

# Process, Power and Marine Division Standards-Based Interoperability ISO15926 – Tactical Update

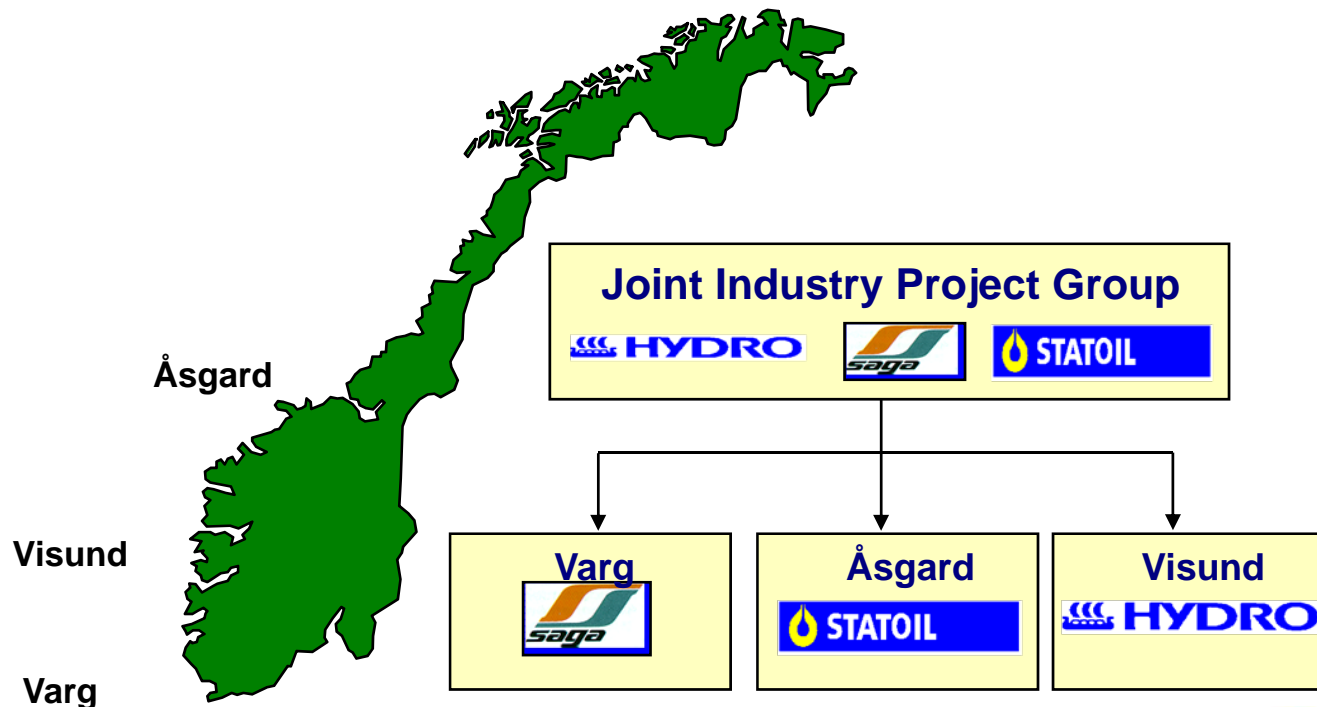
Ewan Botterill, Director GBD, Information Management & Integration, October – 2008



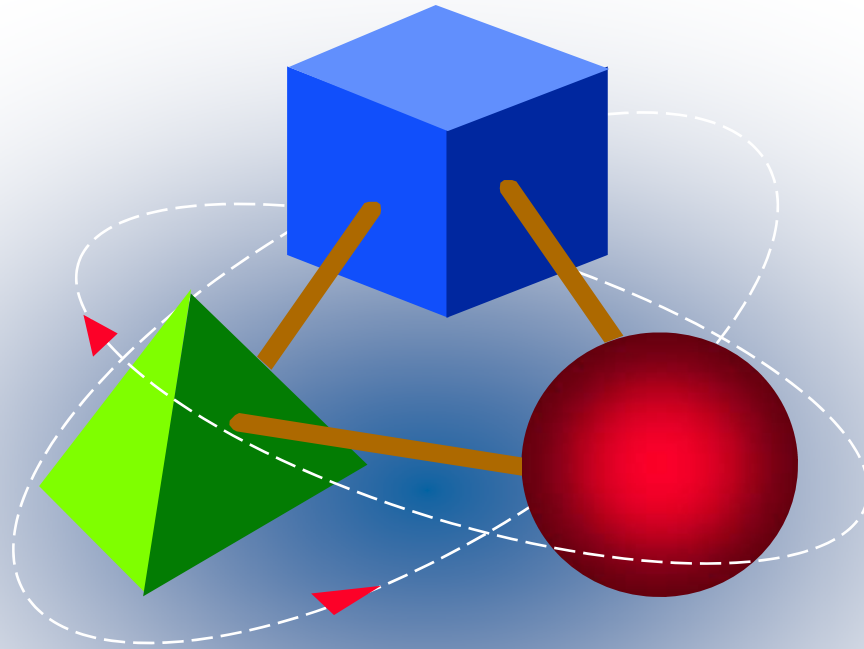
**Integrating the Engineering Enterprise...**

