Engineering Standards & Data Management

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woodside

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All references to dollars, cents or $ in this presentation are to Australian currency, unless otherwise stated.

References to “Woodside” may be references to Woodside Petroleum Ltd. or its applicable subsidiaries.

WOODSIDE - Engineering Data Management

Key Points

- Who is - Woodside
- Our key engineering interfaces
- Asset Lifecycle view
- Engineering Data Management – Our “5” Year Journey
- One Portal - One Entry Point
- Developing Industry Standard Software - Partnerships
- Why Standardise the Standards?
- Development of ISO 15926

WOODSIDE ENERGY - AUSTRALIA

Woodside is currently one of Australia's top ten companies by market capitalisation*, and the nation's largest publicly-traded oil and gas exploration and production company.

Based in Perth, Western Australia, Woodside has major operational assets and exploration and development interests in five continents including Australia and the United States.

In 50 years we have grown from a pioneer oil and gas explorer to Australia's largest independent producer of oil and gas and one of the world's largest producers of LNG.

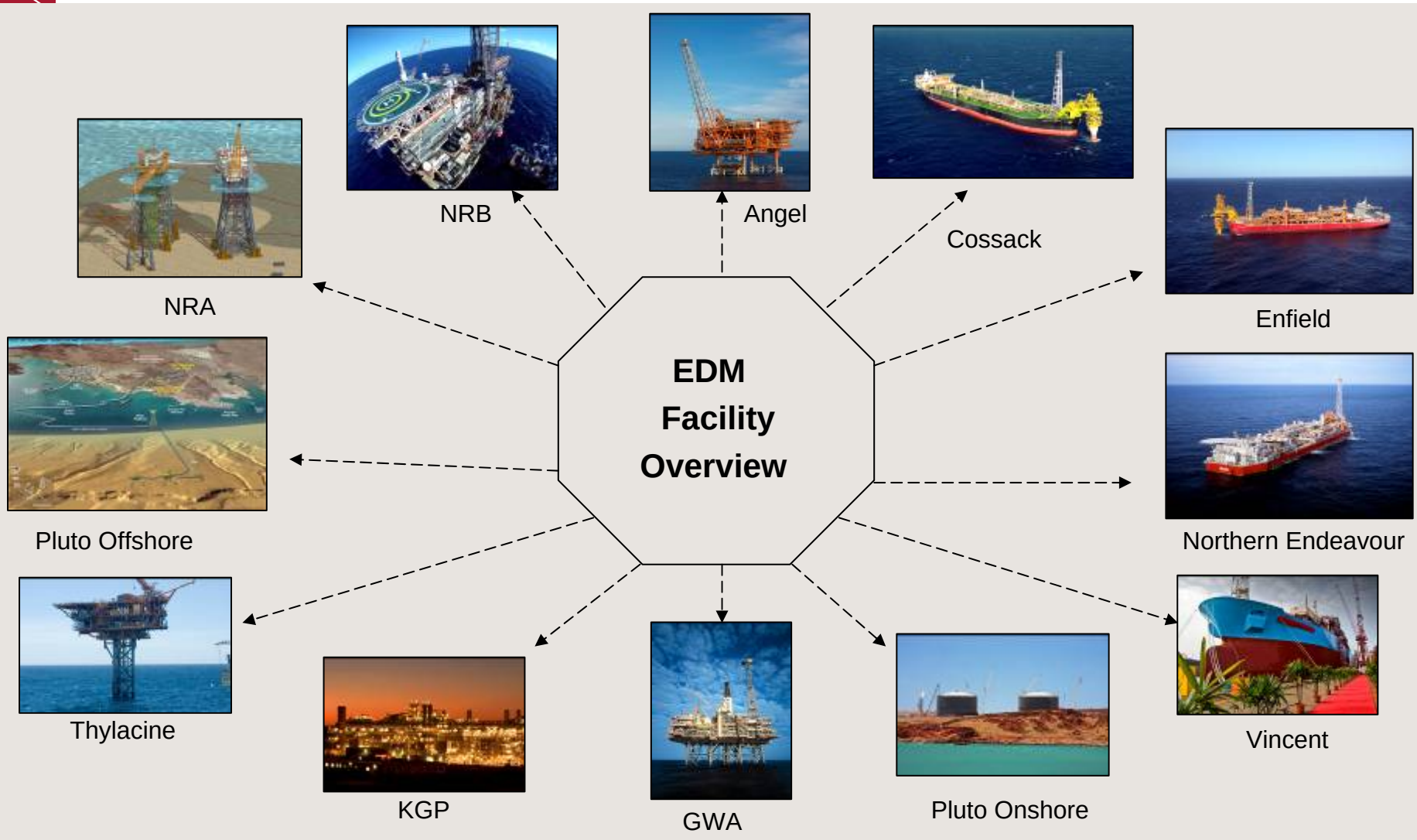
Woodside operates Australia's largest resources project, the North West Shelf Venture in Western Australia, which produces about 40 per cent of Australia's oil and gas.

