

BUREAU OF RECLAMATION
Technical Service Center
Denver, Colorado

TRAVEL REPORT

Code : 86-68460 Date: May 1, 2015

To : Manager, Hydraulic Investigations and Laboratory Services Group
Manager, Water Conveyance Group

From : Tony Wahl and Wylie Duke

Subject: Travel to Memphis, TN and Little Rock, AR, Grand Prairie Region and Bayou Meto Projects

1. Travel period: March 31 – April 3, 2015
2. Places or offices visited:
U.S. Army Corps of Engineers, Memphis District
Grand Prairie Area Demonstration Project
Bayou Meto Water Management Project
3. Purpose of trip: To provide consultation to the U.S. Army Corps of Engineers (USACE) regarding criteria for minimum radius of curvature of canal bends in relation to the Grand Prairie and Bayou Meto projects.
4. Synopsis of trip: We traveled by air to Little Rock, AR on Tuesday morning March 31 and drove to Memphis, TN in the afternoon. We were accompanied on the trip by David Rogers of Rogers Engineering Hydraulics, Inc., who had also been contracted by USACE as a consultant regarding these projects.

On Wednesday morning we met at the Corps of Engineers office in Memphis for informal discussions with USACE staff involved in the Grand Prairie and Bayou Meto projects. Although USACE has a long history of designing floodway channels that operate intermittently, these projects are their first to feature large-capacity canals that deliver irrigation water on a more continuous basis. Mr. Duke and Mr. Wahl shared information from Reclamation's experience with construction, operation and maintenance related to tight-radius canal bends on Bureau of Reclamation projects. Reclamation Design Standards No. 3 recommends that minimum bend radius should be 3 to 7 times the canal top width to ensure good performance with respect to erosion, deposition, waves and turbulence, head loss, and non-uniform flow conditions that can persist for long distances downstream. The criteria allow flexibility to address differences in canal flow velocity, soil types, lining types, and other factors.

Travelers: Wahl, Duke

Date: May 1, 2015

The USACE staff summarized the project planning and design history of the two projects and the criteria they have been using to determine minimum canal bend radii and how to address sites where minimum requirements cannot be readily met. Canal bend radius criteria have been a significant issue on the project because early designs (ca. 2000) did not utilize established criteria and proposed many tight-radius bends that will be susceptible to erosion and deposition problems that may be very costly in the long term. While redesign of these bends will incur additional costs for the project and may require revisions to previously established agreements with landowners, the additional long-term O&M costs are likely to far outweigh the additional short-term expense. Not revising these designs now could also cause future project delays when designs go through USACE-required agency review procedures.

In the afternoon several USACE staff accompanied us back to Little Rock, and along the way we toured project areas and some of the first constructed project facilities, including examples of on-farm water storage reservoirs, the main pumping station for the Bayou Meto Project, and the future site of the Grand Prairie Project pumping station. We spent Wednesday night in Little Rock.

On Thursday morning we met in Little Rock with project stakeholders and other involved agencies, including representatives of the Natural Resources Conservation Service, Arkansas Natural Resources Commission, and the White River Irrigation District and Bayou Meto Water Management District. The meeting effectively presented the canal bend radius issues and the steps needed to move forward with the design process.

Mr. Duke, Mr. Wahl and Mr. Rogers returned to Denver on Friday morning.

5. Conclusions: The USACE staff has made a very thorough investigation of existing design criteria for irrigation canal bends. This includes preliminary construction cost estimates for bend designs with different radii and a range of channel armoring alternatives that can mitigate potential erosion issues on bends that must be constructed with a smaller than desired radius. Anticipating that USACE may design more irrigation-related projects in the future, they are working to ensure that the criteria developed and applied on these demonstration projects will serve as a good model for future projects.

6. Action correspondence initiated or required: The USACE may request a final review of the canal design guidelines that are being developed. If requested, Reclamation staff are willing to assist as needed.

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SIGNATURES AND SURNAMES FOR:

Travel to: Memphis, TN and Little Rock, AR, Grand Prairie Region and Bayou Meto Projects

Dates of Travel: March 31 – April 3, 2015

Names and Codes of Travelers: Tony Wahl, 86-68460; Wylie Duke, 86-68140

Travelers:

Tony Wahl, Hydraulic Engineer Date
Hydraulic Investigations and Laboratory Services Group

Wylie Duke, Civil Engineer Date
Water Conveyance Group

Peer Review by:

Robert F. Einhellig, Manager Date
Hydraulic Investigations and Laboratory Services Group

Noted and Dated by:

Robert F. Einhellig, Manager Date
Hydraulic Investigations and Laboratory Services Group

Timothy Brown, Manager Date
Water Conveyance Group