17 Reactors, 10 Stations
and
1 MOV Test Process

Exelon MOV Program Standardization

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Background

The Exelon fleet consists of 10 Stations that previously had different administrative processes, calculation and test methodologies and GL 89-10 closure commitments. The Stations are:

- Com Ed plants; Braidwood, Byron, Dresden, LaSalle, Quad Cities
- Illinois Power; Clinton
- General Public Utilities; TMI and Oyster Creek
- PECO; Peach Bottom and Limerick

Challenge

The MOV Program was selected by Exelon Senior Management as one of the processes to be standardized.

- The Standardization process started in the first quarter of 2001
- An implementation date of 10/31/02 was established.
- Work would be performed as base level of effort by corporate personnel (2 engineering and 2 maintenance) with review and approval by subject matter experts at the stations.

Essential Contributors to Success

- Senior Management was absolutely committed to successful Standardization implementation
- New procedures and processes were developed by a small core of individuals and presented to the 10 stations for review and comment. “Management by committee “ was minimized.
- Once the comment period expired and the comments were dispositioned, only a “Fatal Flaw” identified by a station could prevent approval and implementation. This eliminated the the continual cycling of a procedure to incorporate late comments.

Development Strategy

- Adopt a best practice approach based on technical merit not on “this is how we do things here at …..”
- Design a process that accomplishes the shift from GL 89-10 “justify engineering assumptions” to GL 96-05 performance monitoring
- Design a fully integrated processes of procedures, software and test data that is accessible from any computer with access to the Exelon intranet

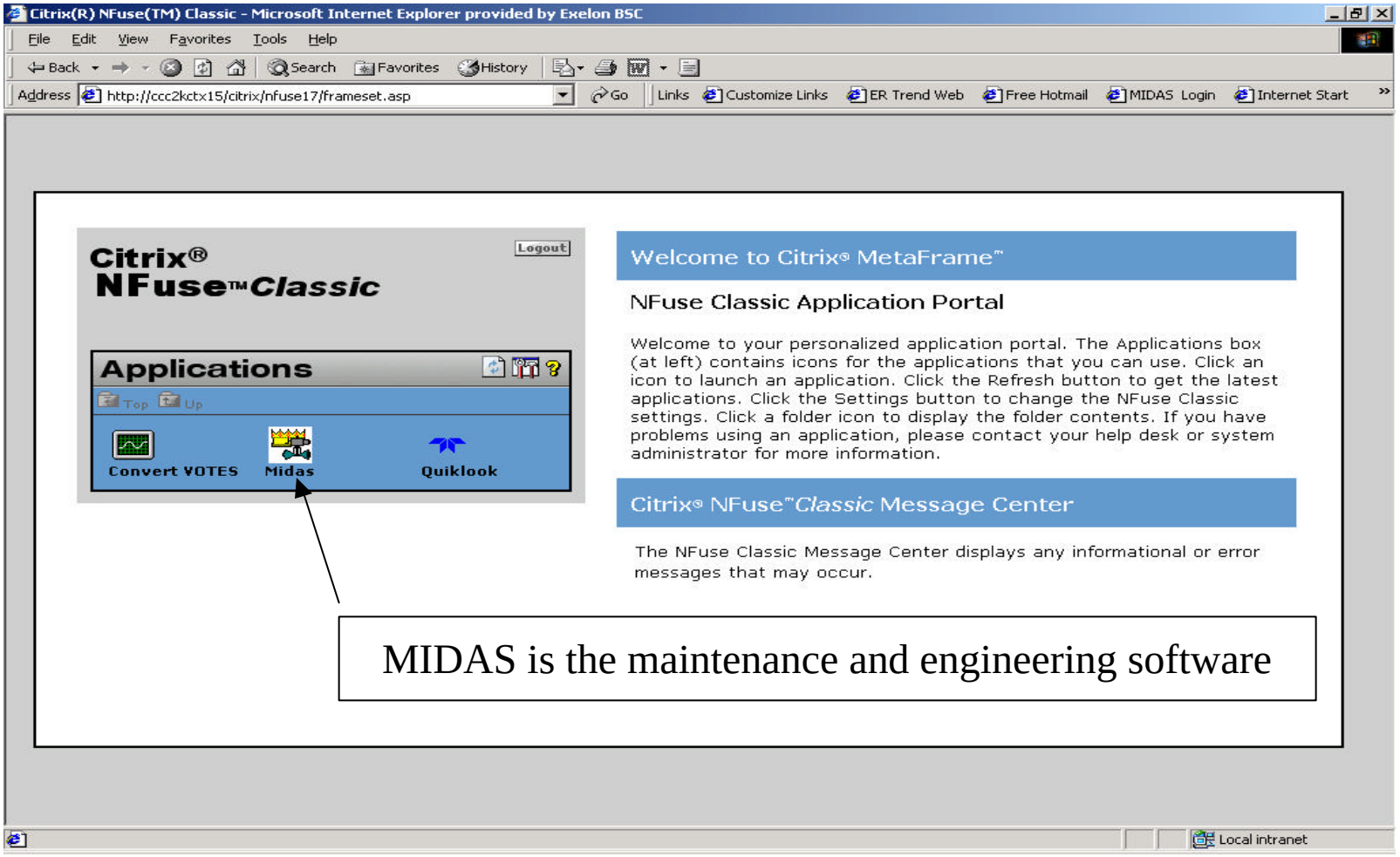
Development Strategy (continued)

- Provide maintenance personnel with simplified criteria that makes MOV diagnostic testing as much like performing a routine surveillance test as possible
- Fully integrate a testing, trending and design into a common process
- Provide procedural guidance to minimize the need for “tribal knowledge” and to achieve consistent test guidance
- Focus on processes and common implementation tools instead of testing hardware and implementation minutiae
- Create a simple software interface that is user friendly to less computer savvy maintenance personnel