Woodside also operates the Pluto LNG Project which is set to become the fastest developed LNG project discovery of the gas field in 2005 to first gas from the field in late 2010 and the first LNG in early 2011. Woodside is also seeking to progress its Sunrise LNG development in the Timor Sea and the Browse LNG development in northern Western Australia.

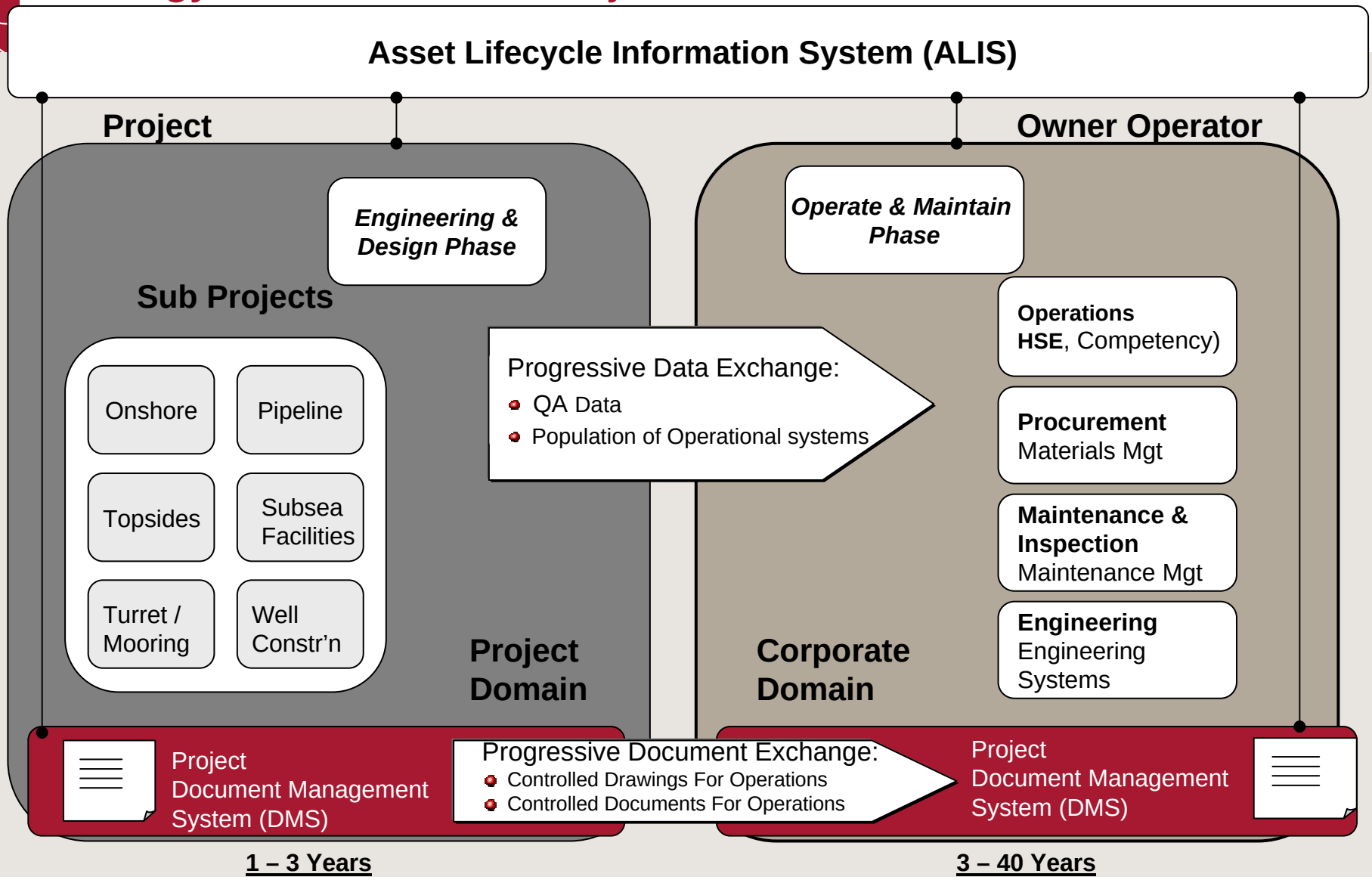
With a proved plus probable reserves to production ratio of 21 years * Woodside is poised to help meet growing global demand for clean energy.

