

RECLAMATION

Managing Water in the West

TR-2014-02

Travel to Roza Canal & Powerplant

Travel to Roza Canal & Power Plant to install water-level logger deployment sites for 2014 Hydro Kinetic testing and to perform a load rejection test for a hydraulic study of the forebay.

Date(s) of Travel: March 11 - 14, 2014



**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: 85-846000

Date: March 27, 2014

To: Manager, Hydraulic Investigations and Laboratory Services Group
From: Josh Mortensen, Hydraulic Engineer

Subject: Travel to Roza Canal & Power Plant to install water-level logger deployment sites for 2014 Hydro Kinetic testing and to perform a load rejection test for a hydraulic study of the forebay.

1. Travel period: 11 March – 14 March 2014
2. Places or offices visited: Yakima Field Office and Roza Canal & Power Plant
3. Purpose of trip: There were two purposes for this trip. The first was to prepare for upcoming Instream hydro-kinetic (HK) field testing by installing deployment sites to measure water surface elevations at various locations along the Roza Main Canal (Research Project 7317). The second was to collect hydraulic data from the Roza Power Plant and canal forebay during a simulated load rejection test, which will be used in a separate study of the spillway siphons and forebay (Rejection Impact Study).
4. Synopsis of trip:

Tuesday, March 11th – Josh Mortensen, Bryan Heiner, and Kylie Fink (rotation engineer from 85-814000) arrived at the Roza Power Plant about 2:30 pm. A JHA meeting was held with plant operators David Hoyt and Jeff Sullivan, after which equipment was gathered. Josh and Kylie installed data acquisition equipment in the power plant while Bryan purchased additional supplies needed for remaining work throughout the week.

Wednesday, March 12th – Josh, Bryan, and Kylie began surveying, installing and/or modifying deployment sites near the Instream HK site. This work continued along the main section of the canal throughout the morning and was completed by noon. The afternoon consisted of surveying and deploying water level loggers at various locations along the forebay in preparation for the load rejection test. Figures 1 and 2 show logger locations for the rejection test.

Thursday, March 13th – Final preparations were made with the data acquisition system in the power plant. Water surface elevations in the forebay were surveyed to tie into water-level logger data. Four different cameras were set up at various locations on the spillway to document water-level transients and siphon operation with video. The load rejection test began at about 11:50 am and ended at about 12:15 pm PST. At the end of the test, all test equipment was packed up and

borrowed safety equipment was returned to YFO. After downloading data, water-level loggers were left at the power plant to be used for HK research this upcoming summer. A CD110 remote terminal unit (RTU) was left in the power plant to log hydraulic data in the plant for research project 7317. Two water-level loggers were also re-deployed in the stilling well house on the forebay and in the tail race to log hydraulic data for research project 7317. Josh, Bryan, and Kylie drove back to Seattle to catch an early morning flight the next day, returning to Denver on Friday, March 14, 2014.

5. Conclusions:

Research Project 7317 – Water-level deployment sites are ready for HK testing beginning this spring. Instrumentation is in place to log hydraulic data at the power plant throughout 2014 testing. Josh will coordinate test dates with YFO, Instream, and Sandia National Labs.

Rejection Impact Study – A load rejection was simulated by taking the unit down from 13 to 1 MW (1,050 to 150 cfs) by closing the wicket gates at the same speed as an emergency closure. This caused a transient water surface in the forebay which overtopped the radial gates and activated the siphons on the spillway. Visual observations and water level measurements indicated that the water level came near the top of the canal lining but did not overtop the canal (Figures 5 & 6). Preliminary data from field measurements are shown in Figures 3 – 6. Data and video collected during the test will be used in an analysis using a numerical model of the forebay to determine spillway and forebay performance in the event of a full load rejection. A full report of that analysis will be available around the beginning of May.

6. Action correspondence initiated or required: Drawings of the canal forebay geometry (specifically transitions at the RID Y junction and the penstock intake) are needed from the Yakima Field Office to improve the accuracy of numeric modeling results.

7. Client feedback received: N/A

cc:

Tom Glover	(YAK-5210)
Ron Moores	(YAK-5230)
Jeff Sullivan	(YAK-5231)
Aaron Galayde	(YAK-5410)
Mike Pulskamp	(86-510000)
Erin Foraker	(08-10000)

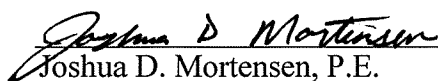
SIGNATURES AND SURNAMES FOR:

Travel to: Roza Canal & Power plant, Yakima, WA

Dates of Travel: 11 March – 14 March 2014

Names and Codes of Travelers: Josh Mortensen, 85-846000, Bryan Heiner, 85-846000, and Kylie Fink, 85-814000

Author:



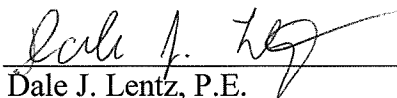
Joshua D. Mortensen, P.E.