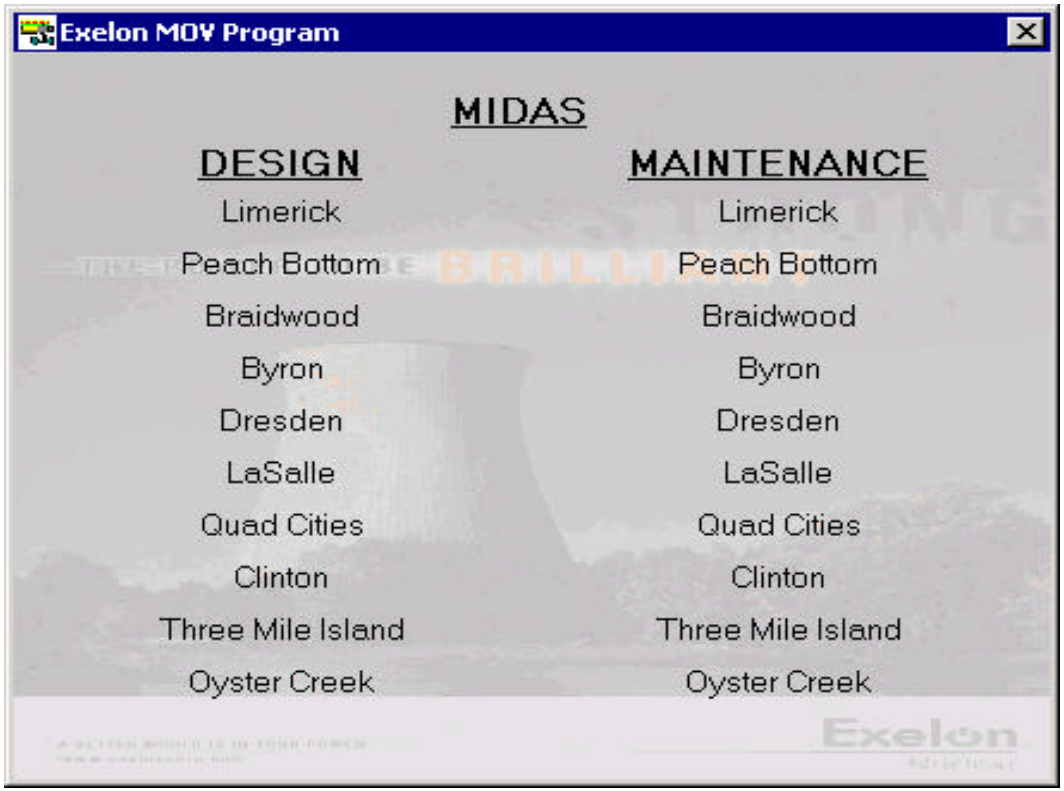
Results

- The Standardized MOV Program was rolled out on schedule on 10/31/02. A total of 16 new engineering and maintenance procedures and new implementing software (programmed for Exelon by Teledyne) was issued
- Site implementation of the new processes has been successful based on follow-up assessment results
- Station acceptance of the new process has been generally positive despite the additional implementation burden at the sites of having to approve a new calculation for each valve prior to testing (all existing calculations must be converted within 2 years regardless of test schedule)

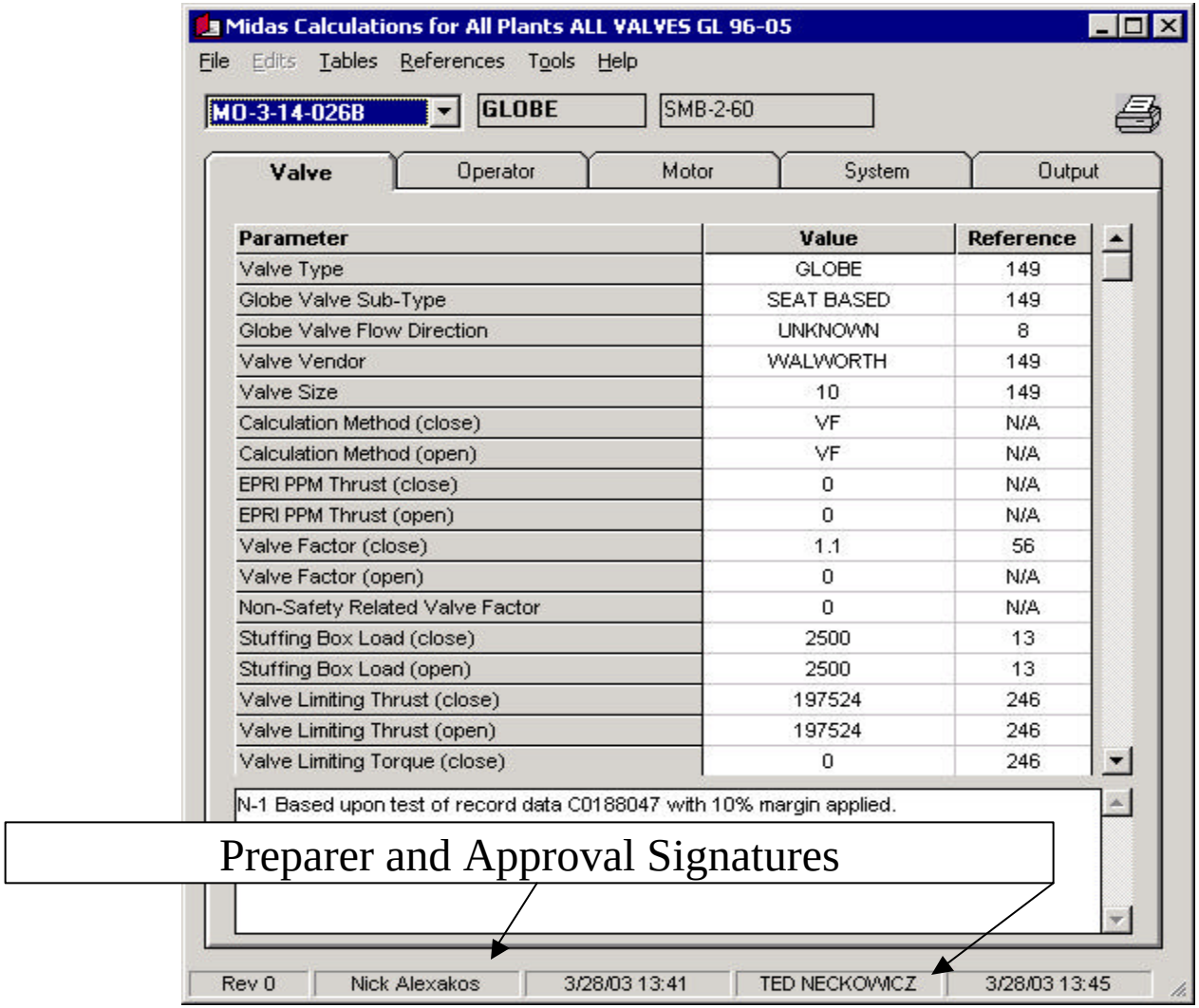
Common Software Access is Available from the Exelon Intranet



