# Delivering the Nuclear Promise
# How Can Valve Testing Contribute?


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TELEDYNE LECROY TEST SERVICES

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# Driving need ….

- **Industry under siege on several fronts;**
  - Lower cost fossil fuels - Primarily Natural Gas
  - Subsidized renewables – Solar & Wind
  - Continued environmental push back – Despite obvious carbon based advantages of Nuclear
  - Continued public concerns over safety
  - High Capital Costs / Lengthy Construction
  - Regulations

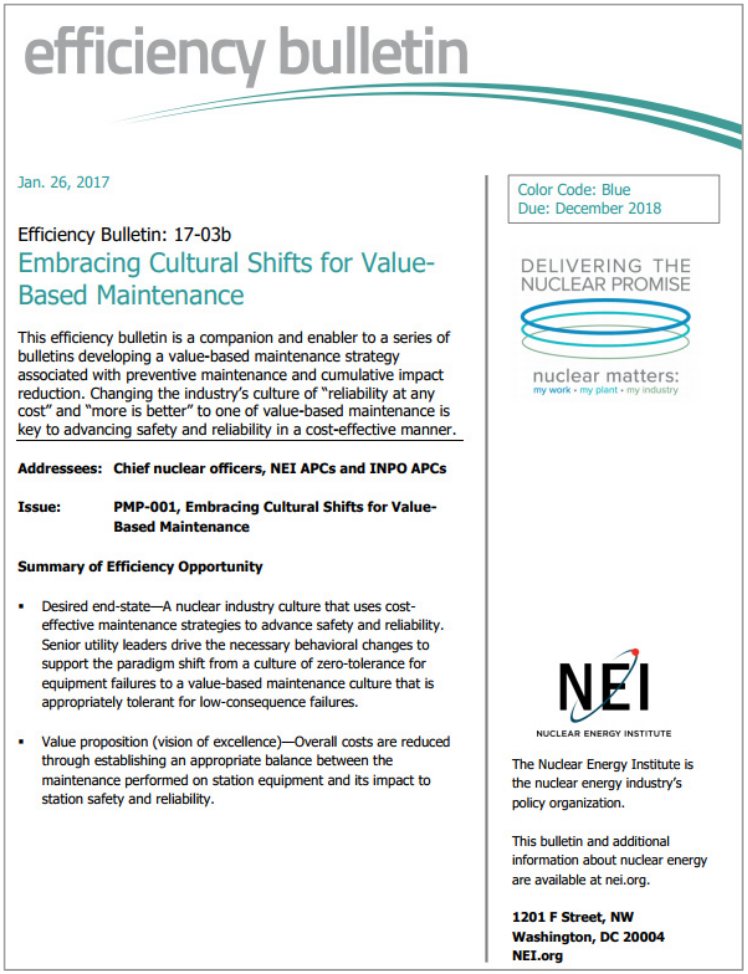
# Nuclear Energy Institute Initiative….

This strategic plan, called Delivering the Nuclear Promise® is intended to…

- strengthen the industry's commitment to excellence in **safety and reliability**
- assure future viability through *efficiency improvements*
- and drive **regulatory and market changes** so that nuclear energy facilities are fully recognized for their value.

# Value Based Maintenance

**Changing the industry's culture of "reliability at any cost" and "more is better" to one of value-based maintenance is key to advancing safety and reliability in a cost-effective manner.**



efficiency bulletin

Jan. 26, 2017

Color Code: Blue
Due: December 2018

Efficiency Bulletin: 17-03b

Embracing Cultural Shifts for Value-Based Maintenance

This efficiency bulletin is a companion and enabler to a series of bulletins developing a value-based maintenance strategy associated with preventive maintenance and cumulative impact reduction. Changing the industry's culture of "reliability at any cost" and "more is better" to one of value-based maintenance is key to advancing safety and reliability in a cost-effective manner.

