

APPENDIX E

Comment Letters Received on March 2009 and December 2009 Draft 10-Year Reviews

From: [Garcia, Dennis E SPA](#)
To: [Gilmore, Andrew F;](#)
cc: [Fitzner, April M SPA;](#)
Subject: RE: Trinidad Review Comment Period
Date: Tuesday, June 02, 2009 1:14:48 PM

Andrew,

Thanks for the reminder. The Corps is certainly appreciative of your efforts to bring this review to fruition.

We've concluded our review of the draft "2009 Review of Operating Principles and Project Operations" and would like to submit the following comments:

General comment: Overall the draft is well organized and the chronological account of activities and actions provides a historical perspective which we found extremely useful and informative.

Comment: Of particular interest to the Corps are those sections that discuss flood control operations along with the current flood control criteria in Article III of the Trinidad Operating Principles. We concur with the draft's conclusions as stated for "flood control" in that there is currently an uncertainty regarding the existing non-damaging flow rate below Trinidad, and indeed the very definition of non-damaging flow as stated in Article III may need clarification. The resolution of these issues will require further discussion, much of which will stem from the findings of the current and ongoing Trinidad Downstream Capacity Study.

Please contact me with questions. We, too, look forward to working with you on this review and as well as future discussions.

Dennis

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-----Original Message-----

From: Gilmore, Andrew F [<mailto:AGilmore@usbr.gov>]

Sent: Monday, June 01, 2009 9:47 AM

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Subject: RE: Trinidad Review Comment Period

Just a quick reminder note, the comment period for the Trinidad Project 1995-2004 Review ends today.

I look forward to continuing our discussions.

Andrew Gilmore

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June 1, 2009

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Dear Mr. Goodenow:

This letter conveys the Colorado Water Conservation Board's ("CWCB") comments on the document entitled "2009 Review of Operating Principles and Project Operations, Trinidad Lake Project Draft for Review" ("10 Year Review") dated March 2009. The Review is intended to analyze project operations for the period 1995-2004. The Colorado Water Conservation Board, while not a party to the Operating Principles, does have an interest in the Review by virtue of its role in representing the State of Colorado on the Arkansas River Compact Administration ("ARCA") and its general mission to secure the greatest beneficial use of the waters of the State of Colorado. The Colorado State Engineer and Division 2 Engineer have also filed comments concerning the Review on behalf of the Colorado Div. of Water Resources. The CWCB concurs in all of those comments and suggestions. In addition, we expect the Purgatoire River Water Conservancy District ("PRWCD"), the entity which manages and repays the irrigation features of the Trinidad Project, to be providing comments. While the CWCB is sensitive to the issues which may be of concern to the District we have not seen their comments.

Before providing our general and specific comments on the Review document we would like to thank you and your staff for getting this process back on track, as well as for extending the comment deadline until today. While all of the key interested parties: Colorado, Kansas, ARCA, and the PRWCD have expressed their frustration and disappointment in the long delay in issuing the Draft for Review, we appreciate the recent efforts to complete the review in an open and comprehensive fashion, culminating in the meeting Reclamation hosted in Trinidad on April 24, 2009. During that meeting it was suggested that one way to avoid long delays on future reviews would be to institute an annual operation overview meeting outside of the mandatory 10 year review process. These meetings would allow all interested parties to raise issues and discuss current operations in a less formal setting and more timely fashion, and could lead to resolution of minor issues before reaching a level that requires detailed written explanation. It would also facilitate corrective actions that, if necessary, would be more likely to mitigate injury to other water users before leading to significant violations of the Operating Principles. We strongly encourage Reclamation to develop a process, similar to the annual operating plan reviews that occur for other projects, which would provide an avenue to discuss operations and address questions and even grievances outside of the 10 Year Review process itself.

We have the following general comments:

- Overall we are pleased to see the finding that there were no significant departures from the Operating Principles, and no post-project reductions in downstream deliveries during the period 1995-2004.
- We again note that the period under review is 1995-2004, and therefore the title of the report should be changed from “2009 Review ...” to “1995-2004 Ten Year Review of Operating Principles and Project Operations, Trinidad Lake Project”.
- In a similar vein we urge caution in describing events and actions that have occurred long after the review period concluded. This is particularly important in this review since the concluding report is being released nearly 5 years after the review period has ended. In some cases it may be necessary to refer to recent events to document that an issue that arose during the 1995-2004 period has been resolved, but frequent description of events occurring in 2007 and later can be misleading and causes the review to lose focus.

We do have a few specific comments and concerns relating to statements about irrigation efficiency and allocation of water between ditches. These issues may also be addressed by the PRWCD because they may directly affect project beneficiaries:

- On page 3 of the draft, while summarizing the 1996 Review (period 1985- 1994), there is a discussion of the need for “developing a current *real time* irrigation requirement”. A similar discussion then leads to a conclusion for the period 1995-2004 found at page 26 that “there is still room for the District to improve irrigation efficiency by using a *real-time* irrigation requirement”. (emphasis added). The CWCB is unaware of any basis in the Operating Principles for requiring the District to move toward water allocation based on real time requirements, and at a minimum the reference to real time on page 26 should be deleted. In our view, based on our current knowledge of the project water supply and irrigation infrastructure, such a requirement would be difficult and costly to implement and of only marginal value in achieving more efficient water use.
- We do recognize that Operating Principle Art. IV.B.3 provides that “All water deliveries ... will be limited during the irrigation season to the irrigation requirements at the *farm headgate* as determined by the District. Allowance for canal and lateral losses on the individual ditch systems will be determined by the District.” (emphasis added). We note that delivery requirements at the farm headgate are much different than a real time irrigation requirement. In an effort to assist the District in making the farm headgate determinations the CWCB and Reclamation funded the USGS to conduct a ditch loss study focusing on eight delivery systems during the period 2000 - 2004. The Review discusses this study which was completed in 2006 (USGS SIR 2006-5164) and we suggest it be included in its entirety as an appendix to this review Report. Our reading of the USGS report indicates no definitive and consistent pattern of losses and gains within the District and we do not reach the same recommendation Reclamation suggests at page 28 as to the potential for additional refinements of headgate delivery requirements based on canal and ditch losses. We do support the recommendation at the top of page 29 that opportunities to improve high seepage ditch reaches should be pursued.
- Reclamation refers to and includes as Appendix N correspondence and contracts related to a USDA-NRCS activity entitled, “Demonstration of Improved Irrigation Practices, Spanish Peaks Soil Cons. District” which was conducted during the review period, and is cited as further support for the recommendation on page 28 regarding irrigation requirements. We do not find the NRCS materials very helpful in this regard and question the usefulness and inclusion of them in the Review report. No background data or analysis is provided to support the speculative conclusions as to current irrigation water use or the potential for reductions in irrigation demand and improvements to water quality asserted. We suggest it may be better to remove the reference.

Finally we also want to comment on the potential for confusion caused by the Summary of 1996 Report provision A. found on page 2. There Reclamation states: “Operating Principles do not need to be

amended to recognize the practice of transfer of water remaining in storage in the Model right to the joint use pool. Action taken: No action required”. Whether or not this is a fair summary of what was said in 1996 it should not be included in the current Review without further explanation. The practice described has been called “rollover” and was extremely controversial in those years when it occurred. The Colorado State Engineer in fact has prohibited rollover at Trinidad Reservoir since approximately 1985, and there was clearly no operation anything like rollover during the current review period. It is the State of Colorado’s position that until the Operating Principles are specifically amended to expressly allow rollover it should not and will not be allowed. Reclamation has taken several positions on this issue, but since rollover did not occur during the subject review period and the District did not ask for an amendment of the Operating Principles to allow it we urge caution in describing the current status of the practice and you may wish to include the limitations imposed by the State Engineer discussed above.

We appreciate this opportunity to provide comments on the review and look forward to further discussions as may be needed as you complete the Review Report for the 1995 – 2004 period. Please feel free to contact us with any questions or for clarification of these comments. Again, we appreciate your efforts to complete the current review in an expeditious manner.

Sincerely,

Steve Miller, Sr. Water Resource Specialist
Colorado Water Conservation Board

Cc:

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Mr. Andrew Gilmore
U.S. Bureau of Reclamation
Via email

Re: Trinidad Project 10-year review draft report

Dear Andrew:

Pursuant to your request, the Purgatoire River Water Conservancy District has the following comments on the draft 10-year review report for the Trinidad Project:

1. Although PRWCD does not object to the inclusion in the report of information regarding activities or issues arising since the 1995-2004 review period, the report should focus on the review period, with the Bureau's findings and recommendations being based on activities and conditions existing during the review period. PRWCD agrees that a separate section of the report could be devoted to updates on activities or recommendations since the end of the review period.
2. In general, each section of the report should focus on the purpose of the review – "to obtain optimum beneficial use of Project water as conditions change, operating experience is gained, and more technical data becomes available". The report should recognize that Kansas requested in its Condition No. 4 that the review also operate as a review of the Operating Principles to determine the effect, if any, the operation of the Project has had on other Colorado and Kansas water users. Accordingly, each area of review should identify the potential for optimum beneficial use of water with respect to this area, changed conditions that affect the optimum beneficial use, gains in operating experience, and technical data that has been collected. If there are past review recommendations that are being evaluated, the report should identify how that recommendation is related to optimizing beneficial use. New recommendations made in the report should specifically identify how the recommendation will optimize beneficial use of water.

3. With respect to Kansas Condition No. 4, the report should identify the specific provision of the Operating Principles that is being evaluated, identify how the Bureau evaluated the operations of the Project in this respect, and list specific findings of the effects on other Colorado or Kansas water users. If no conclusion as to the effects of other water users has been developed, the report should specifically state as much. The report should emphasize that the Bureau's method of evaluating the effects of the Project was the mass-balance study, and should state the conclusion in terms of such effects on other water users. PRWCD would like to point out that the purpose of the review is not to determine "compliance with the Operating Principles" and the scope of the review may need to be adjusted accordingly.

A prime example of statements in the draft report that lack justification is the statement included in the middle of page 17 of the draft report – "The timeliness of submittal of AVS reports needs to be improved..." If this recommendation is to be included in the report, it needs to be based on some finding that such improvements will optimize the beneficial use of water or that the lack of such "improvement" has cast doubt on or has prevented the evaluation of whether the relevant operation has affected other water users.

4. PRWCD agrees with the State of Colorado that the Bureau's recommendation regarding location of new monitoring gages should provide sufficient flexibility in number and location to ensure that the eventual gages accurately measure return flows.
5. PRWCD believes the review should identify the purpose of the irrigated acreage verification as such relates to the purposes of the review, and identify how prior recommendations in this respect will serve these purposes. Analysis of the acreage verification should include the data that PRWCD developed and distributed regarding acreage irrigated within the Project during the review period. The purpose of these activities was to identify changed circumstances and operations of the Project so as to optimize beneficial use of the water, as well as to demonstrate the effect this specific limit in the Operating Principles has had on other water users. PRWCD supplies this information to the Bureau on a yearly basis. It is my understanding that Thelma Lujan, of PRWCD, will send you copies of the reports for the review period. PRWCD recommends that the Bureau's discussion contain a specific finding of whether such activities have the Operating Principles during the review period, based on this information. Recognition that actual irrigated acreage is far below the Operating Principles limit is an essential element of the Bureau's ultimate findings for this report.
6. PRWCD believes the analysis of modeling activities should include specific recognition that PRWCD and the State of Colorado requested that the Bureau not only re-develop the model, but use it to analyze the affects on other water users of winter direct flow storage within the Joint Use pool of the reservoir. The discussion should recognize that although the Bureau decided not to perform such analysis during this review, PRWCD's and Colorado's

request remains open. The discussion should also recognize the various flaws with the redeveloped model and perhaps recommend efforts during the next review period to perfect the model:

- a. the fact that the "late month unusable flows" criteria in the model is due to uncertainty as to where the data for this criteria came from and how it was originally used in the model; and
- b. the fact that the model cuts off once 20,000 acre-feet is stored and doesn't recognize the potential for storage in the Joint Use pool.

While PRWCD believes it is appropriate for the review report to recognize that the model may be a useful tool, PRWCD believes the flaws and lack of updating in the model are sufficient reasons for a conclusion that the model, in its current state may not be an appropriate way to evaluate the affects of operation of the Project on other water users.

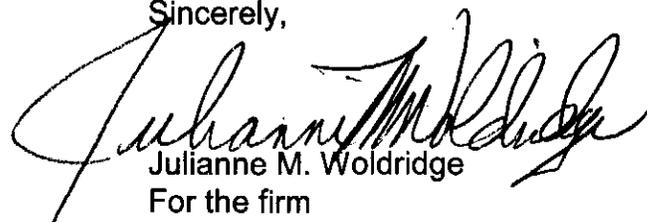
7. PRWCD believes the Bureau should redraft the analysis and recommendation regarding the "irrigation requirement" determination. As noted before, the focus of the 10-year review should be to optimize beneficial use of the Project water or to evaluate the affects of other water users on operation of a specific provision of the Operating Principles. This section of the draft report lacks any identification of the actual provision of the Operating Principles being evaluated, the effects of the Hoehne lawsuit on PRWCD's determinations in this respect, the activities of PRWCD in this respect during the review period, and analysis of how operations optimize use of the water or affects on other water users. The recommendations of the draft report inappropriately mix terms such as "irrigation requirement" and "irrigation efficiency" without definition or reference to requirements in the Operating Principles. The draft report references the Spanish Peaks-Purgatoire River Soil Conservation District report, yet the results of that study have no applicability to optimizing water use in the Project. It appears that reference to this study should be deleted. Furthermore, although the draft report references the USGS Canal loss report, the report fails to identify the findings of that report or how PRWCD has used this information in its operations of the Irrigation Capacity. Accordingly, the recommendations of the draft report, including but not limited to findings that PRWCD could be "doing more" appear to lack foundation or basis, and do not serve the purposes of the review. PRWCD suggests that the Bureau rework this part of the report and if, as it appears, the Bureau did not analyze the issue of activities in this regard, the report should so state. Lack of analysis should thus result in no conclusions.
8. As previously discussed, the report should delete references to a need for definition of Operating Criteria terms.
9. Finally, the draft report contains a plethora of statements of fact for which no sources or bases are provided, and which in many instances are incorrect.

Examples include:

- page 17, the first full paragraph states "Beginning in 2005, the District began providing reports of projected acreage and final acreage for irrigation years." In fact, the District annually reported projected acreage prior to 2005;
- page 21, the first full paragraph states "A goal of the effort was to create a model consistent with the previous analyses..." This was the Bureau's goal. There should be a reference here to the request of PRWCD and Colorado that one goal should be for the Bureau to conduct the analyses;
- page 21, fourth paragraph states "The model was accepted by the team as an adequate update of the original model." PRWCD does not believe there was any formal acceptance by a team; and
- last sentence to begin on page 28 states "The District should also pursue canal improvements..." This fails to recognize that the District does not own or control the individual participating canals.

PRWCD recommends that the Bureau review the draft report very carefully and provide source references for factual statements.

Sincerely,



Julianne M. Woldridge
For the firm

JMW
Cc: PRWCD



DEPARTMENT OF NATURAL RESOURCES

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June 1, 2009

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Dear Mr. Goodenow:

This letter conveys the Colorado State and Division Engineers' comments on the March 2009 Draft for Review of the 10 Year Review of the Trinidad Project for 1995-2004. The Colorado Water Conservation Board has filed comments for the State of Colorado. The Engineers agree with those comments, and have the following additional comments that are more specific to some of the administrative duties of the Division Engineer.

First, I offered to suggest language for the Final Report to characterize the hydrologic period being studied, 1995-2004. I recommend that a new subsection be inserted between "Purpose of this Report" and "Previous 10 Year Reviews and Recommendations", to be entitled "Overview of Hydrology Affecting Project During Review Period." Referenced Figures 1-5 are included as enclosures to this letter. The suggested text follows:

Inflow to Trinidad Reservoir is measured at the Purgatoire at Madrid, CO gage operated by the United States Geological Survey. Figure 1 illustrates the record of inflow throughout the period of review. This 10 year period included significant variability. Noteworthy events include a daily average inflow of 1260 cfs, which occurred on May 3, 1999 (and corresponded with a period of significant storage to be discussed later), and the peak daily average inflow for the period of 1490 cfs, which occurred on August 5, 2004 (and was associated with flood control operations, also discussed hereinafter). Figure 1 also shows the period of extreme drought which began in 2001 and continued into 2003. This drought resulted in the minimum daily average inflow for the 10 year period of only 1.4 cfs, which occurred on September 7, 2002.

