Harlingen Irrigation District Newsletter

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Saving Water for the Future

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FARM Assistance

Texas Cooperative Extension's Financial and Risk Management Assistance (FARM Assistance) program works directly with ADI cooperators to evaluate the farm-level financial impacts of water conservation techniques undertaken during the initiative. These individual studies evaluate the economic impacts of water conservation practices on the farming operations as well as demonstrate the financial benefits and/or viability associated with each conservation practice.

FARM Assistance specialists have completed 8 analyses for demonstration participants, including 3 in 2005 and 5 so far in 2006. These individual studies have involved irrigated cotton, corn, grain sorghum, sugarcane, vegetables, onions, citrus and other crops. Demonstrated irrigation methods have included furrow, surge, drip and micro-jet. Additionally, FARM Assistance specialists are currently working with four other cooperators in the project. To find out more about the FARM Assistance program or to get an analysis of your operation, contact us on the web at: farmassistance.tamu.edu or call toll free at 1-877-TAMRISK.

Economic analyses of the 2005 demonstrations show little difference in the financial outlook for surge irrigation technology compared to traditional furrow irrigation. While the demonstrations did show the potential for water savings, current pricing structures do not translate water savings into cost savings. To demonstrate the potential impact of alternative irrigation methods and the incentive for producers to adopt conservation practices, the FARM Assistance team is currently evaluating irrigation methods under various water price structures. It is expected that these examples will clearly illustrate the value of water saving methods under conditions of limited water and/or volume pricing.

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In this issue

New Cooperators Added to Conservation Demonstration Project

It has been a busy spring at Harlingen Irrigation District. We have added three new cooperators to the list of demonstrators. Harold Siever came onboard with two demonstrations of surge technology, a 90 acre cotton field and a 66 acre grain sorghum field. The cotton field is grown with conventional tillage on 40 inch beds. The sorghum field is conventional till with three lines to a 40 inch bed. Both fields are progressing nicely with three irrigations on the sorghum and two irrigations on the cotton.

Our second new cooperator is Levi Burns. Levi is demonstrating surge technology in conventional tillage corn on 38 inch beds. Half of his forty acre field remains in furrow flood irrigation which will give us a good comparison as to the water savings of surge. Levi has completed three irrigations and probably will not irrigate again.

The third cooperator is Leonard Simmons. Thanks to Danny Sosebee of Netafim, who donated some of the components, Leonard was able to install a Low Pressure Drip System on a 17 acre cotton field which is being farmed with a conventional tillage method. This is the first low pressure system to be installed in Cameron County. The system operates without a major filtration system at a pressure of 2-3 psi. He is able to irrigate using the head pressure supplied by an open canal using a simple screen filter. Leonard also has included in the demonstration an adjacent 39 acre cotton field which is being irrigated using furrow flood. This will give us a good comparison between the two irrigation methods. To date Leonard has irrigated the 17 acre block four times, once with furrow flood to sub up the crop and three times with the LP Drip system applying ½ inch of water with each application. The 39 acre field has been irrigated twice. If you would like to learn more about the Low Pressure Drip System feel free to drop by or call the office.

We continue to monitor the other surge and flood irrigation demonstrations and with the lack of rainfall this year we have had quite a few irrigation events to gather data on. With the continued cooperation of Texas A&M Extension and Texas A&M Kingsville we have had a great spring for collecting data on all our demonstration sites.

Soil Moisture Monitoring to Improving Irrigation Scheduling

High temperatures and minimal to no rainfall has led to an increased demand for irrigation water in South Texas. This heightens our focus on maintaining sustainable crop production while minimizing precious and limiting irrigation water supplies. Soil moisture monitoring can be an effective mechanism improving crop sustainability by scheduling irrigation based on soil moisture levels. Dr. Shad Nelson of TAMU-Kingsville and his ADI team, Ram Uckoo and H "Eddie" Esquivel, have installed several new soil moisture (SM) measuring equipment.

