

<b>SmartPlant Instrumentation Technical User Forum P2C2 (Houston SPI TUF) Meeting</b>	<b>February 02, 2016 8:00 am Intergraph</b>
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<b>Attendees</b>	46 Members in attendance 13 Online Connections		<b>Copied To</b>	Houston SPI LTUF Website <a href="http://www.spi-ltuf.org">http://www.spi-ltuf.org</a>
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<b>Called By</b>	John Dressel	<b>Prepared By</b>	John Bolmanski, Andrew Kunev & John Dressel
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Item	Topic	Notes	Action/Due
1	Welcome 8:00	<p><b>Welcome &amp; Safety Moment</b> Dan Williams, Intergraph</p> <ul style="list-style-type: none"> <li>Thanks to Intergraph for hosting</li> </ul>	
2	Chairman's Notes 8:05 8:10	<p><b>John Dressel, Fluor</b></p> <ul style="list-style-type: none"> <li>Election of officers &amp; Approval of Minutes <ul style="list-style-type: none"> <li>John Dressel voted in as Chairman</li> <li>Blake Biernacki nominated as Vice President/Chair</li> <li>John Bolmanski nominated as Secretary</li> </ul> </li> </ul> <p><b>Introductions</b></p> <ul style="list-style-type: none"> <li>Fluor, Alex online with Intergraph, VP of Intergraph, DeeDee Trindera, Buster Jacobs, Hon, Puffer Sweiven &amp; Fisher, GE oil&amp;gas, JGC, IHI E&amp;C, WP, KBR, OSI, Patton Engr, Sharp E, Contract control, Instrumentation db, Becktel, Mangan, Lubrisol, KBR, Chevron EISegundo, Kansas City, Burrough Global, Valero, Shaw-Power, Colsine tech.</li> <li>Reminder for folk attending to RSVP (both in-person for seating) &amp; remote - please remember to contact John Dressel when invitations go out.</li> <li>Minutes are approved (with corrections from Cooley Core)</li> </ul>	
3	Presentation 8:15	<p><b>Intergraph (Hexagon) corporate update Tom Szoka, Intergraph</b></p> <ul style="list-style-type: none"> <li>Re-Commitment/Death-Sentence poll of group - 4 with over 20 yrs experience with INtools/SPI, 1 person with 25 years back to LIDs</li> <li>Audience comment: INtools/SPI has consistently gotten worse over time since LIDs.</li> <li>Tom is pushed Intergraph Cloud Initiatives.</li> <li>Intergraph CTO &amp; others high in Development for Cloud &amp; Support.</li> <li>Tom's history with SPI: <ul style="list-style-type: none"> <li>Was at 1998 PID purchase,</li> <li>development manager of IDM.</li> <li>SmartPlant Explorer Develop manager.</li> <li>2002 worked with PDAC,</li> <li>2008 SmartPlant 3d manager.</li> <li>LinkedIn promoted briefly.</li> </ul> </li> <li>Tom has never actually used SPI.</li> <li>Tom wants to Undo the Silos between Tools.</li> <li>Alex will cover blending.</li> </ul>	
4	Presentation	<p><b>SPI Support organization for 2015 &amp; 2016 Vivek Mokashi,</b></p>	

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	8:45	<p style="text-align: right;"><b>Intergraph</b></p> <ul style="list-style-type: none"> <li>• Previous power plant experience, then PDS in India, then Intergraph Singapore, 1998 in Huntsville expanded into SP3D and Integration (DDP/P&amp;ID, etc). Since Dec in charge of Support.</li> <li>• Presentation (starts with SR simplified flow.)</li> <li>• Complex issues go to IISDC, Enhancements and Releases are in Tom's division.</li> <li>• Sales pitch for ISO certification.</li> <li>• SmartSupport was Huge Intergraph Investment</li> <li>• Knowledge Base &amp; Customer Satisfaction Survey are highly focused/used</li> <li>• Oracle now Cloud based hosts the Knowledge Base</li> <li>• Support team is adding Answers to Knowledge Base Well - Huge Focus from Intergraph.</li> <li>• Resolution Time for SPI SRs has gotten better from Intergraph's perspective. Monitored Continued Improvements.</li> <li>• SPI Product Release is highly viewed as well – with fewer measured Customer Defects.</li> <li>• Upgrades are becoming less complex due to Intergraph improved focus in QA organization.</li> <li>• Sales pitch: About 100,000 Automated tests get executed every day</li> <li>• SP3D has had biggest improvements.</li> <li>• Intergraph Goals supposed to help customers eventually, especially Cloud (mentioned Amazon Cloud? &amp; others? for support/development)</li> <li>• Intergraph Cloud Hosted SmartPlant is partially Microsoft, partially partnership with Intergraph, and possibly others.</li> <li>• Audience Query: Knowledge Base has been seen to show UNKOWN as a cause for some problems instead of detailed Root Causes ... Intergraph VP focus on Solution, Rick mentioned that some causes are user configuration problems</li> </ul>	
5	Presentation	<p><b>SPI 2016 release Update &amp; Schedule Alex Koifman, Intergraph</b></p> <ul style="list-style-type: none"> <li>• Presentation will be forwarded to SPI LTUF website.</li> <li>• SPI 2016 Scheduled release <b>End of March 2016.</b></li> <li>• Dedicated Support Web page on SmartSupport for SPI2016 upgrade.</li> <li>• Pre/Post-Upgrade Guide soon. Many 1-time migration Tips.</li> <li>• Delta Training will be 3 day class, Update to AsBuilt &amp; EDE is majority.</li> <li>• Next 2 weeks 1<sup>st</sup> Huntsville Update training classes.</li> <li>• Alex wants THIS Upgrade to be painless for customers.</li> <li>• All existing Browsers will be upgraded, some needing customization to bring back Legacy items (with Guidance &amp; Support Utility)</li> <li>• Intergraph recognizes that not all customers will be able to Upgrade immediately (or even within 2 years of 2016 release)</li> </ul> <p style="text-align: center;"><b>&gt;&gt;&gt;&gt; SPI 2016 Road Map &lt;&lt;&lt;&lt;&lt;</b></p>	