Figures 2 and 3 reflect the storage that occurred within Trinidad Reservoir during the review period. Figure 2 relates this information in terms of water surface elevation. It is noteworthy that the maximum recorded surface elevation for this review period - and also for the life of the Project to date - occurred on August 13, 1999, at 6230.31 ft. The bottom of the Flood Control Capacity is established at reservoir elevation 6229.6. At that point in time, the total quantity of water in storage was 72,600 acre-ft as shown in Figure

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3, and which appears to be based upon the Trinidad Lake Elevation-Area-Capacity Table in use 11/94-11/99. This means that less than 1000 acre-feet was held within the Flood Control Capacity at any point in time following the significant storage event that began on or about May 1, 2009 and resulted in a storage increase of approximately 47,900 acre-ft. During the 2000 and 2001 irrigation seasons, significant drafts of stored water were made which amounted to 41,600 acre-ft and 21,300 acre-ft, respectively.

Releases of stored water and bypasses of inflow are measured by the Purgatoire River below Trinidad Lake, CO gage. Flows at this location are depicted in Figure 4. This graphic reflects the occasional peak releases which correspond to flood control operations discussed elsewhere in this report, as well as characteristic pattern of releases and bypasses necessary to meet downstream irrigation requirements. The record of flow at this site also reveals the lack of water available during the worst period of drought in 2002.

The Purgatoire River near Thatcher, CO gage is located well below the Project service area. The record for this gage over the review period is provided as Figure 5. It captures flows that result from all return flows from the irrigation of project lands; water bypassed through the project area to supply downstream water-rights; water released in connection with flood control operations; and, in addition, runoff from precipitation that occurs in areas outside of the Project area and upstream of the gage location.”

Our comments on the individual topics in the Draft are as follows:

1. WATER MEASUREMENT & GAGING

The Engineers have reviewed the detailed double mass analysis at Appendix G comparing flows at the Thatcher gage as a percent of flows at the Trinidad gage, both pre-Project and during the review period. We agree with Reclamation that this methodology is sufficient to analyze the effects of Project operations on downstream users. Draft at 14, 15. We find it very important that the results indicate no negative impact on downstream users or Kansas, and in fact that the trend lines indicate “there is relatively more water at the Thatcher gage since development of the Project than during the pre-Project periods.” Draft at 15.

The Thatcher gage is located on the mainstem of the Purgatoire just below Von Bremmer Arroyo (sometimes, “Van Bremer”). It is located downstream of the Project and is sufficient to capture the total impact of the Project on downstream users, including all return flows from Project lands. The Engineers agree with the Draft’s discussion of the errors in the Model storage right change decree (Case No. 19793), Draft at 14-15, as well as Reclamation’s prior discussion of this issue in the 1988 Ten Year Review. We will continue to advocate amending that decree, with the consent of all objectors in case 88CW21, to remove mention of its two erroneous gage descriptions.¹ The decree should require only use of the Thatcher gage in the Engineers’ required determination of “whether the quantity of water occurring in the Purgatoire River has remained the same as it would have been had the Model Reservoir Right not been transferred to the Trinidad Reservoir.”

¹ The Thatcher gage is identical to the “gage located immediately below Von Bremmer Arroya” described in Para 5(a) on page 12 of the Model change decree. The other two gages described at paragraph 5(b) and 5(c) of that decree are erroneous descriptions and would not provide useful data: the Luning gage, misidentified as Leitensdorfer, in para 5(b) is not in a location that can add any helpful data to the analysis; and the canyon gage “near the Interstate Gas Company pumping station” described in Para 5(c) is an error because it describes the same location as the Thatcher gage, i.e., the gage on the mainstem below Von Bremmer Arroya.

The Draft Report mentions that Reclamation funded half of the O&M costs for the Thatcher gage in 2008. Draft at 13. The Thatcher gage is central to Reclamation's ability to fulfill its duty to monitor the Project's impact on downstream users, including Kansas. The gage is also essential to the Engineers' duty under the 1965 Model change decree discussed above. This gage has a long period of record dating from July 1966, more than a decade before the first storage occurred in Trinidad Reservoir. The DWR is considering accepting responsibility for O&M of an additional new gage, discussed below, and does not have the ability to fund O&M of the Thatcher gage. Due to its vital importance, the Engineers request that Reclamation indicate in the Final Report that it sees a need to continue cost-sharing the Thatcher gage O&M for the foreseeable future or long as federal funds can be obtained.

Finally, as mentioned at the bottom of page 15 of the Draft, the Division 2 Office has indicated a willingness to assume a lead role in establishing and possibly in providing for O&M of one additional gage which would measure bypass flows and Project return flows below the Project. Such measurements can assist with administration of the Project and contribute to the "primary object" of the 10 year review, which is to obtain optimum beneficial use of Project water. Operating Principles at Article VI. The Draft should be more clear, at page 15, that such measurements are helpful for those purposes but are not critical for the review the Engineers are required to conduct under the Model storage change decree or for Reclamation's evaluation of the Project's effect on downstream users.

The Division 2 Office and the District are still working to determine the best location for this new gage, and the language in the Draft is therefore too limiting. The Engineers request deletion of the references to "a gaging site just below the Hoehne, or downstream near the Highway 350 Bridge." These references are located on page 15, 16 and 25 of the Draft.

2. ACREAGE VERIFICATION

Much of the information contained within the sub-section titled "Standardization of the District's Geographic Information System data," on page 17 of the Draft, pertains to developments that occurred after the review period. Significant progress was made on the acreage verification system between 2004-08, and the Engineers agree that it needs to be covered in this Report. If this material is to be included, we have the following changes that correct this sub-section and bring it up-to-date, beginning with the second sentence:

... This effort will result in some standardization. An effort has been made to standardize the District's GIS information with the State's. [No revisions to the third sentence are needed.] CWCB staff indicated that they would be assisting the District... [No further revisions are suggested to the fourth, fifth, or sixth sentences.] In March 2008 the Colorado Division of Water Resources (CDWR) entered into an agreement with the District to provide a means to meet the requirements of the above provision of the Trinidad Operating Principles while also achieving a consistency in data and methodology with similar projects conducted for the Arkansas Mainstem area of Division 2 from Pueblo to the Kansas-Colorado stateline. The essential provisions of the agreement include incorporating the District lands in a five-year irrigated acreage update utilizing verified satellite imagery interpretations and developing a sampling/survey method for interim years. For 2008, the CDWR staff selected, purchased and evaluated three satellite images to cover the range of the growing season. Twenty percent of the parcels within the GIS data set were randomly selected for the purpose of onsite ground truth verification conducted over the 2008 irrigation season. An accuracy assessment conducted using the CDWR ground truth data set indicated an accuracy of approximately 91%, which is considered to be highly accurate for this type of classification process. Results of this effort, including parcel maps of irrigated acreage as classified by CDWR were provided to the District by CDWR. CDWR also suggested a 20% sampling program similar to the ground truth verification process used in 2008,

combined with a post-irrigation season survey of irrigators, as a means of fulfilling the District's interim year AVS reporting obligations. [Continuing with the third from the last sentence in the paragraph;] At the December 9, 2008, ARCA meeting, Bill Tyner reported that this effort has been completed and the 2008 results were reported by the District on January 31, 2009. [The remainder of the paragraph requires no further revisions.]

In light of the above information, there is no basis for the conclusion and recommendation that the District needs to improve the accuracy of its AVS system, as it has been revised in conjunction with the Division Engineer's Office as of 2008. This recommendation therefore should be stricken from the Draft at pages 25 and 28.

3. STOCK WATERING

No comment.

4. CITY OF TRINIDAD M&I USE

No comment.

5. MODELING

The Engineers recognize and appreciate the efforts by Reclamation during 2006-07 to recreate the 1964 and 1988 models in Microsoft Excel. The Draft Report states that Reclamation undertook this effort so that signatories of the Operating Principles and other entities could conduct their own analyses of various Project operations. It notes that the resulting "2007 water accounting model" only covers the period 1927-57, and would need to be updated from 1958 through the present (or some other representative hydrologic period) before it can be used.

The Engineers would like to see Reclamation continue to take the lead on all modeling efforts that are needed to optimize beneficial use of Project waters. The District has indicated a belief that optimum use would be served by allowing winter storage of direct flow water rights outside of the Model storage right. Before such a change in operations could be allowed via an amendment to the Operating Principles, modeling would need to be conducted to prove that it would not cause a material depletion in violation of Article IV-D of the Arkansas River Compact. Thus, modeling is necessary both to determine how to achieve optimum use – the "primary object" of Reclamation's ten year reviews – and also to determine the effect any proposed change in operations would have on downstream users – as required by Kansas's third and fourth conditions on its approval of the Operating Principles. The Engineers believe that Reclamation is best positioned, among the signatories to the Operating Principles, to be responsible for conducting any necessary modeling. The Draft Report appears designed to distance Reclamation from its responsibility to lead such modeling efforts. The Final Report should instead indicate that Reclamation will continue to lead such efforts by updating the 2007 model to present, and by conducting runs of the model to evaluate the effects of winter storage of direct flow water rights outside of the Model storage right.

6. FLOOD CONTROL

The discussion of the 2004 storm events does not mention the Corps' acknowledgement that, due to the unreliability of the outlet works gage, it failed to release the full amount of water that was requested for release by the Division 2 office under Article III of the Operating Principles. In order to provide a complete description of these events in the Ten Year Review, the Engineers request that Reclamation add the following underlined language to the second complete paragraph on page 23:

During the 2004 events, the Corps noted that the outlet works gage immediately downstream of the dam appeared to become unreliable at flows in excess of 1,000 cfs. As a result, the Corps did not release inflows at the rate requested by the Colorado State Engineer under Article III, paragraph 3, of the Operating Principles due to the August 5, 2004 storm event. The Corps later acknowledged by letter dated November 1, 2004, that the Division 2 Water Commissioner had requested the release to be increased to 1,500 cfs and that his request was not accommodated due to the outlet works gage malfunction. The Corps worked with the Survey in the spring of 2005. . . .

The Corps' November 1, 2004 letter is attached. We request that you attach it to the Ten Year Review as item 5 in Appendix M.

7. DETERMINATION OF IRRIGATION REQUIREMENT

No comment.

8. DEFINITION OF OPERATING CRITERIA TERMS

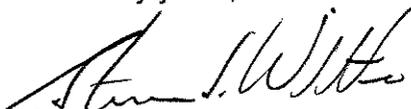
The Engineers recommend that this Recommendation be deleted. We are not aware of any need to define these terms from the Operating Criteria, and note that the Operating Criteria are not within the scope of this Review. If, as indicated on page 24, this Recommendation stemmed from a request by the State Engineer's Office, we withdraw the request.

In conclusion, I want to provide some remarks and offer some minor proofreading suggestions:

- I endorse the suggestion that the period of review should appear on the front cover as part of the title or as a subtitle and that the reference to 2009 should be eliminated.
- I believe that the second sentence of the second paragraph of the Executive Summary should read; "The 1996 Amendment..."
- It is not clear that the report referenced in paragraph F. on page 3 should be characterized as an "investigation" and therefore, whether it should be referenced as a relevant action taken.
- Perhaps the section captioned "1998 Temporary Amendment" on page 6 could be improved by reordering the fourth paragraph to become the second paragraph in that section. The first date referenced precedes those that begin other paragraphs and, placed where it is now, it disrupts the flow of the discussion in paragraphs three and five. Furthermore, I propose that an additional sentence should be added to this paragraph (the one that I'm suggesting should be the new second paragraph) to reference the correspondence of December 3, 1999, which is currently the final document in this sequence of documents currently included in Appendix M.
- Finally, please strike the reference to 2006 in the caption at the top of page 12 and replace it with "1995-2004".

Thank you for this opportunity to comment on the first draft. I look forward to receiving the next draft in the near future.

