



Automatic Irrigation Water
Management Controls

**RETURN ON
INVESTMENT**



Pump shutoff logistics modeling – 21 well Study

Preliminary Results

- Irrigation management window: 7 am to 10:00 pm daily

Thus, wells not shutoff by 10:00 pm would run until 7:00 am even if optimal shutoff was at, say, 2:00 am.

In this example, an excess runtime of 5 hours (2:00 am – 7:00 am) would be tabulated.

- This calc. was done for each well-field combination for the 2021 irrigation season.

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Preliminary Results

Irrigation Parameter	Estimated Value	Comment
Total over-pumping time (1,138 hours) Diesel: 675 hours Electric: 463 hours	Diesel: \$8,100 Electric: \$737 Total: \$8,837	Diesel burn rate: 4 gal per hr @ \$3.00 per gal Electric use rate: 16.2 kWh per hr @\$0.10 per kWh
Total no. of well shutoffs	175	Season-long for all three crops
Total distance driven during season	963 miles	HQ = reference point
Distance to shutoff wells during season	316 miles	
Shutoff costs associated with driving 316 miles	\$50 (fuel cost) \$450 (labor cost) Total: \$500	Fuel cost @ 20 mpg @ \$3/gal ≈\$50. Labor cost @ 15 h driving + 15 h shutoff Labor rate = \$15/h => \$15 x 15 x 15 ≈\$450
Total value of remote well shutoff	\$8,837 + \$500 = \$9,337	Energy costs of over-pumping >> cost to shutoff in this setting and with no QOL considerations.

Pump shutoff logistics modeling – 21 well Study Preliminary Results

Irrigation Parameter	Estimated Value	Comment
Total value of remote well shutoff	$\$8,837 + \$500 = \mathbf{\$9,337}$	
Savings per well	$\$9,337 \div 21 \text{ wells} = \mathbf{\$444}$	
Cost per Electric well	\$795	Cellular subscription: \$6.50/month - \$75/year
Electric Payback period	$\$870 \div \$444 \approx \mathbf{1.9 \text{ years}}$	
Cost per Diesel well	\$495	Cellular subscription: \$6.50/month - \$75/year
Diesel Payback period	$\$570 \div \$444 \approx \mathbf{1.3 \text{ years}}$	

Save Power/Fuel/Water

Only run when needed

- Stop pumping tailwater
- Save Diesel Fuel
- Save Electric Power

Reduce labor costs

Fewer visits to the wells

Remotely Monitor

- Pump Status
- Fuel Levels
- Maintenance Hours

The screenshot displays the aQuarius Farm Controls web interface. At the top left is the aQuarius logo and a 'Home' link. On the top right, there are links for 'Admin', 'aQ-Wilson', and 'Logout'. Below the navigation bar are tabs for 'PUMPS', 'VALVES', 'SENSORS', and 'WEATHER'. A red 'Stop All Pumps' button is located on the right side. The main area features a satellite map with two blue location markers. Below the map is a search bar and a table of pump status:

Pump Name	ID	Status	Maintenance Hours
Big Lake	5163321	In service	583.78 hrs
HWY 61 Lake	5176286	In service	711.00 hrs

Quality Of Life - \$xxx ?

What is it worth to you or your help to:

- Get to go to your kids ball game
- Time with your family
- Not Going out in the bad weather to shut down wells
- Not getting up in the middle of the night to change sets or turn off wells

Telemetry

- Flow Metering
- Weather Station
- Water Level
- Soil Moisture
- Soil Temperature
- Canopy Temperature



Thank You and Credit To

- Joe Massey¹, Gustavo Lima², José Flores³,
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Applied Digital, Inc.





Environmental Stewardship

Reduce Labor Costs

Save Power/Fuel

We at Applied Digital, Inc., the designers of aQuarius Farm Controls, have a passion for this project.



Applied Digital, Inc.