# THE VÅV Take Up Project

- The journey for Intergraph started in 1997 Norway with support of the POSC/Caesar project
- The development of the **first** data warehouse and illustration to the world of neutral data exchange



# The World's First Operational POSC/Caesar Data Warehouse

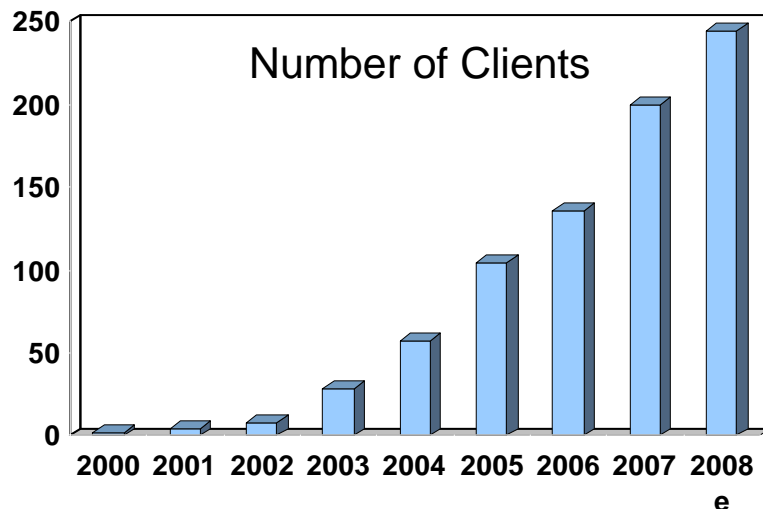


INTERGRAPH  
**Notia**®

# SmartPlant<sup>®</sup> Foundation 2008



- 10 Years young
- 200+ customers strong
- An evolution from data warehouse, to document management, to become the 'hub' of the SmartPlant Enterprise



- A \$30m business

- **August 1997** **Notia1.0**
- January 1999 Notia2.0
- January 2000 Notia2.1
- June 2000 Notia3.0
- March 2001 Notia3.1
- **January 2002** **SPF3.2**
- August 2002 SPF3.3
- March 2003 SPF3.4
- August 2003 SPF3.5
- October 2003 SPF3.5.1
- February 2004 SPF3.6
- August 2004 SPF3.6.1
- January 2005 SPF3.6.2
- August 2005 SPF3.7
- January 2007 SPFv2007
- **March 2008** **SPFv2008**

## Intergraph complying with ISO15926

- **Interfaces** – communication, exchange & *mapping* using common data model
  - (Schema, Reference Data & Templates & Methodologies)
- **Full Lifecycle Change Management** – meta-data / *stewardship* of those communications & exchanges, changing through the lifecycle.
  - *Fundamental to SP Foundation past, present & future.*

# More SPF Specifics concerning 15926



Internal schema has common **15926 heritage** of EPISTLE core model.

Existing implementations already use

- Management meta-data concepts for ownership, change-management, versioning, tomb-stoning, etc ... and these continue to be enhanced
- *InterfaceDef, EdgeDef, GraphDef & ViewDef concepts* to build business-significant data sets from the generic core. *These are directly analogous to 15926 Part 7 Templates.*

Existing and ongoing “ables” development is extending and exploiting these “template” simplification layers to **hide core model complexity** and **make configuration, mapping and interface building easier** through business-friendly views, business rules in content, etc.

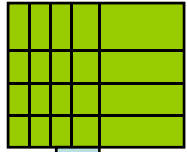
SP-Adapter *technology* evolving into **generic adapter** supporting more flexible interfacing *can* be extended in future to any de-facto technology standard (eg ISO15926 Part 8/9 OWL/RDF Facades).

# Structured content Import/Export

e.g. according to ISO15926, demonstrated 2007



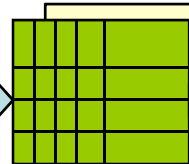
Business DataSet  
Excel or XML  
format



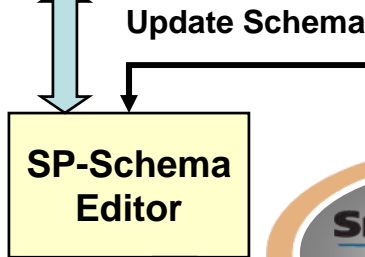
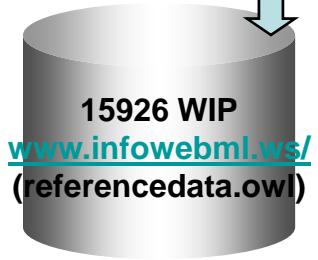
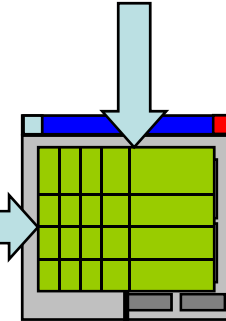
SmartPlant Mapping



