

SPI – SPEL – SP-P&ID USING SMARTPLANT FOUNDATION

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SMARTPLANT FOUNDATION at FLUOR



- Fluor's Investment in the "NEXTGENERATIONSM Initiative"
- Fluor's Global Certified Environment
- Fluor's Execution & Work Processes
- Fluor's NEXTGENERATIONSM Training Programs
- Fluor's Global Deployment / Office Readiness Program
- Fluor's Global Sustaining Organization
- Fluor's Implementation of SP-P&ID Integration
- Fluor's Implementation of SPI Integration
- Fluor's Implementation of SPEL Integration
- Fluor's Implementation of SP3D Integration
- Fluor's Legacy Integration Programs
- Fluor's SmartPlant 3D Design Reuse Tools
- Fluor's NEXTGENERATIONSM "**THINKING FORWARD**"
 - SmartPlant P&ID Data Validation and Editor
 - SmartPlant Instrumentation Data Integration
 - SmartPlant Electrical Cable Management Tools




- Fluor's Investment in the "NEXTGENERATIONSM Initiative"
 - Work Process Review; began mid 2004
 - Technology Evaluation; 2005 – 2006
 - Certified Environment Development & Pilot Projects; 2007 – 2009
 - Office Readiness, Training & Deployment; 2010 – 2011
 - Global Project Execution Directive; 2012

Mission Statement:

Fluor's investment supporting the NEXTGENERATIONSM Initiative is a proactive approach to successfully deploy the Intergraph SmartPlant Suite of technologies within Fluor in advance of production projects;

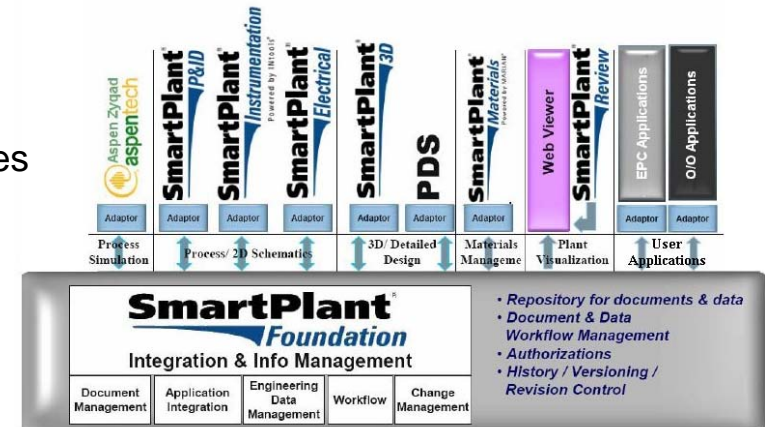
- Implementation of the SmartPlant software suite and SmartPlant Foundation in an Integrated project execution environment
- Work processes and Organizational changes that position Fluor for a "Next Generation" of project execution

- Fluor “Global Certified – Production Ready” Environment
 - Integrated Project Execution Environment with a Defined Set of Automation Tools & Compatible Versions
 - Implementation of Intergraph SmartPlant Enterprise Suite with "Certified - Production Ready" Environment
 - Fluor Utilities, Reporting, Drawing Templates, Catalog / Reference Data, Automation / Rules - with supporting Execution Guidelines, Work Processes, Training Program. & Deployment Program
 - Benefits - Global Execution Consistency, Cost Effective and Streamlined Project Start-up, Reduce Risk to Projects by "Pro-Actively" Testing & Certifying Automation Tools

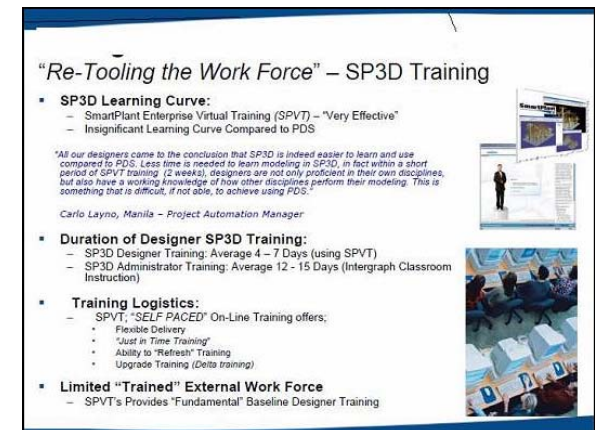
Fluor NGEP Certified Environment Compatibility Matrix										
Revision Date : 1/15/2008										
	<i>Version</i>	<i>Dependent Tools</i>								
		SmartPlant P&ID	SmartPlant Engineering Manager	SmartPlant Instrumentation (Intools)	SmartPlant 3D	SmartPlant Electrical	SmartPlant Markup	SmartPlant Foundation	Eng Framework	Schema
NGEP Certified Environment	NGEP_2007.3.A	05.03.03.13	05.00.03.09	08.00.03.08	07.00.43.07	04.01.03.07	3.8.2.5	03.08.03.08	03.08.03.08	03.08.03.08

- Global Work Process Driven Execution ...
 - Development of SmartPlant Global Execution Work Processes and Procedures
 - NEXTGENERATIONSM Execution Guidelines (Volumes 1,2, & 3)
 - Integrated Execution Work Processes using SmartPlant Foundation
 - Data Consistency, Centralized Integration Layer via SmartPlant Foundation
 - Multi-Functional Design Work Processes
 - Design Reuse; eliminate re-modeling and re-building between functions and projects
 - Material Management, Weight & COG Management, SmartPlant Interfaces (external & internal)
 - Material Management, MTO Extraction Utilities (Material Download Utility), Weight & COG Management Processes, Systems & Tool Interfaces, etc.

