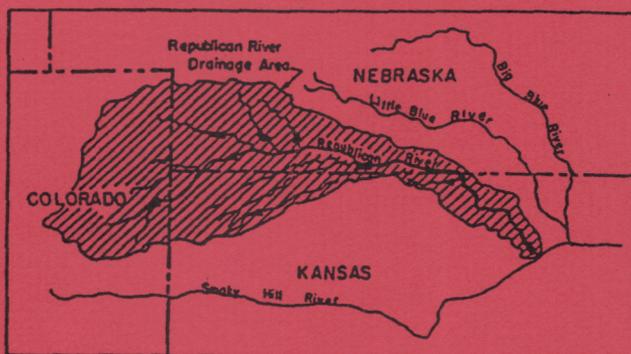




# REPUBLICAN RIVER COMPACT ADMINISTRATION

## THIRTY-SEVENTH ANNUAL REPORT



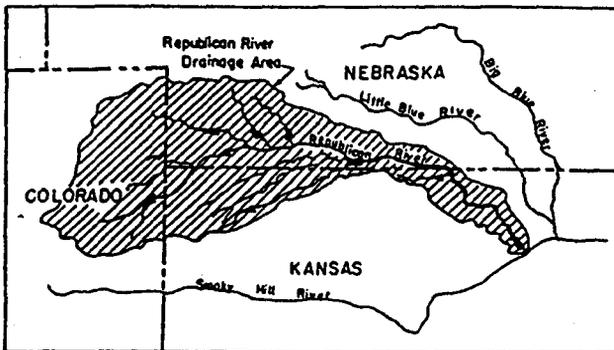
FOR THE YEAR 1996

Burlington, Colorado

June 5, 1997

# REPUBLICAN RIVER COMPACT ADMINISTRATION

## THIRTY-SEVENTH ANNUAL REPORT



FOR THE YEAR 1996

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# THIRTY-SEVENTH ANNUAL REPORT

## REPUBLICAN RIVER COMPACT ADMINISTRATION

In conformity with the Rules and Regulations of the Republican River Compact Administration, the Thirty-Seventh Annual Report is submitted as follows:

1. Pursuant to Rule 12, as amended, this report covers the period from June 7, 1996 to June 5, 1997.
2. Members of the Republican River Compact Administration are the officials of each of the states who are charged with the duty of administering the public water supplies and are as follows:
  - Hal D. Simpson, State Engineer, Colorado
  - J. Michael Jess, Director, Department of Water Resources, Nebraska
  - David L. Pope, Chief Engineer-Director, Division of Water Resources, State Board of Agriculture, Kansas
3. The Thirty-Eighth Annual Meeting of the Administration was held on June 5, 1997, at Burlington, Colorado. The minutes of the meeting are included in this report.
4. During the period covered by this report, three meetings of the Engineering Committee were held. A report from that committee together with the proposals from the three states regarding a definition of an alluvial well, a voluntary well metering proposal, computation of consumptive use, and the Committee's recommendation to the Administration are included in this report.
5. Reports were received from the Bureau of Reclamation on operation and administration of their projects in the basin of the Republican River, by the Corps of Engineers on the construction activity, and by the U.S. Geological Survey on their gaging stations in the same basin.
6. By consensus, Hal D. Simpson, Colorado member of the Administration, served as Chairman from June 7, 1996 to June 5, 1997.

**MINUTES**  
**38th ANNUAL MEETING**  
**REPUBLICAN RIVER COMPACT ADMINISTRATION**

The meeting was called to order by Chairman Simpson at 9:10 a.m., June 5, 1997 at the Burlington Country Club in Burlington, Colorado.

Those in attendance were:

| <u>NAME</u>      | <u>REPRESENTING</u>  |
|------------------|--|
| Hal D. Simpson   | Colorado Commissioner, Chairman                              |
| David L. Pope    | Kansas Commissioner  |
| J. Michael Jess  | Nebraska Commissioner  |
| Richard Stenzel  | Colorado Division of Water Resources / Engineering Committee |
| Bill McIntyre    | Colorado Division of Water Resources                         |
| Marta Ahrens     | Colorado Division of Water Resources                         |
| Dwayne Konrad    | Colorado Division of Water Resources                         |
| Bart Rickenbaugh | Colorado Attorney General's Office                           |
| David Barfield   | Kansas Division of Water Resources / Engineering Committee   |
| Leland E. Rolfs  | Kansas Department of Agriculture                             |
| Scott Ross       | Kansas Division of Water Resources                           |
| Earl Lewis, Jr.  | Kansas Division of Water Resources                           |
| Leif Holliday    | Kansas Division of Water Resources                           |
| Amy Aufdemberge  | Kansas Division of Water Resources                           |
| Donald L. Pitts  | Kansas Attorney General's Office                             |
| Ann Bleed        | Nebraska Dept. of Water Resources / Engineering Committee    |
| Don Blankenau    | Nebraska Department of Water Resources                       |

|                 |   |
|-----------------|---|
| Brad Edgerton   | Nebraska Department of Water Resources                                    |
| Mike Thompson   | Nebraska Department of Water Resources                                    |
| Steve Grazs     | Nebraska Attorney General's Office  |
| Russell Oaklund | Nebraska DWR, Division Manager at Cambridge                               |
| Wayne Heathers  | Middle Republican Natural Resource District                               |
| Ron Wunibald    | Lower Republican Natural Resource District                                |
| Terry Woollen   | Lower Republican Natural Resource District                                |
| John Thorburn   | Tri-Basin Natural Resource District                                       |
| Ralph Bast      | Frenchman-Cambridge Irrigation District, Nebraska                         |
| Roy Patterson   | Frenchman-Cambridge Irrigation District, Nebraska                         |
| Robert Andrews  | Frenchman-Cambridge Irrigation District, Nebraska                         |
| Robert Wallen   | Frenchman-Cambridge Irrigation District, Nebraska                         |
| Norma Sitzman   | Frenchman Valley/Hitchcock & Red Willow Irrigation Districts,<br>Nebraska |
| Mike Delka      | NE Bostwick Irrigation District, Nebraska                                 |
| Clayton Lukow   | Chairman, Blue River Compact, Nebraska                                    |
| Gil Gyllenborg  | Bureau of Reclamation, Grand Island, Nebraska                             |
| Jill Manning    | Bureau of Reclamation, Grand Island, Nebraska                             |
| Marvin Swanda   | Bureau of Reclamation, McCook, Nebraska                                   |
| Dennis Allacher | Bureau of Reclamation, McCook, Nebraska                                   |
| Linda Weiss     | U. S. Geological Survey, Nebraska   |
| Glenn Engel     | U. S. Geological Survey, Nebraska   |
| Michael Bart    | Corps of Engineers, Kansas City, Missouri                                 |
| John Draper     | Montgomery & Andrews, Santa Fe, New Mexico                                |
| Dale Book       | Spronk Water Engineers, Denver, Colorado                                  |
| Wayne Bossert   | NW Kansas GMD #4, Kansas  |
| R. E. Pelton    | Kansas River Water Assurance District #1, Kansas                          |
| Norman Nelson   | Upper Republican Basin, Kansas  |
| Gene Bauerle    | Colorado Ground Water Commission, Colorado                                |
| Ben Saunders    | Management Districts, Holyoke, Colorado                                   |
| Paul Hahlweg    | Marks Butte Management District, Colorado                                 |

Stan Murphy            Plains Groundwater Management District  
John Vasa               Colorado Land Owner, Holyoke, Colorado

### **APPROVAL OF MINUTES**

The Minutes of the 37th Annual Meeting of June 6, 1996, as published in the 36th Annual Report, stood as previously approved and signed.

### **REPORT OF THE CHAIRMAN**

#### **Commissioner Simpson**

Chairman Hal Simpson began his report by explaining how the Republican River Compact water was allocated between the three states based on an estimate of the virgin water supply derived from a study in the early 1940's. Each state has allowed its allocation to be used in various ways including tributary alluvial wells. The definition of alluvial wells will be discussed further during this meeting, including how the amount of water consumed by an alluvial well is determined.

Chairman Simpson reported that the Water Quality Control Commission and the Division of Water Resources are sampling 350 wells in the Ogallala aquifer in 1997 to see if there are trends developing with respect to water quality constituents. The sampling will be for nitrates and certain agricultural chemicals.

Chairman Simpson reported that the Colorado Ground Water Commission modified some of its rules for designated ground water in the Ogallala aquifer, not subject to this Compact, and dealt with well spacing issues and a water conservation reserve program. An increase in the number of hog growing and breeding operations and confined animal feeding operations continue to be of concern in this state. The issue is how to provide water to

these facilities. The Ground Water Commission and staff at the State Engineer's Office will be working on legislation and/or potential rules to deal with this issue because the impact on senior wells could be considerable.

Chairman Simpson reported that it was a quiet year in Colorado with respect to legislation on water in the past session. A bill to limit the effect of the proposed export of ground water from the San Luis Valley on artesian pressure failed in the Senate, however, this bill may come up again next year. As a result of Senate Joint Resolution 33, an interim water study committee was created to deal with water issues and, in particular, basin of origin issues. And finally, after a concerted effort last year, the water commissioner overtime line item for the Division of Water Resources budget was increased about thirty-five percent to fund overtime needs.

#### **REPORT OF THE COMMISSIONER FROM KANSAS**

Commissioner David Pope reported on some activities that took place last year in Kansas. There were no significant bills regarding legislation affecting water rights or allocation of water. However, there was significant legislation related to water quality standards and how they are established. The issue of hog operations has generated considerable controversy on whether they should be allowed or not, particularly with respect to the waste control aspect and protecting the water supply from contamination. Kansas' approach with regard to water rights is to allow these facilities to develop as may be appropriate under local control provided senior water rights are not affected.

Commissioner Pope reported on the on-going litigation between Colorado and Kansas on the Arkansas River Compact. The primary issues were the quantification of violations in terms of acre-feet for the years 1986 to 1994, and the current compliance issues pursuant to the amended rules and regulations of the Colorado State Engineer. The report from the Special Master will be coming out soon, which will give guidance regarding the remedy for past violations and quantification of violations for 1986 to 1994. Additional trial is expected

on the form of repayment.

Commissioner Pope stated Kansas has asked that Colorado install totalizing meters or improve the quality of estimates of ground water pumpage using the power coefficient method. Kansas is making substantial progress toward metering of water use in the Republican River Basin. Surface water right holders were required to install meters prior to the beginning of the 1997 irrigation season, and groundwater users have been required to install meters prior to the 1998 irrigation season. Surface water users who did not have meters installed by the 1997 deadline were ordered to stop pumping until their meters were installed, and similar action will be taken against groundwater users who do not have their meters installed by the 1998 deadline. Commissioner Pope suggested that Nebraska take the same measures with respect to wells impacting the flows of the Republican River.

