

# Smarter SmartPlant<sup>®</sup> *Instrumentation*

## SPI Lessons I have Learned

FLUOR

SmartPlant<sup>®</sup>

Implementation Team

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**FLUOR**<sup>®</sup>

**INTERGRAPH**

# Introduction to Lessons Learned



- ◆ ***“Experience keeps a dear school,  
but fools will learn in no other.”***

~ Benjamin Franklin

- ◆ General Database Lessons
- ◆ SPI Administration Lessons
- ◆ SPI Automation Lessons
- ◆ Instrument Index Lessons
- ◆ Specification Sheet Lessons
- ◆ SPI User Training Lessons





# General Database Lessons

- ◆ ***The First Rule of Database is:***  
**“Garbage In ~ Garbage Out!”**  
~Author Unknown

**Lesson: Useless data will require Maintenance and cause the Database to be oversized for the lifetime of the project**

- ◆ Data With No Value Added
- ◆ Unneeded Instrument Tags Numbers
- ◆ What is Required Index Data

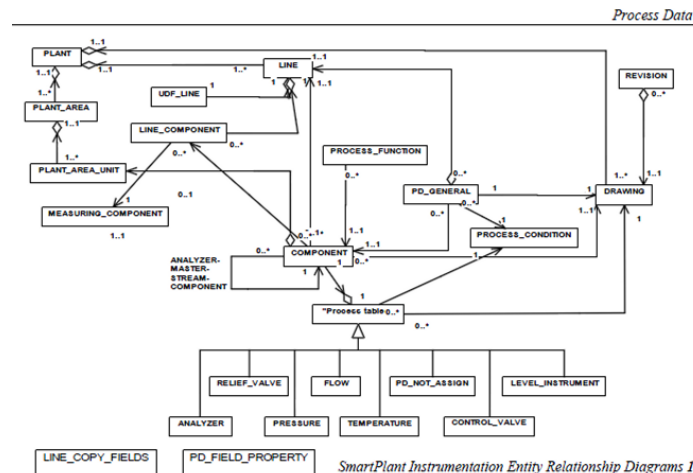




# General Database Lessons

## ◆ Data With No Value Added

- Examples:
  - “N/A” anywhere
  - “- -” anywhere
  - “Yes” or “No” data flags
  - “Space” instead of a “Null” field
- Worse when in Table like “Line No”
- In Oracle, Null data stop the trigger relationships with subsequent table



# General Database Lessons



- ◆ **Unneeded Tags Numbers**
- ◆ Tag numbers that may not be required to be in the Index:
  - Soft Tags (e.g. FIC-100)
  - Implied Tags (e.g. FY-100)
  - Non Wired Tags (e.g. PSV-100)
  - Tags Furnished by others
  - Tags for Non-BPCS devices
- ◆ Only Tags that require Spec Sheets or Wiring data should be in the Instrument Index





# General Database Lessons



- ◆ **What is Required Index Data?**
- ◆ Data that is part of a required deliverable for the project phase
  - FEED Data Requirements
    - Simple Instrument List
    - Basic Process Control I/O List
  - Detailed Engineering Data
    - Instrument Index Data
    - Instrument Specification Data
    - Wiring & Loop Diagram Data





# SPI Administration Lessons

- ◆ ***“By failing to prepare, you are preparing to fail.”***

~ Benjamin Franklin

**Lesson: Failure to configure a project at the beginning will result in significant rework**

- ◆ Plant-Area-Unit Administration
- ◆ Tagging Conventions
- ◆ Use of Default Plant





# SPI Administration Lessons

- ◆ **Plant-Area-Unit Administration**
- ◆ **Basis of PAU structures:**
  - (WBS) Work Breakdown Structures
    - By Physical Area or Process System
  - (CWP) Construction Work Packages
  - (TOS) Turn Over Systems
- ◆ PAU should be established early on a project and be consistent across SPF applications when using Integration
- ◆ Keep the number of Units to a minimum
  - Users work at the Unit Level





# SPI Administration Lessons



- ◆ **Tagging Conventions**
- ◆ Keep tagging conventions short and meaningful
- ◆ Avoid Tagging Conventions that are tied to Equipment or P&ID Numbers
- ◆ Avoid Tagging Conventions that contain SAP or other System Keys
- ◆ Try to stay as close to ISA naming convention as possible
- ◆ Try to make Document naming tied to Loop or Instrument Tag Numbers





