

# POST-INSTALLATION INSPECTION REPORT

## *Farmers Irrigation District Lower District Pressurization Project*

PE1919

Sponsored by:

Energy Trust of Oregon

Submitted by:



**CascadeEnergy**  
ENGINEERING

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10-17-2009

## CONTACTS & PREPARATION

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## **1.1 INTRODUCTION**

This report documents the post-installation inspection of the Lower District Pressurization Project (LDPP) at Farmers Irrigation District.

This project was originally documented for Energy Trust by Cascade Energy Engineering in an Incentive Estimate report dated 11-11-2008. An incentive offer was signed on 11-13-2008.

Inspection visits were conducted on 6-24-2009 and 7-8-2009. Farmers Irrigation District forwarded additional documentation over the course of the irrigation season that demonstrated first year performance of the measure.

## **1.2 INSTALLATION SUMMARY**

The installation was consistent with the design recommended in the original study and incentive agreement. The project involves the following major elements:

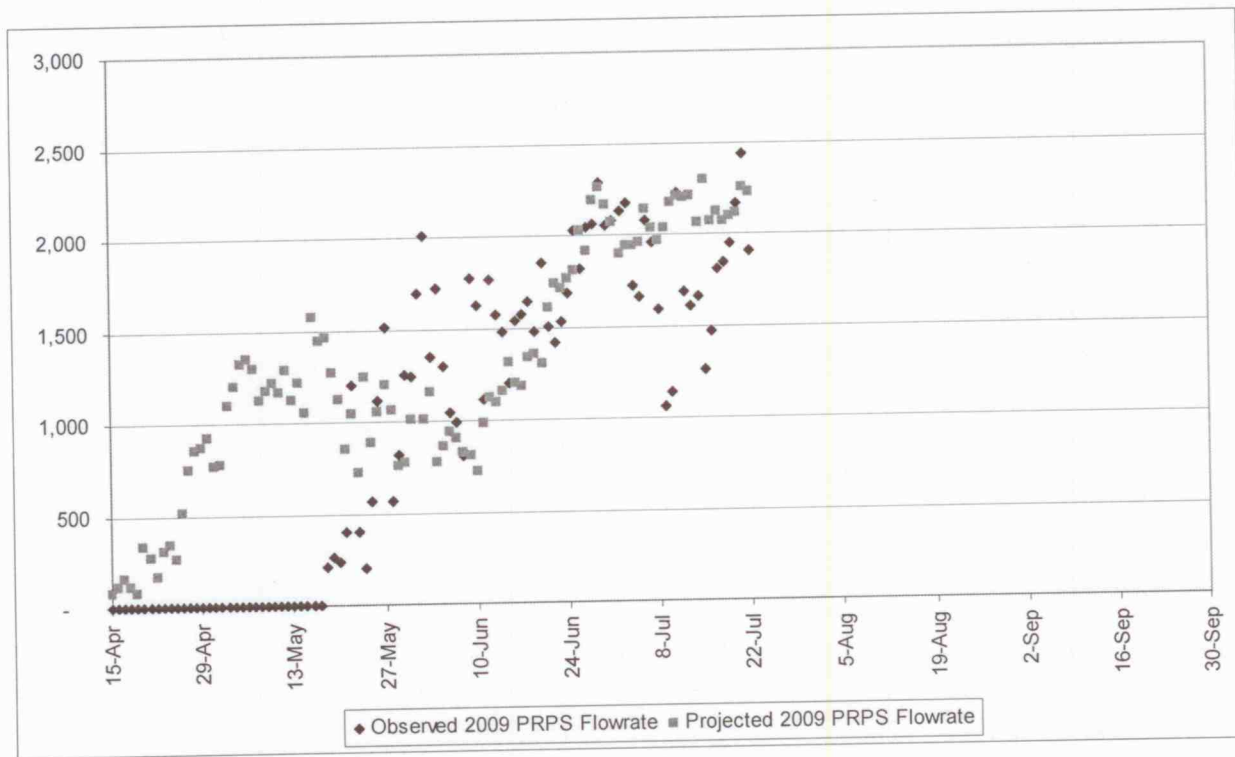
- Replacement of open canals with pressurized pipe for the following segments of the district:
  - High School Line
  - Martin Road Line
  - Dillon Road Line
  - Cherry Drive Line
  - Bradley Drive Line
  - Cemetery Line
  - Eliot Road Line
- The pressurized pipe extends from Forebay #2 through two main lines (PRPS and 24 inch gravity feed) and then a series of lateral and sublateral lines to the district members. The LDPP encompasses approximately 185 members (many own multiple acreages as the total number of individual rights is 515). A total of 981 total water right acres were addressed by this project.
- Member-owned irrigation pumps (and their associated energy use) were eliminated as pressurized water was delivered to each district member affected by this project.
- A new LDPP pump station (aka PRPS) was installed consisting of two 125 hp pumps with VFDs each rated for 3100 gpm and 121 feet of head. This pump station pressurizes a line that serve 51.6% of the 981 acres.
- The project eliminates end-spills at the end of each lateral branch. It also eliminates canal leakage and evaporation. In addition, flow control valves regulate overuse on the part of district members.
- The water savings translate into more water flow into the Plant #2 hydroelectric station owned and operated by Farmers Irrigation District.

