



TELEDYNE
TEST SERVICES
A Teledyne Technologies Company

Sixth Annual QUIKLOOK Users Group Meeting

August 15th & 16th, 2012

Marion, Massachusetts



TELEDYNE
TEST SERVICES
A Teledyne Technologies Company

AOV Software

ACETest Fundamentals

QUIKLOOK Users' Group

2012 Annual Meeting

August 15-16, 2012
Tabor Academy
Marion, MA

Integrated

Design Calculation Software ACE

Test Analysis Software ACETEST

ACE - ZZ-RSTESTCASE

File Edits Tables References Help

ZZ-RSTESTCASE **Globe - Balanced - Flow Over - Down to Close**
Diaphragm - Direct Acting

Packing Accessories Adjustment Factors Output
General Configuration Valve Actuator

Parameter	Dir	Value	Ref
Calculation Number		80054-1	1
Calculation Revision		0	1
System		011	2
Name		Name	3
Fail Position		Open	6
Media		Water	7
Flow Diagram / P&ID		P&ID	8
Max. Fluid Temperature (Deg F)		100	9
Line Pressure Upstream	(C)	200.00	10
Line Pressure Upstream	(O)	100.00	11
Line Pressure Downstream	(C)	20.00	12
Line Pressure Downstream	(O)	10.00	13
Category		1	14
Air System Name		Air System	15
Stem Material		Stainless Steel	16
Young's Modulus (E)		29,000,000	17
Poisson's Ratio (v)		0.290	18

General Comments
Discussion on the method used to determine the line pressures. - LP Discussion

Eric Solla 08/01/2011 13:06 NOT APPROVED N/A

ACETest for ACE & Manual Input Valves - All Plants - ALL VALVES

File Tables Tools Help

FCV-006-112A **Globe - Pilot - Flow Over**
Diaphragm - Direct Acting

Design Rev: 0 Preparer: Eric Solla Verifier: NOT APPROVED

FUNCTION	OPEN	Last Edit	SIGNOFF	Last Signoff	PRINT
Pre-Test		07/26/12 09:33		N/A	
Post Test Evaluation		07/30/12 12:47		N/A	

Add New Work Order

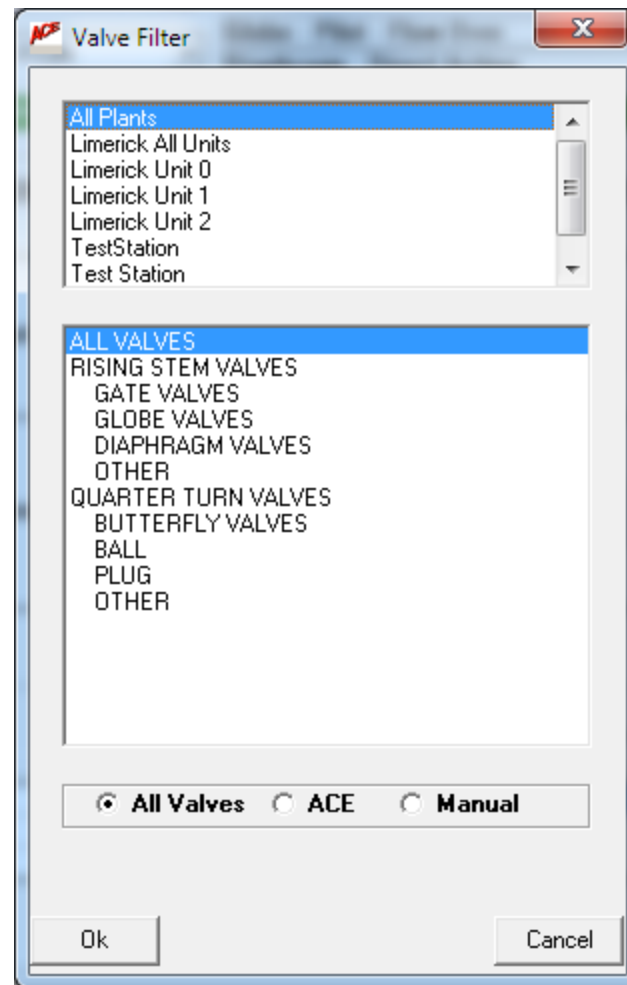
Work Order	AOVDR Rev	Test Date	Test of Record
NEW W/O	2	1/1/2000	...
NEW W/O	1	1/1/2000	...
NEW W/O	0	1/1/2000	...



- 2008 – ACETest Rev 0
 - Initial Release for Entergy – Indian Point
- 2008 – ACETest Rev 1
 - Minor rev
- 2009 – ACETest Rev 2
 - Major changes for Entergy Corporate Use
- 2010 – ACETest Rev 3
 - Renamed Software to ACETest
- 2012 – ACETest Rev 4
 - Updated to Interface with ACE 4.0
- 2012 (4th qtr) – ACETest Rev 4.1
 - Upgrade to Interface and Reports