Sincerely yours,


Steve Witte,
Division Engineer

Enclosure

Cc: Andrew Gilmore

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Figure 1

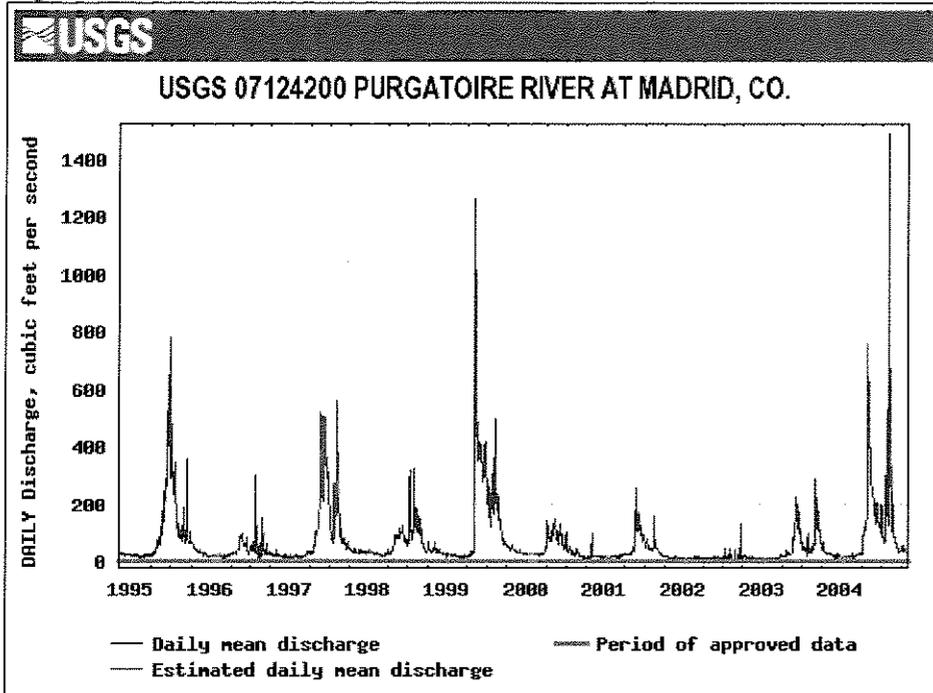


Figure 2

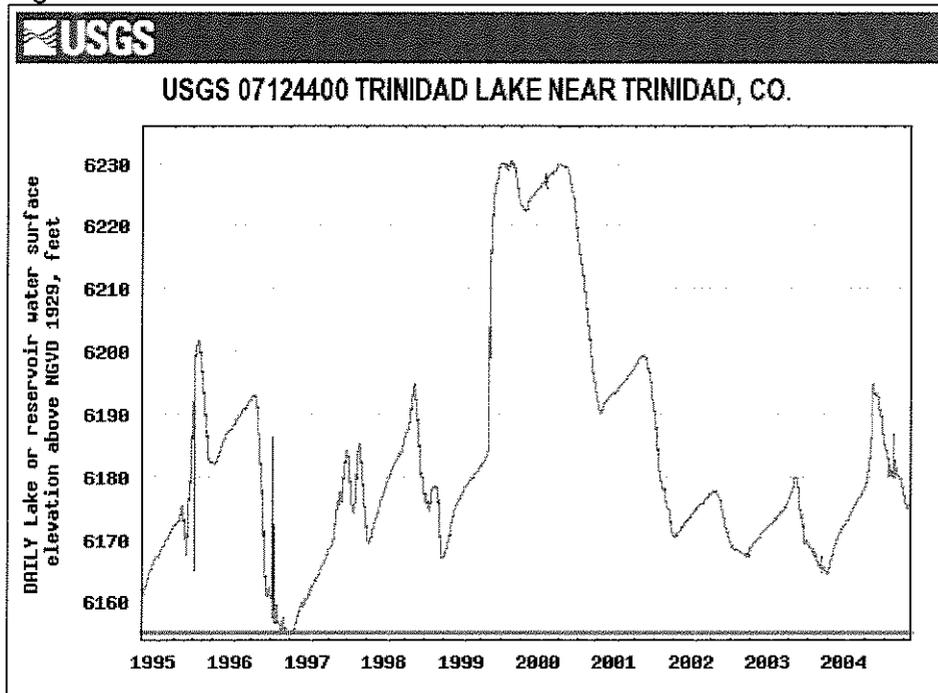


Figure 3

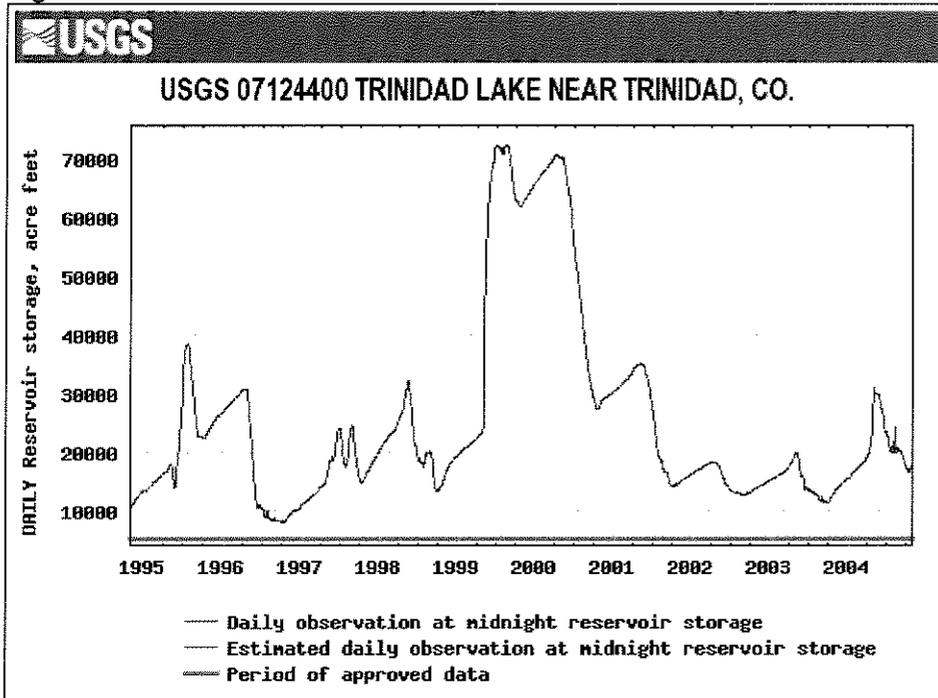


Figure 4

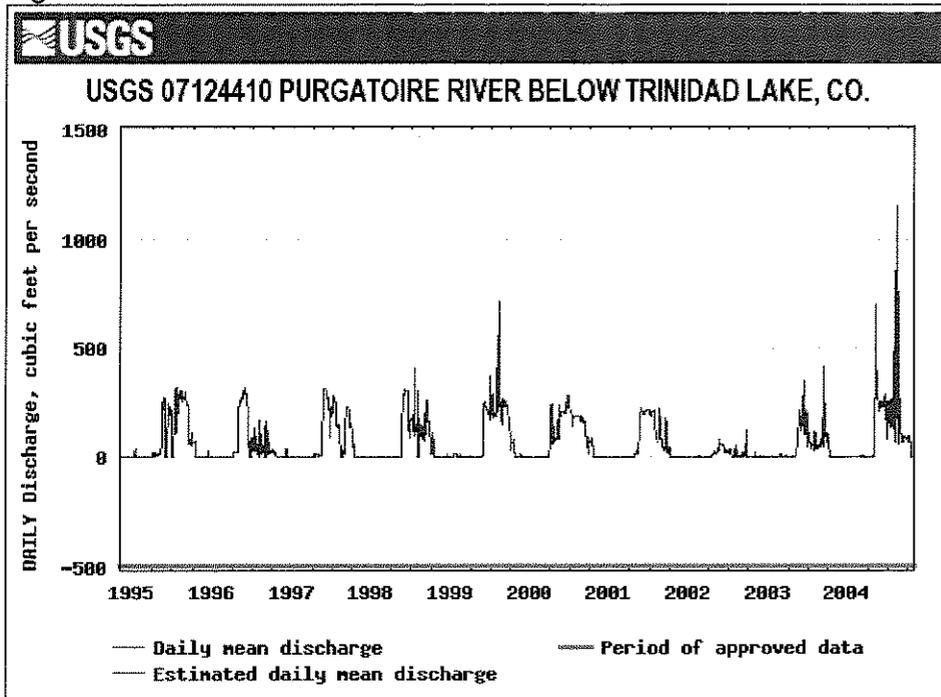
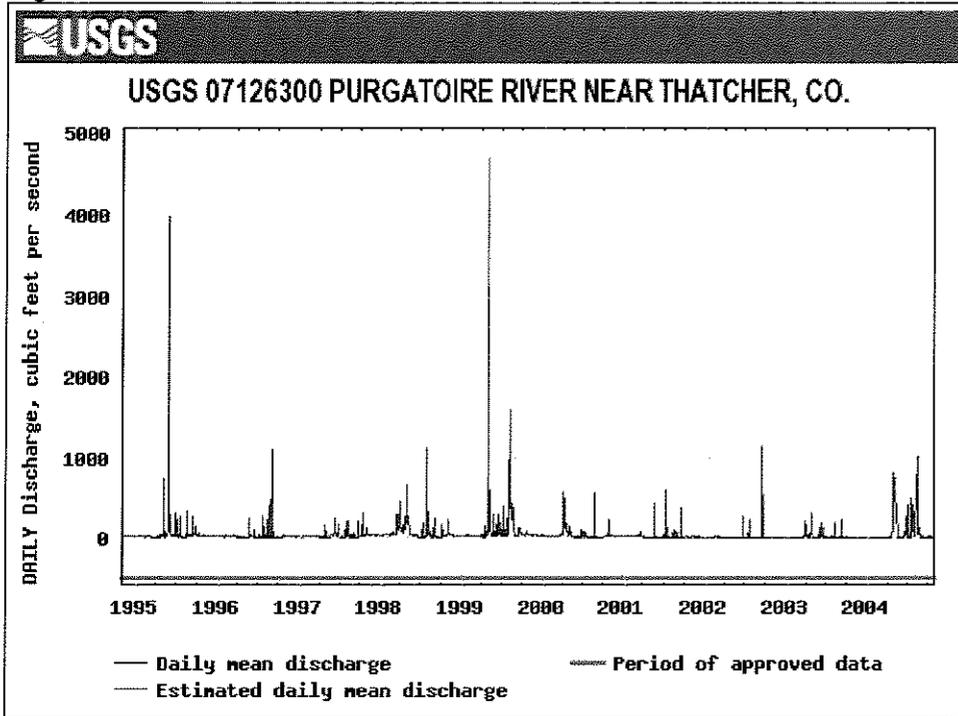


Figure 5



June 1, 2009
Via email only

GREG GOODENOW
ANDREW GILMORE
EASTERN COLORADO AREA OFFICE
11056 WEST COUNTY ROAD 18E
LOVELAND CO 80537-9711

RE: 2009 Review of Operating Principles and
Project Operations – Kansas Comments

Dear Sirs:

This letter will provide comments on the draft *2009 Review of Operating Principles and Project Operations* provided in March 2009 (draft report). I appreciate the meeting that was held on April 24th in Trinidad; it helped me to understand the approach being taken for this review, and by holding the meeting in the project area it provided perspective as to the size and the scope of the project.

From my review of supporting documents, I discovered that many of these issues were the subject to earlier reviews and House Document No. 325, which is often brought up, was controversial. Related to House Document No. 325, there was the original study, which was the basis for House Document No. 325 and Reclamation undertook two additional operational studies in 1961 and 1964. The later was the basis for the Operating Principles.

General Comments: The draft report describes the meetings, activities and amendments to the Operating Principles during the ten-year period which resulted from the 1996 study. However, it does not materially address all of the issues raised by Kansas, including whether operations have complied with the Operating Principles (see letter of April 14, 2005 from Pope to Sunde, and email of May 31, 2006 from Barfield to Gould, Appendix C). The value of the draft report would be improved by the compilation and summary of basic project operational data, such as storage, diversions, irrigated acreage, exchanges and evaporation.

The draft report would benefit from an outline to separate major sections from subsections, as was done in previous reviews. For example, the *Introduction* section includes four subparts, but it is not clear that the *Purpose of this Report*, *Previous 10-year Reviews and Recommendations*, and *Summary of the 1996 Report Recommendations and Actions Taken* are all included in the *Introduction*. The comments in this letter will be keyed to section headings. There are also formatting inconsistencies, misspellings, and capitalization errors which should be cleaned up in the next draft.

Executive Summary: This section should be redrafted based on comments received and changes made to the report as a result.

Report Title: As discussed at the meeting, the title of this report should include the period of review (November 1994 thru October 2004) to clarify the scope of the review.

Introduction: This section should be expanded to provide the reader with a better understanding of the project purpose and history. Kansas would note that there were two operational reviews that were conducted before the Trinidad Project could be constructed that are not specifically recognized in the *Introduction*. These operational studies are important because of resulting modifications to the project: therefore, the project was not constructed as described by the original House Document No. 325. These operational studies addressed concerns of the downstream water users as well as the District. The original Operating Principles were developed as part of those operational studies. Kansas provided five additional conditions which were incorporated into the Operating Principles, and that was the version that the signatories agreed to.

The Operating Principles provide for the regular review of operations at the request of one of the signatories, but in no case more than ten years from the last review. Any review was to be conducted with the following objectives:

- Article VI provides that “The primary object of such reviews will be obtaining optimum beneficial use of water as conditions change, operating experience is gained, and more technical data became available,” and
- Kansas Condition 4 provides that “... the Operating Principles be reviewed to determine the effect, if any, the operation has had on other Colorado and Kansas water users”

These objectives should be more prominent in this report.

Report Purpose: I do appreciate the inclusion of relevant correspondence and documentation related to this review period, whether or not it specifically occurred within the period of November 1, 1994 thru October 31, 2004.

I would suggest expanding the second report purpose to include the two objectives related to the review of the Operating Principles. I would suggest using the following language:

2. Review project operations from November 1, 1994, thru October 31, 2004, to determine if optimum beneficial use is being obtained and determine the effect, if any, of these operations on other Colorado and Kansas water users.

Summary of 1996 Report Recommendations and Actions Taken: I would first note that Kansas did not agree with all of the 1996 Recommendations. Additionally, including them in this letter is no indication that Kansas now agrees with them, but I am making the following suggestion to provide a clear understanding of those recommendations. The 1996

Recommendations need to be included verbatim, because, as currently drafted, the recommendations have been slightly modified from those in the 1996 review.

To illustrate this point, I have included the Recommendation A from the abbreviated version present in the draft report and version found in the December 1996 document below:

Recommendation A from the current draft review – “Operating Principles do not need to be amended to recognize the practice of transfer of water remaining in storage in the Model right to the joint use pool.”

Recommendation A from the 1996 Review – “Suspension of the practice of the transfer of water remaining in storage in the Model Storage right to the joint use pool at the end of the irrigation season has had no effect since all Project lands have been irrigated and the operating principles should not be amended to recognize this practice.”

In either version, the corresponding conclusion should also be included to provide a better understanding of the practice:

Conclusion A from the 1996 Review – “The transfer of water from the Model Storage Right to the joint use pool (rollover) is a departure from the operating principles. This practice was suspended in 1989 by directive of the Colorado State Engineer. The suspension has not had an effect on Project operations because at the time rollover was practiced during the previous review period, the Model Land and Irrigation Company lands were not irrigated during most of the review period whereas all the allowable District lands were irrigated during this review period, and the increased irrigation requirement has greatly reduced the significance of the rollover practice.”

If the 1996 Recommendations are to be included in this current draft report, then they should be put in verbatim and should also include the conclusions. I have attached the 1996 Conclusions and Recommendations along with our understanding of the status of each recommendation. See Attachment A. Please note that the status of each recommendation may differ from the draft report and should be changed to reflect what is shown in Attachment A.

Status of Operating Principles: I appreciate the inclusion of the various versions of the Operating Principles as Appendix A as well as related documents to those amendments. To provide an overview of the different versions of the Operating Principles, I have attached a matrix that describes the various versions in table form. See Attachment B. It is our recommendation that this matrix, or something similar, be included in this and future reports. Given the history of this project, it would be preferable that all versions of the Operating Principles be documented from the Project’s inception.

1996 Permanent Amendment: The draft report should include the explanation that the 1996 Amendment was the reallocation of storage space based on an updated stage storage capacity table (1986). A survey from that time found that the reservoir had more capacity than originally determined. It also should be noted that the reallocation was the subject of a NEPA

Environmental Assessment (November 2004). The amendment recognized this additional total reservoir capacity and allocated the additional space to the permanent fishery pool.

In reviewing my copy of the NEPA Environmental Assessment and Finding of No Significant Impact, I note several concerns with this document. By suggesting that this document be included in this review, it is not an indication of our acceptance of the conclusions or findings of this document.

1997 Permanent Amendment: Additional explanation should be provided as to what water rights were being changed by the City of Trinidad. It should also be noted that this was the subject of a NEPA Environmental Assessment issued on November 12, 2004.

1998 Temporary Amendment: This section contains much more information than just the temporary amendment. This language should be moved to a new section which would have the pertinent events not associated directly with permanent or temporary amendments to the Operating Principles. Such events should be listed chronologically and/or grouped based on subject (e.g., retention of flood flows).

Alternatively, the headings could be changed to reflect those paragraphs associated with permanent or temporary amendments and new headings added to reflect other activities related to the Operating Principles. If this alternative is adopted then the overall heading for this section should be changed from *Status of Operating Principles* to *Activities Related to the Operating Principles*.

2001 Temporary Amendment: This section should deal strictly with the 2001 Amendment. Other information should be included in the proposed new section.

2002 Temporary Amendment: This section should deal strictly with the 2002 Amendment. Other information should be included in the proposed new section.

2004 Permanent Amendment: A NEPA Environmental Assessment was done independent of the amendments to the Operating Principles. I would suggest adding this to the proposed new section.

Review of Operating Principles

General Comments: The review is about the operations of the project and not about how the review has progressed over time. Although this is useful information, a table of dates, events and brief description would better serve this report. More detailed information could be included in an appendix.

Review Process: Suggest deleting this heading as it doesn't add anything to the overall heading *Review of Operating Principles*. In general this section could benefit from review of the language used. For example, in the first paragraph of this section, I would offer the following:

Reclamation initiated the 10-Year Review process by letter dated March 3, 2005 to the signatories and the State of Colorado. Pursuant to the Operating Principles, the letter stated the objectives of the 10-Year Review as:

- 1) To help obtain optimum beneficial use of the water supply as conditions change, experience is gained and more technical data becomes available (Operating Principles, Article VI) and
- 2) To determine the effect, if any, that the Project operations have had on other Colorado and Kansas water users pursuant to Kansas Condition 4.

The letter requested recipients submit any issues or comments that their organizations would like to see addressed in the 10-Year Review by April 15, 2005. The Kansas Chief Engineer and the Colorado State Engineer provided letters by April 15. On October 5, 2005, Purgatoire River Water Conservancy District submitted their letter. These letters are presented in Appendix C.

Additionally, more information should be included about the October 5, 2005 meeting that was set up by Reclamation. There was a tour of the project area before the meeting and at the meeting there were presentations by Kansas and Colorado on the issues they previously provided, as well as a presentation by the District.

The last two paragraphs of this section would be better served if they were moved to the related sections.

