use language that implicitly defines a sub-basin as the area upstream of the confluence between a tributary and the Main Stem.

Subsection III.A.2, addressing the calculation of annual Virgin Water Supply, provides:

> Adjustments for flows diverted around Sub-basin stream gages and for Computed Beneficial Consumptive Uses in a Sub-basin between the Sub-basin stream gage and the confluence of the Sub-basin tributary and the Main Stem shall be made as described in Subsections III.D.1 and 2 and IV.B.

Subsection III.D.1, addressing the calculation of annual Computed Beneficial Consumptive Use of groundwater, then provides:

> The values for each Sub-basin will include all depletions and accretions upstream of the confluence with the Main Stem. The values for the Main Stem will include all depletions and accretions in stream reaches not otherwise accounted for in a Sub-basin.

Moving the groundwater accounting points would exclude certain depletions and accretions from sub-basins as the depletions and accretions would occur below the groundwater accounting point. Exhibit CO 11 (Slattery) at 6. This would have the effect of transferring those depletions and accretions to the Main Stem of the Republican River. *See* Exhibit CO 11 (Slattery) at 6, Tables 3 and 4.

Finally, moving the groundwater accounting point for the North Fork would also contradict the Special Master's finding in the First Report of the Special Master (Subject: Nebraska's Motion to Dismiss) in *Kansas v Nebraska and Colorado*. There, the Special Master found:

> The Republican River is formed at the junction of two rivers that rise in the plains of northeastern Colorado: the Arikaree River and the North Fork Republican River. The North Fork Republican River flows northeasterly from Colorado into Nebraska, and the Arikaree flows northeasterly from Colorado, across the extreme northwest corner of Kansas, and then into Nebraska. The junction of the Arikaree and the North Fork Republican Rivers occurs in extreme southwestern Nebraska near the town of Haigler.

First Report of the Special Master (Subject: Nebraska's Motion to Dismiss), *Kansas v Nebraska and Colorado*, No. 126, Original at 6. No State took exceptions to this finding.

The Special Master's Report shows that the Main Stem begins at the junction of the North Fork and the Arikaree in Nebraska. Therefore, consistent with the other sub-basins, the North Fork sub-basin includes the entire drainage basin of the North Fork, to its confluence with the Arikaree forming the Main Stem. Nebraska did not consider this unchallenged statement by the Special Master. Trial Transcript, March 17, 2009, Pg. 1205, Line 17 – 19

As with all of the changes proposed by Nebraska in the Republican River Arbitration, the Nebraska suggestion to change the four accounting point locations is not innocuous. The "net effect of these changes would be to reduce the allocation of virgin water supply to Colorado and increase the allocation of virgin water supply to Nebraska." Exhibit CO 11 (Slattery) at 6; Table 5.

Nebraska has not proven that its proposed changes to the RRCA Groundwater Model accounting point locations are a necessary improvement to the RRCA Accounting Procedures or that the changes are consistent with the Compact and the States' prior applications of the Compact. The Arbitrator should deny this request.

**IV. Legal Issue Raised by the Arbitrator.**

At the Trial the Arbitrator posed a question to counsel as to whether any rulings changing the Accounting Procedures or other rulings that would change the States' calculations regarding Compact compliance could be applied retroactively. *See* Trial Transcript, March 19, 2009, Pg. 1565, Line 20 – Pg. 1567, Line 5. Second Report of Special Master (Subject: Final Settlement Stipulation), *Kansas v Nebraska and Colorado*, No. 126, Original (April 15,

2003) at 32. To the extent the RRCA has already approved accounting for a given year, that accounting cannot be revisited and the approved accounting cannot be re-opened. *Id.* It is only to the extent that the RRCA has not approved a given year's final accounting, and a State specifically reserved an issue to be determined at a later date that may affect that given year's accounting that a decision may apply retroactively.

## CONCLUSION

Colorado requests that the Arbitrator make the following findings:

1. Kansas' claim for direct and indirect damages has not been proven with reasonable certainty;

2. Kansas is legally entitled to nominal damages for Nebraska's compact breach in 2005 and 2006 but is not entitled to receive actual damages for 2005 and 2006 because it has failed to meet its burden of burden of proof;

3. Nebraska's January Proposal, which suggest changes to the Accounting Procedures, is rejected because the January proposal was not properly submitted to the RRCA;

4. To the extent Nebraska's January Proposal could have been considered, the January Proposal fails as it would result in inaccurate calculations of CBCU;

5. Nebraska's proposal to change the calculation of Haigler Canal net diversions is rejected because it is not supported by valid engineering analysis or data and is contradicted by substantial evidence;

6. Nebraska's proposal to change the return flow calculations of irrigated acres under the Haigler Canal is rejected because it is not supported by valid engineering analysis or data and is contradicted by substantial evidence;

7. Nebraska's proposal to change the calculation of Virgin Water Supply Calculations based upon Haigler Canal diversions is rejected because it is not supported by valid engineering analysis or data and is contradicted by substantial evidence;

8. Nebraska's proposal to change four groundwater accounting points in the RRCA Model is rejected because these changes would redefine the meaning of sub-basin and do not constitute a necessary improvement;

9. Nebraska has failed to sustain its burdens of proof on all proposed changes.

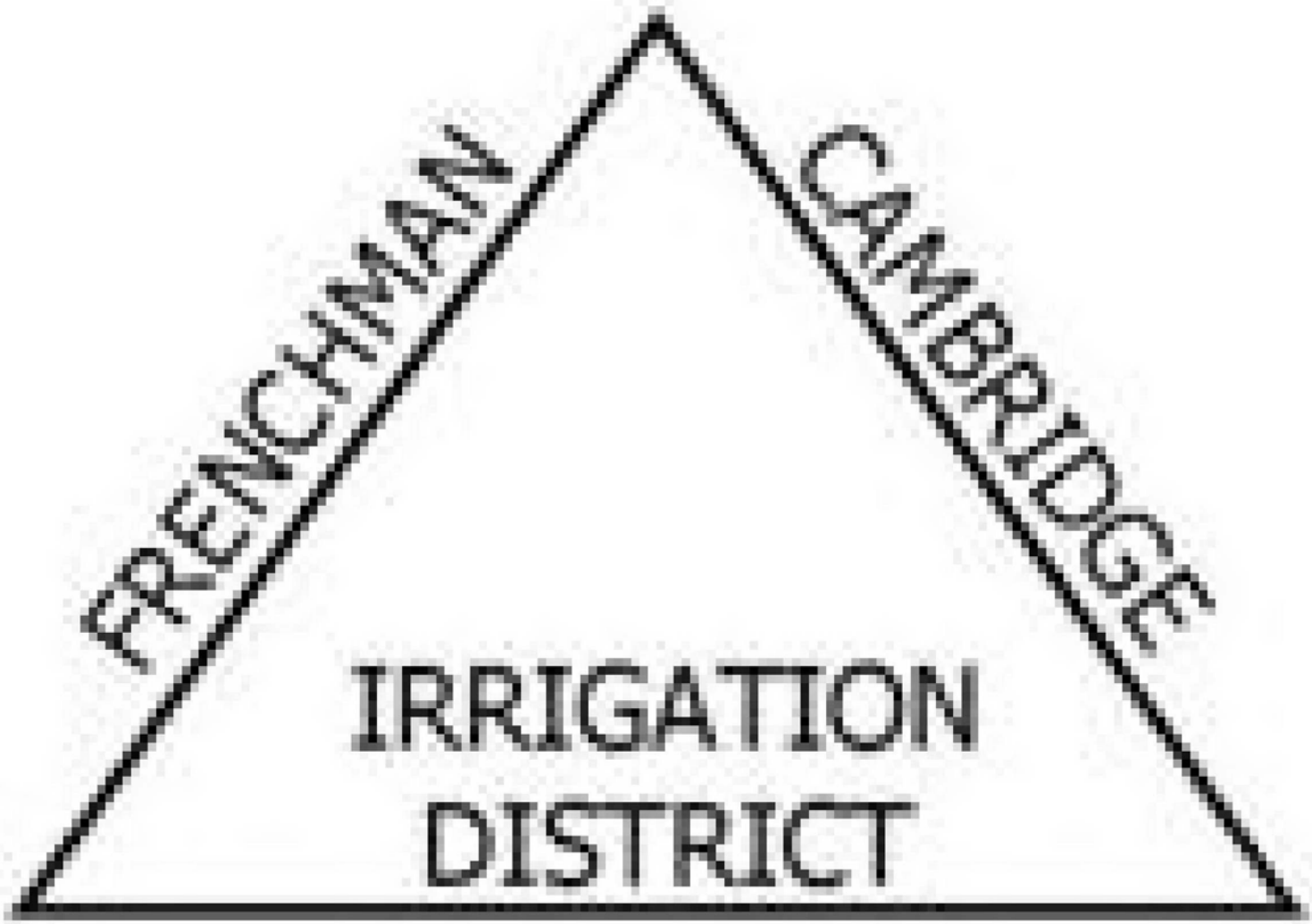
Dated this 24th day of April, 2009.

FOR THE STATE OF COLORADO:

JOHN W. SUTHERS, Attorney General

Peter J. Ampe*
First Assistant Attorney General
Autumn Bernhardt*
Assistant Attorney General
Federal and Interstate Water Unit
Natural Resources and Environment Section
State of Colorado, Office of the Attorney General
1525 Sherman St., 2nd Floor
Denver, CO 80203

*Attorneys of Record


FRENCHMAN
CAMBRIDGE
IRRIGATION
DISTRICT

*Kansas v. Nebraska & Colorado*
No. 126, Orig., U.S. Supreme Court
Decree of May 19, 2003, 538 U.S. 720

State of Kansas, Plaintiff,

v.

State of Nebraska, Defendant,

State of Colorado, State with an Actual Interest

Non-Binding Arbitration Pursuant to Final Settlement Stipulation

Karl J. Dreher, Arbitrator

# Kansas' Post-Trial Brief

Steve Six
Attorney General of Kansas
Michael C. Leitch
Deputy Attorney General
Christopher M. Grunewald
Samuel Speed
Assistant Attorneys General
Burke Griggs
Special Assistant Attorney General

John B. Draper
*Counsel of Record*
Special Assistant Attorney General
Lara Katz
Montgomery & Andrews, P.A.
Post Office Box 2307
Santa Fe, New Mexico 87504-2307
(505) 982-3873

April 24, 2009

## Table of Contents

## Table of Authorities

KANSAS EXHIBITS



NEBRASKA EXHIBITS

COLORADO EXHIBITS

## Introduction

Kansas files this Post-Trial Brief in accordance with the agreement of the States and approval of the Arbitrator. See Arbitration Agreement, Exh. 2; Transcript of Hearing ("Tr.") page 1752.

This Brief is filed as part of the Arbitration initiated by the Joint Notice of Arbitration dated October 21, 2008 pursuant to Section VII of the Final Settlement Stipulation ("FSS") approved by the United States Supreme Court in its Decree of May 19, 2003 in *Kansas v. Nebraska & Colorado*, No. 126 Orig, 538 U.S. 720. The dispute resolution process of which the Arbitration is a part was initiated by Kansas' letter to Nebraska on December 19, 2007, proposing a remedy for Nebraska's violations. See Kansas Exhibit ("Kan. Exh.") 69, Attachment 1 (Letter from Kansas Republican River Compact Administration ("RRCA") Commissioner David W. Barfield to Nebraska Commissioner Ann Bleed dated February 8, 2008). Nebraska then raised certain additional issues. See *id.*, Attachment 2 (Letter from Comm'r Ann Bleed to Comm'r David Barfield and Colorado Commissioner Dick Wolfe, dated April 15, 2008). Colorado also submitted a stream augmentation proposal related to future compliance by Colorado. See *id.*, Attachment 3 (Letter from Dick Wolfe to David Barfield and Brian P. Dunnigan, dated April 11, 2008). The Colorado augmentation proposal is not part of the present Arbitration. See Joint Notice of Arbitration, ¶4.

The disputed issues raised by the States were addressed by the Republican River Compact Administration ("RRCA"), but the RRCA was unable to resolve the undisputed issues. The RRCA adopted a resolution confirming that the disputed issues were then ready to be taken to the next stage of dispute resolution. Kan. Exh. 69, at 1-2. In preparation for the arbitration phase of the dispute resolution process, the States cooperated to a high degree in resolving various procedural issues, including the selection of the Arbitrator.

The Arbitration was formally initiated on October 21, 2008 by the issuance of a Joint Notice of Arbitration by all three States. The States agreed that Colorado would participate as a State with an Actual Interest. Jt. Notice of Arb. 1-2.

Kansas and Nebraska pursued discovery in the form of requests for production and depositions. Both States were hampered significantly by the lack of sufficient time and by the absence of subpoena power to require third parties, such as the Nebraska Natural Resources Districts ("NRDs") and the former director of the Nebraska Department of Natural Resources ("DNR") to respond to discovery requests.

In response to briefing by the States, the Arbitrator issued the Arbitrator's Preliminary Decision on Legal Issues on December 19, 2008 and the Arbitrator's Final Decision on Legal Issues on January 22, 2009. The Arbitrator's legal rulings set the scope of discovery and trial on the issues

addressed. For instance, for the purpose of quantifying Kansas' damages claim, Kansas submitted only its analysis of Kansas losses, not Nebraska's gains, because the Arbitrator had ruled that he would not allow evidence on Nebraska's gains for purposes of damages. And Nebraska was allowed to present evidence on its proposals to change the FSS Accounting Procedures, rejecting Kansas' legal argument that such changes required RRCA approval or amendment of the Decree.

**Summary of Brief**

Segment 1: Damages. Kansas limited its evidence to Kansas' losses and did not submit evidence of Nebraska's gains, in accordance with the Arbitrator's Legal Decision. Based on a quantification of the Nebraska violation in the amount of approximately 79,000 acre-feet, expert analysis determined that approximately 50,500 acre-feet would have reached the farm headgates in Kansas but for the Nebraska violation. Economic analysis based on farmer profit losses and secondary damages throughout the State of Kansas shows total damages, brought to present value of approximately $9 Million. The economic analysis by Kansas was consistent in all respects with the economic analysis accepted by the U.S. Supreme Court in *Kansas v. Colorado*, No. 105, Orig. Nebraska submitted an alternative analysis based on lost rents, which was questionable in a number of respects and suffered from a lack of necessary data.

Segment 2: Future Compliance. Kansas has proposed a fair and equitable remedy, which is necessary in order for Nebraska to achieve compliance with the Supreme Court Decree in the future. The Kansas compliance plan includes eliminating 515,000 acres of groundwater irrigation, making up shortfalls in dry years with surface water, appointing a river master and establishing pre-established sanctions for any future violations. The shutdown of groundwater pumping is considerably less than resulted from Colorado's compliance with the findings of the Supreme Court with respect to the Arkansas River Compact. There, groundwater pumping was reduced by a factor comparable to the reduction shown to be necessary in this case, and all remaining pumping was required to have its effects on the river replaced in the amount required by the rules. Kansas' proposal in this case is to shut down less than half of the pumping and not require offsets of the effects of the remaining pumping.

Nebraska's counterproposal regarding future compliance is wholly inadequate. Its Integrated Management Plans ("IMPs") proposed very meager pumping reductions, at best, that will do little to show the growth in stream depletions, much less reduce them, as is required for Compact compliance. They do not have enforceable limits, they have never been enforced, and they rely on surface water that will not be available. The IMPs are simply another piece of paper from Nebraska based on the expectation that their pumping can go forward largely unabated.

Segment 3: Accounting Procedure Changes. After compliance became an issue for Nebraska, it proposed changes to the Accounting Procedures, which would lessen its noncompliance. The changes to the Accounting Procedures proposed at trial regarding consumptive beneficial use and the imported water supply ("CBCU/IWS") are not the same as those presented to the RRCA and therefore should not be considered in this Arbitration. More importantly, there is no error in the current CBCU/IWS Accounting Procedures that needs to be corrected, as testified to by members of the Technical Modeling Committee. In addition, the specific change proposed by Nebraska is inconsistent with the Compact and should not be adopted. Nebraska's proposal to revise the Haigler Canal Accounting is incomplete, resulting in negative values at the relevant gage, an engineering impossibility. Nebraska's proposed changes to the Groundwater Model accounting points are inconsistent with the Compact, with the exception of the North Fork proposal. In all events, any change approved by the Arbitrator should be prospective only and should not affect 2005 and 2006.

## Argument

### I. Kansas' Damages

#### A. The Amount of Nebraska's Violation

It is undisputed that Nebraska violated the Supreme Court's May 19, 2003 Decree enforcing the Republican River Compact by using significantly more water than its annual allocations in both 2005 and 2006.

It is also undisputed that the amount of the 2006 Water-Short year violation is determined by adding (1) the Nebraska overuse above Guide Rock in 2005 and (2) the Nebraska overuse above Guide Rock in 2006. See Kan. Exh. 1, at 1 ("Nebraska's overuse upstream of Guide Rock for the two years totaled 78, 960 ac-ft")(emphasis added), Attachment 1; Neb. Exh. 8, Table 2-2, at 5 ("Applying the Arbitrator's rulings to the accounting spreadsheets and correcting several mistakes in the spreadsheets results in a corrected total of Nebraska's Allocation – CBCU–IWS above Guide Rock of 71,475 ac/ft for 2005 and 2006") (emphasis added); Colo. Exh. 2, at 2 (used shortfall posited by the Kansas experts without expressing an opinion on its correctness). Thus, although there was a difference in the actual number of acre-feet between the parties, the methodology of adding the overuse for [1]each of the years was not a subject of dispute. The overuse for the Water-Short Year Administration Accounting was only the overuse occurring above Guide Rock, which is based squarely on the Republican River Compact ("RRC") provision. RRC, Art. IV ("provided, that Kansas shall have the right to divert all or any portion [of its mainstem allocation] at or near Guide Rock,

[1] Of the three other changes that Nebraska asserted should have been made, on was a small upward adjustment of 270 acre-feet that was not included in Kansas' analysis. Neb. Exh. 8,Table 2-1. The other two downward adjustments were corrections that were already incorporated in the 2006 RRCA accounting spreadsheet used by Kansas. Kan. Exh. 1 at 1 and Attachment 1; Kan. Exh. 22.

Nebraska"). Further, there is no dispute that Compact accounting pursuant to the FSS Accounting Procedures began with the year 2003. See, *e.g.*, FSS, App. B, at B2 ("Action: Data exchange under RRCA Accounting Procedures Section V.—Date: April 15, 2004 (for the 2003 year)"); Tr. 435-40 (Barfield); Kan. Exh. 22.

The only dispute regarding the amount of Nebraska's violations is the apportionment of Harlan County Lake evaporation in 2006. This subject was addressed in part by an earlier legal determination in this proceeding. See Arbitrator's Final Decision on Legal Issues ("Final Legal Decision") at 10-12. Subsequent to the Final Legal Decision, however, evidence came to light at trial in this matter that recasts the issue decided by the Arbitrator. The earlier Final Legal Decision on this issue was made before evidence was brought out showing that pumping occurred in the Superior Canal service area below Guide Rock in 2006, and that Nebraska substituted the groundwater pumped for the Superior Canal surface water supply. FSS Section IV.A.2.(e)(1) provides a specific method for calculating the evaporation split under such circumstances. The last sentence of Section IV.A.2.(e)(1) states:

> "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." FSS at C34.

By letter dated May 1, 2006, Nebraska stated that it was planning to enter into agreements with NBID to purchase surface water that would otherwise have been diverted into the Superior Canal during 2006. Kan Exh. 84. According to the letter, "[s]ome irrigators in the Superior Canal surface water delivery area will be using *an alternate supply from ground water wells located below Guide Rock Diversion Dam.*" Id. (emphasis added). By pumping groundwater below Guide Rock as "an alternate supply," Nebraska chose to substitute supply for the Superior Canal from its allocation below Guide Rock. This action effectively brought into operation the calculation method outlined in the last sentence of Section IV.A.2.(e)(1).

Nebraska's allocation of all HCL evaporation to Kansas contravenes the provisions of Section IV.A.2.(e)(1), which requires the amount of water pumped below Guide Rock in 2006 to be allocated to Nebraska for purposes of assigning the HCL evaporation consumptive use. However, due to limitations on discovery, the actual amount of water pumped is not known. Given the absence of quantitative data, the best solution is to use the HCL evaporation split assumed by Mr. Book, which is based on long-term average uses. That calculation is more consistent with Section IV.A.2.(e)(1) and with the Arbitrator's interpretation of the Compact. See Final Legal Decision at 12 (stating that the Compact "impliedly apportions evaporation based on where the associated beneficial use occurs").

While the final accountings for 2005 and 2006 have not been formally adopted by the RRCA in all respects, the States do agree on the underlying data for both years. For 2005, the RRCA Engineering Committee "developed two different sets of accounting," Kan. Exh. 48 at 7; see also Tr. 436-40 (Barfield), and for 2006, the "model input and accounting data is considered final," Kan. Exh. 49 at 9; see also Tr. 438-40 (Barfield).

Using the agreed-upon accounting data for 2005 and 2006, Kansas determined that in 2005, Nebraska overused its allocation above Guide Rock by 42,860 acre-feet and, in 2006, by 36,100 acre-feet. Kan. Exh. 1 at Att. 1. Nebraska agrees with Kansas that its overuse above Guide Rock in 2005 was 42,860 acre-feet. Neb. Exh. 8 at 5; Tr. 389 (Groff). For the 2006 value, Nebraska adjusts Kansas' figure downward by about 7,500 acre-feet to 28,615 acre-feet. Neb. Exh. 8 at 3-5. The downward adjustment comes from Nebraska's charging Kansas with the entire amount of evaporation at Harlan County Lake in 2006. Neb. Exh. 8, at 1.

