Best Practices in the Integration of Modeling Software with the PI System

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&

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CAUTIONARY STATEMENT

FOR THE PURPOSES OF THE "SAFE HARBOR" PROVISIONS
OF THE PRIVATE SECURITIES LITIGATION REFORM ACT OF 1995

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About Phillips 66

Midstream

- Moves crude oil, refined products, natural gas and NGL
- Gathering and processing, pipelines, fractionation, storage, and export facilities
- General partner of Phillips 66 Partners LP
- 50% interest in NGL and natural gas processor, DCP Midstream, LLC

Chemicals

- 50% interest in Chevron Phillips Chemical Company LLC
- Manufactures olefins, polyolefins, aromatics, alpha olefins, styrenics and specialty chemicals globally
- Advantaged ethane feedstock

Refining

- Refines crude oil and other feedstocks at 13 refineries in the U.S. and Europe into products (mainly gasoline, diesel and aviation fuel)
- 2.1 MMBD in global refining capacity
- Large, complex refineries with integrated supply and distribution networks

Marketing & Specialties

- Markets refined petroleum products (gasolines, distillates and aviation fuels) mainly in the U.S. and Europe
- 7,550 U.S. branded sites
- 1,630 European retail sites
- Finished lubricants and Excel Paralubes base oil joint venture

Company Information

ROVISYS®
Automation & Information Solutions

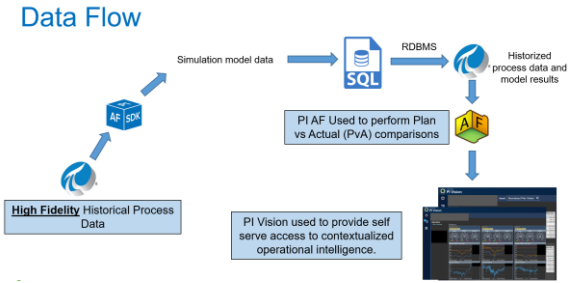
- 30 Years in Business, +25 Years OSIsoft Relationship
- Capabilities for Instrument-to-Executive Solutions
- Over 120,000 hours of PI System services in 2018
- 120+ experienced OSIsoft solution resources
- OSIsoft's First Select Partner in North America

725+EMPLOYEES
Less than 5% Attrition

OSIsoft® Select Partner

GLOBALLY LOCATED
US | Europe | Asia

Best Practices in Integration of Modeling Software with PI AF



CHALLENGE

Integrating PI System data with model data and comparing to actuals

- Different tools/spreadsheets with different data available
- Quality and consistency of monitoring varies
- Level of effort to maintain

SOLUTION

Integrate modeling data with the PI System to provide high fidelity, quality, rich dataset for trending, analysis, monitoring, optimization

- PI SDK to load high fidelity data in model
- PI RDBMS: interface to bring in modeling data back into the PI System
- PI AF: templatize and standardize process data, calculations, and analytics
- PI Vision: standard KPI, economic, summary displays

RESULTS

Improved KPI monitoring, optimization, and model usage resulting in improved economic performance

- Improved performance
- Data transparency
- Empowerment of SMEs with self serve access to model effectiveness

Data Flow

Simulation model data

RDBMS

Historized process data and model results

PI AF Used to perform Plan vs Actual (PvA) comparisons

High Fidelity Historical Process Data

PI Vision used to provide self serve access to contextualized operational intelligence.

Project Approach

- **Strong SME Involvement**
  - The Key to PI AF success!
  - Represent sites and make key business decisions:
    - Hierarchy, nomenclature, UOM, analytics, displays
    - Define unit-to-unit differences
  - Validate solution
  - Train end-users