Commissioner Pope reported on the sub-basin water resources management program. Background information, and ground and surface water data continue to be collected and evaluated in the Prairie Dog, Sappa, and Beaver Creek sub-basins. The intent is to develop management strategies, which will deal with limited water resources issues while considering the importance of the economy of the region.

## **REPORT OF THE COMMISSIONER FROM NEBRASKA**

Commissioner Michael Jess reported that the moratorium that the Department of Water Resources put into effect in the Republican River Basin for new surface water rights continues. The Legislature this year also passed legislation to provide authority to Natural Resources Districts to consider the effects of wells on the flow of streams.

Commissioner Jess reported on the negotiations that Nebraska and Kansas have been conducting to find resolution to issues under dispute. These negotiations continued until February of this year when Kansas walked out, however, Mr. Jess relayed that people in

related ground water and surface water management areas. A study of possible inter-related management areas was initiated in 1996, and is continuing. The first reports will be due from DWR next spring. Receipt of the material will be followed by public hearings. Additional input is expected from a three-year USGS study which will be underway soon. Funding for that effort was provided for by the Nebraska Environmental Trust.

Mr. Heathers noted that his district would be waiting for the studies to conclude, and that the NRD Boards would decide after the studies are finished whether they need a management area. Mr. Heathers also reported that his district recently started a program to share in the purchase of 100 water meters for wells pumping from alluvial aquifers. Finally, Mr. Heathers indicated the Legislature, realizing that the LB-108 studies will take a while, also passed a statute which permits NRD's to temporarily suspend well drilling for three years. The Middle Republican NRD is planning to hold a public meeting in September to consider implementing this legislation in either a portion or all of the district.

### **Ron Wunibald**

Mr. Ron Wunibald, General Manager of the Lower Republican Natural Resources District at Red Cloud, reported that the temporary suspension issue (new well construction moratorium) for either all or part of their district was tabled by the board in April. This same topic is on the agenda for the next board meeting.

He next reported on the EQIP program priority area and funding for water efficiency activities for the alluvial aquifer area. In connection with compact concerns, Mr. Wunibald said that his board established a 4-year metering program in April. That program is scheduled to begin in January of 1998. All 3,500 registered wells in the District will be metered by 2002. The schedule developed by the board calls for all alluvial wells to be equipped with meters in the first two years. Presently, of the 3500 registered wells in Mr. Wunibald's district, only five percent of them are metered.

Mr. Wunibald noted that there were areas within his district where they are still developing

wells. He noted that some wells are being drilled and capped for future use.

### **Terry Woollen**

In response to a question, Mr. Woollen explained that LB-30's temporary suspension of well drilling, if implemented, would not limit expansion of acreage served by an existing well, but he said that most everybody expands a well to the maximum acreage physically possible when they purchase the well.

### **John Thorburn**

Mr. John Thorburn, General Manager of the Tri-Basin Natural Resources District at Holdrege, stated that only six alluvial wells in his District are in the Republican River Basin.

It was said his board has agreed to a cost sharing formula intended to get flow meters installed on these wells. There are 1,280 wells outside the alluvium in his District within the Republican basin. His board is encouraging flow meter installation for each. Mr. Thorburn noted that no specific steps have been taken on any kind of temporary suspension in his District. His District will apply to the USDA for an EQIP priority area to aid in obtaining meters.

Mr. Thorburn said the static water level measurements were up an average of 1.7 feet for the spring readings obtained from the Ogallala aquifer wells. Mr. Thorburn was recently named to head a feasibility study for possible weather modification efforts in the Republican Basin in Nebraska.

### **Don Blankenau**

Mr. Don Blankenau reported on legislative activities of the Nebraska Unicameral. He stated that it was a very light legislative year with regard to this Compact. The first of two items which passed was LB-30, which went through very quickly. Provisions of that bill, which passed with the emergency clause, permit NRD's to institute a well construction

moratorium. The second item mentioned by Blankenau was funding for DWR's obligation under LB-108.

Mr. Blankenau noted that they had requested and received \$225,000 for LB-108 studies in 1997. Ann Bleed clarified that because this was the initial funding for LB-108, a scope of study plan for LB-108 studies was not yet finalized because the money had only recently been made available.

LB-30 is an amendment to LB-108, which passed the previous year. Mr. Blankenau clarified that LB-30 provides authority to NRD's to implement temporary suspensions on new well development, but does not provide authority to control the area irrigated or expansion of existing systems.

## **REPORT FROM THE BUREAU OF RECLAMATION**

### **Gil Gyllenborg**

Mr. Gil Gyllenborg, Area Manager of the Bureau of Reclamation's office in Grand Island, Nebraska, reported on the continuing reorganization and redevelopment of the Bureau. He stated that the draft strategic plan is available on the Internet. He also reported that a water conservation field services program office is located at the BOR Grand Island office. Mr. Gyllenborg also reported on the water quality study dealing with nitrates and atrazine which will be concluded this year, and the planning study that will start in FY98 that deals with wetlands.

### **Jill Manning**

Ms. Jill Manning provided a brief synopsis on the ongoing contract renewal process in the Republican Basin and the contract extension legislation bill, PL 104-326, which covers several districts in Nebraska and Kansas. They anticipate that the contract extension date

will be late 1999, but are always looking at ways of compressing the timeline to complete the activity before the 1999 due date.

Ms. Manring also reported that the Irrigation Project and Reauthorization Council has requested an exemption to the current BOR policy that contracts be signed and executed for a 25-year term. Commissioner Martinez is in the process of having individuals develop guidelines and criteria to determine whether exemptions will be granted to irrigation districts, which are expected to be finalized in the near future.

Ms. Manring discussed the on-going Resource Management Assessment (RMA) for the Republican River Basin. Forty-four what-if scenarios have been developed and are being refined to a smaller number that will be used in an EIS process.

Data collection efforts in the basin have recently been completed and they are currently waiting for the conclusion of the reports. The states of Nebraska and Kansas were coordinating efforts to collect aquatic and riparian information throughout the entire basin except in the Colorado portion. It was a two-year study and the reports will be made available to the general public upon request.

Ms. Manring reported on the water quality study and sampling to evaluate toxic irrigation return flows. Of all the elements that they analyzed, the only one with elevated levels was selenium. A basin-wide study sampling program will be conducted by a special interagency team to determine the significance of elevated selenium levels in irrigation return flows.

#### Marvin Swanda

Mr. Marvin Swanda, from the Bureau of Reclamation's McCook office, distributed the operation and maintenance report for 1996, and reported on the precipitation range, irrigation deliveries, reservoir operations, dam safety issues and seepage concerns. He stated that the Bureau is placing more emphasis on emergency management activities and they anticipate having annual orientation meetings. This year, they will be installing radios

at the dams to have contact with local emergency management officials, and will develop emergency action plans. Mr. Swanda stated that they are installing Hydromet equipment at various locations including diversion dams, and that information will be accessible through the Internet.

## **REPORT FROM THE CORPS OF ENGINEERS**

### **Michael Bart**

Mr. Michael Bart, with the Corps of Engineers in Kansas City, reported that the construction activity has been completed in the outlet works at Milford Dam and it is back to full operational capacity. Mr. Bart discussed the development of a potential project by the Kansas Department of Wildlife in the Milford Flood Control Pool consisting of several thousand acres of developed wetlands, which will be one of the largest wetland complexes in the State of Kansas. He stated that the Corps of Engineers would not be reallocating any storage at Milford for the wetland complex. Milford has been able to maintain its pool since the sixties, and since it is in the flood control pool quite frequently, there should be an adequate water supply for the wetland complex. Mr. Bart also commented on the tainter gate evaluations they are undertaking at Harlan County Reservoir for dam safety concerns.

## **REPORT FROM THE U.S. GEOLOGICAL SURVEY**

### **Glen Engel**

Mr. Glen Engel, from the USGS in Lincoln, Nebraska, reported on the sources of funding to operate gaging stations in the Basin. They operate fourteen stations, review and publish three other stations that Nebraska DWR operates, and maintain seven data collection platforms. Those records from the data collection platforms are available on the Internet. The 1996 water year records were computed and given to the Engineering Committee and

have been published in the annual data report.

## **ENGINEERING COMMITTEE REPORT**

Mr. Dick Stenzel, Colorado's Engineer Adviser, explained that this year's Engineering Committee report consists of a report and five attachments. The attachments consist of the following: (1) Attachment A, Kansas' proposal to the Administration regarding alluvial wells; (2) Attachment B, Nebraska's and Colorado's proposal to the Administration regarding alluvial wells; (3) Attachment C, the Lower and Middle Republican Natural Resource Districts' meter proposal; (4) David Barfield's response to the meter proposal; and (5) the Engineering Committee recommendation to the Administration regarding the Blaney-Criddle method.

Mr. Stenzel stated that the Engineering Committee was assigned the responsibility by the Commissioners to look at coming up with a standard method of computing consumptive use and also to determine which wells should be included in Compact calculations. They met in McCook three times and most NRD's were also present. The Committee reached agreement on the methodology for determining consumptive use for pumping where no metered data is available (Blaney-Criddle), and this recommendation is provided in the last attachment to the Committee's Report (pages 19 and 20). Mr. Stenzel summarized how the Engineering Committee determined consumptive use associated with ground water pumpage from wells. The harder issue was to determine which wells are part of the current methods of the Compact Administration in the virgin water supply calculation. The Engineering Committee agreed that there was a potential and probable depletion to Compact virgin flows caused by wells outside the alluvium. However, a difference of opinion occurred as to whether or not they should consider those wells outside the alluvium. Attachment B to the Report of the Engineering Committee is Nebraska's and Colorado's written proposal as to how to look at the wells within the alluvial fill boundaries and to determine which wells affect the alluvium when they are pumping; and Attachment A is Kansas' written proposal which looks beyond that boundary. Both proposals were

presented to the Commissioners. Mr. Stenzel noted that the Committee made no attempt to perform virgin flow calculations or an allocation analysis. This was the second year the Committee did not perform these calculations. It was decided that until the Administration could provide guidance as to which wells to include in the current methods for Compact calculations, no numbers should be produced.

Mr. Stenzel discussed the concerns regarding relying upon metered data and developing standard criteria on how meters should be installed, how to verify claims on the water user surveys, and when to do field surveys to verify information. He questioned the Administration whether they wanted the Engineering Committee to develop guidelines for meters, surveyed results, and irrigated acreage.

Mr. Dave Barfield, Kansas' engineer, provided some background on concerns expressed in the past to the Compact administration regarding continuing declining estimates of virgin water supply, and his opinion that the current formulas and methods are not comprehensive enough when considering the impacts of ground water on the basin's water supply. He explained that including only wells within the alluvial-fill formation does not produce better estimates of the water supply in the basin nor the impact of man on that supply. Kansas' proposal (Attachment A) is a procedure that would define which wells Kansas believes are within the scope of the current formulas, but is not an attempt to address the broader issues of the impacts of Ogallala pumping.

