

**BUREAU OF RECLAMATION  
TECHNICAL SERVICE CENTER  
DENVER, COLORADO**

**TRAVEL REPORT**

RES-3.50

**Code:** 86-68560

**Date:** September 6, 2006

**To:** Clifford A. Pugh  
Manager, Water Resources Research Laboratory (WRRL)

**From:** Tom Gill, Hydraulic Engineer; Robert Einhellig, Hydraulic Engineer

**Subject:** Travel to Mirage Flats Irrigation District (MFID) near Hay Springs, to provide technical assistance with electronic canal monitoring/control and telemetry equipment.

**1. Travel period:** June 19 - 20, 2006.

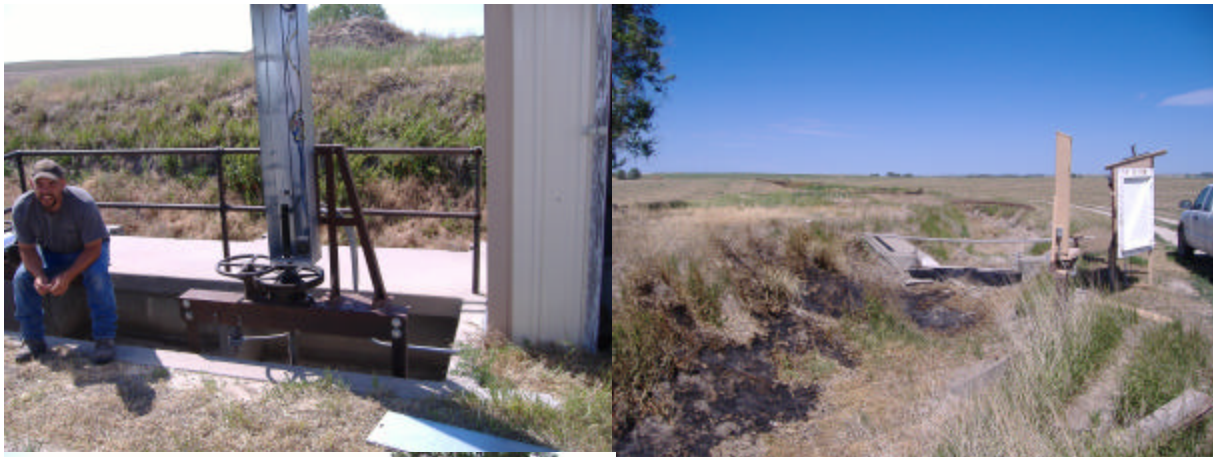
**2. Places or offices visited:** Mirage Flats Irrigation District (Hay Springs, NE)

**3. Purpose of trip:** Objectives of this trip included investigation of problems MFID had been experiencing with telephone telemetry between the office and an automated gate site, as well as viewing sites where MFID would like to expand the scope of their canal modernization efforts.

**4. Synopsis of trip:** We arrived at Alliance, NE, mid-day on Monday, June 19<sup>th</sup>, where we met with Clint Powell, who has recently joined the staff of Reclamation's Nebraska-Kansas Area Office (NKAO) in Grand Island, NE. From Alliance, Clint accompanied us on to the MFID office near Hay Springs, NE, where we met with MFID Manager, Brett Skinner. Brett took us to see field sites where MFID currently has electronic control/telemetry equipment installed. These sites consist of automated gates at each of the three major bifurcation points in the MFID delivery system. Control equipment installed at each of the sites include Sutron 8210 control/datalogging units and chain-drive gate actuators patterned after those that have been used extensively in projects in Utah being carried out in cooperation with the Provo Area Office. Each of the sites has been set up with hard-line telephone telemetry capability.

As flow approaches the MFID service area, the first check structure encountered that is equipped with electronic control equipment is called the Septic. At this site, the upper Sturgeon canal branches off the

Main canal. Gates controlling flow into the upper Sturgeon are automated to maintain a target discharge. Flow continuing down the Main canal next encounters the Mirage-Fairfield split. Electronic equipment at this site controls a motorized gate at the head of the Fairfield lateral. Flow leaving the Septic in the Sturgeon canal is divided at the Sturgeon-Peters split. At this site, electronic control equipment operates a motorized radial gate check structure in the Sturgeon canal.