Issues Addressed in the 10-Year Review: By moving the last two paragraphs of the introduction to this section, then the April 27, 2006 letter is the last one identified. This first paragraph should be redirected to the specific issues reviewed. Based on the draft report, those issues would be:

- Water Measurement and Gaging
- Acreage Verification
- Document current and historic practices, and identify procedural improvements needed to ensure compliance with the Operating Principles for the following existing uses of Project water: stock water releases, permanent fish pool, and City of Trinidad M&I use
- Model review and verification
- Flood Control Operations of Trinidad Dam and Reservoir
- Documentation of Operating Principles Amendments
- Development of Current Real Time Irrigation Requirements
- Definition of Operating Criteria Terms

The Table that accompanied the April 27, 2006 letter should be included in Appendix D. This table lists the issues, the agency that brought up the issue, comments and whether it was included in the 1996 review. I would also suggest moving Dave Barfield's email of May 31, 2006 to Jaci Gould from Appendix C to Appendix D since it is a specific response to the request of the April 27, 2006 letter.

Water Measurement and Gaging: Although the USGS study of the canal transit losses was listed under this heading in the April 27, 2006 letter, it is more appropriate to include this in the *Development of Real Time Irrigation Requirements* section, because this study was to help determine the allocation of the District water supply to meet real time irrigation requirements. However, the installation of satellite monitoring equipment and the work done on measurement structures should be included in this section. Since this work stemmed from the USGS study, there should be a reference to that study.

The documentation of all gages in the Project area, active or inactive, is helpful and should be included in this review.

The stream gages on Luning and Van Bremer Arroyos are required by the decree for the Model right transfer. The 1988 report concluded that these gages fulfill the purpose of the decree provisions. Therefore, the conclusion and recommendation in the draft report are inconsistent with the earlier conclusion. Additionally, there has not been any analysis of the gages to support this conclusion and gages should not be removed from the project area without due consideration and an overlapping period with gages intended to replace them. It is up to either the District or to Colorado to pursue a change to the transfer decree modifying the provisions related to streamgages. Streamflow information from these gages may be useful for future modeling analyses being recommended by Reclamation.

Double mass balance: Reclamation concludes that the project effects can be adequately evaluated with double mass analysis, using the Thatcher gage (p. 14). Kansas does not agree that this analysis provides a reliable measure of what flows would have been without the project. See Kansas comments on similar analysis in letter to Reclamation of October 28, 1996 which is attached and should be included in the draft report. See Attachment C. Reclamation's conclusions give the impression that the test required in the transfer decree is unnecessary and Reclamation's mass curve analysis provides a reliable substitute test. Kansas does not support this conclusion.

Acreage Verification: The irrigated acreage should be provided for each year of the review period. This would include the years 1995 through 2004. This table should also note separately those acres removed from irrigation for other purposes by the City of Trinidad or Colorado State Parks.

Regarding the discussion of *Standardization of District's Geographic Information Data*, the initial discussion related to the H-I Model is not correct. Colorado developed GIS coverage of irrigated tracts along the Arkansas River as part of the *Kansas v. Colorado* litigation many years ago. There is a system in place where the tracts are confirmed using satellite images once every five years. However, 20% of the farm units are surveyed every year. Also, every year there are tracts that surface water is kept off of (dryup). The vast majority of those dryup tracts as well as some portion of the irrigated tracts are reviewed in the field by Colorado and/or Kansas staff every year.

As part of the long standing practice along the Arkansas River mainstem, Colorado DWR agreed to assist the District by purchasing the satellite images for the District area and identified irrigated tracts within their project area. The first time this was done in 2008 by Colorado DWR, which corresponded with the effort along the Arkansas River mainstem. The Colorado DWR work this past year modified the tract boundaries from the GIS coverage originally generated for the District. Previously, the District had been purchasing satellite images and had those images interpreted by a consultant with the aid of data collected on behalf of the District.

I would note the District, under Article IV.B.2., is to provide a report each year that shows the tracts, acreage, and location of lands irrigated in the previous year as well as a separate report showing the same for the acres intended to be irrigated. The Operating Principles did not commit to a specific procedure but require the District to implement a substantive procedure “to verify each year that no more than the District Irrigable Area, less lands removed from irrigation,” are irrigated in any year. It is my expectation that these substantive procedures will include specific information on each irrigated tract within the District each year, so that the number of acres irrigated will be known.

I request that the recommendation state specific improvements necessary to be in compliance with the amended Operating Principles.

Stock Water Releases: The Modeling of Stock Water Alternatives (November 2003) should be attached. It should also be noted that the stock water change was subject to a NEPA Environmental Assessment.

As noted above, the stock water diversions made by the District should be noted for each year of the review period, noting which provision those were made under (e.g., temporary amendment) and any deviations.

Permanent Fishery Pool: As noted above, the annual operations related to the permanent fishery pool should be documented for each year of the review period, noting water transfers, source, end of year account balance, and if any operations deviated from the Operating Principles. The supporting accounting provided in Appendix K is not very clear as to the source of some water put into the permanent fishery pool. It should also be noted that the use of water changed from irrigation to replace evaporation and seepage from the permanent fishery pool was subject to a NEPA Environmental Assessment.

City of Trinidad Use of Municipal and Industrial Water: As noted above, the annual operations related to the City of Trinidad transferred water rights should be documented for each year of the review period, noting water transfers, source, end of year account balance, and if any operations deviated from the Operating Principles. It is assumed that Table 2 is the amount of water released from the reservoir and used by the City. It should also be noted that the change of water rights from irrigation to municipal and irrigation use was subject to a NEPA Environmental Assessment.

Model issues: Kansas has participated in reviewing the re-creation of the operation studies through the model development, as described in the report (pp. 21-22) and Appendix L. Kansas believes Reclamation has substantially accomplished recreating the operation study, which should provide a valuable tool for the parties to make future evaluations of various issues. As noted by Reclamation, some differences between the original studies and current tool remain.

I understand that the District continues to request consideration of increasing storage in Trinidad Reservoir, to be based on alternative model scenarios, although no specific analysis was proposed. Kansas believes the issue of winter storage beyond the Model Storage right was addressed by the various scenarios considered in the 1988 study. Kansas did not agree with Recommendation B of the 1996 report (that storage under the direct flow water rights is allowed by the Operating Principles). The statement on page 2, that the operational model can be used to resolve this issue in the future, mischaracterizes the status of this issue.

Flood Control Operations of Trinidad Dam and Reservoir: It is premature to recommend a modification for channel capacity below Trinidad Reservoir until the ongoing study by the Corps is completed. Reclamation also notes the December 3, 1999 letter and criteria from the Colorado to pass flood storage through the project area when evacuated from Trinidad Reservoir. Kansas recommends that flood storage events be documented and evaluated with respect to these criteria to assess the adequacy of the criteria to satisfy the intent of the Operating Principles.

Development of Current Real Time Irrigation Requirements: Kansas requests that Recommendation 5 be modified to recommend that the District develop and implement methods to limit deliveries to irrigation requirements at the farm headgates. These specific actions should be included in an amendment to the Operating Principles. Kansas has raised this issue since the initial review in 1988. The discussion in the report notes the USGS canal loss study, but does not provide any information about how this information will be used by the District to fulfill Article IV.B.2 of the Operating Principles. Much of the discussion related to this topic concerns funding and efforts by the District to improve system and on-farm efficiency. Kansas recommends that the issue of improved system efficiency be factored into expected impacts on downstream water users in the next project review and on the delivery of the irrigation requirement at the farm headgates.

Letters to be included: The following letters should be included in the next draft. I have attached these letters from my files, for your reference. We may be able to provide cleaner copies if you do not have them in your files.

Attach-ment	Date	From	To	Subject
C	Oct 28, 1996	D.L. Pope	A.J. Garner	Draft Report for Review of the Trinidad Lake Project Operations and the Operating Principles for Trinidad Dam and Reservoir Project, 1985-1994

Attachment	Date	From	To	Subject
D	Dec 23, 1998	D.L. Pope	A.J. Garner	Modeling Approach for Analysis of Trinidad Project Operations
E	Aug 13, 1999	D.L. Pope	A.J. Garner	Criteria for Temporary Detention and Subsequent Release of Flood Flows Stored in the Trinidad Reservoir Conservation Pool
F	Oct 13, 1999	D.L. Pope	A.J. Garner	Trinidad Project Operating Principles: Irrigated Acres
G	Oct 13, 1999	D.L. Pope	A.J. Garner	Trinidad Project: City of Trinidad Transfer
H	Oct 13, 1999	D.L. Pope	A.J. Garner	Trinidad Project Operating Principles: Ideal Headgate Requirements
I	Oct 18, 1999	B. Kroeker	D.L. Steerman & J.S. Lefferdink	Amendments to Operating Principles for Trinidad Dam and Reservoir

Documentation of Current and Historic Practices: Tables of annual operations should be included in the appropriate sections in this review. This would include, but not be limited to: acres irrigated; deliveries to the fishery pool, including type of water; ditch diversions; utilization of Model pool; etc. Such tables should be included in the appropriate subsections in the draft report.

Appendix F: In Table 1, the Purgatoire River at Trinidad (7124500) is misidentified as Purgatoire River below Trinidad Lake.

For Figures 2 & 3, these should reference a date related to the tract status. I am assuming the parcel status would be for a specific year, likely after the review period (1994-2004). It would be good to modify the legend to reflect the features shown on each figure. In Figure 2, there are no Model Land and Irrigation Company tracts shown. Why are Model tracts that were “not irrigated” in this year different from other tracts that may not have been irrigated?

In Figure 3, I would note for Model Land and Irrigation Company, that there are three categories of tracts not irrigated: (1) Model-not irrigated, (2) Model-dried and (3) City-dried. The “Model-dried” should be clarified as to whether these tracts are dried up for the benefit of Colorado State Parks, or for some other purpose.

Appendix G: The gage references should include complete gage names and/or USGS gage number to clarify which gage is being referred to.

In summary, the comments provided in this letter are based on my review to date. The draft report should address the objectives provided for in the Operation Principles and the issues presented by Kansas. This would include adopting the recommendations presented in this letter. Although this draft report has taken considerable time, it is important that the appropriate time and effort be taken to complete this report. It is my expectation that another draft will be issued before the review is finalized, along with an appropriate time for its review. Should you have any questions, please feel free to call me

Sincerely,



Kevin L. Salter, P.E.
Arkansas River Team

KLS:cls

Attachments

Pc: David Barfield
Burke Griggs
Randy Hayzlett
David Brenn
Dale Book
John Draper

Attachment A

1996 REVIEW CONCLUSIONS AND RECOMMENDATIONS

The following are the Conclusions and Recommendations from the 1996 Review of the period 1985 to 1994. These are included to provide an understanding of those issues and any actions taken on those recommendations. Those actions are noted in the Status section under each recommendation.

1996 REVIEW CONCLUSIONS

The operating principles have not been amended to incorporate the conclusions and the recommendations of the 1988 report for review of operations for the 1979-84 period. Therefore, the applicable conclusions of that report as modified by the results of this review are incorporated in the conclusions of this review.

- A. The transfer of water from the Model Storage Right to the joint use pool (rollover) is a departure from the operating principles. This practice was suspended in 1989 by directive of the Colorado State Engineer. The suspension has not had an effect on Project operations because at the time rollover was practiced during the previous review period, the Model Land and Irrigation Company lands were not irrigated during most of the review period whereas all the allowable District lands were irrigated during this review period, and the increased irrigation requirement has greatly reduced the significance of the rollover practice.
- B. The storage of winter water under the direct flow rights may be a departure from Reclamations pre-Project planning model but not necessarily a departure from the operating principles. Article IV.D.2. of the operating principles provides for an allowance for release of stock water and for the District to exercise the direct flow water rights and District storage rights only at such times to assure maximum possible storage of reservoir inflow and equitably distribute this stock water allowance during the nonirrigation season. The District storage right includes the joint use pool by definition. Further clarification can be found in Part C.2.(a)(2) of the Purgatoire River Water Conservancy District Operating Criteria (Appendix A) which provides that all reservoir inflow storable in the unused sediment capacity during the nonirrigation season shall be stored and credited to the Project accounts.
- C. The allocation of the excess storage capacity in Trinidad Reservoir to the permanent fishery pool capacity and the exchange of water for the initial filling and maintenance of permanent fishery pool in accordance with the amendment of the operating principles will not interfere with the District water supply nor will it increase depletions to downstream Colorado and Kansas water users. Similar water exchanges in the amount of 8489 acre feet occurred during the review period without interference to the District water supply and without increased depletions to

- downstream water users. The equal volume exchange at Trinidad Reservoir and the Las Animas gauge is potentially a benefit to Arkansas River water users downstream of John Martin Reservoir due to the potentially large differences in water conveyance losses in the Purgatoire River from Trinidad Reservoir to its mouth and in the Arkansas River from the Las Animas gauge to the mouth of the Purgatoire River. The exchange should be modified to account for the differences in the conveyance losses to the mouth of the Purgatoire River.
- D. The releases for stockwater did not result in storage in excess of 20,000 acre feet on any one day in the Model Storage right in water year 1992 including carryover nor did the accumulated storage exceed the single filling limitation of 20,000 acre feet per water year in water year 1992 under Reclamation's interpretation of the operating principles. Although the amount of water released from Trinidad Reservoir for stock water during the review period did not exceed 1500 acre feet in any water year, the stockwater allowance including river gains from Trinidad Dam to the Trinidad gauge as measured at the Trinidad gauge in accordance with the operating principles exceeded 1500 acre feet in 1985 (1645 AF) and 1992 (1544 AF) during the review period. The stock water allowance for the Hoehne Ditch Company was terminated and transferred to the District water supply through litigation; therefore, the stockwater allowance should be reduced to 1200 acre feet measured at the Trinidad gauge.
- E. The total acreage irrigated with the District water supply did not exceed 19717 acres during the review period. A Reclamation survey in 1985 showed 19385 acres being irrigated and a District survey conducted in 1994 showed 19395 acres being irrigated. Both surveys showed that lands other than lands classified by Reclamation as Class 1, 2 and 3 are being irrigated with the District water supply. Although land classification requirements were exempted from Corps Projects by the Reclamation Reform Act of 1982 and were eliminated from the contract between Reclamation and the District in 1986, land classification requirements are still included in the operating principles. Consequently, the irrigation of lands other than Class 1, 2, and 3 is a violation of the operating principles. The District has not contracted for administration of all the water rights listed in the operating principles and the total allowable irrigated acreage should be reduced accordingly. The District has not developed a methodology to verify that the allowable irrigated acreage limitation is not exceeded in any year.
- F. The operation of the Trinidad Project has not resulted in an increase in depletions of Purgatoire River flows in the Project area and has had no effect on downstream Colorado and Kansas water users in accordance with Kansas' Condition No. 4 for approval of the operating principles. The hydrologic analysis indicates there may

- have been a slight decrease in depletions resulting from Project operations compared to depletions that would have occurred under historical conditions.
- G. The District has not attained optimum beneficial use of the District water supply. The District has not determined individual ditch losses for the allocation of the District water supply nor has the District limited individual ditch diversions to the amount allocated. The District has not developed a methodology for determining a current real time irrigation requirement. Absent the determination of a real time irrigation requirement, the District is unable to limit the allocation or the delivery of water to the irrigation requirement. The District delivered more than the irrigation requirement in seven of the ten years of the review period. The over delivery may not have significantly affected the District water supply because if the water was not legally storable at the time of the overdelivery, the water would have been unavailable for the District to store the water and carry it over into a year of water shortage.
- H. The City of Trinidad may change the use of its Project water rights from irrigation to municipal and industrial purposes in accordance with the contract between Reclamation and the District without interference with the District water supply and pursuant to Colorado water law without injury to downstream Colorado and Kansas water users. The operating principles do not now include a provision for Trinidad to change the use of its Project water rights from irrigation to municipal and industrial purposes. The operating principles should be changed to allow Trinidad to change the use of its water rights pursuant to Colorado law.
- I. Conditions (d) and (e) of H.D. No. 325 which provide for reregulation of summer flows which would have historically been diverted to Project lands and storage of flood flows originating above Trinidad Reservoir could be implemented under Colorado water law through development of substitute water supply plans. The substitute water supply plans would need to provide for protection of downstream water rights on the Purgatoire River and provide replacement water to John Martin Reservoir to prevent material depletion of the inflow to John Martin Reservoir.

1996 REVIEW RECOMMENDATIONS

- A. Suspension of the practice of the transfer of water remaining in storage in the Model Storage right to the joint use pool at the end of the irrigation season has had no effect since all Project lands have been irrigated and the operating principles should not be amended to recognize this practice.