Mr. Barfield further explained that the dispute within the Engineering Committee began when Nebraska presented some of their work which redefined what wells Nebraska would consider as alluvial wells under the current formulas of the Compact Administration. That redefinition resulted in a significant decline of the number of wells which Nebraska would include in Compact calculations for consumptive use, especially in the Frenchman sub-basin.

Mr. Stenzel added that another time-consuming difference was to attempt to agree to a common definition of an "alluvial valley-fill" formation, determining where the alluvial wells

were, and how to handle wells as the water table changes in that alluvium (wells that may be multi-completed). Attachment B provides Colorado's and Nebraska's definition of the boundary and explains how to handle wells within that boundary. Mr. Stenzel noted that discussions between the Engineering Committee broke down when the states could not agree whether those wells located within the "alluvial valley-fill" formations, as defined in Attachment B, should be the limit of wells considered under the current formulas for consumptive use.

Commissioner Jess moved receipt of the Report of the Engineering Committee. Commissioner Pope seconded with a clarification that they are only receiving the report and not necessarily taking any action on the recommendations. Mr. Jess stated that that was his intent. There were no objections so the report was received. Commissioner Jess stated that since the Committee was unable to reach a fundamental agreement on principles and a report on water use and virgin flows, he suggested that the Committee be instructed to prepare multiple tables reflecting the independent calculations of each state. There were concerns expressed by both Commissioners Simpson and Pope regarding whether three sets of computations would be provisional, and, if not, whether and how multiple computations could be useful to the Administration.

Mr. Stenzel stated that one of the problems that may arise in developing Table 2 is if the Engineering Committee members cannot agree with each other's maps of what the valley-fill boundaries and compact wells are. They have to know which wells were included in each state's calculations in order to determine if they want to develop their own report showing what they believe is appropriate for the other state's water use. For example, Kansas would need data for those wells that were dropped from the calculations by Nebraska in the past, and that Colorado and Nebraska would have to provide Kansas necessary data if Kansas needed it to perform calculations under Attachment A.

Ann Bleed noted that any alluvial-fill definition adopted by the Committee would have to be applied equally in all three states. She further stated that the key to accepting information data as presented by each state is to establish uniform guidelines that all three states can

live with in developing their data. Once those guidelines are established, each state would use them to develop an alluvial map. If these guidelines were the same guidelines used by the USGS, the Engineering Committee could use their maps, but at this time it is impossible to know whether the USGS maps would fit the Committee's guidelines.

Mr. Stenzel reviewed the portion of Nebraska and Colorado's proposal to develop a map by August 31, 1997. Chairman Simpson noted that the mapped alluvial boundaries would be helpful to all states to perform calculations under both Kansas' proposal and Nebraska and Colorado's proposal. He suggested that an assignment to the Engineering Committee could be to move forward with only that portion of Nebraska and Colorado's proposal which called for constructing a map. Commissioner Pope noted that that would make sense, provided that necessary information, such as reliable irrigated acreage and reliable pumpage data, is made available to Kansas to perform calculations under its proposed Attachment A.

Considerable discussion then took place between Commissioners Pope and Jess concerning what data would be made available by each state. Specifically, they debated which wells located outside of the alluvial boundaries should be included. Mr. Jess stated that if Kansas wanted to come to Nebraska to collect the data they would need, they could do that. Mr. Pope noted that the idea of creating three separate tables of calculations by each state becomes meaningless if Kansas does not have reliable data from which to create the tables according to the Attachment A method. Mr. Jess agreed.

Members of the Engineering Committee discussed the error in the report with regard to Kansas' perspective to show all the wells within one mile of the boundary, instead of one-half mile. Nebraska requested time to confer on whether they can go one mile at this point because they interpreted what was said in the report as one-half mile and whether they could meet the August 31, 1997, timeline if the distance is one mile since it would enlarge the study area.

After conferring during the lunch break, Commissioner Jess reported that it would take them a full year to prepare the maps if all wells one mile from the alluvial boundary were included. Kansas offered to work with maps that would depict only wells within one-half mile from the alluvial boundary so the maps could be completed before a full year. However, the one-half mile boundary on the maps would not limit the wells for which Kansas would require necessary data to perform calculations under Attachment A.

Discussion then focused again on obtaining data on well pumping for wells outside the alluvial boundary if Kansas needed it to perform calculations under its proposed Attachment A. David Barfield stated that Kansas would need access to Nebraska's updated well registration data, as well as any necessary well logs. Mike Jess noted that those were public information.

Commissioner Pope stated that he would agree to the creation of a map of the alluvial boundaries, if he had assurances that Nebraska would provide necessary information, whether it was reliable irrigated acreage and reliable pumping or metered data, or whatever necessary to perform calculations under Attachment A. He stated that he was not agreeing that the map would represent what is the true alluvial aquifer effects on the stream, but rather would be used by each state to perform calculations under their proposed methodologies.

Commissioner Simpson stated that if Colorado were requested to provide usage on wells within a mile of the alluvial boundary, they could probably do it. Commissioner Pope stated that if Kansas could not get the necessary data, then he was not going to agree to do the mapping, only to have calculations under Attachment B be possible, but impossible under Kansas' proposed Attachment A. Following further discussion, Commissioner Mike Jess stated that he would not want to put Kansas in that position and agreed to provide Kansas access to the necessary information to compute Compact calculations under Attachment A.

## **ASSIGNMENTS TO THE COMPACT'S COMMITTEES**

Chairman Simpson summarized the three assignments for the Engineering Committee, which were as follows: (1) Do the mapping by August 31, 1997, exchange that information and six months later provide the Commission with an agreed upon final set of maps. (2) With regard to the Engineering Committee recommendations on pages 19 and 20 of the Engineering Committee Report, develop and provide guidelines to the Commission on meters and on how to ascertain acres irrigated. (3) Perform computations for 1997 that generate Tables 1 and 2, but let each state develop their own set of basin-wide tables with the understanding that they represent each state's position, but are not necessarily agreed upon as a whole. The deadline for these is the next annual meeting.

Commissioner Jess stated that Nebraska would develop a set of criteria to determine the number of irrigated acres for 1997 and, if data and time are available, attempt to redevelop the irrigated acres for 1995 and 1996. With these data, Tables 1 and 2 could be prepared for 1995 and 1996.

It was agreed that the Engineering Committee would perform the calculations for 1997 and, if resources are available, attempt to do the calculations for 1995 and 1996.

## **LEGAL COMMITTEE REPORT**

Chairman Simpson introduced Bart Rickenbaugh, who is replacing Cliff Seigneur, as Colorado's representative on the Legal Committee. Commissioner Pope appointed Amy Aufdemberge as DeAnn Hupe Seib's successor on the Legal Committee. Don Blankenau stated that the Legal Committee has nothing to report at this time. Chairman Simpson said there are no assignments for the Legal Committee.

## UNFINISHED BUSINESS

**Kansas' continued concerns regarding administration and enforcement of the Compact** – Commissioner Pope reported on the issue that has been going on for a number of years with regard to disagreement between Kansas and Nebraska over the lack of Compact compliance. Commissioner Pope distributed copies of his written comments and asked that his written comments be made an attachment to the Minutes as part of the record. He summarized his comments and stated that Kansas put a lot of time and expense into the mediation effort, however, it became clear that it was not leading to the resolution of their concerns about violations of the Compact by Nebraska. Consequently, Commissioner Pope noted that he reluctantly terminated the mediation process by letter of March 6, 1997 to Commissioner Jess. He also asked that a copy of this March 6, 1997, letter be attached to the Minutes.

Commissioner Pope stated that the states have struggled with the determination of what should be included as ground water pumping which affects the virgin water supply of the Republican River basin under the Compact formulas. He noted that the states are getting further apart in that regard.

Commissioner Pope stated that Kansas began many years ago to express concerns over how the Compact Administration should handle shortages, and its concerns regarding Nebraska's overuse of its Compact allocation, Nebraska's continued escalation of consumptive uses in the Basin, and the corresponding longer and more frequent shortages of water to Kansas.

Commissioner Pope noted that Kansas has submitted proposals in the past, but Nebraska has not accepted them. In 1990, Nebraska began taking the position that ground water should not be included in Compact calculations. The only resolution offered by Nebraska has been to re-negotiate the Compact. He stated that Nebraska is not meeting its obligations or taking meaningful action to come into compliance with the Compact. Ground water pumping in the Republican River Basin in Nebraska continues

to expand even after years of complaints by Kansas. It was Nebraska's refusal to recognize its obligations under the Compact to control depletions of the Republican River which led to the breakdown in mediation earlier this year. Commissioner Pope further noted that since action of the Compact Administration requires unanimous approval by all three states, it is futile to try to resolve broader concerns in this forum.

Commissioner Jess responded to Commissioner Pope's comments and stated that Nebraska has done quite a bit. He reported that the Legislature has passed a number of bills in response to the claims by Kansas and he summarized the various bills.

Commissioner Jess summarized by saying these efforts point out Nebraska has not just been sitting by and doing nothing. Mr. Jess stated that Mr. Pope should recognize that Nebraska has not traditionally had the extent of water regulation that either Kansas or Colorado has had. Mr. Jess stated that time schedules inherent in legislation were discussed earlier, and Kansas should realize the local NRD's would get to a point where Kansas desires before the end of the century. He stated that that was moving quite quickly considering the board members of NRD's are locally elected.

Commissioner Jess went on to say that new proposals are being developed in Nebraska. When finished, they will be shared and Nebraska officials will meet with Kansas at any time or place mutually convenient to discuss. Mr. Jess emphasized that Nebraska wants to resolve this dispute. He added that Nebraska's 1997 report will be more complete than in the last couple of years. With reference to Nebraska's recently enacted legislation, Chairman Simpson added that progress has been made, albeit slow, but a moratorium on well construction would make a lot of sense and show good faith while moving forward on issues that are difficult to resolve.

Commissioner Pope stated that one of Kansas' frustrations is that over the last ten or fifteen years, Kansas and Colorado have recognized the problem and closed areas to new appropriations, adopted moratoriums, and the like, to control both ground and surface water use. In all of those years, development continued to occur in Nebraska

essentially unchecked. At this point in time, stating that a moratorium would fix the problem is not adequate. Kansas' concerns go much beyond that. All of the legislative activity, to date, in Nebraska lay the groundwork for possible regulatory action in the future. They are possibilities, not actions. Kansas is at a point where they want to hear more than discussions, they want to start seeing action.

Commissioner Pope stated that he heard Mr. Jess' suggestion to listen to the possibility of future proposals, but that he can only deal with what is before him at this point in time, which is no proposal officially endorsed by Nebraska.