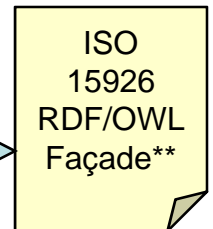
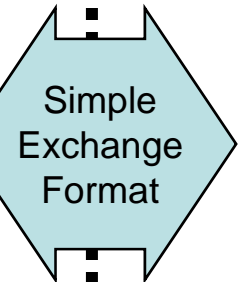
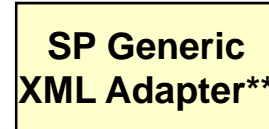
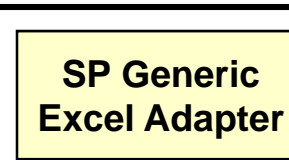
Characterized  
DataSet  
Definition



Populate  
Instance  
with Data



Save / Import Publish Data  
Excel or XML adaptor



\*\* ongoing developments



# Recent SmartPlant Product-Based ISO15926 Interoperability Work



- Comprehensive 15926-style interoperability is already fundamental to SmartPlant Foundation (SPF) strategic approach, architecture and road-map
  - Now - SPF Generic XML / Excel Adapter / Loader Interfaces “Yellow-level”
  - “Green-level” limited only RDS/WIP content (using SPMapper / Schema Editor / Generic Adapter or XMpLant)
- Reference Data Content / Cats & Specs
  - Now - fundamental to SmartPlant Enterprise Integration SmartPlant Reference Data (SPRD) approach
- **Standardization of supply-chain exchange using datasheet content**
  - Now - Providing pragmatic “Yellow-level” conformance where Excel/XML is the transport medium
- **Creation of first XMpLant interfaces for SP3D models**
  - Now - SP3D / SM interfaces  
Exchanging 2D/3D Geometry & Data content.  
“Yellow –level” (eg using XMpLant with or without CIMSteel mapping harmonization.



# API Mechanical Equipment Datasheet development / usage objectives...



- Model content as shared ***data*** but with a ***document*** presentation vehicle
  - **Data** integration
- Uniform and *consistent* presentation between sheets
- Platform for sharing content with applications
  - **Application** integration
- Platform for sharing content with partners/suppliers
  - **Business process** integration
- **Share/Collaborate definitions with industry standards initiatives**
  - **ADI project of FIATECH**
  - **IDS project of POSC/Caesar**
  - **to become the de-facto standard package for communication within the supply-chain for mechanical engineering content...**

# Availability... API Mechanical Equipment Datasheets for Rotary and Heat Transfer Equipment



- API 560 – Air Pre-heater
- API 560 – Fan
- API 560 – Fired Heater
- API 560 – Soot Blower
- API 610 – Centrifugal Pump (OH, BB and VS) (10th edition)
- API 611 – General Purpose Steam Turbine
- API 612 – Special Purpose Steam Turbine
- API 616 – Combustion Gas Turbine (4th edition)
- API 617 – Turbo-expander / Centrifugal Compressor (6th edition)
- API 618 – Reciprocating Compressor (4th edition)
- API 619 – Rotary Type PDP Compressor
- API 660 – Shell and Tube Heat Exchanger (7th edition)
- API 662 – Plate and Frame Heat Exchanger
- API 672 – Packaged, Integrally Geared Centrifugal Air Compressors (4th edition)
- API 673 – Centrifugal Fan (2nd edition)
- API 673 – Electric Motor (2nd edition)
- API 674 – Reciprocating Pump (2nd edition)
- API 675 – Controlled Volume Pump
- API 676 – Rotary Pump (2nd edition)
- API 685 – Seal less Centrifugal Pump

# API Mechanical Equipment Datasheet Look and Feel (API610 example)



CP-101.xls

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z AA AB AC AD AE AF AG AH AI AJ AK AM AN

1 **API INTERGRAPH** PAGE 1 OF 5  
 2 **CENTRIFUGAL PUMP (API 610-10TH)** JOB NO. Job No ITEM NO(S) CP-101  
 3 **PROCESS DATA SHEET** REQ / SPEC NO. Req No  
 4 PURCH ORDER NO. DATE  
 5 INQUIRY NO. Inq No BY

8 APPLICABLE TO:  PROPOSALS  PURCHASE  AS BUILT  
 9 For UNIT  
 10 SITE SERVICE

12 NOTES: INFORMATION BELOW TO BE COMPLETED:  BY PURCHASER  BY MANUFACTURER  BY MANUFACTURER OR PURCHASER

DATA SHEETS							REVISIONS		
	ITEM NO.	ATTACHED	ITEM NO.	ATTACHED	ITEM NO.	ATTACHED	NO.	DATE	BY
8	PUMP	Pump1	<input type="checkbox"/>	Pump2	<input type="checkbox"/>	Pump3	<input type="checkbox"/>		
9	MOTOR		<input checked="" type="checkbox"/>		<input type="checkbox"/>				
10	GEAR		<input type="checkbox"/>		<input checked="" type="checkbox"/>				
11	TURBINE		<input type="checkbox"/>		<input type="checkbox"/>				