# SPI Administration Lessons

- ◆ **Use of Default Plant**
- ◆ Never Rename or Remove the Default Plant from the SPI Database
- ◆ You may “Hide” the Default Plant from the users by un-checking the “Default plant use” in the Domain Definition
- ◆ Uses for the Default Plant:
  - Keep Reference Hookup Data
  - Used for other reference data that is not tied to a P-A-U
  - As a sandbox for practice and training





# SPI Automation Lessons

- ◆ ***“If you have a mess and you Automate it – you get an Automated Mess”***

~ Mike Pye, Fluor

**Lesson: Misuse of Automation is the primary cause of data corruption on an SPI project**

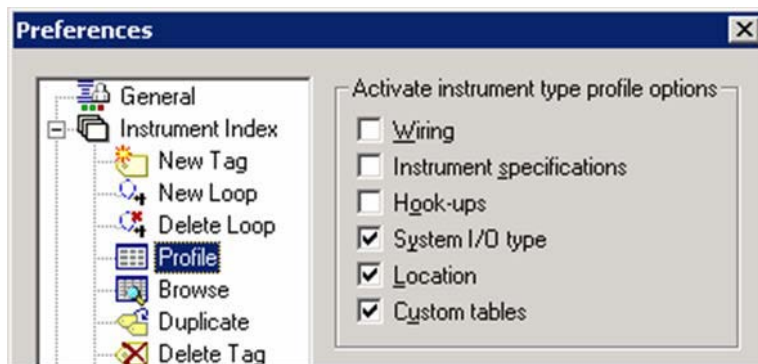
- ◆ Instrument Type Profiles
- ◆ Using Batch Tools Wisely
- ◆ Importing and Integration



# SPI Automation Lessons



- ◆ **Instrument Type Profiles**
- ◆ Keep Instrument Types to a Minimum
- ◆ Complete Instrument Type Profiles before adding Tags to Index
- ◆ If Profiles are not complete turn off Automation in the user Preferences



# SPI Automation Lessons



- ◆ **Using Batch Tools Wisely**
- ◆ Prepare Batch rules carefully before launching a Batch Function
- ◆ Validate data before and after running an Batch Function
- ◆ Don't try and do too much with one Batch Function
- ◆ Check the results of a Batch Operation to assure that you got expected results





# SPI Automation Lessons



- ◆ **Importing and Integration**
- ◆ Do not Import NEW Tags into SPI without setting all required parameters
- ◆ All Importing should be only done by a well trained SPI administrator
- ◆ Do not build Table data in excel or other tool and expect to populate SPI using Importing or Integration
- ◆ Integration is not necessarily data centric (data should be in one place)





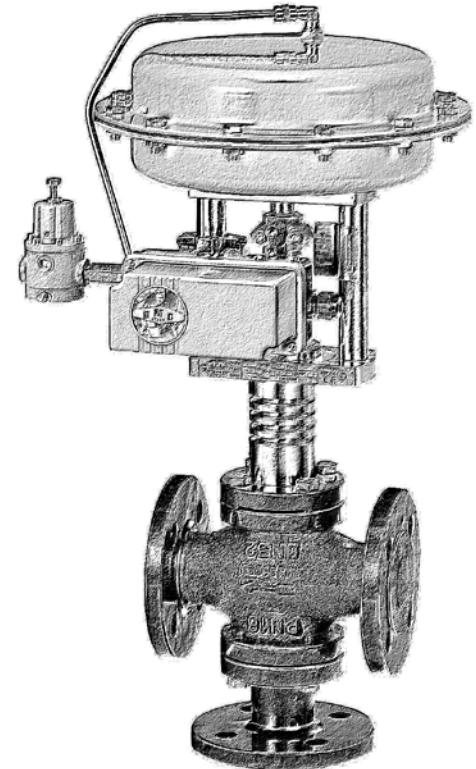
# Instrument Index Lessons

- ◆ ***“It is quality rather than quantity that matters.”***

~ Lucius Annaeus Seneca

**Lesson: More time is wasted trying to produce customized Index reports and content that any other project deliverable**

