The Potential of Variable Rate Irrigation

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VRI Systems...





Speed Control

Hardware Control



VRI Systems on the Market...

- Zimmatic
- Hardware Control
- Full Control every sprinkler
- Separate Control Panel at Pivot Point
- Wireless Nodes along Pivot wireless communication to VRI control Panel
- Full VRI mode Hard Rate
- Percent VRI mode Percent of set point at panel
- Load Rx at Pivot Point
- VRI sprinkler cycles run on electric solenoid valves
- User Friendly Software Rx Loader
- No VRI Corner Arm





VRI Systems on the Market...

Valley

• Speed Control - 180 speed changes – Pro2 Panel

- Hardware Control
- Maximum 30 VRI Control Banks on System
- 4 Sprinkler Resolution if all 30 controllers installed (120 sprinkler system)
- VRI controlled from Pivot Panel
- VRI sprinkler cycles run on water pressure or air pressure
- VRI Application Rates are percentages of the Set Application Rate
- VRI mode1 Speed Changes
- VRI mode2 Hardware only
- Rx Loaded at pivot point or through Valley Telemetry
- Rx Software New File Converter
- No VRI Corner Arm





VRI Systems on the Market...

Reinke

- Speed Control 180 speed changes Sector VRI
- Hardware Control 36 Control Banks
- RPM Touch Screen Panel Required
- Run on Air Pressure

• Trimble – IQ Irrigation

• Full Hardware Control

- Remote Loading of Rx
- VRI includes Corner Arm







Why VRI?... The Benefit

- Simple Rx or Prescription
- Ponds, Oil Wells, Roads, Farm Yard Corners, etc...
- Water and Energy Savings





Why VRI?... The Benefit

The Real Economic Benefit from VRI

Addressing In-Field Variability! Understanding the Soil Water Relationship!

Soil Moisture Holding Capacities, Topography – strong influence
Allows growers to plant differently under a center pivot
Water and Energy Savings – Variable Frequency Drives
Increased Profits by reducing Production Variability
Yield is important but Quality is King!!
Variable Rate Fertigation

Side Note: The Ag Tech Center has evaluated the VFD Economics



In Field Variability... Data Driven Agriculture

• Soil and RTK Data Collection –VERIS Mapping – EC Data







In Field Variability... Data Driven Agriculture

• Soil and RTK Data Collection – VERIS Mapping – EC Data

It all Starts with the Soil!





VERIS Zone Map... Data Driven Agriculture





Elevation Depressions Map... Data Driven Agriculture





Elevation Map... Data Driven Agriculture







Elevation Depressions Map... Data Driven Agriculture

Total Depression Area = 8.5 Acres

Economic Losses ??





Build VRI Rx



Export Elevation and Depression Data to VRI Rx Controller





Six Zones from VERIS Map Sample Each Zone Lab Analysis – Everything!

> For VRI we are Primarily Interested in Texture



- Not Every Sandy Clay Loam is Created Equal
- At least from a Water Holding Capacity Standpoint



Sandy Clay Loam

Sandy Clay Loam





SPAW Hydrology Model Developed by Keith Saxton –USDA and Washington State University

Sandy Clay Loam 77% Sand & 21% Clay

Soil Moisture Holding Capacity

= 35mm/30cm (1.4"/foot) Sandy Clay Loam 46% Sand & 34% Clay

Soil Moisture Holding Capacity = 52mm/30cm (2"/foot)

Difference of 17 mm (0.6") in same texture classification



	25.5	27.8 Acres
	26.6	30.8 Acres
	28.6	37.4 Acres
	30.7	26.3 Acres
	33.9	17.0 Acres
	37	8.9 Acres

mm/30cm





Irrigation Management Zones...

Soil Moisture Holding Capacity

Elevation

Irrigation Management plays a Key Role





Build Rx...



Export Water Holding Capacity Data to VRI Rx Controller



Build Rx...



Export Irrigation Management Zones to VRI Rx Controller



Soil Moisture Sensors... Data Driven Agriculture

Ted Harms Alberta Agriculture

ACIDF Funding Soil Moisture Sensors

AIM Model ran on each Irrigation Zone





Irrigation Deficit Map... Data Driven Agriculture







Irrigation Deficit Map... Data Driven Agriculture





Results... Data Driven Agriculture





ISIS Image July 14, 2013



Results... Data Driven Agriculture





ISIS Image July 14, 2013

🧇 Sunrise AC

Variable Rate Fertigation... Data Driven Agriculture

ISIS Geomatics - NDVI Image July 14, 2013

40 lbs N in Red 30 lbs N in Yellow 20 Lbs N in Green 10 lbs N in Blue

80% of above rates Control 24 lbs N





Variable Rate Fertigation... Data Driven Agriculture

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Variable Rate Fertigation... Data Driven Agriculture







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Thank You ! Questions ??

Special Thanks to those who have Helped and Contributed to our VRI Journey



Photo credits to: Valmont, Lindsay and Reinke