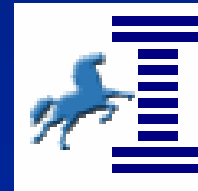
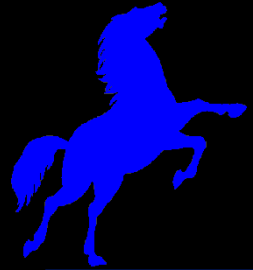


Advanced uses of SPI at Mustang





Mustang's use of external tools in conjunction with SPI

Today we will discuss tools to perform the following functions:

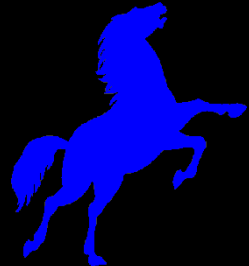
- **Export data to consumers**
- **Mine data from current and past jobs simultaneously**
- **Audit projects to improve quality and consistency**

Exporting data to consumers

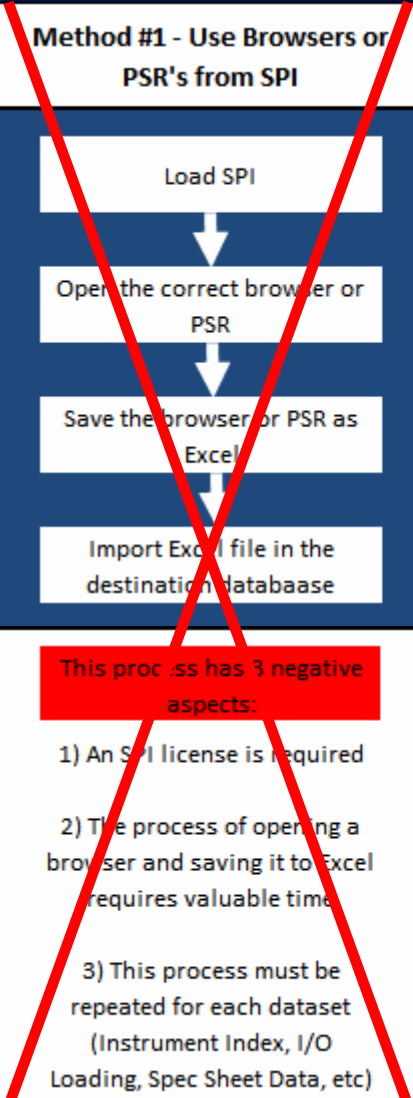
Most projects have at least 2 non-Instrument project groups that need SPI data to complete their tasks.

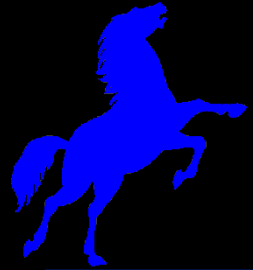


It is important to our success to be able to empower these groups with the ability to get SPI data themselves.



Exporting data to consumers

Method #1 - Use Browsers or PSR's from SPI	Method #2 - On-demand export from external tool	Method #3 - Nightly scheduled export from external tool
 <pre> graph TD A[Load SPI] --> B[Open the correct browser or PSR] B --> C[Save the browser or PSR as Excel] C --> D[Import Excel file in the destination database] </pre>	<pre> graph TD A[Load Mustang SPI Dashboard] --> B[Export data from SPI to the destination database] </pre>	<p>Scheduled nightly export to the destination database</p>
<p>This process has 3 negative aspects:</p> <ol style="list-style-type: none"> 1) An SPI license is required 2) The process of opening a browser and saving it to Excel requires valuable time 3) This process must be repeated for each dataset (Instrument Index, I/O Loading, Spec Sheet Data, etc) 	<p>Positives:</p> <ol style="list-style-type: none"> 1) No SPI License needed 2) Quick and easy access to SPI data 3) The user can request data whenever it is needed 4) The export process can include multiple datasets 	<p>Positives:</p> <ol style="list-style-type: none"> 1) No SPI License needed 2) The data is updated each morning without any effort from the user 3) The export process can include multiple datasets



Exporting data to consumers – Example

Date: Friday, November 4th

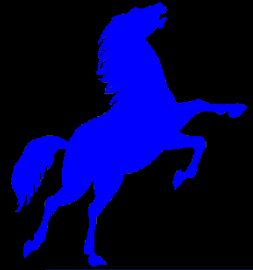
Project details: Multiple projects from the same client being managed by a common automation team.