- Work Processes by SmartPlant Application ...
 - Cross Discipline SmartPlant 3D Work Processes
 - SmartPlant P&ID Process Graphics Work Processes
 - SmartPlant Instrumentation Integration Practice
 - SmartPlant Electrical Implementation Practice



- Role Base Curriculum
 - Leveraging the "Full" Advantage SP3D User Friendly Interface - Enabling "Multi Function Design"
- On-line SmartPlant 3D Virtual Training
 - High Quality, Effective, and Flexible Delivery
 - Enabled Fluor to Train Designers in Advance of Production Projects .
- Fluor Work Process Training
 - Re-enforcing Fluor's Work Processes Described in NEXTGENERATION Guidelines
- Office Readiness - "On-site" Coaching
 - Coaching of "Key" Subject Matter Experts
 - Leverage "existing" SmartPlant tool Experienced Resources
 - SmartPlant 3D Subject Matter Experts
 - SmartPlant P&ID Subject Matter Experts
 - SmartPlant Instrumentation Subject Matter Experts
 - SmartPlant Electrical Subject Matter Experts
 - Establish SmartPlant Foundation Experts in all Fluor Offices



"Re-Tooling the Work Force" – SP3D Training

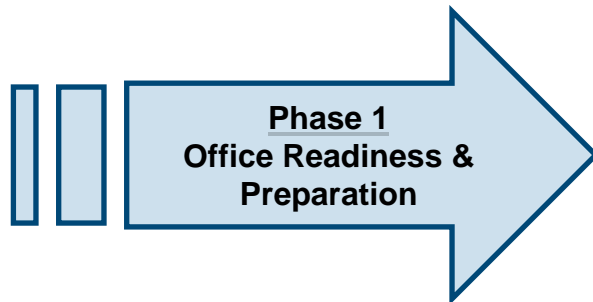
- **SP3D Learning Curve:**
 - SmartPlant Enterprise Virtual Training (SPVT) – "Very Effective"
 - Insignificant Learning Curve Compared to PDS

"All our designers came to the conclusion that SP3D is indeed easier to learn and use compared to PDS. Less time is needed to learn modeling in SP3D, in fact within a short period of SPVT training (2 weeks), designers are not only proficient in their own disciplines, but also have a working knowledge of how other disciplines perform their modeling. This is something that is difficult, if not able, to achieve using PDS."

Carlo Layno, Manila – Project Automation Manager

- **Duration of Designer SP3D Training:**
 - SP3D Designer Training: Average 4 – 7 Days (using SPVT)
 - SP3D Administrator Training: Average 12 - 15 Days (Intergraph Classroom Instruction)
- **Training Logistics:**
 - SPVT, "SELF PACED" On-Line Training offers:
 - Flexible Delivery
 - "Just in Time Training"
 - Ability to "Refresh" Training
 - Upgrade Training (Delta training)
- **Limited "Trained" External Work Force**
 - SPVT's Provides "Fundamental" Baseline Designer Training

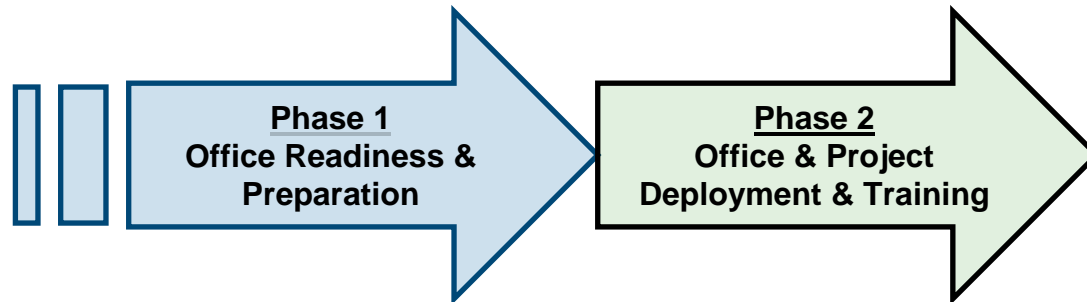
- Fluor's Global NEXTGENERATIONSM Deployment / Office Readiness Program



Phase 1

- IT Infrastructure
- Subject Matter Expert Identification
- Develop Project Deployment Plan
- Training Environment Setup
- Office Readiness Checklist

- Fluor's Global NEXTGENERATIONSM Deployment / Office Readiness Program



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Phase 2

- "On-site" Coaching by Core Team
- "Train the Trainer" Program
- Project Environment Setup & Configuration
- Initiate "Project Task Force" Training Program

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Phase 3

- "On-site" Project Start-up Coaching by Core Team
- Begin Project Execution
- Office Subject Matter Experts - "point of contact" for project / office & as part of Fluor Global Sustaining Organization