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		<p>Agenda</p> <ul style="list-style-type: none"> <li>• SPI Release dates and plans</li> <li>• Integration</li> <li>• Query Builder / EDE</li> <li>• Project / As Build (PAB)</li> <li>• UDF / UDT Editor</li> <li>• SPI v2016 R1</li> <li>• SPI v2018</li> </ul> <p>SPI Release dates and plans</p> <ul style="list-style-type: none"> <li>• SPI 2016 still scheduled for Q1 2016</li> <li>• Future plans of Spi2016 R1 and SPI V.20?? later mentioned.</li> <li>• Spi2013 released in April 2013, with moderate customer use.</li> <li>• Spi2016 Scheduled Jan 2016 in planning</li> <li>• Spi2016 Revision1 tentative Q1 2016, with Infrastructure work and detailed scope planning</li> <li>• Spi20?? Next version not yet scheduled with final data.</li> </ul> <p>Integration</p> <ul style="list-style-type: none"> <li>• Enhanced To-Do List (E-TDL), business drives and benefits</li> <li>• Improve the readability of retrieved information</li> <li>• Enhanced Functionality and user experience</li> <li>• Graphics on Slides presented as powerful new design, with enhanced navigation, etc.</li> <li>• Much time spent on E-TDL examples, can be seen in online presentation soon.</li> </ul> <p>SPI – S3D Cable integration</p> <ul style="list-style-type: none"> <li>• Auto-route Instrumentation and Control (I&amp;C) cables in S3D.</li> <li>• Improve the design accuracy by retrieve the routed cable length and path from the S3D model.</li> <li>• Harmonization - similar to SPEL – S3D integration but for I&amp;C cables (Only updated info in properties will be shown, but will be Visible but Un-editable in the EDE.)</li> </ul> <p>Inter Company Collaboration (ICC) – Phase II</p> <ul style="list-style-type: none"> <li>• Extension to current supported ICC1 – supporting Publish / Retrieve capabilities of As Build information by.</li> <li>• The functionality extension consists of: <ul style="list-style-type: none"> <li>○ Enable Projects to be integrated with SPF</li> <li>○ Publish and Compare is supported (not able to retrieve data) on project level</li> </ul> </li> <li>• Inter Company Collaboration (ICC) Phase II – to be discussed further.</li> <li>• Room Qusetion - Does the SPI 2016 tool have ability to publish from SPI to SPF (like into As-Built section of the plant). - Answer: SPI 2016 Project publishing into SPF.</li> </ul> <p>Query Builder &amp; Engineering Data Editor (EDE)</p> <ul style="list-style-type: none"> <li>• Query Builder, business drives and benefits <ul style="list-style-type: none"> <li>○ Allows users to create instantly flexible queries within SPI <ul style="list-style-type: none"> <li>▪ Knowledge of SPI is required but not data model</li> </ul> </li> </ul> </li> </ul>	

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		<ul style="list-style-type: none"> <li>▪ Simple to use and provides engineering and design context</li> <li>▪ Remove need for 3rd party tools like InfoMaker etc...</li> <li>▪ Sorting of data (example of Index shown) to be much more flexible</li> <li>▪ Data can be previewed to Validate query builds.</li> <li>▪ Colorful highlights will show discrepancies,</li> </ul> <ul style="list-style-type: none"> <li>• Engineering Data Editor, business drives and benefits <ul style="list-style-type: none"> <li>○ Improve usability</li> <li>○ Ease of use</li> <li>○ Intuitive, no need for training (like MS Excel)</li> <li>○ Enhanced Functionality</li> </ul> </li> <li>• SQL editor will allow customization of QB ... delivers a View-Only EDE (which may possibly be converted to full bidirectional EDE ... if item types can be coupled.)</li> <li>•</li> <li>• Spi2016 View-Only EDE has filtering/sorting capability without changing data.</li> <li>• Out-Of-The-Box (OOTB) Queries:</li> <li>• Old Browsers have been converted to EDE, and Users can do so with some of their</li> <li>• QB SQL has it's own Access Rights to relegate separate from users as customers need.</li> <li>• Spi2016 EDE displayed in presentation slides.</li> <li>• Marketing level promotion of the EDE ease of use.</li> <li>• Recent addition of Cross-Column Filters in EDE (SQL *and* operator as well as *or*)</li> <li>• Caller Question: Drawing ID Reference shown in EDE Answer: Yes.</li> <li>• Asterisk &amp; Percent symbols can be used in Searches</li> <li>• EDE Layout Control mentioned, with group editing etc.</li> <li>• EDE has no linkage to Reference Query ... so changes to EDE will not modify the originating Query</li> <li>• EDE Comparison declares change management between Revisions via reports.</li> <li>• Comparison can also be done with different EDEs (for variety of data Delta Reports.)</li> <li>• Room Question: are the Delta Reports publishable to SPF. Answer: Yes.</li> <li>• Intergraph very proud of Spi2016 EDE Default View capabilities.</li> <li>• Spi2016 EDE Expressions shown with examples (similar to Nezar's presentation from Mangan)</li> </ul> <p>Projects/ As Build</p> <ul style="list-style-type: none"> <li>• Project / As Build, Business drives and benefits</li> <li>• Improve visibility of the scoped when claiming or merging</li> <li>• Part of SPI (not Admin) to get most of SPI tasks benefits as reports like ESL etc...</li> <li>• Improve the robustness of supported workflows</li> <li>• Harmonize the process with the below operations <ul style="list-style-type: none"> <li>○ Claim</li> <li>○ Merge</li> </ul> </li> <li>• Remove the constraint of multi users operations when data</li> </ul>	

