Lower Republican Basin Appraisal Study

Discussion Items - -Hydrology Studies

- Desired completion date: January 2004
- Study goals
    - Increase system efficiency
    - Removal/reduction of trigger years
    - Meeting MDS requirements
- Available hydrology modeling uses 1993 level of development
- Extending level of development to year 2000 is possible
- Modeling the "future without" condition: Year 2000?
- Ground water model development schedule
- HCR operational criteria
- Dam Safety studies
- Impacts to schedule

Ann Bleed

From: Michael Kube [MKUBE@gp.usbr.gov]

Sent: Thursday, August 08, 2002 1:53 PM

To: Clarence Duster; Joseph Lyons; Richard Fuerst; Robert McCaig; Tom Cook; Dennis Allacher; Jill Manring

Cc: Dan Donaldson; Francis McLean; Bob Baumgarten; Jack Wergin; Roger Andrews

Subject: Value Planning Study, Lower Rep River

Tom,
I have the following comments for the team's consideration:
1)Area Office References should be NE-KS Area office, not just NE Area Office
2) Cost estimates. some places says sub-appraisal others says appraisal, suggest use sub-appraisal for consistency thru out.
3) Be consistent in terminolgy through out the report.-we have ideas, alternatives and proposal.
4) Page 6 needs numerous revisions- will provide a revised description
5) Pagg 7, pls provide more ledgible map
6) Page 8, 2nd sentence, change to read: " All criteria assume existing laws, standard operating procedures ..."
7) Page 8, insert each of the states rankings into report, like George did.
8) Page 9, Proposal a1a, A1b and a2, A3. Delete "Water rights issues may need to be addressed" That is a given and a true statement for all proposals. Maybe place on page 31.
9) Page 9, Ways to Implement, last sentence. Change to read: The pumps will be sized for 100 feet of total dynamic head. Each site will require 2500 feet of ...
10) Page 9, advantages. with this alternative we can pump during non-irrigation season. this not true a1b.
11) Page 9, disadvantes. Only the pumps have 20/25 year life.
12) Page 11, same comments as above for a1a
13) Page 11, 3rd par. .... very sparse geology.... This is true for all of the A alternatives, right??
14) Page 13, 100 year life. suggest we be consistent and say 50years. pumps have 25 years. place under disadvantages.
15) page 14. Why not consider this idea on the south side and pump into courtland so we can use for 12 months instead of just 3?
16) page 14, 450 HP seems high for 100 ft head, 20cfs. what is the effiiciency??
17) Page 14. potential risks. Delete existing statement and Insert: "Flood protection maybe required for the facility and is not included in the cost estimate"
18) page 19. 2nd par. , 6th line, are we refering to the canal inlet from the feeder canal into the reservoir or the inlet structure on the dam outlet works??
19) page 22, disadvantages: last 2 bulets. These are true for DI and should be inserted in the D1 proposal.
20) Page 23 , this write up is for E3. this should be stated here and you should reference the other esimates for E,1E2 andE4 that were prepared and attached in the report .
21) Page 27, advantages, first bullet change to read: "...the reservoir is expected to have fairly low seepage rates."
22) page 29, disadvantes, last bullet. This statment is true for f1 also and should be inserted there.
23) page 31, insert water rights statement
24) page 31, No. 7. suggest read as follows: "....sub-apprisal level estimates and should be used for comparison of alternatives only."
25) Page 31, No. 2. 2nd sentence: "...of any alternative..."
26) P32, suggest add $/af column. Annual cost or annualized cost mean two different things, this needs clarification.
27) P32, footnote. Change to read -Assume 25 year life expectancy for exposed membrane and pumps.

Estimates-
28) the alternatives with pumps do not address the replacement of the pumps after 25 years
29) I note that the shallow alternative A2 wells are twice the cost of the A1 wells.
30) Alt D1. Annualized cost estimate should not be based on $8.16 million. After 20/25 years we would cover the side slope only with minimal amount surface prep.
31) Alt F1, Q=80cfs and F2, Q=40cfs, the same type 7 inlet/outlet structure was used for both alternates. There should be a diffent structure used for one of the alternates.