Design and Test Data is Available for All Stations

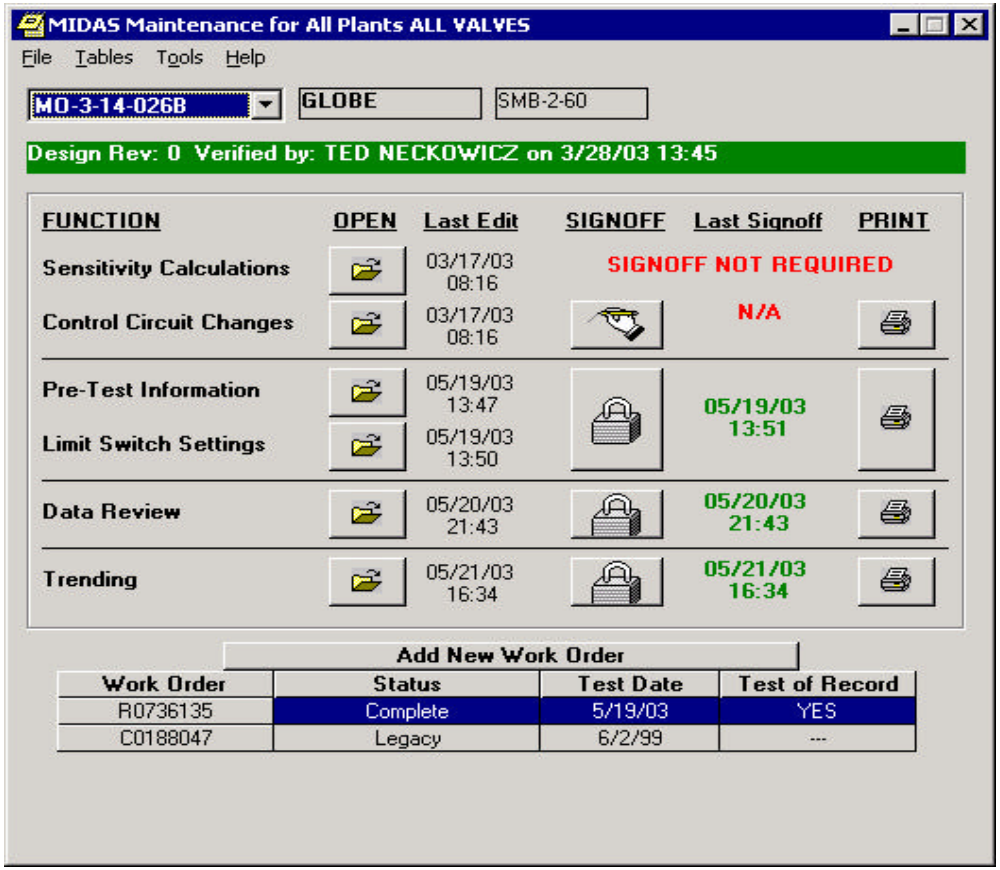


An Approved Calculation is Required to Test



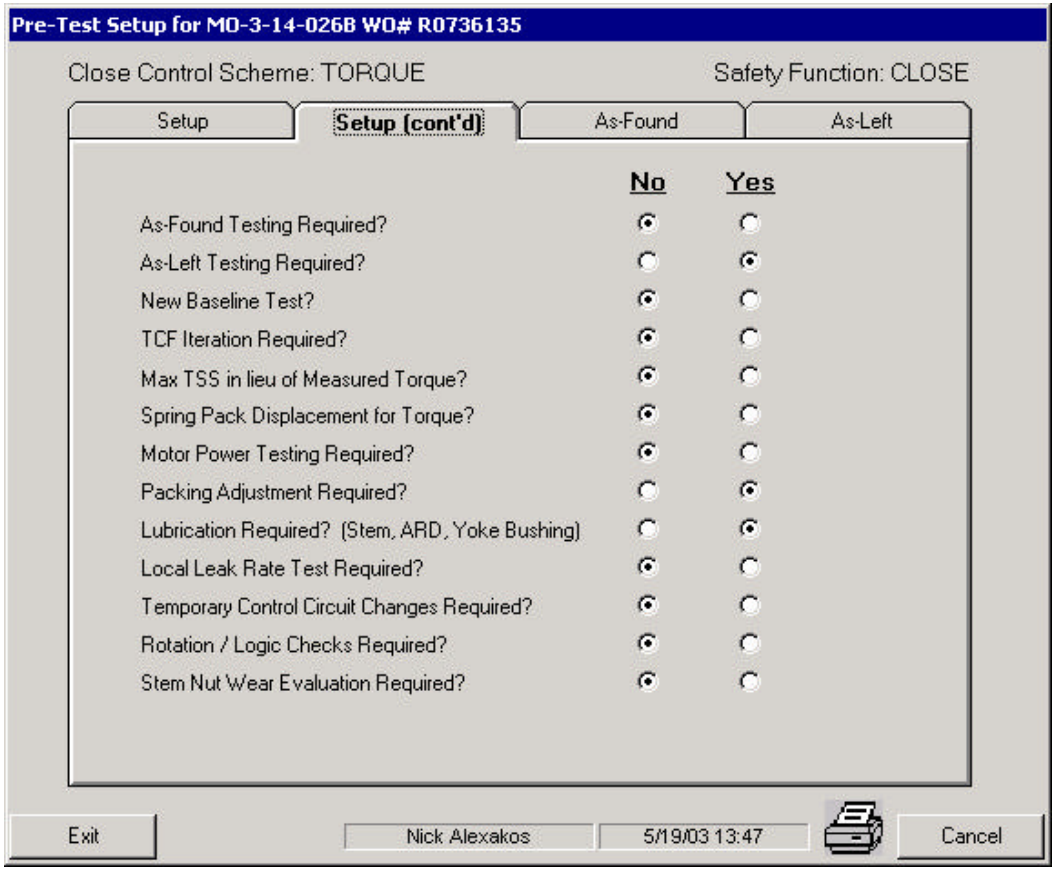
A New Data Record is Created for Each Test by Work Order Number

- A new record is created for each new test work order
- Status changes as the valve moves through the testing process from Pre-test to Data Review and then to Trending as each stage is signed off.