Hydraulic Investigations and Laboratory Services Group

3/27/14

Date

Reviewer:



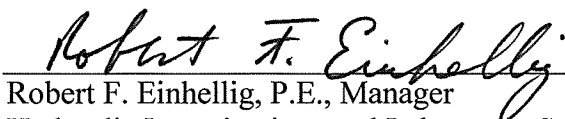
Dale J. Lentz, P.E.

Hydraulic Investigations and Laboratory Services Group

3/27/14

Date

Noted and Dated by:



Robert F. Einhellig, P.E., Manager

Hydraulic Investigations and Laboratory Services Group

3/27/14

Date



Figure 1 Upper forebay canal locations of water-level loggers and video cameras for the rejection test. Loggers are shown in yellow and video cameras in red.



Figure 2 Locations of water-level loggers and video cameras placed near the penstock intake and spillway for the rejection test. Loggers are shown in yellow and video cameras in red.

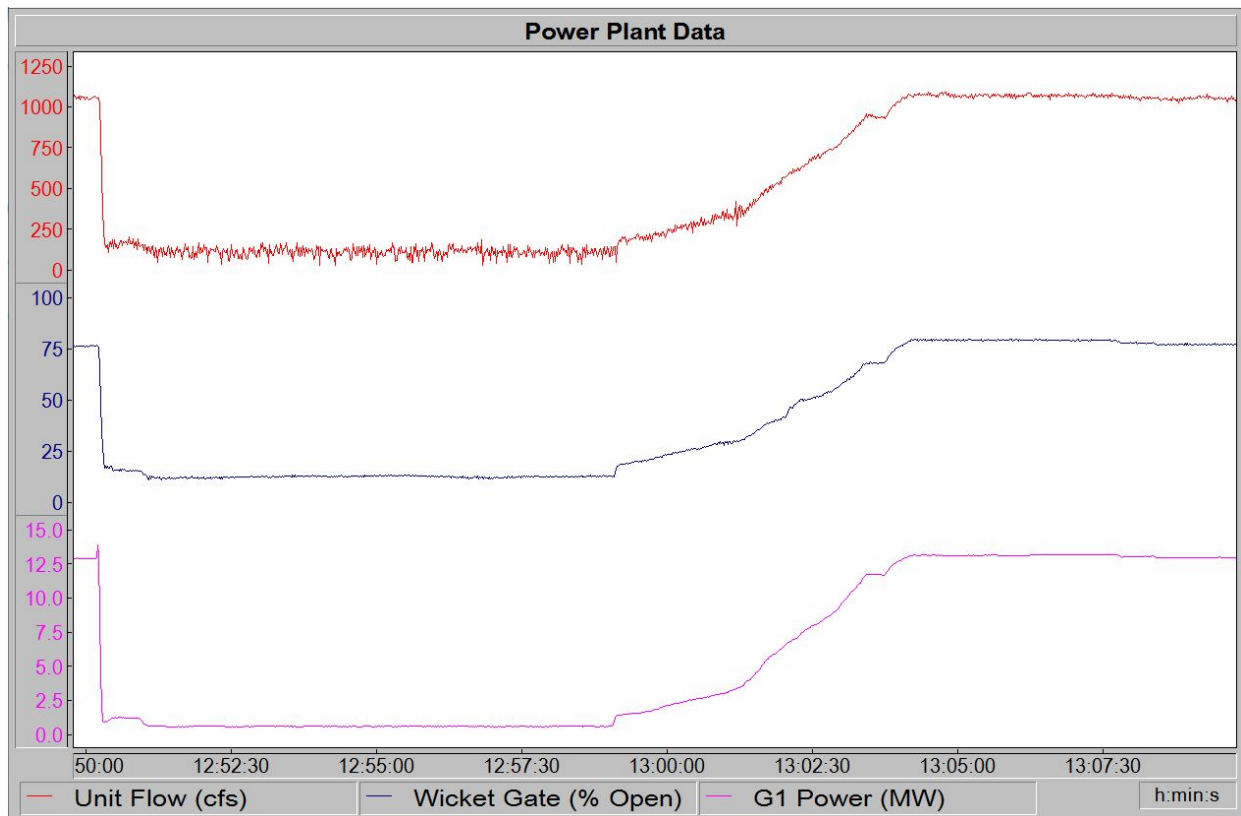


Figure 3 Penstock flow, wicket gate opening, and generator measurements during the load rejection test.