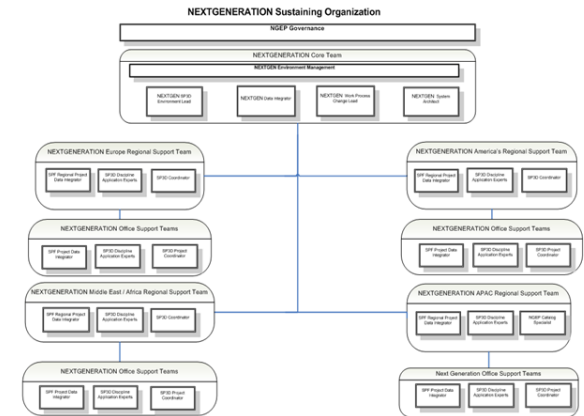
Fluor's Global Sustaining Organization



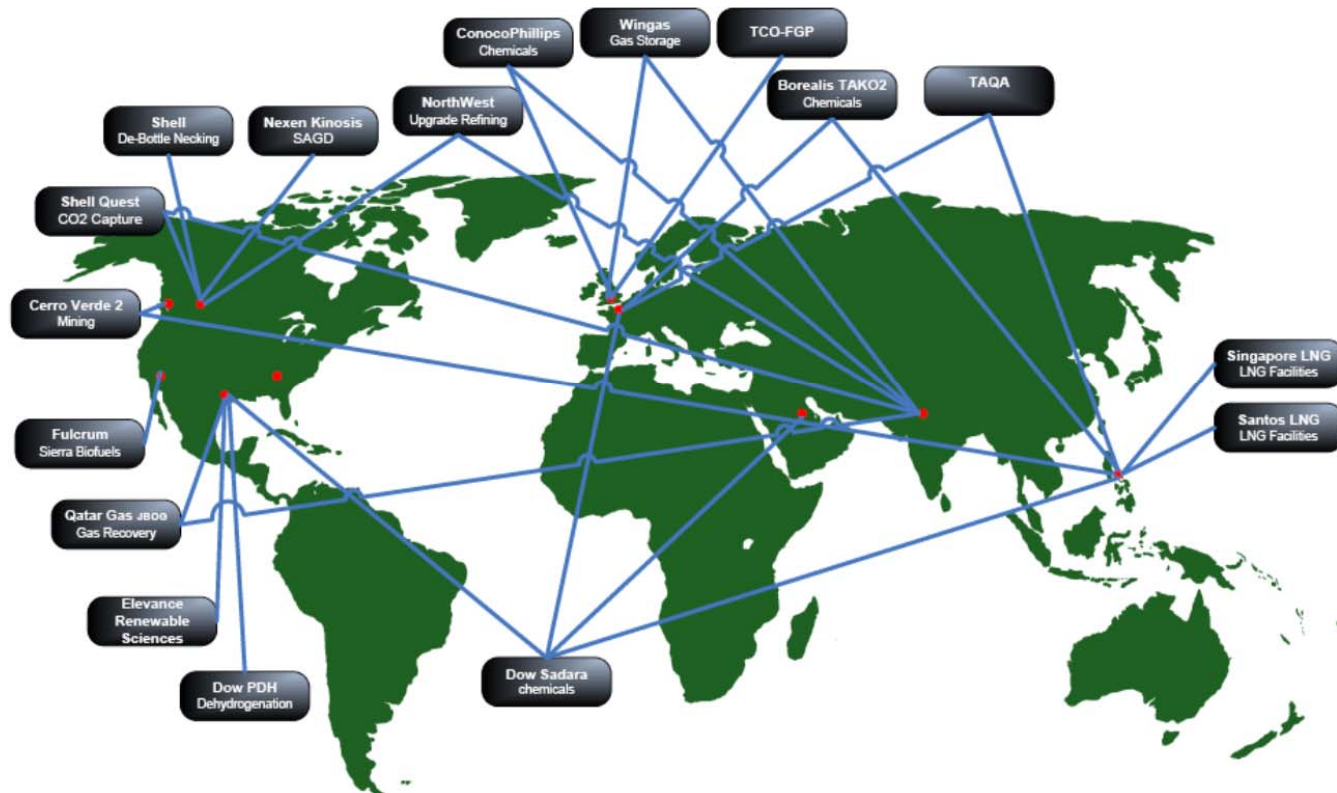
- Fluor's SmartPlant - Global Sustaining Organization
 - Global Core Team
 - Regional Support Teams
 - Office Support Teams

- Global Change Management | Governance Process
 - Certified Environment Change Request Process
 - Governance Process; Evaluation, Resources, Design, & Implement

- Build a Community of Subject Matter Experts
 - Establish Subject Matter Experts thru Office Readiness Program
 - Global Subject Matter Expert Telecoms & Forums
 - Leverage Fluor's Knowledge On-Line