DELIVERING THE NUCLEAR PROMISE

nuclear matters: my work • my plant • my industry

**Addressees:** **Chief nuclear officers, NEI APCs and INPO APCs**

**Issue:** **PMP-001, Embracing Cultural Shifts for Value-Based Maintenance**

**Summary of Efficiency Opportunity**

- Desired end-state—A nuclear industry culture that uses cost-effective maintenance strategies to advance safety and reliability. Senior utility leaders drive the necessary behavioral changes to support the paradigm shift from a culture of zero-tolerance for equipment failures to a value-based maintenance culture that is appropriately tolerant for low-consequence failures.
- Value proposition (vision of excellence)—Overall costs are reduced through establishing an appropriate balance between the maintenance performed on station equipment and its impact to station safety and reliability.

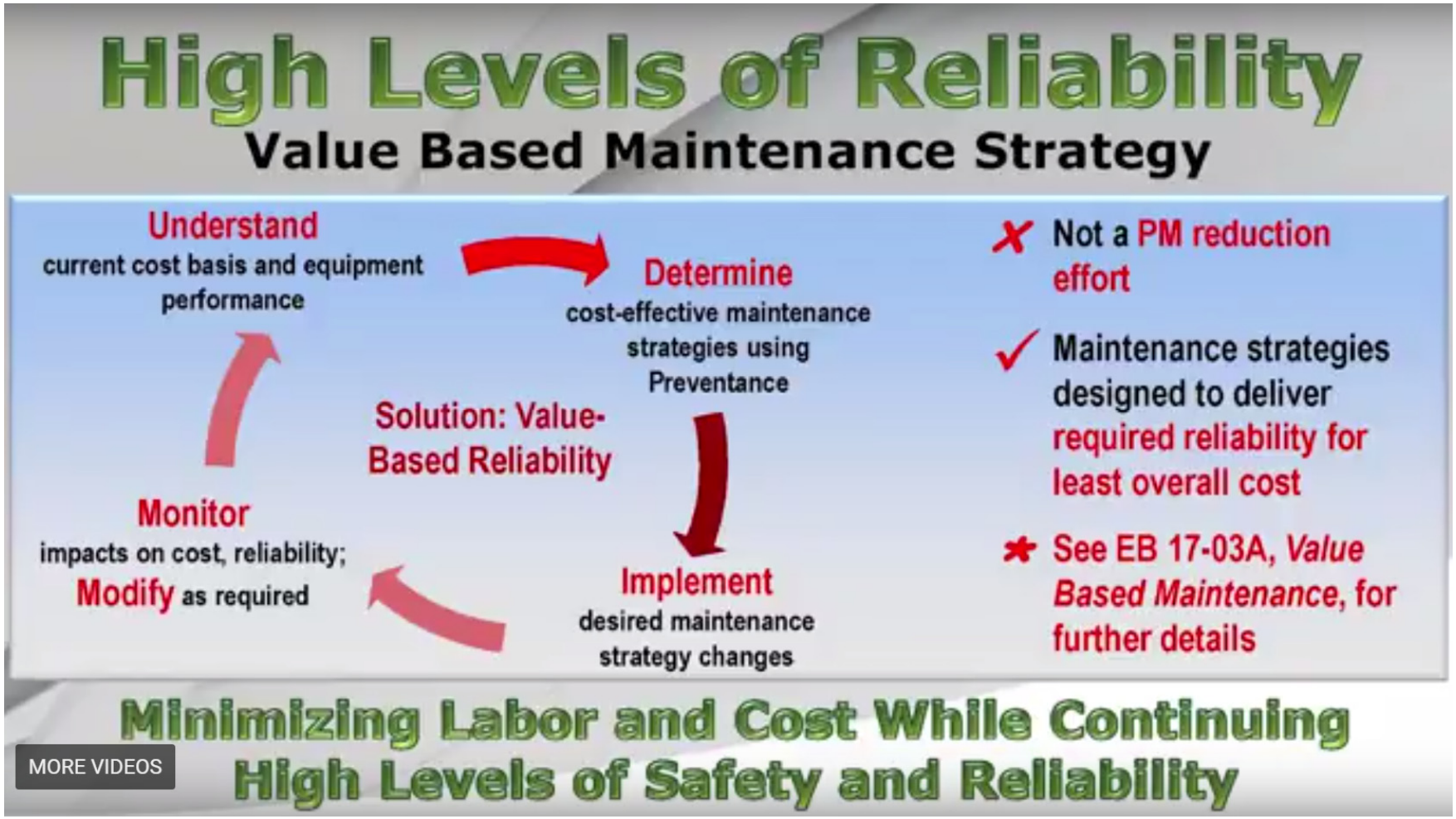
NEI NUCLEAR ENERGY INSTITUTE

The Nuclear Energy Institute is the nuclear energy industry's policy organization.