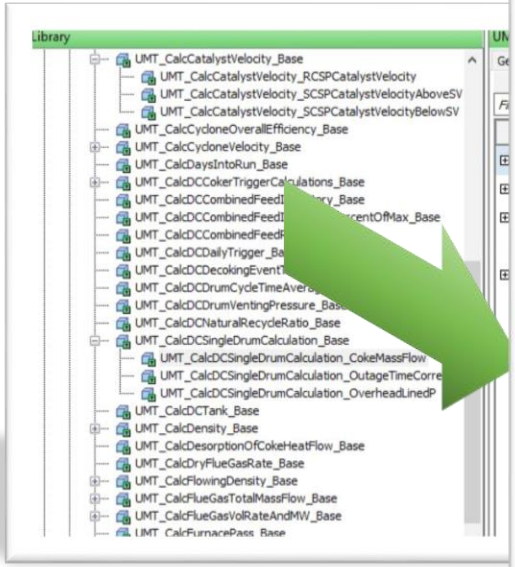
- **Align on an upfront design – forward looking vs specific project**
- **Use robust processes for communication, testing, documentation**
- **PI AF Expert/Partner collaboration – RoviSys and OSIsoft**

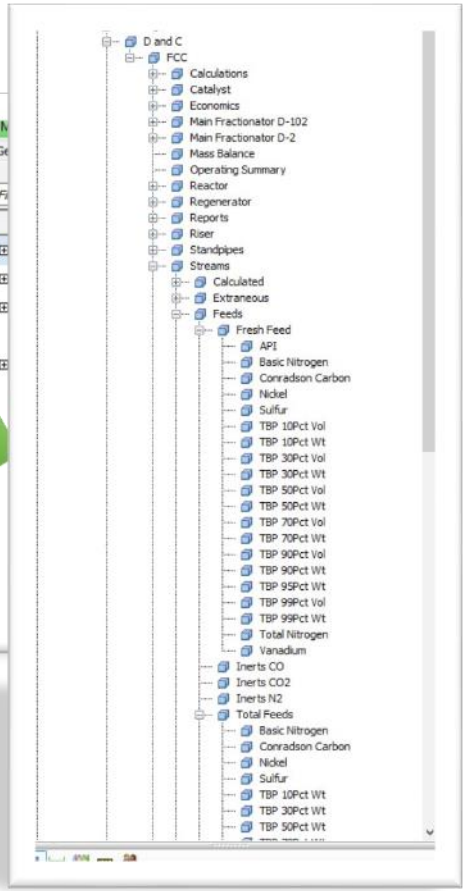
PI AF Template-based Solution

- **Leveraging the power of PI AF Templates of many flavors:**
  Elements, Analyses, Event Frames
  - Many commonalities across unit types
  - Unit-to-unit variations captured

- **Not just *physical* assets**
  - Product Streams, Yields, etc.

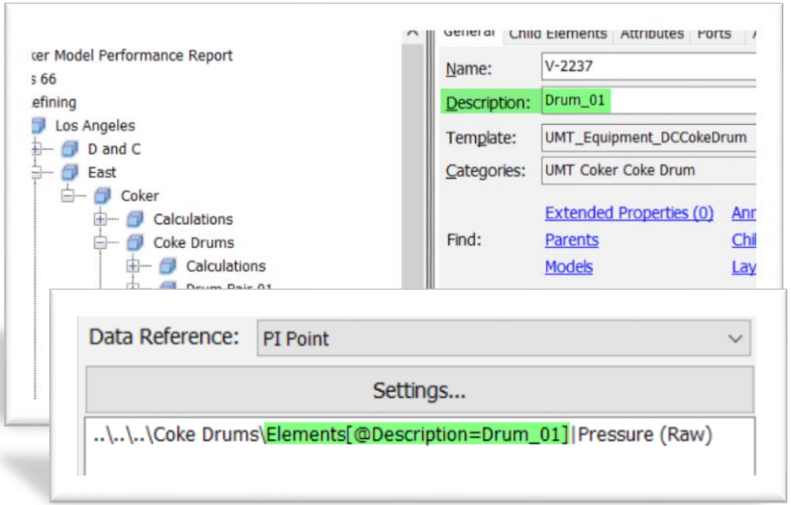
- **Dynamic and centrally managed design**
  - Standardized design library for deployment
  - Adaptable design, can evolve with business needs
  - Iterative approach to continuously improve the solution