Task: Automation engineer to export Instrument Index data and I/O Loading data from 3 projects. Data is to be placed in 3 separate msAccess files.

Start time: 2:40:28 PM

Completion time: 2:42:00 PM

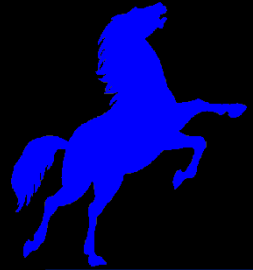
Duration of task: 1 min 32 seconds



Exporting data to consumers – Protecting database connection info

How do we provide data without giving out server and database connection information?

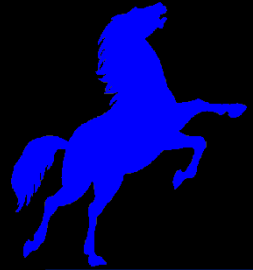
- **For methods #2 and #3, as discussed previously, Mustang uses published .Net applications.**
- **These published applications give the user the functionality they need by simply picking their project and requesting updated data. No database connection information or login credentials are needed.**



Exporting data to consumers – Others Concerns

By allowing easy access to SPI data on-demand, there is the danger of incomplete data being used by other disciplines.

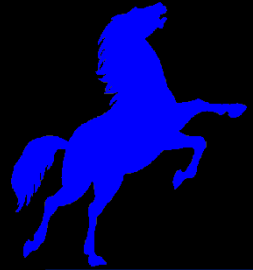
- Consumers must understand that data extracted directly from SPI is often not 100% ready for use throughout the project.**
- Strong communication must be kept with the instrumentation project team to make sure that all parties understand the difference between published data and directly extracted data.**



Exporting data to consumers – Setup

In order to provide easy access to SPI data, an admin must meet with the consumer and discuss the desired dataset to be exported.

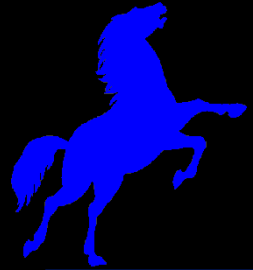
- **This setup time is minimal and saves a large amount of time over the life of the project.**
- **The process keeps the admin team informed of the special needs of the project.**



Exporting data to consumers - Summary

At Mustang we strive to make heroes of each part of our project team.

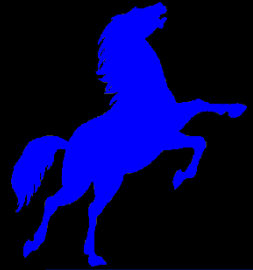
When it comes to SPI data, one way we can make heroes is by increasing the availability of the data and allowing other people to excel.



SPI Data Mining – Using current and past projects

Each project that uses SPI has such a large bank of information that can be used during project execution, during commissioning and startup, and later as we prepare for future projects.

Because Intergraph has allowed the underlying database to remain open, we can tap into this bank of information and improve the way we work.



SPI Data Mining – Multi-project data gathering

The ability to gather data from multiple projects can be extremely valuable for many reasons, including:

- Forecasting**
- Progressing**
- Auditing**
- Comparing**

SPI Data Mining – Multi-project statistics

- 15 projects from 3 different SPI

Mustang SPI Dashboard

File Options ? Help Config

Select Project(s) SPI Statistics SPI Engineering Data Pacesetter Data Project Specific Functions Other Functions

Project HT1 : Metrics - Tags

Update Data Export to Excel Autofit Column Width Options ? Help

Records Returned:

Sorting Criteria (Columns shown bold)

Filtering Criteria (Columns shaded to match filteria type)

Loop				
F -584000				

Select All De-Select All

Visible	Column
<input type="checkbox"/>	Project Name
<input type="checkbox"/>	Engineer Name
<input type="checkbox"/>	Plant Name
<input type="checkbox"/>	Area Name
<input type="checkbox"/>	Unit Name
<input checked="" type="checkbox"/>	Loop