This bulletin and additional information about nuclear energy are available at nei.org.

**1201 F Street, NW**
**Washington, DC 20004**
**NEI.org**

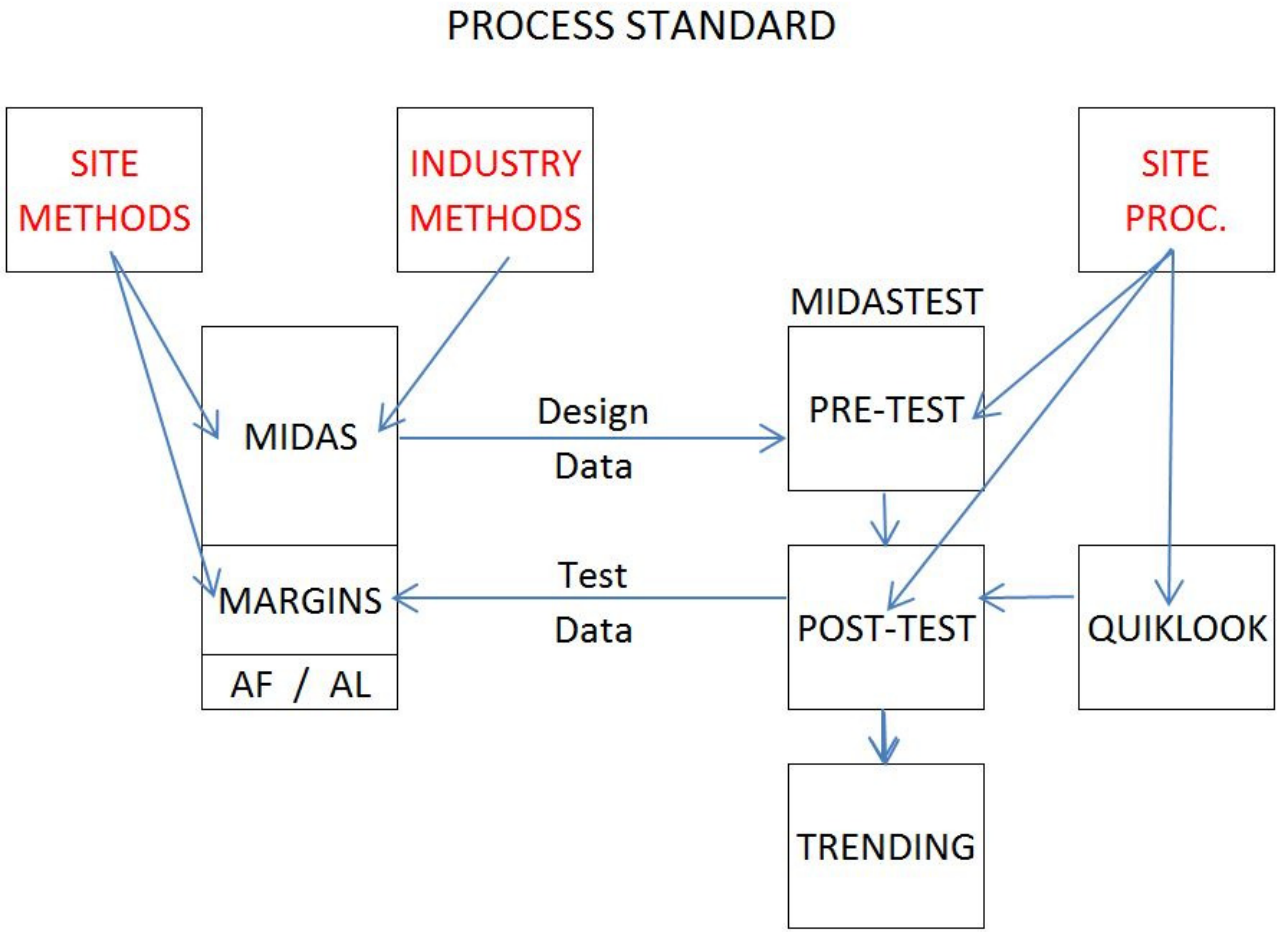
# 40+ Documented Initiatives



# How can we help?

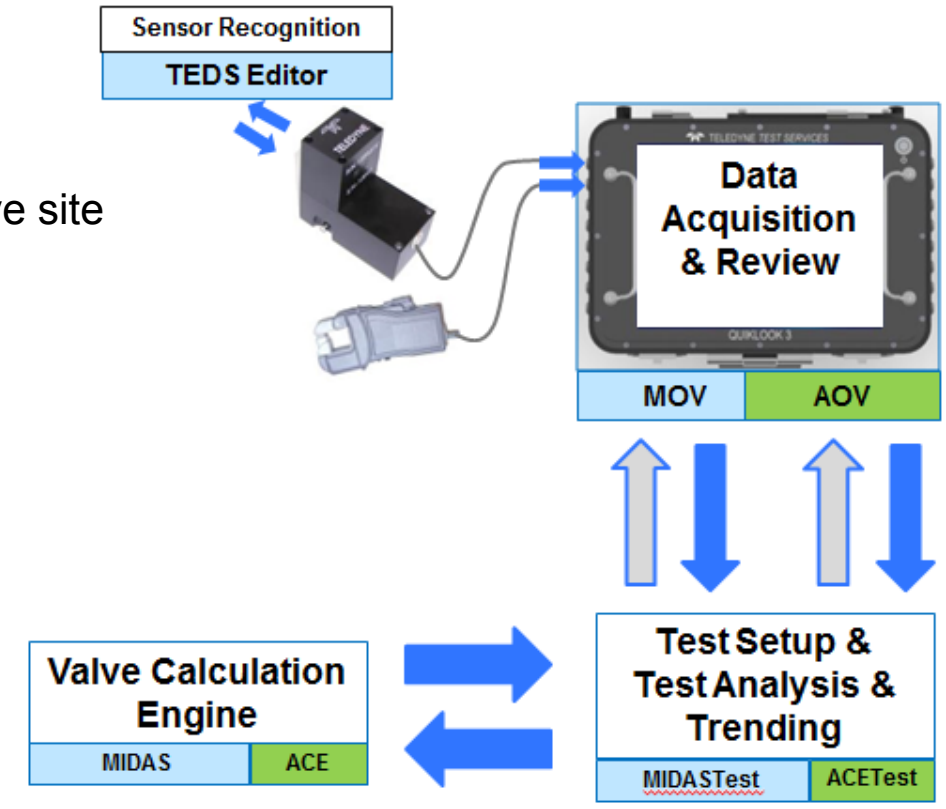
- **Program Standardization**
- **Software Suite Integration**
- **Remote Sensing/Process Monitoring**
  - **Sentry Testing of MOVs**
  - **DVC Testing of AOVs**
- **System Sharing Between Fleet Sites / Resource Sharing**
- **Centralized Fleet Calibration**
- **Other????**

# Program Standardization



# Software Suite Integration

- Integrating Engineering Software with Maintenance Activities
- Midas/ACE criteria auto imported into QL3-FS
- QL3-FS Criteria Tab for MOV and AOV
- Streamline Testing Activities
- No more hard copies of setup criteria
- No more paperwork to complete at the valve site
- **How else can we help???**



# Simplified Valve Testing Initiative

- **Less Regulation than MOV's**
- **How much analysis is really needed for most AOV's?**
- **How should Quiklook & ACE / ACETest be linked?**
- **What are the key design parameters looked for when testing**

# Changes in the Nuclear Industry

- Nuclear Power Industry is now under UNPRECEDENTED cost pressure.
- Renewables and low priced natural gas are redefining “base-load generation”.
- Nuclear generation is becoming “floating” (throttling) instead of base-load (steady state).
- Better valve control is now required than can be provided by older technology analog instruments.
- Real-time status and diagnostic information on health of live, operational control valves is required.