### B. The Amount of Water That Should Have Reached the Fields in Kansas in 2005 and 2006

Nebraska's Compact violations resulted in water deficits at the fields in Kansas, and Kansas has shown that, without Nebraska's violations, in 2005, an additional 26,800 acre-feet would have been delivered to Kansas farms, and in 2006, an additional 23,700 acre-feet would have been delivered. Kan. Exh. 1, at 7. To determine these values, the expert Mr. Book determined the amount of water that would have reached the fields, routing

it through the Kansas Bostwick Irrigation District ("KBID") system to farms in and below KBID. Kansas' calculations of the additional farm deliveries that should have occurred relied on the more normal historical observed conditions for determining losses and use of return flows. Nebraska's analysis, on the other hand, makes unreasonable assumptions that are contrary to the normal operating conditions of the Bostwick Project.

The material dispute between the parties over the calculation of the farm deliveries centers on three areas: losses above the Stateline, system losses in Kansas, and use of return flows from Kansas Bostwick. We address each point in turn.

**1. Losses Above the Stateline**

The Kansas expert Mr. Book first deducted the evaporation that would have been associated with the additional supply in Harlan County Lake. This amounted to 4,000 acre-feet. See Kan. Exh. 1, at 3. There is no dispute regarding this deduction. Then the losses in the Courtland Canal from Guide Rock to the Stateline were determined. This determination was made in accordance with the FSS Accounting Procedures that assign only the consumptive part of the losses to Kansas. See FSS Accounting Procedures, at C44-45, C47. These Accounting Procedures have not been challenged by Nebraska. Further, losses in the Courtland Canal between Guide Rock and the Stateline were determined using normal historical losses experienced in

the Bostwick Project. This resulted in additional losses of approximately 1,800 acre-feet for the two-year period. See Kan. Exh. 1, at 2, Table 2.

The Nebraska expert, on the other hand, deducted all losses from the Kansas water, not only the consumptive use portion, as provided for in the FSS Accounting Procedures, but also the non-consumptive portion, which the Nebraska expert never accounted for, implicitly assuming that it never would have reached Kansas. The Kansas expert did not agree with this approach because water would have been available for diversion at Guide Rock to make up the non-consumptive loss. See Kan. Exh. 53; Tr. 453-56 (Book). A simple check of the values in Kan. Exh. 53 shows this to be true. For instance, Kan. Exh. 53 shows that to support the 2005 delivery from Guide Rock to the Stateline determined by Mr. Book, 88,183 acre-feet needed to be available at Guide Rock. The actual amount diverted in 2005 was 48,737 acre-feet. The additional water that should have been made available by Nebraska for diversion at Guide Rock in 2005 was 41,600 acre-feet (determined from the table on page 3 of Kan. Exh. 1, Mr. Book's expert report (42,900-1,300=41,600)). Adding the actual diversion of 48,737 acre-feet and the required additional divertible amount of 41,600 acre-feet, gives a total amount available for diversion at Guide Rock of 90,337 acre-feet. This confirms that more water would have been available (90,337 acre-feet) than was needed (88,183 acre-feet) to support the delivery from Guide Rock to the Stateline determined by Mr. Book.

### 2. System Losses in Kansas Bostwick

There are significant differences between the States on how they analyzed system losses in the Kansas Bostwick Irrigation District. The KBID losses include those from the Courtland Canal below the Stateline and from the District and farm laterals. Kansas Exhibit 54 compares the percentage losses determined by each of the States' experts with historical losses. The historical period used for comparison was 1994-2007, which includes several years of very low water supply due to overuse in Nebraska (2003-2006) as well as and other years of more normal water supplies. The Kansas values consistently match the actual historical values much more closely than the Nebraska values do. Above Lovewell, the Kansas value is the same as the historical value (26%), whereas the Nebraska value is much higher (38%). Below Lovewell, the Kansas figure (45%) is higher than the historical figure (43%), but the Nebraska figure is higher still (49%). It is unrealistic of Nebraska to reduce the on-farm deliveries by percentages that significantly exceed the historical percentages. The Kansas percentages closely match the historical percentages and should be accepted.

One of the major reasons that the Nebraska expert's KBID loss percentages are unrealistically high is that he imposed a completely unnecessary monthly distribution on deliveries from Harlan County Reservoir. The analysis required no such constraint. And the particular distribution chosen required that releases of stored water be made during the non-

irrigation season. There is no historical evidence in the record that water has ever been released from Harlan County Reservoir for storage in Lovewell Reservoir during the non-irrigation season. It assumes that KBID would call for water when it had no use for that water. The effect was to put water in the canal and laterals at low-flow periods, when the losses would be greater.

Another effect of the Nebraska expert's monthly distribution of deliveries from Harlan County Reservoir is that deliveries were made late in the study period, which made it impossible to apply the water to the fields during the study period. In the Nebraska analysis it remained in Lovewell Reservoir unused. Tr. 412-16 (Groff)

### 3. Use of Return Flows from Kansas Bostwick

The return flows from KBID consist of the amount of water lost through canal and lateral seepage and the unconsumed portion of the water applied to the fields. As calculated by Mr. Book, the return flows were 22,573 acre-feet in 2005 and 16,611 acre-feet in 2006. Mr. Book did not assume that all of this water was diverted by water users downstream. Rather, Mr. Book limited each diversion structure to the highest amount that had been diverted in the period 1994-2004. The effect of this limitation was to limit diversions to less than 25% of the additional return flows that would have been available. Nebraska, on the other hand, would limit the diversion of return flows to the average diversion of each structure, resulting in diversion of a mere 6% of the return flows. To assume that Kansas farmers

with active surface water rights would divert on 6 acre-feet out of every 100 additional acre-feet is unreasonable. Both Mr. Ross and Mr. Pope testified from personal knowledge that flow conditions in the Republican River below KBID were extremely low these two years and many water users had junior groundwater rights curtailed due to administration at the time, a contributing factor to the need for additional water in this reach of the river. Nebraska did not contest these facts, but simply assumed that return flows would have gone undiverted based on average conditions. As Kansas witnesses described, flow conditions for these two years were far from average. Tr. 662-64 (Pope) 142-43 (Ross).

**C. The Value of Kansas' Losses**

**1. Direct Losses**

**a. Kansas' Lost-Profits Approach**

Kansas assembled a team of six highly qualified economic experts from the Midwest region with extensive experience in using the type of local data important for the resolution of this case. Their resumes appear as Kansas Exhibits. 10-15. They are all Ph.D. economists in agricultural economics and related fields.

The Kansas economics experts took a standard, well-tested approach to quantifying the direct economic losses. They submitted a report entitled, "Economic Impacts on Kansas of Diminished Surface Water Supplies to the Lower Republican River Basin Caused by Nebraska in 2005 and 2006," Kan.

Exh. 5. The approach used was similar in all material respects with the approach used in another Supreme Court case in which the losses of the plaintiff downstream State from violations of an interstate Compact were quantified, *Kansas v. Colorado*, No. 105, Orig. The Third Report of Special Master Arthur L. Littleworth in that case ("Third Report") describes the methods that were used in that case to quantify losses and the analysis of the Special Master. That Report can be found on the U.S. Supreme Court website at http://www.supremecourtus.gov/SpecMastRpt/ORG105-8-2000.pdf. A printed copy of this report (2 Vols.) was sent to the Arbitrator on April 17, 2009.

The first factual matter considered by the Special Master in that Report was the analysis of additional groundwater pumping costs in the canal service areas and regionally. Third Report 17-44. No such analysis was called for under the circumstances of the present case because no groundwater pumping of any significance occurs in the KBID canal service areas. Tr. 121-22 (Ross).

The next section of the Third Report describes the analysis that is central to the issues in this case, crop production losses. Third Report 47-64. As in the present case, the first step in the economic analysis was to translate the amount of overuse in violation of the Compact that occurred in the upstream State to the amount of water that failed to reach the fields in the downstream State. That was accomplished by means of a stipulation

between Colorado and Kansas. Third Report 7-9; App., Exh. 9, at 86. In the present case that was accomplished by Mr. Book for Kansas, as discussed above.

Then, in the Arkansas River case, the crop losses of individual farmers were determined based on functions relating water supply and crop yield. Third Report 47-52. In the same way, in this case, the Kansas experts used crop production functions (IPYsim) to determine the losses in crop yield and then, using farm budgets, converted that crop loss into monetary losses suffered by the individual farmers. See Kan. Exh. 5, at 6-7.

The Kansas economists in this case determined a value per acre-foot of lost profit at the farm headgate in the Kansas Bostwick area ranging from about $41 below Lovewell to about $127 above Lovewell, in 2005. In 2006, the value of lost profit per acre-foot at the farm headgate ranged from $108 below Lovewell to $134 above Lovewell. Kan. Exh. 5, Table 14, at 20. These values are in a range consistent with the market values implied by the water purchase agreements of the State of Nebraska just across the Stateline. See Kan. Exhs. 44, 50-52. Kansas Exhibit 44 is a memorandum from Ann Bleed, the Director of the Nebraska DNR, reviewing the cost per acre-foot of water for purchases actually made by the State of Nebraska in 2005. The values range from $50 per acre-foot to $198 per acre-foot. These figures would indicate that the values derived by the Kansas experts, which ranged from $41 to $134 per acre-foot, are relatively conservative.

In sum, the methodology of the Kansas economic experts is consistent with the methodology that has been accepted by the U.S. Supreme Court. Further, the actual results obtained by the Kansas economic experts are fully consistent with the market data available for the same commodity in the same area at the same time. Therefore, the Kansas valuation of losses to Kansas farmers should be accepted as a reliable estimate of the losses suffered by Kansas.

**b. Nebraska's Lost-Rents Approach**

Nebraska employed the services of a single professor in agricultural and resource economics from outside the region. See Neb. Exh. 5. Nebraska's Dr. Sunding did not follow a standard approach. He did not follow the lost-profits approach used by the Kansas experts in this case, the Kansas experts in the Arkansas River case or Dr. Sunding himself in a Central Valley study in California. See Kan. Exh. 42. Rather, he chose to compare irrigated with non-irrigated land rents for the entire North Central region of Kansas as opposed to the Kansas Bostwick Irrigation District specifically.

As Dr. Kastens pointed out in his testimony, a lost-rents approach requires, as a practical matter quantification of a number of factors, that ultimately make the method unusable in this case. Tr. 187-91 (Kastens). Dr. Sunding, however, tried to use the method and simply neglected to account for very significant elements that must be included in any rent

comparison. First among these is the degree to which irrigation equipment was included in the lease values. Dr. Sunding simply neglected this important aspect. In effect, Dr. Sunding assumed that the tenant owned the irrigation equipment:

> "Q. So your assumption was what, with respect to who owned the equipment?
> A. That the operator owns the equipment.
> Q. The tenant?
> A. Yes, which, again, is in keeping with my experience in other places.
> Q. And to the extent that it's the landowner that owns the equipment in KBID, your results would need to be reviewed; is that right?
> A. I think that's fair, yes." Tr. 351-52 (Sunding).

As shown by Kansas Exhibit 46, which is a report from Kansas State University prepared in October 2008, and posted publicly to the University's website, roughly 90% of the equipment was owned by the landowners, not the tenant, in the 12-County North Central region of Kansas. Kan. Exh. 46, Table 4, at 11; Tr. 488-91 (Kastens). But irrigation equipment ownership percentages in the three counties which KBID is located are unknown.

This kind of information, which is required for a differential rent analysis, can only be obtained through an on-site study of the landowners in KBID, something that Dr. Sunding did not do. Tr. 338-39 (Sunding).

In addition, a number of other important costs needed to be accounted for if one were to attempt to do a rent comparison along the lines proposed by Dr. Sunding. Tr. 187-93 (Kastens). For example, in the short run a number of costs will be fixed (e.g., labor, machinery, equipment) and thus a

rent-differences approach is a poor measure of lost profits unless these factors are accounted for. None of these did Dr. Sunding do. Tr. 186-87 (Kastens). Indeed, Dr. Sunding never suggested that he had ever used a differential rents analysis to determine the value of irrigation water.

In addition to using the wrong methodology and in addition to failing to take into account important elements of the methodology chosen, Dr. Sunding also did not use appropriate or reliable data. The data that Dr. Sunding relied upon were taken from a Kansas State University website which is supported by some of the Kansas experts. The data were for the entire North Central Kansas region, not the Kansas Bostwick Irrigation District, and different irrigation methods (e.g., canal v. wells) could significantly affect rent differences. Also, there are problems with the data that Dr. Sunding used for his type of analysis. Dr. Sunding did not make the appropriate inquiries to determine the reliability of the data, even though the website warned that the particular data in question could not be relied upon for the absolute values of the data, but only for purposes of trend analysis. See Neb. Exh. 6, App. (KSU & Ag. Exp. Sta. Serv., Farm Management Guide MF-1100, "Kansas Land Prices and Cash Rental Rates, at 1:" ("these data are more appropriate for analyzing trends than for establishing market value or rental rates for specific tracts of farmland") Tr. 524-25 (Kastens). Dr. Sunding disregarded this warning, further compromising his final results.

Further, the values derived by Dr. Sunding are not consistent with market data. He derived a value of $26.80 per acre-foot. Neb. Exh. 6, at 14. This value is inconsistent with the market value shown by the purchases made at approximately the same time by Dr. Sunding's own client. See Kan. Exh. 44. The purchases by the State of Nebraska itself indicate values for water as high as $198 per acre-foot in the Bostwick Project for larger amounts of water. Dr. Sunding was not made aware of these transactions by his client and therefore did not consider them. See Tr. 336-37 (Sunding). In any event, his results are clearly inconsistent with these market indications. The fact that Dr. Sunding used the wrong methodology to reach his results, that he did not apply the methodology correctly, that he relied on inappropriate and unreliable data, and that his results are clearly inconsistent with actual market values, all combine to discredit his results. Those results should therefore be disregarded.

**c. Colorado's Lost-Profits Approach**

Colorado's witness on Kansas' losses was James Pritchett, Ph.D. Dr. Pritchett concurred with the methodology applied by the Kansas economic experts. In his opinion, the Kansas' experts IPYsim crop-water response function was "accurate" and that its yield prediction seemed "to fit trend yields and also the National Ag Statistic Service yields." Tr. 286-87 (Pritchett).

Dr. Pritchett made the unfortunate mistake of using farm budget data from Northwest Kansas, where the water supply is totally different in a very important way. See Tr. 292 (Pritchett); Tr. 123-26 (Ross). The water supply in KBID is exclusively surface water, whereas the water supply in Northwest Kansas is exclusively deep groundwater. As a result, Dr. Pritchett's analysis yielded unreliable results, including negative values, suggesting that it would be more profitable for a farmer in KBID not to irrigate at all, a result contrary to observed reality. Colo. Exh. 2, at 11-12; Colo. Exh. 3, at 3; Tr. 292 (Pritchett). Dr. Pritchett implicitly realized this, as shown by his refusal to include his negative results in any further computations. See Colo. Exh. 2, at 12-13.

In sum, Dr. Pritchett agreed that Kansas had used the correct methodology, but he used the wrong data, resulting in values that are inconsistent with local market reality. Implicitly Dr. Pritchett rejected the methodology used by the Nebraska expert.

2. Secondary Impacts

As an initial matter, it is undisputed that secondary impacts are well-recognized in economics, see, e.g., Neb. Exh. 6, at 8, and that the United States Supreme Court has awarded damages for secondary impacts in an interstate water dispute, Third Report 65-71 (2000), *Kansas v. Colorado*, 533 U.S. 1 (2001). Kansas' economics experts used IMPLAN, a nationally recognized economic model, to calculate the secondary, or indirect,

economic effects of the water shortfall. Kan Exh. at 9-13. Kansas has shown that, for each year, the indirect economic impacts would equal the direct economic effects multiplied by a factor of 1.44. See Kan. Exh. 5, at 9-12, 21; Tr. 275 (Leatherman). The resulting indirect impacts were $1,019,625 in 2005, and $1,276,281 in 2006. *Ibid.*.

The States agree that Nebraska's water shortfall causes indirect impacts, and that Kansas' calculation reasonably estimates those impacts. Nebraska's expert agreed that "[t]here are indirect impacts," Tr. 364 (Sunding), and characterized IMPLAN as a "standard" method of computing those impacts, Neb. Exh. 6, at 4. He also agreed that the multiplier would be the same for both years, Tr. 371 (Sunding), and that Kansas' computed value was within the "realm" of expected values, Tr. 371 (Sunding). And Colorado took no issue at all with Kansas' approach, using the "the same indirect impact analysis and the same indirect impact factor" as the Kansas experts. Tr. 291 (Pritchett).

While Nebraska offers mild criticism of using IMPLAN here, Nebraska offers no support for this point. Dr. Sunding expressed a concern over the IMPLAN data available "for rural areas," Neb. Exh. 6, at 4, but that related to whether "preprocessing or preinput analysis" had been performed for the Kansas data, Tr. 363 (Sunding), and the most he could say on the subject was that he "think[s]" that it was not done here, Tr. 363 (Sunding). This provides no basis to reject the Kansas approach. Indeed, as explained by Dr.

Leatherman, IMPLAN contains "the data that's necessary to complete the analyses," and "[t]hese data are complete for the nation, all states, all counties." Tr. 256 (Leatherman).

Nebraska's also raises two arguments against any consideration of indirect economic impacts. First, even though it is undisputed that Kansas experienced this harm, Nebraska asserts that any "indirect losses will be offset by indirect gains" from Nebraska's payment for the direct economic damages. Neb. Exh. 6, at 8. Second, Nebraska argues that because "the magnitude of the indirect benefits that results from Nebraska's payment . . . depends . . . on how Kansas chooses to spend the money," Tr. 330 (Sunding), and because Nebraska cannot choose for Kansas how to spend the payment, Nebraska could be unfairly made "to pay even more." *Ibid.* Neither argument has merit.

Regarding the concept of offsetting, the indirect economic harm can be offset completely only if the payments for direct damages "replicate[d] as closely as possible in terms of the amount of damage, as well as the timing of those payments, as well as what ultimately happened to stimulate economic activity." Tr. 263 (Leatherman). In sum, Nebraska's damage payments would need to be received by the same Kansas farmers harmed by Nebraska's overuse.

Setting aside the difficulty in ensuring that Nebraska makes damage payments close in time to when Kansas suffered direct economic injury,

Nebraska's position is more fundamentally flawed. That is because the equivalence required for a proper offset is prohibited by federal law. The payment of damages from a state to specific individuals runs afoul of the Eleventh Amendment to the United States Constitution, which preserves the sovereign immunity of the States. The Supreme Court has held that in an interstate suit in the original jurisdiction involving improper operation of drainage ditches that caused damages in another State, that "The Eleventh Amendment precluded an award of damages based on injuries to individual farmers, where the damages claim was financed by contributions from the farmers and the State had committed to dividing any recovery among the farmers 'in proportion to the amount of [their] loss'" *Kansas v. Colorado*, 533 U.S. 1, 7-8 (2001) citing *North Dakota v. Minnesota*, 263 U.S. 365, 375 (1923). Accordingly, any damage payments cannot be put back into the economy in a way equivalent to the direct economic harm, and thus, the concept of offsetting indirect gains is a practical impossibility.

Finally, Nebraska's argument that it would "pay even more" because Kansas spending decisions cannot be controlled by Nebraska can be quickly set to the side. How Kansas chooses to spend the damage payments is a matter of state sovereignty. Moreover, Nebraska's concern rests on the faulty premise that indirect impacts can be offset in any equivalent way. In any event, absent any specific information on how the money would be

spent, any estimates of potential offsetting gains would be entirely speculative at this point. Tr. 4-8 (Leatherman).

## II. Future Compliance

### A. The Kansas Proposal

Normally a State is allowed flexibility in determining how best to meet its interstate compact obligations. This is not a normal situation, however. As the Arbitrator has ruled, "[O]nce the facts are heard at hearing regarding Nebraska's alleged violations of the Compact and the FSS, and both Kansas' and Nebraska's proposed plans for future compliance are presented and considered, it is appropriate for the Arbitrator to recommend actions that may be necessary for future compliance." Arbitrator's Final Decision on Legal Issues 18. The Kansas proposed remedy was first stated in Kansas' letter to Nebraska of December 19, 2007. See Kan. Exh. 69, Attachment 1. It was restated for purposes of consideration at trial on page 1 of Mr. Barfield's expert report entitled "Ensuring Future Compliance by Nebraska." Kan. Exh. 6, at 1. As stated there, the future compliance provisions of the Kansas proposal are that the Supreme Court enter an order:

> "3. Requiring Nebraska to immediately (a) shut down wells and groundwater irrigation in Nebraska within 2 ½ miles of the Republican River and its tributaries, (b) shut down groundwater irrigation of acreage added after the year 2000 throughout the Republican River Basin in Nebraska, and (c) make further reductions of Nebraska's Computed Beneficial Consumptive Use (CBCU) as are necessary to maintain yearly compliance, especially in Water-Short Year Administration years; or to

undertake an alternative remedy that ensures annual compliance with the Court's Decree;

4. Requiring Nebraska to further reduce Nebraska's CBCU to the extent necessary to keep Nebraska within its Compact allocation until the effects of the reduction of groundwater pumping brings Nebraska into compliance with the Court's Decree;

5. Appointing a river master to administer Decree compliance on an annual basis until such time as Nebraska can demonstrate an independent ability to achieve compliance;

6. Establishing sanctions for future violations of the Decree." *Ibid* (the numbering is from Kan. Exh. 6).

**1. A Very Significant Reduction in Groundwater Pumping is Necessary**

The Kansas expert Dale E. Book of Spronk Water Engineers testified to his report entitled "Requirements for Nebraska's Compliance With the Republican River Compact," Kan. Exh. 2. Tr. 532-47 (Book). The purpose of the analysis described in the Report was to determine whether reduction in groundwater pumping would be necessary for Nebraska to achieve Compact compliance over the long term and, if so, by how much.