	Loop	Loop Service	Loop Function Name	Loop Function Desc	Loop Type	Loop Measured Variable	Loop Measured Variable Desc	Tag	Service	IO Type	Junction Box
▶	F -584000	PROCESS FLAR...	*	*	PCS	F	FLOW RATE	FE -584000A	PROCESS FLAR...	*	
	F -584000	PROCESS FLAR...	*	*	PCS	F	FLOW RATE	FQIT -584000	PROCESS FLAR...	AI-PCS	
	F -584000	PROCESS FLAR...	*	*	PCS	F	FLOW RATE	FIC -584000	PROCESS FLAR...	*	
	F -584000	PROCESS FLAR...	*	*	PCS	F	FLOW RATE	FY -584000	PROCESS FLAR...	AO-PCS	
	F -584000	PROCESS FLAR...	*	*	PCS	F	FLOW RATE	FE -584000B	PROCESS FLAR...	*	
	F -584000	PROCESS FLAR...	*	*	PCS	F	FLOW RATE	PIT -584000	PROCESS FLAR...	AI-FQIT	
	F -584000	PROCESS FLAR...	*	*	PCS	F	FLOW RATE	TW -584000	PROCESS FLAR...	*	
	F -584000	PROCESS FLAR...	*	*	PCS	F	FLOW RATE	TE -584000	PROCESS FLAR...	*	
	F -584000	PROCESS FLAR...	*	*	PCS	F	FLOW RATE	TIT -584000	PROCESS FLAR...	AI-FQIT	

SPI Data Mining – Installation Detail Example


- Instrument design lead needed to track the progress of installation details (hookups) for multiple projects.
- Old-fashioned method was to open a project in SPI, open the appropriate hookup browser, get a record count, record this count, and repeat this process for each type of hookup and for each project.
- New method, calculate using the Mustang SPI Dashboard

Mustang SPI Dashboard

File Options Help Config

Select Project(s) SPI Statistics SPI Engineering Data Pacesetter Data

Select Stats Project Level Stats Stat Grouping Options Group Level

Calculate Statistics  Export Stats

Project	Hookups - Instrument Detail Count	Hookups - Electrical Detail Count	Hookups - Support Detail Count
Project A1	722	0	135
Project C1	1514	2578	1411
Project C2	730	858	47
Project CT1	1023	1018	294
Project DW1	0	1053	340
Project DW2	897	5	199
Project DW3	0	1324	816
Project DW4	1518	0	672
Project HT1	96	0	0
Project J1	2690	2296	762
Project L1	276	608	50
Project P1	450	0	382
Project S1	506	0	260
Project S2	409	0	230
Project V1	1572	3104	1910

SPI Data Mining – Installation Detail Example

- Estimated old-fashioned method – 5 minutes per project
- In the example shown to the right, this task would take **75 minutes**
- Using Mustang SPI Dashboard, total time < **2 minutes**.