This equipment consists of Decagon® Devices dataloggers and ECH_2O® SM probes (Fig. 1) and Spectrum® Technologies, Inc. WatchDog® dataloggers and WaterMark® SM sensors (Fig. 2). Both are commonly used due to their relatively due to relatively low cost and flexibility, however, each has their own advantages and disadvantages. Table .1 gives the comparison of these two moisture sensors that can assist in deciding which soil moisture sensing equipment to select.

Fig. 1 Decagon® Devices

Fig. 2 Spectrum® Technologies Inc.

Table 1. Comparison of Decagon® Devices and Spectrum® Technologies, Inc. Datalogging and Soil Moisture Sensor Probe Assemblies.

	Decagon® Devices		Spectrum® Technologies	
EQUIPMENT	Assembly	Cost	Assembly	Cost
Datalogger: # probe ports	EM-50® (5 ports)	$400 ea.	WatchDog® (4-ports)	$315 ea.
SM Probes	ECH_2O®	$70-100 ea.	WaterMark®	$50-60 ea.
Software Name	DataTrac	$300	Spec7 Pro	$250
	ADVANTAGES AND DISADVANTAGES			
Probe sensor SENSITIVITY	High: Immediate response to changes in soil moisture, rainfall, irrigation.		Low: Slow response to changes in soil moisture, rainfall, irrigation	
Datalogger FLEXIBILITY	Fair: Requires a PDA or computer to download and observe SM data (in % volumetric water content).		Good: Active display allows you to observe current SM status (in kPa units) at each sensor location. Requires a small data shuttle or computer to download all data.	
Probe sensor ACCURACY	High: Good degree of accuracy when sensors are installed properly and in good contact with soil. Sensor readings give precise soil moisture status for easier irrigation scheduling.		Fair: Lower degree of accuracy by sensors and soil moisture readings response differ among soil types. Takes time to determine what sensor reading is best suited to indicate the need for irrigation.	

HID Installs Experimental Surge/ Automatic Valve

One of the problems with the use of surge technology has been the flow restrictions caused by the ten inch and twelve inch surge valves. The growers in Harlingen Irrigation District have progressed to irrigating with Poly Pipe and the Irrigation District accommodated them by installing Hancor risers to allow for unrestricted flow into various sizes of poly pipe. When the Agricultural Demonstration Initiative introduced surge as a conservation method we quickly realized the problems caused by flow restrictions in surge valves available in the market place.

In the fall of 2005 the staff at Harlingen Irrigation District designed and developed a surge valve to accommodate the high flows required by the growers. Off the shelf knife gates, satellite dish actuators, and a P&R surge controller were adapted to work with existing Hancor risers, allowing for a fifteen inch discharge from the riser. We have been able to flow thirty-five hundred to four thousand gallons per minute with no restriction. The controller and associated electric actuators are powered by two twelve volt batteries. The battery voltage is maintained with a twenty watt solar panel. Flow is monitored with a Seametrics insertion mag-meter installed beneath the valve. Future applications for the valve are the addition of drain water sensing devices and a simplified timer switch to allow for automatic changing and shutoff of irrigation.

The valve has been used for three successful irrigations with minimal problems. We expect to test the valve for one more season before making it available to growers. If you are interested in more information about the valve please contact the Harlingen Irrigation District ADI office.

Field Area Network RTU (2nd Series)

A Field Area Network (FAN) RTU consists of four primary components within a NEMA 4 water proof enclosure. Figure 1 shows a picture of the inside of a FAN RTU design to work with the Siemen's SONOFLO ultrasonic transient time flow meter (wetted transducers).