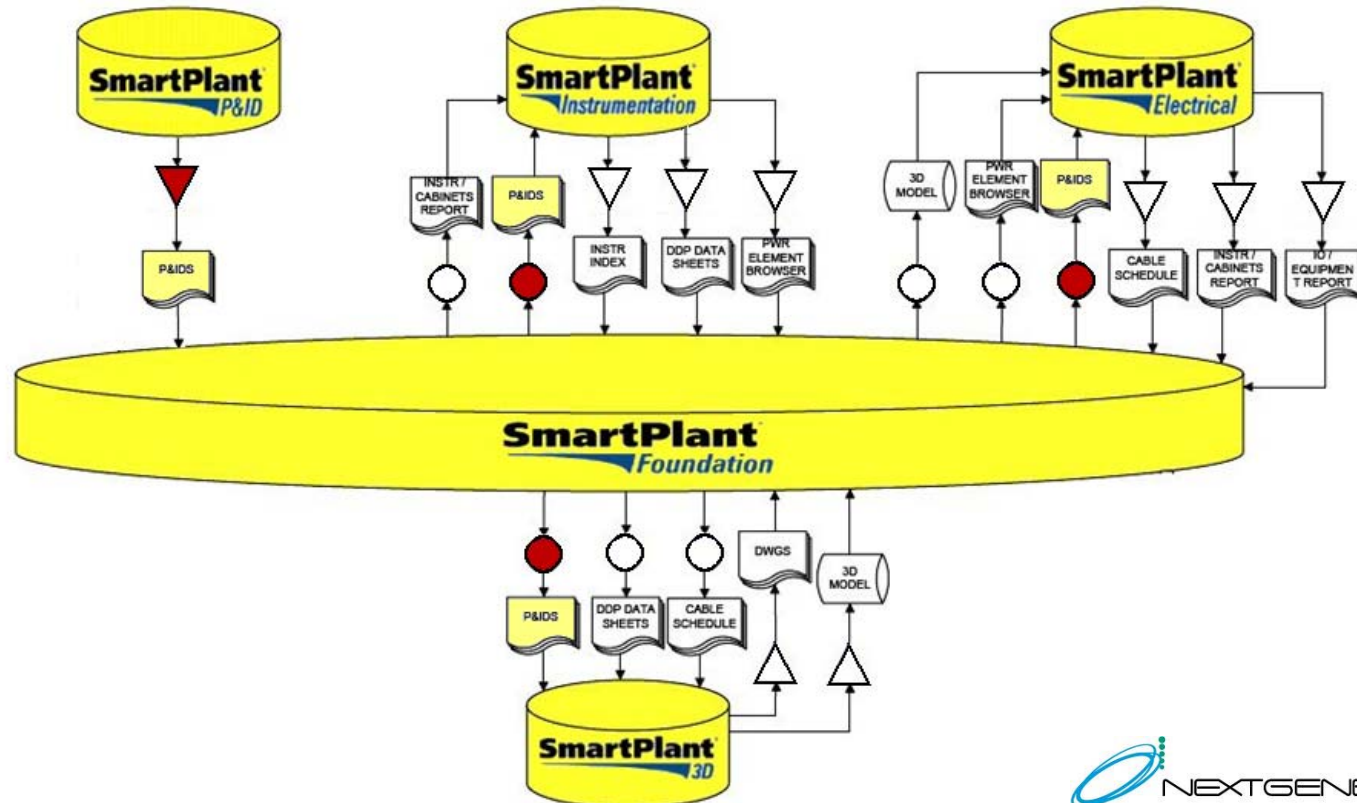


- Fluor's Global NEXTGENERATIONSM Project Execution Directive:
“All Fluor Projects worldwide shall be implemented using the SmartPlant software suite and SmartPlant Foundation in an Integrated project execution environment”