- **Filtering**
 - **Plant**
 - **Unit**
 - **Valve Type**



- **Pre-Test Inputs**
 - Similar layout to ACE

Pre-Test Setup for FCV-006-112A

Print Edits Tables Return Help

Accessories Adjustment Factors Test Requirements

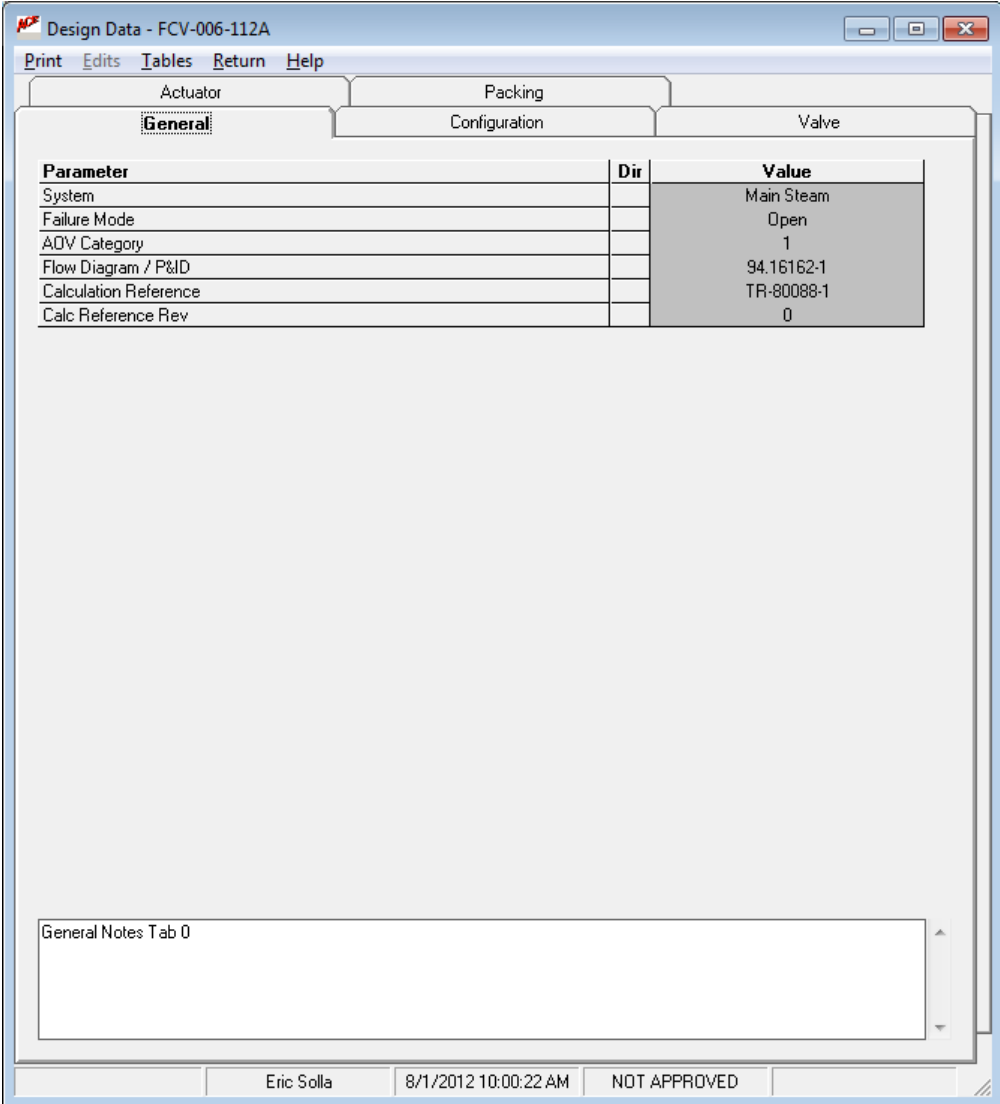
General Valve Actuator

Parameter	Dir	Value
Description		MSL Downstream drain line header
Misc References		DBR
Primary ADV Function		Control Valve
ADVDR Revision		2
ADVDR Status		Pending / 1st Time
IST		No
LLRT		No
Thermal Perf		No
SOV Limit IP EQ		N/A

General Notes Tab 0

Eric Solla 7/26/2012 9:33:16 AM NOT APPROVED

- **Design Inputs**
 - Imported from ACE



The screenshot shows a software window titled "Design Data - FCV-006-112A". The window has a menu bar with "Print", "Edits", "Tables", "Return", and "Help". Below the menu bar are three tabs: "Actuator", "Packing", and "Valve". Under the "Valve" tab, there are two sub-tabs: "General" (which is selected) and "Configuration".

Parameter	Dir	Value
System		Main Steam
Failure Mode		Open
ADV Category		1
Flow Diagram / P&ID		94.16162-1
Calculation Reference		TR-80088-1
Calc Reference Rev		0

Below the table is a text area labeled "General Notes Tab 0". At the bottom of the window, there is a status bar with the following information: "Eric Solla", "8/1/2012 10:00:22 AM", and "NOT APPROVED".

- **Pre-Test Inputs**
 - Manual Valve
 - Includes Design & Pre-Test Inputs

Design Data / Pre-Test Setup for AA-QT-TestCase (Manual Valve)

Print Edits Tables Return Help

Accessories Adjustment Factors Test Requirements

General Configuration Valve Actuator

Parameter	Dir	Value
System		N/A
Failure Mode		Open
ADV Category		1
Flow Diagram / P&ID		N/A
Calculation Reference		Unknown
Calc Reference Rev		0
Description		N/A
Misc References		N/A
Primary ADV Function		N/A
ADVDR Revision		0
ADVDR Status		Pending
IST		Yes
LLRT		No
Thermal Perf		No
SOV Limit IP EQ		Yes

N/A

Eric Solla 7/25/2012 4:04:26 PM NOT APPROVED



- **Pre-Test Inputs**
 - **Valve Tab**

Pre-Test Setup for FCV-006-112A

Print Edits Tables Return Help

Accessories Adjustment Factors Test Requirements

General **Valve** Actuator

Parameter	Dir	Value
Valve Drawing		Dwg ###
Nominal Stroke Tolerance (%Decimal)		0.0100
Min Required Seat Load Remarks	(C)	Close Min Comment
Min Required Seat Load Remarks	(O)	Open Min Comment
Max Allowable Thrust Remarks	(C)	Close Max Comment
Max Allowable Thrust Remarks	(O)	Open Max Comment
Calculate Open Force Settings		Yes
Include Detailed Seat Load Calc in Report		Yes
Desired Friction Range - Minimum		100.0
Desired Friction Range - Maximum		140.0

Valve Notes Tab 2

Eric Solla 8/8/2012 10:52:25 AM NOT APPROVED

- **Pre-Test Inputs**
 - **Actuator Tab**

Pre-Test Setup for FCV-006-112A

Print Edits Tables Return Help

Accessories		Adjustment Factors		Test Requirements	
General		Valve		Actuator	
Parameter	Dir	Value			
Actuator Drawing		Act Dwg ###			
Stoke Time Adjustable (Needle) Valve		Yes			
Handwheel Mounting		Top			
Hide Setup Window		No			
Minimum Lower Bench Set - Target		2.00			
Maximum Lower Bench Set - Target		3.50			
Lower Bench Set - Target		2.75			
Lower Bench Set - Remarks		LBS Comment			
Upper Bench Set - Target		15.00			
Upper Bench Set - Remarks		UBS Comment			

Actuator Notes Tab 3

Eric Solla 8/8/2012 10:52:25 AM NOT APPROVED

- **Accessories**
 - Imported from ACE
 - Additional Fields added

Pre-Test Setup for FCV-006-112A

Print Edits Tables Return Help

General Valve Actuator
Accessories Adjustment Factors Test Requirements

Positioner SOV I/P
Accumulator **Air Regulator** Booster Limit Switch

Add Air Regulator Delete Air Regulator

Parameter	Dir	Value
Equipment ID		Air Regulator 2
Manufacturer		Air reg Manuf
Model Number		Air reg Model
Shop Order Number		Air Reg Shop Order No
Serial Number		Air Reg SN
Current Air Regulator Setting (psig)		48.00
Maximum Rated Pressure (psig)		125.0
Air Pressure Min (psig)		42.00
Air Pressure Max (psig)		52.00
Air Pressure Target (psig)		47.00
Input Pressure (psig)		100.0
Supplies		Booster

Air Regulator Notes Tab 6

Eric Solla 7/26/2012 9:33:16 AM NOT APPROVED

- Accessories
 - I/P Added

Pre-Test Setup for FCV-006-112A

Print Edits Tables Return Help

General Valve Actuator
Accessories Adjustment Factors Test Requirements

Accumulator Air Regulator Booster Limit Switch
Positioner SOV I/P

Add I/P Delete I/P

Parameter	Dir	Value
Equipment ID		I/P 7
Manufacturer		I/P Manuf
Model Number		I/P Model
Shop Order Number		I/P Shop Order No
Serial Number		I/P Serial No
Action		Reverse Acting
I/P Input Signal		4 - 40 ma
I/P Output Signal		3 - 15 psig