## **1.3 PERFORMANCE CONCLUSIONS**

To evaluate the project, we examined the following data:

- Pacific Power billing history energy for a partial season on the new LDPP pump station.
- Daily flow readings for the two main lines delivering water to the LDPP: PRPS and 24 inch gravity feed.
- Operating pressures for the PRPS
- Hydroelectric generation for Plant #2

The average measured PRPS pump station flow (averaged from the daily logs) from the start of the season through 7/17/2009 (the last date with available Pacific Power billing history) was 982 gpm. This flowrate was significantly below the projected pump station of flowrate (through the same date) of 1226 gpm. The lower flows indicate that the LDPP was modeled conservatively in terms of flow requirements.



The new pump station consumed approximately 61,000 kWh through 7/17/2009.

2009 Partial year LDPP Pump Station billing history (Pacific Power meter # 36120218)

Billing Period	Start	End	Energy (kWh)
July Billing	6/23/2009	7/17/2009	28,280
June Billing	5/19/2009	6/23/2009	29,240
May Billing*	4/19/2009	5/19/2009	3,000
April Billing*	3/19/2009	4/19/2009	600
Partial season total			61,120

\* Estimated off bar graph on June Bill

This billing history energy use was about 20% higher than what our model would project based upon the recorded 40 psi operating pressure and the actual measured PRPS flows. However, the energy use was still lower than what was expected as originally modeled (which were based upon the higher flows through the pump station). In other words, the 20% lower overall efficiency (pump, motor, VFD) was more than offset than offset by the 20% lower pumped flow and the slightly lower operating pressures (40 psi versus 42.5 psi). Based upon this data, we conclude that the inspected savings meet the original estimates from the earlier analysis and incentive agreement (481,458 kWh)

The Plant #2 generated in 2009 6,649,305 kWh on its dedicated meter which was 1,239,034 kWh above 5,410,271 kWh target for the project. This data has been shared with the Jed Jorgensen of the Energy Trust renewable department in a separate email communication.

## 1.4 PROJECT COSTS

Farmers Irrigation District provided cost documentation for the project totaling \$3,242,688 based upon distribution request forms to the Oregon Department of Environmental Quality. These forms summarized project costs for submission dates between 12/29/2008 and 8/31/2009 and generally coincide with payments made on Phases 3,5,6,7, and 8 which were the relevant project phases LDPP project. Several hundred pages of invoice and check copies are forwarded in electronic form.

### **Disbursement Request Form**

<b>Date</b>	<b>Amount</b>
12/29/08	\$ 510,910.78
01/22/09	\$ 148,736.02
02/19/09	\$ 670,188.73
04/01/09	\$ 575,595.44
04/28/09	\$ 155,643.10
05/20/09	\$ 227,144.07
08/31/09	\$ 954,470.13
	<b>\$ 3,242,688.27</b>

## 1.5 INCENTIVES

The incentive caps based upon the energy savings of 481,458 kWh and totals \$154,067.

## 1.6 PROJECT PHOTOS

No photos were taken.