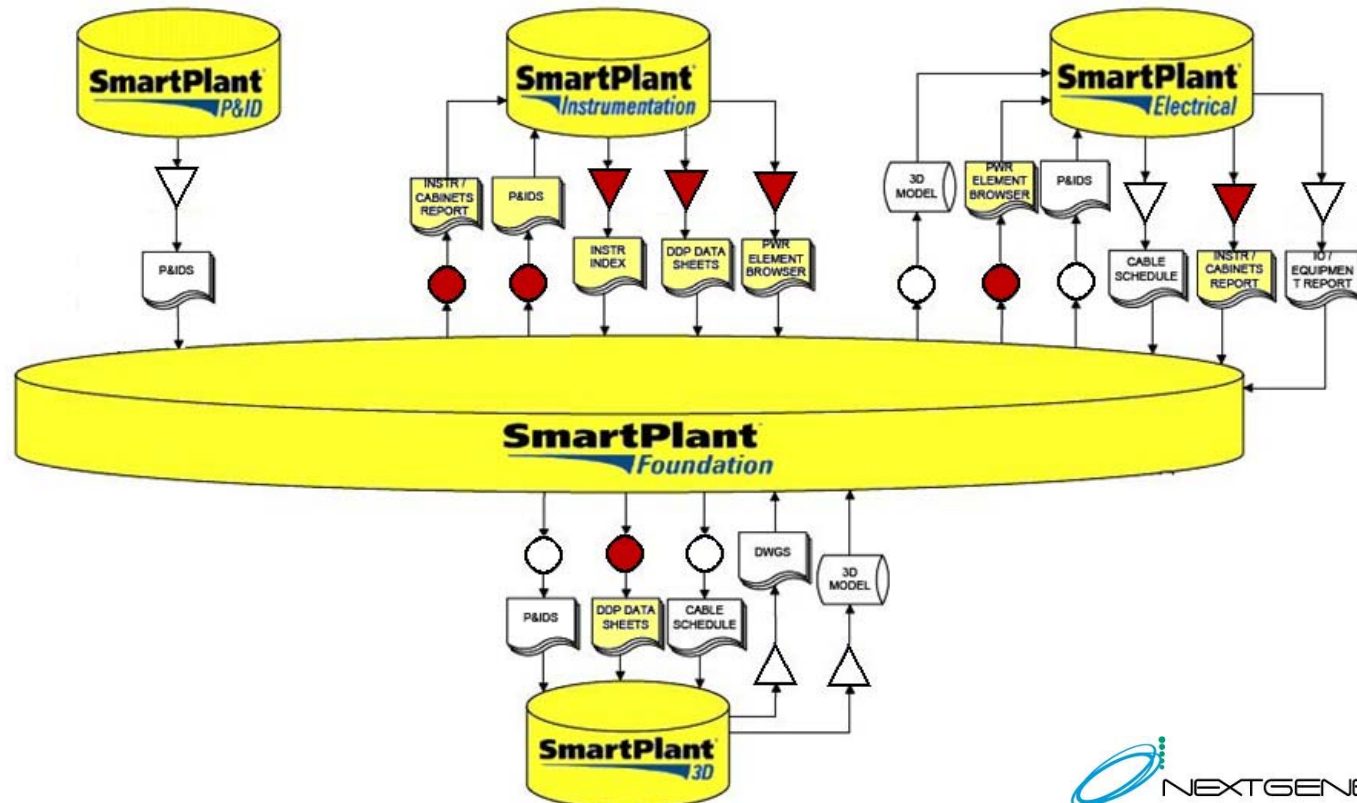
Implementation of SP-P&ID Integration

- SmartPlant P&ID “Publish” P&ID Diagram Numbers, Instrument Numbers, Line Numbers, Equipment Numbers and Associated Data to SmartPlant Foundation
- Other SmartPlant tools “Retrieve” the P&ID Data from the SmartPlant Foundation



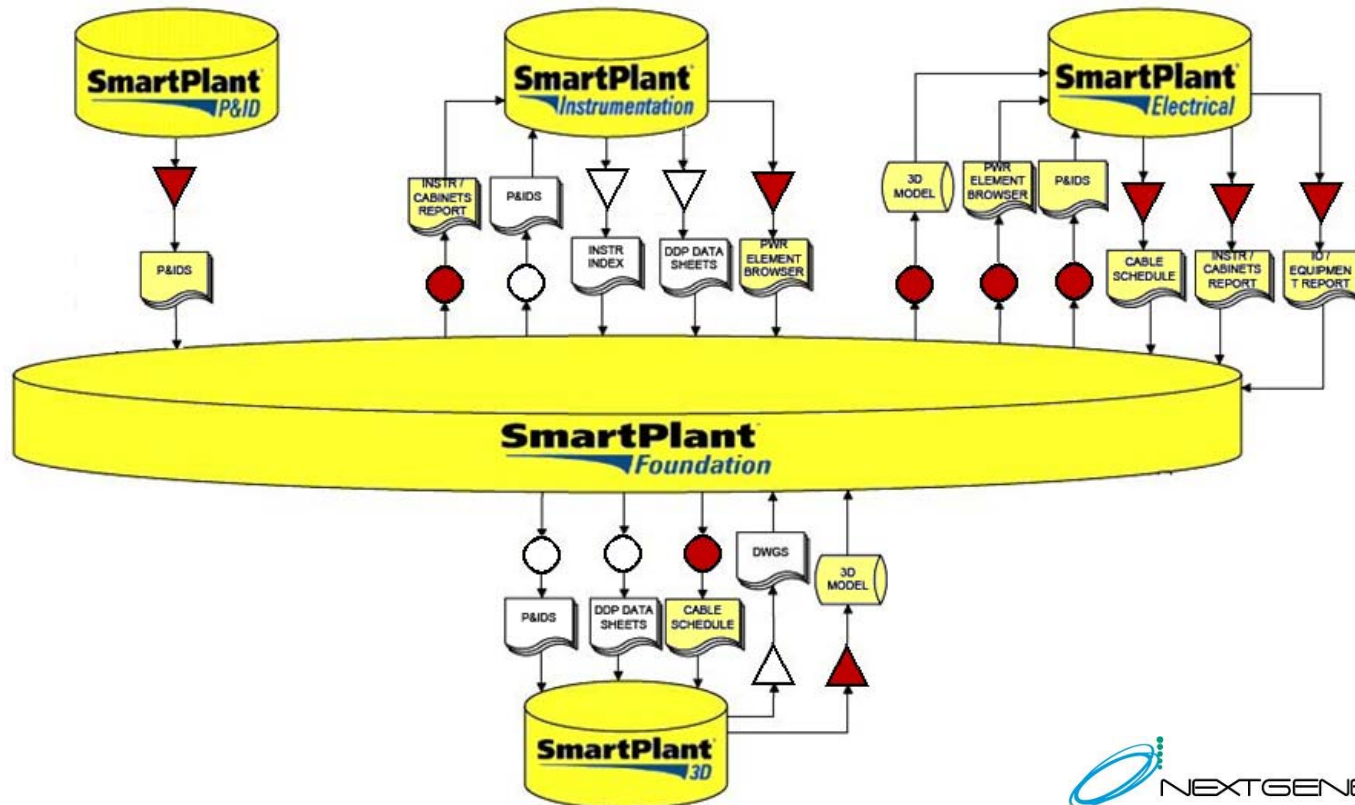
Implementation of SPI Integration

- SmartPlant Instrumentation correlates Instrument tag Numbers with SP-P&ID for MOC
- Instrument Power requirements and Signal cross reference is Published to SPEL
- Dimensional Data for Piping and Inline Instrument tags are published to SP-3D