The five major components are:

1. 200 mW or 1.00 W 900 Mhz Spread Spectrum Radio
2. Modbus® A/D – D/A Interface Card
3. Solar Regulator
4. Sleep Cycle Timer
5. Battery, Connectors, Wiring, and Terminal Strip

Figure 2-FAN RTU Front

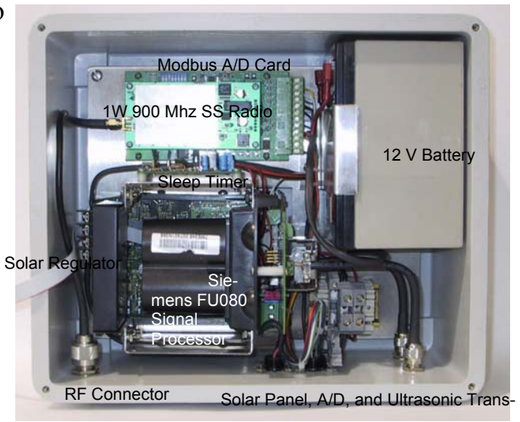

Figure 1: FAN RTU/Siemens Signal Processor-
8"x16" NEMA 4x Enclosure

The electronics for the FAN RTU are enclosed in a 8"x16" by 4" deep fiberglass-pvc composite NEMA 4 waterproof enclosure with the display to the Siemens SONO8000 flow meter mounted in the cover of the enclosed (see Figure 2). The connectors for the radio antenna, solar panel, analog to digital inputs, and upstream and downstream flow meter components are install on the bottom or side of the enclosure (see Figure 3 for wiring schematic).

The FAN RTU measures the pulse output of the SONOFLO FU080 signal processor. Each pulse corresponds to a given amount of volume (typically 0.00001 acre-feet). Approximately every 15 minutes the FAN RTU is polled by a nearby SCADA PLC and the rate in pulses per second is measured (flow rate) and averaged over a 2 to 7 minute period and then a sleep timer powers down the RTU for 8 minutes until the next read cycle.

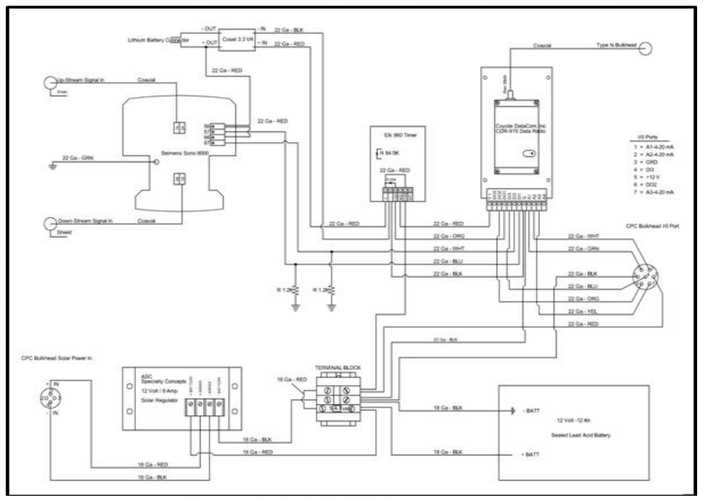

Figure 3: FAN RTU Schematics

Educational Opportunities Offered in ADI office

Harlingen Irrigation District held its first Water Management Course on April 26th, 2006. The course was designed and taught by Dean Santisteven of NRCS and Dr. Juan Enciso of Texas A&M Extension Service. The half day course touched on many aspects of water management such as; meter reading, water measurement conversions, soil moisture measurement, evapotranspiration, and soil characteristics. The aim was to educate growers on the tools that are available to more intensely manage their irrigation applications. The course was especially useful to those growers who are signed up for the water management incentive payment offered under the NRCS EQIP program.

In March of 2006 Harlingen Irrigation District held an EPANET software short course. This course was taught by Dr. Al Blair and attended by Valley irrigation district employees and engineers from the private and public sector. The courses' focus was on the use of EPANET software for the design and testing of pipelines and variable speed pumps. Also included was the use of GIS and satellite imaging in conjunction with EPANET. EPANET software is available free of charge online at www.onenature.com.

For information on the Water Management Incentive and future courses offered through NRCS and Harlingen Irrigation District contact the Harlingen Irrigation District ADI office.