PHOTOS: *Above left* – MFID Manager Brett Skinner at the motorized gate at the Sturgeon Canal headworks at the Septic site; *Above right* – At right is the motorized gate at the head of the Fairfield lateral at the Mirage-Fairfield split. Visible in the center is the Cipoletti weir that measures flow continuing down the Mirage canal. *Left* – In the foreground is the motorized radial gate at the Sturgeon-Peters Split

At the time of our visit, it was our understanding that only the Septic site had been programmed for local automation. As initially configured, the discharge set-point for flow entering the Sturgeon canal could be remotely adjusted via telephone communications. Lightning damage in 2004 necessitated replacing the modem in the office computer. Since that time, MFID has been unable to contact any of the field sites using the Sutron PC Base II program through which communications had previously been handled. The Sutron 8210 units at the Mirage-Fairfield split and at the Sturgeon-Peters split are currently set up for datalogging flow conditions and controlling motorized operation of gates, but they are not set up for automated control like the Septic site.

As evidenced in the photographs above, the canal system had not yet started operations for the 2006 season at the time of our visit. MFID priorities associated with our visit were: 1) to re-establish communications capability with field sites via PC Base II and 2) to establish local automation capability at the Mirage-Fairfield split and at the Sturgeon-Peters split.

During our visit, we made multiple attempts to re-configure the PC Base II setup following the product user manual, but were unsuccessful in establishing communications. A Sutron technical assistance staff member was contacted by phone, and we were advised to attempt to make contact using the Microsoft utility HyperTerminal. This test would enable us to determine whether or not the modem in the office desktop PC was functional. If so, the problem would be isolated to setup of the PC Base II program.

We were able to successfully communicate with one of the two sites at which phone communications had been connected for the season using HyperTerminal. At this point, Brett Skinner suggested the second field site might likely have a blown fuse, as he could get no indication the modem was alive when dialing the site directly. Once we had determined the office desktop PC modem was functional, we made a final effort to work through the PC Base II setup again – without success. Given the limited time available, we were not able to resolve this software communication issue prior to our departure. Brett indicated he would pursue this issue further with Sutron.

**Conclusions:** Automation of the Mirage-Fairfield and Sturgeon-Peters sites would entail loading of appropriate program code in the Tiny Basic language. Upon returning to Denver we were able to locate programs written for the Sutron 8210 units for maintaining constant upstream water level that were written as part of work done at the East Bench district. For similar local upstream control operations, this programming should need minimal editing for installation at MFID. For automation based on maintaining a constant discharge, some editing would be required, but this should not be a complex task. The largest anticipated cost for automating these two sites would be staff time for on-site monitoring after programming is installed to verify proper operations, and for code modifications and editing as needed.

Follow-up contact with Brett Skinner will be needed to find out whether or not problems with the PC Base II software have subsequently been resolved. It is troubling, given that we had full Sutron documentation references for the software available, that we were unable to achieve a suitable set-up for the communications linkage in our repeated efforts while on-site. This may in part be due to the fact that both the Sutron 8210 units and the PC Base II program are becoming dated technologies. Future compatibility issues with upgrades of complementary components, (such as the PC modem replacement), and with less-than-ideal technical support are likely to be growing problems.

It may be worth considering setting up a demonstration-scale installation of more recently available communications/control technologies for MFID to evaluate. While MFID has generally had positive

experience with the Sutron 8210's and has developed a comfort level with their use, the cost of technical assistance for problems such as the interruption in communications currently encountered could quickly exceed the costs for replacing the three field units and associated base equipment with newer technologies.

**6. Action correspondence initiated:** Follow-up contact with Brett Skinner is needed to determine whether or not problems associated with communications through the PC Base II software have been resolved. Any program editing/installation for automating the Mirage-Fairfield and the Sturgeon-Peters splits should be considered in terms of longer-term considerations of MFID's preference for either continuing with the Sutron 8210's for the foreseeable future, or weighing possibilities for updating control/communications equipment.

cc: Jack Wergin (NK-300); Michael Kube (NK-300); Clinton Powell (NK-300); Brett Skinner (MFID);

**SIGNATURES AND SURNAMES FOR:**

**Travel to:** Northeast Nebraska Area

**Date or Dates of Travel:** June 15-16, 2006

**Names and Codes of Travelers:** Tom Gill, 86-68560; Robert Einhellig, 86-68560

**Traveler:** \_\_\_\_\_  
**Tom Gill, 86-68560** **Date** \_\_\_\_\_

**Traveler:** \_\_\_\_\_  
**Robert Einhellig, 86-68560** **Date** \_\_\_\_\_

**Noted and Dated by:**

\_\_\_\_\_

Travelers: Tom Gill, Robert Einhellig

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**Clifford A. Pugh, Manager**  
**Water Resources Research Laboratory**

**Date**