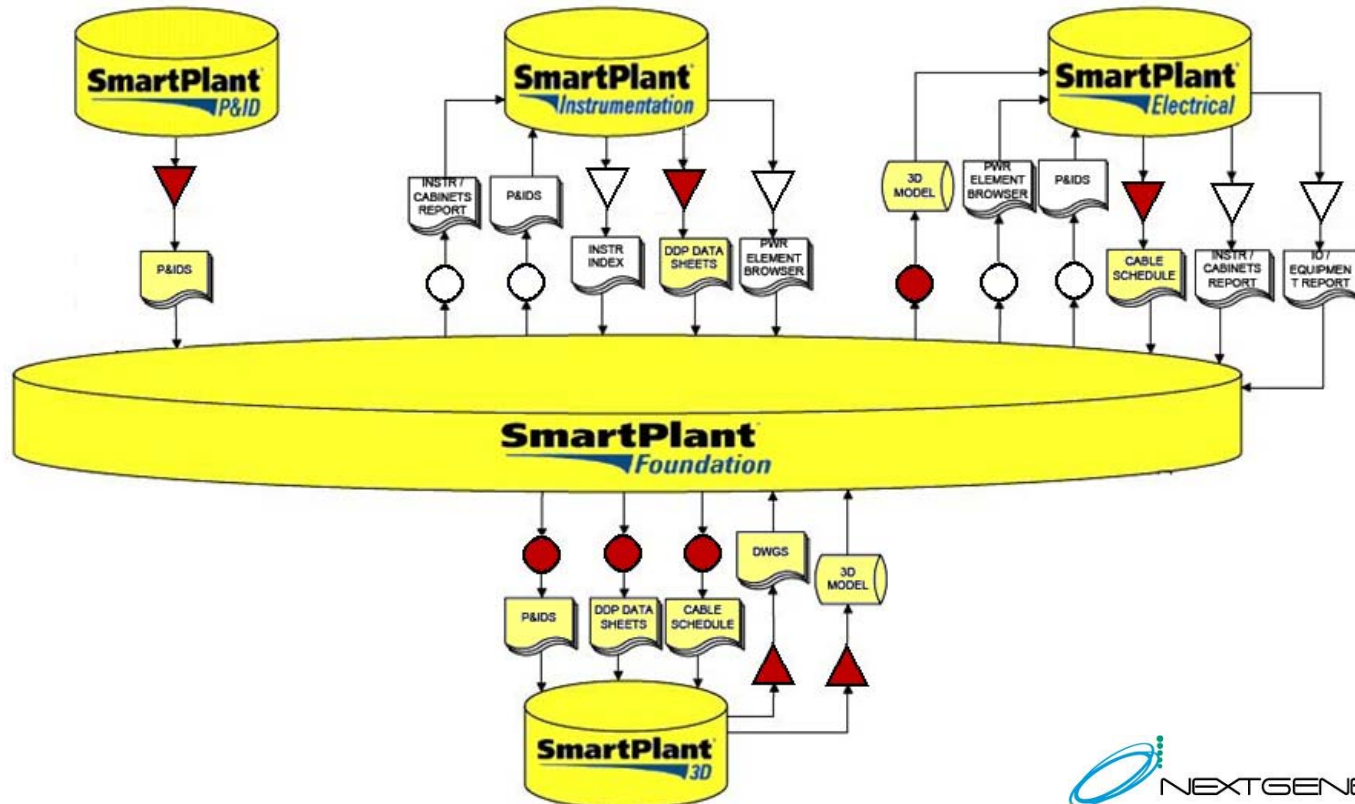
Implementation of SPEL Integration

- SmartPlant Electrical Retrieves Instrument Power Requirements and Signals from SPI and Electrical Equipment Numbers from SP-P&ID and Tray Data from SP-3D
- SmartPlant Electrical Publishes Cables requirements to SP-3D and Instrument circuiting with Electrical Signals to SPI

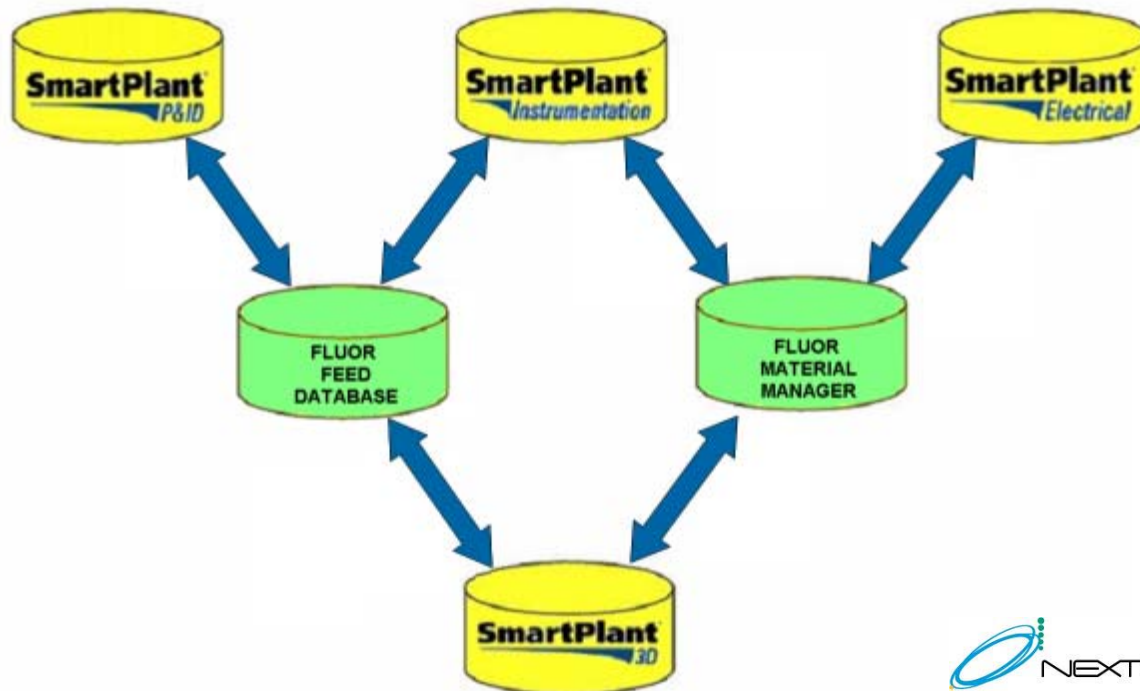


Implementation of SP-3D Integration

- SmartPlant 3D Retrieves Equipment and Line Numbers from SP-P&ID – Dimensional Data for In-lines from SPI – Cable Data from SPEL
- SmartPlant 3D Publishes 2D Location drawings and Model Material Requirements for Cable and Cable Tray System to SPEL