19 APPLICABLE OVERLAY STANDARD(S):

OPERATING CONDITIONS (5.1.3)				LIQUID (5.1.3)				
14	FLOW, NORMAL	60000	gal_US/h	RAT'D	1200	gal_US/min	LIQUID TYPE OR NAME	Water
15	OTHER	Other					<input type="checkbox"/> HAZARDOUS <input checked="" type="checkbox"/> FLAMMABLE <input checked="" type="checkbox"/> TOXIC (5.15)	
17	SUCTION PRESS. MAX. RATED	200	ft	220	psig		MIN. NORMAL MAX.	
18	DISCHARGE PRESSURE	100.00	psig			PUMPING TEMP	F 35.6 86 122	
19	DIFFERENTIAL PRESSURE	50	psi			VAPOR PRESS	atm	
20	DIFF. HEAD	30	ft	NPSHA	30	RELATIVE DENSITY	1 1 1	
21	PROCESS VARIATIONS (5.1.4)	Proc var				VISCOSITY		
22	STARTING CONDITIONS (5.1.4)	Start conditons				SPECIFIC HEAT, Cp	0.222 Btu_IT/(lb-degF)	
23	SERVICE: <input type="radio"/> CONT. <input type="radio"/> INTERMITTENT (STARTS/DAY)					CHLORIDE CONCENTRATION (6.5.2.4)	2 Btu_IT/(lb-degF)	
24	PARALLEL OPERATION REQ'D (5.1.13)					H <sub>2</sub> S CONCENTRATION	66 Btu_th/(lb-degF)	
25	SITE DATA (5.1.3)					CORROSIVE / ERODIVE AGENT	dadf cal/(g-degC)	
27	LOCATION: (5.1.30)					MATERIALS (5.12.1.1)	cal/(kg-degC)	
28	<input type="radio"/> INDOOR <input checked="" type="radio"/> OUTDOOR <input type="radio"/> HEATED <input type="radio"/> UNHEATED					ANNEX H CLASS (5.12.1.1)	annex hclass CHU/(lb-degC)	
29	ELECTRICAL AREA CLASSIFICATION (5.124 / 6.14)					MIN DESIGN METAL TEMP (5.12.4.1)	300 J/(kg-degC)	
30	CL CL GR GR DIV Div					REDUCED HARDNESS MATERIALS REQ'D. (5.12.1.12)	J/(kg-K)	
31	<input type="checkbox"/> WINTERIZATION REQ'D <input type="checkbox"/> TROPICALIZATION REQ'D.					BARREL/CASE	SS IMPELLER SS	

39 **PROCESS DATA** / OH / BB / VS / DESIGN CODES + WELD + INSPECT / Version /

# API Mechanical Equipment Datasheet Look and Feel (API610 example)



CP-101.xls

1 2 3 4 5 6

7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

APPLICABLE TO:  PROPOSALS  PURCHASE  AS BUILT

FOR: \_\_\_\_\_ UNIT: \_\_\_\_\_

SITE: \_\_\_\_\_ SERVICE: \_\_\_\_\_

NOTES: INFORMATION BELOW TO BE COMPLETED:  BY PURCHASER  BY MANUFACTURER  BY MANUFACTURER OR PURCHASER

DATA SHEETS							REVISIONS		
	ITEM NO.	ATTACHED	ITEM NO.	ATTACHED	ITEM NO.	ATTACHED	NO.	DATE	BY
PUMP	Pump1	<input type="checkbox"/>	Pump2	<input type="checkbox"/>	Pump3	<input type="checkbox"/>			
MOTOR		<input checked="" type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>			
GEAR		<input type="checkbox"/>		<input checked="" type="checkbox"/>		<input type="checkbox"/>			
TURBINE		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>			

