



GOODNIGHT

MIDSTREAM

**HYGENIC DATA
COLLECTION**

**PRODUCED WATER SOCIETY
FEBRUARY 14, 2018**

DATA ANALYTICS

- DATA COLLECTION
- CONNECTIVITY
- DATA SOURCE
- RELIABILITY
- FORMAT DECISIONS
- ANALYSIS
- ABOUT US

DATA COLLECTION

Methods for receipt and collection

- Packaged software
- Proprietary software

How do we ensure consistency?

Can we make it reliable & timely?



CONNECTIVITY

High bandwidth vs low bandwidth

InterField vs IntraField

Manageability – Stepwise approach to finding and resolving a break in the chain

Corporate – data digestion for leak prevention programs as well as back office support





SOURCE OF DATA

Ownership

- Goodnight
- Producer

Meters

- Calibration, and cleaning

Normalizing Data

Relationship Management

RELIABLE DATA COLLECTION

DATA FIDELITY:

Redundant data links

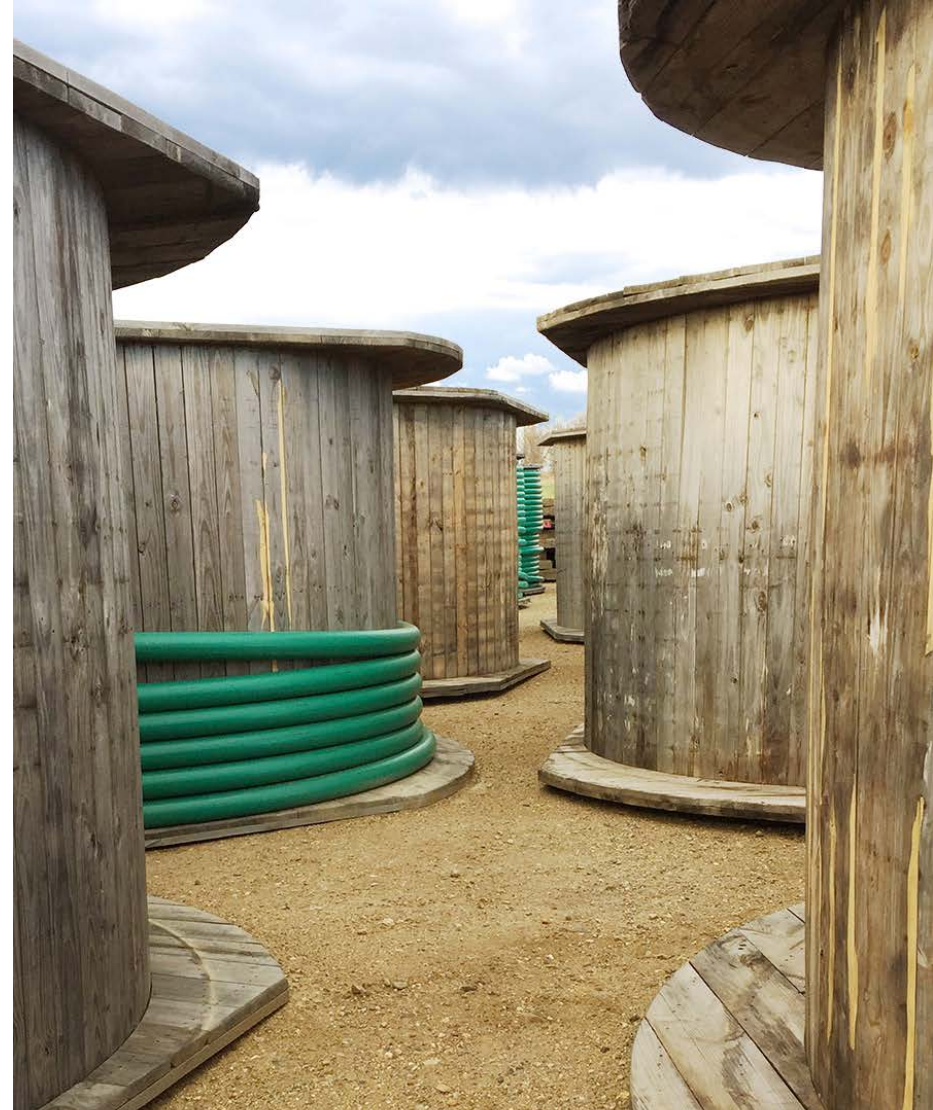
Store and Forward technologies to ensure data collection

