10 Year Evolution of Remote CP Monitoring

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Benefits of Remote Monitoring

- Regular, high-quality data
- Reduced costs for routine measurements
- Increased safety
- Proactive protection (CP Alarms)
- Remote & Instant Interruption Capability
- Pipe Locating Capability
RMU Development

Evolution of Remote CP Monitoring

- CP Monitoring Requirements
  - Measurements
  - Communications
  - Software
  - Design

Integration

RMU System
Size Matters!
Evolution of Remote Monitoring
Evolution of Remote Monitoring
Evolution of Remote Monitoring
Size Matters – The Benefits

• Eliminates Vandalism
• Speeds up Installation
• Reduces Installation Costs
Evolution of Remote Monitoring - Communication
Communication

Evolution of Remote CP Monitoring
Communication

- Hardwire (Telephone)
- Radio (SCADA)
- Radio (Drive-by)
- Analog Cellular
- Digital Cellular
- Satellite
- Fiber Optic
Communication

Digital Cellular Technology - 2G/3G/4G and...
Communication

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Communication

Satellite Communication
Communication

Satellite Options

- Iridium (5-60 seconds)
- InmarSat (20-60 seconds)
- OrbComm (5-45 minutes)
Evolution of Remote Monitoring

Two-Way Communication
Two-Way Communication

Evolution of Remote CP Monitoring
Two-Way Communication

Evolution of Remote CP Monitoring
Two-Way Communication – The Benefits

- Request instant CP readings
- Set CP alarm thresholds
- Turn off the CP
- Start & stop interruption cycles
- Efficiency
Evolution of Remote Monitoring - Software

Internet & Intranet-based CP Software
Evolution of Remote CP Monitoring
Asset Mapping

Evolution of Remote CP Monitoring
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Evolution of Remote CP Monitoring
Evolution of Remote CP Monitoring
Evolution of Remote Monitoring – Design

Improved Lightning Protection
Improved Lightning Protection – The Benefits of Improved Design

- Lab-tested surge protectors
- Improved grounding of rectifiers
- Improved RMU design
Evolution of Remote Monitoring – Other than Rectifiers

- Bond Monitors
- Test Station Monitors
- Stray AC Current/AC Mitigation
Test Station Monitoring

**Typical Features**

- Battery-powered
- Multiple Channels
- Integral relay (for instant-off readings)
- Monitors AC Interference
Test Station Monitoring

Evolution of Remote CP Monitoring
AC Mitigation

Evolution of Remote CP Monitoring
Pipe Locate Technology
Pipe Locate Technology

Solid-State Relay

30-2000 Hz
Summary - How RMU’s have Changed Over the Last 10-15 Years

- Smaller Hardware
- Advanced Communication Methods
- Two-Way Communications
- Cell Phone and Satellite Control
- Complete Internet Access and Control
- Improved Lightning Protection
- Test Station and Bond Monitors
- Custom Pipe Locating Signal
Questions