Thanks for your support. Pls call if questions. Mike

-

NKAO August 12, 2002

Value Study Report, Lower Republican River
Revised
CURRENT DESCRIPTION(page 6)

The Republican Valley suffered from severe droughts and floods in the 1930's. Following these events the Bureau of Reclamation and the U.S. Army Corps of Engineers began construction of a series of dams and storage reservoirs and related surface-water irrigation projects in the valley. These projects reduce flooding and provide for irrigation among other benefits. Two of the valley's major projects are located in the lower portion of the valley. These are Reclamation's Bostwick Division and the Corps of Engineers Harlan County Dam and Lake. The projects are inter-related as the Bostwick Division utilizes storage space in Harlan County Lake for irrigation. Harlan County Dam has provisions for releasing water directly to two of the Bostwick Division's canals as well as releasing water back to the river for diversion further downstream to the other canals. In addition to irrigation and flood control, the projects provide benefits for sediment control, fish and wildlife enhancement, and recreation. The Bostwick Division serves lands located in both Nebraska and Kansas. The Nebraska Bostwick Irrigation District (NBID) provides service in Nebraska and the Kansas Bostwick Irrigation District No. 2 (KBID No. 2) provides service in Kansas.

The first irrigation deliveries from the NBID began in 1952. The district is divided into two units, the Franklin Unit and the Superior-Courtland Unit. The Franklin Unit is served by the Franklin and Naponee Canals which divert water directly from Harlan County Lake and the Franklin South Side Pump Canal which diverts water directly from the river through a pumping plant 17 miles downstream of the dam. The Superior-Courtland Unit is served by the Superior and Courtland Canals which divert water from the river at the Superior-Courtland Diversion Dam, located 50 miles downstream of Harlan County Dam. The Nebraska Bostwick Irrigation District has service available for about 23,000 acres. The Superior-Courtland Diversion Dam, through the Courtland Canal, also provides irrigation water into Kansas for KBID No. 2.

The first irrigation deliveries from KBID No. 2 began in 1955. The KBID No. 2 receives most of its water from requested releases from Harlan County Lake in Nebraska and by storage of White Rock Creek runoff in Lovewell Reservoir. The remainder is provided by direct diversion of Republican River gains between Harlan County Dam and the Superior-Courtland Diversion Dam. Harlan County Dam was closed in 1951 and storage began in 1952. Releases from the Lake are not generally made unless requested by one of the irrigation districts or precipitation is abundant and flood releases are necessary. The releases for KBID No. 2 flow down the Republican River and are diverted at Guide Rock, Nebraska, by the Superior-Courtland Diversion Dam (completed in 1952) into the Courtland Canal, which provides irrigation service to lands in Kansas and transports water to Lovewell Reservoir in Kansas. Lovewell Reservoir, which was completed in 1957, generally does not release water unless it is required for irrigation to district lands or precipitation is abundant. The KBID No. 2 has service available for about 42,000 acres of which about 13,550 are located above Lovewell Reservoir and 28,350 are located below. Water released from Lovewell Reservoir for use by the KBID No. 2 is distributed by a network of canals that begin at the dam.

Ann Bleed

From: Michael Kube [MKUBE@gp.usbr.gov]

Sent: Thursday, August 08, 2002 1:53 PM

To: Clarence Duster; Joseph Lyons; Richard Fuerst; Robert McCaig; Tom Cook; Dennis Allacher; Jill Manring