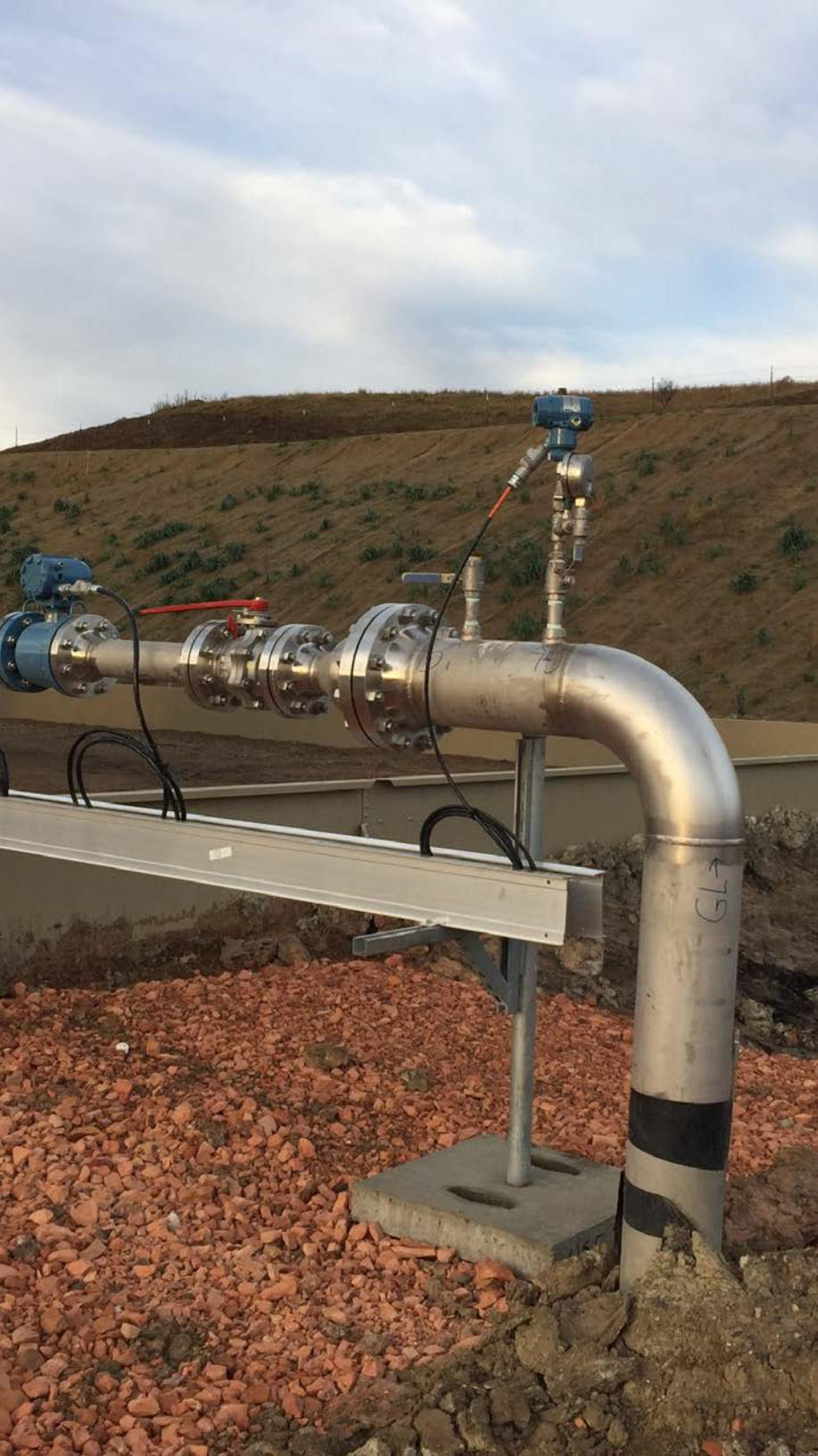
CUSTOM TOOLS DELIVER:

- Adjustable and Predictable comm / transfer Intervals
- Custom Asynchronous Service for low overhead operation
- Hygenic JSON formatted data events

```
> 2/8/18 {  
  4:53:05.000 PM  ,  
                  "ID": "871441"  
                  ,  
                  "DT": "2018-02-08 16:53:05"  
                  ,  
                  "berwaldnorth1received": "5009.25"  
                  ,  
                  "berwaldnorth1sent": "5042.0859375"  
                  ,  
                  "Location": "Berwald",  
                  "Station": "IO"  
                }  
  Show syntax highlighted  
  Collapse
```

Station = IO | host = BERWALD | source = C:\azureFilesLocal\prod\IO__Berwald__--swd-2018-02-08 16.54.45_636528403320162957.... | sourcetype = _json





FORMAT DECISIONS

Data package formats:

- XML
- JSON
- Text
- CSV

“Nothing” is not equal

- Zero
- Null
- Blank or Missing

ANALYSIS

Multi-Tiered analysis (for this presentation we will focus on flow)

- Variance
- Volumetric charting
- Granular analysis by individual contributors
- Statistical analysis against flow using ML tools