*As at the 24th February 2010.

EDM – Engineering support



Strategy for Greenfield Projects



Woodside EDM Journey

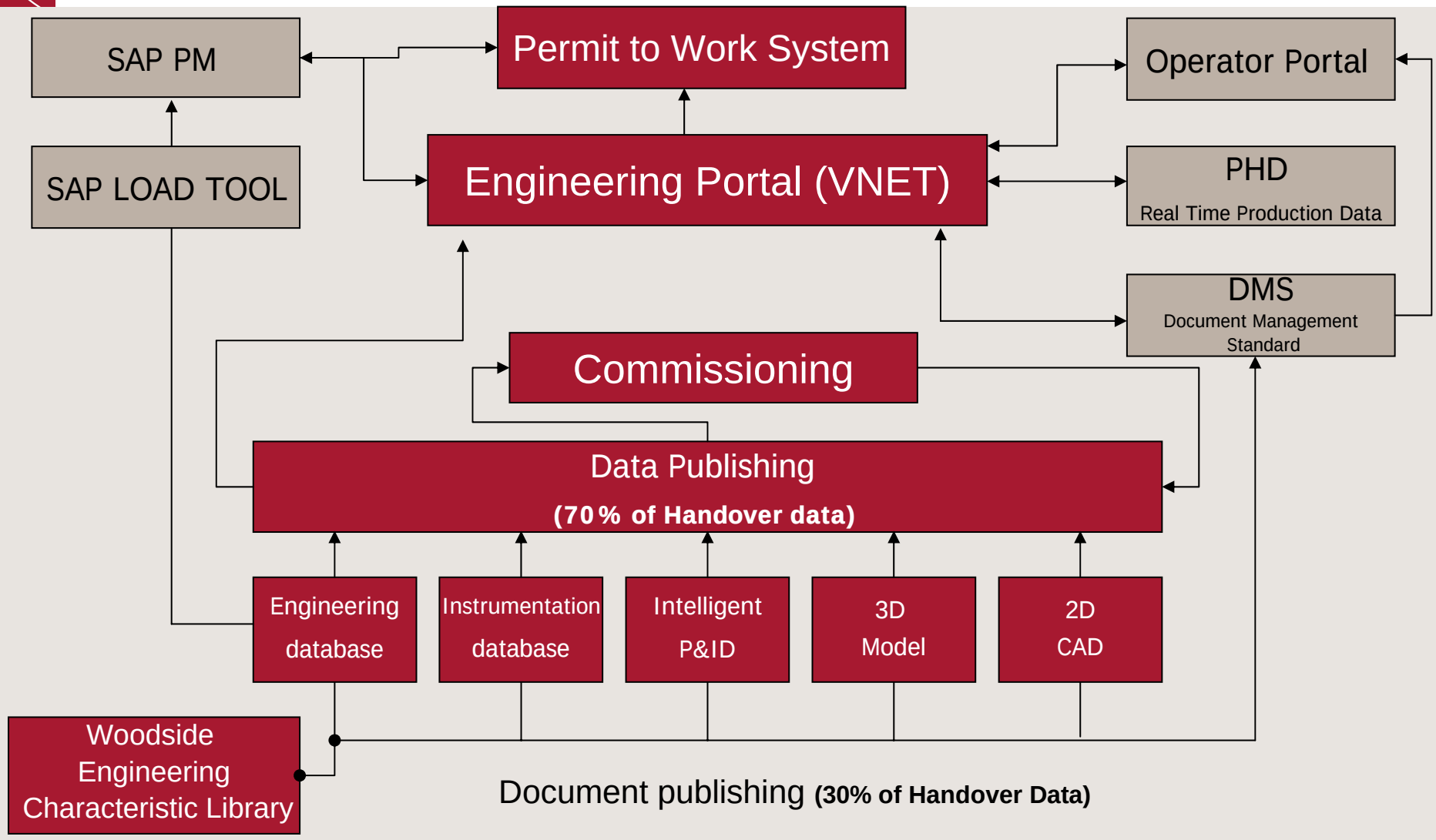
Our EDM journey commenced Jan 2005 with clearly defined objectives, originating in the Brownfield projects division and migrating to the Production division in 2007. Practical project completion December 2009.