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		<p>is claimed or merged</p> <ul style="list-style-type: none"> <li>• Predictability</li> <li>• Projects/As-Build goals itemized as Development Drives &amp; User Benefits.(Owner/Operator mode Claim &amp; Merge)</li> </ul> <p>UDF/UDT Editor</p> <ul style="list-style-type: none"> <li>• UDF / UDT Editor, Business drives and benefits</li> <li>• Harmonize the definitions of UDF* / UDT captions across the domain</li> <li>• Allow to build custom select lists</li> <li>• Expose the use of select list for UDF fields for EDE use</li> </ul> <p>*Caution – not yet supporting Spec’s UDF</p> <ul style="list-style-type: none"> <li>▪ Caller Question: Can’t merge in SPI 2009 with Users in the database (but caller reports Customers are now doing so). Guy answers that data consistency needs to be checked with possible failures &amp; locked records with current SPI versions. But SPI 2016 will allow merge with confidence of data consistency.</li> </ul> <p>SPI 2016 comments</p> <ul style="list-style-type: none"> <li>▪ SPI-Fisher Interface was updated, as E+H was done previously, and other Vendors will also be updated asap. New Spec form will be used for Fisher in SPI 2016. Currently still file based, but future will be via API with no ‘files’.</li> <li>▪ SPI 2016 Tutorials HAVE been updated for Trainings</li> <li>▪ SPI 2016 Delta Training will be longer in Duration than previously attended (might be 4-5 days.)</li> <li>▪ No Mention was made for Instrument Component ID availability OOTB as multiple customers have requested in this new EDE over the past 2 years.</li> </ul> <p>SPI v2016 R1</p> <ul style="list-style-type: none"> <li>• Tentatively scheduled for 4Q2016 / 1Q2017 <ul style="list-style-type: none"> <li>○ Master Tag Registry (MTR) - phase I support</li> <li>○ ESL fully converted to Dot.net</li> <li>○ Disconnected Workshare (overhaul- previous ‘Import Project’)</li> <li>○ Expose Web Services to support vendor integration as well as SmartPlant Enterprise Portal (SPEP) – SmartPlant Explorer’s (SPEX) Replacement</li> </ul> </li> </ul> <p>SPI v2018 Next Major Release</p> <ul style="list-style-type: none"> <li>• Introduce replacement technology to Infomaker forms for:-</li> <li>• Flexible Process Data module functionality</li> <li>• Control Logic Diagram</li> <li>• Engineering dashboard</li> <li>• Business drivers: <ul style="list-style-type: none"> <li>○ Quality, Upgrade Support, New ESL (.Net), Disconnected Work share (IMPORT projects), Infrastructure Integration, Vendor Integration with file-less processes., Replace Infomaker in Specs etc.</li> </ul> </li> </ul> <p style="text-align: center;"><b>&gt;&gt;&gt;&gt; End of Road Map &lt;&lt;&lt;&lt;&lt;&lt;</b></p>	

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		<ul style="list-style-type: none"> <li>• Planning exercise will continue thru Q2 2016 for Intergraph, impacting Vision as well as Tactical plans.</li> <li>• 2016-2018 might be a single release instead of separate v2016R1 &amp; v20xx ... to be discussed or decided later.</li> <li>• Automatic Tests are being expanded and broadened daily – includes Regression Testing – Cloud technology Usage is Highly Motivating</li> <li>• ESL migration from VB to .NET is going to be a big deal for Intergraph.</li> <li>• SPEX replacement by Enterprise Portal</li> <li>• Future Visions provided, with Disclaimer of future discussions to be added later.</li> <li>• Master Tag Registry Query form room: Alex = bring back to forefront with New APIs and integration infrastructure (maybe 2016-2018)</li> <li>• Audience: SPI integrations using new Web APIs are Very highly needed.</li> </ul> <p><b>SPILTUF Members Feedback Q&amp;A Alex Koifman, Intergraph</b></p> <ul style="list-style-type: none"> <li>• Many Intergraph representatives available online &amp; in room to answer questions:</li> <li>• JB: SPI projects being used on MANY older versions of Citrix &amp; old instances of SPI. Alex ensures that upgrades will be much easier in future, so O/O Clients may be encouraged to upgrade more confidently and easily (?) Intergraph says they cannot influence customers.</li> <li>• Intergraph in Room suggests Intergraph should PARTNER with O/O customers to compel upgrades ...</li> <li>• Room reminds that CITRIX is often a bottleneck for SPI usage: Intergraph reluctant to do more fixes of Spi2009, and promote Upgrading as Fix.</li> <li>• EoM is example of good upgrade to 2013. Room reminded that some clients still use INtools6.</li> <li>• Production concerns should be brought to Intergraph Support – Intergraph VP comments that HotFix support is a Balance or Regression (bug fixes) versus the Business Benefits. HotFixes are destabilizing in Intergraph perspective.</li> <li>• Room Q: 2016 Upgrade will be critical for Clients to recognize that Infrastructure Upgrades will be needed (VP answer that Many customers are already requesting environment Upgrades.)</li> <li>• We SPI users are only a PART of the equation with regard to client Upgrades overall.</li> <li>• Q: Changes to Project MERGE changes with regard to Revisions? Alex: No, Revisions and Process Cases are still needed to be addressed in 2016R1</li> <li>• How are we going to move to Spi20xx while SAP removing support of InfoMaker? Zur asked by Alex to see if there is any change to InfoMaker availability (Intergraph has rights to resell versions to support SPI) No plans to upgrade the Infomaker infrastructure due to .NET improvements</li> <li>• Alex willing to make changes if there is Risk to Client Production.</li> <li>• Room Q: Concerned with Windows 10 compatibility, Alex</li> </ul>	

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		<p>will look into. Windows 8 and Vista are not being Ignored by Intergraph InfoMaker works on Windows 10 (although it is not certified)</p> <ul style="list-style-type: none"> <li>• New Suggestion: 2016 has been tested by many, some mild training.</li> <li>• Next LTUF at Jacobs in MAY should Host SPI2016 LIVE for Testing and Q&amp;A (no slides – HANDS-ON-LIVE functionality. As-Built, EDE, Including 3D cable routing.)</li> <li>• Q: SPI 2013 Test drive – Upgraded to 2016 at what time? Alex = 2-3 weeks after March releases with the Libraries of Reference Explorers for MACs. David Kaiser confirmed.</li> <li>• Q: several Clients still use ACAD &amp; MicroStation, and that level Deliverables with Layers etc? Tom Intergraph will NOT imbed ACAD or MicroStation, but 2 Intergraph Teams are working to upgrade the RAD versions to produce better SAVE-AS capabilities. (now we use RAD4 and with 2016R1 will use RAD11 and ESL upgrades.)</li> <li>• Some Deliverables might be savable now out of ESL/RAD4, but Layers information are not yet available.</li> <li>• SP3d&lt;-&gt;SPI work (faceplate flanges, dimensions, DDP – not easy to exchange Vendor information.) Intergraph asked to push Vendors.</li> <li>• ThomasNet is an answer for their Drive to get MANY Vendor Instruments up to their Cloud. (3d Shapes and dimensional data) EPCs Contracting Vendors will PUSH them to provide better online info (eventually for all users)</li> <li>• SP Reference Data will include MUCH of the future Dimensional Data.</li> <li>• Integration talk is ongoing with other vendors.</li> <li>• SPI 2016 will be available for SignUp Very soon (Internal only now, published external soon) Train-the-Trainer logic still available. Tutorial Guides will be available with the classes. O/O As-Built training will be available soon</li> </ul>	
6	Presentation	<p><b>SPI Instruments in SmartPlant P&amp;ID      John Dressel, Fluor</b></p> <ul style="list-style-type: none"> <li>• Topics Covered in this Presentation <ul style="list-style-type: none"> <li>○ Introduction – Intro to SmartPlant Piping and Instrument Diagrams</li> <li>○ Issues – Current problems with SmartPlant Piping and Instrument Diagrams</li> <li>○ Standards – Applying Instrumentation Symbols and Identification Standards</li> <li>○ Databases – Data Properties of SmartPlant Piping and Instrument Diagrams</li> <li>○ Integration –P&amp;ID integration with other SmartPlant Automation Tools</li> <li>○ Practices – Best Practices for SmartPlant Piping and Instrument Diagrams</li> </ul> </li> <li>• SmartPlant Piping &amp; Instrument Diagrams <ul style="list-style-type: none"> <li>○ There is a tendency to put less and less on P&amp;IDs by using graphic symbols to represent the instrument components as well as the process interoperability and loop associations</li> <li>○ This practice was initiated to streamline and de-</li> </ul> </li> </ul>	