PI AF Hierarchy Design

- **Hierarchy captures physical asset relationship**
  - Process, calculated, and modeled data side-by-side
  - Each PI Tag mapped once at major unit level
- **Hierarchy enables use of substitution parameters**
  - Only 10% process data tags with non-standard naming
  - PI AF Table lookups and substitution parameters reduced 90% of manual attribute data source mapping
  - Scalable and dynamic for long-term sustainability of solution
- **Forward-looking Data Infrastructure**
  - Supports current initiative
  - Lays groundwork for future solutions



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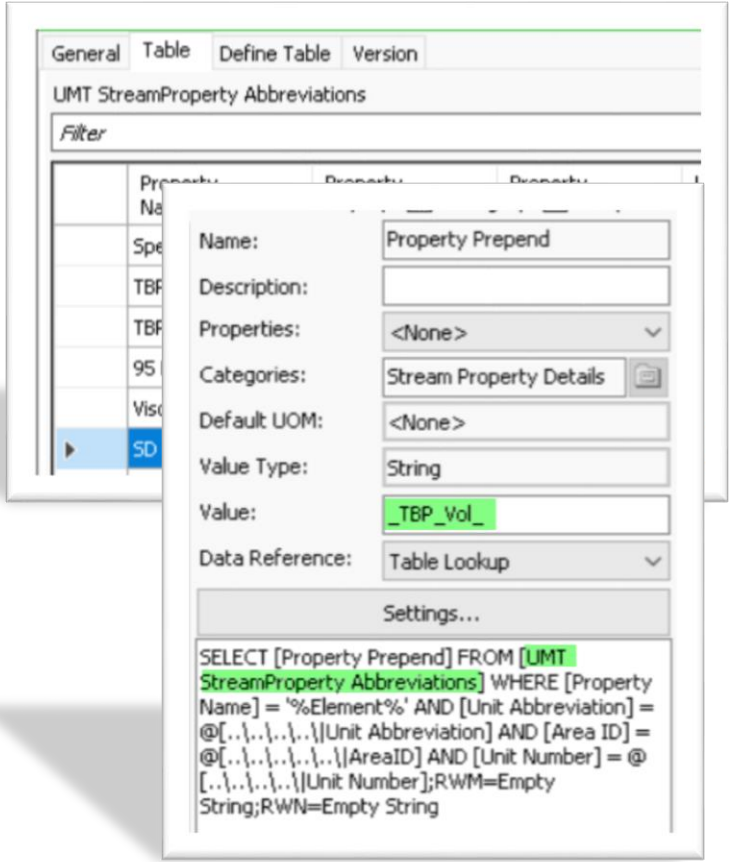