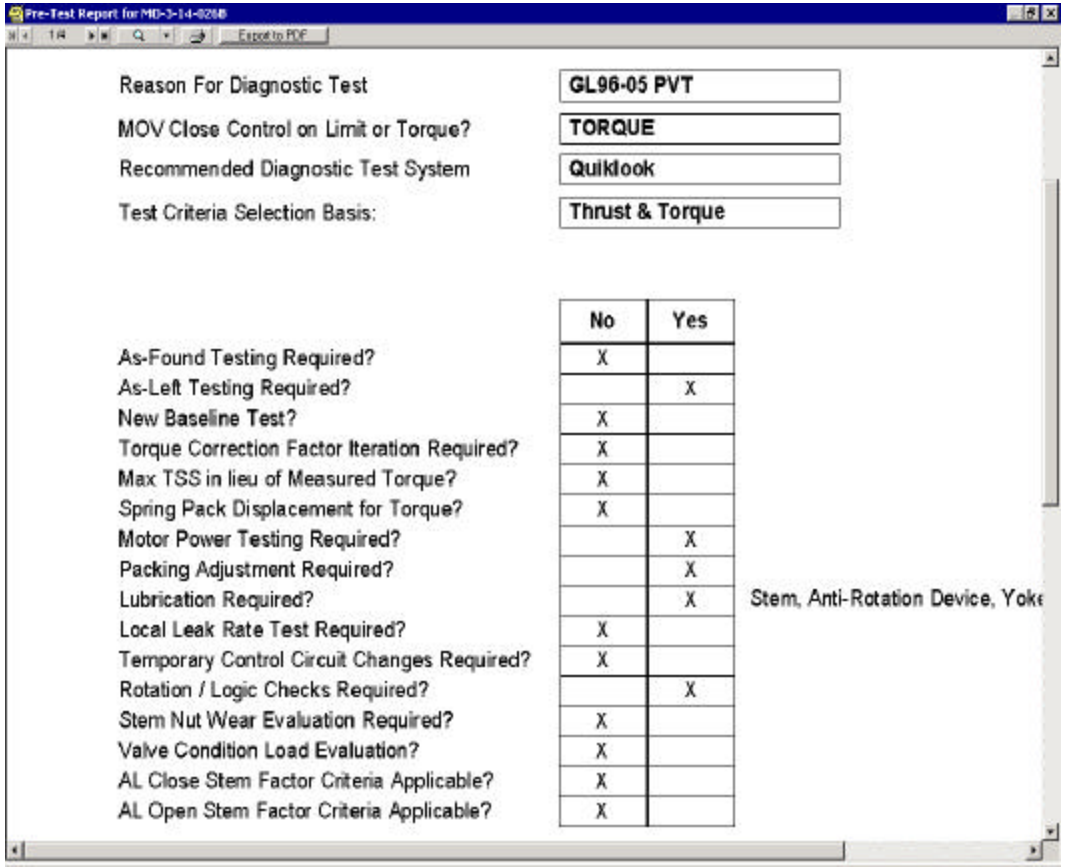
Menu Driven Software Guides the Engineer Through the Pre-Test Preparation Process

- Each software step in the decision making process is provided with procedure guidance and examples



Maintenance Instructions are Formatted to Facilitate a Pre Job Brief

- A simple format is used on the first page of the test instructions to communicate general test requirements



Pre-Test Report for MD-3-14-0268

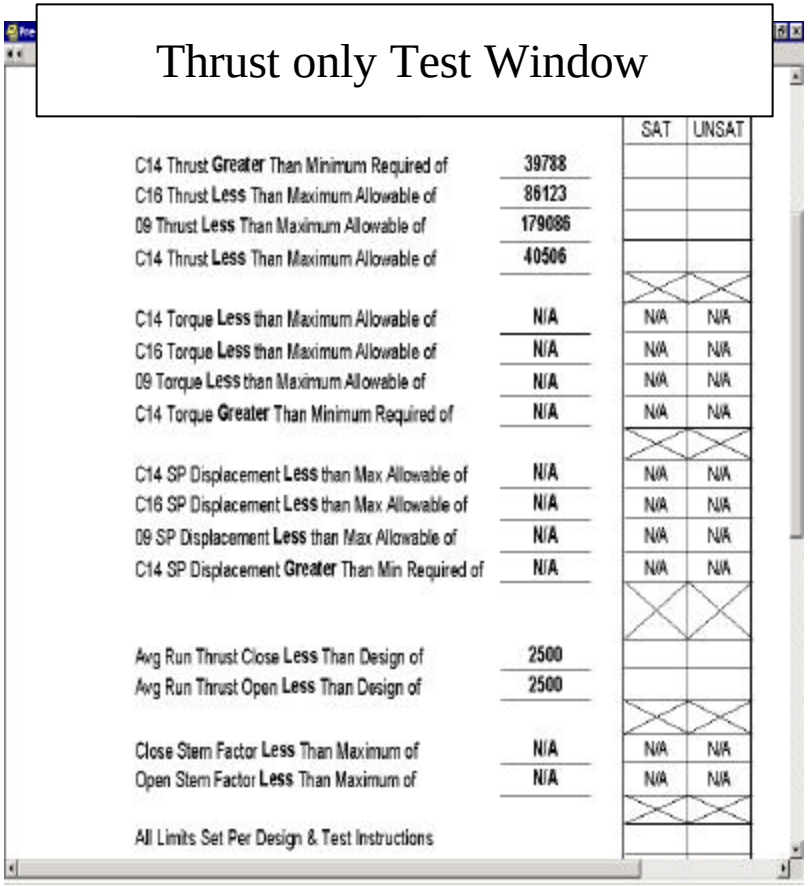
Export to PDF

Reason For Diagnostic Test	GL96-05 PVT
MOV Close Control on Limit or Torque?	TORQUE
Recommended Diagnostic Test System	Quiklook
Test Criteria Selection Basis:	Thrust & Torque

	No	Yes	
As-Found Testing Required?	X		
As-Left Testing Required?		X	
New Baseline Test?	X		
Torque Correction Factor Iteration Required?	X		
Max TSS in lieu of Measured Torque?	X		
Spring Pack Displacement for Torque?	X		
Motor Power Testing Required?		X	
Packing Adjustment Required?		X	
Lubrication Required?		X	Stem, Anti-Rotation Device, Yoke
Local Leak Rate Test Required?	X		
Temporary Control Circuit Changes Required?	X		
Rotation / Logic Checks Required?		X	
Stem Nut Wear Evaluation Required?	X		
Valve Condition Load Evaluation?	X		
AL Close Stem Factor Criteria Applicable?	X		
AL Open Stem Factor Criteria Applicable?	X		

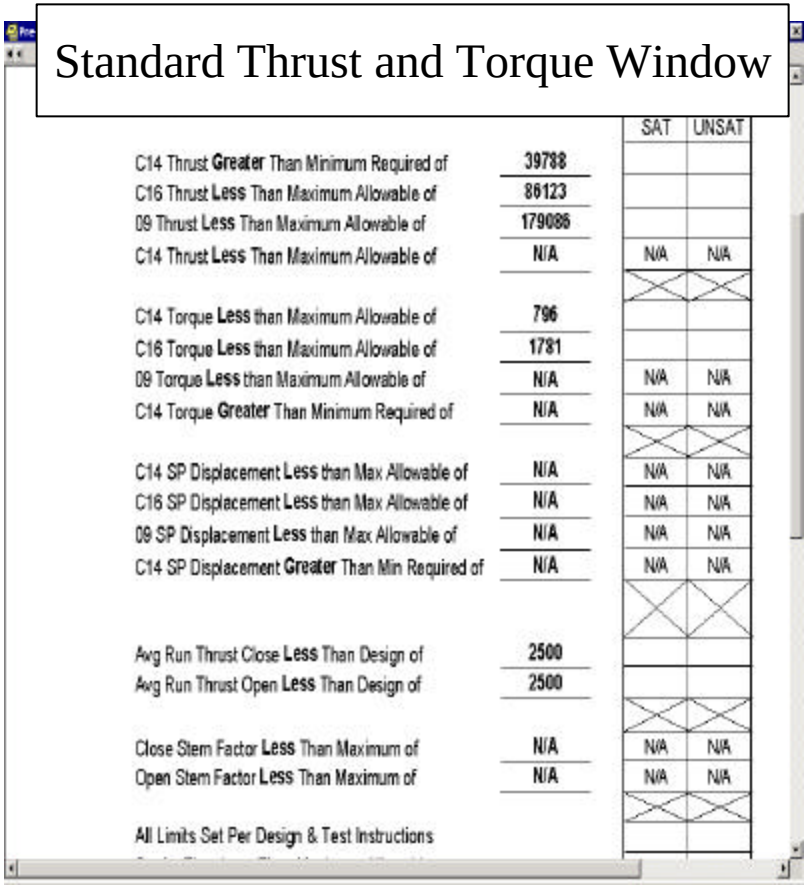
Only Required Test Acceptance Criteria is Provided to Maintenance