APPLICABLE OVERLAY STANDARD(S): \_\_\_\_\_

OPERATING CONDITIONS (5.1.3)				LIQUID (5.1.3)				
FLOW, NORMAL	60000	gal_US/h	RAT'D	1200	gal_US/min	LIQUID TYPE OR NAME	Water	
OTHER	Other					<input type="checkbox"/> HAZARDOUS	<input checked="" type="checkbox"/> FLAMMABLE	<input checked="" type="checkbox"/> TOXIC (5.15)
SUCTION PRESS. MAX. RATED	200	ft	220	psig		MIN.	NORMAL	MAX.
DISCHARGE PRESSURE	100.00	psig			PUMPING TEMP	35.6	86	122
DIFFERENTIAL PRESSURE	50	psi			VAPOR PRESS	atm		
DIFF. HEAD	30	ft	NPSHA	30	RELATIVE DENSITY	1	1	1
PROCESS VARIATIONS (5.1.4)	Proc var				VISCOSITY			
STARTING CONDITIONS (5.1.4)	Start conditons				SPECIFIC HEAT, Cp	0.222		
SERVICE: <input type="radio"/> CONT. <input type="radio"/> INTERMITTENT (STARTS/DAY)					CHLORIDE CONCENTRATION (6.5.2.4)	2		
<input type="checkbox"/> PARALLEL OPERATION REQ'D (5.1.13)					H <sub>2</sub> S CONCENTRATION	66	lb/lb	
	SITE DATA (5.1.3)				CORROSIVE / ERODIVE AGENT	dadf		
LOCATION: (5.1.30)					MATERIALS (5.12.1.1)			
<input type="radio"/> INDOOR <input checked="" type="radio"/> OUTDOOR <input type="radio"/> HEATED <input type="radio"/> UNHEATED					ANNEX H CLASS (5.12.1.1)	annex hclass		
ELECTRICAL AREA CLASSIFICATION (5.12.4 / 6.14)					MIN DESIGN METAL TEMP (5.12.4.1)	300		
CL CL GR GR DIV Div					<input type="checkbox"/> REDUCED HARDNESS MATERIALS REQ'D. (5.12.1.12)			
<input type="checkbox"/> WINTERIZATION REQ'D <input type="checkbox"/> TROPICALIZATION REQ'D.					IMPELLER CASE	SS	IMPELLER	SS

Multi Sheet

Schema version

PROCESS DATA / OH / BB / VS / DESIGN CODES + WELD + INSPECT / Version

# API Mechanical Equipment Datasheet Look and Feel (API610 example)



CP-101.xls

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z AA AB AC AD AE AF AG AH AI AJ AK AM AN

**INTERGRAPH**  
**CENTRIFUGAL PUMP (API 610-10TH)**  
**PROCESS DATA SHEET**

JOB NO. Job No ITEM NO(S) CP-101  
 REQ / SPEC NO. Req No  
 PURCH ORDER NO. DATE  
 INQUIRY NO. Inq No BY

PAGE 1 OF 5

PROPOSALS
  PURCHASE
  AS BUILT

For UNIT UNIT  
 SITE SERVICE Service

NOTES: INFORMATION BELOW TO BE COMPLETED:
  BY PURCHASER
  BY MANUFACTURER
  BY MANUFACTURER OR PURCHASER

DATA SHEETS				REVISIONS				
ITEM NO.	ATTACHED	ITEM NO.	ATTACHED	ITEM NO.	ATTACHED	NO.	DATE	BY
PUMP	Pump1	<input type="checkbox"/>	Pump2	<input type="checkbox"/>	Pump3	<input type="checkbox"/>		
MOTOR		<input checked="" type="checkbox"/>		<input type="checkbox"/>				
GEAR		<input type="checkbox"/>		<input checked="" type="checkbox"/>				
TURBINE		<input type="checkbox"/>		<input type="checkbox"/>				

APPLICABLE OVERLAY STANDARD(S):

OPERATING CONDITIONS (5.1.3)				LIQUID (5.1.3)					
FLOW, NORMAL	60000	gal_US/h	RAT'D	1200	gal_US/min	LIQUID TYPE OR NAME	Water		
OTHER	Other					<input type="checkbox"/> HAZARDOUS	<input checked="" type="checkbox"/> FLAMMABLE	<input checked="" type="checkbox"/> TOXIC (5.15)	
SUCTION PRESS. MAX. RATED	200	/	220	psig		MIN.	NORMAL	MAX.	
DISCHARGE PRESSURE	100.00			psig	PUMPING TEMP	F	35.6	86	122
DIFFERENTIAL PRESSURE	50			psi	VAPOR PRESS	atm			
DIFF. HEAD	30	ft	NPSHA	30	RELATIVE DENSITY		1	1	1
PROCESS VARIATIONS (5.1.4)	Proc var				VISCOSITY				
STARTING CONDITIONS (5.1.4)	Start conditons				SPECIFIC HEAT, Cp		0.222		
SERVICE: <input type="radio"/> CONT. <input type="radio"/> INTERMITTENT (STARTS/DAY)					CHLORIDE CONCENTRATION (6.5.2.4)		2		
<input type="checkbox"/> PARALLEL OPERATION REQ'D (5.1.13)					H <sub>2</sub> S CONCENTRATION		66	lb/ft	
SITE DATA (5.1.3)				CORROSIVE / ERODIVE AGENT				dadf	
LOCATION: (5.1.30)				MATERIALS (5.12.1.1)					
<input type="radio"/> INDOOR	<input checked="" type="radio"/> OUTDOOR	<input checked="" type="radio"/> HEATED	<input type="radio"/> UNHEATED	ANNEX H CLASS (5.12.1.1)	annex hclass				
ELECTRICAL AREA CLASSIFICATION (5.12.4 / 6.14)				MIN DESIGN METAL TEMP (5.12.4.1)	300				
CL	CL	GR	GR	REDUCED HARDNESS MATERIALS REQ'D. (5.12.1.12)					
CL	CL	GR	GR	BARREL/CASE	SS	IMPELLER	SS		
<input type="checkbox"/> WINTERIZATION REQ'D	<input type="checkbox"/> TROPICALIZATION REQ'D.								