Cc: Dan Donaldson; Francis McLean; Bob Baumgarten; Jack Wergin; Roger Andrews

Subject: Value Planning Study, Lower Rep River

Tom,
I have the following comments for the team's consideration:
1)Area Office References should be NE-KS Area office, not just NE Area Office
2) Cost estimates. some places says sub-appraisal others says appraisal, suggest use sub-appraisal for consistency thru out.
3) Be consistent in terminolgy through out the report.-we have ideas, alternatives and proposal.
4) Page 6 needs numerous revisions- will provide a revised description
5) Pagg 7, pls provide more ledgible map
6) Page 8, 2nd sentence, change to read: " All criteria assume existing laws, standard operating procedures ..."
7) Page 8, insert each of the states rankings into report, like George did.
8) Page 9, Proposal a1a, A1b and a2, A3. Delete "Water rights issues may need to be addressed" That is a given and a true statement for all proposals. Maybe place on page 31.
9) Page 9, Ways to Implement, last sentence. Change to read: The pumps will be sized for 100 feet of total dynamic head. Each site will require 2500 feet of ...
10) Page 9, advantages. with this alternative we can pump during non-irrigation season. this not true a1b.
11) Page 9, disadvantes. Only the pumps have 20/25 year life.
12) Page 11, same comments as above for a1a
13) Page 11, 3rd par. .... very sparse geology.... This is true for all of the A alternatives, right??
14) Page 13, 100 year life. suggest we be consistent and say 50years. pumps have 25 years. place under disadvantages.
15) page 14. Why not consider this idea on the south side and pump into courtland so we can use for 12 months instead of just 3?
16) page 14, 450 HP seems high for 100 ft head, 20cfs. what is the effiiciency??
17) Page 14. potential risks. Delete existing statement and Insert: "Flood protection maybe required for the facility and is not included in the cost estimate"
18) page 19. 2nd par. , 6th line, are we refering to the canal inlet from the feeder canal into the reservoir or the inlet structure on the dam outlet works??
19) page 22, disadvantages: last 2 bulets. These are true for DI and should be inserted in the D1 proposal.
20) Page 23 , this write up is for E3. this should be stated here and you should reference the other esimates for E,1E2 andE4 that were prepared and attached in the report .
21) Page 27, advantages, first bullet change to read: "...the reservoir is expected to have fairly low seepage rates."
22) page 29, disadvantes, last bullet. This statment is true for f1 also and should be inserted there.
23) page 31, insert water rights statement
24) page 31, No. 7. suggest read as follows: "....sub-apprisal level estimates and should be used for comparison of alternatives only."
25) Page 31, No. 2. 2nd sentence: "...of any alternative..."
26) P32, suggest add $/af column. Annual cost or annualized cost mean two different things, this needs clarification.
27) P32, footnote. Change to read -Assume 25 year life expectancy for exposed membrane and pumps.

Estimates-
28) the alternatives with pumps do not address the replacement of the pumps after 25 years
29) I note that the shallow alternative A2 wells are twice the cost of the A1 wells.
30) Alt D1. Annualized cost estimate should not be based on $8.16 million. After 20/25 years we would cover the side slope only with minimal amount surface prep.
31) Alt F1, Q=80cfs and F2, Q=40cfs, the same type 7 inlet/outlet structure was used for both alternates. There should be a diffent structure used for one of the alternates.

Thanks for your support. Pls call if questions. Mike

-

8/19/02

Review Comments, NKAO August 8, 2002

VALUE STUDY REPORT
LOWER REPUBLICAN RIVER
STREAM FLOW AUGMENTATION
Sent to Team for Review
August 2, 2002

General Comments:

1. Page 1. The reader would get a better understanding of the report if the Executive Summary began with a statement of why the study was done and who it is for. The following could be added to the beginning of the Executive Summary:

> The participants involved in the negotiations to resolve the lawsuit among Kansas, Nebraska, and Colorado concerning the flows in the Republican river asked that a study be done that would analyze the various flow augmentation proposals that had been presented. This analysis should be done in such a manner that a comparison of the proposals and/or combination of proposals could be made that would enable the negotiators to identify some acceptable alternatives that could be recommended for further study. The Bureau of Reclamation was asked to form a Value Study Team to perform this work.

2. Page 6. We will provide revised section.

3. Page 8, Technical Viability Criteria and Implementation Criteria. The use and results of these criteria does not seem to be anywhere in the report now. If they were used there should be some display the results, similar to the work done by George Austin.