Thrust only Test Window



		SAT	UNSAT
C14 Thrust **Greater** Than Minimum Required of	39788		
C16 Thrust **Less** Than Maximum Allowable of	86123		
09 Thrust **Less** Than Maximum Allowable of	179086		
C14 Thrust **Less** Than Maximum Allowable of	40506		
C14 Torque **Less** than Maximum Allowable of	N/A	N/A	N/A
C16 Torque **Less** than Maximum Allowable of	N/A	N/A	N/A
09 Torque **Less** than Maximum Allowable of	N/A	N/A	N/A
C14 Torque **Greater** Than Minimum Required of	N/A	N/A	N/A
C14 SP Displacement **Less** than Max Allowable of	N/A	N/A	N/A
C16 SP Displacement **Less** than Max Allowable of	N/A	N/A	N/A
09 SP Displacement **Less** than Max Allowable of	N/A	N/A	N/A
C14 SP Displacement **Greater** Than Min Required of	N/A	N/A	N/A
Avg Run Thrust Close **Less** Than Design of	2500		
Avg Run Thrust Open **Less** Than Design of	2500		
Close Stem Factor **Less** Than Maximum of	N/A	N/A	N/A
Open Stem Factor **Less** Than Maximum of	N/A	N/A	N/A
All Limits Set Per Design & Test Instructions			

Standard Thrust and Torque Window



		SAT	UNSAT
C14 Thrust **Greater** Than Minimum Required of	39788		
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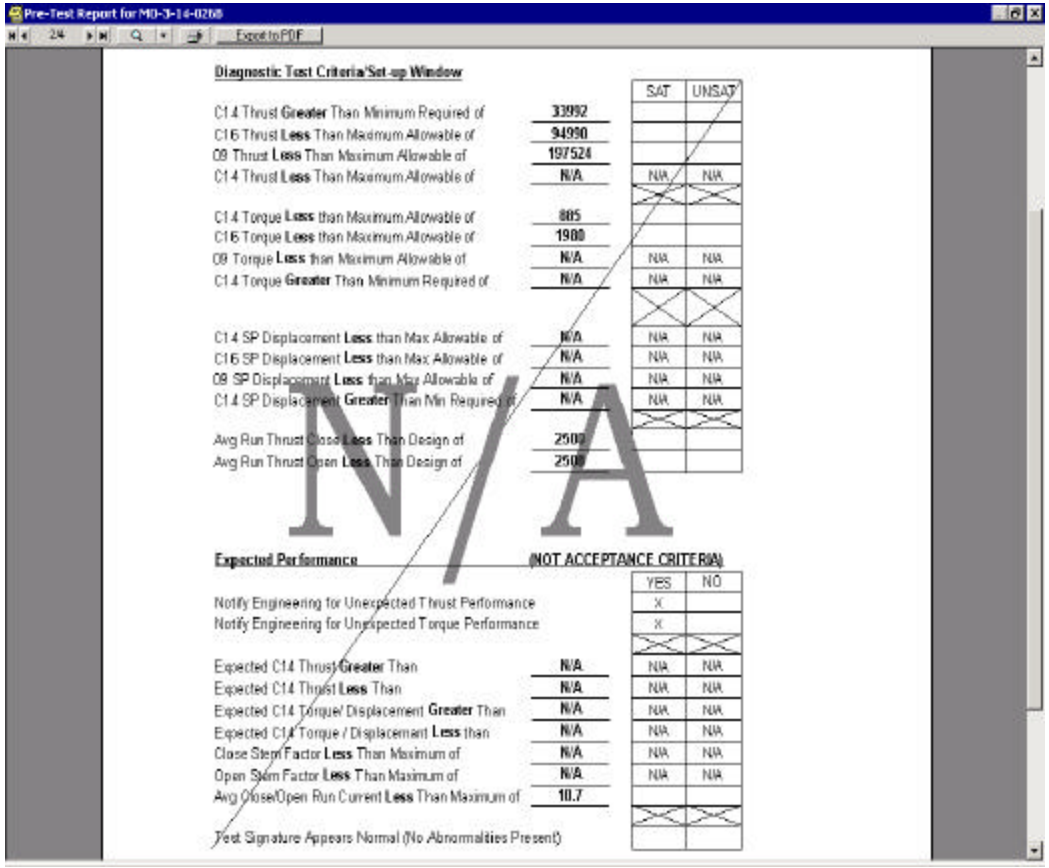
09 Thrust **Less** Than Maximum Allowable of	179086		
C14 Thrust **Less** Than Maximum Allowable of	N/A	N/A	N/A
C14 Torque **Less** than Maximum Allowable of	796		
C16 Torque **Less** than Maximum Allowable of	1781		
09 Torque **Less** than Maximum Allowable of	N/A	N/A	N/A
C14 Torque **Greater** Than Minimum Required of	N/A	N/A	N/A
C14 SP Displacement **Less** than Max Allowable of	N/A	N/A	N/A
C16 SP Displacement **Less** than Max Allowable of	N/A	N/A	N/A
09 SP Displacement **Less** than Max Allowable of	N/A	N/A	N/A
C14 SP Displacement **Greater** Than Min Required of	N/A	N/A	N/A
Avg Run Thrust Close **Less** Than Design of	2500		
Avg Run Thrust Open **Less** Than Design of	2500		
Close Stem Factor **Less** Than Maximum of	N/A	N/A	N/A
Open Stem Factor **Less** Than Maximum of	N/A	N/A	N/A
All Limits Set Per Design & Test Instructions			

The Software is Structured to Minimize the Potential Errors and Confusion During Testing

- The software will N/A information that is not required in advance of the procedure going to the field