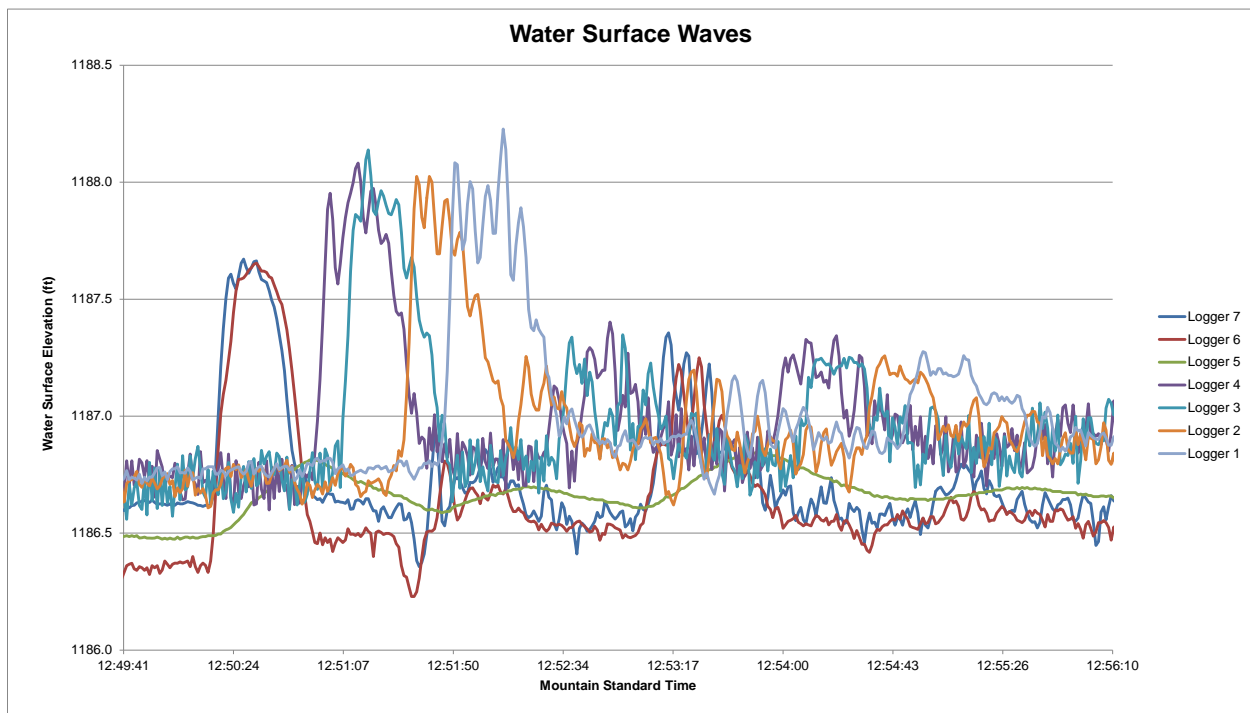


Figure 4 Transient wave at the various logger locations along the canal forebay. Logger 7 is at the siphons and logger 1 is closest to the tunnel outlet. Preliminary analysis shows the wave speed was about 12 ft/s.