Mustang SPI Dashboard

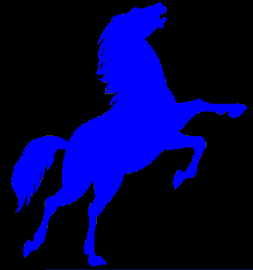
File Options Help Config

Select Project(s) SPI Statistics SPI Engineering Data Pacesetter Data

Select Stats Project Level Stats Stat Grouping Options Group Level Stats

Calculate Statistics Export Stats

Project	Hookups - Instrument Detail Count	Hookups - Electrical Detail Count	Hookups - Support Detail Count
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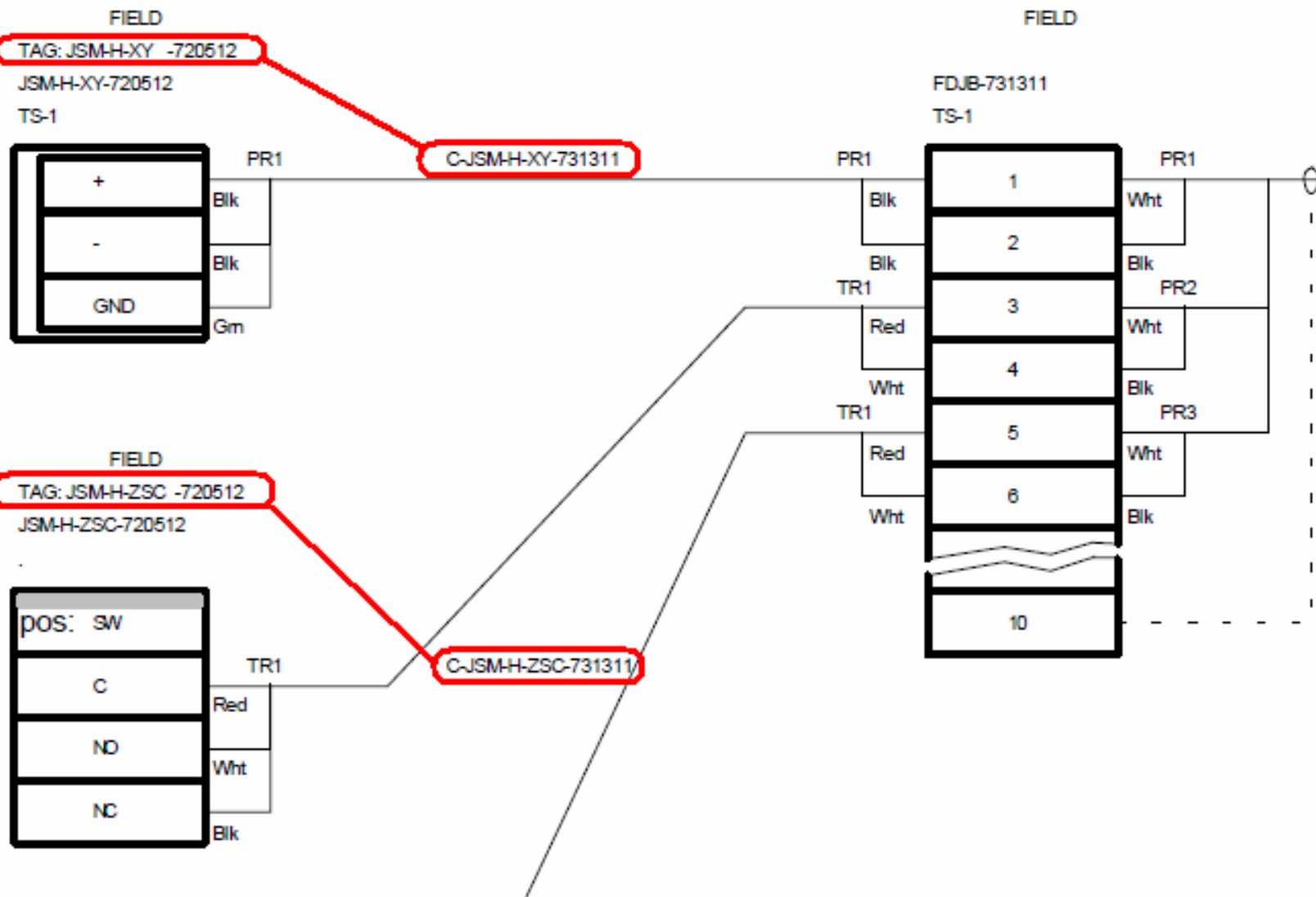