Contrary to the damages analysis of 2005 and 2006, for the purpose of determining losses to Kansas, no use of surface water from the U.S. Bureau of Reclamation projects was assumed for purposes of future Compliance. This was based on Kansas' understanding that the Bureau of Reclamation could not guarantee that surface water would be available from its projects for use for Compact compliance purposes by Nebraska. This understanding was subsequently confirmed by the testimony of the U.S.

Bureau of Reclamation witnesses on April 14, 2009. See Tr. 1615 (Thompson); 1703-04 (Swanda).

Mr. Book's analysis determined that the groundwater CBCU must be adjusted from a current amount of 200,000 acre-feet per year, the 2002-2006 average, to 175,000 acre-feet per year on average. See Kan. Exh. 2, Table 1. Mr. Book determined that compliance with the two-year water-short year requirements of the FSS may require reduction in surface water use as well.

Based on Mr. Book's conclusion that the depletion of Republican River streamflow would need to be reduced to an average of 175,000 acre-feet per year as part of achieving long-term compliance, Samuel P. Perkins of the Kansas Division of Water Resources and Steven P. Larson of S.S. Papadopoulos & Associates applied the RRCA Groundwater Model to determine the amount of pumping that would need to be shut down in order to achieve the result mandated by Mr. Book's analysis. Mr. Larson testified to the results of their analysis, which is contained in Kan. Exhs. 3 and 4. Mr. Perkins and Mr. Larson found that, in order to achieve the reduction in stream effects mandated, future groundwater irrigation in the Republican River Basin in Nebraska would need to be reduced by 514,610 acres. Kansas' proposed reduction is to areas that will have the most-significant effect on streamflow. An untargeted approach would require greater reductions. The impact of the proposed reduction on streamflows is shown

on Figure 2 of Kan. Exh. 3. As shown in Figure 2, approximately seven years is required for the pumping effects to diminish to the required level. During that time, further reductions in consumptive beneficial use in Nebraska would likely be necessary, as indicated also by Mr. Book. Further, it can be seen on Figure 2 that the reduction of depletions of streamflows by groundwater pumping is not steady over the long-term, as the depletions begin to increase again toward levels above the required175,000 acre-feet per year, indicating that further actions are likely to be needed in the future. In addition to achieving Compact compliance, the Kansas proposal would also benefit Nebraska's surface water users.

**2. Use of Surface Water is Necessary**

As indicated by Mr. Book, purchase and transfer of surface water by Nebraska will likely be necessary in certain water-short years to maintain Compact compliance, even with the reduction of groundwater-pumping-caused depletions of streamflow to an average of 175,000 acre-feet per year. This is shown by Mr. Book's analysis in Table 1 of Kan. Exh. 2. There, under the adjusted analysis which assumes that groundwater CBCU has been reduced to 175,000 acre-feet in each year, there is nevertheless a pair of years in which Nebraska's CBCU would exceed its allocation. Nebraska's imported water supply credit is, of course, taken into account. Thus, in sum, Mr. Book's analysis shows that in a dry period such as those experienced in the 2002-2006 period, two out of five years should be

expected to require additional actions to obtain and transfer Bureau of Reclamation surface water or take other equivalent actions to maintain compliance.

3. **A River Master is Necessary**

Although the United States Supreme Court rarely appoints a river master, this appears to be one of those rare occasions when it would be appropriate to do so. The Arbitrator has ruled that the only damages payable under the present circumstances are to be based on Kansas losses. As Mr. Barfield has testified, these losses are considerably less than Nebraska's gains from violating the Decree. Tr. 735 (Barfield); Kan. Exh. 6, Sec. III.b.v. Therefore, there is every incentive for Nebraska to fail to comply or delay compliance as long as possible.

There is also an institutional reason for appointing a river master, namely, that the State of Nebraska does not have central state institutions that are capable of achieving, in the short-term, compliance with the Decree. As made clear by Nebraska itself, primary responsibility for controlling groundwater pumping is placed with the local political subdivisions known as Natural Resources Districts. Neb. Exh. 15, at 1. While some possibilities of assertion of State control do exist as a result of recent legislation in Nebraska, whether such new legislation can prove effective in achieving compliance every year and by limiting groundwater use, is highly questionable.

Other States have central State authorities which are capable of imposing legally enforceable requirements to curtail groundwater pumping. A good example of that is the State of Colorado, a party to this proceeding. In response to the ruling of the Special Master and of the Court in *Kansas v. Colorado*, No. 105, Orig., the Colorado State Engineer proposed and adopted binding regulations requiring that all pumping in the Arkansas River Valley within the domain of the model adopted in that case be required to shut down unless replacement water had been provided to the river to offset the effects of that pumping on the river, including the lag effects of that pumping and previous pumping.

The Director of the Nebraska Department of Natural Resources has no power to curtail groundwater pumping that matches the powers of the Colorado State Engineer in this regard. The State of Nebraska, the entity responsible for Compact and Decree compliance, must rely on the cooperation of the groundwater pumpers who sit on the boards of the Natural Resources Districts in the Republican River Valley in Nebraska. Those groups of groundwater pumpers have not been sufficiently cooperative. In the view of the U.S. Bureau of Reclamation, no meaningful reduction in groundwater pumping has been achieved at all. Tr. 1692-93 (Swanda). Even though some of the actual pumping numbers have been lower recently, this appears to be largely a result of wetter conditions that

mean less pumping is necessary in order to maintain crop yields in Nebraska and has not impacted long-term consumptive use by Nebraska.

It was asserted by Nebraska counsel on the last day of trial that a river master could be considered only if Nebraska had been found to be in bad faith. This is not consistent with the ruling of the United States Supreme Court in *Texas v. New Mexico*, 482 U.S. 124 (1987). In that case, in which the Supreme Court appointed a special master the Court recognized that New Mexico had acted in good faith, saying: "But good-faith differences about the scope of contractual undertakings do not relieve either party from performance." *Id.*, at 129. After discussing the ruling of the Court that New Mexico would be required to pay damages, the Court discussed the question of whether a river master should be appointed. The Court determined that the recommendation of the Special Master to appoint a river master to oversee enforcement of its decree should be accepted. The Court pointed out that "the natural propensity of these two States to disagree if an allocation formula leaves room to do so cannot be ignored." *Id.*, at 134. Here, as well, although the parties hoped that the five volumes of the Final Settlement Stipulation and the DVD containing the RRCA Groundwater Model would leave no room for disagreement, such has not been the case. Unfortunately, as Justice Frankfurter once pointed out with respect to an interstate water compact, "Though the circumstances of its drafting are likely to assure great care and deliberation, all avoidance of disputes as to

scope and meaning is not within human gift." *West Virginia, ex rel. Dyer v. Sims*, 341 U.S. 22, 28 (1951).

Here, in addition to the natural propensity of the States to disagree, there is also the institutional dysfunction in Nebraska that greatly diminishes the likelihood of compliance by Nebraska. In other words, the refusal of groundwater pumpers in Nebraska to make necessary reductions and the inability of the central State government to require such reductions argues for imposition of a river master.

In sum, until Nebraska modifies its internal institutions sufficiently to be able to believably ensure that groundwater pumping will be reduced to the extent necessary, a river master is needed.

**4. Pre-Established Sanctions Are Necessary**

As Mr. Barfield pointed out in his report and in his testimony, increasing sanctions for continued failure to comply with court orders are an effective means of bringing about compliance. See Kan. Exh. 6, Sec. III.b.vi; Although it can be hoped that the other parts of the remedy proposed by Kansas would be sufficient, it is recommended that sanctions for further violations would be an effective deterrent, as shown by experience in water administration in the West. The most obvious place to begin with regard to sanctions for future violations by Nebraska would be the imposition of a requirement that Nebraska's gains be disgorged so that it may not continue to profit from violation of the Court's Decree in the future. Although as the

measure of damages the Arbitrator has rejected Nebraska's gains in 2005 and 2006, disgorgement by Nebraska of its gains from further violations.

**5. The Proposed Remedy is Fair and Equitable**

The remedy proposed by Kansas to bring Nebraska into compliance is fair and equitable for a number of reasons. The relief requested is required by the RRCA Groundwater Model which was adopted by Nebraska and the other parties as the proper measure of groundwater pumping impacts on the Republican River. The results of the modeling, in fact, are not surprising, given that none of the States dispute that there is a hydraulic connection between all of the groundwater pumping in the Republican River Basin and the river and its tributaries. The RRCA Groundwater Model simply quantifies the timing, placing and amount of the effects that the existence of the hydraulic connection implies.

Reduction of the irrigated acreage by 515,000 acres would simply take the amount of groundwater irrigated acreage back to the levels that were in place in the mid-1980s when Kansas first noticed that it was not receiving the waters it should and complained to Nebraska in the forum of the Republican River Compact Administration. See Kan. Exh. 6, Figure 2 and accompanying text. The requested reduction is about 43% of the total groundwater irrigated acreage of 1,200,000 acres in the Republican Basin in Nebraska. See *ibid.*

The reduction in groundwater pumping proposed by Kansas is consistent with what has been accomplished in fact by Colorado in the Arkansas River Basin. Kansas sued in 1985 to enforce the Arkansas River Compact. *Kansas v. Colorado*, No. 105, Orig., U.S. Sup. Ct. When the Special Master in that case issued his first report in 1994, Colorado immediately developed rules to implement the finding of the Special Master that post Compact groundwater pumping had caused Colorado to violate the Arkansas River Compact. Those rules have been in effect since 1996 and have had the effect of reducing the maximum pumping that occurred during dry periods prior to the litigation from about 290,000 acre-feet per year to approximately 120,000 acre-feet per year under the new rules a reduction of about 60%. See Fourth Report of the Special Master, *Kansas v. Colorado*, No. 105, Orig., U.S. Supreme Court, at 40, 98 (2003). Average pumping was reduced from about 170,000 prior to the rules to about 100,000 acre-feet per year in the first years after adoption of the rules, a reduction of about 40%. Thus, the pumping in the Arkansas River Valley in Colorado has been reduced by a factor comparable to what is being requested as part of the Kansas remedy in this case. Further, even the pumping that is allowed in the Arkansas Valley in Colorado is only permitted to the extent that groundwater pumpers provide the replacement water to the stream that is required by the rules. Without replacement water, no pumping may occur at all. See Fourth Report, Exh. 6, Rule 3.1, at 40 ("all diversions of tributary

groundwater for irrigation . . . shall be totally discontinued unless depletions to usable Stateline flow caused by such diversions are replaced"). This is a far cry from the laissez-faire approach allowed by Nebraska's system which has made very little progress toward meeting its Compact and Decree obligations.

In addition, the U.S. Bureau of Reclamation has determined that "drastic reductions in groundwater pumping" are necessary in order to restore the streamflows contemplated by the Republican River Compact to the Federal irrigation project in that part of the Basin. See Kan. Exh. 81, at 51; Tr. 1701-03 (Swanda). Drastic reductions in groundwater pumping are necessary for Nebraska to come into compliance, just as they were in the Arkansas River Basin in Colorado. The only reason that the reductions necessary may appear severe is that Nebraska has systematically ignored the warnings, the lawsuits and the Supreme Court Decrees that have requested or contemplated reductions in groundwater development since the mid-1980s. The gains from violating Kansas rights under the Republican River Compact are many times the losses that Kansas suffers as a result. Thus, Nebraska's farmers have profited handsomely over many, many years. They should not complain, nor should Nebraska, if that over pumping and over profiting must come to an end.

## B. The Nebraska Proposal

For any compliance plan to succeed, it must remove the causes of noncompliance. Nebraska's plan does not: rather, it sets forth only a hopeful policy of compliance, with little basis in hydrology and legal enforceability. Nebraska claims that "noncompliance is not an option for the State of Nebraska as a policy matter." Tr. 1772 (Wilmoth); Tr. 954 (Dunnigan). As such a matter of policy, Nebraska enacted in 2004 the "Nebraska Ground Water Management and Protection Act," ("Act"), Neb. Rev. Stat. 46-701 *et seq.*, which requires Nebraska Department of Natural Resources ("DNR") and the relevant Natural Resources District ("NRD") to jointly develop IMPs for fully appropriated and overappropriated river basins. Neb. Rev. Stat. 46-715(1). However, the exhibits and testimony confirmed that neither the Act, nor the IMPs, nor surface water purchases can remove the causes of Nebraska's noncompliance. Nebraska's plans do not reduce its depletions of groundwater in any material way. Over several decades, in both wet and dry years, these depletions have steadily and significantly reduced surface water supplies, which, as a result, cannot be made available to bring Nebraska into Compact compliance. Therefore, Nebraska's IMPs are inadequate to bring Nebraska into compliance with the Compact.

### 1. The Hydrologic Inadequacy of the IMPs

Nebraska's noncompliance has two principal causes. The first cause is hydrological: despite the FSS, Nebraska has allowed the expansion of

groundwater irrigated acres in the Basin since 2003. (Exh. 6, fig.2). As James Williams of Nebraska DNR testified, irrigators and other water users in the three Republican River NRDs consume about 95% of groundwater depletions to the streamflows of the Republican River in Nebraska. Tr. 829 (Williams). Nebraska's IMPs simply fail to recognize the magnitude of the problem and are legally and hydrologically inadequate to address it. Importantly, they do not recognize the significant legacy effects of past overpumping, they ignore the legal and hydrological uncertainty of whether surface water supplies will be legally or physically available in the future.

***a. The IMPs Reject Any Significant Reduction in Groundwater Pumping***

The most recent IMPs do not contain any significant reductions in groundwater pumping: at best, they contain reductions of ten percent above the long-term mean, barely slowing the rate of Nebraska's depletions. See Kan. Exh. 65. Mr. Larson and Dr. Perkins analyzed the reductions in the impacts of ground water pumping that were called for by the Nebraska IMPs. Taking the Upper and Middle Republican NRD IMPs at their face value, which required a twenty percent reduction in groundwater pumping from the historical levels between 1998 and 2002, and making adjustments to accurately reflect the necessary model runs, Mr. Larson testified that such reductions would not even approach the reductions needed for compliance across the Basin, and "would have a very limited reduction in the increasing

trend in . . . beneficial consumptive use going out into the future, and there would be continuing increases at that level of development up into the range [of] 250- to even 300,000 acre-feet per year." Kan. Exh. 4; Tr. 598-99 (Larson). Dr. Schneider of Nebraska recognized the need to reduce depletions by "over 300,000 acre-feet on average going forward . . . ." Tr. 906 (Schneider). Nonetheless, Nebraska realized the hydrological inadequacy of its IMPs. (Kan. Exh. 6, at 19). For example, the Upper Republican River NRD IMP seeks to reduce ground water pumping to 425,000 acre-feet. Tr. 728 (Barfield). However, multiplying the certified acreage in that NRD by its allocation yields a figure of 485,000 acre-feet—only 10,000 acre-feet less than the 495,000 acre-feet that is currently being pumped per year, Tr. 728-29 (Barfield), and 60,000 acre-feet more than the purported NRD maximum.

A plan must remove the problem of the legacy effects of past pumping, and the Nebraska plan does not. Mr. Steve Larson, a modeling expert for Kansas, stressed the importance of the lag or "legacy effect" to the Nebraska groundwater pumping "that has occurred, basically since the 1960's, where there has been a continual reduction in storage over that time, and that continues to manifest itself on streamflows going into the future." Tr. 567 (Larson). Overpumping and its legacy effects have placed the entire Basin in a state of hydrological imbalance that will take substantial reductions to correct, as set forth in the Kansas remedy. Kan. Exh. 4, Fig. 2; Tr. 557-59, 567 (Larson). Such depletions are, as the Arbitrator noted,

taking place on the order of 100,000 to 130,000 acre-feet a year. Tr. 863 (Dreher). Mr. Larson pointed out that the Kansas remedy, for all of its perceived severity, nonetheless would fall short of restoring the Basin to hydrological balance for a very long time; such a steady state condition would take "hundreds of years" to occur. Tr. 570-73 (Larson). As the Arbitrator stressed, "the lag effects are not only significant, they can take a long, long, long time to express themselves." Tr. 805 (Dreher).

Given the extent of the groundwater depletions in the Basin, these lag effects pose a formidable challenge. Nebraska overpumping has profoundly damaged the Basin by putting it out of hydrologic balance. Yet the IMPs show no awareness of these legacy effects; the Arbitrator voiced concern that the five-year bases of the IMPs do not "address that legacy depletion of that magnitude" and that he did not "understand completely yet why Nebraska would believe that a five-year IMP is good enough." Tr. 803, 864 (Dreher). Nebraska's response to this concern was inconsistent. On one hand, Mr. Williams stressed that the IMPs had a short life span; they were "dynamic , they're reviewed on a regular basis, they are flexible . . . ." Tr. 772 (Williams). "They are supposed to change in time with changing conditions. And where Kansas has taken a look 50 years into the future and their remedy is specified now for the next 50 years, Nebraska has written the IMPs to cover a five year period, one year of which is past." Tr. 800 (Williams). Despite this emphasis on the purported dynamic aspect to IMPs,

the first generation of IMPs did not change during their five-year lifespan, despite Nebraska's annual noncompliance since their inception.

On the other hand, Mr. Williams claimed that the IMPs were anything but dynamic: "for practical purposes, I would view the IMPs as permanent." Tr. 864 (Williams). Speaking for DNR, Williams acknowledged the legacy effect, but acknowledged DNR's effective powerlessness to remedy it: "we [DNR] are well aware of [that] and we have made the NRDs aware of that." Tr. 804 (Williams). DNR cannot enforce groundwater pumping limits; it can only ask the NRDs to do so, but the NRDs have no statutory or regulatory duty to do so. Legally, there are doubts whether the NRDs are equipped to bring about Compact compliance.

Nebraska DNR recognizes the lag effect: as Williams stated, "if you pump a lot more, then the coming lag effect is going to become a lot greater." Tr. 865 (Williams). Dr. Schneider of Nebraska does as well. Tr. 906-08 (Schneider) Nebraska's response to the legacy effect is troubling for at least three reasons. First, it has sought to minimize the effect statistically, either by performing unusual model simulations ("you turn everything off and run it forward", Tr. 907-08 (Schneider), or by recharacterizing the problem as "something that is going to be there, no matter what . . . ." Tr. 908 (Schneider). Second, Nebraska has defended its short-term compliance plans on the grounds that long-term solutions to the legacy effect are unavailable. Tr. 910-11 (Schneider). Yet perhaps most troubling is the lack of any

recognition in the IMPs that such an effect exists and the lack of even the beginning of any remedy for it.

***b. Nebraska's Principal Reliance is on Surface Water***

Nebraska plans to rely upon surface water purchases as part of its efforts to "close the gap" between its current noncompliance and compliance. (Neb. Exh. 15, at 12-14, App. H). As Williams claimed, "Nebraska has been quite successful at leasing large volumes of surface water in 2006, '07 and '08. And they were joined by the NRDs in 2007, as well. And, quite frankly, you may look at that as the lowest hanging fruit on the tree . . . ." Tr. 794 (Williams). Dr. Schneider similarly stressed the importance of obtaining surface water supplies. Tr. 904-06 (Schneider).

***c. Surface Water Will Not be Available***

Any compliance plan that depends on use of surface water must demonstrate that Nebraska has a firm, adequate supply that is legally and physically available to Nebraska so that Nebraska can annually comply with the Compact on a timely basis. Nebraska's plan does not have these required elements.

From a legal standpoint, the NRD's ability to obtain surface water supplies is in doubt. In *Garey v. Nebraska Dept. of Nat. Resources,* 277 Neb. 149 (2009), mentioned above, the Nebraska Supreme Court held that a property tax levy imposed upon NRDs in the Basin pursuant to LB 701, for the purpose of funding surface water purchases, violated the Nebraska

Constitution, which prohibits levying a property tax for a state purpose. Director Dunnigan admitted that *Garey* raised problems for such purchases. Tr. 964 (Dunnigan).

From a hydrological standpoint, the surface water supplies will probably not be available. In 2006, Dr. Schneider wrote a memorandum to former Director Bleed that expressed skepticism about the reliability of future surface water purchases. (Kan. Exh. 60). Dr. Schneider's analysis concluded that "unless surface water supplies are significantly greater than expected in the future, additional reductions in groundwater use will probably also be needed in the short term, and will definitely be needed to keep Nebraska in compliance with the Compact in the long term." Kan. Exh. 60; Tr. 937 (Schneider). At hearing, Dr. Schneider denigrated his own analysis as outdated because the IMPs had been implemented and subsequent precipitation has raised some reservoirs. Tr. 937-38 (Schneider). Mr. Swanda of the USBR flatly contradicted these statements. Tr. 1691, 1703-04 (Swanda).