Status: practice was discontinued

- B. The storage of winter water under the direct flow rights in any of the irrigation capacity is allowed by the operating principles and the operating principles should be amended to clarify this issue.

Status: no amendments have been offered

- C. The amendment to the operating principles for enlargement, initial filling and maintaining the enlarged permanent fishery pool should be incorporated into the operating principles. After determination of water conveyance losses in the Purgatoire River, the operating principles should be amended to provide a volume for volume exchange at the mouth of the Purgatoire River considering conveyance losses in the Arkansas and Purgatoire Rivers. The amendment should be modified to change the point of reference for non-interference of flow from useable Stateline flow to inflow into John Martin Reservoir.

Status: Operating Principles were amended to address: enlargement and the transfer of Model water rights to Colorado State Parks. The Operating Principles do not recognize either the volume for volume exchange, but exchanges have occurred on this basis. Kansas does not agree with the portion of this recommendation that deals with the point of interference, as Kansas Condition 4 specifically provides for

- D. The operating principles provide for a stock water release rate up to the rate of inflow to Trinidad Reservoir and it is accounted for as a pass through and not as stored water. The stock water allowance includes river gains from Trinidad Dam to the Trinidad gauge and the volumetric allowance of 1500 acre feet measured at the Trinidad gauge. Since the Hoehne Ditch stockwater allowance has been terminated and transferred to the District water supply, the operating principles should be modified, if necessary, to allow a rate of release up to the rate of inflow to Trinidad Reservoir without counting as stored water and the volume limit should be reduced to 1200 acre feet, measured at the Trinidad gauge.

Status: Operating Principles were amended in 2004 to address allowing for the storage of and release of stock water. Before this, a series of temporary amendments accomplished this same thing.

- E. The operating principles should be amended to reduce the total irrigable acreage to 19499 acres rather than the 19439 acres recommended in the 1988 report considering the ownership of water rights and lands and the contracts between the District and the individual ditches. Land classification requirements should be deleted and the irrigable lands should be identified and designated by individual ditch. The District should develop a procedure to verify that no more than the 19499 acres are receiving an allocation of water and/or actually irrigated in any year.

Status: Operating Principles were amended in 2004 to address the total irrigable acreage and removed the land classification requirement, and provide for a procedure to verify that no more than irrigable acreage, less the land removed from irrigation, is irrigated in any year.

- F. The District should develop a methodology for determining a current real time irrigation requirement as it is a critical element for management of the District water supply.

Status: A methodology has not been developed. USGS did complete a transit loss study that could be incorporated into such a methodology.

- G. The District should determine the water transportation losses of each of the individual ditch systems for allocation of the District water supply and administer the delivery of the District water supply in accordance with the allocations by individual ditch.

Status: USGS completed a transit loss study that should be incorporated into District operations.

- H. The operating principles should be amended to allow the City of Trinidad to change the use of the Project water rights from irrigation to municipal and industrial purposes in accordance with Colorado water law and the contract between the District and Reclamation.

Status: The Operating Principles were amended to recognize the transfer of Model water rights (irrigation use) to the City of Trinidad (M&I use).

- I. The operating principles should be amended to allow the District to implement conditions (d) and (e) of H. D. No. 325 with development and approval of a substitute water supply plan pursuant to Colorado water law.

Status: no amendments have been offered.

Attachment B

Attachment C

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

October 28, 1996

OFFICIAL FILE COPY	
RECLAMATION	
NOV 1 1996	
106	11/7
1317	11/4
100	11/5

VIA TELEFACSIMILE

Mr. A. Jack Garner
Area Manager
Eastern Colorado Area Office
Bureau of Reclamation
United States Department of the Interior
11056 West County Road 18E
Loveland, CO 80537-9711

Re: Draft Report for Review of the Trinidad Lake Project Operations and the Operating Principles for Trinidad Dam and Reservoir Project, 1985-1994

Dear Mr. Garner:

Thank you for providing me with a copy of the Draft Report referenced above by your letter dated August 30, 1996. I also appreciate your extension of the schedule for our reply until today.

We appreciate the work that your staff has put into producing this Draft. I will limit my comments to the most important issues that need to be addressed. I will organize my comments by the Conclusions and Recommendations contained on pages 28-33 of the Draft Report.

You state in the first sentence of the Conclusions section that "The Operating Principles have not been amended since publication of the 1988 report . . ." This statement is correct for the study period which the Bureau of Reclamation has chosen for this report, namely, 1985-94. I would note, to be sure it is clear, that the Operating Principles have been amended subsequent to the study period, on January 26, 1996, as shown by the copy of that resolution contained in Appendix A of the Draft Report.

A. Kansas agrees with the Bureau of Reclamation that the Operating Principles should not be amended to recognize the practice of rollover.

B. The Bureau of Reclamation concluded in the 1988 Report that, "The storage of winter water under the direct flow rights is also a departure from the intent of the Operating Principles." This conclusion was based on an analysis of the language of the Operating Principles themselves and on the operation studies which were "used to establish that the Project would not cause damage to the downstream users," as discussed on page 11 of the 1988 Report. Therefore, the Operating Principles should not be amended to depart from the original intent of the Operating Principles until such time as it is reliably demonstrated that such an amendment would not cause depletions to downstream users and to Kansas.

C. Conclusion C and Recommendation C both address a development which has occurred subsequent to the study period for the Draft Report. They should therefore be deleted. The corresponding discussion in the text and material in Appendix A should also be deleted. It is also premature to discuss this development until there is some operational history under the new amendment to the Operating Principles and until there is an adequate analysis of the Purgatoire River transit losses.

D. The Operating Principles currently provide a 5 cfs limitation on stock water releases, as recognized by the Colorado State Engineer, and as discussed on page 15 of the Draft Report. Recommendation D to modify the Operating Principles to remove the 5 cfs limitation is therefore premature. Before such a change in the Operating Principles can be considered, an adequate analysis of its effect on downstream users must be provided.

E. The first sentence of Conclusion E should be changed to read, "The total acreage irrigated with Project water did not exceed 19,717 acres in 1985 and 1994. The acreage irrigated in other years is unreported."

F. Conclusion F that the operation of the Trinidad Project has not resulted in an increase in depletions of Purgatoire River flows in the Project Area and has had no effect on downstream Colorado and Kansas water users is based on a comparison of pre-Project depletions with post-Project depletions at the Thatcher Gauge. Draft Report, p. 11. This is inconsistent with the Decree for the transfer of the Model Right and is inconsistent with the way Kansas believes the analysis should be done. The appropriate comparison is no project versus actual historical Project operations. The Decree is contained in Appendix IV of the 1988 Report. In addition, mass diagrams are inadequate to determine whether reservoir operations are creating additional depletions. Any analysis should include effects at the stateline.

G. No comment.

Mr. A. Jack Garner
October 28, 1996
Page No. 3

H. Kansas agrees that an amendment to the Operating Principles should be considered to allow the City of Trinidad to change the use of the Project water rights from irrigation to municipal and industrial purposes in accordance with the contract between the District and Reclamation and Colorado water law. An appropriate analysis should be presented showing that the change can be made without injury to downstream Colorado and Kansas water users.

I. Recommendation I, to amend the Operating Principles to allow the District to implement conditions (d) and (e) House Document No. 325 with development and water court approval of substitute water supply plans pursuant to Colorado law, is premature. These conditions in House Document No. 325 were vague at best and cannot be considered appropriately until specific proposals are made by the District and adequately analyzed by the Bureau of Reclamation or otherwise.

There is reference to temporary detention and release of flood flows on page 28 of the Draft Report. This information should be documented for the study period in a manner similar to the 1988 Report so it can be reviewed and Recommendation I of the 1988 Report can be implemented.

These are what I consider to be the major objections that we have to the Draft Report. Given the extremely short amount of time allowed for these comments, we have not been able to perform a technical analysis of the Draft Report. We expect that analysis to be complete about the time of the Annual Compact Administration Meeting in December. Kansas requests that the Draft Report not be made final until that technical analysis is received and considered by the Bureau of Reclamation.

Sincerely,

David L. Pope

David L. Pope, P.E.
Chief Engineer-Director

by Leland E. Rolfs

DLP/bs

Attachment D

STATE OF KANSAS

MODELING

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



DIVISION OF WATER RESOURCES
David L. Pope, Chief Engineer-Director
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KANSAS DEPARTMENT OF AGRICULTURE

December 23, 1998

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DEC 29 1998

Field Office
Division of Water Resources
Garden City

A. Jack Garner, Area Manager
U. S. Department of the Interior
Bureau of Reclamation
Eastern Colorado Area Office
11056 West County RD 18E
Loveland, CO 80537-9711

RECEIVED
KS Dept. of Agriculture
JUL 16 1999
Garden City Field Office
Division of Water Resources

RE: Modeling Approach for Analysis of Trinidad Project Operations.

Dear Mr. Garner:

In accordance with Recommendation B. of my letter of March 18, 1998, below are the criteria that Kansas believes the Bureau's modeling study must meet in order to adequately evaluate the impact of the amendments proposed by the Bureau to allow storage of winter direct flows in the Joint Use Pool of Trinidad Reservoir.

I. Introduction

The Purgatoire River Water Conservancy District (District) has requested that the Operating Principles be amended to exempt storage during the nonirrigation season from the 20,000 acre-foot limit in Trinidad Reservoir. The Bureau of Reclamation (USBR) has requested that Kansas furnish recommended criteria for a modeling analysis that would be used to evaluate the District's request and identify necessary terms and conditions for approving the request.

This letter provides the USBR with Kansas' recommendations for criteria to be included in the modeling studies of the District's proposed amendment to allow additional storage in Trinidad Reservoir. The appropriate criteria for model evaluation and model simulations are described below. Some of the modeling criteria described in this letter were generally set out in a previous letter from Kansas to the USBR of November 14, 1995.

II. Project Evaluation Criteria

The modeling studies will provide a basis to evaluate how the operation of the project, with the proposed amendment, would have affected historical streamflows by simulating the proposed

project operations and a "no project" baseline condition and predicting streamflows for each case. A fundamental change from the original USBR studies conducted in 1961 and 1964 will be the need to simulate the "no project" condition for the period beginning in 1979, when the project went into operation, until the present. This will also facilitate ongoing monitoring of the project impacts. Subsequent to any amendments of the Operating Principles, USBR and Colorado will have a continuing obligation to see that the operation of the Trinidad Project will not violate Article IV.D of the Arkansas River Compact. This will require that a tool be available to measure project impacts into the future.

Several criteria are necessary for Kansas to evaluate the District's proposed amendment.

1. The analysis must compare a "project" and "no project" condition. A "no project" condition provides the baseline for compact compliance against which effects of the project operations can be compared. The evaluation must quantify the hydrologic impacts of the District's proposal by computing the changes to streamflows caused by the proposed operations. The analysis should be updated annually to determine the effect of the project in the future.
2. The impacts on usable stateline flow must be considered. This requires that the analysis be extended first to John Martin Reservoir near the confluence of the Purgatoire River and the Arkansas River, and then to the Stateline. This will require consideration of stream conditions below the Trinidad Project as well as conditions in and downstream of John Martin Reservoir.
3. The criteria must consider month-to-month and year-to-year effects of the proposed operations on usable stateline flows. It is not sufficient simply to consider a long-term average effect on inflows to John Martin Reservoir.

III. Model Approach

A. Modeling Procedures and Assumptions

The original USBR analysis included a number of assumptions and calculations related to consumptive use, irrigation efficiencies, delivery losses, return flows and river transit losses which should be reviewed and refined as necessary. Because the original studies are more than 30 years old, there are likely refinements that should be made to consider additional data and better understanding of the processes being modeled. For example there has been additional work done on the subject of river transit losses in the Arkansas River Basin and the Purgatoire River specifically that should be considered. The consumptive use analysis should be updated to incorporate procedures more commonly used today. More data may be available to estimate canal losses in the project area.

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DEC 29 1998

Field Office
Division of Water Resources

A. Jack Garner
December 23, 1998
Page 3

Irrigation efficiency and return flow assumptions should be reviewed and updated as necessary. Better information and changes in cropping patterns should also be considered.

B. Study Period and Data

The study period to evaluate the project should extend from 1925 to the present. Inclusion of the pre-project period of 1925 - 1975 will provide additional data for calibration of the model in the "no-project" condition. Streamflow, diversion, climate and other data should be compiled for the entire study period and used in the analyses and for calibration of the model.

C. Model Calibration

The model should be calibrated to historical streamflow and diversion data using standard techniques. Parameters such as return flows, transit losses, nonbeneficial consumptive use and diversion demands should be refined through calibration so that the model can reasonably replicate the historical streamflows and diversions. The ability of the model to replicate the "no project" condition should be demonstrated by comparison of model results to pre-project streamflow and diversion records. Return flow parameters should be refined to provide a reasonable fit with stream baseflows. The allocation procedures to predict diversions should be calibrated to historical records, both in pre-project conditions and during the period of actual project operation.

D. Model Comparisons

The model should be used to simulate operations and predict streamflows for two conditions; the "no project" condition and the "with-project" condition, as proposed to be operated with the amendment. The results of these two simulations should be compared to quantify project impacts. This approach would also be applied into the future to continue monitoring the effects of any amendment.

IV. Analysis of Impacts Below Trinidad Project Area

It is necessary to quantify the project effects through John Martin Reservoir and at the Stateline in order to properly consider the interests of the State of Kansas. The original USBR analysis considered only the project effects translated from the project area to the Arkansas River and John Martin Reservoir. This procedure should be reviewed and updated as necessary. Additional analysis will be required to consider the translation of effects from John Martin Reservoir inflows to usable stateline flows.

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JUL 16 1999

Garden City Field Office
Division of Water Resources

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DEC 29 1998

Field Office
Division of Water Resources
Garden City

V. CONCLUSION

The modeling studies of the Trinidad Project must demonstrate that the proposed operations by the District to increase storage in Trinidad Reservoir will not materially deplete usable stateline flows. The analyses and assumptions should be based on standard approaches commonly used in hydrologic modeling. The model must be calibrated and demonstrated to be reliable by reasonably replicating historical streamflows and diversions. The model must be capable of analyzing the "no project" condition so that the ongoing obligation to show compliance with the Arkansas River Compact can be met with a tool acceptable to the State of Kansas and other parties.

Sincerely yours,



David L. Pope, P.E.
Chief Engineer-Director

DLP:dr

pc: Steve Miller
Wendy Weiss
Julianne Woldridge
John Draper
Don Pitts
Leland Rolfs
Dale Book
Mark Rude
John Lefferdink
Donald Steerman
Alice Johns
David Bremm
Randy Hayzlett

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DEC 29 1998

Field Office
Division of Water Resources
Garden City

Attachment E

STATE OF KANSAS

BILL GRAVES, GOVERNOR
Mary Jane Staltelman, Acting Secretary of Agriculture



DIVISION OF WATER RESOURCES
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KANSAS DEPARTMENT OF AGRICULTURE

August 13, 1999

Mr. A. Jack Garner, Area Manager
United States Department of the Interior
Bureau of Reclamation
Eastern Colorado Area Office
11056 West County Rd 18E
Loveland, CO. 80537-9711

Re: Criteria for Temporary Detention and Subsequent Release of Flood Flows Stored in the Trinidad Reservoir Conservation Pool

Dear Mr. Garner:

At the July 12, 1999 meeting in Denver called by you for purposes of discussing Dam and Reservoir Project issues related to the Trinidad Operating Principles, Kansas agreed to submit comments on the Colorado Division Engineer's Criteria for Temporary Detention and Subsequent Release of Flood Flows Stored in the Trinidad Reservoir Conservation Pool, submitted to you by letter dated December 2, 1998 from Mr. Steve Witte, the Colorado Division 2 Engineer ("Criteria").