I/P Notes Tab 18

Eric Solla 8/1/2012 10:00:22 AM NOT APPROVED

- **Adjustment Factors**
 - Not same as ACE

Pre-Test Setup for FCV-006-112A

Print Edits Tables Return Help

General Valve Actuator

Accessories **Adjustment Factors** Test Requirements

Parameter	Dir	Value
Acquisition Module Reading Accuracy (%Decimal)		0.0100
Acquisition Module Full Scale Accuracy (%Decimal)		0.0000
Pressure Transducer		Pressure Transducer Model #
Pressure Trans Full Scale Reading		100.00
Pressure Transducer Reading Accuracy (%Decimal)		0.0100
Pressure Transducer Full Scale Accuracy (%Decimal)		0.0000
Recommended Device to Acquire Thrust		EDA
Thrust Device Full Scale Reading		5,000.00
Tq / Th Device Reading Accuracy (%Decimal)		0.0800
Tq / Th Device Full Scale Accuracy (%Decimal)		0.0000
PreAmp Reading Accuracy (%Decimal)		0.0100
PreAmp Full Scale Accuracy (%Decimal)		0.0000

Adjustment Factor Notes

Eric Solla 8/1/2012 10:00:22 AM NOT APPROVED

- Test Requirements

Pre-Test Setup for FCV-006-112A

Print Edits Tables Return Help

General Valve Actuator
Accessories Adjustment Factors **Test Requirements**

Parameter	Dir	Value
Reason for Diagnostic Test		PVT / PM
As Found Testing Required		Yes
Baseline Test		No
As Found LLRT Required		Yes
Actuator Maintenance Required		No
Accessory Maint / Calibration		No
Packing Adjustment Required		No
Control Room Stroke Time Required		No
Strain Gauge for Thrust Data		No
Use Installed IP		Test
High Pressure IP Used		Yes
Test Ramp Time		0

Special Test Instructions - Tab 19

Eric Solla 7/26/2012 9:33:16 AM NOT APPROVED

- **Adjustment Factors (QSS)**
 - Device Dependant
 - Open Calc Optional
 - Detailed Calc in Report Optional

Edit Accuracies - Seat Load - FCV-006-112A

Edits Print Return

Device to Acquire Thrust: **QSS**

Thrust Device Full Scale Reading: 5,000.00

Accuracies

Acquisition Module Reading: 0.0100 % Decimal

Acquisition Module Full Scale: 0.0000 % Decimal

Tq / Th Device Reading: 0.0800 % Decimal

Tq / Th Device Full Scale: 0.0000 % Decimal

PreAmp Reading: 0.0100 % Decimal

PreAmp Full Scale: 0.0000 % Decimal

	Close	Open
Min. Required Thrust:	1,200 lbf	1,300 lbf
Max Average Friction:	150 lbf	150 lbf
Desired Thrust Limit (Seat Load Only):	1,050 lbf	1,150 lbf
Min Required Seat Load:	1,135 lbf	1,243 lbf
Remark (N/A if Not Applicable)	Close Min Comment	Open Min Comment
Max Actuator Rating (Weak Link):	7,000 lbf	6,000 lbf
Adjusted Max Allowable Thrust:	6,432 lbf	5,513 lbf
Remark (N/A if Not Applicable)	Close Max Comment	Open Max Comment

Include Detailed Seat Load Calc in Report Calculate Open Force Settings

- **Adjustment Factors (EDA)**
 - Device Dependant
 - Open Calc Optional
 - Detailed Calc in Report Optional

Edit Accuracies - Seat Load - FCV-006-112A

Edits Print Return

Device to Acquire Thrust:

Fail Mode:

Act Eff Area @ Seating: sq in

Act Eff Area @ Seating Tol: % Decimal

Pressure Transducer:

Pres Trans Full Scale Reading: psig

Accuracies

Acquisition Module Reading: % Decimal

Acquisition Module Full Scale: % Decimal

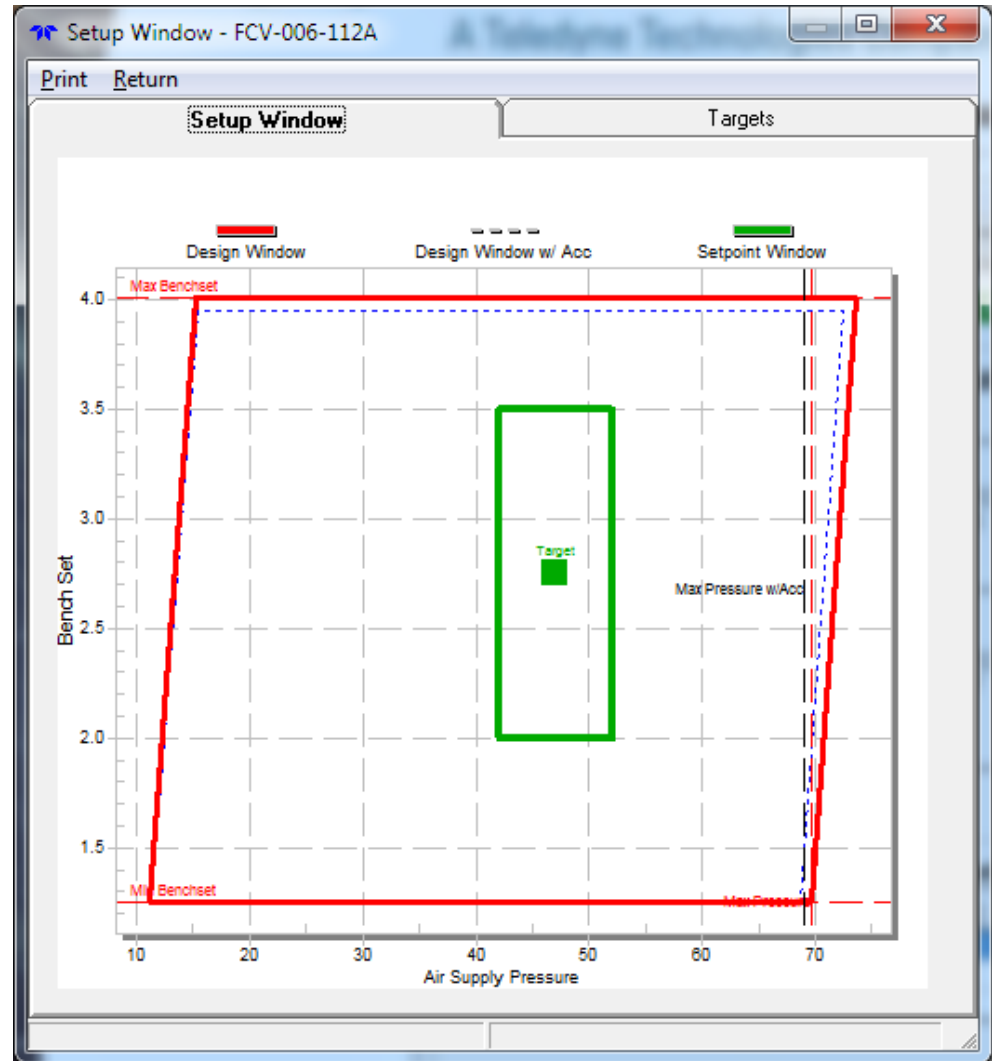
Pressure Transducer Reading: % Decimal

Pressure Transducer Full Scale: % Decimal

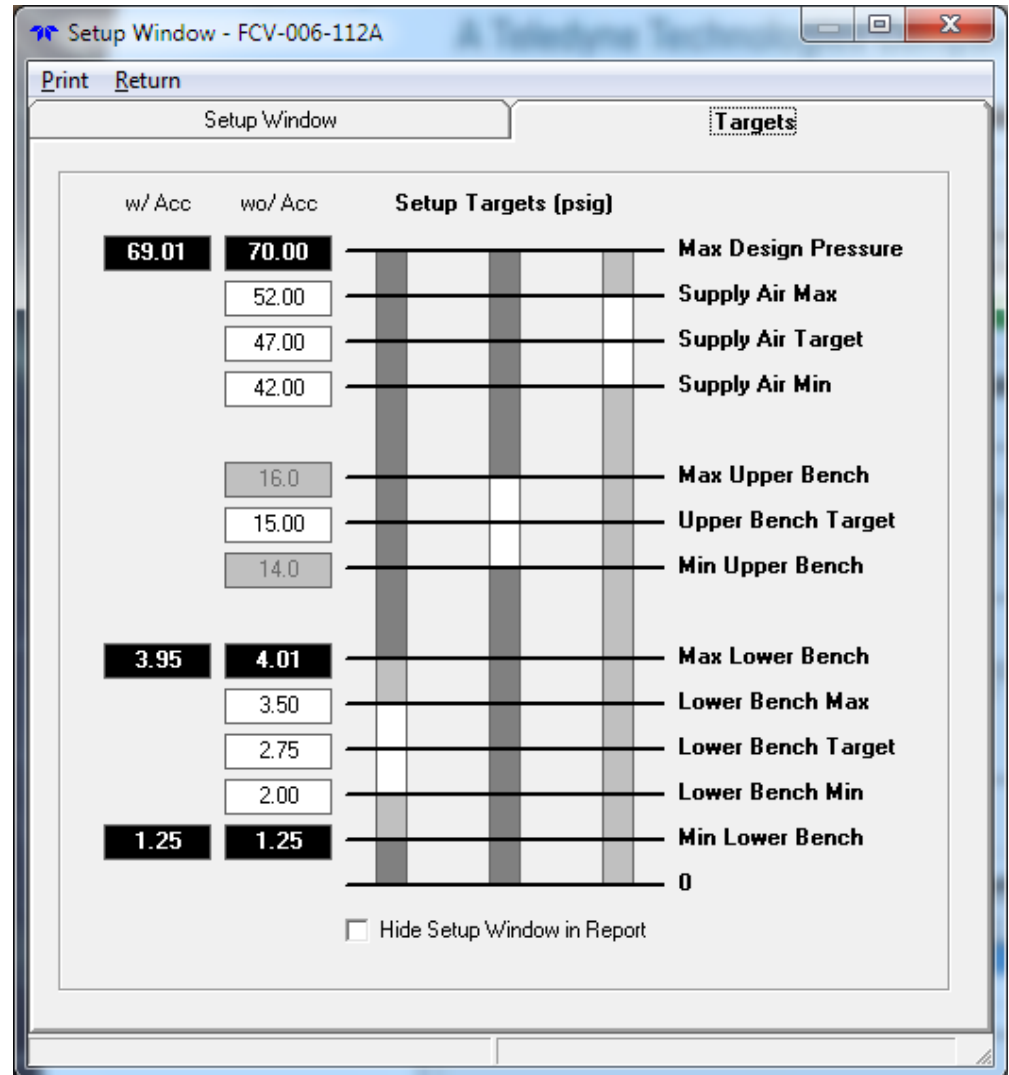
	Close	Open
Min. Required Thrust:	<input type="text" value="1,200"/> lbf	<input type="text" value="1,300"/> lbf
Max Average Friction:	<input type="text" value="150"/> lbf	<input type="text" value="150"/> lbf
Desired Thrust Limit (Seat Load Only):	<input type="text" value="1,050"/> lbf	<input type="text" value="1,150"/> lbf
Min Required Seat Load:	<input type="text" value="1,086"/> lbf	<input type="text" value="1,190"/> lbf
Remark (N/A if Not Applicable)	<input type="text" value="Close Min Comment"/>	<input type="text" value="Open Min Comment"/>
Max Actuator Rating (Weak Link):	<input type="text" value="7,000"/> lbf	<input type="text" value="6,000"/> lbf
Adjusted Max Allowable Thrust:	<input type="text" value="6,766"/> lbf	<input type="text" value="5,799"/> lbf
Remark (N/A if Not Applicable)	<input type="text" value="Close Max Comment"/>	<input type="text" value="Open Max Comment"/>

Include Detailed Seat Load Calc in Report Calculate Open Force Settings

- Setup Window



- Setup Window
 - Target Values



- **Set Points**
 - Part of Setup Window
 - Used in Post Test Review


Edit Set Points - FCV-006-112A

Edits Print Return

	Min Allowable	----- Desired Range -----			Max Allowable
		Min	Target	Max	
Lower Bench	1.25	<input type="text" value="2.00"/>	<input type="text" value="2.75"/>	<input type="text" value="3.50"/>	3.95
Upper Bench	<input type="text" value="14.0"/>		<input type="text" value="15.00"/>		<input type="text" value="16.0"/>
Air Supply Pressure		<input type="text" value="42.00"/>	<input type="text" value="47.00"/>	<input type="text" value="52.00"/>	70.00
Valve Travel	3.589		<input type="text" value="3.625"/>		3.661
Spring Rate	<input type="text" value="0"/>				<input type="text" value="0"/>
Friction		<input type="text" value="100.0"/>		<input type="text" value="140.0"/>	<input type="text" value="150"/>

● Pre-Test Report

- 2 to 5 pages long
- Only variable applicable to valve type shown
- Header fields customizable

	Exelon Nuclear	Quality Related	
	Limerick Unit 1	Informational Use	Sheet 1 of 4

AOV Data Record Form

AOV ID: FCV-006-112A Work Order: NEW W/O

GENERAL DATA

Valve Type:	Globe - Pilot - Flow Over	AOVDR Revision:	2
Actuator Type:	Diaphragm - Direct Acting	AOVDR Status:	Pending / 1st Time
Fail Position:	Open	IST:	No
Calculation Reference:	TR-80089-1 Rev 0	LLRT:	No
Misc References:	DBR	Thermal Perf:	No
Flow Diagram / P&ID:	94.16162-1	Category:	1
System:	Main Steam	Primary AOV Function:	Control Valve
Description:	MSL Downstream drain line header bypass	SOV Limit IP EQ:	N/A

VALVE

Valve Manufacturer:	BADGER METER CO	Valve Stem Diameter:	2.500 in.
Valve Model:	1002GCS36BVOPJLN36	Stem Material:	Stem Material 12345
Size:	0.50 in.	Young's Modulus (E):	29,000,000
Serial Number:	N/A	Poisson's Ratio (ν):	0.301 psi
Valve PO Number:	V PO #	Rated Stroke Length / Tol:	3.625 in. / 1.00%
Valve Drawing:	Dwg ###	Stroke Length Setting:	3.589 / 3.661 In.