Dr. Schneider's testimony was also refuted by David Pope, who pointed out that compliance is most necessary during periods of drought, not rain. As chief engineer for Kansas for over two decades, Mr. Pope had the legal duty to administer both surface and ground water rights in accordance with the principles of prior appropriation. K.S.A. 82a-706. Despite the signing of the FSS in 2003, Nebraska has not kept its consumptive use

within its allocation since then; and that overuse caused real problems for Kansas and for Mr. Pope. "I did not believe Nebraska was taking the timely actions, especially in the early process, that would be needed to comply with the FSS. The numbers started coming in year by year that were big negatives in 2003, 2004 and 2005 and on." Tr. 652 (Pope) As a result of Nebraska's noncompliance, Mr. Pope "actively administered water rights, both surface water and groundwater," by shutting down diversions in the Lower Republican Basin in Kansas from 2002 to 2007. Tr. 662 (Pope). During this time, KBID was "very short in supply, and that's the surface water project that directly takes the water from the Republican River . . . ." Tr. 663 (Pope). Mr. Pope discussed the difficulty of that administration:

> "I guess I would say that this was a very difficult thing for me personally. I had to administer water. I had gone into the process of working with these same people, these water users, during the course of the settlement [of the dispute between Kansas and Nebraska] . . . . And the level of disappointment and the concern about those people that simply didn't get water during that period was very difficult, because I had been involved in trying to come up with a settlement process . . . . And yet, during this very period when we needed the water the most, it wasn't there. And yet, the numbers kept coming in year-by-year in terms of the extent of the overuse in the accounting year-by-year, and it was very difficult." Tr. 663-64 (Pope).

Based on his two decades of experience as the chief engineer for Kansas DWR, Mr. Pope expressed grave concerns about whether surface water supplies would be available for purchase by Nebraska, especially during dry periods. Tr. 654-57 (Pope). In response to questioning by the Arbitrator, Mr.

Pope explained that Nebraska did not notify Kansas of its plans to purchase surface water supplies until it was effectively too late to benefit Kansas irrigators. Tr. 668 (Pope).

Mr. Pope contrasted the Nebraska compliance plan with New Mexico's compliance plan in *Texas v. New Mexico,* a plan that was predicated on restoring hydrological balance to the Pecos River Basin, and that contained three components noticeably lacking in the Nebraska plan: (1) the purchase of lands and their retirement from agricultural production; (2) the retirement of water rights; and (3) a sustainable augmentation plan. Tr. 673-75 (Pope). Such a plan "has defined components that are effective. They can be relied upon, they work, and they [New Mexico] have stayed in compliance ever since the final order of the court was issued [in 1998]." Tr. 675 (Pope).

Unfortunately, Nebraska DNR has no plans to retire or lease water rights—even surface water rights, which are within the statutory domain of that agency. Tr. 963 (Dunnigan). Rather, "these are discussions within the NRDs on purchasing or leasing surface water rights right now." Tr. 963 (Dunnigan). The IMPs area consequently hydrologically inadequate in almost every respect.

### 2. The Legal and Administrative Inadequacy of the IMPs

The second cause of Nebraska's noncompliance is legal and administrative: although Nebraska recognizes its duty to stay within its Compact allocation, under Nebraska water law and its attendant regulations,

no state agency or state official has the duty to limit groundwater pumping, because the State of Nebraska has delegated the authority to limit groundwater pumping to the NRDs. Yet the NRDs have no legislative mandate that requires them to bring about Compact compliance or compliance with an interstate water decree entered by the United States Supreme Court. The NRDs, run by the water users themselves, have adopted Integrated Management Plans ("IMPs") that set allocations for groundwater pumping that reduce gross pumping by 20% as compared to the 1998-2002 actual pumping. These are insufficient actions to regulate groundwater to bring Nebraska into Compact compliance, yet the DNR is largely powerless to require the NRD's to take additional actions to bring Nebraska into Compact compliance. Nebraska has attempted to enact statutory schemes to authorize the NRDs to fund purchase of surface water. One of the two taxes has been declared unconstitutional and the other is still under review in the Nebraska courts. *See Garey v. Nebraska, supra.* Consequently, the Act and the IMPs are legally and administratively inadequate. Nebraska suffers from a self-inflicted dysfunctionality with respect to Compact compliance. Nebraska's laws are dysfunctional and inadequate to bring Nebraska into Compact compliance; and therefore Kansas requests that the State of Nebraska be required to impose additional restrictions on groundwater pumping in Nebraska.

The IMPs and the NRD regulations suffer from three at least three flaws: (1) There is no certain pumping limit; (2) even though the effects of past and current well pumping will extend far into the future, they will expire after five years and may or may not be renewed; and (3) they can be can changed at any time as long as a hearing is held.

At the level of the individual irrigator, the IMPs fail for several reasons as well: they contain variance, carryover, and "bonus" provisions that entitle individual groundwater irrigators to exceed the modest pumping limits of the IMPs. These provisions remove the ability of the NRDs to adequately limit the pumping of their irrigators, which render the IMPs' limits on groundwater pumping essentially unenforceable, which is confirmed by the absence of explicit and tested enforcement procedures against individual irrigators. And the supposed allocations are not one-year limits but five-year limits, which mean virtually no limitations at all in the first three years. See, *e.g.*, Neb. Exh. 17, at 23.

*a.* **Under Nebraska Law, No State Agency has the Duty to Limit Groundwater Pumping**

Nebraska DNR regulates surface water appropriators *see* Neb. Rev. Stat. 61-201 *et seq.*, while the regulation of ground water has been statutorily delegated to the NRDs. Neb. Rev. Stat. 46-703(3). Kan. Exh. 57. This segregation does not endow any state agency or official with the authority and duty to reduce ground water pumping to protect surface water

rights that are hydrologically connected to ground water. After the 2003 United States Supreme Court Decree approving the Final Settlement Stipulation in *Kansas v. Nebraska & Colorado,* No. 126 Orig., the Nebraska Legislature passed the Act in 2004. One year later, the Nebraska Supreme Court reviewed the Act, and stated that the Nebraska legislature "has not developed an appropriation system that addresses direct conflicts between users of surface water and ground water that is hydrologically connected." *In re Central Nebraska Public Power and Irr. Dist.,* 699 N.W.2d 372, 377 (Neb., 2005) (citing *Spear T Ranch v. Knaub,* 691 N.W.2d 116 (Neb., 2005)). Nebraska DNR has "no independent authority to regulate ground water users or administer ground water rights for the benefit of surface water appropriators." *Id.* at 378. Since the passage of the Act in 2004, the Nebraska Supreme Court has twice noted "the lack of an integrated system" to regulate ground water and surface water. *Id.* Nebraska DNR concurs: as James Williams testified, the NRDs, and not Nebraska DNR, are responsible for implementing the IMPs. Tr. 844-45 (Williams). "The IMPs, as I understand it, are administered just by the NRDs." Tr. 771 (Williams).

At the hearing, Nebraska state water officials attempted to eavde the unfortunate fact that Nebraska law does not impose any clear duty to limit groundwater pumping. Their testimony on the subject of the IMPs' enforceability reveals that, when pressed by the Arbitrator on the subject, they carefully fell short of contradicting this fact. Tr. 858-60 (Williams).

Such evasions demonstrate the unfortunate reality that Nebraska DNR cannot control groundwater depletions by imposing limits on the NRDs. In the wake of the Act, Nebraska admitted that "it is a relatively new thing for DNR and the NRDs to collaborate to ensure the proper administration of hydrologically connected waters." Tr. 1771 (Wilmoth). DNR can, at best, collaborate. It cannot control the NRDs and their IMPs. Even after the Act, DNR does not supervise the transfer of groundwater rights in Nebraska. Tr. 956 (Dunnigan).

Nebraska witnesses also conceded that the IMPs and their rules and regulations do nothing to transfer powers of enforcement in groundwater to DNR. Mr. Williams could only state that "asking the growers to cut the water pumping is, of course, an option that is—that is available to them [the NRDs]." Tr. 860 (Williams). The Arbitrator asked Mr. Williams, "Can an NRD do more than ask a grower to reduce his consumption [of ground water]?" Tr. 860-61 (Dreher) Mr. Williams replied, "I can't imagine that [the NRD] would do it for an individual grower, unless they're offering him money to stop, at least just seeing the way that they have discussed it, talking with the board members [of the NRDs]." Tr. 861 (Williams). Mr. Williams also conceded that "there is no compliance standard section in the Lower Republican [NRD IMP]." Tr. 871 (Williams). "[T]here is no overall pumping volume limit as specified, but the concept is still there, and the overall need to remain in compliance is still there." Tr. 872 (Williams). Dr. James

Schneider similarly noted that the IMPs had the "intention" of reducing pumping from the 1998-2002 volumes, but little more. Tr. 893 (Schneider). As Mr. Dunnigan admitted, he was not aware of any situation in which the NRDs had actually shut down any well owners under the current IMPs. Tr. 967 (Dunnigan). Despite the fact that Nebraska has been overusing its yearly allocations since the signing of the FSS, Dunnigan told the Arbitrator that "there has never been a need" for the State of Nebraska to bring an enforcement action against an IMP. Tr. 979 (Dunnigan). On the contrary, he admitted that DNR depends upon the cooperation of the NRDs to achieve Compact compliance. "That's the responsibility that the legislature gave to the Natural Resource Districts and we would carry out our function as the Department of Natural Resources to make sure that there is Compact compliance." Tr. 969 (Dunnigan). Dunnigan's statement returns us to the problem: DNR administers surface water supplies (Neb. Rev. Stat. 61-201 *et seq.*), while the regulation of ground water has been statutorily delegated to the NRDs. Neb. Rev. Stat. 46-703(3) Therefore, DNR cannot ensure Compact compliance. It needs the NRDs.

Director Dunnigan protested that Nebraska can, under the Act, truly enforce groundwater pumping limits. Tr. 980 (Dunnigan). Dunnigan and Williams relied upon Neb. Rev. Stat. 46-719, which provides for the formation of an "Interrelated Water Review Board" in the event that Nebraska DNR and the relevant NRD cannot resolve disputes over the

management of water. Neb. Rev. Stat. 46-719(2)(a); Tr. 846 (Williams). See Kan. Exh. 57. This Board is temporary, and it consists of five members: the Governor or his designee, and four other members, two of which may reside in the NRD in question. *Id.* 46-719(1)(a). Under the provisions of Neb. Rev. Stat. 46-719, the Board can adopt both surface and groundwater controls, and the latter "shall be implemented and enforced by the affected natural resources districts." *Id.,* 46-719(2)(e). Unfortunately, there is no language in this statute which requires the limitation of groundwater pumping. Thus, despite the language in Neb. Rev. Stat. 46-719, the enforcement of groundwater controls does not fall to DNR or even to the Governor, but rather to the NRDs themselves; and the NRDs have yet to act. To date, Nebraska has never sought to form this board, despite the prominent conflicts between surface and groundwater users which have twice reached the Nebraska Supreme Court. *See, e.g., In re Central Nebraska Public Power and Irr. Dist.,* 699 N.W.2d 372, (Neb. 2005); *Spear T Ranch v. Knaub,* 691 N.W.2d 116 (Neb. 2005)).

Because administrative regulations cannot exceed the scope of statutes under which they are promulgated, administrative regulations issued pursuant to Nebraska water law, such as IMPs, cannot create a legal duty to reduce ground water pumping to protect surface water rights that are hydrologically connected to ground water. As long as the statutory

segregation between ground and surface waters continues in Nebraska, the IMPs are doomed to fail.

***b.*** **The IMPs Fail at the District Level to Limit Groundwater depletions**

The Nebraska IMPs "mandate average pumping levels . . . of approximately 866,000 acre-feet per year on average." Tr. 891 (Schneider). Nebraska experts claimed that this figure represented an eighty percent reduction from the 1998-2002 pumping volume. Tr. 892 (Schneider) The choice of this period as a baseline creates fundamental uncertainties as to whether the IMPs limit pumping at all. During this period, the only NRD in the State with an allocation system and a well moratorium was the Upper Republican NRD; and due to the litigation then taking place between the States, irrigators in the Nebraska portion of the Basin were actively drilling new groundwater wells, with the belief they would not be able to drill in the near future. Further, they were expanding acres under the new wells and existing wells. See Kan. Exh. 6, Fig. 1. Consequently, the years 1998-2002 represent some of the highest periods of water use in the history of the Republican River Basin. As Dr. Schneider testified, "in the late '90s, 2000, 2002 we had very high pumping rates . . . ." Tr. 908-09 (Schneider). Reducing pumping levels from this high point does not represent any meaningful reduction in Nebraska pumping.

Nebraska understands that this reduction is not meaningful. On December 15, 2006, during the meeting between the Governor, Ann Bleed, and the Republican River NRD's, DNR provided the foundation of the reductions needed to come into compliance. Kan. Exh. 61. Five months earlier, in July, 2006, Nebraska DNR performed analyses which sought to calculate the baseflow impacts from reduced groundwater allocations. Kan. Exh. 58; Tr. 928-29 (Schneider); Tr. 990-91(Larson). As Nebraska conceded, these Nebraska exhibits contained recommendations for pumping limits that were similar to those called for by Kansas in its remedy. Kan. Exh. 3, Fig.2; Tr. 934 (Schneider) However, Nebraska's most recent IMPs have considerably larger allocations than those called for by Director Bleed. Tr. 851(Williams). Based on the testimony of Director Dunnigan, the difference between what Nebraska believed was required in 2006, and what it now believes is required, was the result of negotiations between DNR and the NRDs, not hydrology. Tr. 961 (Dunnigan). The values used for allocations under the current IMP's have no foundation in science. They are politically negotiated values that will not achieve compliance.

*c.* The IMPs' Variance, Carryover, and Bonus Provisions Remove the Ability of the NRDs to Limit the Pumping of Their Irrigator

Each IMP has provisions which allow the relevant NRD to "provide pumping variances for various purposes." Tr. 837(Williams). Individual irrigators can obtain variances from the IMPs' limits upon "good cause shown." (Middle Republican NRD IMP, Rule 2-1.1, as reproduced in Nebraska Exhibit 15. The Lower and Upper Republican NRD IMPs contain similar variance provisions for "good cause shown," Tr. 840 (Williams), a term which is defined consistently in both Neb. Rev. Stat. 46-706 and all three of the IMPs' rules and regulations. Tr. 838-41 (Williams). As Mr. Williams stated, the term "good cause shown" means a "justification for granting a variance to consumptively use water that would otherwise be prohibited by rule or regulation" if the NRD (and only the NRD) believes that such a variance will provide an economic benefit that is equal to or greater than the benefit to be obtained from the pumping limit. Tr. 838-39 (Williams). Mr. Williams conceded that if a farmer decided that it was too expensive to comply with the IMP pumping limits, he could approach the NRD and request a variance. Tr. 839 (Williams). When asked whether such a farmer "would be entitled to a variance" if he "could argue that any economic, environmental, social, or public health and safety benefit would be greater than the benefit resulting from his not pumping," Mr. Williams responded that such a farmer could then obtain a variance. Tr. 840 (Williams). "[T]he variance procedure would then be allowed" to relieve individual irrigators

from the allocations that would otherwise limit their pumping. Tr. 841-42 (Williams).

David Barfield, Chief Engineer for Kansas DWR, testified as an expert, having personally reviewed the past and current IMPs, having relied upon experts on his staff, having personally attended presentations by Nebraska DNR about them, and having participated in "a lot of exchanging of documents and interviewing State of Nebraska personnel and NRD personnel in terms of what the IMPs had in them and what they didn't have in them." Tr. 755-56 (Barfield). Barfield was especially concerned by the carryover provisions in the IMPs. Under the three Republican River NRD IMPs, nearly three million acre-feet of groundwater may still be pumped: approximately 243,000 acre-feet in the Lower Republican NRD, approximately 287,000 acre-feet in the Middle Republican NRD, and a startling 2.4 million acre-feet in the Upper Republican NRD. Tr. 729-30 (Barfield). Mr. Barfield may well have understated the figure: for, as James Williams of Nebraska DNR testified, the carryovers for the Upper Republican are "unlimited." Tr. 779 (Williams).

The rules and regulations for the Middle Republican NRD IMP allow individual irrigators to pump beyond their allocation, by increasing their pumping limits. Although this IMP sets a nominal limit of sixty inches over its five-year period, that may be increased by one "bonus inch" each time the

State of Nebraska has stayed within its yearly allocation the previous two years. Tr. 834 (Williams). Such a provision ignores the legacy effects of pumping depletions; worse, as Nebraska admitted, it could exacerbate such effects. Tr. 835 (Williams).

### 3. The Views of the U.S. Bureau of Reclamation

#### a. The Bureau is an Independent Agency With Independent Views

"The Compact was initiated at the Bureau's insistence to protect its investments . . . ." Kan Exh. 6, Sec. II.b. (quoting Mr. Robert D. Kutz, Project Manager for the Bureau, 1989). The Bureau was involved in the formation of the Compact, and maintains an abiding interest in the Basin as a whole, since Bureau projects are an integral part of the river system and the Compact allocation for each state. Tr. 1594-99 (Thompson); Kan. Exh. 74, at 4. As a federal independent agency with views that are independent from those of the States, the Bureau has a duty to maintain impartiality in conducting its business. The Bureau's written and oral testimony at the hearing was impartial and consistent with that duty. Kan. Exh. 74, at. 4; Tr. 1593-94 (Thompson).

#### b. Very Significant Groundwater Pumping Reductions are Needed

For over two decades, the Bureau has expressed its strong opinion that Nebraska must achieve very significant reductions in groundwater pumping. The Bureau began expressing this opinion to the RRCA in 1984, when it warned of depletions to Red Willow and Medicine Creek basins. Kan.

Exh. 6, Sec. II.b. The Bureau continued to notify the RRCA of the problem of depletions for the next fifteen years. *Ibid.*. At hearing, Mr. Thompson demonstrated that the Bureau's concerns have not gone away. He consistently expressed that Nebraska must reduce its groundwater pumping by a substantial amount. Groundwater pumping in NRDs are depleting reservoir flows; according to Thompson, "Without additional limits and controls on groundwater pumpers, irrigation deliveries and other important project benefits will continue to decline." Tr. 1601. Reduced baseflows, the result of Nebraska's groundwater pumping, had reduced storage into Bureau reservoirs, making it "more difficult to provide water to assist a state -- State of Nebraska in Compact compliance activities." Tr. 1601. "It is our position that groundwater consumptive use must be reduced to allow base flows to recover to a level that will allow both Colorado and Nebraska to consistently comply with the Compact." Tr. 1601. Mr. Thompson was confident in his opinion that Nebraska must reduce its depletions.

> "We have numerous resources that tell us, maps from USGS, we have irrigation deliveries over time being declining, we have groundwater tables declining, we have reservoir streamflows declining. We didn't get there overnight and it's -- and the effects from groundwater mining can't be replaced overnight, from what I'm told by my experts and what I hear from experts from other states; and that further -- further reductions are, in my opinion, necessary to not only come into compliance, but have equity among water users." Tr. 1602.

The Bureau's review of the IMPs for the Upper, Middle, and Republican River NRDs was consistently critical as well. These three

exhibits, Kansas Exhibits 78, 79, and 80, received a complete review under the Bureau's review process, "all the way to our regional director," and possibly to the Secretary of Interior's office. Tr. 1620-21. According to Mr. Thompson, "It is my belief that it [reduction in pumping] needs to be beyond what is currently required in the IMPs." Tr. 1602. Indeed, the overpumping problems in the Upper Republican NRD are so well known to Bureau staff that it has named the graph that describes these problems the "X Graph," which shows a rise in wells that corresponds to a decline in inflows into Enders Reservoir. Kan. Exh. 78; Tr. 1603. The "X graph" dhows "how, over time, that as wells and groundwater become more prevalent, that inflows and streams and reservoirs have declined." Tr. 1603. This excessive groundwater pumping has created significant negative impacts to inflows into Bureau irrigation districts in the Upper NRD. Kan. Exh. 78, at 3; Tr. 1605-06 The Bureau estimated annual deficits in the Upper Republican NRD to amount to as much as 75,000 acre-feet per year. Kan. Exh. 78, at. 5; 1608. Such declines were the source of "grave concern" to the Bureau; namely, that "there will never be an improved, restored surface water supply." Kan. Exh. 78, at 6; Tr. 1609. Kansas Exhibits 79 and 80, which are Bureau testimony concerning the IMPs of the Middle and Lower Republican NRD IMPs, voiced "nearly identical" concerns. Tr. 1610.

**c. The Bureau Believes that Nebraska's Proposal to Rely on Surface Water is Unrealistic**

In addition to offering such complete written testimony to the Republican River NRDs concerning the Bureau's concerns with the IMPs, the Bureau also notified the State of Nebraska, expressing doubts about the viability of long-term surface water purchases for Compact compliance. Kan. Exh. 82; Tr. 1614. Mr. Swanda affirmed that current groundwater depletions are reducing streamflows, which, in turn, means that the surface water supplies in the basin are dwindling. He first explained that in the Republican River basin, "significant depletions . . . have been occurring for a number of years due to groundwater development." Tr. 1691 (Swanda). Indeed, Mr. Swanda noted that the Bureau of Reclamation was already concerned about this issue in 1981, when he transferred to the McCook field office. Tr. 1691 (Swanda). Mr. Swanda further testified that "the significant part of the depletions to the streamflows, to our projects, to our irrigation districts are related to groundwater development." Tr. 1691 (Swanda). For example, according to Mr. Swanda, in the Frenchman Valley, without drastic reductions in groundwater pumping, the depleted streamflows will prevent "any sizeable deliveries" to the H&RW Irrigation District. Tr. 1701-02 (Swanda); see also Kan. Exh. 81. That district's future water supply is so in doubt that the district's contract with the Bureau of Reclamation was renegotiated to reflect the expectation that the future water supply "will completely go away," due to "decreasing streamflows." Tr. 1702 (Swanda).