As a result of the discussion at the meeting and subsequent consideration, Kansas would propose that the Criteria be modified as follows:

1. Title: Modify the title of the Criteria to read as follows: "Criteria for Temporary Detention and Subsequent Release of Flood Flows Stored in the Trinidad Reservoir Below Flood Control Capacity and for Distribution of Released Flood Flows Generally".
2. The second-to-last paragraph of the Criteria should be supplemented by adding the sentence: "However, the Corps of Engineers may direct releases greater than 3,000 cfs, but not to exceed 5,000 cfs at the Trinidad gage, if channel conditions permit." This is in accordance with the suggestion by the Corps of Engineers in their letter to you of February 10, 1999.
3. New subheading before the last paragraph of the Criteria: "Criteria for Distribution of Released Flood Flows".

4. The last paragraph of the Criteria, the only paragraph under the new subheading suggested above, should be modified to read as follows:

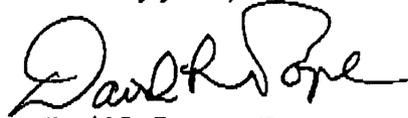
"The Division Engineer distributes the released waters ensuring that the project ditches are not diverting any flood flows temporarily stored in the Trinidad Reservoir, either below or in the Flood Control Capacity, unless John Martin Reservoir is spilling".

5. The Criteria should be incorporated into the Operating Principles by amending Article III, Paragraph 3 of the Operating Principles by adding at the end of paragraph 3 the following sentence: The Colorado State Engineer shall comply with "The Criteria for Temporary Detention and Subsequent Release of Flood Flows Stored in the Trinidad Reservoir Below Flood Control Capacity and for Distribution of Released Flood Flows Generally" dated _____, appended to these Operating Principles.

The reason for the suggested changes regarding distribution of released flood flows are (1) to clarify that the Criteria apply not only to flood flows temporarily detained below the Flood Control Capacity, but also to flood flows temporarily stored in the Flood Control Capacity; and (2) to eliminate the implication of the previous wording that project ditches may have an entitlement to divert flood flows temporarily detained or stored in Trinidad Reservoir.

For convenience, a copy of the amended criteria, as proposed, is attached.

Sincerely yours,



David L. Pope, P.E.
Chief Engineer

DLP:dr

pc: See attached distribution list (As used with Jack Garner letter dated July 8, 1999)

**Criteria for Temporary Detention and Subsequent Release of Flood Flows
Stored in the Trinidad Reservoir Below Flood Control Capacity and for
Distribution of Released Flood Flows Generally**

Criteria for Temporary Detention of Flood Flows

The Division Engineer temporarily detains flood flows to limit releases from Trinidad Dam so as to cause the flow measured at the Trinidad gage not to exceed 3,000 cfs. This is in accord with a letter from Gary L. Gamel of the Corps of Engineers dated April 16, 1993, which states:

The Water Control Plan for the flood control operation of Trinidad Lake calls for releases of 5000 cfs, as measured at the Trinidad gage. . . Until the Water Control Plan can officially be revised, any releases from Trinidad Dam in excess of 3000 cfs should not be made without consultation with this office.

Because this lower rate is based upon hydraulic analysis performed below Trinidad, Colorado, this is interpreted to mean that releases from Trinidad Dam should be limited so as to cause the flow measured at the Trinidad gage not to exceed 3000 cfs without consultation with appropriate personnel of the Albuquerque District, Corps of Engineers.

Criteria for Subsequent Release

The Division Engineer begins releasing water temporarily detained after 8:00 a.m. of the following day as soon as channel capacity is available. Channel capacity is available when such releases will not cause the flow at the Trinidad gage to exceed 3,000 cfs.

Water temporarily detained is released at the maximum rate, taking into account bypasses of reservoir inflow to satisfy current district demands and downstream senior rights, that will not cause the flow at the Trinidad gage to exceed 3,000 cfs. However, the Corps of Engineers may direct releases greater than 3,000 cfs, but not to exceed 5,000 cfs at the Trinidad gage, if channel conditions permit.

Criteria for Distribution of Released Flood Flows

The Division Engineer distributes the released waters ensuring that the project ditches are not diverting any flood flows temporarily stored in the Trinidad Reservoir either below or in the Flood Control Capacity, unless John Martin Reservoir is spilling

Attachment F

STATE OF KANSAS

BILL GRAVES, GOVERNOR
Jamie Clover Adams, Secretary of Agriculture



DIVISION OF WATER RESOURCES

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Topeka, Kansas 66612-1283
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KANSAS DEPARTMENT OF AGRICULTURE

October 13, 1999

Mr. A. Jack Garner, Area Manager
United States Department of the Interior
Bureau of Reclamation
Eastern Colorado Area Office
11056 West County Road 18E
Loveland, CO 80537-9711

RE: Trinidad Project Operating Principles: Irrigated Acres

Dear Jack:

At the meeting with Reclamation, the Purgatoire River Water Conservancy District (District), the State of Colorado and others on July 12, 1999 in Denver, Reclamation requested that Kansas prepare a proposed amendment to the Trinidad Operating Principles to address the issue of compliance with the limitation on irrigated area served by the Trinidad Dam and Reservoir Project. This request was made in response to Kansas' concerns about the District's suggestion in their letter to you dated May 1, 1998 that current practices by the District adequately address the issue.

Kansas believes that the District's response is inadequate. While the District has submitted a procedure, it appears that the District has merely summarized its procedures which were in effect at the time of the meeting in February, 1998. At that meeting, both Reclamation and Kansas requested that additional procedures be proposed by the District to address deficiencies in enforcement and verification of acreage limits. Kansas requested that the procedure provide that by April 1 each year the District report to Kansas which tracts will be irrigated that year and that no changes in irrigated land be allowed during the remainder of the calendar year. The Kansas request was reaffirmed in Recommendation E of my letter to you dated March 18, 1998. The May 1, 1998 letter failed to include the requested provisions. Therefore, Kansas continues to believe that the monitoring procedure currently being used by the District, as described in its letter of May 1, 1998 and at the July 12 meeting is inadequate.

Reclamation, in the 1988 review of the Operating Principles, concluded that the District should implement procedures for positive verification that no more than the maximum irrigated acreage is actually irrigated. Reclamation recognized in its report that the limitation on the amount of lands irrigated is a critical element in the protection of downstream water rights. The procedures

need to include annual documentation of lands receiving water, verification that only lands so identified were actually irrigated, and provisions for enforcement. The procedures should be sufficient to allow other water users and officials to determine whether the acreage limitation is being complied with from the documentation provided by the District.

Attached is recommended language for inclusion in the Operating Principles to address this issue. This provision should be added to Article IV.B.1 of the current Operating Principles.

Kansas requests that this provision be included in any amendment that shall hereafter be adopted to the Operating Principles. It is imperative that the District implement substantive procedures to verify, on an ongoing basis, that no more than the maximum project acreage is irrigated.

Sincerely yours,

A handwritten signature in black ink, appearing to read "David L. Pope". The signature is fluid and cursive, with a large initial "D" and "P".

David L. Pope, P.E.
Chief Engineer

DLP:dr

Attachments

pc: Attached Distribution List

Attachment G

STATE OF KANSAS

BILL GRAVES, GOVERNOR
Jamie Clover Adams, Secretary of Agriculture



DIVISION OF WATER RESOURCES

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KANSAS DEPARTMENT OF AGRICULTURE

October 13, 1999

Mr. Peter Evans, Director
Colorado Water Conservation Board
721 State Centennial Building
1313 Sherman Street
Denver, CO 80203

RE: Trinidad Project; City of Trinidad Transfer

Dear Peter:

The amendment to the Trinidad Project Operating Principles adopted by ARCA in December, 1997 to allow the City of Trinidad to store water in Trinidad Reservoir in lieu of irrigating some of the lands located in the District irrigable area, provided for advance notice to ARCA of the designation of such lands. Notice was received by a letter from the City's consultant to ARCA, dated April 16, 1999. This letter provided notice that 123.7 acres under the Model Ditch would be dried up and the water consumptively used on this tract would be stored in Trinidad Reservoir. The amended Operating Principles also provide that any dry-up for the City of Trinidad shall reduce the number of acres allowed to be irrigated from the District Water Supply. (Article IV.B.3.(c) of the Amended Principles).

The City of Trinidad received approval from the Colorado State Engineer to dry-up 948 acres under the Johns Flood Ditch and 373.7 acres under the Model Ditch in the 1997 amendment. They are proposing to store water in Trinidad Reservoir corresponding to 123.7 acres under the Model Ditch for 1999. The tract claimed for dry-up has not been irrigated for a number of years and was not included as irrigated in the two studies of project irrigated area undertaken by Reclamation in 1985 and 1994.

The position currently taken by the District, and consented to by Reclamation and Colorado, is that the acreage irrigated by the Project water supply can be shifted from year to year. We understand that the combined total of contracted acreages exceed the project limit and also that lands other than those originally intended to be irrigated with project supply have been irrigated. For these reasons it is necessary to monitor acreage year to year to insure the project limit is not exceeded.

Reclamation's Final Report on the latest review of the Operating Principles dated December, 1996 (1996 Report) made several findings relevant to this situation. The total irrigated area with project supply in 1994 was determined by Reclamation to be 19,458 acres. This was slightly less than the 19,499 acres, which should be considered the limit on project acreage, since 218 acres are irrigated with non-project supply. In

addition, 367 acres were identified by Reclamation as "intended to be irrigated". These totals did not include the City's claimed tract for dry-up under the Model Ditch.

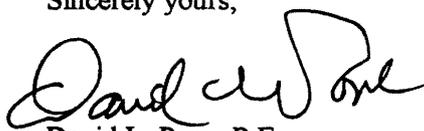
While Kansas believes it is not adequate to have to rely on data from 1994 for assessing current compliance with the acreage limit, this data is apparently the best information available. Based on this information, the total irrigated acreage in the project exceeds the limit under the Operating Principles, when the City's 124 acre tract is included. The tract claimed by the City has not been irrigated for many years, if at all. It would therefore be necessary to discontinue some other acreage being irrigated with project water supply in order for the project to remain under the acreage limit.

Kansas requested that the mapping and notice provision be included in the 1997 amendment to allow verification that the project limitation was not being exceeded when considering the City's tracts in combination with the remaining irrigated land. We were frankly surprised when the first tract claimed under the provisions of the 1997 amendment had not been irrigated for many years, if ever, and believe this situation leads to potential compliance difficulties with the acreage limitation for the project. Kansas has maintained in the discussions over possible further amendments to the Operating Principles that procedures need to be implemented to insure that the acreage limit is adhered to. The present claim by the City for dry-up of unirrigated land further demonstrates this need.

Based on the documentation provided in the 1996 report, the total project irrigated acreage is not being limited to the allowable acreage in apparent violation of the Trinidad Operating Principles. Kansas requests that further documentation be provided to identify the tract(s) irrigated with project water supply in 1994, which are not being irrigated in 1999, to insure that the acreage limit is not being exceeded when the City's tract is included. Kansas also requests an updated map identifying the 1999 irrigated acreage with project water supply.

The use of water for augmentation purposes is also inconsistent with the intent of the Operating Principles. To clarify this, I have attached a proposed amendment to the definition section in the Operating Principles.

Sincerely yours,



David L. Pope, P.E.
Chief Engineer

DEP:dr

Attachments

pc: Attached Distribution List

Draft Amendment to Trinidad Operating Principles

October 13, 1999

The following definition is hereby added to Article II of the Operating Principles, Trinidad Dam and Reservoir Project, as paragraph 19.

19. "Municipal and Industrial Use (M&I Use)" means the use made of water delivered, or to be delivered, directly to an incorporated municipality and distributed through a common distribution system operated by the municipality to be applied directly to beneficial uses within the corporate limits of the municipality, including the use of water in connection with the manufacture, production, transport, or storage of products, and the use of water in connection with providing commercial services.

Municipal and Industrial Use does not include the use of water for augmentation for any purpose.

Attachment H

STATE OF KANSAS

BILL GRAVES, GOVERNOR
Jamie Clover Adams, Secretary of Agriculture



DIVISION OF WATER RESOURCES

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KANSAS DEPARTMENT OF AGRICULTURE

October 13, 1999

Mr. A. Jack Garner, Area Manager
United States Department of the Interior
Bureau of Reclamation
Eastern Colorado Area Office
11056 West County Road 18E
Loveland, CO 80537-9711

RE: Trinidad Project Operating Principles; Ideal Headgate Requirements

Dear Jack:

At the meeting in Denver on July 12, 1999, it was agreed that Kansas would review information provided by Reclamation and the Purgatoire River Conservancy District (District) concerning the Ideal Headgate Requirement for diversions by the project ditches. This letter provides Kansas' comments on the information provided and positions stated by Reclamation and the District, with a recommendation for an amendment to the Operating Principles to correct deficiencies in administration of the Trinidad Project as related to delivery limitations.

Background

In your letter of July 8, 1999, you point out the difference in language between the recommendations in the 1988 report relating to "ideal irrigation requirement" and the Operating Principles limiting deliveries to irrigation requirements at the farm headgate, with allowance for canal and lateral losses. Kansas does not understand this distinction to be material; the Operating Principles contain the provision to limit deliveries to irrigation requirements in Paragraph IV.B.2. The issue currently being addressed is how to implement this provision. The 1961 study referred to the limitation of headgate diversions to "ideal crop requirements". The limitation in the Operating Principles is intended to prevent diversions and deliveries in excess of irrigation requirements, on a reasonable time interval, with adequate estimates of irrigation demand made ahead of time so that the provision can be effectively enforced.

The issue of excess diversions was addressed in the 1988 Reclamation Report on the first review of the Operating Principles. In that Report, Reclamation concluded that the District had made no effort to limit the headgate diversions to that necessary to meet irrigation requirements and excess diversions had in fact occurred. The Report went on to describe general effects of this practice to reduce inflows to John Martin

Reservoir. The Report included a recommendation to implement procedures for limiting diversions to the "ideal irrigation requirement".

The issue was revisited in the 1996 Reclamation Report on the second review of the Operating Principles. Reclamation found that the District had not developed a methodology for determining a "current real time irrigation requirement". This conclusion was supported by Reclamation's finding that excess diversions had occurred in seven out of the ten years of the review period. Again Reclamation recommended that the District should develop (and strictly administer) a methodology for determining a current real time irrigation requirement. However, unlike the 1988 report (and the 1961 Study), the 1996 Report fails to point out the depletive effect of excess diversions to downstream water rights.

The excess diversions do have depletive effects on downstream water users. The 1964 Irrigation Report describes the water supply for the Project as follows:

"Any improvement in water supply conditions must be accomplished by increasing the irrigation efficiency of existing supplies. This type of development is imperative because there are no substantial new water supplies available to be developed. The dominant aspect of future project operations are, therefore, concerned with improving water use efficiency." (Pg 17)

Obviously the anticipated benefits of the Project were re-regulation of the existing supplies to improve the timing of deliveries to times when the water would be more usable in supplying crop consumptive demands. The low efficiencies historically prevalent in the project were to be increased by improved timing of deliveries and eliminating excess deliveries. Also obvious was the requirement that project depletions not be increased beyond the historical depletions to prevent impacts on downstream water users. In order for this to be possible, an accounting of the pre-project return flows was made and the depletive effects of return flows from excess diversions were estimated and included in the analysis. In concept, this is the only way it would be possible for the Project water supply to be improved to increase crop consumption while not exceeding historical depletions in the project area.

Contrary to assertions presently being made by the District, excess diversions do not occur without some loss before returning to the stream. Reclamation's analysis in the 1988 report showing increased Project depletions with excess diversions demonstrates this. This is also intuitive when considering the benefit of project storage to re-regulate the available water supply to provide water to the crops at times more beneficial to increase crop consumption relative to no-project conditions. Excess diversions have the effect of maintaining pre-project losses on nonbeneficial diversions while also allowing for increased crop consumptive use. Therefore, as concluded in the original Project studies, the limitation on deliveries to meet irrigation requirements is a necessary condition for project operation in order to prevent effects on downstream water users. The ideal irrigation requirement was not a meaningless limitation when the parties incorporated it in the operating principals in 1967, and no analysis since the original studies has shown this limitation to be unnecessary.