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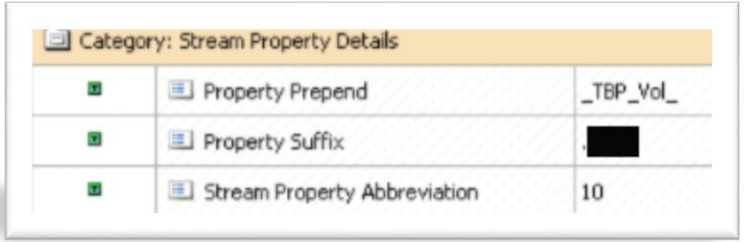
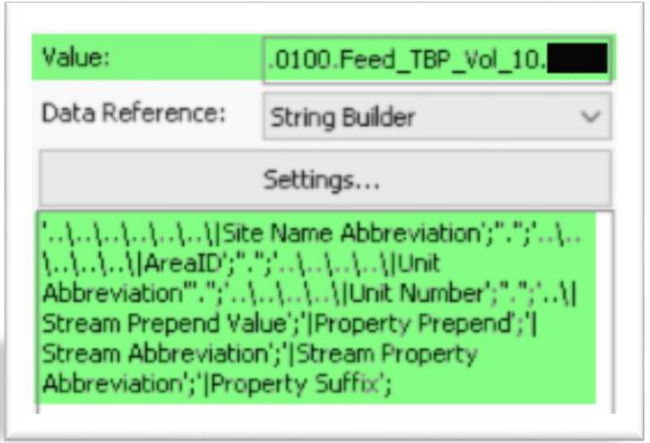
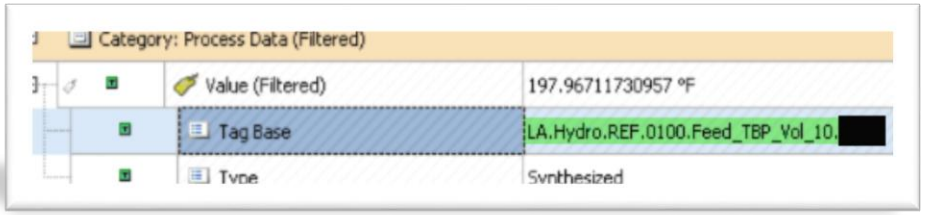
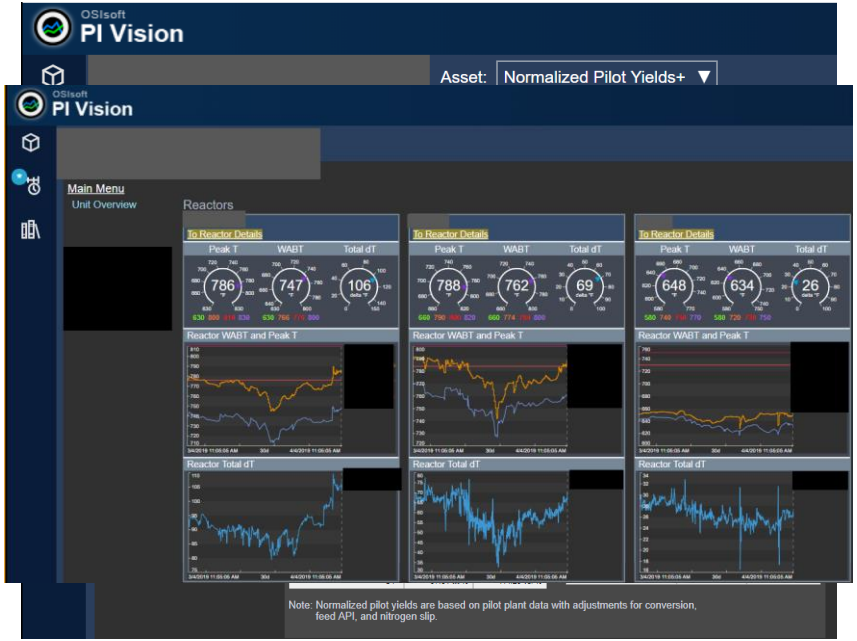






Scalable PI Vision Displays

- "Reports" PI AF Hierarchy branch created to reference critical values for displays
  - Consistent for every instance across the enterprise
- All display values are tied to AF Element Template attributes
  - PI Vision automatically enables Asset Relative Displays
  - Create each screen once per unit type Element Template and it applies to all instances in the AF Hierarchy
- Standardized view of real-time data and KPIs
  - No need to manage each person's "version of the truth"



Quick Tips

1. Consider using a PI AF Jump Start to establish standards, best practices, and initial learnings

2. Ensure no new unnecessary UOM classes & align with existing

3. Base & derived templates: Standardize hierarchy levels and element structure and as much as possible (SME involvement)

4. PI AF is a journey…that never ends; use agile methodology by initiative

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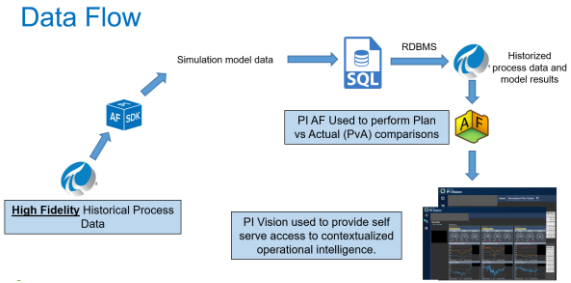

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Speaker Information

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Questions?

Please wait for the **microphone**

State your **name & company**

Please remember