Commissioners Pope and Jess entered into a discussion following Mr. Jess' request to have access to historical documents acquired by Kansas by a private research consultant. Mr. Pope noted that Mr. Jess made the same request last year and that Kansas' position on this matter has not changed: Kansas is willing to share the information if Nebraska pays for its fair share of the costs associated with acquiring it. Kansas has invested time and money in looking for these documents. Mr. Pope noted that Kansas has carried the burden over the years to resolve the dispute. Kansas has developed and made numerous proposals, none of which have been accepted by Nebraska thus far. Mr. Pope stated that it was only fair for Nebraska to pay its share of the historical research, especially considering that there is no commitment from Nebraska to take meaningful actions to resolve the dispute. No agreement was reached. Mr. Jess responded that if Kansas could not provide the documents to Nebraska free of charge, any efforts to find middle ground between the two states is stymied.

## **NEW BUSINESS**

**Engineering Committee Members for 1997** - Commissioner Jess nominated the General Managers of the four Natural Resources Districts. They include John Thorburn, Ron Wunibald, Wayne Heathers, and Virgil Norton. Ann Bleed added that she would like the record to state that these four local water entity managers attended all the meetings and

were very actively involved in the report. Discussion took place on whether their signatures should be included in the report. Chairman Simpson stated that they should be recognized as participants, but it is not necessary for all of them to sign the report. Kansas' members include David Barfield, Leif Holliday, Scott Ross, and Earl Lewis. Colorado's members are Dick Stenzel, Bill McIntyre, and Chuck Roberts. Nebraska's other members are Ann Bleed, Michael Thompson, and Russell Oaklund.

**USGS funded gages** - Commissioner Pope stated that the Republican River Compact administration strongly supports the continuation of federal funding for the gages currently operated by the U.S. Geological Survey in the Republican River Basin for Compact purposes. Commissioner Pope moved a formal resolution in recognition of the USGS responsibilities under Article IX of the Republican River Compact to collaborate with the states in the collection of water facts needed for administration of the Compact, and in view of the importance of data the USGS has historically collected and continues to collect in its federal program in the Basin, and the importance of the data in the computations of the Republican River Compact Administration. Therefore, the Republican River Compact Administration strongly supports the continuation of federal funding for the gages currently operated by the U.S. Geological Survey in the Republican River Basin.

Commissioner Pope requested that Chairman Simpson write a letter to the appropriate officials conveying the general message that the U.S. Geological Survey maintain a high priority for interstate water gages as the USGS re-evaluates its priorities in terms of what to fund with its available resources. Commissioner Jess seconded the motion.

Chairman Simpson stated that he also supports this and that it is sufficient to move the resolution. He requested a copy of the resolution to use in writing the letter.

Commissioner Pope recognized Ron Milner, who could not attend the meeting, for his help to the Compact administration and to the states.

## REMARKS FROM THE PUBLIC

There were no remarks from the public attending the meeting.

## SETTING OF THE 1998 ANNUAL COMPACT MEETING

The Compact Administration selected June 4, 1998, for its next Annual Meeting to be held in Colorado. Chairman Simpson suggested the Burlington Country Club again for the location.

## ADJOURNMENT

No response was given when Chairman Simpson asked if there were any final comments from either Commissioners. Commissioner Jess moved to adjourn. Commissioner Pope seconded the motion. The meeting adjourned at 2:20 p.m.



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Hal D. Simpson  
Colorado Commissioner (Chairman)



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David L. Pope  
Kansas Commissioner



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J. Michael Jess  
Nebraska Commissioner

## Appendix A

### Summary

#### **Report of the Engineering Committee For the Republican River Compact Commission Special Project Concerning Standard Consumptive Use Methods And Standard Method of Determining Which Wells Should Be Included In Compact Calculations**

The Engineering Committee for the Republican River Compact Commission met on July 11, August 6, and September 6, 1996 in McCook, Nebraska. Attending all of the meetings were David Barfield and Scott Ross from Kansas DWR; Ann Bleed, Michael Thompson, and Russell Oaklund from Nebraska DWR; and Dick Stenzel from Colorado DWR. Leif Holliday of Kansas DWR attended the August 6th and September 6th meetings. Bill McIntyre from Colorado DWR attended the July 11th meeting while Chuck Roberts of the Colorado DWR attended the August 6th and September 6th meeting. Also in attendance at all of the meetings were John Thorburn of the Tri Basin NRD; Ron Wunibald of the Lower Republican NRD; and Ronald Milner of the Upper Republican River NRD. The Middle Republican NRD was represented by Wayne Heathers at the July 11th and August 6th while Dan Smith attended the September 6th meeting. On August 6th James Goeke and Vince Dreeszen of UNL-CSD, and Ben Saunders and Gene Bauerle of Colorado groundwater management districts were also in attendance. The Engineering Committee also held two telephone conference calls on April 14th, 1997 to discuss the final recommendations to the Republican River Commissioners and to agree on what issues remain unresolved.

### Agenda

At the Annual Meeting on June 6th, 1996 the Engineering Committee was requested by the Republican River Commissioners to: 1) Define what is to be considered as an alluvial well and thus considered as part of the Compact calculations in each state; and 2) Develop a standard method that will be used by all three states to calculate the consumptive use for wells that do not have a meter or don't report the amounts pumped. The recommendations of the Engineering Committee were to be made by the end of October 1996 and the Commissioners then would act on the proposals by the end of the year. After the Commissioners approve the recommendations of the Engineering Committee the 1995 report on virgin water supply and consumptive use will be finalized.

## July 11th Engineering Committee Meeting

This meeting first of all reviewed once again in greater detail the current methods used by each state to calculate depletions associated with groundwater irrigation both when pump records or power records were available and also what was done if only survey data were available. This was originally discussed at the May 1995 Engineering Committee meeting in Lincoln. For information beyond that described below see also the detailed discussion of the procedures used by each state as discussed in the 1995 Engineering Committee report.

Kansas reported that it uses its water-use reporting program to determine diversions for each surface water and ground water right included in the computations. Kansas statutes require water use reports from all water right holders to be submitted annually. The Division aggressively pursues complete reports for each of its water uses. The Division and the Kansas Water Office review the reports submitted by each water right holder for completeness and consistency and follow up on problem reports. Kansas uses metered data when available to calculate the amount of water pumped for irrigation. Currently only 20% of the wells are metered, but all wells that Kansas believes that have an immediate impact on the compact will be metered by June of 1998. Currently when meter data is not available Kansas uses the reported hours and the rate pumped, as submitted annually by all water right holders, to calculate diversion amounts. They review the amount reported each year and have full time staff who enforce perceived violations involving over pumpage and follow-up apparent problems which may include field checks if it is felt necessary. They don't use Blaney Criddle since they believe their program of water use reporting and review provides for accurate determination of water use. .

Colorado uses the results of an annual survey to determine the type crops grown. They estimate the return rate for their surveys was around 50%. Colorado feels there are only 133 wells that pump from what they define and have field verified as the alluvium and thus have an impact on the compact. A questionnaire has annually been sent out since 1989 to determine the irrigated acreage and type crops grown. It was assumed that permitted acreage was irrigated if questionnaires were not returned to the State Engineers Office. It was also assumed that an average crop mix similar to that determined by the questionnaire results occurred for the wells that did not have questionnaires returned. The consumptive use for the various crop types is calculated using the TR21 modified Blaney Criddle method. No elevation correction is made and it is assumed that the crops receive a sufficient water supply to meet the potential consumptive use. The amount of water needed to meet the potential consumptive use was reduced by the effective precipitation. This value then was divided by 75% to allow for irrigation application efficiencies as required by the compact and was reported as the amount pumped by the farmer.

In 1995 Nebraska used the metered data available in the Upper Republican Natural Resources District (NRD) to arrive at the amount of water pumped in that district. Over 95% of the wells in this NRD are metered. There are approximately 3200 wells in the district. In 1995, 256 of these wells were considered to be compact wells. The Upper Republican NRD reads the sealed meters on all wells annually and services all meters in the district every two years. The other districts in the Republican River basin have some wells metered but the NRD's relied on questionnaire results to determine well usage. The NRD's questionnaire asks if the wells were used during the

past year and also asks if the well was commingled with any other wells or with surface water permits to irrigate the same lands. The questionnaire results are then used to determine the number of acres irrigated. On wells for which a questionnaire was returned, the acreage reported on the questionnaire was used. Where no questionnaire was returned, the state assumed the well was used to irrigate the number of acres listed on the well registration, with some adjustment for overlap of acres on wells known to be used to irrigate the same fields. Until this year, Nebraska assumed that 26 inches of water was needed by the crops that were grown on the irrigated lands. This number was then reduced by the total precipitation reported at weather stations located in and around the area during the period of April through August. The precipitation was distributed using Theissen polygons. The values obtained using this procedure were then multiplied by the number of acres irrigated within each polygon to determine the amount of water pumped within each precipitation polygon. No correction was made to account for irrigation efficiency.

The balance of the meeting involved a discussion of what methodology should be used to determine ground water depletions when pumpage estimates are not available or reported. Two analytical methods were discussed by the states. Bleed proposed the use of the Penman Monteith to determine potential consumptive use and stated that the calculations of crop water needs were reported at numerous weather stations in Nebraska.

Stenzel described the Blaney Criddle method and the tools that Colorado was willing to develop for the compact states if this procedure was adopted. While acknowledging that the Penman Monteith procedure probably gives a better estimate of potential consumptive use, Stenzel still questioned the use of the method due to the lack of all the information being available at all the stations currently being used in Nebraska and Kansas. Data needed for the Blaney Criddle Method is readily available at all the stations currently being used by each state. He also stated that metered results in areas of Colorado would seem to indicate that the farmers are applying something less than the calculated potential crop requirement regardless of which method was used. However, Stenzel said that Colorado did not currently make any adjustment and felt that this provided an incentive to meter actual amounts pumped. Heathers suggested that the full potential crop requirements should be adjusted by 10% to recognize the inability to meet the full crop requirement. Bleed concurred stating an explicit adjustment to accommodate the problem was preferable to using a method which is considered to be inaccurate. Several NRD representatives agreed that by not allowing for an adjustment to the calculated values it would appear it may give the impetus to get meters installed and pumpage amounts reported. It would appear this would be especially true if farmers felt that the calculated values were excessively high.

Antecedent soil moisture was questioned as a further adjustment to the amount of the irrigation water that was needed to meet the crop needs. Stenzel said he would run the program to show the difference using the TR21 Blaney Criddle method. There is a direct correlation to the amount of antecedent soil moisture that exists and the irrigation requirement. For example if there is 2" of moisture in the soil at the beginning of the irrigation year and it is all used to meet crop needs, the amount of irrigation water that will be needed to be applied for that year will be reduced by 2". There was some question as to how the antecedent soil moisture values would be obtained. No

decision was arrived at during this meeting. Bleed asked if the crop curves and precipitation curves provided in the TR21 manual should be adjusted to meet local conditions.

The NRD's representatives asked Kansas to consider what procedure would be acceptable to them if the Nebraska NRD's obtained unverified pump records from their farmers. Barfield stated that it is important to assure whether adequate installation of the meters occurred and the reported pumping amounts should be checked out if they appear unreasonable. He also expressed concern with the use of the survey data without some type of verification. He wanted more time to think about what should be required.

