

RECLAMATION

Managing Water in the West

TR-2012-07

Travel to Davis Dam for Modifications to Test System for Turbulence Research

Dates of Travel: April 16-18, 2012



**U.S. Department of the Interior
Bureau of Reclamation
Technical Service Center
Hydraulic Investigations and Laboratory Services Group
Denver, Colorado**

BUREAU OF RECLAMATION
Technical Service Center
Denver, Colorado

TRAVEL REPORT

Code: 86-68460 Date: April 19, 2012
To: Manager, Hydraulic Investigations and Laboratory Services Group
From: Josh Mortensen
Subject: Travel to Davis Dam for modifications to test system for turbulence research

1. Travel period: 16 April 2012 – 18 April 2012
2. Places or offices visited: Davis Dam
3. Purpose of trip: modify turbulence test system to release air within the test pipes.
4. Synopsis of trip: The main intent of this trip was to identify how air is entering into the turbulence test system on the cooling water discharge and determine what modifications are necessary to achieve air-free operation. On Monday April 16th Josh arrived at Davis Dam approximately 11:00 AM PST via the Las Vegas Airport. Josh and Vince Lammers consulted construction drawings and inspected the cooling water system to identify the source of air that is entering the cooling system. They identified a 6-inch air vent that draws air from outside the dam and transports it across the hallway on Level 3 (Figure 1) and into the 12-inch cooling water main before it drops vertically to the discharge gallery where the test system is located. Currently there is no way of throttling air flow from the vent to reduce airflow into the cooling water system. It was also confirmed that the cooling water system is not throttled and flow is dependent solely on reservoir head.



Figure 1. 6-inch air vent pipe to cooling water system

Due to the airflow supplied from the vent to the cooling water system, attempts were made to release the air from the turbulence test system at the same rate. On Tuesday 4/17/12 an air-release chamber was installed on the downstream end of the treatment pipe. It consisted of four holes (1-1/2 inch dia.) that released air into a 3-inch diameter chamber (Figure 2). Air was released from the chamber by a 2-inch vent that ran to the floor drain. On Wednesday the system was modified by adding a 2-inch air valve to the other end of the chamber (Figure 3). The size of the chamber was limited by the space between the top of the pipe and the ceiling.



Figure 2. Air-release chamber on top of treatment pipe



Figure 3. Air valve connected to air-release chamber

On Tuesday Sherri Pucherelli met Josh at the dam to install mussel collection plates in the bio-coolers and assist Josh with modifications to the test system. At 1:30 pm on Wednesday, after having installed and operated the air-release system, Josh left Davis Dam to return to Las Vegas to catch a flight back to Denver and Sherri returned to her office in Boulder City, NV.

5. Conclusions: Attempts to release air from test system were unsuccessful. The amount of air in the test pipes was reduced when using the air-release chamber but not enough to keep up with the incoming air supply from the cooling water main. Large air pockets were still present in the treatment pipe (bottom pipe) causing unsteady slug flow.

Air flow calculations will be performed to determine if the air supply can be reduced without causing negative affects to the operation of the cooling water system. If these calculations indicate that the air vent can be safely throttled they will be presented to Davis Dam personnel. Josh and one of Denver's lab shop crew will return to Davis to install a throttle valve on the vent pipe and make any necessary modifications to the turbulence test system.

6. Action correspondence initiated or required: None

7. Client feedback received:

cc:

Leonard Willett (LCD-8200)
Joseph Kubitschek (86-68460)
Sherri Pucherelli (86-68220)
Vince Lammers (LCD-D11)

bc:

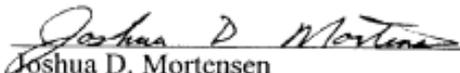
SIGNATURES AND SURNAMES FOR:

Travel to: Davis Dam, Bull Head City, AZ

Dates of Travel: April 16 – 18, 2012

Names and Codes of Travelers: Josh Mortensen, 86-68460

Travelers:


Joshua D. Mortensen
Hydraulic Investigations and Laboratory Services Group

4/19/12
Date

Peer Review by:


Bryan J. Heiner
Hydraulic Investigations and Laboratory Services Group

4/19/12
Date

Noted and Dated by:


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

4/19/12
Date