The consequences of these ongoing depletions are grave. Nebraska's proposal for Compact compliance hinges on Nebraska's ability to lease or purchase surface water rights. Yet, future surface water supplies are not a reliable source of help for Nebraska. As Mr. Swanda testified, future water supplies to assist Nebraska with Compact compliance are not "expect[ed] . . . to be available consistently," Tr. 1704 (Swanda), and would instead depend on "large runoff events." Tr. 1703 (Swanda). Mr. Thompson, the Area Director, put it most directly: "The Bureau cannot guarantee what quantity of water may be available in the future." Tr. 1618.

## III. Nebraska's Proposed Changes to Accounting Procedures

### A. Nebraska's Current Proposal to Change the CBCU/IWS Accounting

The Arbitrator has indicated that he has begun the process of deciding the Nebraska Accounting issues already. Consequently, what follows is a summary argument.

#### 1. Nebraska's Current Proposed Accounting Changes Have Not Been Presented to the RRCA

As the Arbitrator has ruled previously, an issue not fully presented to the RRCA cannot be decided by this arbitration. Arbitrator's Final Decision on Legal Issues ("Final Decision"), January 21, 2009 at 21. Nebraska has presented many iterations (*See* Arbitration Hearing Tr. 1255; Kan. Exh. 28, at 5) of an accounting change to the RRCA that in some way resemble the Accounting change that Nebraska presented to the Arbitrator. However, the detailed report in Nebraska Exhibit 30 has never been presented to the RRCA. There is also a significant difference between the Nebraska Exhibit 30

proposal and the one proposed to Kansas in August 2008 entered in this arbitration at Kan. Exh. 38. *See* Arbitration Hearing Tr. 1384.

Failure to submit this proposal to the RRCA is a violation of the FSS arbitration process. While there is no merit in law, engineering or groundwater modeling to Nebraska's proposal, the RRCA should have the opportunity to be fully informed about proposed changes to its procedures and to address the proposal in a manner consistent with the Dispute Resolution Process set forth in the FSS. It is an improper use of the dispute resolution process to try to circumvent the RRCA.

### 2. There is No Error in the Current Accounting Procedure

Nebraska has asserted that there is an error in the accounting procedures. The Arbitrator has ruled that if there is a significant flaw or error in the RRCA Accounting Procedures that each State will not receive its "equitable division" or "allocation", as set forth in Article IV of the Compact. Final Decision at 3.The solution Nebraska has devised is to use the model in a manner for which it was not calibrated Tr. 1391, to produce results that it suggests are more accurate. However, Nebraska's method is hardly unique and therefore cannot be shown to be the "correct" solution. In the words of Dr. Ahlfeld " Tr. 1475 "there are an infinite number of proposals that could be put forward." The proposed Nebraska method satisfies only Nebraska.

As Mr. Pope pointed out, the RRCA has corrected errors in the past. Arbitration Hearing Tr. 644. But the accounting procedure, to be corrected, must be a "bust," not merely an attempt, as here, to change the Accounting Procedures in order to acquire a larger allocation.

Nebraska has the burden to prove there is an error, and it has not met its burden. Nebraska has neither shown that there is an error based on a comparison of estimated values and known values nor has it shown that there has been a computational error. Tr. 1236. Essentially, Nebraska makes

the observation that the model is not linear and then proposes a correction. Colo. Exh. 7 at 2. ("...these perceived deficiencies are simply a result of the nonlinear behavior inherent in the RRCA groundwater model. "There is no disagreement by any of the states that there are non-linear effects produced by the Model due to the relationship between groundwater pumping, evapotranspiration and stream effects." Kan. Exh. 28, at 7.

The obvious fact that the model was non-linear was known to Nebraska when it agreed to the FSS and the groundwater model. *See* Arbitration Hearing Tr. 1385-88. Members of the modeling committee testified that during the settlement negotiations they were aware of the non-linearity of the model and the consequences. *See* Arbitration Hearing Tr. 1233-34. Nebraska did not produce even one member of the modeling committee to state that he or she was unaware of this feature of the model, even though Mr. McDonald, one of Nebraska's members of the Modeling Committee and a co-author of Nebraska Exhibit 30, was present in the courtroom during the presentation of Nebraska's case on this issue.

### 3. The Accounting Procedures do Not Violate the Compact

It is Kansas' position that the Court may amend an FSS Accounting Procedure only if that procedure violates the Compact. Nebraska's burden in this case is to prove that the accounting procedure complained of does so. It has not met its burden.

This Accounting Procedure was approved by the RRCA on August 22, 2003, and again on January 12, 2005, when the rules were amended and restated. This Accounting Procedure has previously been ruled to be in accord with the Compact by the Special Master and subsequently by the United States Supreme Court. Nebraska has not produced any facts under

any recognized legal theory on which the Court could possibly upset those judgments. Further, Nebraska has argued up to, and including this hearing, that the FSS was "acceptable" at the time it was approved. Arbitration Hearing Tr. 1426.

Furthermore, Nebraska has not demonstrated that its proposal is in accord with the Compact. The practical effect of Nebraska's proposal "...actually means that Colorado and Kansas are burdened for impacts to dry streams, which is just impossible." Tr. 1389 (Schreuder). Nebraska's proposal would also result in an increase in the Imported Water Supply ("IWS") credit which currently only benefits Nebraska. Tr. 1268-69 (Book).

Nebraska's proposal to change the accounting procedures should be denied because: (1) they have not been presented to and Addressed by the RRCA as required by the dispute resolution procedure in the FSS; (2) Nebraska has not satisfied its burden of showing that an error exists in the current accounting procedures, and (3) Nebraska has not demonstrated that its proposal is in accord with the Compact.

### B. Nebraska's Proposal to Revise Haigler Canal Accounting Is Incomplete

Kansas' position has not changed on this issue as a result of the hearing. See Kan. Exh. 29. Nebraska's proposal is incomplete. Its experts should study their concerns further and present a more thoughtful proposal to the RRCA if they still believe it necessary.

### C. Groundwater Model Accounting Points

Nebraska's proposals on the Frenchman, South Fork and Driftwood are inconsistent with the Compact. It would unnecessarily burden Colorado and serves no other purpose than to add to Nebraska's allocation. As shown

in the expert reports of Kansas, Colorado and the testimony at trial, the Nebraska proposal does not reflect the Compact or the FSS. *Ibid.*

Kansas does not oppose Nebraska's proposal on the North Fork Republican. However, the proper method for changing this is through the RRCA process.

**Conclusion**

Kansas' damages as quantified by the Kansas experts should be adopted. Kansas' Future Compliance Plan for Nebraska should be approved. Nebraska's proposed Changes to the Accounting Procedures should be rejected, with one exception, all as described in the foregoing Brief.

Respectfully submitted,

Steve Six
Attorney General of Kansas
Michael C. Leitch
Deputy Attorney General
Christopher M. Grunewald
Samuel Speed
Assistant Attorneys General
Burke Griggs
Special Assistant Attorney General

John B. Draper
*Counsel of Record*
Special Assistant Attorney General
Lara Katz
Montgomery & Andrews, P.A.
Post Office Box 2307
Santa Fe, New Mexico 87504-2307
(505) 982-3873)

## CERTIFICATE OF SERVICE

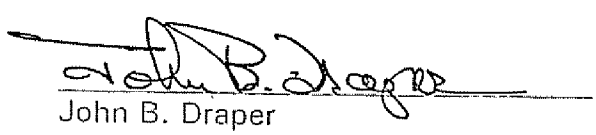
I, John B. Draper, hereby certify that on this 24th day of April, 2009, I caused to be transmitted by Federal Express, a copy of the foregoing Kansas' Post-Trial Brief, addressed to each of the following:

Karl J. Dreher, Arbitrator
Dreher Consulting, LLC
10572 Hillrose Street
Parker, CO 80134

Justin D. Lavene, Esq.
Nebraska Attorney General's Office
2115 State Capitol
Lincoln, NE 68509

Don Blankenau, Esq.
Husch Blackwell Sanders, L.L.P.
206 S. 13th St., Suite 1400
Lincoln, Nebraska 68508

Peter J. Ampe, Esq.
First Assistant Attorney General
Federal and Interstate Water Unit
Natural Resources and Environment Section
1525 Sherman Street, 5th Floor
Denver, CO 80203



John B. Draper

**REPUBLICAN RIVER COMPACT ARBITRATION**

◆

**BEFORE MR. KARL DREHER, ARBITRATOR**

**Pursuant to Section VII,**

**Final Settlement Stipulation**

**(December 15, 2002)**

◆

# STATE OF NEBRASKA'S POST HEARING BRIEF

JON BRUNING
Attorney General of Nebraska

JUSTIN D. LAVENE
Assistant Attorney General
*Counsel of Record*
MARCUS A. POWERS
Assistant Attorney General
2115 State Capitol
Lincoln, NE 68509

DONALD G. BLANKENAU
THOMAS R. WILMOTH
Special Assistant Attorneys General
HUSCH BLACKWELL SANDERS LLP
206 S. 13th St., Ste. 1400
Lincoln, NE 68508

# TABLE OF CONTENTS

Page

## INTRODUCTION[1]

This dispute comes before the Arbitrator pursuant to Section VII (Dispute Resolution) of the Final Settlement Stipulation ("FSS"), executed on Dec. 15, 2002 by the sovereign States of Colorado, Nebraska and Kansas, and approved by the United States Supreme Court. *Kansas v. Nebraska*, 538 U.S. 720, 123 S.Ct. 1898 (2003). After the Arbitrator issued his Final Decision on Legal Issues (Jan. 22, 2009), a two-week trial was held on the remaining substantive issues presented in this Arbitration. The Parties identified the trial issues generally as: 1) Kansas' Damages for Nebraska's Over-consumption in 2005 and 2006; 2) Nebraska's Future Compact Compliance; and 3) Nebraska's Proposed Accounting Changes.

By way of background, Kansas' claims arise primarily from circumstances occurring in the Basin from 1998 through 2006.[2] The years immediately proceeding and following execution of the FSS, were extremely dry, aquifers and reservoirs were severely depleted, groundwater pumping in Nebraska was peaking, and Compact allocations were extremely low. While precipitation recovered to above average toward the end of this period, the water supply of the basin

[1] References to the transcript of the hearing conducted from March 9, 2009 through March 19, 2009, as well as the supplemental hearing conducted April 14, 2009, appear herein as "T:" followed by the page within the transcript on which the cited portion appears. References to the hearing exhibits appear as "KS Ex." or "NE Ex." followed by the page within the exhibit on which the cited portion appears.

[2] As the Arbitrator correctly observed, the relevant period for purposes of this Arbitration begins December 15, 2002. T:615, 717.

continued to decrease through 2006. Improving the situation required a renewed commitment by Nebraska to manage aggressively its hydrologically connected waters. Thus, immediately after the FSS was executed, and in light of various other commitments and obligations around the State, Nebraska officials went to work developing legislation to address this complex problem.

The result is codified in the Nebraska Groundwater Management and Protection Act, NEB. REV. STAT., Ch. 46, art. 7. As it relates to the Republican River Basin, the cornerstone of this legislation is the requirement that DNR and the NRDs jointly develop and implement an integrated surface water and ground water management plan ("IMP"). NEB. REV. STAT. § 46-715. Statutory goals of each IMP include managing hydrologically connected ground and surface water and maintaining Compact compliance, NEB. REV. STAT. §§ 46-715(2); 46-715(3). In the Republican River Basin, IMPs were first adopted in late 2004 and early 2005, and additional short-term measures were implemented to facilitate compliance under the new regime imposed by the FSS.[3] The extreme hydrologic conditions of the Basin that came on the heels of adopting the FSS, provided insight and vision for water resource management that DNR and the three primary Republican River

[3] As evidence of her commitment to Compact compliance, Nebraska's expenditures on surface water in 2006 alone vastly exceed the economic harm Kansas suffered from the deprivation of Republican River water in 2005 and 2006 combined. *Compare* KS Ex. 44 and discussion in Damage Section.

NRDs used in the development and adoption of new IMPs by 2008. These have been approved by DNR, and along with supplemental efforts, as necessary, will keep Nebraska Compact compliant.

Nebraska made numerous attempts to work within the RRCA framework to resolve Kansas' concerns about the new IMPs, providing, for instance, multiple modeling scenarios demonstrating their anticipated performance into the future. NE Ex. 15 Appx. E and G. Although Kansas remains unconvinced of Nebraska's ability to comply with the FSS, the fact is Nebraska remained 30,000 acre feet under her allocation in 2007 and 78,000 acre feet under her allocation in 2008, as shown in the following table:[4]

[4] The values presented use currently approved accounting procedures. 2008 information uses preliminary estimates. The highlighted figures were read into the record by Nebraska's expert. T:878.

| Nebraska's Allocation and CBCU | | | | |
|---|---|---|---|---|
| Year | Allocation | Computed Beneficial Consumptive Use | Imported Water Supply Credit | Allocation - (CBCU - IWS Credit) |
| 2003 | 227,580 | 262,780 | 9,780 | (25,420) |
| 2004 | 205,630 | 252,650 | 10,380 | (36,640) |
| 2005 | 199,450 | 253,740 | 11,965 | (42,325) |
| 2006 | 187,200 | 228,460 | 12,085 | (29,175) |
| 2007 | 243,400 | 234,200 | 21,760 | 30,960 |
| 2008 | 332,400 | 274,310 | 19,969 | 78,059 |
| Average 2003-2007 | 212,652 | 246,366 | 13,194 | (20,520) |
| Average 2004-2008 | 233,616 | 248,672 | 15,232 | 176 |

While Kansas criticizes Nebraska for not having done more sooner, Nebraska's actions have been commensurate with those taken by other States in similar circumstances. T:673-75.[5]

Nebraska also attempted to explain and negotiate with the RRCA Technical Committee problems she observed in the RRCA Accounting Procedures, but to no avail. KS Ex. 32 through 38. For instance, although Nebraska designed a remedy

[5] Ironically, one Kansas witness praised the State of New Mexico's performance in developing a "comprehensive" Compact compliance plan composed primarily of retiring irrigated acreage, purchasing land and water rights, and augmenting stream flow. *Id.* Of course, Nebraska too is involved in surface water purchases, groundwater pumping reductions, and augmentation plans, among other things. NE Ex. 15. T:794, 880-82, 953, 1660.

to an error she identified in the Consumptive Beneficial Use ("CBCU") calculation to respond to Kansas' proposed "Virgin Water Supply Metric," no ground could be gained. As the Arbitrator rightly surmised, any proposal that results in a particular state receiving less water is likely to (and usually does) result in a "no" vote. T:644. The States, not surprisingly, now find themselves arbitrating this issue too.

As explained below, Kansas has not carried her burden of proof with regard to her claims for damages or her request for injunctive relief against Nebraska. In contrast, Nebraska has proved the existence of several flaws in the Accounting Procedures, which must be corrected to ensure effective sub-basin accounting. For the reasons stated herein, the Arbitrator should find in favor of Nebraska on all three issues.

## SUMMARY OF THE EVIDENCE ADDUCED DURING THE HEARING

According to the official accounting records of the Republican River Compact Administration ("RRCA"), Nebraska consumed more than her allocation of Republican River water in 2005 and 2006.[6] By the fall of 2007, Kansas officials, including its Legislature, began planning for a recovery of damages from Nebraska for her overuse. T:444-45. In December 2007, Kansas sent a demand letter to Nebraska seeking over $72,000,000.00 in monetary damages for past

[6] For purposes of this Arbitration, Nebraska accepts the official accounting of the RRCA, as adjusted to reflect the rulings of the Arbitrator on various accounting issues. Nebraska calculates this figure at 71,475 acre feet. NE Ex. 8.

violations along with and an award of attorneys' and related litigation fees.[7] *See* Joint Notice of Arbitration Ex. 1, T:443. This demand was apparently made without consideration of whether, or to what extent, irrigators in Kansas were actually harmed by the reduced flows in 2005 and 2006.

Approximately forty days later, before receiving Nebraska's response, Kansas officials testified before the Kansas Legislature explaining the impending award should be spent to, among other things, replenish a $20,000,000.00 interstate water litigation fund (which had been depleted as a result of recent Arkansas River litigation), provide for various conservation and related water projects in the Republican River Basin and improve statewide water planning. T:443-449. Kansas maintained a large recovery was warranted because the appropriate measure of damages was the amount by which Nebraska had been "unjustly enriched" as a result of her actions. This claim was properly rejected in the Arbitrator's Final Decision on Legal Issues (Jan. 22, 2009), thus limiting the scope of Kansas' claims to harm actually suffered by Kansas water users.[8]

---

[7] The Supreme Court recently limited the extent to which Kansas may recover expert witness fees in the Arkansas River case. *Kansas v. Colorado*, ___ U.S. ___, 129 S.Ct. 1294 (2009).

[8] Kansas limited the scope of its alleged harm to that suffered by Kansas irrigators. Kansas has presented no evidence of actual harm suffered by other users in the lower Republican River system and has assigned no economic value to any harm that might have been suffered by other kinds of water users. T:215.

Upon considering the actual harm suffered by irrigators in the Kansas Bostwick Irrigation District ("KBID") and those downstream of the District, Kansas economic modelers in January 2009 concluded, theoretically, Kansas irrigators could have suffered harm on the order of $9,000,000.00. KS Ex. 5 When tested against empirical evidence from within KBID, however, three things became clear: 1) Due to timely precipitation and the availability of alternative groundwater supplies, there was little (if any) need for additional Republican River water in 2005 and 2006; 2) the Kansas economists failed to account for such key factors that minimized the adverse effects of Nebraska's overuse; and 3) if additional water had reached KBID, its value would have been "nearly zero." T:510-11. When empirical data and the additional factors are considered, actual damage suffered by Kansas was less than $1,000,000.00.

In addition to monetary compensation, Kansas demanded Nebraska shut down over 500,000 acres of irrigated lands, ostensibly to ensure Compact compliance in the future. Nebraska responded to Kansas' demands in the spring of 2008 by explaining that newly adopted Integrated Management Plans ("IMPs") had been promulgated and that those IMPs, along with planned surface water purchases and related measures, would guarantee future Compact compliance. Before fully understanding the content and mechanics of those IMPs, T:896, Kansas initiated this Arbitration and sought an order from the Arbitrator seeking to impose its "draconian" remedy on Nebraska. T:565.

As demonstrated during a two week hearing, the Kansas experts conducted their analyses and prepared their reports based on information and assumptions not reflected in the IMPs. For example, Kansas' experts multiplied historic irrigation depths by 2006 irrigated acreage in Nebraska's Natural Resources Districts ("NRD") to project future pumping without regard to the overall NRD-wide pumping limits. T:591. This resulted in significant overestimates of the impact of Nebraska's pumping in the future. The modeling results presented by Nebraska, in contrast, were based on the express language of the IMPs and showed their provisions will keep Nebraska in Compact compliance during their presumptive term (5 years) unless extraordinary drought conditions occur. *See generally* NE Ex. 15. The evidence showed that even under such dry conditions, Nebraska's shortfall would be less than 9,000 acre feet. To the extent groundwater reductions incorporated into the IMPs are forecasted to be insufficient in any one year, Nebraska showed she will rely on multiple tools, including surface water purchases, to keep her overall CBCU within her allocation. While the RRCA Accounting is retrospective and makes long-term planning more difficult, T:696-97, the flexibility inherent in the IMPs, including their five-year averaging provisions, is designed specifically to allow adjustments as necessary to ensure Compact compliance. Indeed, as the Director of the Department of Natural Resources ("DNR") specifically testified, such compliance is of paramount importance, and non-compliance is "not an option." T:954.

Perhaps the best evidence that Nebraska will maintain Compact compliance in the foreseeable future is the fact that Nebraska was over 78,000 acre-feet "in the black" in 2008 and is fully compliant based on five-year average accounting from 2004-2008. T:878. This is true under current accounting without regard to how Nebraska's proposed changes to the accounting procedures are resolved[9] or the extent to which any payments for overuse in 2005-2006 might result in a credit to Nebraska. *Id.* While Nebraska experienced difficulties under her original IMPs, it is important to recognize Nebraska since corrected the problem by changing those plans and will continue to do so as necessary to accommodate changing hydrology, including the legacy effect of past pumping as it is captured in the Groundwater Model. The current IMPs and the additional tools available to Nebraska will ensure Compact compliance through 2012. If at that time more aggressive action is required to address the legacy effects of past groundwater pumping or other changes in hydrologic conditions, the IMPs will be revised again to ensure they achieve their statutory mandate of Compact compliance. Neb. Rev. Stat. § 46-715(3). To facilitate that review, and ensure timely adjustments, DNR has instituted annual forecasting pursuant to State law, which includes a one-year and ten-year projection. NE Ex. 15 at 7 and Appx. D. While Kansas may not trust

[9] If Nebraska's proposed change to CBCU, for example, were adopted, it would improve Nebraska's positive five-year average (2004-2008) by approximately 9,000 acre feet. NE Ex. 15 at 11.