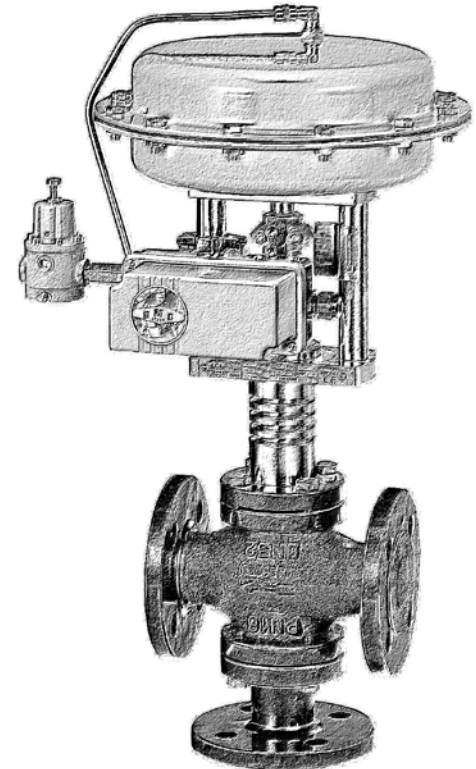
- ◆ Instrument Index Reports
- ◆ User Defined Index Fields
- ◆ Support Table Content





# Instrument Index Lessons

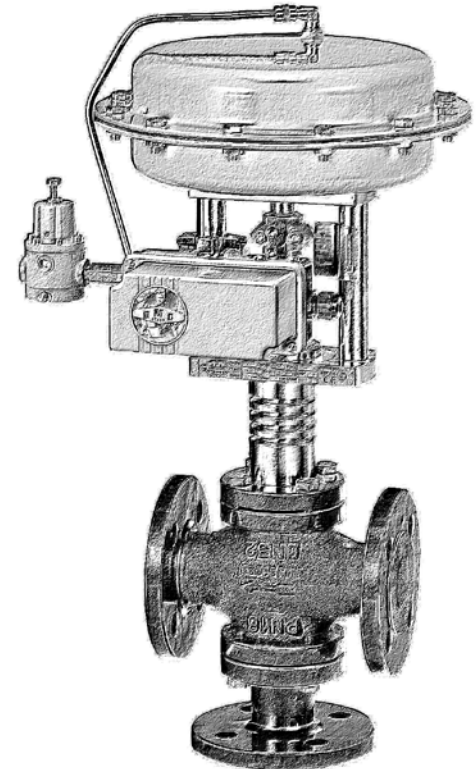
- ◆ **Instrument Index Reports**
- ◆ The days of a single paper Instrument Index report for all purposes are gone
- ◆ Index reports are multiple Indexes with data focused per module or purpose
- ◆ Instrument Indexes are now delivered as electronic files to specific users
- ◆ Custom Instrument Index reports are usually a result of personal preference rather than actual necessity and generally a waste of time





# Instrument Index Lessons

- ◆ **User Defined Index Fields**
- ◆ User Defined Fields are one of the most misused functions of SPI
- ◆ SPI already provides more columns of data than what is needed for almost any Instrument Index Report
- ◆ Do not copy data from one module to a Index User Defined Field. This results in data to be maintained in two places
- ◆ Govern the use of User Defined Fields by assigning them in the Administration Module

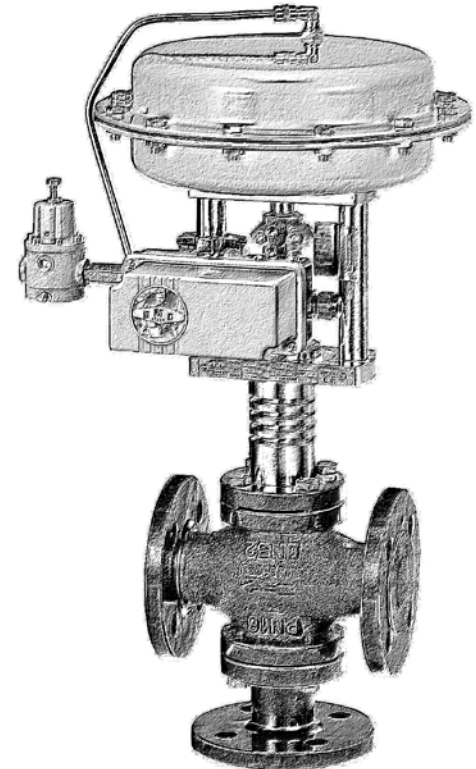




# Instrument Index Lessons

## ◆ Support Table Content

- ◆ The Index Support Tables are intended to be used to maintain data consistency
- ◆ Some Default Data in Support Tables should not be changed (e.g. I/O Type)
- ◆ The Description Column in some tables should not be used (e.g. P&ID Number)
- ◆ The Key and Description should match in some Tables (e.g. Location Table)