### **August 6th Engineering Committee Meeting**

Bleed and Thompson discussed the results using the Penman Monteith procedure at selected sites in Nebraska. Stenzel provided the results of the Blaney Criddle methodology and demonstrated how the Colorado computer program developed by the SCS worked. Barfield and Holliday also provided the output from their Blaney Criddle calculations for selected stations in all three states. Bleed stated that even though Nebraska felt that the Penman Monteith procedure was the more accurate method that Nebraska would accept the use of the Blaney Criddle (B/C) method. It therefore is recommended by the committee that:

**For the period 1995-1997 when pumpage estimates are not available and after 1997 when metered pumping data is not available the modified TR21 Blaney Criddle method shall be used to determine the consumptive use per acre.**

In Colorado no antecedent soil moisture should be assumed. NRD's in Nebraska other than the Upper Republican NRD can assume a 2" antecedent soil moisture exists. An elevation correction will be used by both Colorado and Nebraska and effective precipitation will be calculated using the standard TR21 methodology. Crop curves that will be used shall be the standard curves that exist in the TR21. The values derived by using the above procedure will be divided by 75% to arrive at the amount of ground water pumped to meet irrigation needs. If any state seeks to use a different crop curve than that provided in TR21, the curve must be approved by the Engineering Committee.

If the Commissioners approve the use of the Blaney Criddle method, Colorado will develop a computer tool to calculate the TR21 Blaney Criddle values using the agreed upon procedures described above and provide the tool that will be used by all the member states when metered data is not available.

The NRD's again asked Barfield what Kansas would require before they would allow them to use metered data. Several ideas were suggested. If a meter was found to be faulty, then the NRD would use the TR21 Blaney Criddle method to determine the total water pumped by that well for the irrigation season. The Committee agreed that NRD's should propose a program of their own at the September 6th meeting showing what they feel would be an acceptable program in

order to use metered data in the future. It should describe the quality checks that will be used to verify data and when the NRD will consider the data reported as reasonable versus when they will require further investigation or analysis. If or when Colorado seeks to also use unverified pump data, they agreed they will have to submit a proposal of the method to be used and get committee approval of the proposal prior to using reported data.

Each state also described which wells they considered as being compact wells. Ross provided detailed handouts regarding the process that is used by Kansas to determine which wells are to be metered in the Republican River basin. Kansas believes their methodology should be considered by all three states to define wells that impact the compact and for purposes of determining the consumptive uses and virgin flows in the Republican River or its tributaries. (See Attachment "A")

Nebraska next described their procedures for identifying which high capacity wells are considered to be alluvial. Before 1991 all wells within a mile of the thread of a perennial stream and not completed in a bedrock aquifer were considered to be alluvial wells. In 1991 Nebraska changed the list to include wells within the alluvial valley without regard to distance from the stream channel and without regard to whether a stream reach is indicated as perennial on United States Geological Survey (USGS) 7 ½ minute series topographic maps. The published USGS map Hydrological Reconnaissance of the Republican River Basin, Nebraska by Mike Ellis, 1981 was used in conjunction with well surface elevations to approximate alluvial thickness. Wells with a depth exceeding 120% of the estimated alluvial thickness were eliminated. This process was not a significant limiting factor when considering wells within the Republican River valley, since the base of its alluvial aquifer overlays relatively impermeable shale and some limestone to the east. On the tributaries, few wells in the alluvial plain were eliminated from the Compact tabulations by the depth test.

In 1995, Nebraska hired Dreeszen of the University of Nebraska Conservation and Survey Division to help make a new determination of alluvial wells in the Republican River Basin. Dreeszen checked the logs of wells within stream valleys as indicated on USGS topographic maps. He reviewed wells on Nebraska's 1994 list of Compact wells and others in the vicinity. Dreeszen also identified additional wells he thought might be alluvial. A brief review of the wells along the main stem convinced Dreeszen that the boundaries as noted on maps from the USGS publication Ground Water in the Republican River Basin in Nebraska by H.A. Waite, E. C. Reed and D.S. Jones, Nebraska Water Resources Survey Water Supply Paper 1, 1944 were accurate. Therefore, Dreeszen focused on determining the extent of alluvial wells along tributary streams. Based on well logs Dreeszen identified three general formations in which wells have been developed. The alluvium; the Ogallala formations; and Pliocene-Pleistocene formations with a lithology similar to the Ogallala but not contemporaneously deposited with either the Ogallala or the current alluvial valley. Dreeszen then examined and categorized wells, including wells not previously counted as Compact wells, based on the formation(s) from which they derived water. Many wells were pumping from the alluvium and one or more of the other formations.

Thompson reviewed Dreeszen's work to make a preliminary list of alluvial wells to be included in Compact calculations. For Compact purposes, if any well was located in the alluvial valley of the

main stem of the Republican River, the well was included. On the tributaries, a well was not included unless it was located in a distinct flood plain and was determined to draw at least part of its water supply from the alluvial aquifer. Of the roughly 2630 irrigation wells previously listed by Nebraska as alluvial, over 400 wells were defined by Dreeszen as wells pumping from Pleistocene or Ogallala formations. One hundred and fifty-seven of these wells were dropped from the list of alluvial wells. The remaining wells are still being examined and therefore have been maintained on the list. Sixty-five of the ninety-six wells dropped from the alluvial list in the Frenchman Creek sub-basin were Ogallala wells above Enders Reservoir. Forty-eight other Ogallala and Pleistocene wells were dropped from the main stem or small tributaries of the Republican River, twelve wells were dropped from the Medicine Creek sub-basin above Harry Strunk Lake. One Ogallala well was dropped from Red Willow Creek sub-basin. During an April 14<sup>th</sup> telephone conference call it was stated that Thompson is still reviewing the Dreeszen work and has not determined the final number of wells that will be considered as Compact wells by Nebraska.

Colorado described how the alluvium was defined in 1986 by field investigations made by George Van Slyke and John Romero. Any well drilled in what was determined to be the alluvial valley aquifer of any compact stream whether totally completed in the alluvium or multiply completed in both the alluvium and the Ogallala was considered as impacting the compact. If a well was multiply completed no determination was made as to what portion was contributed by only the alluvium. Total withdrawals from these wells were applied towards the compact calculations. No attempt was made to determine if there was unsaturated alluvium within the areal extent of the alluvial valley fill aquifer. At the present time there are only 133 wells that are drilled within the alluvial boundaries as described for the compact streams of Colorado. No wells were considered if they were drilled outside of the defined alluvial valley fill aquifer area. Nebraska asked Colorado to provide the Engineering Committee with a copy of the Van Slyke and Romero report. Colorado stated that there was never a written report. A letter written by George Van Slyke dated September 5, 1996, which described the Colorado process used to define the alluvium, was subsequently provided to the Engineering Committee members.

It was agreed that at the September 6th meeting each state would indicate what they felt were the pro's and con's of switching to the methodology proposed by Kansas and the current procedures used in Nebraska and Colorado. It was also proposed that the Committee would attempt to get resolution of a standard means of defining which wells are to be considered in Compact evaluations.

#### **September 6th Engineering Committee Meeting:**

Each state discussed what they felt were the pros and cons of using the Kansas methodology as outlined in Attachment A. Roberts reported that if we were to use the procedure proposed by Kansas that it would result in 33 additional wells being considered as compact wells in Colorado. Stenzel stated that he was concerned about whether the process being proposed by Kansas was permanent and subject to further revisions. He also questioned the basis for the one half foot decline limit for wells located in the Ogallala outside the alluvial valley fill. The reason behind looking only at a single year's pumping impact or not considering the impact of multiple wells pumping on the alluvial aquifer was also questioned. He stated that once you start considering

Ogallala wells located outside the alluvial valley fill he did not see how you could limit any evaluation of impacts to only wells that cause a specific amount of drawdown or are located at some distance from the alluvial valley fill. He expressed a concern how you would evaluate each state's pumping impacts from Ogallala wells and the possible impacts across state lines. If a state causes stream depletions in another state how would that affect each states compact allocation? Further how would the compact members evaluate impacts of pumping from the Ogallala by state's that are not a part the existing Compact that may impact virgin flows?

Bleed had the same concerns as Stenzel. In addition she stated that she could live with the assumption that all alluvial well pumping affected the virgin flows during the year the wells were pumped; however, she questioned the assumption being used for the Ogallala wells. This would be especially true if the assumptions are further extended in the future to include the Ogallala wells that are located at greater distances than those that would be included using the existing Kansas methodology. Bleed stated she felt that the farther a well is from the stream the less likely 100% of what is pumped will result in a depletion to the stream. Thorburn also expressed concern that including Ogallala wells would start the process down a very slippery slope.

Barfield reaffirmed what he felt were the advantages of the Kansas methodology, as noted in attachment "A"; he also stated that he felt that the existing method was only a first step and that there may need to be additional wells added in the future. He understood the concern about future modifications but those issues would have be addressed when that time came. He stated that he had difficulty with Nebraska's methodology of defining the alluvium on tributaries to the Republican River. Kansas stated that they did not believe Nebraska's changes in 1995 were a step forward, particularly in the Frenchman basin. Kansas stated it was extremely difficult to review Nebraska's changes without a map of the valley fill aquifer. Kansas and Colorado suggested that until Nebraska could produce an acceptable map for review, the 1994 well listing be used. Bleed stated the alluvial wells were identified by Dreeszen based upon the drillers logs for each well and soils and topographic information from USGS maps. This information was made available to Kansas in Lincoln. She asked what other information would Kansas want to see in order to evaluate Nebraska's determination? She also asked Kansas to provide an explicit operational definition of how to determine the alluvial-fill boundary.

The Engineering Committee agreed that to fully define the impact of pumping of Ogallala Aquifer on the water supply of the basin would require detailed computer modeling. Kansas believes their proposal defines well pumping which has a direct annual impact on the surface water alluvial system and thus could be justified without such modeling. The other members questioned whether the additional wells, using the Kansas method, had any less impact than the remainder of the Ogallala wells other than the fact that the impacts would be felt faster than the remainder of wells in the Ogallala aquifer. Kansas stated that the adoption of the Kansas proposed methodology does not fully address the Ogallala pumping impacts to the surface system.

The members of the Engineering Committee agree that there is potential and probable depletion to compact virgin flows caused by wells outside the alluvium. The engineering representative for Kansas has submitted Attachment "A" as the procedure to be used to determine which wells shall be considered as pumping from the alluvium for compact purposes. Barfield suggested that if this

procedure is adopted in its entirety by the Compact Commissioners then the 1995 virgin flow study should be modified using information provided by each state using this procedure. Colorado and Nebraska recommended that only wells described in Attachment "B" shall be considered as pumping from the alluvium for compact purposes.