EDM group established as a core corporate team delivering significant value in cost savings and improved data quality.

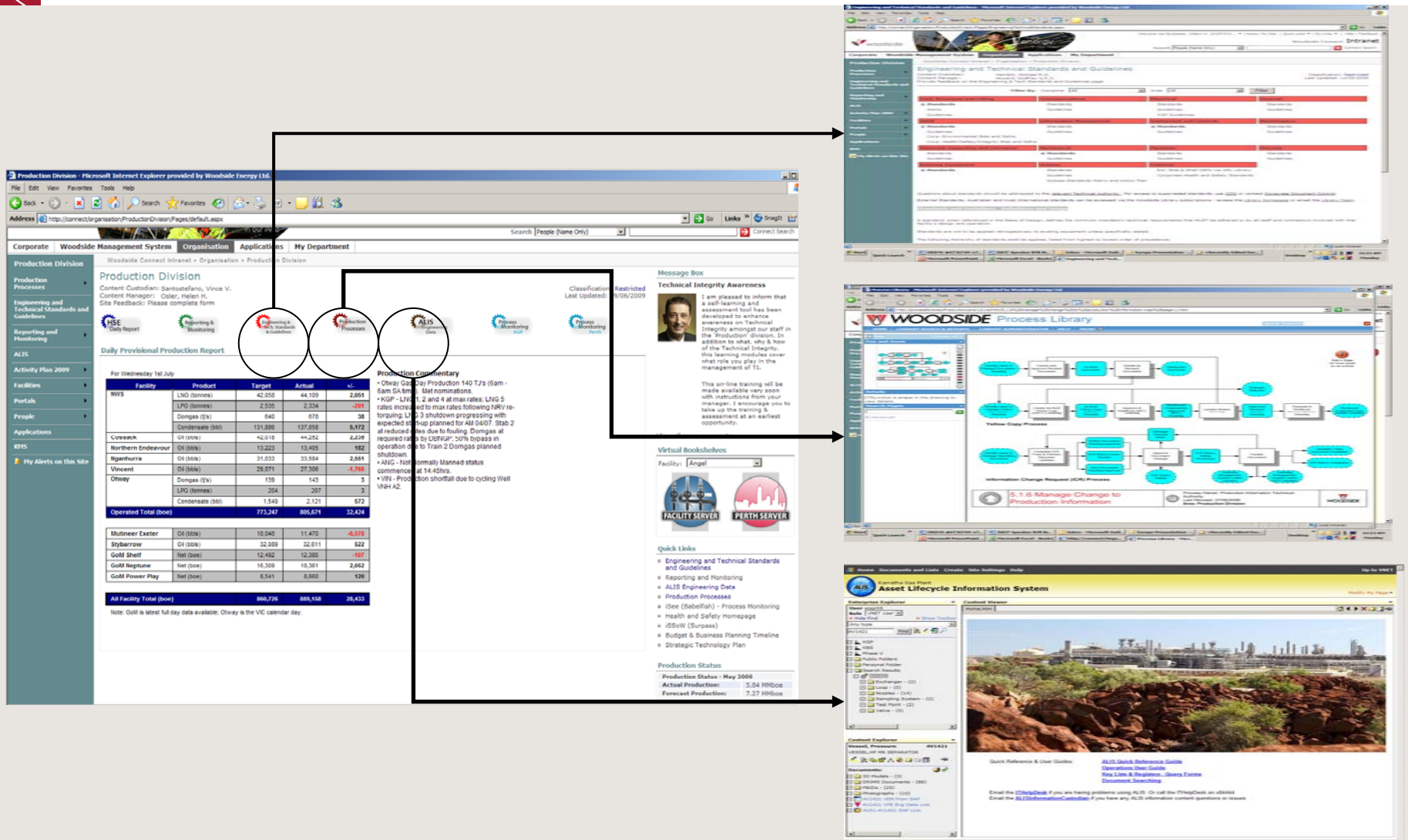
Key deliverables

- Select Software Systems, Configure & deploy
- Migrate company legacy data & systems into a digital plant environment
- Develop standards to support a digital plant
- Improve data quality, access & linkage
- Enable efficient handover from Greenfield & Brownfield Projects
- Identification and rectification of data inconsistencies
- Identify value adding opportunities Enterprise & Next Generation Software
- Early developer & adopter of International standards
- Measure, evaluate effectiveness & achieved cost savings against R.O.I.