4. General or page 31. There are no analyses of how the increased storage space or water savings could be used. A caution should probably be given that some level of hydrology studies need to be done early on to better determine the hydrologic consequences of implementing various proposals. Certain proposals may not be able to perform satisfactorily unless other proposals are implemented. Increasing the storage in Lovewell or Jamestown would probably require improvements to the Superior-Courtland Diversion Dam and the Courtland Canal in order to have divertible water . This is inferred on page 33, Proposal Combinations. Maybe a display of Proposal Combinations should be included. . This may affect the final scoring as done by George Austin. Also certain proposals such as Courtland Canal lining reduces diversion demand but what does it do to return flows and the pattern of flows at the MDS points in Kansas? Maybe some judgement statements could be made or a general statement included in page 32. Also, suggest page 31 be moved to the front, possibly just before page 9.

5. Page 32. For the results of the proposals to be more useful by the report users it would be helpful if some additional display of the results were included, i.e., cost per usable acre-foot.

6. General. Most cost estimates seem to be low. This is not all bad if all cost are comparable so

that the proposal comparisons are not skewed. Particularly, the new dam and reservoir estimates seem low. Do the cost for new dam and reservoir proposals include lands and rights? Maybe these are considered to be in unlisted items. I know we are hesitant to display these kind of cost in construction estimates but it should not be of major concern in this level of estimate. Also, both of the Jamestown Dam and Reservoir cost may need to include some special cost for habitat mitigation/development. In addition, we know there will be some costs associated with the relocation of recreation facilities at Lovewell. If this is not included in the cost estimate, we should state that in the write ups.

7. Suggest consideration be given for renaming the report. This not just stream flow augmentation. Suggest consider: " Lower Rep. River Water Supply Proposals"

In addition, we were using the term "Value Planning Report". I notice in the report we have "value study report" and "value engineering report". What term is appropriate?

Specific Comments:

1. Pages 10, 12, 13, and 14. The term "Annualized Cost" for Proposals A1A, A1B, A2, and A3 probably means Annual Cost. It appears this cost is for the energy to run the pumps. The term Annualized Cost for Proposal D1 is correct as this is the cost to replace the membrane lining after 25 years.

2. Page 22, third bullet under Description. Both 60-mil and 40-mil liner are mentioned. Which one is being used?

Review Comments, NKAO August 8, 2002

VALUE STUDY REPORT
LOWER REPUBLICAN RIVER
STREAM FLOW AUGMENTATION
Sent to Team for Review
August 2, 2002

General Comments:

1. Page 1. The reader would get a better understanding of the report if the Executive Summary began with a statement of why the study was done and who it is for. The following could be added to the beginning of the Executive Summary:

> The participants involved in the negotiations to resolve the lawsuit among Kansas, Nebraska, and Colorado concerning the flows in the Republican river asked that a study be done that would analyze the various flow augmentation proposals that had been presented. This analysis should be done in such a manner that a comparison of the proposals and/or combination of proposals could be made that would enable the negotiators to identify some acceptable alternatives that could be recommended for further study. The Bureau of Reclamation was asked to form a Value Study Team to perform this work.

2. Page 6. We will provide revised section.

3. Page 8, Technical Viability Criteria and Implementation Criteria. The use and results of these criteria does not seem to be anywhere in the report now. If they were used there should be some display the results, similar to the work done by George Austin.

4. General or page 31. There are no analyses of how the increased storage space or water savings could be used. A caution should probably be given that some level of hydrology studies need to be done early on to better determine the hydrologic consequences of implementing various proposals. Certain proposals may not be able to perform satisfactorily unless other proposals are implemented. Increasing the storage in Lovewell or Jamestown would probably require improvements to the Superior-Courtland Diversion Dam and the Courtland Canal in order to have divertible water . This is inferred on page 33, Proposal Combinations. Maybe a display of Proposal Combinations should be included. . This may affect the final scoring as done by George Austin. Also certain proposals such as Courtland Canal lining reduces diversion demand but what does it do to return flows and the pattern of flows at the MDS points in Kansas? Maybe some judgement statements could be made or a general statement included in page 32. Also, suggest page 31 be moved to the front, possibly just before page 9.

5. Page 32. For the results of the proposals to be more useful by the report users it would be helpful if some additional display of the results were included, i.e., cost per usable acre-foot.