ACTUATOR

Actuator Manufacturer:	BADGER METER CO	Actuator PO Number:	Act PO #
Actuator Model:	1002GCS36BVOPJLN36	Handwheel Mounting:	Top
Actuator Size:	Act Size	Stoke Time Adjustable (Needle) Valve:	Yes
Serial Number:	217926		
Diaphragm Effective Area (Extended) and Tolerance:		100.00 in. ² Tol:	2.00%
Diaphragm Effective Area (Retracted) and Tolerance:		120.00 in. ² Tol:	4.00%

PACKING

Manufacturer:	Packing Man	Torque applied to Follower Bolts:	25.25 ft-lbs.
Packing Material:	Packing Material	Is the Packing Live Loaded?:	Yes
Alt Packing Material:	Alternate Material		



- **Pre-Test Report**
 - Only Accessories chosen are shown

	Exelon Nuclear	Quality Related	
	Limerick Unit 1	Informational Use	Sheet 2 of 4

AOV Data Record Form

AOV ID: FCV-006-112A Work Order: NEW W/O

ACCESSORIES

I/P

Equipment ID:	I/P 7	Serial Number:	I/P Serial No
Manufacturer:	I/P Manuf	I/P Action	Reverse Acting
Model:	I/P Model	I/P Input Signal	4 - 40 ma
Shop Order Number:	I/P Shop Order No	I/P OutputSignal	3 - 15 psig

POSITIONER

Equipment ID:	Positioner 5	Maximum Rated Pressure:	5.0 psig
Manufacturer:	Pos Manuf	Input Range:	5 - 5
Model:	Pos Model	Input Range Units:	55
Shop Order Number:	Pos Shop Order No	Input Pressure to Positioner:	555.0 psig
Serial Number:	Pos SN	Positioner Action:	Direct Acting

AIR REGULATOR


Equipment ID:	Air Regulator 2	Air Pressure Range (Min/Max):	42.00 / 52.00 psig
Manufacturer:	Air reg Manuf	Setting:	48.00 psig
Model:	Air reg Model	Maximum Rated Pressure:	125.00 psig
Shop Order Number:	Air Reg Shop Order No	Input Pressure:	100.0 psig
Serial Number:	Air Reg SN	AR Supplies:	Booster

LIMIT SWITCH

Equipment ID:	Close Limit Switch	Shop Order Number:	Close Order No
Manufacturer:	Close Manf	Serial Number:	Close SN
Model:	Close Model		
	Contact #	Between	Remark (NA if Not Applicable)
Close Contact (Green)	Valve Full Closed	0.00 10.00	% Full Closed

Equipment ID:	Open Limit Switch	Shop Order Number:	Open Order No
Manufacturer:	Open Manuf	Serial Number:	Open SN
Model:	Open Model		
	Contact #	Between	Remark (NA if Not Applicable)
Open Contact (Red)	Valve Full Open	90.00 100.00	% Full Open

- **Pre-Test Report**
 - Force Settings
 - Benchset Settings
 - Testing Requirements

	Exelon Nuclear	Quality Related		
	Limerick Unit 1	Informational Use	Sheet 3 of 4	

AOV Data Record Form

AOVID: FCV-006-112A Work Order: NEW W/O

FORCE SETTINGS (lbs) - Measurement Device: EDA

OPEN SETTINGS		Remark (NA if Not Applicable)
Open Adj Min Unseating Force	1,190	Open Min Comment
Open Adj Max Unseating Force	5,799	Open Max Comment
CLOSE SETTINGS		Remark (NA if Not Applicable)
Close Adj Min Seating Force	1,086	Close Min Comment
Close Total Adj Max Seating Force	6,766	Close Max Comment

BENCHSET SETTINGS (psig)

	Between		Remark (NA if Not Applicable)
Lower Benchset	1.25	4.01	LBS Comment
Lower Benchset Target	2.75		
Upper Benchset	14.0	16.0	UBS Comment
Upper Benchset Target	15.00		

TEST REQUIREMENTS

Reason for Diagnostic Test:	PVT / PM	Packing Adjustment Required:	No
As Found Testing Required:	Yes	Control Room Stroke Time Reqd:	No
Baseline Test:	No	Strain Gauge for Thrust Data:	No
As Found LLRT Required:	Yes	Use Installed IP:	Test
Actuator Maintenance Required:	No	High Pressure IP Used:	Yes
Accessory Maint. / Calibration:	No	Test Ramp Time:	0

Special Test Instructions:

Special Test Instructions - Tab 19



- **Pre-Test Report**
 - Setup Window
 - Optional

	Exelon Nuclear	Quality Related	
	Limerick Unit 1	Informational Use	Sheet 4 of 5

AOV Data Record Form

AOVID: FCV-006-112A Work Order: NEW W/O

Target - Set Point	
Parameter	Value
Lower Bench Set Range (Psig)	2.00 - 3.50
Lower Bench Set - Target (Psig)	2.75
Supply Air Setting Range (Psig)	42.00 - 52.00
Supply Air Setting Target (Psig)	47.00


Design		
Parameter	w/o Accuracies	w/ Accuracies
Maximum - Lower Bench Set (Psig)	4.01	3.95
Minimum - Lower Bench Set (Psig)	1.25	1.25
Max Design Pressure (Psig)	70.00	69.01
Min Pressure at Min - Lower Bench Set (Psig)	11.22	11.38
Min Pressure at Max - Lower Bench Set (Psig)	15.31	15.44
Max Pressure at Min - Lower Bench Set (Psig)	69.61	68.63
Max Pressure at Max - Lower Bench Set (Psig)	73.53	72.41