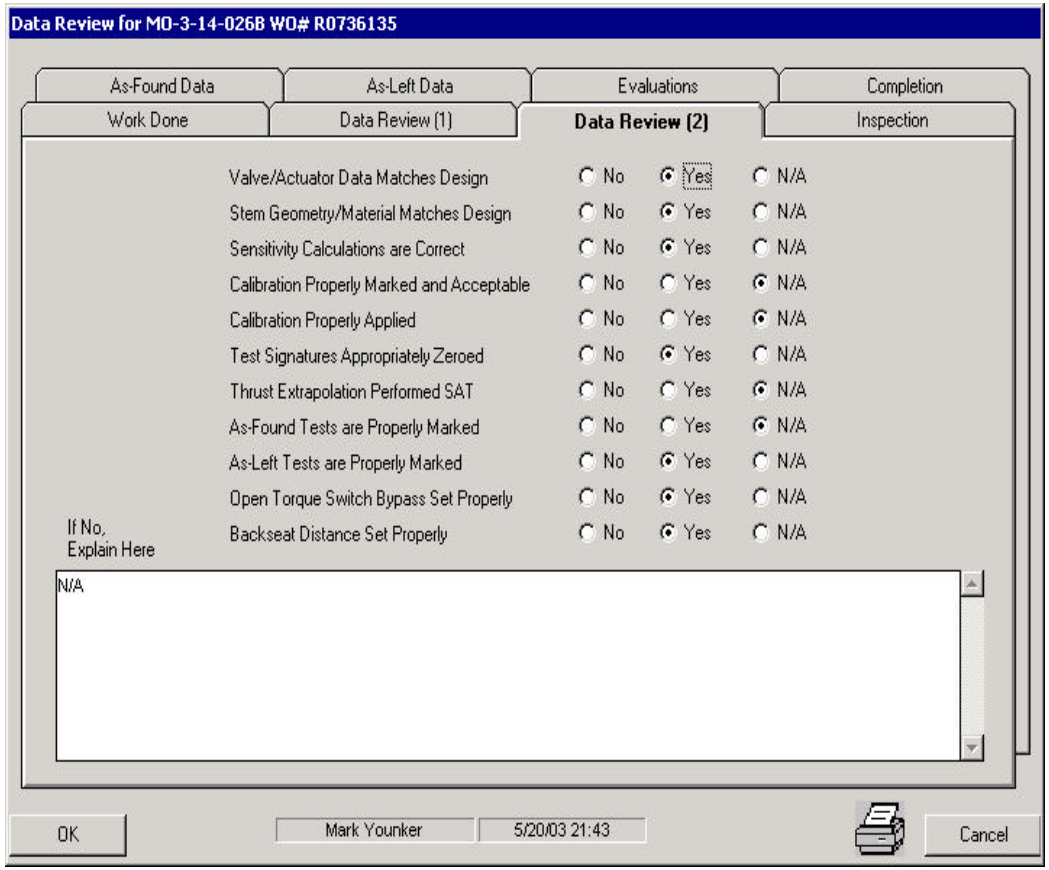


Testing is Performed with a Common Procedure Utilizing the Test Instructions

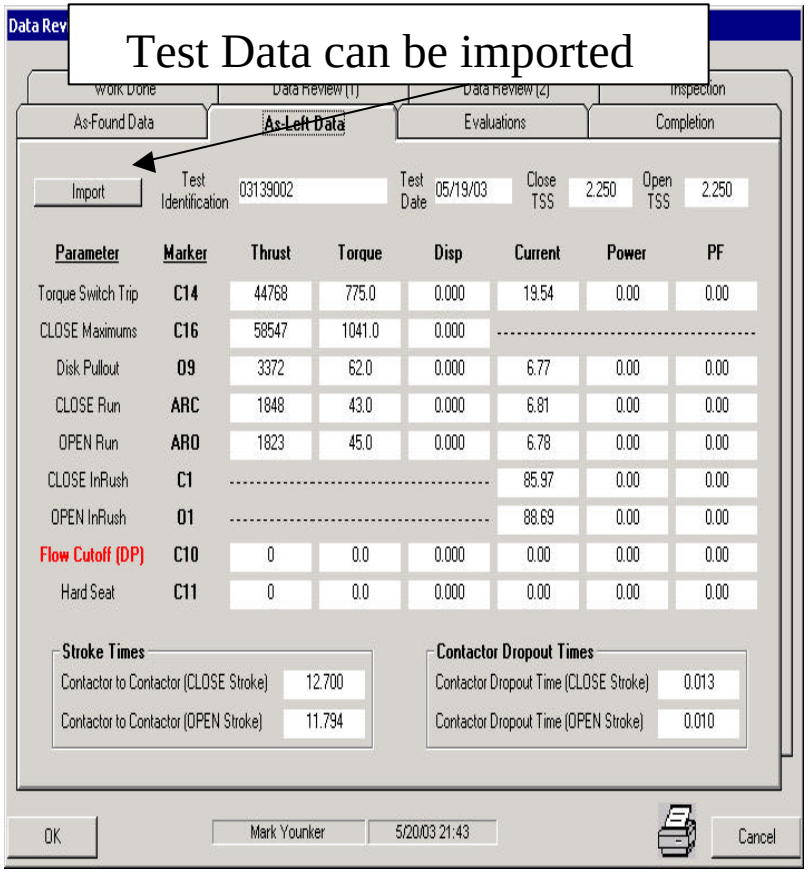
- The test procedure is designed to minimize or eliminate the redundant recording of data.
- The test instructions are included as part of the permanent test record
- Numerical test results are not required to be transcribed into the procedure
- As Left test results are independently verified.
- If all Test Acceptance Criteria is satisfactory then the test is acceptable and the valve can be returned to operations at this time without additional review by engineering.

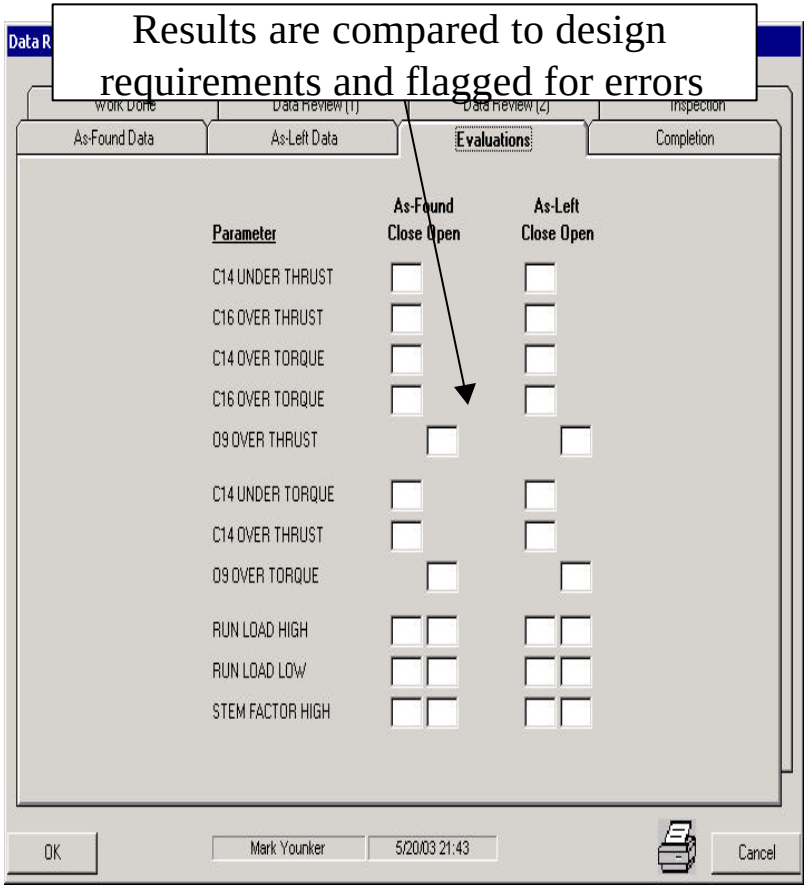
Menu Driven Software Guides Maintenance Through the Data Review Process