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		<p>clutter the diagrams but requires much interpretation by the users</p> <ul style="list-style-type: none"> <li>○ SmartPlant Piping &amp; Instrument Diagrams</li> <li>○ The addition of a data layer to the P&amp;ID has resulted in what is commonly called the Smart Piping and Instrument Diagram</li> <li>○ An Smart P&amp;ID contains both graphic and meta data and is the source of all the information needed to develop the Process Equipment Sequence and the Instrument Control Schemes</li> </ul> <p>Issues</p> <ul style="list-style-type: none"> <li>● Multiple Standards for P&amp;ID Symbols <ul style="list-style-type: none"> <li>○ There are many different standards for the symbology used in the development of Piping and Instrument Diagrams</li> <li>○ Standards serve a particular purpose or market for example: ISO/IEC-14617 standards is used for PFD equipment while PIP and ANSI/ISA-5.1 standards are for Instrument P&amp;ID Symbols</li> </ul> </li> <li>● Piping &amp; Instrument Diagram Legends <ul style="list-style-type: none"> <li>○ Legend Sheets show all the Symbols, Identifications, Naming Conventions and Abbreviations used on the P&amp;ID</li> <li>○ Additional Properties are assigned to the Symbols to add more information and Intelligence to the P&amp;ID</li> <li>○ Most Properties are not displayed on the face of the Diagram</li> </ul> </li> <li>● Out of Date Instrument Diagram Symbols <ul style="list-style-type: none"> <li>○ Most Company Legend Sheets and Symbols are based on Older Standards or Historical Project legends but more recent Versions of Standards render the existing Symbols Out of Date</li> <li>○ Updating the Legend Sheets and Symbols can be a costly effort but will enable the use of Emerging Technologies</li> </ul> </li> <li>● Use of Abbreviated or Typical Symbols <ul style="list-style-type: none"> <li>○ Abbreviated symbology used to de-clutter the drawing results in Implied Tag Instruments not being shown on the P&amp;ID</li> <li>○ Implied Instrument Tags cannot be represented in the SmartPlant P&amp;ID database as they do not have a symbol in the body of a P&amp;ID to attach the Tag Data properties</li> </ul> </li> <li>● Use of Tabular Data in Place of Symbols <ul style="list-style-type: none"> <li>○ Creating One Typical P&amp;ID for Duplicate Equipment, Trains or Units and using Tables or Tag Prefixes to Reference the Tags across the duplicate systems limits relationship to the Database</li> <li>○ Using Tables to List Instruments Associated with each Loop instead of showing Symbols for each Tag does not provide enough detail to reflect the</li> </ul> </li> </ul>	



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		<p style="text-align: center;">actual design conditions of the Control System</p> <ul style="list-style-type: none"> <li>• Use of Complex Naming Conventions <ul style="list-style-type: none"> <li>○ Trying to put too much information in the Tag numbering convention can overly complicate the Tag naming process</li> <li>○ A simple ISA naming convention should be adequate to give each tag a unique ID and any additional information can be added as Data to the Properties of the Symbols</li> </ul> </li> <li>• Piping &amp; Instrument Diagram Workflow <ul style="list-style-type: none"> <li>○ Most P&amp;ID workflows are focused on the graphics and visible part of the diagrams with little attention to the Data Properties</li> <li>○ SmartPlant P&amp;ID workflows should direct attention to the data centricity capabilities of the P&amp;ID and provide mechanisms for Data Input, Validation and Integration</li> </ul> </li> <li>• Emerging Instrument Technologies <ul style="list-style-type: none"> <li>○ Instrumentation Technologies Have changed dramatically over the last few years but most Projects still use outdated Symbols on the P&amp;IDs that do not represent current emerging technologies</li> <li>○ Different Instrument Systems and Wiring methods need to be correctly represented on the Intelligent P&amp;IDs so that all of the information used to define the properties of the control networks are accounted for</li> </ul> </li> </ul> <p>Standards</p> <ul style="list-style-type: none"> <li>• PIP PIC001:2008 <ul style="list-style-type: none"> <li>○ PIP Piping Industry Practice - PIC001 “Piping and Instrumentation Diagram Documentation Criteria” has symbols for Process Piping and Equipment as well as basic Instrument symbology</li> <li>○ This standard can be used to create a complete P&amp;ID and is the basis for most SmartPlant P&amp;IDs</li> <li>○ PIP PIC001 refers to ISA 5.1 as the basis for Instrument Symbols and the two standards should be used in conjunction for the most up to date representation of Control Systems Instrumentation Technology</li> </ul> </li> <li>• ANSI/ISA-5.1:2009 <ul style="list-style-type: none"> <li>○ The latest version of ANSI/ISA-5.1-2009 Instrumentation Symbols and Identification has significant changes over the previous version ISA-5.1-1984 (R1992)</li> <li>○ This standard has been updated to include new and evolving Instrument Technology, Control Systems and Computer Networks</li> <li>○ This standard addresses only the graphic layer of the documents and does not address the Data or Attribute layer of Intelligent P&amp;IDs but the symbols are easily adapted to add data properties links</li> </ul> </li> <li>• ANSI/ISA-5.1:2009 Tables</li> </ul>	