SPI Data Mining – Quality Control

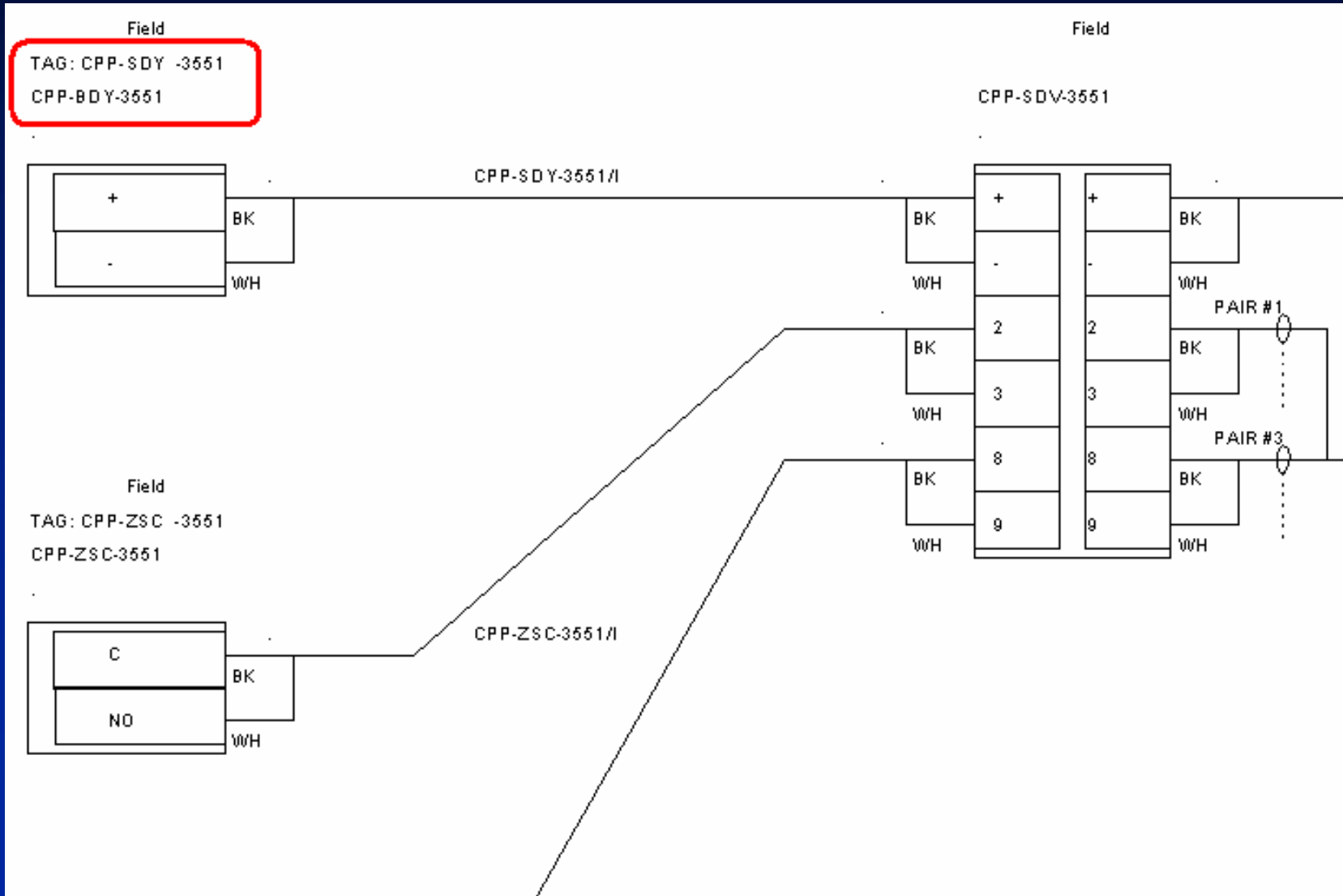
One of the most important things that we do with our Mustang SPI Dashboard is to perform quality control checks. A great example of these are tag / entity name mismatches.

- **Tag**
- **Loop**
- **Device Panel**
- **Device Cable**
- **Fieldbus Virtual Tag**
- **CS Tagname**
- **Specification Sheet**
- **Process Data Sheet**