Nebraska's process, Kansas has failed to ***prove*** the process will not function as anticipated.

Finally, Nebraska has identified several clear errors in the existing RRCA Accounting Procedures. The primary issue is related to CBCU for groundwater ("CBCUg") and the Imported Water Supply ("IWS") credit which, while attenuated in a basin-wide context, manifests itself distinctly at the sub-basin level. NE Ex. 30; T:1544-46. Because accurate sub-basin accounting is critical to Compact compliance (and to proper intrastate water management) the error must be corrected. If it is not corrected now, the evidence shows it will likely get worse in the future. T:1541-44; NE Ex. 42-44. There is no dispute as to the existence of the error; rather Kansas and Colorado simply maintain the error was bargained for in the FSS. The concept of bargained for errors was properly rejected in the Arbitrator's Final Decision on Legal Issues. Moreover, Kansas' claim this particular error was contemplated and accepted by the FSS negotiators is not supported by the record. Moreover, as the Arbitrator already has concluded, such errors should be fixed unless it would alter the fundamental allocations under the Compact. As Nebraska has shown, correcting the manner in which CBCUg is calculated will ensure Compact accounting is more accurate and actually will help avoid miscalculations under the Compact.

# DAMAGES

## I. KANSAS HAS THE BURDEN OF PROOF CONCERNING THE SCALE OF ITS LOSS, AND THE ECONOMIC HARM OCCASIONED BY THAT LOSS.

It is undisputed that Kansas bears the burden of proof concerning the extent of her alleged damages in 2005 and 2006. Kansas' attempt to recover damages is an effort to enforce her rights under the Compact, and in such a situation, Kansas must prove her case by a preponderance of the evidence. *Nebraska v. Wyoming*, 507 U.S. 584, 113 S.Ct. 1689 (1993). "The burden of showing something by a preponderance of the evidence ... simply requires the trier of fact to believe that the existence of a fact is more probable than its nonexistence before [he] may find in favor of the party who has the burden to persuade the [judge] of the fact's existence." *Concrete Pipe & Products of Cal., Inc. v. Construction Laborers Pension Trust for Southern Cal.,* 508 U.S. 602, 622, 113 S.Ct. 2264, 2279 (1993) *(quoting In re Winship,* 397 U.S. 358, 371-72, 90 S.Ct. 1068, 1076 (1970) (Harlan, J., concurring) (citations omitted) (brackets in original)).

This simply means Kansas must show the existence of a particular fact (*e.g.*, that in 2005 and 2006 water users below KBID would have beneficially used the maximum amount of surface water they had used in the past 13 years) is more probable than not. It is important to recognize that in evaluating whether Kansas has met her burden on these (or Future Compliance) issues, the question is ***not*** whether Nebraska "proved" an alternative scenario, but whether Kansas

established the facts entitling her to the relief sought (i.e., whether she met her burden in the first place).

## II. THE SCALE OF THE LOSS.

As the Arbitrator correctly noted, the determination of how much water Kansas could have received in 2005 and 2006 is the foundation of Kansas' damage claim. T:67. This foundational issue may be resolved by: a) Allocating Harlan County Lake evaporation per the Arbitrator's Final Decision on Legal Issues; b) applying actual, rather than hypothetical, conveyance losses in the Courtland Canal above the State line; and c) applying average, rather than maximum water use assumptions below KBID. When this is done, and even giving Kansas the benefit of the doubt concerning water routing through KBID, the maximum possible loss sustained by Kansas (for 2005 and 2006 combined) is 32,456 acre feet at the farm gates in KBID, and 2,369 acre feet below KBID, for a total of 34,825 acre feet.

### A. When all Harlan County Lake evaporation is charged to Kansas, the scale of the loss is decreased immediately by approximately 8,000 acre feet.

The Arbitrator has correctly concluded: "The current Republican River Compact Administration Accounting Procedures allocate evaporative losses from Harlan County Lake entirely to Kansas when the Kansas Bostwick Irrigation District is the only entity actually diverting stored water from Harlan County Lake for irrigation." Arbitrator's Final Decision on Legal Issues at 10. It is undisputed that Kansas' experts did not take into account this decision. T:57, 76. When all

Harlan County Lake evaporation is charged to Kansas, and certain minor, undisputed technical corrections are made to the accounting spreadsheets,[10] the starting point for the calculation (the total of Nebraska's allocation less CBCU plus IWS above Guide Rock) is reduced to 71,475 acre feet. NE Ex 8 at 5 (Table 2-2).

### B. *Actual* losses in the Courtland Canal, above the State line, would have been far greater than the 2.9% Kansas calculated.

Nebraska calculated the losses in the Courtland Canal above the state line to be approximately 20% (56,941 ÷ 71,475). NE Ex. 8 at 6-10. Kansas calculated losses in this same reach to be less than 3%. T:78. The *actual* losses in the Courtland Canal are set forth in KS Ex. 1, Appx. B (Courtland Canal Headgate Diversions and Losses in Nebraska 1995-2006). That document shows actual losses in the Courtland Canal in 2005 were 17.8% and in 2006 were 24%. The average loss from 1995 through 2006 in the Courtland Canal was 12.9%. *Id.*

Notwithstanding the availability of these actual data, Kansas' experts assumed a significantly smaller loss "to reflect the historical system efficiency for a more normal water supply… ." T:460-61. This is true despite acknowledging that in 2005 and 2006 the volume of water flowing in the Courtland Canal was "significantly lower" than in normal years. T:467. It also is true despite the fact that KBID water users apparently elected to leave approximately 10,000 acre feet

[10] These technical corrections, which were not disputed, are described in NE Ex. 8 at 3-5.

of water in Harlan County Lake in 2005 specifically because it would have been lost in the Courtland Canal. T:153. While Nebraska acknowledges that losses might have been lower in a "normal year," 2005 and 2006 were not "normal years." Nebraska approached loss calculations recognizing the conditions of the previous years delivery in 2004 in addition to recognizing that compliance is an annual test for Nebraska. The system condition of a preceding year and the potential for canal delivery outside the irrigation season (e.g., to fill Lovewell Reservoir) were accounted for in the Nebraska analysis. Nebraska chose to use real data and previous years' river and canal system conditions to estimate how the amount of overuse might have been delivered to Kansas. Kansas' attempt to represent how this water may have been diverted grossly inflates the volume of water that physically would have reached Kansas State Line. Her combination of data, statistics, compact accounting percentages, and other assumptions follows a theme to use historical information to create the best results, not the best data to estimate the most likely result.

The Arbitrator already has explained that: "[a]ny damages awarded to Kansas are properly limited to the actual damages suffered by Kansas… ." Arbitrator's Final Decision on Legal Issues at 13. Kansas' expert acknowledged that if one were seeking to determine what the ***actual*** loss would have been in 2005 and 2006, it would have been appropriate to rely on the more realistic average loss of 12.9%. T:84. *See also* T:153, 479 (explaining he did not utilize this figure).

Even this figure, however, is significantly smaller than what the actual losses would have been in 2005 and 2006. In fact, when one examines the actual losses experienced in those years (an average of 20.9%), it is clear that Kansas' estimates are grossly understated. Applying the 20% loss calculated by Nebraska would have yielded a net flow available at the State line of 56,941 acre feet. Regardless of whether one applies the 12.9% average loss, or the 20% loss calculated by Nebraska, it is clear that Kansas has not met her burden to show that 2.9% is in any way a reasonable estimate.

### C. Even affording Kansas the benefit of the doubt concerning KBID routing practices, she still overstates farm gate deliveries.

Properly accounting for Harlan County Lake evaporation, and utilizing a realistic loss assumption for the Courtland Canal, Nebraska found 56,941 acre feet would have been available at the State line. As acknowledged by Nebraska's experts, there are many different ways in which one could route the available State line flows through KBID and develop return flow estimates. *See, e.g.,* NE Ex 8 at 1. Nebraska's method resulted in a total on farm delivery of just 20,574 acre feet. *Id.* at 2. The Kansas experts estimated 41,372 acre feet of an estimated 73,156 acre feet available at the Stateline (approximately 57%) was delivered to farm gates. While Nebraska stands by the routing process employed in NE Ex. 8, using the same 57% developed by Kansas, no more than 32,456 acre feet of the 56,941 acre feet available at the State line could be available at the farm gate in KBID. Thus,

Kansas has overstated farm gate deliveries by at least 22% - even taking her routing methods at face value. Kansas has failed to meet her burden on this count too.

### D. Kansas' use of *maximum* historical uses to determine losses below KBID is unsupportable.

The real issue bearing on Kansas' loss calculations below KBID is not the scale of return flows reaching the Republican River from KBID. T:421. Rather, the primary difference between the states in this regard is the assumption used to determine the amount of water that would have been used by water users below KBID. *Id.* Kansas' experts assumed that all water users below KBID would utilize the ***maximum*** amount they had ever used in the prior 13 years. KS Ex. 1, Appx. D (Republican River Active Surface Water Rights Senior to Minimum Desirable Streamflow). However, Kansas' experts conducted no analysis whatsoever to determine whether, in fact, this maximum use assumption was reasonable. T:94-96, 99. Indeed, in many cases, it appears such an assumption was inconsistent even with the underlying rights on which the assumption was based. T:98-99, 148-151 (explaining some historic uses likely exceeded legally authorized amounts).

Considering the fact Kansas' experts conducted no analysis of these users' intentions in 2005 or 2006, a far more reasonable assumption would be based on average use over the same period. Using an average use assumption, the total loss

below KBID is reduced by 6,755 acre feet to not more than 2,369 acre feet. Thus, Kansas' estimate of losses below KBID are overstated by approximately 385%.

## III. REGARDLESS OF THE AMOUNT OF WATER KANSAS FAILED TO RECEIVE, THE "ACTUAL HARM" SUFFERED WAS MODEST.

As previously noted, "[a]ny damages awarded to Kansas are properly limited to the actual damages suffered by Kansas… ." Arbitrator's Final Decision on Legal Issues at 13. When checked against reality, it is clear Kansas suffered relatively little economic harm from any loss of Republican River water she sustained. Indeed, in 2005, the evidence shows that crop yields in KBID reached unprecedented highs and times were good enough that farmers within KBID were purchasing a good deal of new farm equipment. T:123; 260. As with her quantification of water lost, Kansas ignores available data undermining her theoretical model results.

### A. Kansas failed to consider numerous essential factors that should have reduced her damage calculation.

Kansas' experts admitted throughout the course of the hearing they failed to consider myriad factors that, in fact, reduced the need for additional Republican River water and minimized economic harm suffered from Nebraska's overuse in 2005 and 2006. For example, as the Arbitrator rightly concluded, Kansas experts neglected to consider the extent to which timely precipitation reduced the need for surface water irrigation. T:62, 87. This is true despite their acknowledgement that

precipitation directly affects how much water is called out of Harlan County Lake. T:161.

They did not consider the extent to which surface water shortages were offset by groundwater pumping within and outside KBID. T:86, 236. This is particularly problematic, considering one Kansas expert testified that those water users below KBID "will make every effort to utilize groundwater" in times of low flow. T:139, 152. To the extent Kansas felt it was too difficult to take this into account, T:140, Kansas should not be rewarded for her lackadaisical approach.

Kansas did not consider the extent to which prevented planting payments were sought or received by Kansas farmers. T:235. Nor did she explore the extent to which Conservation Reserve Program or comparable farm programs were relied on in 2005 or 2006. T:235-36, 268. This is so, despite the recognition that such payments would have reduced the damages calculated by Kansas. T:236. Finally, Kansas did not offer any evidence to explain how Colorado's Compact non-compliance (overuse), during the same period, impaired Nebraska's ability to comply with the Compact or supply additional water to Kansas. Even failing to account for these factors, the evidence unequivocally demonstrates that the value of additional Republican River water in 2005 and 2006 was minimal.

### B. Kansas' modeled analysis is wholly unreliable.

Kansas relies principally on outputs from the IPYsim model to support her damage calculations. KS Ex. 5. The IPYsim model, however, is not properly

suited for the analysis conducted in this case. For example, the model is a farm-level model, and is not properly extrapolated to the large area represented by KBID. It does not account for heterogeneity among farms and farming practices within KBID. T:197. It does not account for differences in soil types or farmer skill levels. T:218. The IPYsim model is designed to make recommendations, rather than to predict behavior and is not reconciled with actual on-farm behavior. T:311, 315. Not surprisingly, then, the IPYsim model never has been used to prove damages in a proceeding like this. T:215

Most importantly, as demonstrated in the hearing, the IPYsim model is not calibrated to ensure it replicates reality. T:313. Nor did Kansas' experts make any effort to cross-check its results against actual behavior in KBID. T:217, 267. Rather, the IPYsim model is calibrated simply to ensure it is internally consistent. *Id.* As explained at length by Nebraska's expert, as well as Colorado's, the Kansas experts not only employed an inherently unreliable model, they actually manipulated its output to derive an economically optimal[11] result that was directly contrary to actual crop yield data, known water-yield relationships and principle economic theory. T:287-88, 317-324; NE Ex. 3, 6, 10-12.

[11] Under optimal conditions the yield response to additional irrigation water would be lower, given diminishing returns to water in the production function. However, Kansas argues that under near optimal conditions in 2005 and 2006 the response to additional irrigation water would be greater. This is accomplished through their ad hoc calibration procedure.

For example, the IPYsim model as employed by Kansas' experts indicated corn crop yields within KBID in 2005 should have been 150.5 bushels per acre. T:221. In fact, however, those yields were ***a record high*** of 187 bushels per acre. *Id.* and NE Ex. 3. As correctly observed by the Arbitrator, T:497-502, Kansas departed from the recommendations of Stone by employing her own ad-hoc "calibration" using a proportional difference method (multiplying the ratio of predicted yields by actual yield), which had the effect of altering the slope of the yield curve. This is best demonstrated by Dr. Sunding's testimony concerning NE Ex. 11. [12] This, not surprisingly, indicated that yields ***theoretically*** should have been even higher than the 187 bushels per acre actually observed.

When pressed about the practical ramifications of this discrepancy, Kansas' expert made the following startling revelation:

> Q: … What I was asking you in your deposition on February 24, 2009, is if you substituted the 150.5 number with 187, how would it affect your ultimate expected yield?
>
> …
>
> A: Actually, I answered it wrong in the deposition. The yield would actually go down, because if we – if the model predicted 187 with low

[12] Kansas questions the credibility of Nebraska's attack on the IPYsim model as employed by her experts because Dr. Sunding once conducted an unrelated analysis involving a relationship between water input and yield output. T:358. Dr. Sunding did not use the same crop production function employed by Kansas. Specifically, Dr. Sunding did ***not*** scale up crop production functions as Kansas has in this case.

> irrigation and predicted the 166 you see with high irrigation, then I would have to infer a drop in yield associated with more irrigation.

T:223. Thus, if the IPYsim model had been calibrated to reality, and the effects of timely precipitation included in the model, the model would have shown that any additional water beyond what produced the maximum historical yield of 187 bushels per acre would have had an ***adverse economic impact*** on Kansas farmers. As explained by Nebraska's expert, this is because timely precipitation and other factors essentially eliminated the marginal value of irrigation water in KBID during the relevant period. NE Ex. 6, Fig. 3-5 and pages 16-18.

Of course, such a result would not support the case Kansas has mounted, which is why Kansas' case is based principally on a manipulated version of the IPYsim model, and not any actual physical loss in Kansas. T:234. As rightly observed by the Arbitrator and confirmed by Kansas' expert, "it's tied to speculation, not necessarily reality[.]" T:502.

### C. <u>When actual land rentals are examined, the marginal value of water in 2005 and 2006 was "nearly zero".</u>

Although Kansas bears the burden of proof on this issue, Nebraska's expert conducted an alternative analysis based on land rental values. NE Ex. 6 at 13-20. He derived an "implicit market price of $26.80 per acre foot for irrigation water in North-Central Kansas." *Id.* at 18. As described in that report, it is easy to obtain a direct economic damage figure simply by multiplying this figure by the volume of water lost in Kansas. *Id.* Taking the Nebraska analysis contained in NE Ex. 8, this

yields an actual damage of not more than $614,872.00. Even giving Kansas the benefit of the doubt concerning the manner in which water would have been routed through KBID, the maximum possible damage actually suffered by Kansas could not have exceeded $930,630.00 (34,725 acre feet x $26.80).[13]

While Kansas attempted during the hearing to argue Nebraska's land rent method was unreliable, the evidence adduced at the hearing actually confirmed the Nebraska's estimates were likely excessive. Because landowners within the affected area actually own a large percentage of irrigation equipment (contrary to Nebraska's expert's assumption), Kansas' expert explained that the actual value of water in the area was "nearly zero." T:510-511. While Kansas' expert felt this result was suspect, it simply means that irrigation water in KBID is the functional equivalent of crop or drought insurance which rational farmers typically choose to purchase even though they recognize it may have no value in most years.

In sum, the actual, direct economic harm suffered by Kansas as a result of Nebraska's overuse is somewhere between "nearly zero" and $930,630.00.

---

[13] During the course of the hearing, Kansas implied and the Arbitrator questioned whether payments made by the State of Nebraska for water in Nebraska Bostwick Irrigation District ("NBID") might bear on the value of water in KBID. As explained by Nebraska's expert, such a comparison would be inappropriate because it does not represent a true market transaction. T:374-75. Moreover, as Kansas' expert acknowledged, the prices paid might have been inflated due to the potential penalties associated with non-compliance with the Compact. T:515-16.

### D. Since the direct economic impact was modest, any indirect impact is, likewise, modest and must be reduced further by the indirect effect of any damage payment made.

Finally, Kansas has claimed indirect damages arising from Nebraska's overuse. Kansas' claims in this regard must fail for two reasons. First, Nebraska's expert testified that indirect damages are not appropriate in this proceeding principally because the measures used to calculate them are not reliable enough for any analysis beyond the policy level.[14] T:363. Moreover, any damage payment would, by necessity create its own offsetting indirect benefit. T:364. Kansas failed even to consider this issue. T:265. As Nebraska's expert testified, "if Nebraska makes a cash payment to Kansas to compensate for direct losses, that payment will generate its own indirect effects." T:329. Indeed, Kansas' experts testified that any money received in this proceeding would be used to fund various State programs, including potential projects in the Republican River Basin. T:447-448.[15] Assuming the indirect impact associated with Nebraska's overuse were

[14] Kansas again attacks Dr. Sunding's prior use of the IMPLAN model in an unrelated policy analysis conducted in California. As Dr. Sunding explained, that analysis did not require the same level of rigor as a judicial proceeding in which one State seeks to recover damages from the other and bears a burden of proof as Kansas does in this action. T:363. In addition, Dr. Sunding testified that, unlike Kansas, his use of IMPLAN was supported by State-specific pre-input analysis. T:363.

[15] As Nebraska's expert testified, the very notion of indirect damages improperly places Nebraska in the untenable position of being wholly dependent on Kansas' behavior with respect to the use of any award in this case. T:330.

anything other than zero, that figure would necessarily have to be reduced by the indirect benefits accruing from payment of any damage award in this case.

Kansas maintains the Supreme Court has sanctioned the use of IMPLAN and the indirect impact calculations Kansas employed in this case citing the Third Report of Special Master Arthur Littleworth in *Kansas v. Colorado*, No. 105 Orig., (August 2000) ("Third Report"). The Special Master there concluded "the weight of the evidence supports Kansas claim for secondary economic damages." *Id.* at 71. Colorado's sole expert on the issue "had only limited experience with input-output models" and did little to counter the secondary impact analysis of the Kansas experts. *Id.* at 65-66. The Special Master specifically noted "***Colorado does not have an estimate*** of secondary damages." *Id.* at 65 (emphasis supplied).

As the weight of the evidence on secondary impacts leaned heavily in Kansas' favor, Special Master Littleworth had little choice but to adopt Kansas' analysis, and as explained by Nebraska's expert, "I think frankly, [Kansas] got away with one in that case." T:365. While Colorado took exception to several conclusions to the Third Report, Colorado did not ultimately take exception to the conclusion that damages for secondary economic impacts were appropriate. *See*, Colorado's Exceptions to the Third Report of the Special Master and Brief in Support Thereof, 1 (November 24, 2000) (available at 2000 WL 1838225). Nebraska was not a party to the Arkansas River case, and she is not now bound by Colorado's failure to contest vigorously Kansas' indirect impacts claims.

Second, assuming *arguendo* the concept were legitimate, the indirect damage calculation was based on the erroneous direct damage calculation compiled by Kansas' experts. It is undisputed that if the direct damage figure were overstated, the indirect damage figure was, likewise overstated and must be reduced. T:265-66. Even accepting at face value the general multiplier (1.44) resulting from the Kansas indirect damage analysis, the maximum damage (including indirect damages) attributable to Nebraska's overuse in this case could not exceed $1,340,107.20 ($930,630.00 x 1.44). As Kansas' expert on indirect damages aptly put it, however, "the impact of nothing is nothing." T:529. Thus, if the marginal value of the water lost from Kansas in 2005 and 2006 was indeed "nearly zero," then the indirect impacts were likewise.

As with its overstatement of the actual water lost, Kansas has dramatically overstated her economic injury (both direct and indirect). She has, therefore, failed to meet her burden of proof in this phase of the case.

## FUTURE COMPACT COMPLIANCE

### I. KANSAS BEARS THE BURDEN OF PROOF TO SHOW THAT NEBRASKA CANNOT COMPLY WITH THE COMPACT AND THAT KANSAS' REMEDY IS REQUIRED TO ENSURE FUTURE COMPLIANCE.