Status
NOT APPROVED

ACETest 2012.214
MRNE NPC34.E ric

Page 4 of 5
8/1/2012 2:17:23 PM

- Pre Test Report
 - Detailed Seat load Calc
 - Optional

	Exelon Nuclear	Quality Related	
	Limerick Unit 1	Informational Use	Sheet 5 of 5

AOV Data Record Form

AOVID: FCV-006-112A Work Order: NEW W/O

Pressure Derived Seatload / Friction

	Close		Open	
Effective Actuator Area (Nominal):	100.00	in ²	100	in ²
Effective Actuator Area (Tolerance):	2%	in ²	2%	in ²
Min. Required Thrust:	1,200	lbf	1,300	lbf
Max Average Friction:	150	lbf	150	lbf
Desired Thrust Limit (Seatload Only):	1,050	lbf	1,150	lbf
Max Actuator Rating (Weak Link):	7,000	lbf	6,000	lbf

Combined Equipment Accuracies

Measurement Device: EDA Full Scale Reading: 100.00 Psig

	Reading Accuracies	Full-Scale Accuracies
Acquisition Module Accuracies	1%	0%
Pressure Transducer Accuracies	1%	0%
Square Root of the Sum of the Squares (SRSS) - Combined Errors	1.41%	0%

Minimum Required Pressure Difference Reading

	Close		Open	
Pressure Difference Reading (with EDA incorporated):	10.71	Psig	11.73	Psig
Pressure Transducer ERROR:	0.15	Psig	0.17	Psig

(ERROR = Reading Accuracy + Full Scale Accuracy)

Minimum Required Pressure Difference*: 10.86 Psig 11.90 Psig

*Used for Manual MODE Evaluation

(Min. Measured Value = DESIRED UPPER LIMIT + ERROR)

Minimum Required Seatload Value**: 1,086 lbf 1,190 lbf

**Used for Automated Analysis Evaluation

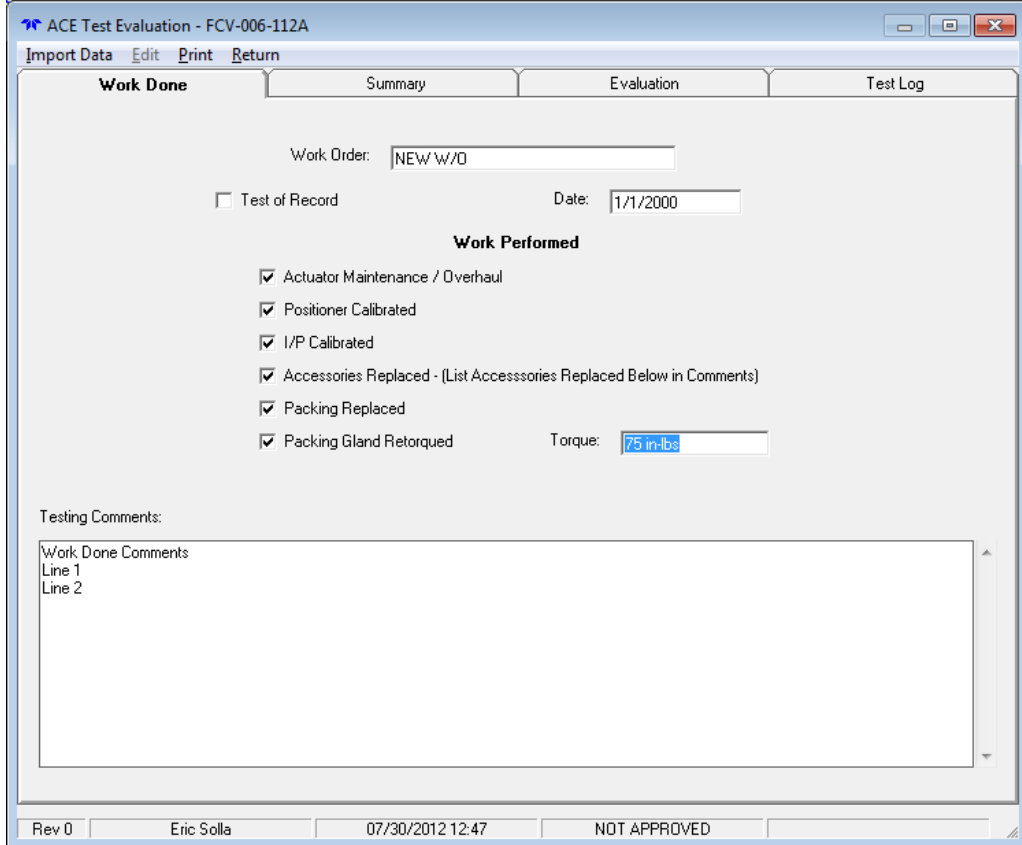
(Min. Required Seatload Value = Min. Req. Pressure Difference x EDA without tolerance)

Adjusted Maximum Required Thrust: 6,766 lbf 5,799 lbf

Prepared By: Eric Solla Date: 8/1/2012 10:00:22 AM

Reviewed By: NOT APPROVED Date:

- **Post Test Evaluation**
 - **Work Done**



ACE Test Evaluation - FCV-006-112A

Import Data Edit Print Return

Work Done Summary Evaluation Test Log

Work Order: NEW W/O

Test of Record Date: 1/1/2000

Work Performed

- Actuator Maintenance / Overhaul
- Positioner Calibrated
- I/P Calibrated
- Accessories Replaced - (List Accessories Replaced Below in Comments)
- Packing Replaced
- Packing Gland Retorqued Torque: 75 in-lbs

Testing Comments:

Work Done Comments
Line 1
Line 2

Rev 0 Eric Solla 07/30/2012 12:47 NOT APPROVED

- **Post Test Evaluation**

- **Summary**
- **Import Data**
- **Setpoints calculated**
- **Pass/Fail calculated with setpoints**
- **Pass/Fail**
 - Pass
 - Fail
 - Trend
 - N/A
- **Adjusted**
 - N/A
 - Yes
 - No

ACE Test Evaluation - FCV-006-112A

Import Data Edit Print Return

Parameters	As-Found	Min Setpoint	Max Setpoint	As-Left	Pass / Fail (As-Left)	Adjusted
Total Travel (inch)	0.2	3.589	3.661	3.6	Pass	N/A
Linearity Error (%)	1			0	N/A	N/A
Average Friction (lbf)	0	100.0	140.0	120	Pass	N/A
Seat Friction (lbf)	0			0	Yes	N/A
Lower Benchset (psig)	0	1.25	4.01	2.5	Pass	N/A
Upper Benchset (psig)	0	14.0	16.0	14	Pass	N/A
Spring Rate (lbf/in)	0	0	0	0	Pass	Yes
Seatload, Actuator + Spring (lbf)	0	1,086	6,766	2000	Pass	N/A
Seatload, Spring Only (lbf)	0			0	N/A	N/A
Unseating Force (lbf)	0	1,190	5,799	4444	Pass	Yes
Available Torque (ft-lbf)	0			0	N/A	N/A
Signal Pressure Seat (psig)	0			0	N/A	Yes
Signal Pressure Full Open (psig)	0			0	N/A	N/A
Linearity Error Positioner (%)	0			0	N/A	N/A
Positioner Balance Pressure (% nominal)	0			0	N/A	N/A
Minimum Signal I/P (psig)	0			0	N/A	N/A
Maximum Signal I/P (psig)	0			0	N/A	N/A
Linearity Error I/P (% full-scale)	0			0	N/A	N/A
Air Supply Decrease (% nominal)	0			0	N/A	N/A
Air Supply Pressure (psig)	0	42.00	52.00	50	Pass	N/A
Pilot Stroke Length (inch)	0			0	N/A	N/A
Pilot Spring Rate (lbf/in)	0			0	N/A	N/A
Pilot Seat Load (lbf)	0			0	N/A	N/A
Close Light Indication (%)	0			0	N/A	N/A
Open Light Indication (%)	0			0	N/A	N/A
Close Margin		5		84.16	Pass	N/A
Open Margin		5		273.45	Pass	N/A