The Engineering Committee discussed what steps the NRD's would need to take for the committee to accept voluntary meter readings and survey results. The Lower and Middle Republican NRD's each submitted a proposed meter policy that dealt with verification of flow meter data that would be used to report well pumping in their NRD's in the future. Following a discussion regarding the proposal and the concerns of David Barfield it was agreed that with the revisions suggested by David that the NRD's would resubmit their proposal for approval of the Committee. The two NRD's agreed to redraft a single proposal which is attached hereto as attachment "C".

Kansas raised the broader issue of verifying the questionnaire information on irrigated acres. Kansas suggested that in the future, along with their survey, the NRD's request the landowners to submit third-party verification of acres irrigated, possibly using FSA maps, or that the NRD's work with FSA directly. Colorado supported the Kansas position that reduction in acreage from authorized acreage would require some type of verification on the part of the NRD's.

In regard to verifying the 1995 acreage reductions based on the NRD's surveys, Kansas suggested that the verification of at least a portion of these reports would be needed. Kansas suggested that the NRD's target the top 25% acreage reductions resulting from the survey for verification. Kansas agreed to review the NRD data and make a recommendation for the Commissioner's consideration concerning what percentage should be sampled and what form that should take. Attachment "D" is Barfield's letter of November 26, 1996 to Mr. Wayne Heathers with his suggestions in this regard.

The Engineering Committee will ask if the Commissioners want to assign the Committee the responsibility to draft a minimum set of guidelines for meter readings and submittals from the well owners that will be used by all the member states and ask for any further guidance the Commissioners may provide regarding the scope of the assignment. It was also decided that procedures for the verification of data submitted in regards to irrigated acreage should only be developed if that is the desire of the Commissioners and to determine what the Commissioners want as to the scope of any such procedure.

## ATTACHMENT A

# PROPOSED METHODOLOGY TO DETERMINE METER REQUIREMENTS ON WATER RIGHTS IN THE UPPER REPUBLICAN BASIN

## INTRODUCTION

The purpose of this file review was to determine which points of diversion are to be metered under the proposed metering order of the Chief Engineer in the Upper Republican Basin in Northwest Kansas. In 1984, Beaver, Sappa and Prairie Dog Creeks and their respective alluviums were closed to further appropriation by the Chief Engineer based on declining stream flows. Since that time it has been generally recognized that there is a need for increased water management in the area which addresses the impact of groundwater pumping on stream flow. The reason for metering is to increase the Chief Engineer's ability to manage the water resources and facilitate fair and accurate administration of water rights. Therefore, water meters are being proposed to be required on groundwater wells that have been identified as potentially affecting stream flow.

The primary concern behind this evaluation was to determine which diversions were affecting the flows of the Upper Republican Basin to the extent they should be metered. These diversions may eventually represent the files to be considered in both the Republican River Compact Allocations and those under any new management plan proposed by the Sub-Basin Management Team.

## GEOLOGY OF THE REGION

The Geohydrology of the Upper Republican Basin is described in numerous publications by the Kansas and US Geological Surveys. The Kansas Geological Survey (KGS) County Bulletins serve as the primary source of information used to develop this methodology. These bulletins suggest the geohydrology of the Upper Republican Basin can be divided into three major areas. Each area reflects a different connection between the recent Quaternary alluvial aquifers and the Tertiary Ogallala aquifer. Those areas are defined from West to East in Kansas as follows:

Area 1. An area where the alluvial material, if any, does not contain any saturated thickness or the saturated thickness is separated from the Ogallala by a significant impermeable boundary. Water tables in these areas show no evidence of any connection.

The location of these areas can be generally defined as west of Range 29 West in the Prairie Dog, and Sappa Creek basins, and west of Range 34 West in the Beaver Creek basin. The South Fork Republican and Arikaree River Basin do not seem to have any significant portion in this type area.

Area 2. The second type hydrology can be described as areas where the Ogallala Aquifer is in direct connection with the Quaternary alluvial and terrace deposits. These are areas where the water levels are continuous across the geologic boundary. These conditions warranted additional evaluation to determine the impact of the diversion on the adjacent Quaternary aquifers and the significance of that impact. It can generally be found in locations between Range 29 West and Range 24 West on both the Prairie Dog and Sappa Creeks. That portion of Beaver Creek with this type hydrology is found between Range 34 West and Range 32 West. The South Fork Republican and the Arikaree River contain primarily this type hydrology.

Area 3. The final type hydrology can be described as an area where the water table in the Ogallala aquifer lies entirely above the highest elevation of the adjacent Quaternary deposits. We found, in our review of the KGS bulletins, clear evidence the Quaternary deposits had truncated the Cretaceous Pierre Shale and Niobrara Formation. These Cretaceous deposits form a continuous local aquiclude serving as the foundation of the Ogallala aquifer. Where the water table in the Ogallala outcrops on the surface, springs and seeps are formed. These springs contribute to the tributary flow in the area, but lack any direct connection to the alluvium.

## ANALYSIS

The KGS County bulletins clearly map the Quaternary Alluvium in each of the Upper Republican River Sub-basins when it is present. All of the diversions of water, except domestic diversions, are required to be permitted. Based on authorized well locations, we decided if the well was diverting alluvial water.

Unless the file contained information indicating the well driller had isolated the source below a boundary, the well was included in the metering program. None of the wells currently on file contained information supporting their removal from the list of wells to be metered.

Wells in the Area 1 type geohydrology were not generally counted in the metering program. The pumping of these wells did not influence any of the Quaternary aquifers.

The water levels in these wells were usually below 100 feet. The well log or information from the KGS Bulletin usually indicated that a boundary exists between the Quaternary deposits and the Ogallala.

Wells in the Area 2 type geohydrology presented the most difficulty in assessing their impact on the Quaternary aquifers. As before if the well was located in an area the KGS had mapped as Quaternary Alluvium, they were added to the metering list. The wells located within one mile of the stream were added to a separate list for further examination. The examination of the impact of these "connected" wells began with a general review of the Ogallala Aquifer parameters. We used the USGS Open File Report No. 85-4198 to arrive at average Transmissibility and Storage Coefficient values of 52,000 gallons/day/cubic foot and 0.066 respectively. A Theis calculation using an average pumping rate of 500 GPM for 90 days pumping, suggested any well within one mile of the stream might create a one-half foot drawdown on the alluvial aquifer.

We then returned to the map and listed all of the wells within one mile of any mapped Quaternary Alluvium. This generally included any wells within the areas mapped as Quaternary Terrace deposits with a hydraulically connected water table. The wells we found in Area 2 not diverting directly from the mapped alluvium were examined in more detail. If the specific information in the file indicated the bottom of the well was at or below the elevation of the base of the adjacent alluvium, and the water table was at or above the stream bed elevation, we included them in the metering list. If the bottom of the well was above the stream bed elevation and the water levels were not contiguous, they were dropped from the list. If the well was greater than one-half mile from the alluvium and the water levels indicate it should be included in the list, we did some additional Theis calculations. These calculations were based on the specific authorized rate and quantity. If the one-half foot drawdown point did not reach the mapped alluvium within the authorized pumping time, the well was removed. If the cone of depression did reach the mapped alluvium, the well remained on the metering list.

The actual parameters on the aquifer generally do not allow the one-half foot drawdown to occur. The saturated thickness normally found in adjacent terrace deposits do not support large scale diversions like those needed for irrigation. Therefore, we generally did not find wells more than one-half mile from the stream impacting stream flow.

The wells within the Area 3 type geohydrology were initially divided into 3 groups. Those wells within the mapped Quaternary Alluvium were added to the meter list. The wells within the Quaternary Terrace deposits were noted for further study. The wells outside the Quaternary deposits were not included.

The wells located within the Quaternary Terrace deposits were examined using the same techniques described above for wells outside the alluvium in Area 2. The difference being the Transmissibility and Storage Coefficient values. Because no definitive works have been done on these deposits identifying specific aquifer parameters, we found it necessary to make an assessment of each file. Where possible we assigned values of T and S for the calculation of drawdown. Fortunately, we found very few of these wells.

The wells excluded from the list in the Area 3 type geohydrology were generally diverting water from some isolated Ogallala remnant. The only potential impact might be a reduction in seeps and springs along the valley walls. This, in our opinion, would not represent any significant impact.

## SUMMARY TABLE

The following table describes the three types of areas evaluated to determine those wells that should be included in the metering program. It provides a description of the aquifer, the proposed meter action, the evaluation criteria considered and the methodology.

| Type     | Alluvium  | Meter Action | Criteria  | Methodology   |
|----------|---|--------------|---|---|
| Area I   | No saturated thickness OR separated from Ogallala by impermeable boundary.                          | Metered      | Shallow wells within the mapped alluvium  | Well depths recorded and water levels of wells in mapped alluvium.  |
|          |   | Not metered  | Wells with water depths below 100 ft.   | Water level depths from well logs   |
|          |   |              | Impermeable boundary between alluvial and Ogallala aquifers.  | Well logs from KGS  |
| Area II  | Some saturated thickness in connection with the Ogallala.   | Metered      | Wells diverting directly from alluvium.   | Mapped alluvium in KGS Bulletins and well logs.   |
|          |   |              | Wells with bottom at or below alluvium A water level at or above the stream bed.                                      | Well depths from well logs and stream elevations from topographic maps.   |
|          |   |              | Wells within 1 mile of the stream that might create a 0.5 ft drawdown based on This equation calculations.            | Wells within 1 mile of the stream. Equations calculated with transmissivity of 52,000 gal/day/cubic ft, storage coefficient of 0.066. Pump rate at 500 GPM for 90 days. |
|          |   |              | Wells within 1 mile of mapped alluvium that might creat a 0.5 ft drawdown in adjacent alluvium based on This equation | Similar to previous This equation calculation except that actual rates and quantities for the wells were used.  |
|          |   | Not metered  | Those wells within the alluvium or within one mile of the alluvium not meeting the meter criteria listed above.       | Previously listed methodologies for Area II   |
| Area III | Saturated thick-ness of alluvium separated from Ogallala and represented by water table elevations. | Metered      | Wells within the mapped Quaternary deposits including alluvium and terrace deposits.                                  | KGS Bulletins   |
|          |   | Not metered  | Wells outside of Quaternary deposits.   | KGS Bulletins   |

## ATTACHMENT "B"

Only wells that were drilled within the approved mapped boundaries of the alluvial-fill formation as defined below and that derived some or all the pumped water from the alluvial-fill formation at the time the well was drilled should be considered as pumping from the alluvium for Compact purposes. Within these boundaries Compact wells will include any well that:

1. Obtains all or any part of its water from unconsolidated materials whose water level at the time the well was drilled was within the alluvial valley fill profile. The total amount of water pumped from a well will be credited towards compact depletions i.e. no attempt will be made to determine the amount of water that is pumped from each source.
2. Is completed only into the Ogallala formation where the water level in the well, at the time it was drilled, is equal to or above the alluvial valley fill profile.