# FIELDVUE™ Digital Valve Controller


- Over 2 million sold over 20+ years
- Highly-accurate positioning control
- Digital configuration and calibration
- Continuous device status information
- Diagnostic testing through use of embedded sensors and ValveLink software

**One flexible instrument for many control valve applications!**

# DVC6200 Nuclear – Key Information

Qualified according to EPRI and NRC guidance on evaluating commercial grade digital equipment

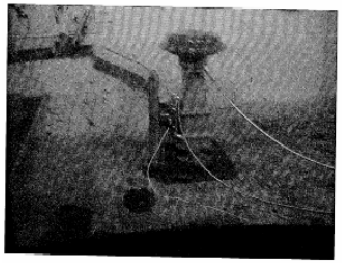
- EPRI TR-106439

Radiation Tested

- DVC6200 tested to 2.27e4 rads
- DVC6215 tested to 1.82e6 rads
- DVC6015 tested to 2.624e6 rads

Seismic Tested

- Tested to USNRC Regulatory Guide 1.100
- Tested to IEEE 344-1987
- 7g maximum seismic acceleration



# DVC6200 - Parameters Available


- Loop Current
- Valve Setpoint
- Output Pressure A
- Actual Valve Travel
- Drive Signal
- Output Pressure B
- Supply Pressure
- PWB Temperature
- Device Status and Alerts

# Summary

**FIELDVUE Digital Valve Controllers contain information about valve assembly health and the operation of the process**

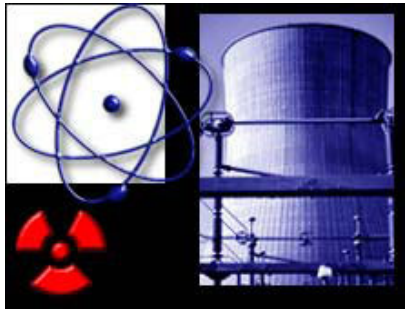
- Predictive diagnostic technology for valves is now available.

**FIELDVUE Digital Valve Controllers have an excellent reliability record**

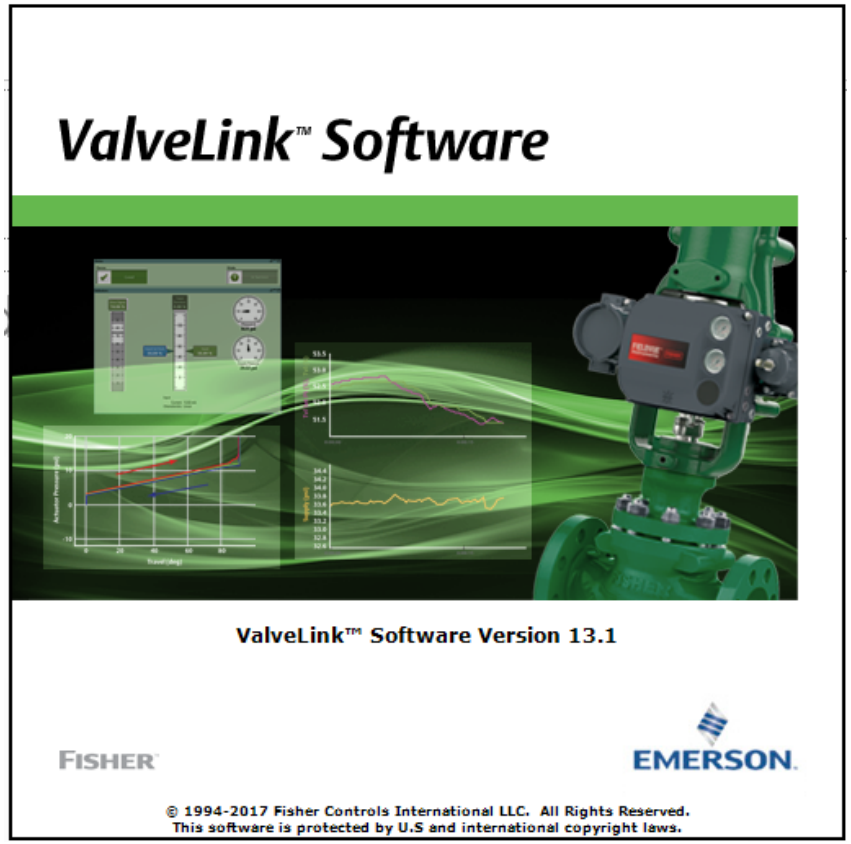
- Considered the industry standard
- Used in nuclear power industry over 12 years - proven reliable