Disposition for Out of Tolerance Condition:

Testing Comment 1
Testing Comment 2

Rev 0 Eric Solla 07/30/2012 12:47 NOT APPROVED

- **Post Test Evaluation**
 - Evaluation
 - Only Questions Applicable to Valve Type Shown
 - Questions will be customizable

ACE Test Evaluation - FCV-006-112A

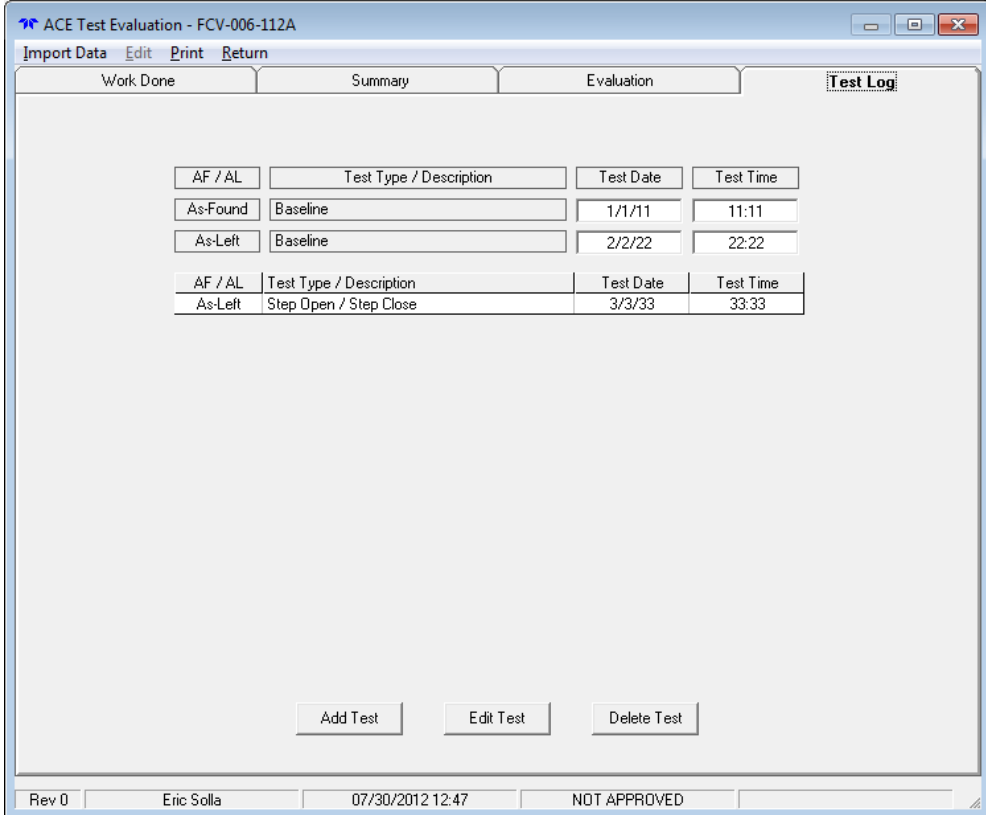
Import Data Edit Print Return

Work Done Summary **Evaluation** Test Log

	Yes	No	N/A
Static Closed Data Evaluation			
Seatload is greater than the minimum required to close?	X		
Valve Seating force profile has been reviewed for abnormalities and is acceptable?		X	
Closed Stroke Diagnostic traces have been reviewed for abnormalities and are acceptable?			X
Closed Light Indication limit switch tripped within the AOVDRClosed Travel (if required)		X	
Static Open Data Evaluation			
Valve Unseating (Breakaway) force profile has been reviewed for abnormalities and is acceptable?	X		
Open Stroke Diagnostic traces have been reviewed for abnormalities and are acceptable?		X	
Open Light Indication limit switch tripped within the AOVDROpen Travel (if required)			X
Valve Unseating (Breakaway) force is greater than the force required to open valve.		X	
Margin Evaluation			
Is the Close Margin greater than 5%?	X		
Is the Open Margin acceptable?		X	
General Stroke Data Evaluation			
Has the max design pressures in the actuator and / or any related accessories been exceeded?			X
Is the Maximum Average Friction less than the specified Maximum AND within the acceptable range?		X	
Valve Travel is within the limits specified?	X		
Spring rate is within the limits specified?		X	
Air Supply Pressure setting is within the limits specified?			X
Lower Benchset is within the limits specified?		X	
For Air to Close valves, Upper Benchset is acceptable?	X		
Diagnostic Traces Reviewed with Previous Traces		X	
Overall Performance of Valve			
Is the Travel smooth and linear?			X
Is the overall Friction smooth and constant?		X	
Does the Travel appear to contact the seat as expected?	X		
Does the Travel appear to contact the backseat or backstop as expected?		X	
Justification for Any No Answers:			
Eval Comments			
Line 1			
Line 2			

Rev 0 Eric Solla 07/30/2012 12:47 NOT APPROVED

- **Post Test Evaluation**
 - **Test Log**



ACE Test Evaluation - FCV-006-112A

Import Data Edit Print Return

Work Done Summary Evaluation **Test Log**

AF / AL	Test Type / Description	Test Date	Test Time
As-Found	Baseline	1/1/11	11:11
As-Left	Baseline	2/2/22	22:22

AF / AL	Test Type / Description	Test Date	Test Time
As-Left	Step Open / Step Close	3/3/33	33:33

Add Test Edit Test Delete Test

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- **Post Test Report**
 - **Work Performed**
 - **Test Log**
 - **Comments**

	Exelon Nuclear	Quality Related		
	Limerick Unit 1	Informational Use	Sheet 1 of 4	

AOV Data Record Form

AOVID: FCV-006-112A Work Order: NEW W/O

Valve Type: Globe - Pilot - Flow Over
 Actuator Type: Diaphragm - Direct Acting
 Fail Position: Open
 Primary AOV Function: Control Valve

WORK PERFORMED

Actuator Maintenance / Overhaul: Yes Packing Replaced: Yes
 Positioner Calibrated: Yes Packing Gland Retorqued: Yes
 I/P Calibrated: Yes Packing Gland Torque: 75 in-lbs
 Accessories Replaced - Accessories Replaced Listed in Comments Below: Yes