As established during the hearing, Kansas' proposed remedy would infringe on the sovereign rights of the State of Nebraska to regulate users within her borders to maintain Compact compliance. Kansas' proposed remedy would also

effect a major shift in the States' allocations by requiring Nebraska to live within an unreasonable groundwater pumping limit each and every year. NE Ex. 15 at 17-18, T:905. In such a case, "a higher standard of proof applies." *Nebraska v. Wyoming*, 507 U.S. at 592, 113 S.Ct. at 1695. Kansas' demands "raise questions not decided in the original proceedings and therefore may be best understood as requests for modification of the decree." *Id.* As stated in that case:

> … when the plaintiff essentially seeks a reweighing of equities and an injunction declaring new rights and responsibilities, we think the plaintiff still must make a showing of substantial injury to be entitled to relief. That is so not only because a new injunction would work a new infringement on sovereign prerogatives, but also because the interests of certainty and stability counsel strongly against reopening an apportionment of interstate water rights absent considerable justification.

507 U.S. at 593, 113 S.Ct. at 1696. When arguing for what amounts to a new apportionment, Kansas must prove her case by "clear and convincing evidence" of "some real and substantial injury or damage." 507 U.S. at 591, 113 S.Ct. at 1695 (citations omitted).

## II. KANSAS FAILED TO ANALYZE THE CONTENTS OF THE IMPs, AND HER EXPERTS' VIEWS ARE, THEREFORE, OF NO IMPORT.

Kansas is certain Nebraska's IMPs will not function as intended. Yet, Kansas admits she does not understand how the IMPs operate and is not sure how to model the impacts of the IMPs. T:756, 1051. During the course of a two week evidentiary hearing, Kansas failed to provide any countervailing evidence showing

the IMPs cannot operate effectively because, simply put, Kansas never has analyzed those IMPs as written.[16]

It is undisputed that Kansas' experts did not analyze the IMPs correctly in their initial expert reports. Rather than applying explicit pumping reductions imposed by the IMPs, the Kansas experts applied historic irrigation depths to 2006 irrigated acreage amounts to derive an overall pumping volume that exceeded authorized pumping by approximately 300,000 acre feet. T:591, 600, 602, 604, 891-93. *See also* 758-59 (explaining Mr. Barfield's reliance on Larson and Perkins analysis). This resulted in an overestimation of the likely future impacts of Nebraska groundwater pumping. Even when it became clear during the course of Kansas' direct case she had not properly analyzed the IMPs, and when afforded an opportunity to conduct additional analysis during the hearing, she again refused to accept their contents (or the sworn testimony of Nebraska's witnesses) in her rebuttal case. T:1010-11. This is particularly disconcerting considering the fact that Kansas' experts admitted that a crucial prerequisite for determining the impact of groundwater pumping via modeling is the extent of that pumping in the first place. T:1019.

[16] One Kansas expert testified, in fact, that the analysis he had conducted for this proceeding was unchanged from the analysis supporting the December 19, 2007 demand letter to Nebraska. T:534.

Despite her very definite views about the IMP's shortcomings, Kansas still has not ***proved*** they will not work. Unfortunately, the problem appears to be rooted more in Kansas' distrust of Nebraska's process rather than any real objection to Nebraska's modeling results. T:1052. Although she bears the burden of proof on this issue, the thrust of Kansas' case is hyperbolic rhetoric designed to obscure the fact that Nebraska has made great strides in the last few years and is now well prepared to ensure it remains compliant with the Compact.

For instance, Kansas remains fixated on the increased number of wells in the Nebraska portion of the Republican River Basin, despite recognizing that groundwater depletions overall have declined between 2000 and 2007. T:687. Moreover, this argument ignores the fact that the only relevant input into the Groundwater Model is the overall pumping volume. Neither the number of wells in the Basin, nor the amount of irrigated acreage is relevant. As long as they remain within the overall depletion limits imposed by the IMPs, irrigators in any one NRD could stack all available water on a single acre, and still have nearly the same impact at the Hardy gage.

Kansas similarly makes much of the fact that Nebraska's modeling team at one time analyzed greater reductions in groundwater withdrawals than are called for in the IMPs. However, as explained by Nebraska's expert, the characterization that Nebraska somehow considered and rejected this approach for political reasons is nonsense. T:935. At most, the evidence adduced in this regard shows it is

helpful to run a wide array of pumping scenarios to understand the response of the RRCA Groundwater Model. T:935.

Simply put, Nebraska has not acted irresponsibly by failing to implement the most aggressive groundwater reductions it might ever have theorized. Rather, as the testimony showed, Nebraska's 2007 analyses are outdated, and have been superseded by new developments. T:937, 938. Foremost among these is the implementation of the IMPs with their 20% reduction from baseline pumping and additional measures, including allocations of total basin wide depletion allowances. T:937, 938 (explaining Nebraska's prior analyses did not account for these reductions, but rather "suffers the same fundamental shortcomings that the Kansas analysis does."). In addition, unlike 2007, significant surface water supplies are now available in the system, so much so that Harlan County Lake has recently been spilling water. T:938. While these facts have been ignored by Kansas, they are particularly relevant to Nebraska's water managers and certainly justify a more measured approach than shutting down every well within 2½ miles of the Republican River and its tributaries.

## III. KANSAS OVERSTATED THE SCOPE OF FUTURE GROUNDWATER PUMPING IMPACTS, AND HAS PROPOSED A REMEDY THAT WOULD FUNDAMENTALLY ALTER THE COMPACT ALLOCATIONS.

The Kansas remedy is premised on the erroneous assumption Nebraska must curtail her groundwater pumping to 175,000 acre feet or less every single year over

the next 50 years. T:586, 752. This, in turn, is based on a scenario beginning with depleted water supplies and 40th percentile precipitation (2002-2006), which even Kansas admits never has occurred for 50 consecutive years. T:754. Kansas relied on a recent dry cycle to establish this target allowable groundwater depletion and an above average precipitation period to determine how much Nebraska would have to reduce future pumping to reach this unreasonable target. NE Ex. 15 at 16-17. Pumping during this period was often higher than it can be in the future under the current IMPs (i.e., the future baseline condition assumed Nebraska took no significant action to curtail groundwater pumping in the future). The result of this combination is a significant overstatement of the degree to which Nebraska must be curtailed in the future. *Id.*

There is no dispute that, if implemented, the remedy Kansas proposes will yield approximately 1.7 million acre feet more water to Kansas than the Compact currently affords her. NE Ex. 15 at 17-18, T:905, 943, 1027. *See also* T:587,588. Yet, inexplicably, Kansas never even analyzed this issue. T:743. Kansas attempts to dismiss this untenable result by arguing Nebraska might someday develop new diversions and impoundments that might capture and retain this additional water. T:742. This assertion ignores the fact that the States, in the FSS, agreed to a moratorium on the construction of new wells upstream of Guide Rock, Nebraska. It also strains the imagination to believe Kansas would not object strenuously to new large scale surface water diversions in the Republican River Basin. Moreover,

it interjects into the analysis an unknowable property, which is why Nebraska assumed that storage in Nebraska remained as it was in the 1990-2006 period when conducting its analysis. T:943.

## IV. THE BUREAU'S CONCERNS DO NOT SPEAK TO COMPACT COMPLIANCE AND ARE, THEREFORE, IRRELEVANT IN THIS PROCEEDING.

Although Nebraska appreciates the Bureau of Reclamation's ("Bureau") willingness to participate in this proceeding and to offer insights on historical water development in the Basin, the Bureau's actual testimony has little, if any, relevance to the issue of whether Nebraska will be able to comply with the Compact in the future. As a preliminary matter, the Bureau's witnesses expressly disclaimed any intent or authority to speak to policy or other related issues that might affect future compliance. T:1625-26. Indeed, they did not even understand they had been called in the Future Compliance phase of this Arbitration. T:1627.

At best, the Arbitrator might be able to speculate about future Bureau behavior based on past outcomes. Considering the recent past as an indication of future scenarios, the most important testimony concerned the Bureau's cooperation in facilitating Nebraska's efforts to purchase surface water and transfer it for downstream use. The evidence adduced demonstrated Nebraska had engaged in a number of surface water purchases, some of which involved the Bureau, and others which did not. NE Ex. 54-56, T:1723-26, 1659-61. The Bureau could identify no problems associated with those transactions, T:1726, and have historically

indicated a willingness to assist Nebraska in achieving Compact compliance. NE Ex. 52, T:1659.

Of course, the Bureau remains most interested in protecting inflows to Bureau Projects. They complain groundwater pumping has impacted baseflows, yet make no effort to show the relative impact of pumping versus conservation measures, T:1634 and NE Ex. 45, or of Nebraska pumping versus pumping in other states. T:1718 Insofar as the Bureau complains of low inflows, its testimony is no more persuasive than any other water user in the Basin seeking to ensure its own self-interest is protected.[17] The Bureau desires greater groundwater restriction because it might mean more surface water in Bureau Projects, thus providing a steady revenue stream. T:1640, 1719. Indeed, the evidence showed that between 60% and 80% of the Bureau's customers in the Frenchman-Cambridge division can access groundwater when desired. T:1706-07. While Project water availability thus has marginal impact on the individual Project customers, the conversion to groundwater directly reduces the revenue stream on which the

[17] As the Bureau witnesses explained, the Bureau's water rights are issued pursuant to, and are subject to regulation under, Nebraska law. T:1653. NE Ex. 51. While the Bureau apparently expected Nebraska law to protect their surface water rights from the adverse impacts of groundwater pumping from the beginning, the Bureau should have known that Nebraska law did not afford such protection in the 1940s when the Projects were built. NE Ex. 50. Nebraska now is attempting to provide the very protection the Bureau ostensibly seeks by implementing the IMPs. T:1651-52.

Bureau relies. While this may be an interesting fiscal policy question, it has nothing to do with future Compact compliance.

Ultimately, the Bureau offered no compelling testimony about Nebraska's future compliance because the Bureau, like Kansas, never has analyzed the impact of the IMPs. T:1711-14, 1726-32. Rather, the Bureau conceded that in drawing its conclusions about the effectiveness of the IMPs it relied principally on historical trend data, RRCA modeling results from 2003-2005, and a narrow analysis the State of Nebraska produced in 2007 concerning the Frenchman Valley. T:1657, 1722-23. As explained by the author of the latter analysis, it cannot be extrapolated to draw conclusions about IMP performance throughout the Basin. T:1745. The best available projections concerning IMP performance is now reflected in NE Ex. 15. T:1745.

## V. NEBRASKA HAS DEMONSTRATED THE ABILITY TO COMPLY.

Implicit in the Kansas remedy is a false premise that Nebraska must have in place today measures that ensure her compliance 50 years into the future. However, the FSS currently requires Nebraska to ensure she remains under her allocation on a five (or two) year running average. T:634, 703 ("a single year, by itself, is not the measure … for purposes of Compact compliance."). Not

surprisingly, then, Nebraska's IMPs are tied to the five-year averaging concept embodied in the FSS.[18] T:831.

Nebraska's IMPs are focused in 5-year increments, with the understanding that they at all times remain subordinate to the overriding statutory mandate to ensure Compact compliance. Neb. Rev. Stat. 46-715(3); T:875. Because of this mandate, the IMPs remain subject to alteration as necessary to avoid future Compact violations. T:874. To help determine whether more aggressive measures will be needed, Nebraska engages in annual forecasting. NE Ex. 15 at 7 and Appx. D. Kansas simply has not shown that failure of the IMPs is more probable than not, and cannot, therefore, carry her burden on proof on this count.

While Nebraska recognizes the Arbitrator's concern for the potential "legacy" impacts of groundwater pumping, that effect is accounted for in the modeling supporting the IMP analysis. T:803, 864-65. As explained by Nebraska's expert, moreover, the IMPs' mandate of a reduction in groundwater pumping of nearly 300,000 acre feet is designed specifically to prevent an increase in depletions in the future, thereby muting the legacy effect. T:906.

[18] In addition, Kansas' 50-year timeline produces questionable results because the uncertainty of modeled outcomes increases the farther into the future the analysis is run. T:1022.

### A. The IMPs contain enforceable pumping limits that will ensure Compact compliance in all but the driest years.

While the IMPs are based on five year (and sometimes two year) averages, this in no way diminishes their enforceability. T:859-60. As explained by the DNR Director, IMPs are enforceable, have been enforced, and will be enforced. T:948-49, 967. As repeatedly discussed during the hearing, the IMPs contain meaningful standards composed principally of the following, in order of importance:

- A percentage of allowable Basin-wide groundwater depletions applicable to every NRD;
- overall groundwater pumping limitations applicable to the two larger NRDs; and
- individual allocations applicable to every individual irrigator.

*See* NE Ex. 15 at 6-7 and Appx. A-C, 16 and 17.

The most important of these restrictions is the requirement that each NRD remain within a set percentage of the allowable Basin-wide depletion. This is the most significant limitation in the IMPs because, regardless of the other two variables, allowable groundwater depletions go down in drought periods (as the state allocations decline). As explained by Nebraska's expert, therefore, this restriction always controls, ensuring groundwater depletions remain low (regardless of individual allocations or overall NRD pumping limits), or are offset by other measures, when necessary to ensure compliance. T: 1749-50.

In addition, overall groundwater pumping limitations are applicable to the two larger NRDs. In wet years, a particular allowable depletion percentage might otherwise exceed the overall NRD pumping limit, in which case, the overall pumping limit would cap the amount of groundwater use in each NRD. The effect of this cap is to ensure that, during an average or wet period, excessive pumping (and its legacy impact) does not create a compliance problem in the future. As explained during the hearing, both of the two restrictions applicable at the NRD level supersede individual pumping allocations within the NRDs. T:825-26. Of course, additional reductions in groundwater pumping always remain an alternative measure if, and when such reductions are shown to be necessary to ensure Compact compliance. T:860.

Nebraska has shown that in all but the driest years, she will be in Compact compliance. NE Ex. 15. Indeed, it appears that even in the driest long-term scenario conducted by the parties (a 35$^{th}$ percentile hydrology), Nebraska will be only slightly beyond her allocation without implementing any measure other than the groundwater reductions contemplated in the IMPs. Notably, under this scenario, properly modeled groundwater impacts[19] are only slightly more than the 175,000 acre foot limitation advocated by Kansas. T:902.

[19] Kansas' modeled impacts of 225,000 acre feet are unreasonable because the Kansas analysis couples a wet period to analyze pumping impacts with a dry period to establish allocations. T:902-03. *Compare* T:540.

Kansas' intimation that Nebraska and her NRDs have no motivation to comply with the law as written is a smokescreen. Nebraska's NRDs are political subdivisions of the State of Nebraska and are no less compelled to enforce the law than is the State itself. T:969-70. As if any other motivation were required, the NRDs benefit from an extraordinary amount of local control over natural resources within their bounds. To the extent they fail to protect those resources in a manner consistent with local, State or Federal law, they run the risk of losing that autonomy. T:971, 980. Of course, Kansas has presented no evidence to support her speculation that the NRD/DNR partnership cannot function as intended. Indeed, as the Director of DNR testified, there has been no need to hypothesize about the outcome of any irreconcilable conflict between the NRDs and DNR because such a conflict never has occurred. T:979.

Despite the foregoing, Kansas would have the Arbitrator believe Nebraska is not committed to Compact compliance, perhaps because it is in Nebraska's best interest to pay damages rather than complying with the Compact. The DNR Director responded to such allegations as follows:

> [T]hat is not an option to the State of Nebraska. It's not an option to me, as the Director of the Department of Natural Resources, and it's not an option of the Governor's either.

T:954. Nothing more can or need be said.

### B. The additional tools available to Nebraska are more than adequate to cover any shortfall in the foreseeable future.

Of course, groundwater pumping limits are not the only means by which Nebraska can maintain compliance.[20] As the Arbitrator surmised, there are other ways to generate additional water, if and when needed for Compact compliance. T:568. To help determine when additional supplies might be needed, Nebraska will look to her annual forecasting results. NE Ex. 15 at 7 and Appx. D. To the extent additional measures are needed to reduce Nebraska's CBCU further than the IMPs already do, those measures are available.[21] The evidence shows Nebraska has been successful in leasing large volumes of surface water when needed to assist with Compact compliance in 2006, 2007 and 2008. T:794. This includes successful working relationships with the Bureau. T:953. This was confirmed by the Bureau witnesses who testified as to the effectiveness of these purchases in yielding wet water downstream. NE Ex. 56; T:1660.

Kansas criticizes Nebraska for not having measures already in place today to address potential future shortfalls that no party currently can predict. This position

---

[20] Notwithstanding their recognition of alternative means, Kansas' expert reports assume groundwater pumping limits are the only tool available to Nebraska. T:569, 582.

[21] In the short-term, Nebraska is most likely to rely on surface water purchases because there is water available in the system and because such purchases produce an immediate benefit. However, as explained, Nebraska has available to her additional tools, including sustainable augmentation projects, T:880-81, vegetation removal and related actions. NE Ex 15 at 10-15.

is unreasonable. First, the RRCA accounting is retrospective in nature, and it is not possible for Nebraska to know today whether she might require surface water purchases in future years. T:692, 694, 696-97. Second, the Bureau has actively discouraged Nebraska from seeking to enter long-term contracts. KS Ex. 82, 83; T:1661. Third, the Compact operates on an annual basis. Nebraska's compliance is measured only by whether her annual consumption is within her allocation.

Kansas also intimates it will be difficult for Nebraska to obtain water from the Bureau Projects in a timely fashion because Nebraska will have to navigate various bureaucracies. The evidence is to the contrary. T:1659-61, 1726. Moreover, not all purchases require Bureau approval. T:849, 1659-61. Rights to the natural flow of the Republican River can be purchased and transferred without Bureau approval. T:953-54. As a result, the various environmental clearances and related administrative processes applicable to Project water do not apply. Regardless, bureaucracy is no barrier to Compact compliance.

Finally, Kansas seems to suggest Nebraska cannot fund the necessary purchases. Yet again, contrary to Kansas' assertions, if it becomes necessary to purchase surface water, the evidence shows Nebraska can access the funds needed to acquire the necessary rights. T:951-53, 972, 978-79.

### C. The Crediting Issue and accounting changes may affect scope of compliance.

Finally, it is important to recognize that, depending how the Arbitrator resolves certain key issues, including Nebraska's proposed accounting changes and the Crediting Issue, the scope of any shortfall may be much less significant than currently thought. Indeed, it is possible that there will be ***no shortfall***, even under the most extreme drought scenario developed by any party. As reflected in the Table found on page 4 above, Nebraska is compliant with the most recent 5-year accounting period, and is not today relying on the Crediting Issue or any accounting change to ensure future compliance. However, the issues clearly have an impact on the scope of Nebraska's compliance through 2010.

Although clearly relevant to calculating future compliance targets, Kansas failed to contemplate the effect of damage payments made (if any) as a result of this process on future Compact accounting before determining the scope of Nebraska' future compliance obligation. T:749. As Nebraska has shown, any credit, if provided, will reduce Nebraska's five-year average for 2003-2007, 2004-2008, 2005-2009, and 2006-2010. Because Nebraska has demonstrated she will be in compliance in the future, the Crediting Issue affects only these accounting periods. Nevertheless, the scope of any shortfall, and indeed the likelihood that any shortfall even might exist, depends on how this issue is resolved. NE Ex. 15 at 11-12; T:745-750.

## NEBRASKA'S PROPOSED ACCOUNTING CHANGES

Because accurate subbasin accounting is necessary for Compact compliance, Nebraska examined the accounting procedures to ensure that they were reflective of actual hydrologic conditions. This examination revealed several important errors. In 2007, Nebraska voiced objections to the final 2006 RRCA annual accounting because she believed the errors in the RRCA's accounting procedures produced results that did not accurately reflect the hydrologic conditions of the Basin. Despite repeated requests, neither Kansas nor Colorado agreed to take any action to correct the accounting problems identified by Nebraska. Some of those accounting issues were addressed by the Arbitrator in the preliminary legal issues phase of the Arbitration. Three additional issues were tried before the Arbitrator: (1) CBCU accounting; (2) The location of ground water accounting points; and (3) Haigler Canal accounting. Each of these issues is addressed below.

### I. THE EXISTING CBCU ACCOUNTING DOES NOT REFLECT ACTUAL HYDROLOGIC CONDITIONS.

The Compact has two fundamental features: First, the Compact requires an annual determination of the beneficial consumptive uses to ensure no State is consuming more than its allocated share. Second, the Compact requires an annual determination of the virgin water supply ("VWS") of the Basin so that the annual allocations can be established. The original VWS and allocations set forth in the Compact were established using average annual streamflow data collected from

1929 to 1940. T:1297. If either determination does not reflect the actual hydrologic conditions of the Basin, the central purpose of the Compact cannot be achieved.

In 2007, Nebraska observed that the RRCA's accounting procedures produced CBCU results under certain circumstances, that were hydrologically impossible under actual conditions. Specifically, Nebraska found that the accounting procedures produced results that showed the impact of each state's respective groundwater CBCU and the IWS to be greater or less than the total impact to the stream. Stated in simple terms, the sum of the consumptive use parts does not equal the whole. The difference between the sum of the parts and the whole, represent residual water that in not accounted for by the existing procedures. In effect, the demand for water by two competing states exceeds the calculated supply. The practical consequence of this problem is that both the VWS calculation and the state Compact compliance determination, produce results not reflective of actual hydrologic conditions.