### A. The alluvial-fill formation will be determined as follows:

The alluvial-fill formation is defined as the area of unconsolidated, detrital material of the Quaternary period that yields sufficient water for a well and that is within the erosional depression bounded by bedrock that does not yield sufficient water for a well, elevated river terraces, escarpments or gentle topographic highs. Information used to define the alluvial fill formation will be based on the earliest information available for those wells operating after 1943. As additional wells are drilled, the alluvial-fill formation boundaries as originally defined will not be revised if the basis for the change is a lack of an existing ground water table or a broken connection that is the result of subsequent pumping.

The alluvial valley-fill material may contain wholly or in part deposits generally characterized as erosional material transported and deposited by flowing water. These deposits are commonly referred to as river alluvium, alluvial-fill, terrace deposits, flood plain deposits, depositional fans and lake deposits.

### B. Approval of Map of Alluvial-Fill Formation Boundary

The alluvial-fill formation boundary used by each state will be mapped and provided to the Republican River Compact Commission for their approval. All states agree to submit a map at a scale of at least 1:50,000 by August 31st of 1997. To aid the Commission in its review, all wells that are within one half mile of the boundary as proposed by each state will also be shown on the map. Until such mapping is approved for any tributary or Republican River reach, the virgin water supply accounting cannot be completed. Once the map is approved, any revisions to the boundaries of the alluvial fill formation must be approved by the Republican River Compact Commission.

## ATTACHMENT C

### LOWER & MIDDLE REPUBLICAN NATURAL RESOURCES DISTRICTS

9 September 1996

#### Meter Policy for Compact Reporting Wells

#### INSTALLATION STANDARDS AND CERTIFICATION

Water meters may be installed as a stand alone practice, a component of an irrigation water management practice or as part of a regulatory district program. Any meter that receives cost-share assistance from the District or that is installed to comply with a district program shall be certified by the manufacturer as meeting American Water Works Association (AWWA) Standard C704-92 for propeller type meters. Meters must be installed according to the manufactures standards and guidelines, the standards and guidelines provided in Neb-Guide G78-392 (May 1994), Selecting and Using Irrigation Propeller Meters or guidelines established by the District. As new standards are developed by the AWWA for other meter types, such as venturi meters, those standards will apply as appropriate and those other meter types will be eligible for district programs. Installation of these meters will be certified by the NRD, the NRCS or other agencies and private individuals as designated by the NRD.

Previously installed meters meeting District standards and existing meters without AWWA standards will be checked by the NRD using an ultrasonic flow meter or other reputable measuring device and can be certified if operating within a 5% accuracy.

#### ANNUAL REPORTS

Annual irrigation water use reports will be filed with the district for any meter that is cost-shared. If a mandatory meter program is in place, annual reports will be required from all operators. Reports shall contain beginning and ending meter readings for that irrigation season, inches of water applied, the crop irrigated and the acres irrigated for that meter. Additional information may be required as needed.

#### VERIFICATION OF METER ACCURACY

Meter accuracy will be verified by the district by comparing energy records, by using a ultrasonic meter or by other check devices that may become available to the district. New meters will be considered accurate for a period of three years after certification of proper installation. A program of regularly scheduled spot checks will be initiated to monitor reliability of the meters.

Other timing or measuring devices that may provide reliable ground water flow data will be evaluated as acceptable on case by case basis. Other industry standards may have applicability to these devices.

#### VERIFICATION OF ANNUAL REPORTS

The District will work with appropriate State and Federal agencies to develop a regional standard to aid the NRD in establishing a reasonable crop water use. Operators will be expected to keep annual irrigation applications within this standard. Annual reports with deviations of more than 25% of this standard or incomplete reports will be verified for accuracy.

#### COORDINATION OF PROGRAMS

In the absence of other programs that require different or additional rules the Middle Republican and Lower Republican NRD's will attempt to coordinate programs so that rules and regulations between districts are the same. Minor differences in reporting dates, information reported, verification equipment, frequency of inspections and service programs are to be expected. District employees may provide similar services across district lines.

ATTACHMENT D

STATE OF KANSAS

BILL GRAVES, GOVERNOR  
Alice A. Devine, Secretary of Agriculture



DIVISION OF WATER RESOURCES  
David L. Pope, Chief Engineer-Direct  
901 South Kansas Avenue, 2nd Fl.  
Topeka, Kansas 66612-1101  
(913) 296-3717 FAX (913) 296-1101

KANSAS DEPARTMENT OF AGRICULTURE

November 26, 1996

Mr. Wayne Heathers, Manager  
Middle Republican NRD  
220 Center - P.O. Box 81  
Curtis, Nebraska 69025

Mr. Ron Wunibald, Manager  
Lower Republican NRD  
P.O. Box 618  
Alma, Nebraska 68920

RE: Republican River Compact Computations, Verification of Acreage Reductions

Dear Wayne & Ron:

As I promised at our last special Engineering Committee meeting, below is Kansas' view on verification of reductions in irrigated acres for both 1995 data and beyond.

Background

For Water Year 1995, Nebraska significantly altered its process for estimating its consumptive use of Republican River waters. One major change is the use of data gathered by Nebraska's Natural Resource Districts within the Republican River basin.

For the Upper Republican NRD, meter information was used. Due to the comprehensiveness of the Upper Republican NRD's meter program, neither Kansas nor Colorado has challenged the use of the District's meter data. In the Middle Republican NRD and Lower Republican NRD, the State developed estimates based on irrigated acres reported to the NRD's by landowners of registered alluvial wells (as opposed to the previous process of assuming that irrigated acres were equivalent to registered acres of these alluvial wells). The use of landowner estimates resulted in a significant decline in Nebraska's estimate of acres irrigated from these wells.

At the most recent special Engineering Committee meeting, we discussed the need for verification of acreage reductions from the landowner reports. I suggested for the 1995 estimates it would be necessary to verify at least a portion of these reports and that, in the future, the Districts should obtain this verification up front. I promised, after reviewing the data, to provide a proposal for the NRD's to review regarding verification requirements. It is expected that the Republican River Compact Commissioners will consider this proposal and provide guidance to the Engineering Committee on what verification will be required for 1995 and subsequent estimates.

## 1995 Survey Data Verification

At the meeting, I suggested for 1995 that 25% of the surveys showing the greatest acreage reductions be verified. I suggested one independent data source which could be used for this verification is the Farm Service Agency (FSA).

In reviewing the data further, and in discussing the matter with my Commissioner, we believe the proposal I outlined to be reasonable and prudent. We would ask the Districts to report back to the State of Nebraska, as well as Colorado and Kansas, with a summary of their verification findings. This should include as a minimum for each well (or clearly defined group of wells irrigating the same tract of land) a listing of the well location, registered acres, irrigated acres from the survey, and irrigated acres from the verification. A description of the source of the verification data should also be provided.

In order for the 1995 survey data to be utilized in the Engineering Committee's estimates, this verification should demonstrate the accuracy of the survey data. The Commissioners and Engineering Committee must decide on the standard. We suggest the accuracy of each NRD's work be evaluated separately and that acreage estimated by the surveys for the sample should not vary by more than 10% from the verification data. If the survey data meets the standard, all of the 1995 survey information could be used (but not extended to non-surveyed areas, as I believe we have agreed). If the survey data does not meet the standard, only verified surveys could be used.

## Future Survey Data Verification

We propose a higher standard in the future. We think this is both desirable and achievable through improvement of the NRD's surveys and processes. Our concession for 1995 is based in part on the presumption that there still may be some over-reporting occurring in the assumption that non-surveyed areas are pumping to the full registered acres with no overlapping tracts.

We suggest the Natural Resource Districts consider either working directly with the FSA to verify landowner estimates, or that they require the landowner to obtain this data from FSA as part of the survey. We believe that verification is required only where there is a significant reduction in estimates of irrigated acreage (versus the registered acres).

Sincerely,



David W. Barfield, P.E.  
Republican River Compact  
Kansas Engineering Committee Member

DWB:jb

cc: Ann Bleed, Nebraska DWR  
Ron Milner, Upper Republican NRD  
Dick Stenzel, Republican River Basin  
David L. Pope, KS DWR  
DeAnn Hupe Seib, KS DWR

## **Recommendations to Republican River Commissioners**

### **1. Compact Wells to be used by the Republican River Compact Commission to Calculate Virgin Water Supply and Consumptive Use**

The members of the Engineering Committee agree that there is potential and probable depletion to compact virgin flows caused by wells outside the alluvium. However, Colorado and Nebraska Engineering Committee members do not agree with Kansas that wells outside the alluvial fill formation boundary should be considered as part of any virgin flow calculations. Therefore the committee was unable to obtain any agreement in regards to what wells should be considered as Compact wells. Thus it was agreed that Kansas would make a recommendation as to which wells should be considered as pumping water from the alluvium and Nebraska and Colorado would make a combined recommendation as to which wells should be considered as pumping water from the alluvium for compact purposes to the Republican River Commissioners. Once a procedure is adopted in its entirety by the Compact Commissioners then the 1995 virgin flow study should be modified using the information provided by each state using this procedure.

#### **Colorado and Nebraska Proposal**

Colorado and Nebraska representatives recommended that the procedure described in Attachment "B" be used by the Republican River Compact Commission to determine which wells should be considered as pumping from the alluvium for compact purposes.

#### **Kansas Proposal**

The engineering representative for Kansas submitted Attachment "A" as the procedure to determine which wells shall be considered as pumping water from the alluvium for compact purposes.

### **2. Determining Ground Water Pumpage From Wells**

The Engineering Committee recommends that the following procedure be used to determine depletions to the compact caused by irrigation wells that impact virgin flows.

A. For wells that are metered in accordance with the guidelines of the Republican River Compact Commission, meter readings will be used to determine the amount of water pumped. Guidelines for meters will be developed.

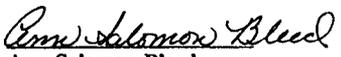
B. For the period 1995-1997, when pumpage estimates are not available, and after 1997 when metered pumping data is not available, the amount of water pumped per acre will be

determined according to the following procedure. The modified TR21 Blaney Criddle<sup>1</sup> method shall be used to estimate the consumptive use per acre. In Colorado no antecedent soil moisture should be assumed. Natural Resources Districts in Nebraska, other than the Upper Republican Natural Resources District, can assume a 2" antecedent soil moisture exists. An elevation correction will be used by both Colorado and Nebraska. Effective precipitation will be calculated using the standard TR21 methodology. Crop curves that will be used shall be the standard curves that exist in the TR21 manual. If the amount of surface water provided to an irrigated acreage is known, that amount can be deducted from the crop irrigation requirement. The balance will be assumed to come from ground water.

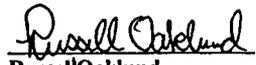
The values derived by using the above procedure will be divided by 75% to arrive at the amount of ground water pumped to meet irrigation needs. If any state seeks to use a different crop curve than that provided in TR21, the curve must be approved by the Republican River Compact Commission.