Need for Amendment to Operating Principles

The information and descriptions of current administrative practices in the District lead us to conclude that there have been no changes to limit deliveries to the irrigation requirements. The District has interpreted

the Operating Principles to mean that the allocations it makes to the ditches, however they are determined, are sufficient to satisfy the requirement of Paragraph IV.B.2. The District further asserts that it is not possible to anticipate the irrigation requirement during the season and therefore not practical to implement any limitation on diversions beyond whatever allocation the District has made. This statement is clearly incorrect, especially given the findings of Reclamation in both the 1988 and 1996 Reports and, if accepted, would effectively eliminate the limitation of deliveries to irrigation requirements as a constraint on the irrigation operations of the District, to the detriment of downstream water users.

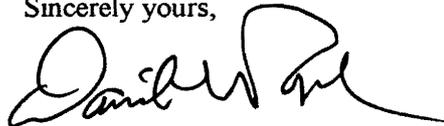
In response to Kansas' requests for documentation on the District's efforts to enforce this limitation, Reclamation has described a cooperative program between Reclamation, a local soil conservation district and NRCS to study alternatives to improve irrigation efficiencies in a portion of the Project service area. However, there is no indication that the District is participating in this program. Further, Reclamation stated that the District is exploring an agreement with Reclamation to do a transit loss study. However, again, there is no indication that any action has occurred on this front.

These actions are not responsive to the issue of limiting deliveries to irrigation requirements. The studies of the NRCS to improve irrigation efficiencies do not address determination of requirements and control of deliveries. The limitations included in the Operating Principles are to apply to existing efficiencies. Reclamation estimated such requirements in the Irrigation Studies and concluded in the review reports that actual diversions exceeded the requirements for efficiencies with the existing systems. Any improvements in irrigation efficiencies should be accounted for by reducing the ideal irrigation requirement. It should be noted that increased irrigation efficiencies serve to reduce return flows and increase consumptive uses, which should be accounted for when assessing whether Project depletions have exceeded historical no-project depletions.

Any study of transit loss, if it occurs, would be only the first step in implementing the limitation set out in the Operating Principles.

The provisions of the Operating Principles limiting water deliveries to irrigation requirements should be implemented. An amendment to the Operating Principles is necessary to provide specific guidelines to determine the diversion limits. Paragraph IV.B.2 should be amended by adding the attached language to the existing provision.

Sincerely yours,



David L. Pope, P.E.
Chief Engineer

DLP:dr

Attachments

pc: See Attached Distribution List

October 13, 1999

Proposed Amendment to Paragraph IV.B.2. of the Operating Principles

The irrigation requirement will be established by the District each year for each ditch system based on the number of acres and types of crops to be irrigated during the season, as follows:

- (a) The consumptive use requirement for crops will be determined by calculating the consumptive use for each ditch based on the crop distribution irrigated under that ditch. The average crop distribution from the previous five years shall be used, unless a Ditch provides a commitment to grow different during the current year, in which case the latter crop mix shall be used. The method used to calculate consumptive use shall be approved by the Bureau of Reclamation and shall will incorporate climate data for the previous five years to calculate the monthly consumptive use requirement of crops.
- (b) The effective precipitation will be determined using records of actual precipitation collected within the project area. Precipitation from the current irrigation season will be used to calculate effective precipitation on a monthly basis, using a method approved by the Bureau of Reclamation, and the consumptive irrigation demand will be updated throughout the season using this data.
- (c) The farm delivery requirement will be calculated assuming farm losses of no more than 35%.
- (d) Canal and lateral losses will be determined by the Bureau of Reclamation for each ditch system. The losses will be added to the farm delivery requirement to determine the river headgate requirement for each ditch system.
- (e) Diversions for each ditch will be limited during the current irrigation season to the calculated river headgate requirement, as updated throughout the irrigation season for effective precipitation. The District will maintain ongoing records of updated river headgate requirements and the actual river headgate diversions for each ditch for the purpose of providing notice of limits and enforcing the diversion limits.
- (f) The District will provide Reclamation and the State of Kansas by December 1 each year with a summary of the calculated river headgate requirements and actual river headgate diversions on a monthly basis for that year.

Attachment I

October 18, 1999

Donald L. Steerman, Esq.
Shinn, Steerman & Shinn
P.O. Box 390
Lamar, CO 81052

John S. Lefferdink, Esq.
Lefferdink Law Office, LLC
Drawer 110
Lamar, CO 81052-0110

Re: Amendments to Operating Principles for Trinidad Dam and Reservoir Project

Gentlemen:

As you know, the Purgatoire River Water Conservancy District (District) is proposing to amend the Operating Principles for the Trinidad Project. Proposed changes to several portions of the Operating Principles would allow storage of the direct flow priorities during the non-irrigation season without such storage being charged against or deducted from the 20,000 acre-feet that can be stored under the Model storage right. Various interested parties have different opinions about the need to evaluate the effects of the proposed amendments with additional modeling studies.

The State of Kansas submitted a letter to the Bureau of Reclamation (Bureau) dated December 28, 1998 in which they describe their beliefs about proper criteria for modeling the potential impacts of the proposed amendments. Kansas suggested a detailed modeling approach that would result in a model that would extend to the stateline and could be used to determine Trinidad Project impacts on usable stateline flow. The District responded in a letter dated January 29, 1999 that it could not undertake the modeling study proposed by Kansas and that it was unnecessary to do so.

On behalf of the District 67 Ditch Association and Fort Lyon Canal Company, we have been asked to develop a suitable technical approach for evaluating the effects of the proposed amendments on downstream Colorado water rights. In order to properly do so, it is necessary to consider the terms and conditions in the decree that changed the Model storage right to Trinidad Reservoir and documented information about the intentions of the parties to that decree. Accordingly, we have reviewed the decree in Civil Action No. 19793 (hereinafter "1965 Model transfer decree"), two Colorado Supreme Court rulings regarding the Model transfer decree, information contained in the Bureau of Reclamation report titled "Review of Operating Principles, Final Report", dated December, 1988 (hereinafter "the 1988 Bureau Report"), and other background information. After doing so, it is our conclusion that it is not necessary to perform additional modeling studies to determine the effect of the proposed amendments upon downstream Colorado water rights. Our reasoning in reaching this conclusion is described below.

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The transfer of the Model storage right to Trinidad Reservoir was required by House Document 325 as a condition precedent to the construction of the Trinidad Project. The District requested approval of that transfer from the Las Animas County District Court in Civil Action No. 19793. A consent decree was entered in that matter on April 15, 1965, after several years of negotiations between the District and objectors to the case, including the Fort Lyon Canal Company, Amity Mutual Irrigation Company, and the Arkansas Valley Ditch Association. The Project then proceeded to construction.

The 1965 Model transfer decree changed the entire 20,000 acre-feet decreed to the Model storage right, although a survey in 1946 had determined that the usable capacity of the reservoir was only 6,200 acre-feet at that time. The Colorado Supreme Court later ruled that the 1965 Model transfer decree had made the changes set forth in House Document 325 and the Operating Principles, which included storage of Project's direct flow rights during the non-irrigation season, even though such storage may not have been explicitly described in the 1965 decree.

Paragraph 10 of the findings in the 1965 Model transfer decree states in part:

"The protestants hereto have consented to the issuance of this Decree changing the location of the place of storage of the Model Reservoir Right from the Model Reservoir to the Trinidad Reservoir upon the representation and assurance of the Petitioners, *based upon engineering studies made by the United States Bureau of Reclamation* that with the imposition of the following enumerated conditions, the exercise of the Model Storage Right of 20,000 acre feet at the Trinidad Reservoir as part of the Trinidad Dam and Reservoir Project will not injure or impair the vested water rights of any of the parties to this proceeding or their beneficiaries." (emphasis added)

The decree then specified seven conditions upon which the parties had consented to the entry of the decree, one of which reads in part as follows:

"e. That the Petitioners' storage of water in the Trinidad Reservoir under the Model Reservoir Right shall be regulated in such a manner that the quantity of water occurring in the Las Animas or Purgatoire River at a gauging station on said river below Van Bremmer Arroya shall remain and be the same, as determined by the State Engineer, during any period of ten consecutive years reckoned in continuing progressive series beginning with January 1, 1954 as it would have been had the Model Reservoir Right not been transferred to the Trinidad Reservoir."

Inclusion of this term and condition was a key element in the negotiations that resulted in entry of the consent decree. Representations had been made, based upon the engineering studies conducted by the Bureau, that operation of the project as planned would not reduce flows available to downstream water rights. This decree condition provided the means to test the accuracy of that representation on an on-going basis after project completion.

October 18, 1999

Page 3

The 1965 Model transfer decree and operation of the Trinidad Project have been the subject of two appeals before the Colorado Supreme Court. It is of interest that in both of the decisions resulting from those cases the Supreme Court chose to recite and emphasize that this decree condition (e) provided protection for downstream Colorado water rights (see Purgatoire District v. Highland, 194 Colo. 510, 574 P.2d 83 (Colo. 1978) and Purgatoire District v. Kuiper, 197 Colo. 200, 593 P.2d 333 (Colo. 1979)).

To our knowledge, the State Engineer has never made the annual determination required by condition (e) of the consent decree nor regulated the reservoir in accordance therewith. As a consequence, the information that would result from those determinations is not available to assist in determining whether operations according to the *existing* Operating Principles have been in compliance with the 1965 Model transfer decree or resulted in injury to downstream Colorado water rights.

An additional condition of the consent decree states in part:

“g. That the storage of water in Trinidad Reservoir under the transferred Model Reservoir Right shall at all times be conducted in accordance with, subject to, and governed by The conditions of operation of the Trinidad Dam and Reservoir Project prescribed by House Document 325 as implemented by Article IV of the ‘Operating Principles – Trinidad Dam and Reservoir Project which is appended to Volume I of the United States Bureau of Reclamation Irrigation Report on said project (Revised September, 1964)”

The representations of non-injury made during the negotiation of the consent decree in the 1965 Model transfer case were based upon the planning studies conducted by the Bureau. The Bureau studies were premised upon the assumption that the winter water would be stored under the Model storage right and credited against the 20,000 acre-foot allowed under that right (page 11, 1988 Bureau Report). The objectors in the 1965 case believed that was the operation they were consenting to, and condition (g) of the decree appears to require such operation.

The 1988 Bureau Report includes the following statement on page 11:

“From a review of House Document No. 325 and the 1961 and 1964 studies, there is little doubt the Bureau of Reclamation personnel formulating the irrigation components of the project did not intend that water stored under the Model Right be transferred out of the Model Right or that winter water be stored under any right but the Model right.”

Accordingly, the 1988 Bureau Report concluded that these practices were a departure from the intent of the Operating Principles. They also appear to be a departure from the intent of the 1965 Model transfer decree.

In our opinion, any water stored under the Model storage right (including winter direct flow water) in excess of 20,000 acre-feet is water that should be passed downstream for the benefit of downstream

October 18, 1999

Page 4

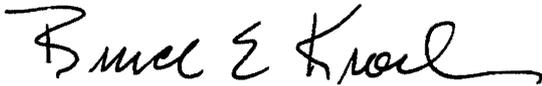
users under the intent of the 1965 Model transfer decree (except at times when John Martin Reservoir is spilling or expected to spill). It is not necessary to use a model to determine the effect of the District's proposed amendments to the Operating Principles. If the District stores more water than it is entitled to, some downstream water user receives less.

The District got a good deal in the 1965 Model transfer decree. It changed a 6,200 acre-foot off-channel reservoir into a 20,000 acre-foot on-channel reservoir and received the right to store winter direct flow water in that reservoir. It is not fair to the downstream Colorado water users to now change the method of operation they consented to in 1965.

For the reasons described above, we do not believe that the Arkansas River Compact Administration should consider any amendments related to the storage of winter water.

Please call if you have any questions or wish to discuss this matter.

Sincerely,

A handwritten signature in black ink, appearing to read "Bruce E. Kroeker". The signature is fluid and cursive, with a long horizontal stroke at the end.

Bruce E. Kroeker, P.E.

cc: Parties at meeting on 10/19/1999

KANSAS DEPARTMENT OF AGRICULTURE
Division of Water Resources
Garden City Field Office

M E M O R A N D U M

TO: Andrew Gilmore, USBR

DATE: March 31, 2010

FROM: Kevin Salter, KS DWR 
Arkansas River Team

RE: Trinidad 10-yr Review
Double Mass Analysis

The *1995-2004 Review of Operating Principles and Project Operations* (draft dated December 2009) includes a double mass analysis which purports to show the impacts of the project on the water supply. Kansas continues to question the conclusions which can be drawn from such analysis. We have reviewed the draft review, Appendix G and the backup data used in this analysis (provided by your email of March 11th). We do not agree that this analysis shows the true impact of the project on the water supply. This memo describes some of our concerns with the way the double mass analysis is being interpreted, and offers some suggestions.

Period of Record: The pre-project period of record for the Purgatoire River at Thatcher is only ten year starting in November 1966 and ending in October 1976 for this analysis. For a double mass analysis, it would be preferable to have a pre-project period on the order of 30 years to capture a variety of hydrologic conditions. Table 1 compares the accumulated flows over successive ten year periods. It stands out that the November 1966 to October 1976 period is driest of these periods.

Table 1 Comparison of accumulated flows for successive 10-year periods.

10-year period	Total Trinidad Accumulated flow for period (AF)	Total Thatcher Accumulated flow for period (AF)
Nov 1966 - Oct 1976	389,060	279,949
Nov 1976 - Oct 1986	633,417 ^(a)	555,909
Nov 1986 - Oct 1996	587,502 ^(a)	474,878
Nov 1996 - Oct 2006	568,813 ^(a)	408,220
^(a) These periods includes Trinidad Reservoir evaporation		

Reservoir Evaporation: The Appendix G table includes flow data for the Purgatoire River at Trinidad and Thatcher gages along with Trinidad Reservoir data: storage (content), change in storage and evaporation. It is good to have the reservoir information in this table to understand how the Purgatoire flows have been impacted. The storage information shows how the timing of the flows has changed due to the operation of the reservoir. The evaporation data provides water lost from the system due to the presence of the reservoir. Because the monthly evaporation represents lost stream flow, it should be accumulated along with the gaged flow for Purgatoire River at Trinidad. See Figure 1. By including the monthly evaporation, the slope and intercept of the trend line is changed.

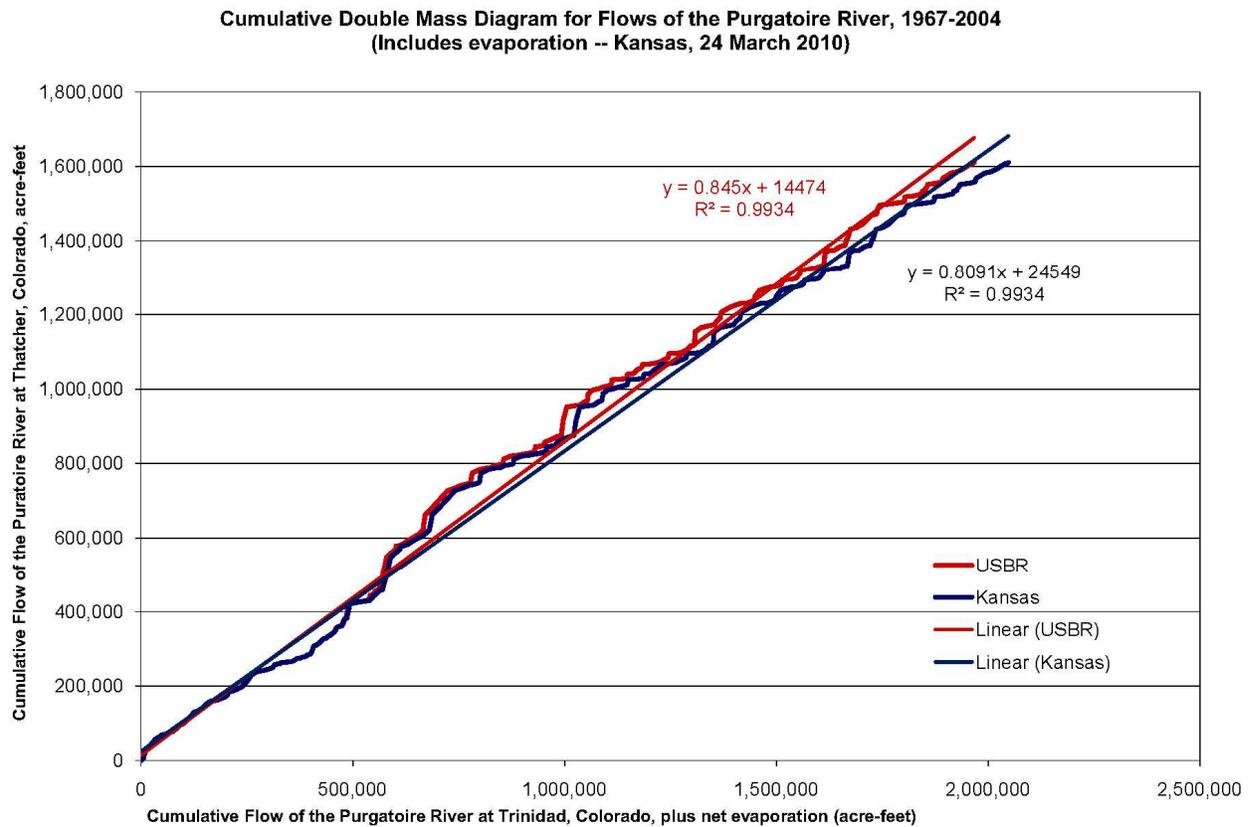


Figure 1

Recent Trend: The double mass analysis indicates a recent trend towards diminishing flows at Thatcher relative to flows at Trinidad. This may be more indicative of total hydrologic supply rather than the impact of the project itself. When evaporation is included as part of the accumulated flow through Trinidad, the slope of the line more closely matches the pre-project condition. See Figure 2.