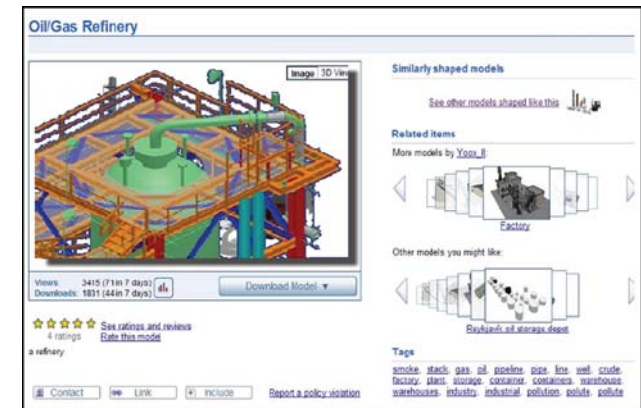
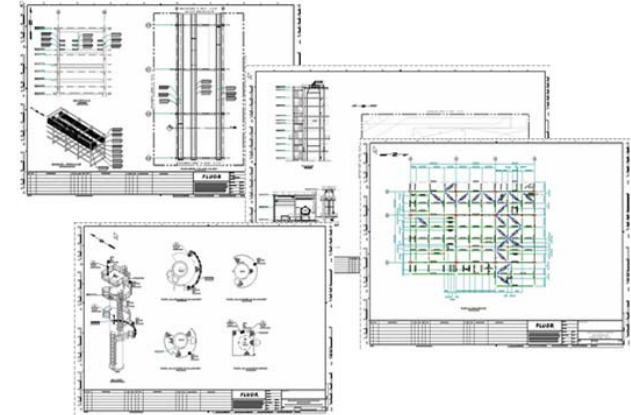
- Fluor Feed Database (FFD)
 - Acquires data from Smart P&ID and Process Simulators and inputs Mechanical, Process and Line data into SmartPlant Instrumentation and SmartPlant 3D
- Fluor Material Manager (MatMan)
 - Retrieves Material Requirements from SmartPlant Instrumentation, SmartPlant 3D and SmartPlant Electrical and Produces Purchase Orders, Bills of Material and Field Material Control & Warehousing Reports



Fluor's SmartPlant 3D Design Reuse Tools



- Fluor “Global” SmartPlant 3D Drawing Templates
 - Piping Templates
 - Civil / Structural Templates
 - Electrical and Control Systems Templates
 - Material Handling Templates
 - HVAC Templates
- Design Reuse Benefits
 - “Fully” Automated Drawings
 - Minimize Manual Annotations
 - “Pre-Configured” & “Standardized” Global Templates
 - Project Configuration Savings
 - Operational Consistency for Distributed Execution
 - Provide multi-office Project deliverables



SmartPlant Foundation - THINK FORWARD



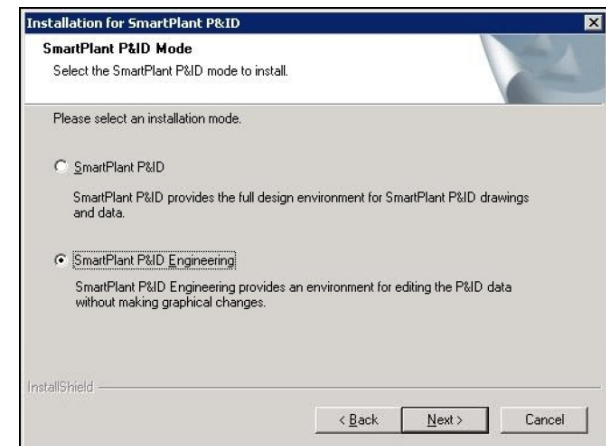
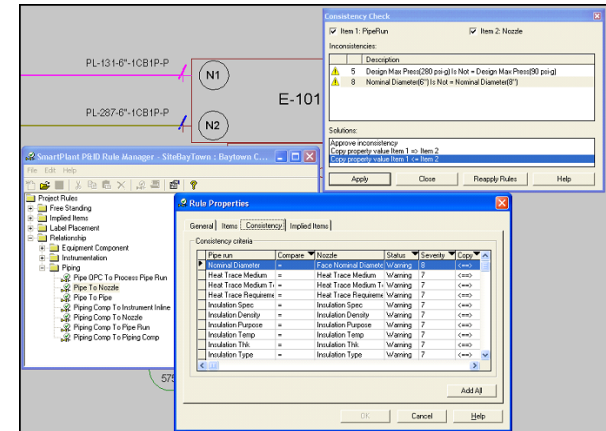
Fluor's NEXTGENERATIONSM "THINKING FORWARD"