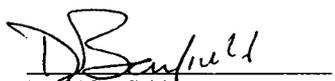
The amount of water pumped per acre will then be multiplied by the number of acres irrigated by that well. The number of acres irrigated by a well will be determined according to the guidelines of the Republican River Compact Commission. Guidelines need to be developed.

  
Richard Stenzel  
Colorado

  
Ann Salomon Bleed  
Nebraska

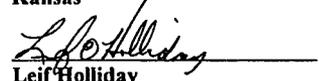
  
William McIntyre  
Colorado

  
Russell Oaklund  
Nebraska

  
David Barfield  
Kansas

  
Michael Thompson  
Nebraska

  
Scott Ross  
Kansas

  
Leif Holliday  
Kansas

<sup>1</sup>United States Department of Agriculture, Soil Conservation Service. 1970. Irrigation water requirements. Tech. Rel. No. 21 (Rev.2).

## Appendix B

### STATE OF KANSAS



BILL GRAVES, GOVERNOR  
Alice A. Devine, Secretary of Agriculture

DIVISION OF WATER RESOURCES  
David L. Pope, Chief Engineer-Director  
901 South Kansas Avenue, 2nd Floor  
Topeka, Kansas 66612-1283  
(913) 296-3717 FAX (913) 296-1176

### KANSAS DEPARTMENT OF AGRICULTURE

March 6, 1997

Mr. Mike Jess, Director  
Nebraska Commissioner, Republican River Compact  
Nebraska Department of Water Resources  
301 Centennial Mall South - 4th Floor  
Lincoln, Nebraska 68509-4676

Dear Commissioner Jess:

The purpose of this letter is to inform you of the State of Kansas' position on negotiations with the State of Nebraska about Kansas' concerns regarding the Republican River Compact.

As you are aware, for more than a decade now, as Kansas' representative to the Republican River Compact Administration, I have expressed concerns regarding Nebraska's on-going beneficial consumptive use beyond Nebraska's allocation under the Compact and the lack of effective enforcement of the Compact through the Compact Administration. Despite continued efforts by me and my staff, and with support of our elected leaders, we have yet to see any meaningful action by the State of Nebraska in addressing these concerns.

Kansas has invested considerable resources in these negotiations and participated in meetings, almost on a monthly basis, since the fall of 1995. We found the initial meetings to be fruitful in understanding each others' interests and in exploring alternatives for potential resolution of Kansas' concerns in a manner consistent with the Compact and the needs of each State. Unfortunately, over the last eight months, we have seen little significant progress. In fact, we feel Nebraska has been backing away from its earlier commitment to take action to resolve this dispute.

Resolution of Kansas' concerns regarding enforcement of the Republican River Compact requires Nebraska not only to recognize and understand the problem, but to take meaningful action towards its resolution. Despite the hard work and the good intentions of the Nebraska negotiating team, we believe that, until the responsible parties of the State of Nebraska acknowledge their obligations under the Republican River Compact, and take action to fulfill them, our continued participation in negotiations will not lead to agreement or action.

Mr. Mike Jess, Director  
March 6, 1997  
Page 2

As a result, Kansas will no longer participate in the mediation process. Kansas will continue to put its energies into exploring other means for resolving our concerns.

Sincerely yours,

A handwritten signature in black ink, appearing to read "David L. Pope". The signature is fluid and cursive, with the first name "David" being the most prominent.

David L. Pope, P.E.  
Chief Engineer-Director  
Kansas Commissioner,  
Republican River Compact Administration

DLP:dr

cc: Governor Bill Graves  
Attorney General Carla Stovall  
Allie Devine, Secretary, Kansas Department of Agriculture  
Hal Simpson, Colorado Commissioner, Republican River Compact  
Jim Cook, Nebraska Natural Resources Commission  
Terry Woolen, Nebraska Natural Resources Districts Representative  
Chris Moore, CDR Associates  
Mike Harty, CDR Associates

## Appendix C

### Statement of Kansas Commissioner David L. Pope

Thirty-Seventh Annual Meeting  
Republican River Compact Administration  
June 5, 1997

#### I. Water Administration Developments in Kansas

##### A. Kansas v. Colorado

Since the last Republican River Compact Administration meeting, trial has been held intermittently in the ongoing interstate litigation between Colorado and Kansas over the Arkansas River Compact. This has dealt primarily with two areas: (1) quantification of violations of the Arkansas River Compact in terms of acre feet for the years 1986-94 (The Court had earlier determined on the basis of a stipulation between the two states that the cumulative violation for the years 1950-85 was 328,505 acre feet.); and (2) current compliance with the Arkansas River Compact pursuant to amended rules and regulations adopted by Colorado last year. Whether Colorado's efforts have been sufficient has not yet been determined.

A report from the Special Master is expected in the near future. In addition to recommending to the Supreme Court the quantity of violations for the years 1986-94, it is expected that the report will give guidance on some of the issues regarding the remedy for past violations of the Arkansas River Compact by Colorado. These may include what the measure of the remedy for past violations should be, including whether prejudgment interest will be assessed. Further trial is expected on the form of repayment. Kansas is asking for repayment in money. Colorado is asking to be allowed to repay in water. Kansas has also asked that Colorado be required to install totalizing meters or else improve the quality of the estimates of groundwater pumpage currently being made based on power coefficients and kilowatt-hour records.

##### B. Metering

As I have reported in earlier Compact Administration meetings, Kansas is making substantial progress toward metering in the Republican River Basin. Last year, I reported that all surface water right holders were required to install meters prior to the beginning of the 1997 irrigation season and our intention to require all owners of alluvial

wells in northwest Kansas to install measuring devices on their pumps and diversions within three years. That program is progressing ahead of schedule with a required completion date prior to the 1998 irrigation season. All surface water right holders which have not installed measurement devices have been ordered to stop pumping until a measurement device is installed. We intend to take the same enforcement actions against any well owners that have not complied by the 1998 deadline. We believe that Nebraska should be doing the same with respect to those wells impacting the flows of the Republican River and its tributaries.

#### C. Status of Sub-basin Water Resources Management Program

During last year's annual meeting I described an initiative we call the Sub-basin Water Resources Management Program. The key difference of the program from DWR's past water resources management is that it is a proactive approach which is holistic in nature. This program is a watershed-based analysis which involves a significant amount of local involvement. Because of our desire to meet the needs of our water users in Northwest Kansas and our obligations under this compact with the limited water supply of the region, we felt that the Republican River tributaries in Northwest Kansas would benefit from this program. Work is currently underway in the Prairie Dog, Sappa and Beaver Creek sub-basins. Background information and studies have been gathered, ground water and surface water data continue to be collected and evaluated and discussions of issues and management alternatives with local interested parties has been initiated. It is the intent of this program to develop management strategies which will deal with limited water resource issues while considering the economy of the region.

## II. Republican River Issues

### A. Termination of Mediation

As of the last Compact meeting the states of Kansas and Nebraska were continuing the mediation of their disagreement over the lack of Compact compliance by Nebraska as perceived by Kansas. The negotiations were pursued diligently by both states, at least initially. I can verify that the costs to Kansas were substantial both in terms of money and human resources that were devoted to this effort. It became clear to Kansas by the early months of 1997, however, that the mediation was not leading to a

viable resolution of the ongoing violations of the Compact by Nebraska. Therefore, I wrote to Commissioner Jess on March 6, 1997 reluctantly terminating the 14-month-old mediation process. I would ask that a copy of my March 6, 1997 letter be attached as an exhibit to the annual report.

#### B. Definition of Alluvial Wells

In contrast to the purpose of reaching a consensus which was the goal of the mediation, the positions of Kansas and Nebraska on some matters have moved farther apart in the last year. During 1996 Nebraska announced its intention to reevaluate the list of wells it considers "alluvial" under the Formulas for the Computation of Annual Virgin Water Supply and Consumptive Use, adopted in 1982 and revised in 1990. These proposed revisions would reduce the number of wells it considers in its estimates of its consumptive uses of the basin's water supply, particularly in the Frenchman Creek sub-basin. Kansas has expressed its concerns that the groundwater pumping included in calculations under the Formulas is too small. Nebraska, on the other hand, has sought to make the amount of groundwater pumping included even smaller and has even denied that groundwater use is regulated by the Compact. Thus, the positions of the states are widening on this critical issue regarding the extent to which groundwater pumping must be recognized and accounted for in the implementation of the Compact.

#### C. History of Kansas Complaints

In 1974 Kansas began to express concern as to how the Compact Administration should handle shortages of water supply on the Republican River. Since 1985, Kansas has consistently expressed its concerns regarding Nebraska's overuse of its Compact allocation, Nebraska's consumptive use escalation, the corresponding longer and more frequent shortages to Kansas, and the lack of an enforcement mechanism to deal particularly with the times of water shortage. In 1989 Kansas presented a set of proposals that represented one way of bringing about Compact compliance at the annual meeting. Nebraska vetoed the proposals and did not present any counter proposals. Kansas has become particularly concerned since 1990 when Nebraska began to take the position that groundwater was not included in the allocations of the Republican River Compact.

At the annual meeting in 1992 Kansas made a motion that the Compact Administration ask each state to take whatever measures necessary to stay within its annual adjusted allocations of beneficial consumptive use of the waters of the Republican River. This motion was vetoed by Nebraska. In 1994 Kansas introduced Resolution B asking the Engineering Committee to review consumptive use estimation methodologies and to make recommendations to the Compact Administration. This study was vetoed by Nebraska. In 1995 Kansas proposed a resolution advocating a three-pronged approach to address overuse. Adoption of the resolution failed, once again, because of Nebraska's veto.

Kansas has expressed its desire to resolve its concerns through the Compact Administration and has attempted to do so for many years. Through the years Kansas has continuously renewed its formal request that Nebraska limit its consumptive uses to its Compact allocations. In 1993 Kansas invited Nebraska to propose ideas or alternatives to address Kansas' repeatedly stated concerns. Nebraska has failed to provide any meaningful response. Over the years, only one resolution has been offered by Nebraska and it did not even attempt to address Kansas' concerns under the Compact. Rather, Nebraska came forward in 1995 with a resolution that proposed renegotiation of the Compact which had been in place for over half a century.

#### D. Continuing Kansas Concerns

I would like to reiterate our earlier complaints that, in our view, Nebraska, although it has enacted certain authorizing legislation, is not meeting its obligations under the Compact nor is it taking meaningful actions to come into compliance with the Compact. Groundwater pumping in the Republican River Basin in Nebraska continues to expand even after years of complaints by Kansas. It was Nebraska's refusal to recognize its obligations under the Compact to control depletions of the Republican River that led to the breakdown in the mediation earlier this year. Since action of this Administration requires unanimous approval by all three states, it has proven futile to try to address Kansas' concerns in this forum.