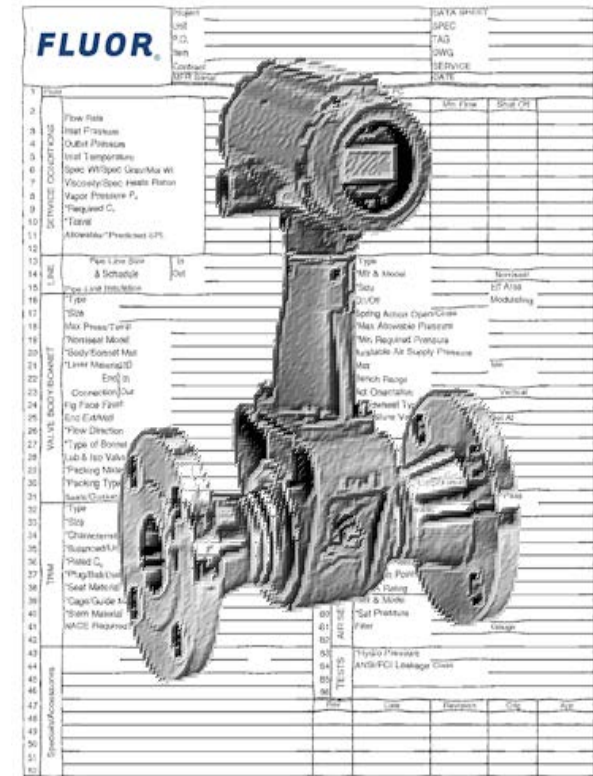
# SPI Specification Sheet Lessons

◆ ***“Beware small expenses. A small leak will sink a great ship.”***

~ Benjamin Franklin

**Lesson: Engineers put more unneeded information on Spec Sheets that any other SPI deliverable on a project**

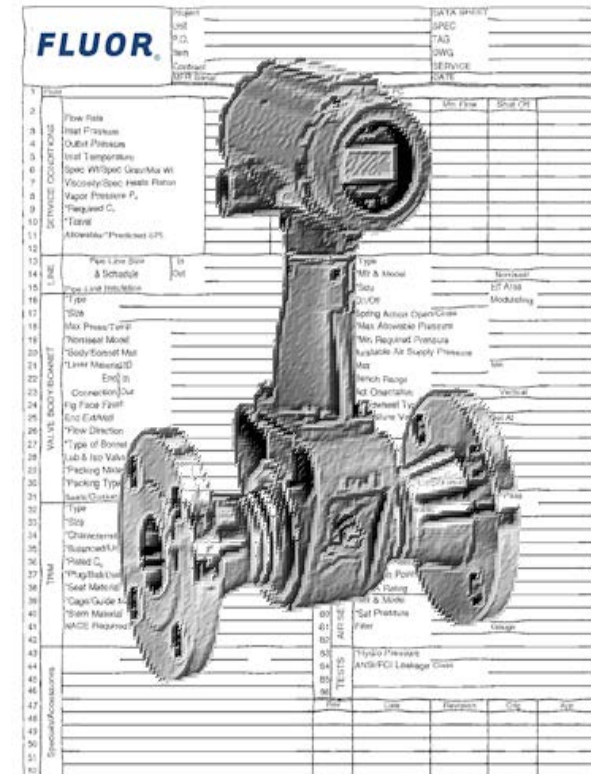
- ◆ Specify to Purpose
- ◆ Handling Spec Notes
- ◆ Using Spec Browsers



# SPI Specification Sheet Lessons



- ◆ **Specify to Purpose**
- ◆ The purpose of most Specification Sheets is to Size, Select and Purchase engineered Instrument Devices
- ◆ Specify to “Manufactures Standard” when possible
- ◆ Leave empty fields empty (Remember the First Rule of Database - GIGO)
- ◆ Know the difference between the Model Number and the Catalog Number





# SPI Specification Sheet Lessons

- ◆ **Handling Spec Notes**
- ◆ Many forms have too small a notes area to be used effectively
- ◆ Notes needed for sizing and selection are mostly process related notes
- ◆ Printing Notes on Second Sheet is awkwardly set in User Preferences
- ◆ **Solution - Create your own Notes Page with Large Notes and Process Notes and add to Valve and Flow Spec Forms**