Mismatch between Tag and Device Cable



Mismatch between Tag and Device Panel

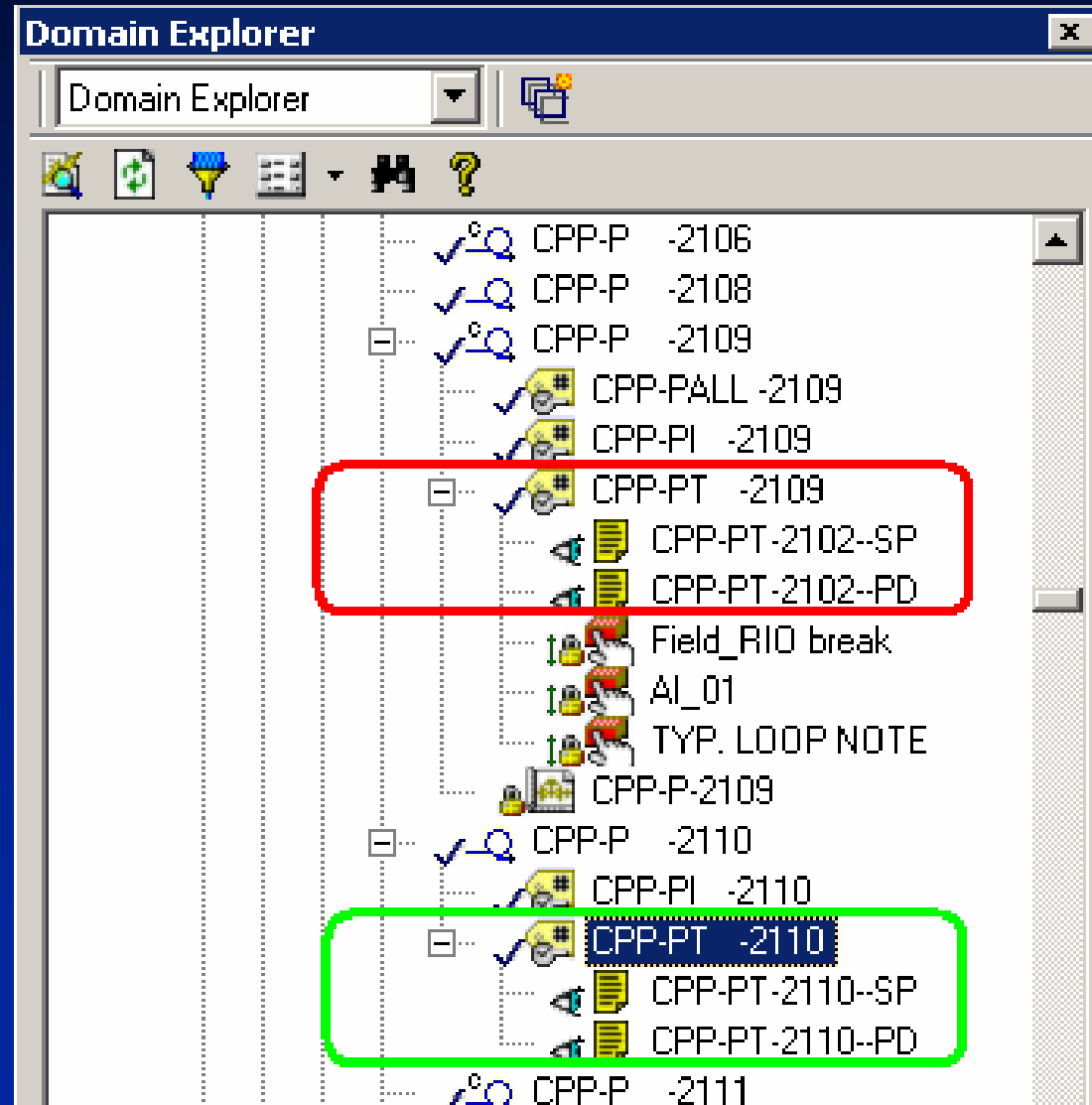


Mismatch between Tag and Control System Tag

Address Information:	Highway or network:	Device or node:	Module:
	Profibus Information:		Profibus DP node number:
	Primary Controller / Processor		Secondary Controller
Cabinet:	PFU01-CP-80001		*
Rack:	*		*
Slot:			
Sys. cable:			

Terminal	Channel	Channel Address	Control System Tag	Tag Number
B7	7			
C7				
A8	8		PFUXY .1.1.1.1.1	PFU01-XY -56210
B8				
C8				
A9	9		PFUXY .1.1.1.1.1	PFU01-XY -56220
B9				
C9				
A10	10		PFPXYA	PFP01-XY -14210-A
B10				
C10				
A11	11		PFPXYA .1	PFP01-XY -14220-A
B11				
C11				
A12	12		PFPXYA .1.1	PFP01-XY -14230-A
B12				
C12				
A13	13		PFPXYA .1.1.1	PFP01-XY -14810-A
B13				

Mismatch between Tag and Spec Sheet / Process Data Sheet



SPI Data Mining – Quality Control

Project A1 : Index Audit - Device Panel/Tag Name Mismatch

Update Data Export to Excel Autofit Column Width Options Help

Records Returned: 42

Sorting Criteria (Columns shown bold)

Filtering Criteria (Columns shaded to match filteria type)

Select All

De-Select All

Visible	Column
<input type="checkbox"/>	Engineer Name
<input type="checkbox"/>	Plant Name
<input type="checkbox"/>	Area Name
<input type="checkbox"/>	Unit Name
<input checked="" type="checkbox"/>	Panel Name
<input checked="" type="checkbox"/>	Tag