WINTERIZATION REQ'D
  TROPICALIZATION REQ'D.

BARREL/CASE
  SS
  IMPELLER
  SS

DESIGN CODES + WELD + INSPECT / Version

Data by purchaser

Data by manufacture

Data by either

# API Mechanical Equipment Datasheet Look and Feel (API610 example)



CP-101.xls

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

JOB NO. Job No ITEM NO(S) CP-101  
 REQ/ SPEC NO. Req No  
 PURCH ORDER NO. DATE  
 INQUIRY NO. Inq No BY

APPLICABLE TO:  PROPOSALS  PURCHASE  AS BUILT  
 For UNIT SERVICE  
 NOTES: INFORMATION BELOW TO BE COMPLETED: BY PURCHASER BY MANUFACTURER BY MANUFACTURER OR PURCHASER  
 DATA SHEETS REVISIONS

	ITEM NO.	ATTACHED	ITEM NO.	ATTACHED	ITEM NO.	ATTACHED	NO.	DATE	BY
PUMP	Pump1	<input type="checkbox"/>	Pump2	<input type="checkbox"/>	Pump3	<input type="checkbox"/>			
MOTOR		<input checked="" type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>			
GEAR		<input type="checkbox"/>		<input checked="" type="checkbox"/>		<input type="checkbox"/>			
TURBINE		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>			

OPERATING CONDITIONS (5.1.3) LIQUID (5.1.3)  
 FLOW, NORMAL 60000 gal\_US/h RAT'D 1200 gal\_US/min LIQUID TYPE OR NAME Water  
 OTHER Other  HAZARDOUS  FLAMMABLE  toxic (5.15)  
 SUCTION PRESS. MAX. RATED 200 / 220 psig MIN. NORMAL MAX.  
 DISCHARGE PRESSURE 100.00 psig PUMPING TEMP F 35.6 86 122  
 DIFFERENTIAL PRESSURE 50 psi VAPOR PRESS atm  
 DIFF. HEAD 30 ft NPSHA 30 RELATIVE DENSITY 1 1  
 PROCESS VARIATIONS (5.1.4) Proc var VISCOSITY  
 STARTING CONDITIONS (5.1.4) Start conditons SPECIFIC HEAT, Cp Btu\_IT/(lb-degF)  
 SERVICE:  CONT.  INTERMITTENT (STARTSDAY) CHLORIDE CONCENTRATION (6.5.2.4) 2 Btu\_IT/(lb-degF)  
 PARALLEL OPERATION REQ'D (5.1.13) H<sub>2</sub>S CONCENTRATION 66 lb/lb Btu\_th/(lb-degF)  
 cal/(g-degC)  
 cal/(kg-degC)  
 cal\_IT/(g-degC)  
 cal\_IT/(lb-degC)

LOCATION: (5.1.30)  INDOOR  OUTDOOR  HEATED  UNHEATED  
 ELECTRICAL AREA CLASSIFICATION (5.12.4/6.14) ANNEX H CLASS (5.12.1.1) annex hclass 300 J/(kg-degC)  
 CL CL GR GR DIV Div MIN DESIGN METAL TEMP (5.12.4.1) 300 J/(kg-K)  
 WINTERIZATION REQ'D TROPICALIZATION REQ'D. BARREL/CASE SS IMPELLER SS  
 REDUCED HARDNESS MATERIALS REQ'D. (5.12.1.12)