Project Impact: The Executive Summary (as drafted) has the following statement.

A mass balance analysis of the Trinidad and Thatcher gages (above and below the Project) shows no negative impact from the Project. The Project may have a slight positive impact on downstream users, as compared to pre-Project conditions.

This statement is not supported based on Figure 2, especially for the 1995 to 2004 period being reviewed. Figure 2 is similar to the graph which appears in Appendix G on page G-15. The differences are that each of the full 10-year review periods has separate trend lines and evaporation is included in the accumulated flow for Purgatoire River at Trinidad. Based on the backup data provided it was noted that the periods graphed on page G-15 starts in October 1984 and October 1994 rather than November 1984 and November 1994 as indicated.

Cumulative Double Mass Diagram for Flows of the Purgatoire River for selected periods, 1967-2004

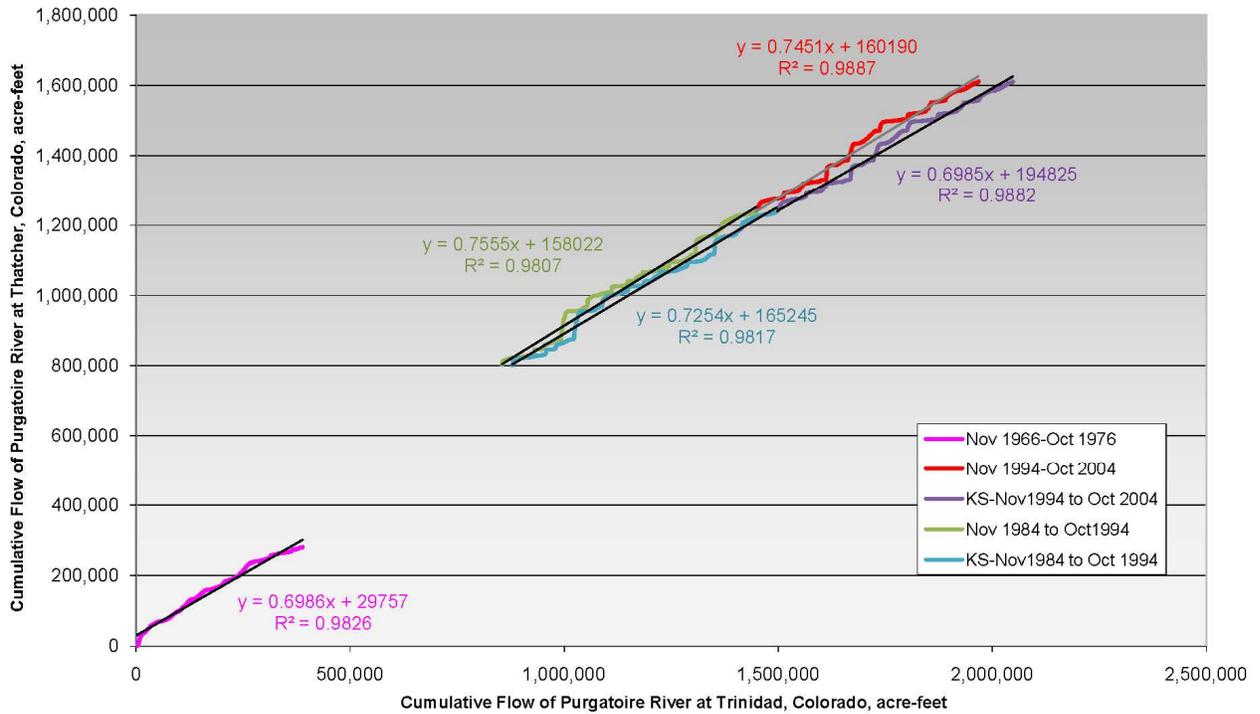


Figure 2

Hydrologic Impacts: There is a period from November 1966 to September 1968 where there is flow record for Purgatoire River at Alfalfa, Purgatoire River at Thatcher, Van Bremer Arroyo near Model and Lunning Arroyo near Model. Table 2 has the records for this overlapping period. The last column adjusts the flow for the Purgatoire River at Thatcher to Alfalfa by subtracting off the flows measured on the Lunning and Van Bremer Arroyos.

Comparing Column (E) to Column (A), approximately 50% of the time, the adjusted monthly flow (E) is close to that measured on the Purgatoire River at Alfalfa (A). The rest of the time, the difference between the monthly flows is significantly greater than 200 AF. Generally, these are months where there are significant inflows measured on the two arroyos. This would suggest that maybe other ungaged tributaries are also contributing to Purgatoire River flows below the Alfalfa gage.

Table 2

Year-Month	Purgatoire River at Alfalfa (A)	Luning Arroyo near Model (B)	Van Bremer Arroyo near Model (C)	Purgatoire River at Thatcher (D)	Thatcher Adjusted to Alfalfa (E=D-B-C)
1966-11	701	20	7	732	705
1966-12	946	17	13	976	947
1967-01	1,075	19	11	1,130	1,100
1967-02	691	9	10	902	883
1967-03	530	9	12	627	606
1967-04	322	11	10	322	300
1967-05	1,905	262	1,802	6,970	4,906
1967-06	15,388	401	861	20,000	18,739
1967-07	7,226	279	645	9,600	8,676
1967-08	15,108	494	30	15,750	15,226
1967-09	3,120	23	9	3,960	3,928
1967-10	1,233	32	17	1,120	1,071
1967-11	1,271	33	10	1,280	1,237
1967-12	725	30	8	1,100	1,062
1968-01	1,454	26	13	1,710	1,671
1968-02	1,065	19	13	1,180	1,148
1968-03	825	16	11	1,040	1,013
1968-04	1,111	22	13	1,100	1,065
1968-05	2,003	20	23	1,930	1,886
1968-06	4,795	256	2	6,240	5,982
1968-07	5,741	743	302	8,140	7,094
1968-08	8,535	2,078	201	11,910	9,632
1968-09	440	32	10	355	313

Summary:

- Period of record for the pre-project is too short and occurred during a dry period as compared to the post project periods.
- Reservoir evaporation needs to be accumulated with the Purgatoire River at Trinidad flow to account for lost flow.
- The recent trend is towards diminishing flows at Thatcher.
- The trend line for the most recent 10 year period (1995-2004) has nearly the same slope as the available pre-project period. Thus there doesn't appear to be a positive impact to the downstream users due to project operations.
- The graph on page G-15 needs to be adjusted to start on the correct months for the project periods.
- Gaged tributary inflows suggest that some of the water supply that is measured through the Purgatoire River at Thatcher is generated by runoff, rather than project operations. It also appears that ungaged inflows below the Purgatoire River at Trinidad but above the Thatcher gage also impact the double mass analysis.

KLS:kls

From: Jeris Danielson [mailto:jeris_danielson@hotmail.com]

Sent: Thursday, April 08, 2010 11:19 AM

To: Gilmore, Andrew F; Adam Bergeron; amity@rural-com.com; Bernadine Cisneros; Bill Tyner; Griggs, Burke; Cann, Steve; Charlie DiDomenico; Dale Book; Barfield, David; dennis.e.garcia@usace.army.mil; D'Orazio, Sam; Edelmann, Patrick F; Glenn Wilson; Goodenow, Gregory (Greg) S; Heimerich, Matt; Iseman, Tom; Jeff Montoya; Jim Fernandez; Jim Soltis; jkahn@blglaw.com; joe.flory@state.co.us; jwoldridge@waterlaw.tv; Kroeker, Bruce; Salter, Kevin; Liz Aragon; Matthew Moorhead; McDonald, Eve; Miller, Lisa D; mldegarbo@mindspring.com; Nguyen, Lee Ann; oxleymgr@hotmail.com; Parker, Nancy L; prwcd@yahoo.com; Ronca, Carlie A; Samuel Speed; shinnsteermanlaw@centurytel.net; steve.miller@state.co.us; steve.witte@state.co.us; Thompson, Colin; Thompson, Gary; Yuska, Mark

Cc: ECA CFiles

Subject: Re: Trinidad 10-yr Review / Double Mass Analysis

Andrew

Thanks for forwarding Salter's letter. It would have been nice to have had it before hand to be able to respond in a knowledgeable fashion during the tele-conference. My comments follow:

1. With respect to the lack of pre-project data, my only comment is that we always WISH we had more data. Unfortunately, we don't,, so , we do the best with what we have.

2. It is absolutely fallacious to argue that the evaporation from Trinidad Reservoir should be included in the flows of the Purgatoire River below Trinidad Dam. If you want to play with evaporation, then, you must deduct from current reservoir evaporation the evaporation from the original Model Reservoir and consumptive use of winter irrigation diversions. Of course, we have no knowledge of what these pre-project conditions were, so, the argument seems moot to me.

3. Comment on recent trend for 1995 thru 2004. Salter states that there appears to be a downward trend for this period. This is certainly not surprising since the period includes the year 2002 which was the driest year in the entire record. Additional comments about how different trends change from one ten year period are not surprising. Of course they vary, since, they are entirely different data sets. Salter argues , with respect to pre-project data, that ten years is insufficient to draw conclusions and that thirty years would be better. He then tries to draw conclusions in his "recent trends" analysis by using ten year periods. Let's at least be consistent. The purpose of a double-mass analysis is to look at ALL the data available and identify LONG-TERM trends, temporary trends based on analyzing small portions of the data set.

I feel the Bureau has done the best job they could have, given the vagaries in available data. The time has come for the Bureau to make a decision and put an end to the constant nit-picking.

From: Salter, Kevin [mailto:Kevin.Salter@KDA.KS.GOV]

Sent: Tuesday, April 27, 2010 10:05 AM

To: Jeris Danielson; Gilmore, Andrew F; Adam Bergeron; amity@rural-com.com; Bernadine Cisneros; Tyner, Bill; Griggs, Burke; Cann, Steve; DiDomenico, Charles; Book, Dale; Barfield, David; dennis.e.garcia@usace.army.mil; D'Orazio, Sam; Edelmann, Patrick F; Glenn Wilson; Goodenow, Gregory (Greg) S; Heimerich, Matt; Iseman, Tom; Montoya, Jeff; Jim Fernandez; Jim Soltis; jkahn@blglaw.com; Flory, Joe; jwoldridge@waterlaw.tv; Bruce Kroeker; Liz Aragon; Matthew Moorhead; McDonald, Eve; Miller, Lisa D; mldegarbo@mindspring.com; Nguyen, Lee Ann; oxleymgr@hotmail.com; Parker, Nancy L; prwcd@yahoo.com; Ronca, Carlie A; Samuel Speed; shinnsteermanlaw@centurytel.net; Miller, Steve; Witte, Steve; Thompson, Colin; Thompson, Gary; Yuska, Mark

Cc: ECA CFiles

Subject: RE: Trinidad 10-yr Review / Double Mass Analysis

Upon further consideration, I am responding to Dr. Danielson's comments related to my concerns with the double mass analysis. It is not my intent to change, modify, or delay the report that is being finalized. I will provide Dr. Danielson's comments with my reply directly below:

2. It is absolutely fallacious to argue that the evaporation from Trinidad Reservoir should be included in the flows of the Purgatoire River below Trinidad Dam. If you want to play with evaporation, then, you must deduct from current reservoir evaporation the evaporation from the original Model Reservoir and consumptive use of winter irrigation diversions. Of course, we have no knowledge of what these pre-project conditions were, so, the argument seems moot to me.

The evaporation of the original Model Reservoir and consumptive use of winter irrigation diversions are already included in the pre-project condition because they occurred between the two points considered in the double mass analysis. However, since the evaporation has now moved outside of the two points being considered, it should be included in the Trinidad gage.

3. Comment on recent trend for 1995 thru 2004. Salter states that there appears to be a downward trend for this period. This is certainly not surprising since the period includes the year 2002 which was the driest year in the entire record. Additional comments about how different trends change from one ten year period are not surprising. Of course they vary, since, they are entirely different data sets. Salter argues, with respect to pre-project data, that ten years is insufficient to draw conclusions and that thirty years would be better. He then tries to draw conclusions in his "recent trends" analysis by using ten year periods. Let's at least be consistent. The purpose of a double-mass analysis is to look at ALL the data available and identify LONG-TERM trends, temporary trends based on analyzing small portions of the data set.

I agree with Dr. Danielson's comment that each ten year period is an entirely different data set, which raises problems when the double mass analysis attempts to compare a ten year period with subsequent years. This continues to be a concern with the double mass analysis.

I look forward to subsequent discussions on this matter. Kevin

From: Miller, Steve [Steve.Miller@state.co.us]
Sent: Tuesday, April 27, 2010 12:17 PM
To: Salter, Kevin; Jeris Danielson; Gilmore, Andrew F; Adam Bergeron; amity@rural-com.com; Bernadine Cisneros; Tyner, Bill; Griggs, Burke; Cann, Steve; DiDomenico, Charles; Book, Dale; Barfield, David; dennis.e.garcia@usace.army.mil; D'Orazio, Sam; Edelman, Patrick F; Glenn Wilson; Goodenow, Gregory (Greg) S; Heimerich, Matt; Iseman, Tom; Montoya, Jeff; Jim Fernandez; Jim Soltis; jkahn@blglaw.com; Flory, Joe; jwoldridge@waterlaw.tv; Bruce Kroeker; Liz Aragon; Matthew Moorhead; McDonald, Eve; Miller, Lisa D; mldegarbo@mindspring.com; Nguyen, Lee Ann; oxleymgr@hotmail.com; Parker, Nancy L; prwcd@yahoo.com; Ronca, Carlie A; Samuel Speed; shinnsteeermanlaw@centurytel.net; Witte, Steve; Thompson, Colin; Thompson, Gary; Yuska, Mark
Cc: ECA CFiles
Subject: RE: Trinidad 10-yr Review / Double Mass Analysis

I suggest we get the current draft report finalized and issued ASAP. The issues with the double mass method of assessing project impacts deserve further discussion and should be on the agenda for the first of the periodic [annual or biennial?] Project Operations review meetings we all agree would be advantageous and which USBR has committed to conduct in the current draft review report for the period 1995-2004. Hopefully we can have a clearer understanding of what is currently in and out of the analysis and make any necessary modifications well in advance of starting the 2005-2014 review.

Steve Miller, P.E.
Sr. Water Resource Specialist
Colorado Water Conservation Board(CWCB)
Water Supply Protection Section
1313 Sherman Street, Room 721
Denver, CO 80203
phone: 303-866-3441, ext 3228
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