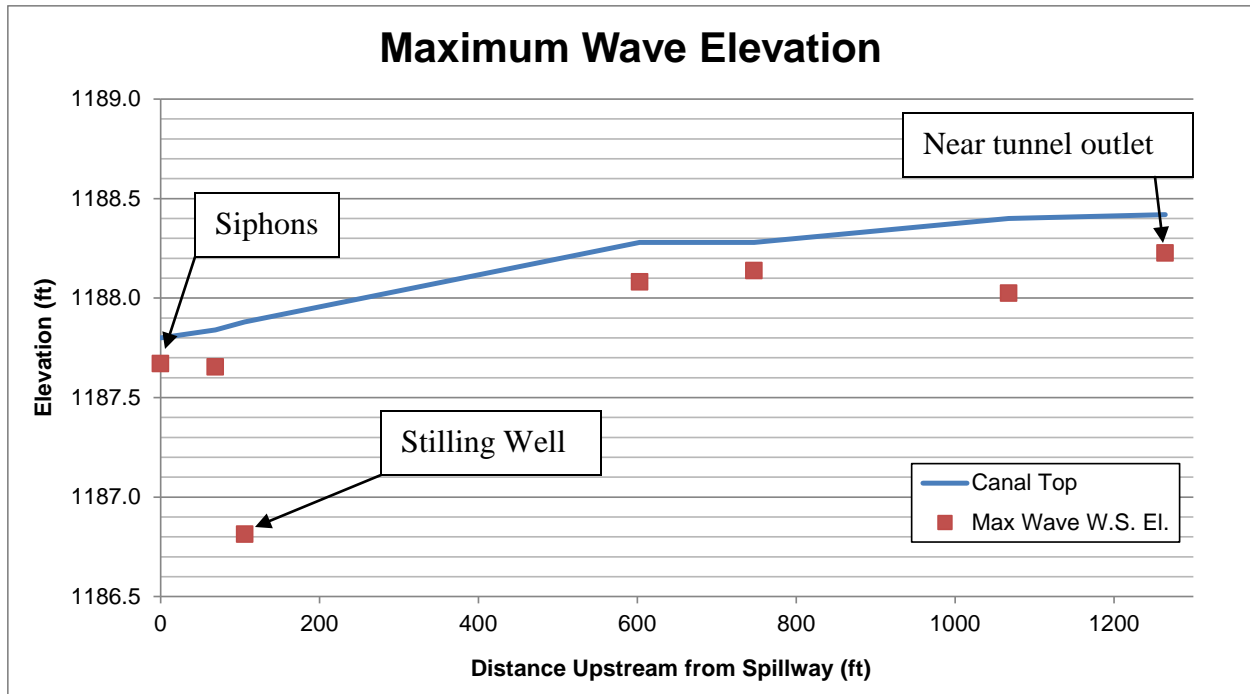


Figure 5 Maximum water surface elevations relative to the top of the canal forebay lining.

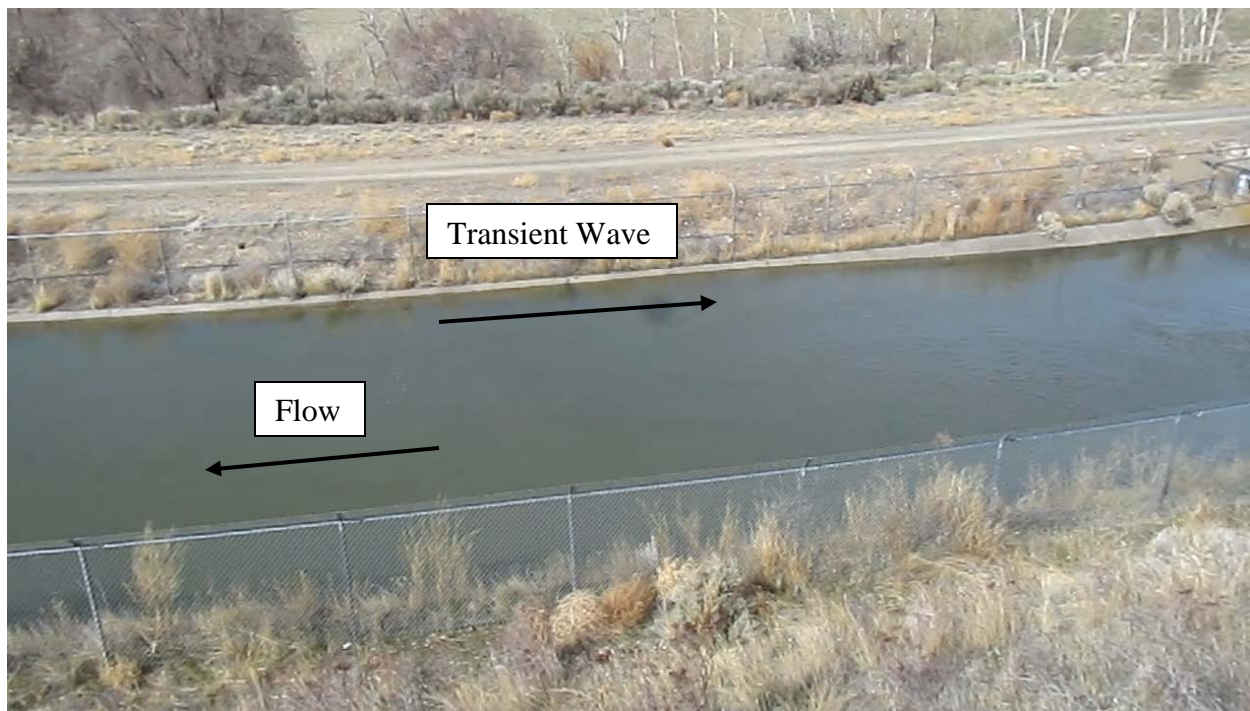


Figure 6 Transient wave near the top of the lining in the canal just upstream of the RID Y junction, near logger #4 (about 600 ft upstream from siphons). Video observations seem to confirm water levels recorded by the loggers.