6. General. Most cost estimates seem to be low. This is not all bad if all cost are comparable so

that the proposal comparisons are not skewed. Particularly, the new dam and reservoir estimates seem low. Do the cost for new dam and reservoir proposals include lands and rights? Maybe these are considered to be in unlisted items. I know we are hesitant to display these kind of cost in construction estimates but it should not be of major concern in this level of estimate. Also, both of the Jamestown Dam and Reservoir cost may need to include some special cost for habitat mitigation/development. In addition, we know there will be some costs associated with the relocation of recreation facilities at Lovewell. If this is not included in the cost estimate, we should state that in the write ups.

7. Suggest consideration be given for renaming the report. This not just stream flow augmentation. Suggest consider: " Lower Rep. River Water Supply Proposals"

In addition, we were using the term "Value Planning Report". I notice in the report we have "value study report" and "value engineering report". What term is appropriate?

Specific Comments:

1. Pages 10, 12, 13, and 14. The term "Annualized Cost" for Proposals A1A, A1B, A2, and A3 probably means Annual Cost. It appears this cost is for the energy to run the pumps. The term Annualized Cost for Proposal D1 is correct as this is the cost to replace the membrane lining after 25 years.

2. Page 22, third bullet under Description. Both 60-mil and 40-mil liner are mentioned. Which one is being used?

NKAO August 12, 2002

Value Study Report, Lower Republican River
Revised
CURRENT DESCRIPTION(page 6)

The Republican Valley suffered from severe droughts and floods in the 1930's. Following these events the Bureau of Reclamation and the U.S. Army Corps of Engineers began construction of a series of dams and storage reservoirs and related surface-water irrigation projects in the valley. These projects reduce flooding and provide for irrigation among other benefits. Two of the valley's major projects are located in the lower portion of the valley. These are Reclamation's Bostwick Division and the Corps of Engineers Harlan County Dam and Lake. The projects are inter-related as the Bostwick Division utilizes storage space in Harlan County Lake for irrigation. Harlan County Dam has provisions for releasing water directly to two of the Bostwick Division's canals as well as releasing water back to the river for diversion further downstream to the other canals. In addition to irrigation and flood control, the projects provide benefits for sediment control, fish and wildlife enhancement, and recreation. The Bostwick Division serves lands located in both Nebraska and Kansas. The Nebraska Bostwick Irrigation District (NBID) provides service in Nebraska and the Kansas Bostwick Irrigation District No. 2 (KBID No. 2) provides service in Kansas.

The first irrigation deliveries from the NBID began in 1952. The district is divided into two units, the Franklin Unit and the Superior-Courtland Unit. The Franklin Unit is served by the Franklin and Naponee Canals which divert water directly from Harlan County Lake and the Franklin South Side Pump Canal which diverts water directly from the river through a pumping plant 17 miles downstream of the dam. The Superior-Courtland Unit is served by the Superior and Courtland Canals which divert water from the river at the Superior-Courtland Diversion Dam, located 50 miles downstream of Harlan County Dam. The Nebraska Bostwick Irrigation District has service available for about 23,000 acres. The Superior-Courtland Diversion Dam, through the Courtland Canal, also provides irrigation water into Kansas for KBID No. 2.

The first irrigation deliveries from KBID No. 2 began in 1955. The KBID No. 2 receives most of its water from requested releases from Harlan County Lake in Nebraska and by storage of White Rock Creek runoff in Lovewell Reservoir. The remainder is provided by direct diversion of Republican River gains between Harlan County Dam and the Superior-Courtland Diversion Dam. Harlan County Dam was closed in 1951 and storage began in 1952. Releases from the Lake are not generally made unless requested by one of the irrigation districts or precipitation is abundant and flood releases are necessary. The releases for KBID No. 2 flow down the Republican River and are diverted at Guide Rock, Nebraska, by the Superior-Courtland Diversion Dam (completed in 1952) into the Courtland Canal, which provides irrigation service to lands in Kansas and transports water to Lovewell Reservoir in Kansas. Lovewell Reservoir, which was completed in 1957, generally does not release water unless it is required for irrigation to district lands or precipitation is abundant. The KBID No. 2 has service available for about 42,000 acres of which about 13,550 are located above Lovewell Reservoir and 28,350 are located below. Water released from Lovewell Reservoir for use by the KBID No. 2 is distributed by a network of canals that begin at the dam.