Not long after the problem was discovered, Nebraska, still in 2007, provided the RRCA with a review of the problem and an initial resolution. Nebraska's approach was rejected by Kansas specifically because it failed to meet what Kansas referred to as the "Virgin Water Supply Metric." NE Ex. 36. Accordingly, Nebraska subsequently secured the service of Dr. David Ahlfeld to further examine the problem and to develop a proposal to correct the accounting procedures, with

one critera – that it would satisfy Kansas's desired Virgin Water Supply Metric at the sub-basin level.

### A. Nebraska's Proposal Properly Accounts For the Model's Non-Linear Response and is closer to the Virgin Water Supply Metric than current accounting.

As a preliminary matter, Nebraska acknowledges that the non-linear response of the model does not in itself, cause a problem. What is a problem, is how those non-linear responses are addressed within the accounting procedures. For that reason, Nebraska focused its examination on how the accounting procedures could be modified to correct the non-linear model outputs.

Dr. Ahlfeld, along with other Nebraska consultants, ultimately concluded that using additional model runs would address the non-linear response of the model and produce accounting results that more closely reflect actual hydrologic conditions NE Ex. 30. Specifically, Nebraska proposes to use 16 runs of the existing RRCA Groundwater Model. These 16 model runs represent every combination of human activity that is considered by the accounting procedures. (*See* NE Ex. 30, Table 10.) Simply averaging the eight possible difference calculations possible with these 16 model runs for each state and the IWS produces results that all but eliminate the residuals. Without any further refinement, this correction produces substantially better results than the existing procedures. This corrective measure was presented to the RRCA in August of 2008 but not accepted by the other States. Nebraska, however, remains convinced that the adoption of

this measure alone would better comply with the Compact than the existing procedure.

Despite Nebraska's efforts, the other States ignored its proposal. Nebraska next attempted to further refine the results in an effort to eliminate the residuals entirely. To fully eliminate the residuals, the model runs were given coefficients to obtain a weighted average. These coefficients were derived algebraically, as explained by Dr. Ahlfeld. (NE Ex. 30; T:1092-1102). This weighted average produces results that ensure the sum of individual state's groundwater CBCU and the IWS was exactly equal to the total CBCU – and thereby produces a logical result that reflects actual hydrologic conditions. Furthermore, Kansas's expert acknowledged that this proposal is closer to Kansas's desired Virgin Water Supply Metric than the existing procedure. T:1294.

Because the original Compact VWS determinations were made before groundwater development had occurred in the Basin and from actual streamflows, a basic test for Nebraska's proposed solution is to compare its results to the Compact VWS. As illustrated by the testimony of Dr. Ahlfeld and by a simple comparison, Nebraska's solution clearly brings the calculated VWS closer to the historical conditions than does the existing procedure. In fact, using the Beaver Creek example, the existing accounting method indicates that approximately 16,000 of acre-feet of annual supplies simply disappeared from that basin. T:1298. Nebraska's proposal provides a result that better accounts for the water that would

have been in that Basin, absent the activities of man. Accordingly, Nebraska's proposal better conforms to the central purposes of the Compact.

**B. <u>The responses of Kansas and Colorado are without merit.</u>**

In an interesting "about face," Kansas rejects Nebraska's proposal in this Arbitration because it satisfies the very criteria Kansas demanded when it vetoed Nebraska's 2007 proposal – it meets the Virgin Water Supply Metric. *See* NE Ex. 36, T:1294, T:1337-1339. In so doing, Kansas revealed that under no circumstances will she accept an accounting change if such a change could result in less water being available to Kansas. Kansas holds this position even if the suggested change more accurately reflects the actual hydrologic conditions of the Basin and better serves the purposes for which the Compact was entered.

Kansas' expert report is little more than a regurgitation of its prior argument that the accounting procedure should not be disturbed because the parties had previously agreed to the procedure. Stated more directly, Kansas's experts argue that Nebraska's proposal should be rejected because "a deal is a deal." However, the evidence is to the contrary. T:700-01. In fact, when explaining the mechanics of the FSS to Special Master McKusick, Mr. Pope explained:

> While the settlement teams have worked hard to make the document comprehensive and significant changes are not expected, ***it is expected that there will be some modifications with the completion of the model to fully conform with its output and other changes may occur from time to time, as well as the possibility that advances in technology, for example, could allow for improved methods.***

KS Ex. 31 at 65 (emphasis supplied).

None of Kansas's expert witnesses conducted any substantive analysis of Nebraska's proposal that could be considered "expert" in nature. At times, the Kansas witnesses seemed to lack even a basic understanding of the Compact and the issues to which they were providing testimony. For example, Mr. Book had difficulty explaining the components of the VWS and testified that he couldn't "state exactly what the intention was with the virgin water supply [within the meaning of the Compact]." T:1301. Similarly, Mr. Larson opined on the propriety of Nebraska's accounting proposal but testified that he is "not an expert on the [accounting] procedures." T:1255. Most telling was the testimony of Mr. Barfield who, after providing historical background on accounting procedures from the reports of the Special Master, stated in response to questioning from the Arbitrator: "Well, I'm not an expert in the reports; I haven't studied them." T:1333.

Ultimately Kansas does not oppose Nebraska's proposal because the proposal does not more accurately account for the water supplies of the Basin. Rather she objects because the proposal could result in an increase to Nebraska's Imported Water Supply ("IWS") credit. In his testimony, Mr. Book reveals that increases to Nebraska's IWS credit would be viewed as detrimental to Kansas. T:1268-1272. Perhaps not surprisingly, Kansas attempts to minimize the legacy impacts of IWS on the one hand and maximize the legacy impacts of groundwater

pumping on the other. In fact, the IWS is enormous, growing and will have long-lasting impacts. T:1547-50.

Mr. Barfield testified that the canal losses from the Platte River are in the range of the entire VWS of the Republican River. Mr. Barfield specifically stated: "My understanding is they are on the order of 600,000 acre-feet, the canal leakage; that's in the range of what the virgin water supply to the Republican is in many years." T:1343. The short term reduction in this mound recharge would not be expected to have an immediate effect on the IWS Credit. In fact, as a percent of the mound recharge, the IWS would be expected to continue growing.

Only a few weeks ago, the USGS released a study entitled, "Changes in Water Levels and Storage in the High Plains Aquifer, Predevelopment to 2007", NE Ex. 47, which illustrates the extent and degree of Nebraska's groundwater mound. In that study, the USGS observed that the largest increase in groundwater levels within the eight-state aquifer, was in Nebraska's ground water mound region that provides the IWS to the Republican Basin. According to the USGS, the increase to the mound area was "84 feet." *Id.* Yet despite this data and information, Kansas attempted to obfuscate the issue by going back to its primary argument that "a deal is a deal." In fact, Kansas's primary expert on the IWS component of this issue, Mr. Book, admitted that he had not even bothered to examine groundwater heads in the mound area before appearing at the hearing. T:1290.

Kansas also offered its Exhibit No. 28, Figure 6 to argue that the difference between the sum of the individual impact and the simultaneous impacts was slight and therefore not worthy of consideration. As explained by Dr. Schneider, however, Kansas's analysis was flawed because it used a Basin-wide approach rather than a subbasin analysis. T:1540-44. This Basin-wide approach hides the impacts to individual subbasins, which can be substantial. Nebraska's exhibits, No. 42, 43 and 44 show not only a significant difference, but also a growing one in several subbasins.

Lastly, and perhaps most importantly, Kansas acknowledged that the existing accounting procedures fail to address the non-linear responses of the model. T:1332, T:1335-1337. Indeed, there is no disagreement on this point by any of the States as Colorado's expert report and testimony acknowledged the same. T:1402. By acknowledging the non-linear functioning of the Groundwater Model and how they are treated by the accounting procedures, Kansas and Colorado have effectively conceded that the accounting procedures produce results that cannot reflect actual hydrologic conditions. Fundamentally, if the model functions in an increasingly non-linear fashion as stream drying becomes more prevalent, the existing accounting cannot capture actual hydrologic conditions. Kansas cannot refute this point – and didn't even try.

Like Kansas, Colorado's expert witness, Dr. Schreuder, is a groundwater modeler, not a Compact accounting expert. Like the Kansas experts, the area of

Dr. Schreuder's expertise is, at best, tangential to the issue. That said, Dr. Schreuder's initial criticism of Nebraska's proposal was that in illustrating the problem, Nebraska chose a year (2003), in which the non-linearities of the model would be significant. T:1404-1405. Selecting a year in which the problem is most prominently highlighted, of course, is exactly the point of the illustration. Dr. Schreuder's objection, however, demonstrates exactly why Nebraska's proposal is so reasonable – it will not alter the accounting results under conditions where non-linearity of the model does not exist (e.g. when no stream drying is present). Stated alternatively, Nebraska's proposal operates only when it needs to, to ensure it captures the actual hydrologic conditions.

Dr. Schreuder also testified that the differences between Nebraska's August 2008 proposal and Nebraska's arbitration proposal (2009) to be significant. T:1383-84. Dr. Schreuder is wrong. As explained earlier, the only difference between Nebraska's 2008 proposal and the arbitration proposal was the assignment of weighted coefficients to the model runs in an effort to eliminate the residuals entirely. The actual difference in results is very small and either the 2008 proposal or arbitration proposal is superior to the existing procedures.

In truth, Colorado opposes Nebraska's proposal because it may make its own Compact compliance more difficult. This position was revealed when Dr. Schreuder testified that the magnitude of any error in the accounting was irrelevant to whether the error should be corrected. T:1409. Nebraska could not disagree

more. Nebraska contends that the magnitude of an accounting error bears directly on whether the accounting procedures should be changed. Unless the VWS and CBCU are accounted for to the best of the States' abilities, the central purposes of the Compact are being undermined.

While Dr. Schreuder stated that Dr. Ahlfeld's efforts in developing the coefficients to Nebraska's proposal amounted to "fun with math," T:1395, Dr. Schreuder's analysis of the Frenchman Creek instead displays his proclivity toward hydrologic frivolity. Although he testified that he did not ever examine the number of wells in the Frenchman Creek, never calculated the number of irrigated acres, and never calculated the volume of water pumped, he did not hesitate to conclude Nebraska's proposal resulted in impacts attributable to Colorado pumping as being too high. T:1410. Indeed, without examining any of the physical evidence, Dr. Schreuder simply concluded that depletions of a mere 19 acre-feet annually to the Frenchmen Creek, caused by Colorado pumping, was reasonable.

In fact, Colorado's use of water in the Frenchman Basin is substantial – over 93,000 acres are irrigated, and Colorado has over 350 wells. NE Ex. 41. Moreover, the recent USGS study, "Changes in Water Levels and Storage in the High Plains Aquifer, Predevelopment to 2007" NE Ex. 47, clearly shows that groundwater declines in the Frenchman Basin in Colorado near the stateline with Nebraska to be among the greatest in the Basin. Therefore, attributing depletions

of 19 acre-feet annually appears to be nothing more than "fun with hydrology." Nebraska's proposal would put the depletions attributed to Colorado at about 2,500 acre-feet – a mere 4% of the total depletions for that subbasin. Given the documented groundwater declines in Colorado, and the extensive groundwater use there, depletions of 2,500 acre-feet certainly appear to be more reasonable than 19 acre-feet.

Finally, it should be noted that the change suggested by Nebraska will add little preparation time to the accounting process. Nebraska's own implementation of its proposal revealed that it added only a few hours per year to the total time. Neither Kansas nor Colorado attempted to implement Nebraska's proposal and therefore had no basis to suggest the proposal should be rejected because it was too onerous to implement.

### C. Nebraska's proposed changes to CBCU calculation should be adopted.

Earlier in this proceeding, Kansas argued that no accounting changes should be made without the unanimous consent of all States. While the Arbitrator has already addressed that issue, some history may be of importance in considering the present issue.

In the early years of the RRCA, all three states unanimously voted to exclude non-alluvial groundwater from Compact accounting. As the years passed and uses grew, Kansas argued that all water hydraulically connected to streamflow

should be included in Compact accounting and like Nebraska now, made attempts to amend the accounting procedures. At that time, Nebraska resisted the Kansas attempts, arguing that the Compact required a unanimous vote to alter the Compact accounting procedures. By contrast, Kansas argued that the accounting procedures must be changed even against the desires of the other States if the procedures are not in accord with the Compact. Kansas prevailed on that issue and the accounting was changed.

Today, Nebraska has demonstrated that a significant accounting problem exists. In fact, the magnitude of the CBCU miscalculation, over time, will exceed the magnitude of Kansas's claims against Nebraska for over-use. Neither Kansas nor Colorado has advanced positions based on hydrologic reality. Nebraska's proposal does. For the reasons expressed above, the Arbitrator should acknowledge that the current accounting is flawed and recommend the adoption of Nebraska's CBCU proposal.

## II. SPILLBACK/RETURN FLOWS FROM THE HAIGLER CANAL TO THE ARIKAREE RIVER ARE FROM THE NORTH FORK AND SHOULD BE SO RECOGNIZED.

Under the present accounting procedures, all water diverted from the North Fork of the Republican River into the Haigler Canal (expressly referred to in the Compact, Art. V., as the Pioneer Canal), are presumed to be used on lands in the Main Stem of the Republican River. (The North Fork in Nebraska is defined in the Compact as being a part of the Main Stem sub-basin.) When the accounting

procedures were adopted, the States agreed to "investigate whether return flows from the Haigler Canal diversion in Colorado may return to the Arikaree River, not the North Fork of the Republican River, . . . [i]f there are return flows from the Haigler Canal to the Arikaree River, these formulas will be changed to recognize those returns." Accounting Procedures, page 26, footnote 2.

Nebraska responded to the commitment by the other States to investigate the location of any spillback/return flows. T:1192. Nebraska's investigation revealed that a significant volume of North Fork water was not only being used in the Arikaree subbasin but that spillback/return flows to the Arikaree River exceeded 1,100 acre-feet annually. NE Ex 31, Table 1. Moreover, if the spillback/return flow water goes past the Arikaree gage and back to the Republican River, it is essentially double-counted – it has already been counted as North Fork water and is then counted again as originating from the Arikaree sub-basin. The effect of the present accounting practice is to overstate the CBCU for the North Fork while overstating the VWS for the Arikaree River. The existing accounting procedures (in other locations in the Republican River Basin) assign return flows to the subbasin in which the water is applied – but not here. NE Ex. 31, Table 1. Despite the logic and clear evidence to support its proposed accounting change, neither Colorado nor Kansas has agreed with Nebraska.

The self-interest of the States toward Nebraska's proposal was highlighted by Colorado's witness, James Slattery. Mr. Slattery candidly admitted that the

problem with Nebraska's proposals on Haigler Canal and Accounting Points was that, "they [Nebraska] want to make Nebraska's piece of the pie bigger and it comes out of Colorado's portion of the pie." T:1350. Indeed, the criticisms of both Colorado and Kansas were not aimed so much at addressing the merits of Nebraska's position so much as they were focused on avoiding any changes that might diminish their share of "the pie."[22] In fact, both Colorado and Kansas approved a similar accounting change in 2008 regarding the Riverside Canal because neither was impacted by that particular correction. T:1194.

The primary substantive objection voiced by both Colorado and Kansas was that spillback to the Arikaree is typically lost to seepage before it gets to the Arikaree gage. There is no dispute that the Arikaree is now frequently dry and that spillback/return water may not get to the Arikaree gage – but that doesn't change the fact that North Fork water is nevertheless discharged into the Arikaree River and thereby directly or indirectly inflates the VWS. The Arikaree once flowed over 20,000 acre-feet annually. T:1373-74. The diminished streamflows could be the result of many different human activities but it is clear that any discharge into the stream, is a direct credit to that stream whether it is lost to seepage or not.

[22] As the Arbitrator correctly observed early in this proceeding, changes to how compacts are administered often revolve around whose interests are impacted.

Colorado also argued that return flows from irrigation occurring in the Arikaree subbasin would naturally appear in the Republican River itself. Mr. Slattery, however, testified that he used the Groundwater model to determine the flow gradient of the ground water system. Such a determination seems doubtful given that the Groundwater Model uses one-mile cells and the distance between the Haigler Canal and the Republican River is less than one mile. T:1369. If the Haigler Canal and Republican River are in the same model cell, or even in adjacent cells, no gradient would likely be determined. In any event, Colorado did not provide a reference or an independent analysis to support its contention.

## III. THE GROUNDWATER ACCOUNTING POINTS SHOULD BE CHANGED TO MATCH THOSE OF THE SURFACE WATER SYSTEM.

Nebraska's final accounting change seeks to match several groundwater accounting points contained in the Groundwater model, with the accounting points used for the surface water system. As explained in Nebraska's Expert Report on Accounting issues, several of the groundwater accounting points are located miles below the subbasin as defined in the FSS. NE Ex. 31. Although four of the subbasins for which Nebraska seeks corrections are not expressly defined in the Compact, the North Fork is defined. Accordingly, Nebraska contends that failure to change the accounting point for the North Fork is in direct conflict with the express Compact language.

As a general matter, the distance between surface and ground water accounting points interjects an element of inaccuracy or at least uncertainty to the accounting that should be eliminated. Nebraska's expert witness, Mr. James Williams articulated the problem with the existing procedure as follows: "[W]e are trying to calculate surface water at one location and groundwater consumptive use at another location. So there is a potential for some of the surface water passing that gage to then be consumed by the groundwater and, in effect, a double-accounting." T:1220.

As the Arbitrator observed, the FSS does contain language to address Nebraska's accounting points issue. T:1227-29. That said, Mr. Williams explained that Nebraska believes the change will result in "a more accurate accounting of the effects of groundwater depletion measured at that accounting point . . ." It is noteworthy that neither Colorado nor Kansas argued that the change would result in less accurate accounting. Moreover, the RRCA previously approved a similar change in the accounting point location with regard to Guide Rock. (T:1187-88). Again, Nebraska's efforts are aimed at improving the overall accounting to better reflect actual hydrologic conditions.

## IV. EFFECTIVE DATES OF THE ACCOUNTING CHANGES.

The Arbitrator asked that Nebraska to explain when its accounting changes should take effect. T:1566. This section addresses that question.

Nebraska formally objected to the 2006 annual accounting in 2007 when it first observed that the calculated VWS, IWS and CBCU did not appear to mirror actual conditions. Since that time, the final RRCA accounting has not been finalized in order to fully assess and resolve these key issues. Accordingly, Nebraska believes that its accounting changes should be applied to all years in which the accounting has not been approved by the RRCA. Nebraska does not seek to alter the official RRCA accounting for those years in which such accounting has been finalized.

## CONCLUSIONS AND REQUEST FOR RELIEF

As explained throughout this brief and during trial, Nebraska attempts to rely whenever possible on hard data to reproduce results that reflect conditions actually occurring in the Basin. Whether exploring actual losses in the Courtland Canal or attempting to recapture water "lost" under the current CBCU calculation, Nebraska is concerned first and foremost with accuracy and reliability. Kansas, in contrast, consistently relies on theoretical, modeled results, the assumptions or outputs of which are distorted to support inflated damage claims, to maximize the potential impact of future groundwater depletions, or to minimize the importance of the accounting errors Nebraska has identified. Accordingly, Nebraska respectfully asks the Arbitrator to find in Nebraska's favor on all issues.

Respectfully submitted this 24th day of April, 2009.

Jon Bruning
Attorney General of Nebraska

JUSTIN D. LAVENE
*Counsel of Record*
MARCUS A. POWERS
Assistant Attorney General
2115 State Capitol
Lincoln, NE 68509

DONALD G. BLANKENAU
THOMAS R. WILMOTH
Special Assistant Attorneys General
HUSCH BLACKWELL SANDERS LLP
206 S. 13th St., Ste. 1400
Lincoln, NE 68508

**REPUBLICAN RIVER COMPACT ARBITRATION**
**BEFORE MR. KARL DREHER, ARBITRATOR**

**CERTIFICATE OF SERVICE**

I, Donald G. Blankenau, Special Assistant Attorney General for the State of Nebraska in the above-captioned matter, hereby certify that I made service of INTRODUCTION AND SUMMARY OF THE EVIDENCE ADDUCED DURING THE HEARING, by causing a paper copy and an electronic copy on CD of the same to be delivered by FEDERAL EXPRESS on this 24th day of April, 2009 to:

**Karl Dreher, Arbitrator**
Dreher Consulting, LLC
9667 Timber Hawk Circle, No. 13
Highlands Ranch, CO 80126-7148

I further certify that I made service of INTRODUCTION AND SUMMARY OF THE EVIDENCE ADDUCED DURING THE HEARING by causing an electronic copy on CD of the same to be delivered by Federal Express on this 24th day of April, 2009 to:

**For State of Kansas**
John B. Draper
Special Assistant Attorney General
Montgomery & Andrews, P.A.
P.O. Box 2307
Santa Fe, NM 87504-2307

Samuel Speed
Assistant Attorney General
Memorial Hall, Third Floor
120 SW 10th Street
Topeka, KS 66612

**For State of Colorado**
Peter J. Ampe
First Assistant Attorney General
Federal and Interstate Water Unit
Natural Resources and
Environment Section
1525 Sherman Street, 5th Floor
Denver, CO 80203

Donald G. Blankenau
Special Assistant Attorney General
HUSCH BLACKWELL SANDERS LLP
206 S. 13th St., Ste. 1400
Lincoln, NE 68508

*For the State of Nebraska*