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		<ul style="list-style-type: none"> <li>○ Table 5.2 is a new table for Measurement Notations, Descriptions and Functions to be used with symbols (e.g. OP-MH = Orifice Plate Multi-hole, LSR= Laser, GWR = Guided Wave Radar, etc...)</li> <li>○ Table 5.2.3 - Primary element symbols with several new symbols for special orifices and measurement technologies (e.g. Concentric, Eccentric, Quadrant and Multi-hole Orifice Plates)</li> <li>○ Table 5.2.5 - Measurement symbols for auxiliary and accessory devices (e.g. the addition of “Probe” function for sample probes connection )</li> <li>○ Table 5.3.2 - Line symbols for instrument-to-instrument connections with new symbols or signal types (e.g. Wireless, Fieldbus and Smart or Serial signals)</li> <li>○ Table 5.4.2 - Final control element actuator symbols with new positioners and partial stroke testing device symbols (e.g. Added Valves with Positioner to eliminate the use of I/P Transducer)</li> <li>● ANSI/ISA-5.1:2009 Annexes <ul style="list-style-type: none"> <li>○ Annex A has expanded Tables for Allowable Loop, Tag &amp; succeeding letter combinations for instrument functions (e.g. Added Function modifiers FF = Ratio, FQ = Total, FS = Safety &amp; FZ = SIS - ISA now recognizes over unique 1000 Instrument Type identifiers)</li> <li>○ Annex B “Graphic symbol guidelines” (Informative), is a new informative clause that replaces the examples formerly given in Clause 6, “Drawings,” to provide some limited assistance in the application of the symbols in Clause 5. (e.g. the use of “FC” Field Controller for Fieldbus Virtual Field Device) These examples are more generic and limited in nature than the previous ANSI/ISA-5.1-1984 (R 1992)</li> </ul> </li> </ul> <p>Databases</p> <ul style="list-style-type: none"> <li>● Symbol Attribute Connection to Database <ul style="list-style-type: none"> <li>○ The standards when applied to the Legend sheets define naming conventions that define the mechanical, electrical, process, Piping Lines and instrument systems</li> <li>○ The naming conventions give unique Tag Names to the symbols and elements on the P&amp;ID</li> <li>○ On SmartPlant P&amp;IDs the Tag Name text is placed in the Symbols as a Tag Property that is associated to the Database Tables as Key Fields</li> <li>○ The P&amp;ID Database has separate tables for each type of Symbol</li> <li>○ Additional columns in each table allow the placement of additional properties added to each Tag Name</li> </ul> </li> <li>● SmartPlant P&amp;ID Properties Editing <ul style="list-style-type: none"> <li>○ Since the Database contains the intelligence of the P&amp;ID it is important that the data be input and managed by the engineers that are responsible for that Data</li> <li>○ Piping and Mechanical Engineers should edit and</li> </ul> </li> </ul>	

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		<p>manage the Piping Line and Equipment Databases to support the graphics provided by the Process Engineer</p> <ul style="list-style-type: none"> <li>○ Control Systems Engineers should have access to the Instrument Tag and Loop data tables for editing</li> <li>○ Management of change is important as the P&amp;ID is the primary source document for all engineering</li> <li>● SmartPlant P&amp;ID Instrument Data <ul style="list-style-type: none"> <li>○ The P&amp;ID Instrument Data Properties include the Loop and Tag Names, Service Descriptions, Signal Types, Process Operating Conditions and additional Monitoring or Control data</li> <li>○ The Instruments, especially Control Valves, have the largest number of Data Properties of any the P&amp;ID elements</li> <li>○ The Symbols used on P&amp;IDs should convey a minimum Data set such as Device Type, Signal Type, System Type and Measurement Technology</li> <li>○ Sufficient Instrument Data can be loaded into the P&amp;ID Database that Instrument Indexes and I/O lists can be created directly from the P&amp;IDs</li> </ul> </li> <li>● SmartPlant P&amp;ID Reports and Exports <ul style="list-style-type: none"> <li>○ Most Intelligent Piping and Instrument Diagram software have provisions for generating reports from the database</li> <li>○ The Report generators also have the ability to Export in other File Formats using Open Database Connectivity (ODBC)</li> <li>○ Typical Reports and/or Exports from the P&amp;ID database are: <ul style="list-style-type: none"> <li>▪ Instrument Lists and Indexes</li> <li>▪ P&amp;ID drawing Lists</li> <li>▪ Electrical Load Lists</li> <li>▪ Inline Device Lists</li> <li>▪ Piping Line Lists</li> <li>▪ Equipment Lists</li> <li>▪ I/O Lists</li> </ul> </li> <li>○ The Exports are used for Integration</li> </ul> </li> </ul> <p>Integration</p> <ul style="list-style-type: none"> <li>● P&amp;ID Integration with other SmartPlant Tools <ul style="list-style-type: none"> <li>○ In a Data Centric Engineering Environment the Integration of data between each Discipline Automation tools is essential</li> <li>○ SmartPlant P&amp;ID is the source for most of the data that initializes the other Engineering Automation Project databases</li> <li>○ Several mechanisms are used to pass data between tools</li> </ul> </li> <li>● SmartPlant P&amp;ID Integration Data Sets <ul style="list-style-type: none"> <li>○ SmartPlant Foundation is a complementary offering to Intergraph's SmartPlant Suite, acting as a data exchange hub between SmartPlant P&amp;ID and SmartPlant Instrumentation</li> <li>○ Certain Key Fields (Usually Tag Names) must be correlated between the databases to establish record matching</li> </ul> </li> <li>● SmartPlant P&amp;ID Integration Data Mapping</li> </ul>	

Item	Topic	Notes	Action/Due
		<ul style="list-style-type: none"> <li>○ SmartPlant Foundation Data Validator can be used to map SP-PID data to SPI for verification before loading Publishing</li> <li>○ Intimate knowledge of both data structures is necessary for mapping and in some cases data may need redefinition</li> </ul> <p>Best Practices</p> <ul style="list-style-type: none"> <li>● Legend Sheets for Intelligent P&amp;IDs <ul style="list-style-type: none"> <li>○ Following are a few simple Rules and Practices to take full advantage of Data Centric SmartPlant P&amp;ID and Legend Sheets</li> <li>○ The Legend Sheets need to be based on the latest standards</li> <li>○ Naming Conventions for all Key Tag entities should be defined on the P&amp;ID Legend Sheet</li> <li>○ Be sure all the Primary Symbols defined on the Legend Sheets have attributes linked to the database</li> <li>○ Update the Legend Sheets as design develops to show actual usage of symbols and tag naming</li> <li>○ The Legend Sheets need to address naming conventions and symbology for Emerging Instrument Systems</li> </ul> </li> <li>● Provide for New and Emerging Technologies <ul style="list-style-type: none"> <li>○ Instrumentation Technologies Have changed dramatically over the last few years but most Projects still use outdated Symbols on the P&amp;IDs that do not represent emerging technologies</li> <li>○ Different Instrument Systems and Wiring methods also need to be represented and Identified on the P&amp;IDs</li> <li>○ Instrumentation Systems <ul style="list-style-type: none"> <li>▪ Basic Process Control Systems (BPCS)</li> <li>▪ Safety Instrumented Systems (SIS)</li> <li>▪ Equipment Protection Systems (EPS)</li> <li>▪ Burner Management Systems (BMS)</li> </ul> </li> <li>○ Emerging Wiring Systems <ul style="list-style-type: none"> <li>▪ Conventional 4-20 ma Instruments</li> <li>▪ Smart Digital Instrument Systems</li> <li>▪ Bus Based Instrument Wiring Systems</li> <li>▪ Wireless Instrument Systems</li> </ul> </li> </ul> </li> <li>● Do Not Take Drafting or Data Shortcuts <ul style="list-style-type: none"> <li>○ The Piping and Instrument Diagrams and SmartPlant P&amp;ID Database are the most important source of information on any project</li> <li>○ The P&amp;ID is the wrong place to try to save time or money when developing the content of the Process and Control Systems</li> <li>○ Every Tagged Element needs to be shown on the face of the P&amp;ID so they will have a record in the database</li> <li>○ The P&amp;ID Data layer properties define all of the engineering requirements of a project so do not think of the SmartPlant P&amp;ID as simply graphics</li> <li>○ The owners of the individual types of data need to be the ones editing and validating the content of the P&amp;ID Graphics and Data</li> </ul> </li> </ul>	

