Wireless Continuous Vibration Monitoring in Industry including Shale Gas Applications

Dr. Jeremy Frank
President, KCF Technologies, Inc.

CAV Workshop, April 2014

- Low-cost
- Long battery life
- Continuous monitoring
- Remote applications
Typical Case: Specialty Paper Manufacturing

- Problem: Make-Up Liquor Pump and Booster Pump from Pulp Digester are failing prematurely
Vibration Data: Trend Thresholds and Overall Levels

Charts showing vibration data with trend thresholds and overall levels.
New Applications: Shale Gas Industry
What is it?
Explosion of Unconventional Natural Gas Extraction (Shale Gas)

Historical (Conventional)

Unconventional (Shale)

U.S. Annual Dry Natural Gas Production, 1930-2012

Monthly dry shale gas production in the USA
billions of cubic feet per day color coded by rock unit

Where it’s Happening

- 2192 Active Drill Rigs in U.S. and Canada
  - ~1800 international
  - Historical
    - High: 4530 in 1981
    - Low: 488 in 1992
  - 125 in PA/WV/OH
    - 1200 in TX/OK/LA
    - 180 in ND
Drilling Applications for Wireless Condition Monitoring

Industry Characteristics

- High variability
- Challenging operational environment
- Downtime cost of $35-50K per day
- ... Machine failures are expensive!
Well Completion Applications for Wireless Condition Monitoring

Operational Challenges

- High Pressure
- Fine-grit sand
- Changing conditions
- Short valve life
- Frequent pump failures
- Downtime: $115,000 / day
Vibration – highly variable, intermittent, with transient/impacts
Midstream Applications for Wireless Condition Monitoring

- Existing & Aging Infrastructure
- Growing Infrastructure
- Unknown process conditions
  - Water
  - Sand
  - Rocks
  - Temperatures
Data Flow - Cellular

**Software in the Cloud**

- SD Cloud Servers
- VMS 1.x Application & DB

**Initial Setup**

- Software in Cloud
- Cellular Comms from Collection Servers
Data Flow - LAN

Local or Cloud Software

SD Servers

VMS 1.x Application & DB

Optional Setup

- Software Onsite or In the Cloud
- LAN Data Upload
Questions?

Dr. Jeremy Frank
President, KCF Technologies, Inc.
www.kcftech.com