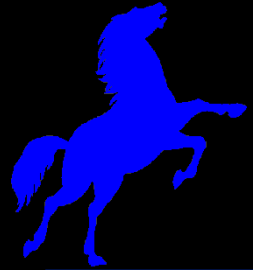
	Panel Name	Tag	Service	Loop	Loop Service	IO Type	Instrument Type Desc	Instrument Type
	WHP-	WHP-ZSO -1031	Sep to Subsea Li...	WHP-S -1031	Sep to Subsea Li...	DI-PSS	7440-Position Sw...	ZSO
	CPP-BDY-3541	CPP-SDY -3541	Fuel Gas Header ...	CPP-S -3541	Fuel Gas Header ...	DO-PSS	7210-Solenoid V...	SDY
	CPP-BDY-3551	CPP-SDY -3551	Fuel Gas Header ...	CPP-S -3551	Fuel Gas Header ...	DO-PSS	7210-Solenoid V...	SDY
	CPP-PT-5421	CPP-PDT -5421	MEG Cartridge Fil...	CPP-P -5421	MEG Cartridge Fil...	AI-PCS	7162-Diff. Press. ...	PDT
	CPP-SDY-5683	CPP-XY -5683	MEG Reboiler O...	CPP-X -5683	MEG Reboiler O...	DO-PSS	7210-Solenoid V...	XY
	CPP-UV-3061-01	CPP-UV -3061	Main Gas Comp ...	CPP-U -3061	Main Gas Comp ...	AO-MGP1	7201-Control Val...	UV
	CPP-BDV-3003	CPP-ZSO -3003 -01	Gas/Gas Exchan...	CPP-B -3003	Gas/Gas Exchan...	DI-PSS	7440-Position Sw...	ZSO
	CPP-US-9401-(2)	CPP-XS -9401	Emergency Gene...	CPP-X -9401	Emergency Gene...	DI-PCS	7414-Contact	US
	CPP-US-9402-	CPP-XS -9402	Emergency Gene...	CPP-X -9402	Emergency Gene...	DI-PCS	7414-Contact	US
	CPP-AT-8401	CPP-FE -2713	Gas/Gas Exch 1 ...	CPP-F -2713	Gas/Gas Exch 1 ...	*	7119-Flow Meter ...	FE
	CPP-AT-8401	CPP-AT -01FIR-E	Main DK NW Sta...	CPP-A -01FIR	Main DK NW Sta...	AI	7177-Analyzer Tr...	AT



SPI Data Mining – Statistics Overview

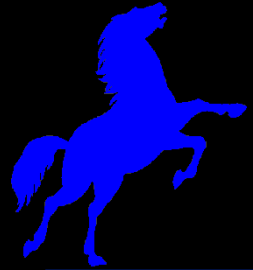
- We offer our projects over 100 statistics
- We encourage feedback from our users and build from their requests
- We do create some statistics only for specific projects

View/Hide	Stat Type
<input checked="" type="checkbox"/>	Metrics
<input type="checkbox"/>	Admin Check
<input type="checkbox"/>	Index Audit
<input type="checkbox"/>	Description Audit
<input type="checkbox"/>	Loop Audit
<input type="checkbox"/>	Range/SetPoint Audit
<input type="checkbox"/>	FieldBus
<input type="checkbox"/>	Specs
<input type="checkbox"/>	Process Data
<input type="checkbox"/>	Hookups
<input type="checkbox"/>	Wiring Data
<input type="checkbox"/>	I/O Loading
<input type="checkbox"/>	Loops
<input type="checkbox"/>	Electrical
<input type="checkbox"/>	ESL
<input type="checkbox"/>	Cables
<input type="checkbox"/>	Lines



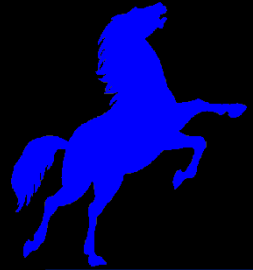
SPI Data Mining – Summary

- **Quick, read-only access to SPI data**
- **Progressing and auditing capabilities**
- **Specific functions to meet the needs of each project**



Where are we headed?

- **Continued excellence with SPI**
- **Continued integration with SmartPlant P&ID**
- **Continued integration with SmartPlant Electrical**



Questions

Any questions or ideas?