- Each software step is provided with procedure guidance and examples
- As-Found and As-Left test data results can be directly imported into the software to eliminate data entry errors



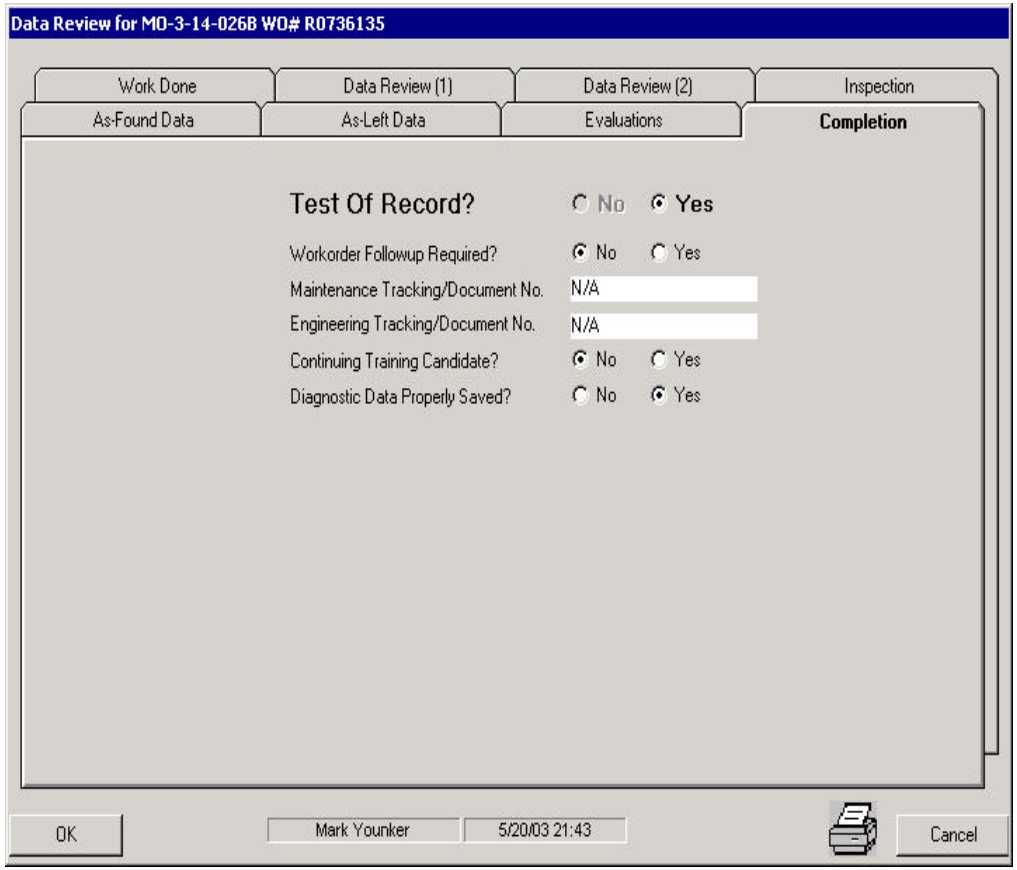
Automatic Import Minimizes Data Entry Errors and Compares Results to Design





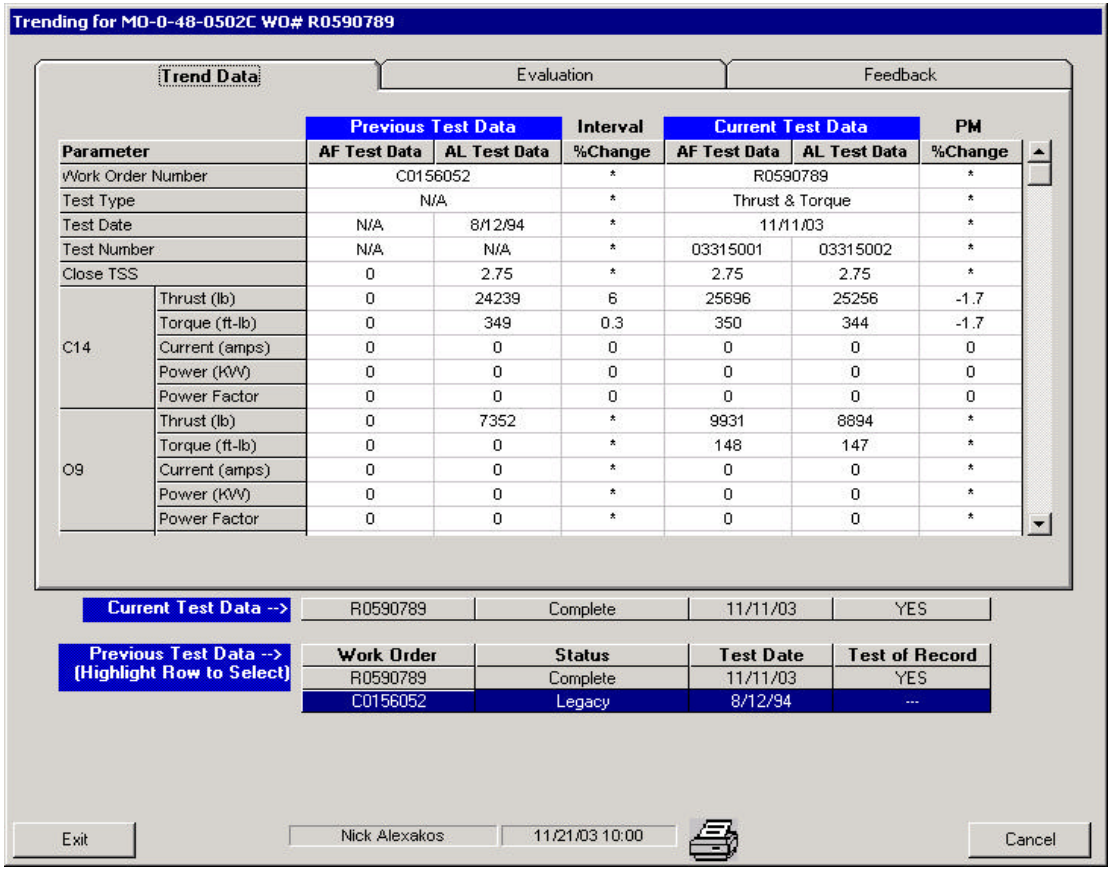
Maintenance Completes the Test Data Review