DESIGN CODES + WELD + INSPECT Version

SPF Title Blocking

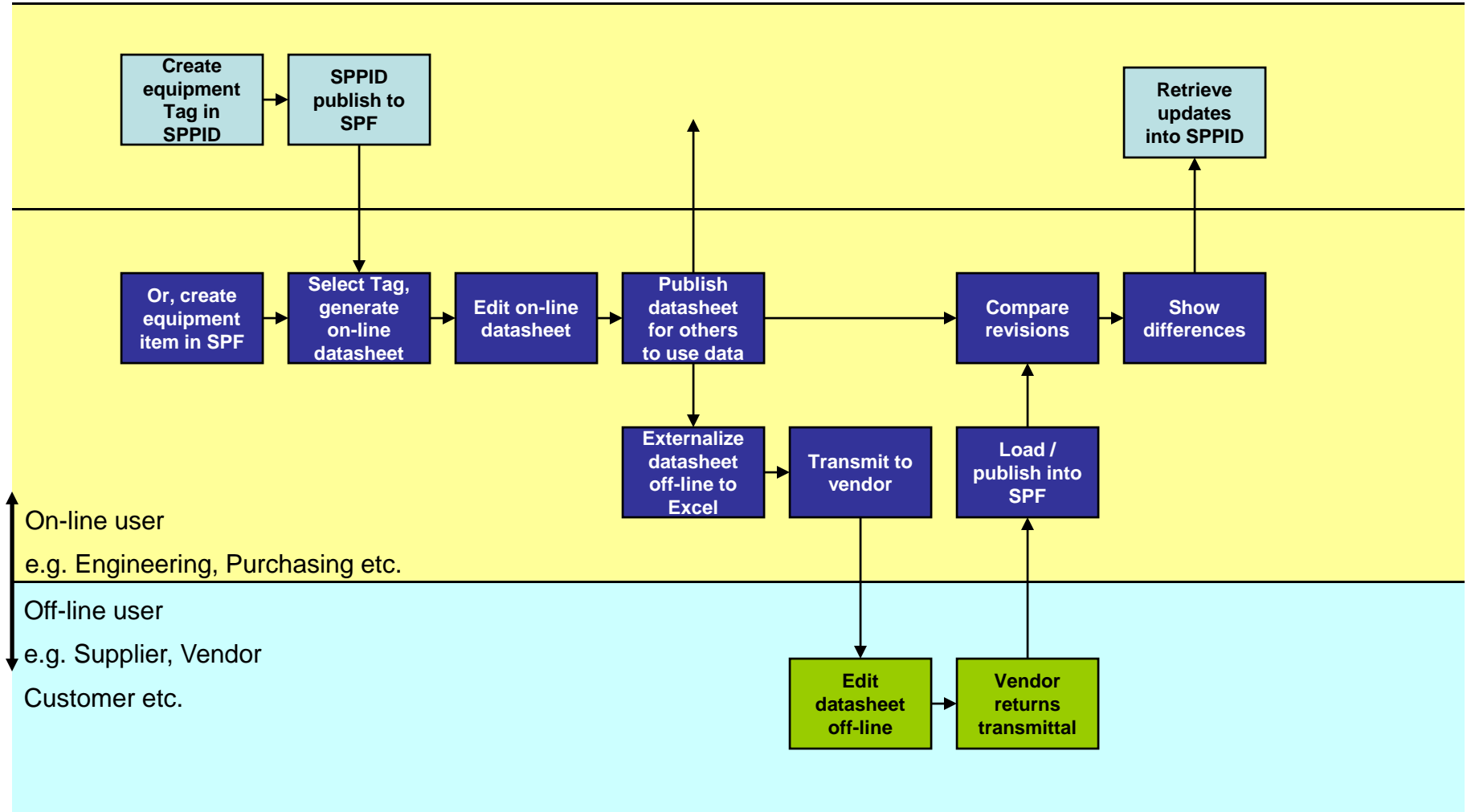
User edited fields

Tab between editable fields

Radio Buttons

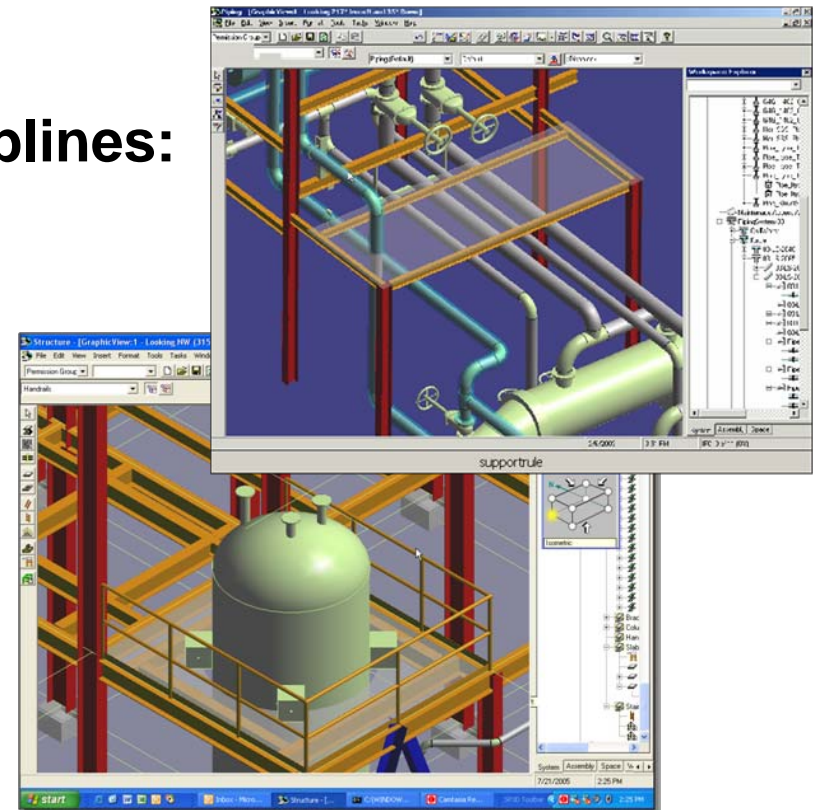
Check Boxes

Drop down UoM list for conversions to value field



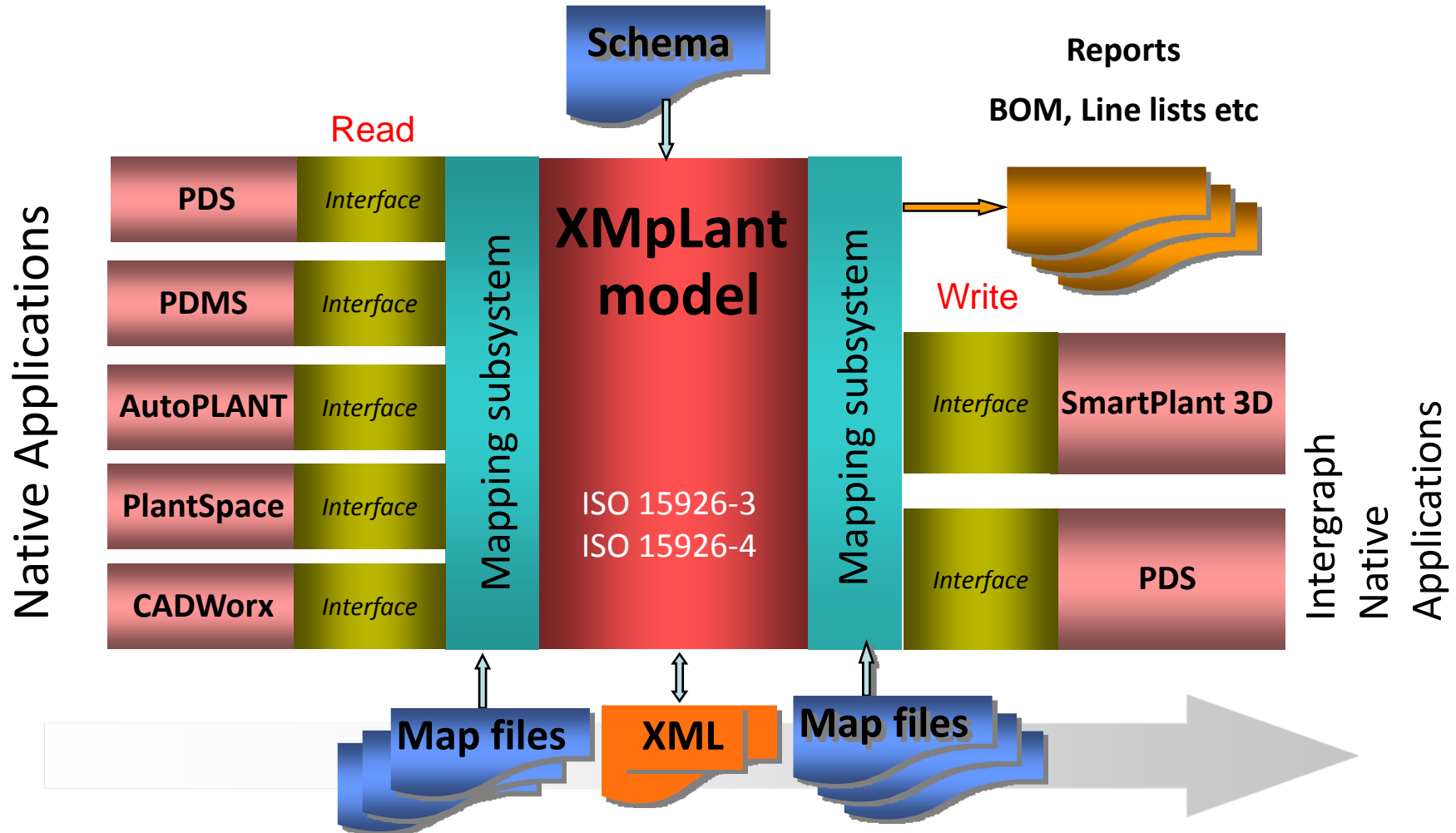
## ***XMpLant write interfaces announced development go-ahead 4Q07***


- **Scope:**
  - **Write interfaces for plant disciplines:**
    - Piping
    - Equipment
    - Electrical Cable/ Raceways
    - HVAC
    - Hangers & Supports
  - **SmartPlant 3D Structural:**
    - CIMsteel today
  - **Catalogues/ Specifications:**
    - Via intermediate XMpLant





# Plant Design Systems Interoperability – XMpLant **Read** and **Write** interfaces



- **Write interfaces for plant disciplines:**
  - Piping *Completed*
  - Equipment *Completed*
  - Electrical Cable/ Raceways
  - HVAC
  - Hangers & Supports
  - **Structural**
    - XMpLant write interface *During 2009*
  - **Catalogues/ Specifications**
    - Via intermediate XMpLant *In Development*
- **Availability** **Early 2009**

# Integrating the Engineering Enterprise...