LINE	ITEM	UNIT	TYPE	VALVE BODY SKETCH	TESTS
1	Flow Rate				
2	Inlet Pressure				
3	Outlet Pressure				
4	Inlet Temperature				
5	Spec. Weight				
6	Unit/Material				
7	Viscosity/Spec. Heat Rating				
8	Vapor Pressure P <sub>v</sub>				
9	'Regard C.'				
10	'Taint'				
11	Allowable/Preferred LPI				
12					
13	Pipe Line Size & Schedule	In	Out		
14	Pipe End Connection				
15	Size				
16	Material				
17	Valve Type				
18	Max. Press./Temp.				
19	Bonnet Material				
20	Body Material				
21	Line Material				
22	End(s)				
23	Connection				
24	End Face				
25	End EIA				
26					
27	Valve Direction				
28	Type of Bonnet				
29	Seat & Inlet Valve				
30	Packing Material				
31	Packing Type				
32	Seal				
33	Stem				
34	Characteristics				
35	Suspended				
36	'Plant C.'				
37	'Plug Back Check'				
38	Seal Material				
39	'Gate Guide'				
40	Stem Material				
41	API/ASME Rating				
42					
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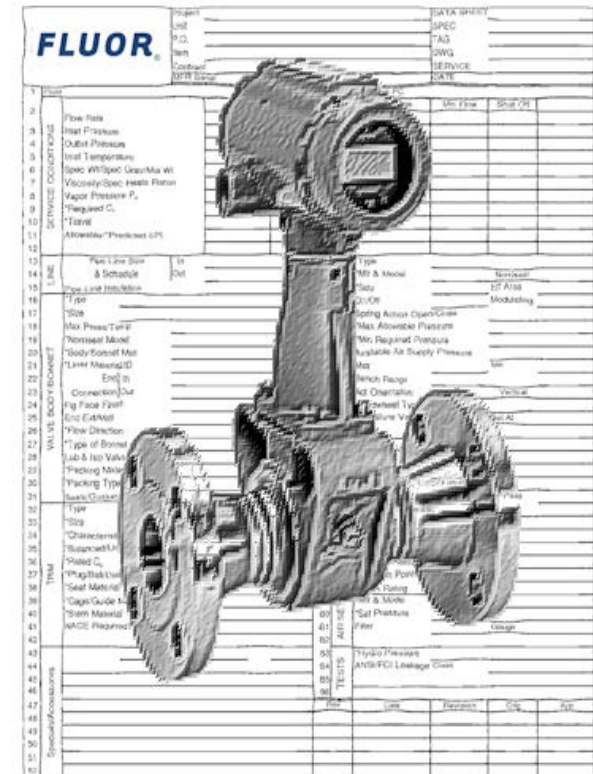
# SPI Specification Sheet Lessons

- ◆ Using Spec Browsers
- ◆ In Spec Data Dictionary select only the spec\_sheet\_data for Templates, All tables for Browser and All but Component for Editable in IEE
- ◆ Change the headers in the Spec data dictionary to make more sense and shorten to fit the browser area.

5	Line I.D.		line_i_d
6	spec_udf_c23		spec_udf_c22
7	Fluid	State	pd_fluid_name   pd_fluid_phase

Column Header	Template	Browser	Editable in IEE
L6 data	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
L6 Header	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Flow Full Scale	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>







# SPI User Training Lessons

- ◆ ***"It is easier to prevent bad habits than to break them."***

~ Benjamin Franklin

**The Lesson: Failure to Train SPI users will result in lost time and high rework costs on a project**

- ◆ Creating Specialty Users
- ◆ Training and User Guides
- ◆ SPI Training Resources







# SPI User Training Lessons

## ◆ Creating Specialty Users

- ◆ SPI is very complex and no one can know everything about all Modules
- ◆ Focus your training programs:
  - Instrument Designers
    - Instrument Index
    - Wiring and Wiring Drawings
    - Hookups and Material management
    - Telecom and Special Systems
  - Engineers
    - Specification Sheets
    - Process Data and Calculations



# SPI User Training Lessons



## ◆ Training and User Guides

- ◆ SPI is well documented with Help and Tutorials built into the documentation
- ◆ I suggest that you create User Guides specific to the project for each work process you expect to use
- ◆ Provide guides on how to use the tool properly or Users will attempt to use other tools in their comfort zone – *“When the only tool you know how to use is a hammer – everything looks like a nail”*





# SPI User Training Lessons

## ◆ SPI Training Resources

- ◆ The SPI Tutorial in the Documentation
- ◆ SmartPlant Instrumentation User's Guide
- ◆ SmartPlant Instrumentation Online Help
- ◆ Intergraph SPI Training Programs
- ◆ Overload Services Inc. SPI Training
- ◆ PP&M GetSmart! Webinar Series
- ◆ SmartPlant Instrumentation Test Drive





# SPI Lessons I have Learned

- ◆ ***“Much to learn you still have...my old padawan.” ...  
“This is just the beginning!”***

~ Yoda



## QUESTIONS YOU HAVE?