- Designation of “Test of Record” updates the design calculation with the new test data
- All margin calculations will now be based on the most recent test data



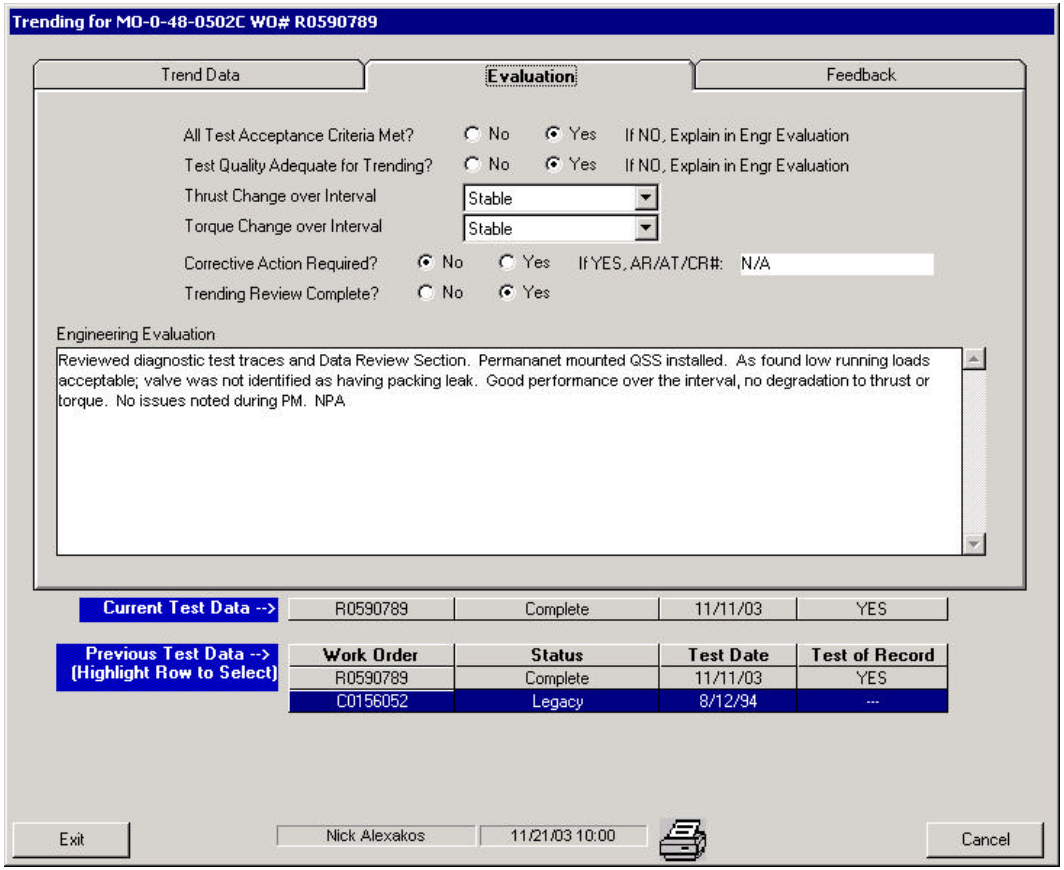
Engineering Performs the Trending Review

- As Found test results for the current test are compared to the previous as left test results
- The change form as found to as left performance is also compared



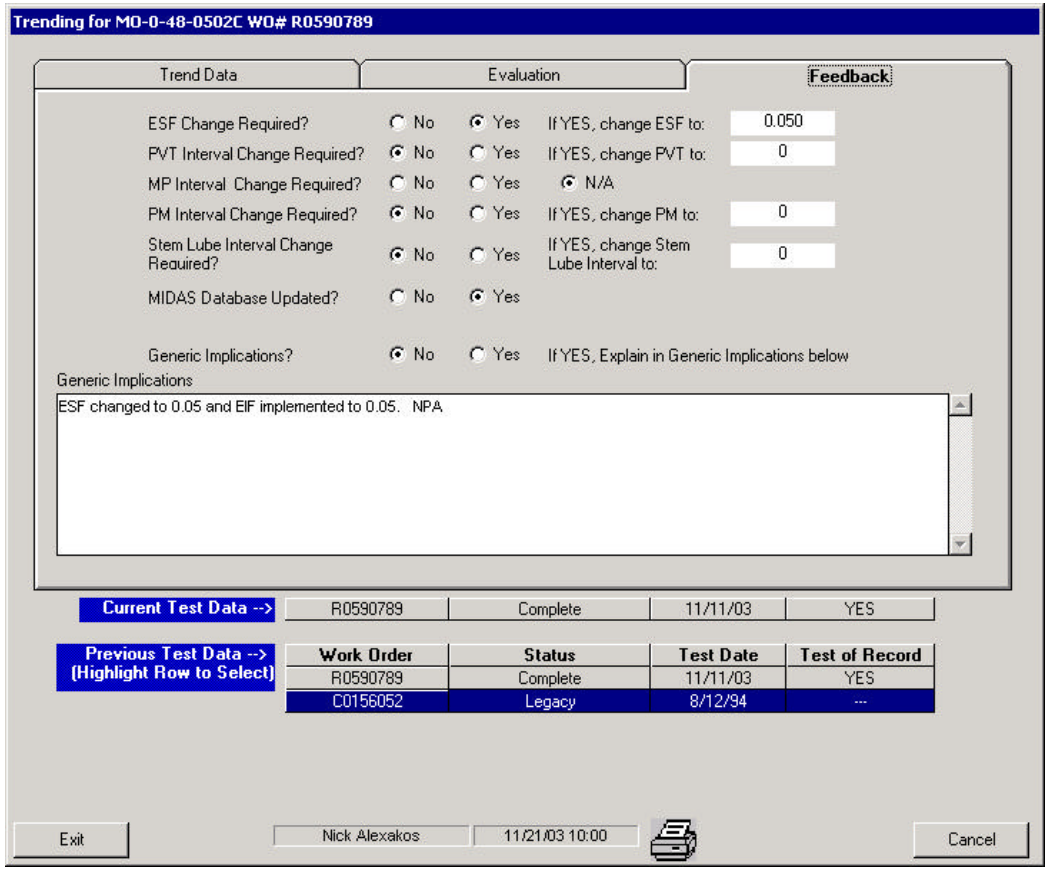
Engineering Evaluates Performance Over the the Test Interval

- Quality of the test data for trending is confirmed
- Test performance is evaluated



Engineering Makes Adjustments to the Future Test Interval

- Engineering is required to evaluate if adjustments to the PM interval, Test interval or degradation factors in the design calculation prior to closing the trending module



Engineering Completes the Trending Module and the Testing Process is Complete

- Signoff of the Trending Module locks down the file and completes the testing process for the valve under the existing work order.