Item	Topic	Notes	Action/Due
		<ul style="list-style-type: none"> <li>• Develop Data Centric P&amp;ID Work Processes <ul style="list-style-type: none"> <li>○ Most work processes for developing P&amp;IDs are focused on the Graphics layer of the documents with little regard to how the data properties are populated or validated</li> <li>○ The P&amp;ID Database contains information from several disciplines so members of those departments should be defined in the Data Centric Work Process</li> <li>○ A typical Data Centric Work Process: <ul style="list-style-type: none"> <li>▪ Process Engineering is responsible for overall Graphics and Process Data</li> <li>▪ Piping, Mechanical and Instrument Engineering are responsible for their respective data properties</li> <li>▪ It may be necessary for other entities to have input to the database (e.g. Plant Operations or Safety Engineering)</li> </ul> </li> <li>○ Make provisions for Data Integration</li> </ul> </li> <li>• Expand SmartPlant P&amp;ID Data Integration <ul style="list-style-type: none"> <li>○ The primary reason to use SmartPlant P&amp;IDs is to create a data source for other Automated Engineering Applications</li> <li>○ SmartPlant P&amp;ID has interfaces that allow the data to be formatted and exported to other tools</li> <li>○ The extent of the Integration will depend on the quantity and quality of the Data in the Database</li> <li>○ Some common Integration data sets: <ul style="list-style-type: none"> <li>▪ Equipment Lists with Properties</li> <li>▪ Piping Line Lists with Properties</li> <li>▪ Instrument Lists with Properties</li> <li>▪ Electrical Load Lists with Properties</li> <li>▪ Process Design Conditions</li> </ul> </li> </ul> </li> </ul> <p>Observations:</p> <ul style="list-style-type: none"> <li>• PID is source of Instrument Data for SPI. Interface currently poor SPI&lt;-&gt;SPP&amp;ID</li> <li>• Best Practices = show MUCH more info on P&amp;IDs, but streamlined projects are minimalistic.</li> <li>• Some P&amp;IDs have graphic images AND meta-Data, and Users must make sure Proper info is input into P&amp;ID. Also Global offices differ with Standards, ISO &amp; ANSI in America is good start.</li> <li>• Legend sheets are VITAL, Symbology, naming conventions, abbreviations, etc – practical P&amp;IDs must have active Properties maintained in the P&amp;ID databases (often more than viewable on actual drawings.)</li> <li>• Hidden data, Tabular or unseen (stockpile) database data in P&amp;ID is not available for Users to input/modify well, and interface with expanded SPI needs.</li> <li>• Problems are also seen in the workforces and work-Flows that are antiquated.</li> <li>• Standards conversations in-depth on Slides...</li> <li>• LTUF members are Asked to submit New SRs or goto CR Ranking site to Increase awareness to Intergraph about current SPP&amp;ID problems with Change Management &amp; Access Rights Control (especially for SP P&amp;ID Engineering</li> </ul>	

Item	Topic	Notes	Action/Due
		<p>Mode ... which is currently seldom used due to the above issue.)</p> <ul style="list-style-type: none"> <li>• SPF integration is rough. Master Tag Registry may someday help with Instrument Naming Conditions for P&amp;ID entry (limited to one ... no diff for HART/Conv/FFB etc.)</li> <li>• WE in LTUF need to talk to internal company folk to encourage Better P&amp;ID use to give more/better data for SPI</li> <li>• Intergraph may be able to aid with Instrument Type differences in SPI&lt;-&gt;SPP&amp;ID</li> <li>• UOM in SPI have flag, and are customizable, and can handshake with P&amp;ID</li> </ul>	
7	Presentation	<p><b>Testing the Fisher Interface with SPI</b>      <b>John Dressel, Fluor</b>  <b>(Emerson / Puffer Sweiven)</b>      <b>Keith Herbsleb, Puffer Sweiven</b></p> <p><b>The New Fisher First 2 (FF2) to SPI Interface</b></p> <ul style="list-style-type: none"> <li>• <b>After 100+ customer interviews in 2014, we learned...</b></li> <li>• Control valve dimensional data is required as early as possible (sometimes at budgetary)</li> <li>• Many customers easily <b>export</b> control valve specification sheet data from SPI to the control valve manufacturers for sizing and selection.</li> <li>• None of the customers we interviewed <b>directly imported</b> the completed control valve specification data from the valve manufacturers into SPI.</li> <li>• The main reasons were: <ul style="list-style-type: none"> <li>○ Most projects use <b>custom project control valve specification sheets</b> requiring manual field mapping which is time consuming and difficult</li> <li>○ Mapping requires knowledge of the manufacturer's valve field names</li> <li>○ Most Instrument Engineers are far too busy.</li> </ul> </li> <li>• The Emerson (Fisher) – Intergraph Smart Plant Instrumentation(SPI) Interface: <ul style="list-style-type: none"> <li>○ Significantly simplifies the export and import of Fisher control valve data</li> <li>○ Will pass Dimensional Data for Piping for standard Fisher constructions along with the completed control valve specification sheets</li> </ul> </li> </ul> <p><b>The FF2 to SPI Interface Test Program</b></p> <ul style="list-style-type: none"> <li>• <b>Participants:</b> <ul style="list-style-type: none"> <li>○ Tom.Podhajsky, Emerson</li> <li>○ Nagamani Mohan (Mani), Emerson</li> <li>○ Keith.Herbsleb, Puffer.com</li> <li>○ John Dressel, Fluor</li> </ul> </li> <li>• <b>Method:</b> <ul style="list-style-type: none"> <li>○ Define Spec Sheet format – Fisher or SPI Spec Form</li> <li>○ Import proper Link Files from Emerson</li> <li>○ Export Valve Spec Sheet data from SPI to Fisher First 2</li> <li>○ Use Fisher First 2 for Sizing, Selection, and Pricing</li> <li>○ Export Valve Spec and DDP data from Fisher First 2 to SPI</li> <li>○ Run Fisher First 2 Link Files in SPI Import Module</li> <li>○ Publish DDP data to SmartPlant Foundation</li> </ul> </li> </ul>	