AOV VALVE DATA ACQUISITION OPEN / CLOSE STROKE TESTING

AF / AL	TEST TYPE / DESCRIPTION	TEST DATE	TEST TIME
As-Found	Baseline	1/1/11	11:11
As-Left	Baseline	2/2/22	22:22
As-Left	Step Open / Step Close	3/3/33	33:33

TESTING COMMENTS

Work Done Comments
 Line 1
 Line 2

SAMPLE

Status: NOT APPROVED ACETest 2012.214 Page 1 of 4
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- **Post Test Report**
 - **Summary**

	Exelon Nuclear	Quality Related	
	Limerick Unit 1	Informational Use	Sheet 2 of 4

AOV Data Record Form

AOVID: FCV-006-112A Work Order: NEW W/O

TEST DATA REVIEW

Parameter	As-Found	Setpoint Range		As-Left	Pass/Fail (As-Left)	Adjusted
		Min	Max			
Total Travel (inch)	0.200	3.589	3.661	3.600	Pass	N/A
Linearity Error (%)	1.000			0.000	N/A	N/A
Average Friction (lbf)	0.000	100.0	140.0	120.000	Pass	N/A
Seat Friction (lbf)	0.000			0.000	Yes	N/A
Lower Benchset (psig)	0.000	1.25	4.01	2.500	Pass	N/A
Upper Benchset (psig)	0.000	14.0	16.0	14.000	Pass	N/A
Spring Rate (lbf/in)	0.000	0	0	0.000	Pass	Yes
Seatload, Actuator + Spring (lbf)	0.000	1,086	6,766	2,000.000	Pass	N/A
Seatload, Spring Only (lbf)	0.000			0.000	N/A	N/A
Unseating Force (lbf)	0.000	1,190	5,799	4,444.000	Pass	Yes
Available Torque (ft-lbf)	0.000			0.000	N/A	N/A
Signal Pressure Seat (psig)	0.000			0.000	N/A	Yes
Signal Pressure Full Open (psig)	0.000			0.000	N/A	N/A
Linearity Error Positioner (%)	0.000			0.000	N/A	N/A
Positioner Balance Pressure (% nominal)	0.000			0.000	N/A	N/A
Minimum Signal I/P (psig)	0.000			0.000	N/A	N/A
Maximum Signal I/P (psig)	0.000			0.000	N/A	N/A
Linearity Error I/P (% full-scale)	0.000			0.000	N/A	N/A
Air Supply Decrease (% nominal)	0.000			0.000	N/A	N/A
Air Supply Pressure (psig)	0.000	42.00	52.00	50.000	Pass	N/A
Pilot Stroke Length (inch)	0.000			0.000	N/A	N/A
Pilot Spring Rate (lbf/in)	0.000			0.000	N/A	N/A
Pilot Seat Load (lbf)	0.000			0.000	N/A	N/A
Close Light Indication (%)	0.000			0.000	N/A	N/A
Open Light Indication (%)	0.000			0.000	N/A	N/A
Close Margin		5		84.16	Pass	N/A
Open Margin		5		273.45	Pass	N/A

DISPOSITION FOR OUT OF TOLERANCE CONDITIONS

Testing Comment 1
 Testing Comment 2



- **Post Test Report**
 - **Evaluation**

	Exelon Nuclear	Quality Related		
	Limerick Unit 1	Informational Use	Sheet 3 of 4	

AOV Data Record Form

AOV ID: FCV-006-112A Work Order: NEW W/O

QUALITATIVE TEST DATA REVIEW

****This Evaluation should use the latest test data after adjustments (if any) have been performed.**

	Yes	No	N/A
Static Closed Data Evaluation			
Seatload is greater than the minimum required to close?	X		
Valve Seating force profile has been reviewed for abnormalities and is acceptable?		X	
Closed Stroke Diagnostic traces have been reviewed for abnormalities and are acceptable?			X
Closed Light Indication limit switch tripped within the AOVDRClosed Travel (if required)		X	

Static Open Data Evaluation			
Valve Unseating (Breakaway) force profile has been reviewed for abnormalities and is acceptable?	X		
Open Stroke Diagnostic traces have been reviewed for abnormalities and are acceptable?		X	
Open Light Indication limit switch tripped within the AOVDROpen Travel (if required)			X
Valve Unseating (Breakaway) force is greater than the force required to open valve.		X	

Margin Evaluation			
Is the Close Margin greater than 5%?	X		
Is the Open Margin acceptable?		X	

General Stroke Data Evaluation			
Has the max design pressures in the actuator and / or any related accessories been exceeded?			X
Is the Maximum Average Friction less than the specified Maximum AND within the acceptable range?		X	
Valve Travel is within the limits specified?	X		
Spring rate is within the limits specified?		X	
Air Supply Pressure setting is within the limits specified?			X
Lower Benchset is within the limits specified?		X	
For Air to Close valves, Upper Benchset is acceptable?	X		
Diagnostic Traces Reviewed with Previous Traces		X	

Overall Performance of Valve			
Is the Travel smooth and linear?			X
Is the overall Friction smooth and constant?		X	
Does the Travel appear to contact the seat as expected?	X		
Does the Travel appear to contact the backseat or backstop as expected?		X	
Does the valve stroke its rated travel within the normal input signal range			X
Does the Valve stroke its full travel?		X	



- **Post Test Report**
 - Evaluation (cont)
 - Comments
 - Signoffs

	Exelon Nuclear	Quality Related		
	Limerick Unit 1	Informational Use	Sheet 4 of 4	

AOV Data Record Form

AOV ID: FCV-006-112A Work Order: NEW W/O

Overall Performance of Actuator

Is the Pressure output smooth?	X		
Does the Actuator Pressure saturate or completely exhaust at the end point?		X	
Is there sufficient Seatload generated by the Actuator at seat contact?			X
Do abrupt changes in the Friction correspond to changes in Actuator Press?		X	
Are there any indications of Actuator air leaks?	X		
Do the Actuator Pressure traces look normal for this type Actuator?		X	
Are the bench settings correct?			X

Overall Performance of I/P

Is the Pressure output smooth and linear?		X	
Does the trans have a min pressure cutoff function & if so set properly?	X		
Does the valve operate over the proper output pressure range?		X	
Is the test range sufficient to cover the expected output pressure range?			X

Overall Performance of Positioner

Is the Travel smooth and linear?		X	
Does the valve operate over the proper I/P output pressure range?	X		
Is the test range suffi to cause the Posit to cover the expected Travel ran		X	
Does the Output Pressure properly bleed off and saturate at the end points?			X

JUSTIFICATION FOR ANY NO ANSWERS

Eval Comments

Line 1
 Line 2

Prepared By: Eric Solla Date: 7/30/2012 12:47:18 PM

Reviewed By: NOT APPROVED Date: _____



ACETest Questions?

- **History**
- **Basic Capabilities**
- **Tools**
- **Margins**
- **Reports**
- **Verification & Validation**
- **Documentation**