North Pipeline - Flow Rates



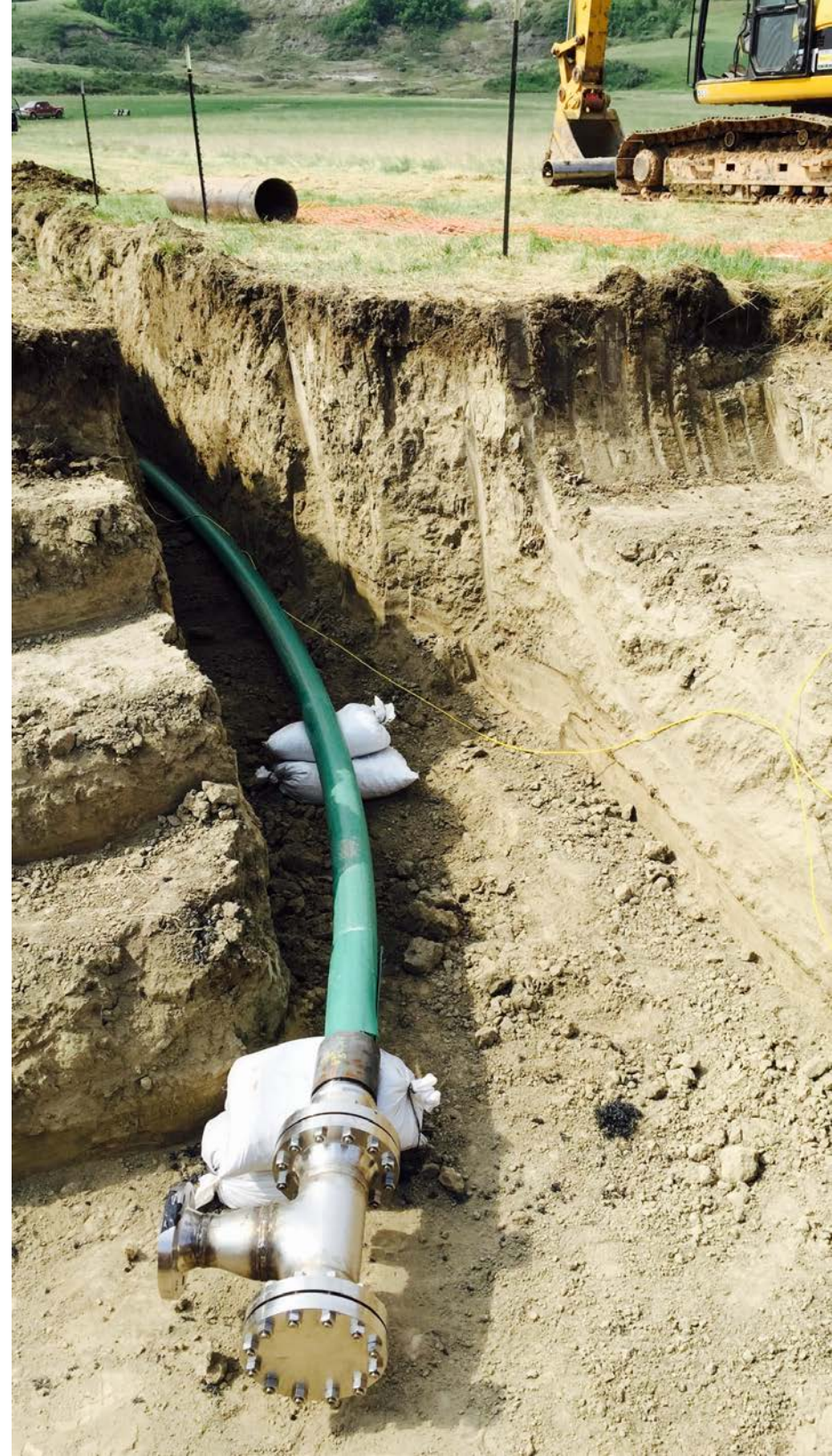
ABOUT GOODNIGHT MIDSTREAM

- Founded in 2011
- Transport or dispose ~230,000 BWPD
 - 33 SWDs, 250 miles of pipeline
- Largest water handler in North Dakota
- Entered Permian Basin in 2016
- Primary focus on pipe transport
- Anticipate growth in both re-use and resale of produced water

COMMITMENT

The most reliable produced water gathering and disposal company in the Permian and Bakken.

- Over \$100mm of available capital
- 98 full-time employees
- Executed and delivered on long-term contracts with twelve major producers
- Receive 2/3 of daily volume via pipeline
- Maintain excellent landowner relationships
- 99%+ pipeline uptime





COMMUNITY IMPACT

- Since 2012, more than 30 million barrels of produced water have moved through Goodnight Midstream pipes.
- Experienced only two pipeline leaks totaling 50 barrels of water since inception (99.9998% success).
- Goodnight's pipelines have eliminated 250,000 truck runs and 2.5 million miles of heavy truck traffic*.

*Assumes 120 barrels per truck and 10 miles per truck trip



www.goodnightmidstream.com