- As New Intergraph SmartPlant Tools are developed Fluor's NEXTGENERATIONSM Team will create new Global Work Processes and Practices
- Optimize Fluor's NEXTGENERATIONSM Work Processes and Practices to leverage the SmartPlant Foundation Integration and Global Project execution
- Establish Fluor's NEXTGENERATIONSM Team as a beta test facility for Intergraph SmartPlant suite Tool and Feature development
- Fluor's NEXTGENERATIONSM Team will continue to work with vendors in the supply chain to facilitate SmartPlant suite integration with vendor sizing, selection and procurement software



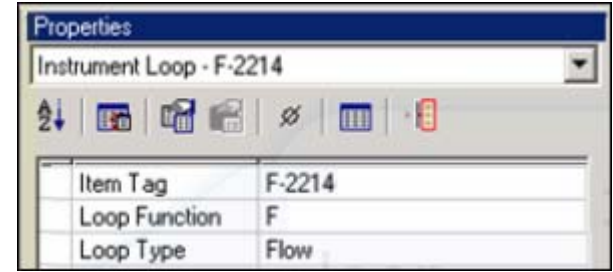
Fluor's NEXTGENERATIONSM "THINKING FORWARD"

- SmartPlant P&ID Engineering Integrity
 - Rule Based Graphics and Data Validation
 - Avoid making costly changes late in a project cycle
 - Ensure the quality and dependability of P&ID data
 - Capture Fluor's Best Practices
- SmartPlant P&ID Engineering - Data Editor
 - Allows Engineering Access to P&ID Data and Properties without affecting Process Graphics
 - Cross Discipline SmartPlant P&ID Work Processes
 - Establishes Discipline Data Ownership in P&ID
 - Improves Quality of Data Integration

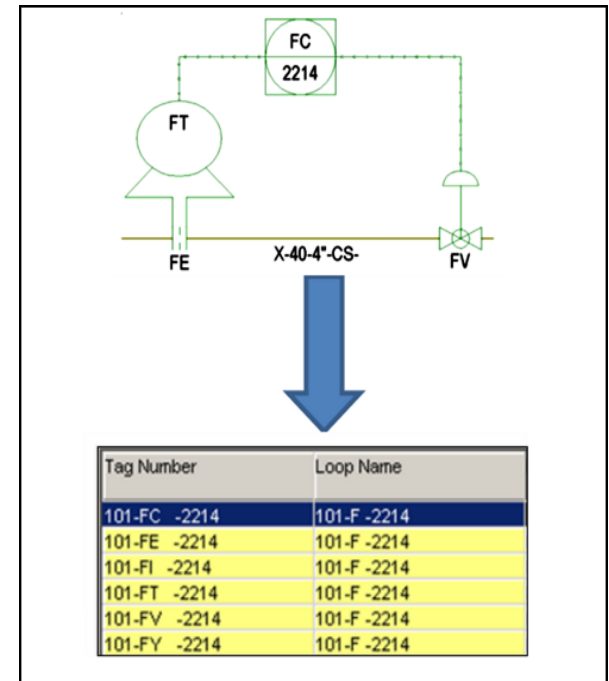


Fluor's NEXTGENERATIONSM "THINKING FORWARD"

- SmartPlant P&ID Engineering - Data Editor
 - Allows Control Systems Access to P&ID Tag and Loop Data without affecting Process Graphics
 - Adds the Ability to normalize the Instrument Types and Descriptions between SP-P&ID and SPI
 - Improves Quality of Instrumentation Data so additional Data can be Published and Retrieved to SPI
- SmartPlant Instrumentation Macro Expansion
 - Allows Control Systems Access to P&ID Tag and Loop Data without affecting Process Graphics
 - Adds the Ability to normalize the Instrument Types and Descriptions between SP-P&ID and SPI
 - Improves Quality of Instrumentation Data so additional Data can be Published and Retrieved to SPI

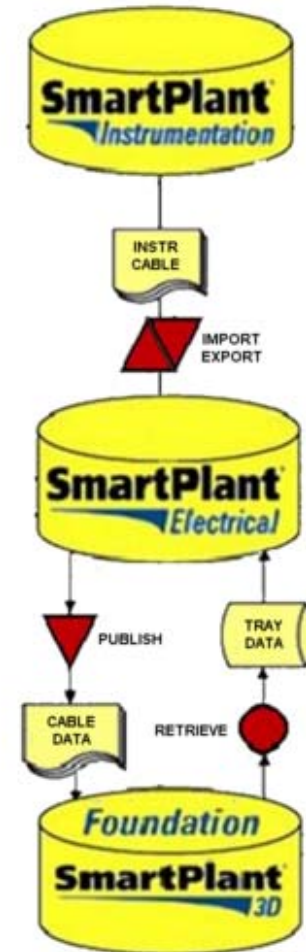


Properties	
Instrument Loop - F-2214	
Item Tag	F-2214
Loop Function	F
Loop Type	Flow



Fluor's NEXTGENERATIONSM "THINKING FORWARD"

- New SmartPlant Instrumentation Cable Browser View
 - Allows SPI to export the instrument cable requirements to SPEL
 - SPEL can then Publish both Electrical and Instrument Cable requirements to SP3D for Tray Loading
 - Cable Tray Routing and Loading done in SP3D will Provide Lengths and Routing Data
 - The SP3D Cable Lengths and Routing is Published Back to SPEL
 - Cable Schedules can be Published from SPEL for Electrical and Instrument Cables
 - or
 - Instrument Cable Data may be Exported from SPEL and Imported into SPI for Instrument Cable Schedules



QUESTIONS

SPI – SPEL – SP-P&ID USING SMARTPLANT FOUNDATION

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