**FIELDVUE Digital Valve Controllers are available to the nuclear community**

- EPRI reviewed
- Radiation tested
- Seismic tested
- EMC tested



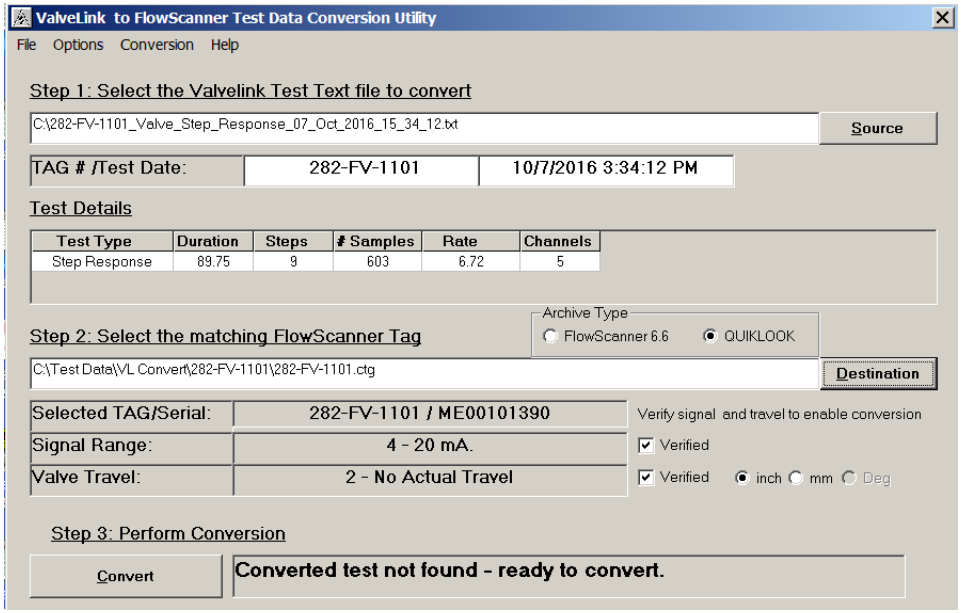
# ValveLink™ Software




- FIELDVUE configuration and calibration tool.
- “On-line” and “off-line” ValveLink Diagnostics.