Item	Topic	Notes	Action/Due
		<ul style="list-style-type: none"> <li>○ Retrieve DDP data into S3D Libraries</li> <li>○ Place Valve with DDP data in S3D Model</li> </ul> <p><b>Define Spec Sheet format</b></p> <ul style="list-style-type: none"> <li>● <b>Define Specification Sheets:</b> There are two cases for exporting and importing control valve specification sheets:</li> <li>● <b>Case A:</b> The Fisher standard control valve specification sheet is used on the project <ul style="list-style-type: none"> <li>○ Emerson solution will be a readily available out-of-the-box (OOTB) export-import round trip from SPI to Emerson Fisher.</li> </ul> </li> <li>● <b>Case B:</b> A vendor-neutral SPI customized control valve specification sheet is used on the project <ul style="list-style-type: none"> <li>○ Emerson solution will be a simple <u>two stage</u> process between the Fluor and Fisher sales office. <ol style="list-style-type: none"> <li>1. Set up the export-import Mapping process upfront – Emerson/Fisher will provide the necessary files.</li> <li>2. Fluor can now exchange tag data with any Fisher sales office.</li> </ol> </li> </ul> </li> <li>● For either case - Fluor to load provided Link Files from Emerson/Fisher into SPI Import Module for Spec and DDP data Import</li> <li>● For this test we elected to use a standard SPI Form 01 Valve Specification</li> </ul> <p><b>Import Link Files from Emerson/Fisher</b></p> <ul style="list-style-type: none"> <li>● The import Links Service in SPI Import Module created four Link Files</li> <li>● Issues: <ul style="list-style-type: none"> <li>○ Need to compare .CVS file externally to validate Imported Spec fields</li> <li>○ Requires running all Link Files to import complete Spec and DDP Data</li> <li>○ Link Files did not define Plant Area Unit settings from Spec Sheet so we had to run each link for each unit when valve export involved other Units</li> <li>○ Initially the DDP import did not contain End Prep data in Link File</li> </ul> </li> </ul> <p><b>Export Spec Files to Fisher First 2</b></p> <ul style="list-style-type: none"> <li>● Fluor Selected a set of 6 valves and exported via Excel the contents of the spec forms with process data for sizing and selection test</li> <li>● Issues: <ul style="list-style-type: none"> <li>○ No needed data could be in notes fields</li> <li>○ Units of measure needed to be corrected for Fisher First 2 data match</li> <li>○ The valves we selected already had DDP groups assigned in SPI so new Fisher DDP shapes could not be tested on first pass</li> </ul> </li> <li>● Fisher First 2 used to Size and Select Control Valves</li> <li>● Fisher First 2 exports to SPI a CSV file with control valve specifications and dimensional data.</li> </ul> <p><b>FF2 to SPI Interface Test Spec Import</b></p> <ul style="list-style-type: none"> <li>● Methods: <ul style="list-style-type: none"> <li>A - Unlink the process conditions and import only the valve construction information on the spec sheet? (to avoid overwriting the process data in SPI for the new imported rev.)</li> </ul> </li> </ul>	

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		<ul style="list-style-type: none"> <li>○ This could result in the process data not matching the actual data when Emerson/Puffer sizing of the Valve</li> </ul> <p>B - Import both the process conditions AND the valve construction info on the spec sheet.</p> <ul style="list-style-type: none"> <li>○ After the import, the EPC I&amp;C Engineer could use the functionality within Intergraph to compare revision data to highlight if any of the process condition values were changed by Emerson/Puffer</li> </ul> <ul style="list-style-type: none"> <li>● So the benefit of importing the process conditions with the valve construction data is that the EPC can see what process conditions were actually used when the valve was sized and selected. The values should not be different than what the EPC sent to Puffer, but if they are, it is highlighted red in SPI and the EPC can ask the question.</li> </ul> <p><b>Fluor imports CSV file from Fisher into SPI</b></p> <ul style="list-style-type: none"> <li>● Before importing Fisher Spec Data and DDP data into SPI we needed to do a comparison to see what data fields had changed</li> </ul> <p><b>SPI Publishes the DDP data to SPF then to S3D</b></p> <ul style="list-style-type: none"> <li>● We did two DDP Import exports for DDP groups already in the S3D library and for New Fisher DDP Symbols to test positioner orientation dimension codes <ul style="list-style-type: none"> <li>○ We imported the DDP data into S3D for existing shapes that were already in the S3D library and tested the valve placement</li> <li>○ We imported two new Fisher DDP shapes into S3D for testing placement of new groups – after placement we actually rotated the positioner by modifying the DDP data</li> </ul> </li> <li>● Piping Selects Tag and Places valve in the S3D</li> <li>● Fisher dimensions mapped to DDP models in Intergraph</li> <li>● Many new 'standard' shapes have been defined in SPI and S3D to handle Fisher control valves</li> </ul> <p><b>FF2 to SPI Interface Test Discoveries</b></p> <ul style="list-style-type: none"> <li>● All Spec Data fields come back into SPI from Fisher – may need to un-map some fields in the Import link files to prevent overwriting existing data</li> <li>● End Prep and Line data needs to be included in the data that passes from the SPI spec through FF2 into the DDP data for ease of publishing DDP data</li> <li>● Management of Change was only available for data published through SPF. Data imported into SPI with the Import module needs to be validated before import</li> <li>● Suggest that the SPI P-A-U be included in the export and import so the import links do not need to be run for each Unit</li> <li>● Valve Type Code had to be adjusted for SPI Body Type look-up table values (e.g. 1= Globe, 2=Ball, etc...)</li> <li>● The Test was successful and the Idea of bring DDP and Valve Sizing data directly from the vendor proved to be a valid concept</li> <li>● Moving forward we would suggest building an Intergraph API for a more seamless interface that worked through the SPI To-Do-List for MOC</li> </ul> <p><b>Comments:</b></p>	



Item	Topic	Notes	Action/Due
		<ul style="list-style-type: none"> <li>• Spec form interface (Link datasheet files) &amp; DDP data</li> <li>• The process displayed in the presentation works with SPI 2013 as well as SPI2016</li> <li>• Import Module can be set to avoid over-writing data from Vendor, during workflow.</li> <li>• Workflow with data imported and sent thru to SP3d was tested and worked relatively well</li> <li>• Lessons Learned in Slide 17</li> <li>• Phone question: Who to contact at Emerson/PufferSweiven – after roll-out in May2016 most reps should be available progressively</li> </ul>	
8	Presentation	<p><b>Universal Reporter and SPI</b> <span style="float: right;"><b>Christine Rech, CAXperts</b></span></p> <ul style="list-style-type: none"> <li>• Quality Assurance Module takes multiple SmartPlant Tools data (and others) and dumps out Excel Reports.</li> <li>• Typical Interface available to look at data &amp; select RULES to query the level of data with colorful xls output</li> <li>• 3 columns are added to create Filter or calculation capability on the Reports (with Legend sheet as separate xls Tab)</li> <li>• Multiple Graphics rules/checks work for P&amp;ID (not yet SPI ESL)</li> <li>• Some Example rules (20-100) and 'very easy' to customize more.</li> <li>• UniversalReporter can do limited EDIT-capabilities for P&amp;ID/SP3d and xls, but not yet SPI.</li> <li>• Comparison reports are able to be made on SPI data</li> <li>• Example of SPP&amp;ID &lt;&gt; SPI data comparison of many attributes with Report generated color-coded different checks</li> <li>• 2 snapshots of different Revisions of all SmartPlant databases can be compared</li> <li>• Fields to be reviewed are based on VIEWS in UniversalReporter.</li> <li>• MORE Slides will be sent and shared on SPILTUF.org</li> <li>• Demonstrated options of using tools Very productive and tempting to procure.</li> <li>• Useful for Upgrade-Testing as well as workflow revision checking, and comparison of similar/different</li> <li>• Feedback Requested ~ do the tools seem useful, and what other topics would be desired by LTUF folk.</li> </ul> <p>Comments:</p> <ul style="list-style-type: none"> <li>• Only two in room are currently using UR tool,</li> <li>• 3 in room are interested but, as John said many companies are reluctant to acquire more tools. Alex jumped in and reminded that SPI and SPP&amp;ID are restrictive to EDIT from external tools/sources other than manual data entry.</li> <li>• Spec sheet data comparison sounds very useful. Process data comparisons also useful. As-Built Versus Project from O/O mode standpoint of data is useful option.</li> <li>• Tom-Intergraph promoted potential new SPI APIs will allow more protocols exposed for external design tools</li> </ul>	

Item	Topic	Notes	Action/Due
9	Forum Topics	<ul style="list-style-type: none"> <li>• SPI Cable management <ul style="list-style-type: none"> <li>○ SPI/SPEL are keeper of Cable data, SP3D will read some data, but managed in SPI/SPEL (except around Routing Details.) Cable Schedules are more compact, and would be so desired.</li> <li>○ Cable Schedules from SPI are popular, but SP3D is not commonly used by audience (but is recommended by Fluor)</li> </ul> </li>   <li>• SPI Alarm Management <ul style="list-style-type: none"> <li>○ Many options allowed via SPI, but most folk desire UDFs (although formal methods are available.) Soft Tags discussion also raised. Alex suggests global committee results are desirable,</li> <li>○ Note SPI should HOLD the Alarm data, but once OWNERS get the SPI database, the MAC/MICC tools are often the Live repositories of Alarm data and supersede the SPI</li> </ul> </li>   <li>• SPI and Conditioning Orifice Plates <ul style="list-style-type: none"> <li>○ Multi-Holed orifice placed nearby disruptions to tighten configuration.</li> <li>○ Mangan queries best way to calculate, as well as storing the data for the configuration.</li> <li>○ Valero uses this for Conditioning Orifice Plates, and others are starting to.</li> </ul> </li> </ul> <p>Other items discussed:</p> <ul style="list-style-type: none"> <li>• Below is the preliminary compatibility matrix for SPI 2016. This has not been released to the public yet. <ul style="list-style-type: none"> <li>○ Enterprise Database Server</li> <li>○ Operating Systems <ul style="list-style-type: none"> <li>▪ Windows Server 2012 R2 - Standard/Datacenter Server</li> </ul> </li> <li>○ Database Platforms <ul style="list-style-type: none"> <li>▪ MS SQL Server 2014 - 12.0.2000.8</li> <li>▪ Oracle 12c R1 (12.1)</li> </ul> </li> </ul> </li> <li>• Remote Client Technology <ul style="list-style-type: none"> <li>○ Operating Systems * Windows Server 2012 R2</li> <li>○ Database Clients <ul style="list-style-type: none"> <li>▪ MS SQL Server 2014 Client - 12.0.2000.8</li> <li>▪ Oracle 12c R1 Client - 12.1.02.0</li> </ul> </li> <li>○ Application Publishing Products <ul style="list-style-type: none"> <li>▪ Citrix XenApp 7.6</li> </ul> </li> </ul> </li> <li>• Enterprise Client <ul style="list-style-type: none"> <li>○ Operating Systems <ul style="list-style-type: none"> <li>▪ Windows 10 - Professional &amp; Enterprise 64bit.</li> <li>▪ Windows 7 64-bit - Microsoft Windows 7 Professional &amp; Enterprise 64bit SP1</li> </ul> </li> </ul> </li> </ul>	

Item	Topic	Notes	Action/Due
		<ul style="list-style-type: none"><li>○ Database Clients<ul style="list-style-type: none"><li>▪ MS SQL Server 2014 Client - 12.0.2000.8, 32 bit.</li><li>▪ Oracle 12c R1 Client - (12.1.02.0). Oracle 32 bit Client required for both 32 bit and 64 bit Oracle databases.</li><li>▪</li></ul></li></ul>	
10	Close	<ul style="list-style-type: none"><li>• Next meeting will be May 10, 2016 at Jacobs (Big LIVE-DEMO of SPI2016)</li><li>• John Dressel closed meeting and thanked everyone for attendance</li></ul>	