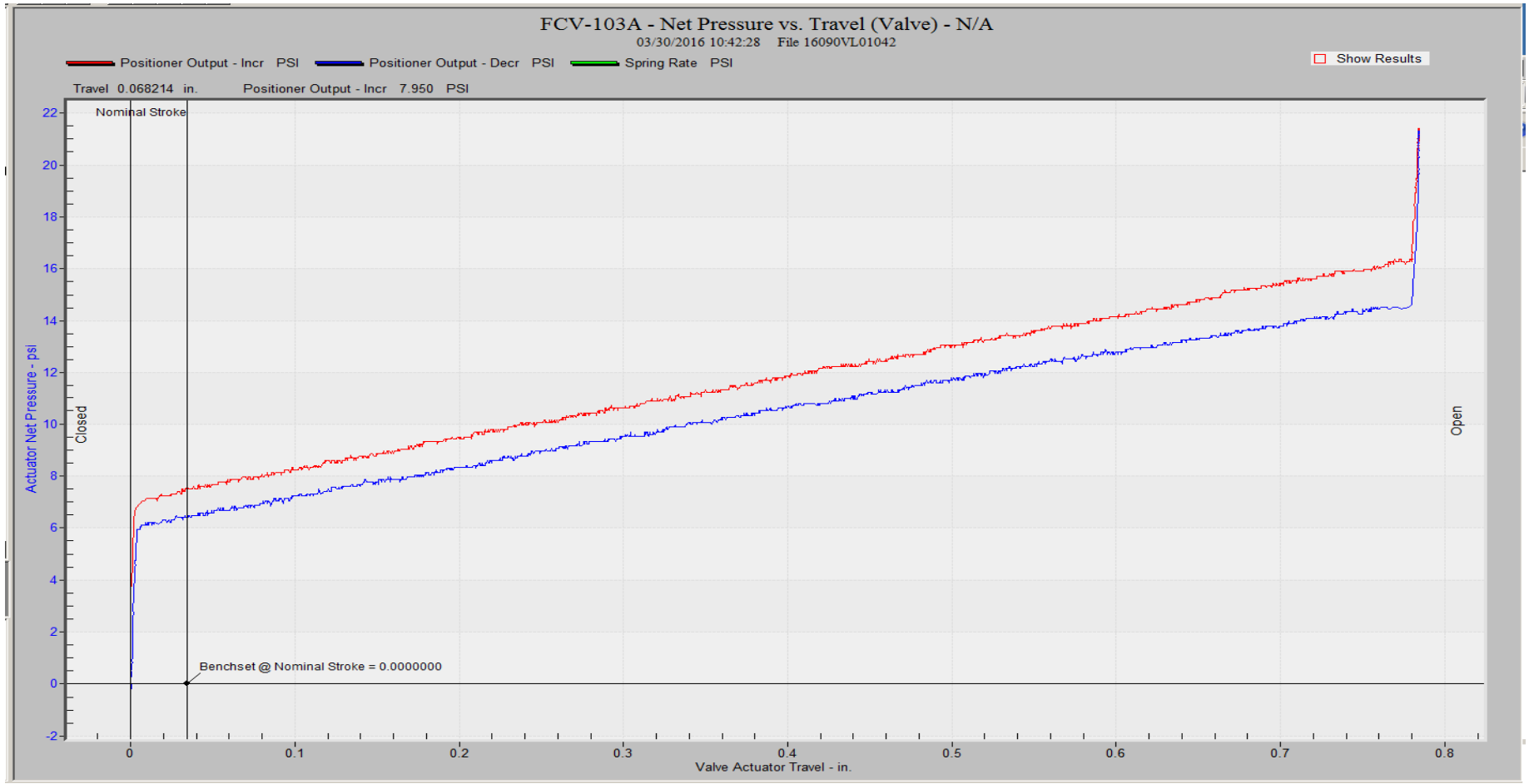
# Remote Sensing

- Utility Program to convert FIELDVUE ValveLink diagnostic test data to QUIKLOOK format.
- ALARA: Allows easy to gather ValveLink test data to be overlaid with QUIKLOOK FlowScanner datasets for comparison.
- Valve Qualification with QuiklookFS is still required due to conditional assumptions made about FIELDVUE's Input Signal and Valve Travel ranges.
- V & V'd under Emerson's Appendix B Quality Program.
- Target availability:  Fall 2017



# Remote Sensing

## ValveLink converted into QUIKLOOK plot…



# Outage Testing

## vs. On-line Stroke Monitoring

# Advantages of On-line Stroke Monitoring

- Reduce Outage Work Scope by Eliminating GL 89-10 / 96-05 Testing
  - Associated Personnel
  - Scaffolding
  - Dose (ALARA)
  - Clearance Order (Tag Outs)
  - Scheduling
- Reduced outage duration
- Extend valve & actuator life (test mishaps…)
- Reduce DP & Leak Rate Tests
- Improved monitoring of critical / problematic valves
- Provides a record of all events and actions

# Remote Sensing / Process Monitoring

Entergy
THE POWER OF PEOPLE™

## Pilgrim Station




- Purchased 65 Sentry units for on-line monitoring
- Retrofitted into existing plant
- Cost savings analysis predicted $4.4M over life of plant

# Shared Resources / Centralized Calibration

- Exelon PL, Duke… others

# Group Discussion

- What Initiatives has your utility undertaken under the banner of Fulfilling the Nuclear Promise?

- How can Team Teledyne help?

# Any Questions?

THANK YOU

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