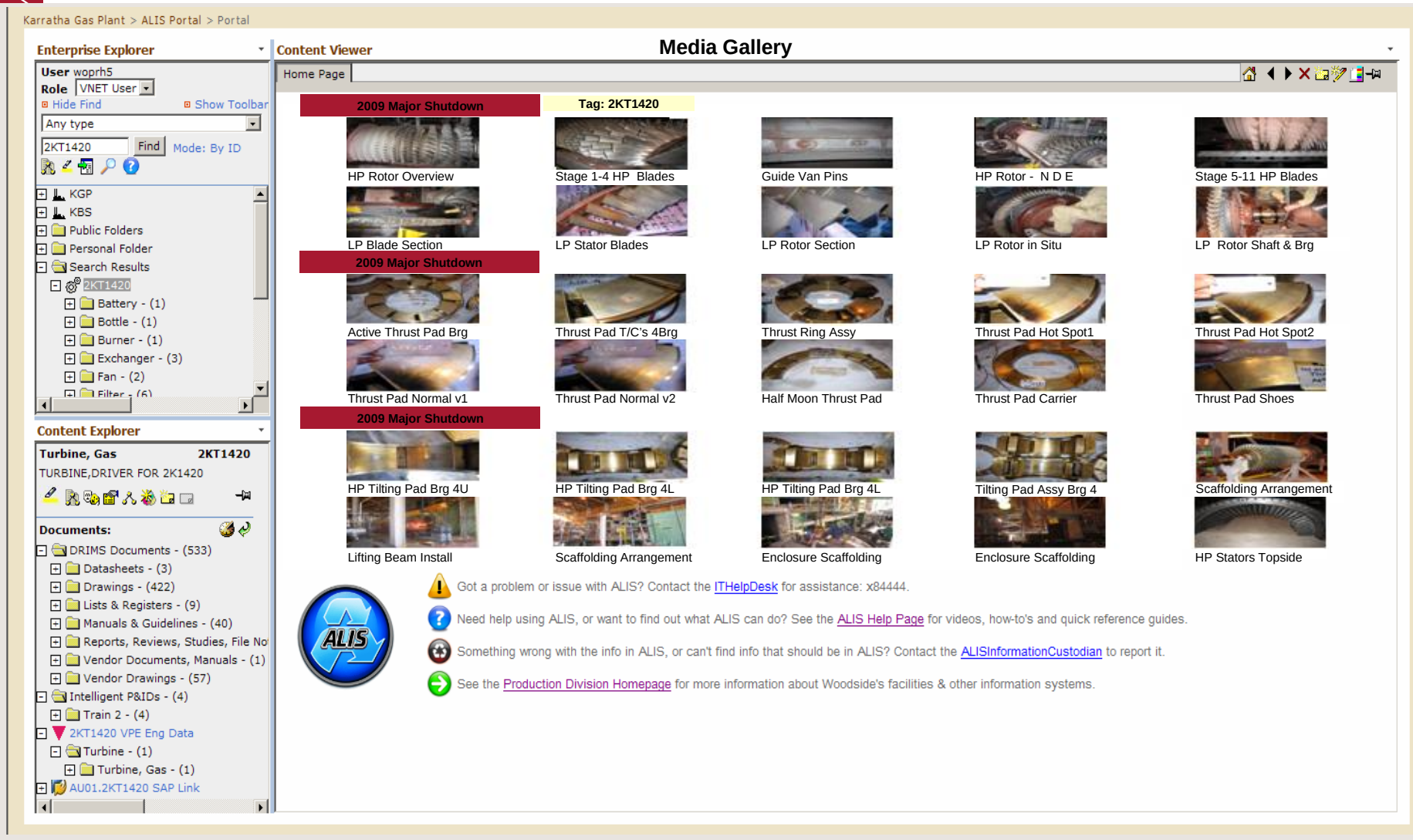
Engineering Portal relationship to EDM applications



Strategic Management – Production's Single Entry Point



Develop & Enhance Industry Standard Applications



ISO 15926 - Why focus on common standard ?

- Integration pre-requisite – Mega Project Environment
- Common information language & format
- Reduce time for handover between life-cycle phases
- Set direction for Owner Operators & EPC's
- Ensure Uniformity – Apples are Apples not Pears
- Reduced errors on input
- Reduced costs to maintain ($m's)

Why Standardise?

- Engineering Characteristics library provided to POSC/Caeser contribution to ISO 15926 reference data library.
- One global standard for common information types, reduces the workload on creators of information.
- Data can be verified throughout project cycle for validity and gap analysis.
- Non application specific, so creators able to maintain own systems and still meet Owner Operator requirements.
- Software vendors able to embed standard in products to provide off the shelf compatibility with other applications
- Proposed membership to standards committee focusing on part of ISO 15926 Part 4 initially.
- Long term involvement with industry bodies & standards organisation to assist in direction setting
- Operators multi facility - common view / user base

Understanding Owner Operator Data

Evolution from EPISTLE & Step compliant projects over the years has failed to gain sufficient traction for a variety of reasons.

It has not aligned our requirements with EPC deliverables or engineering software development required to support Mega projects.

Woodside have identified our critical documents & data sets to support Production on a full Asset Information Life Cycle.

Attributes consist of generic engineering deliverables (No Gold plating)

The owner operator world is now maturing with a growing trend to define and expect quality information deliverables.

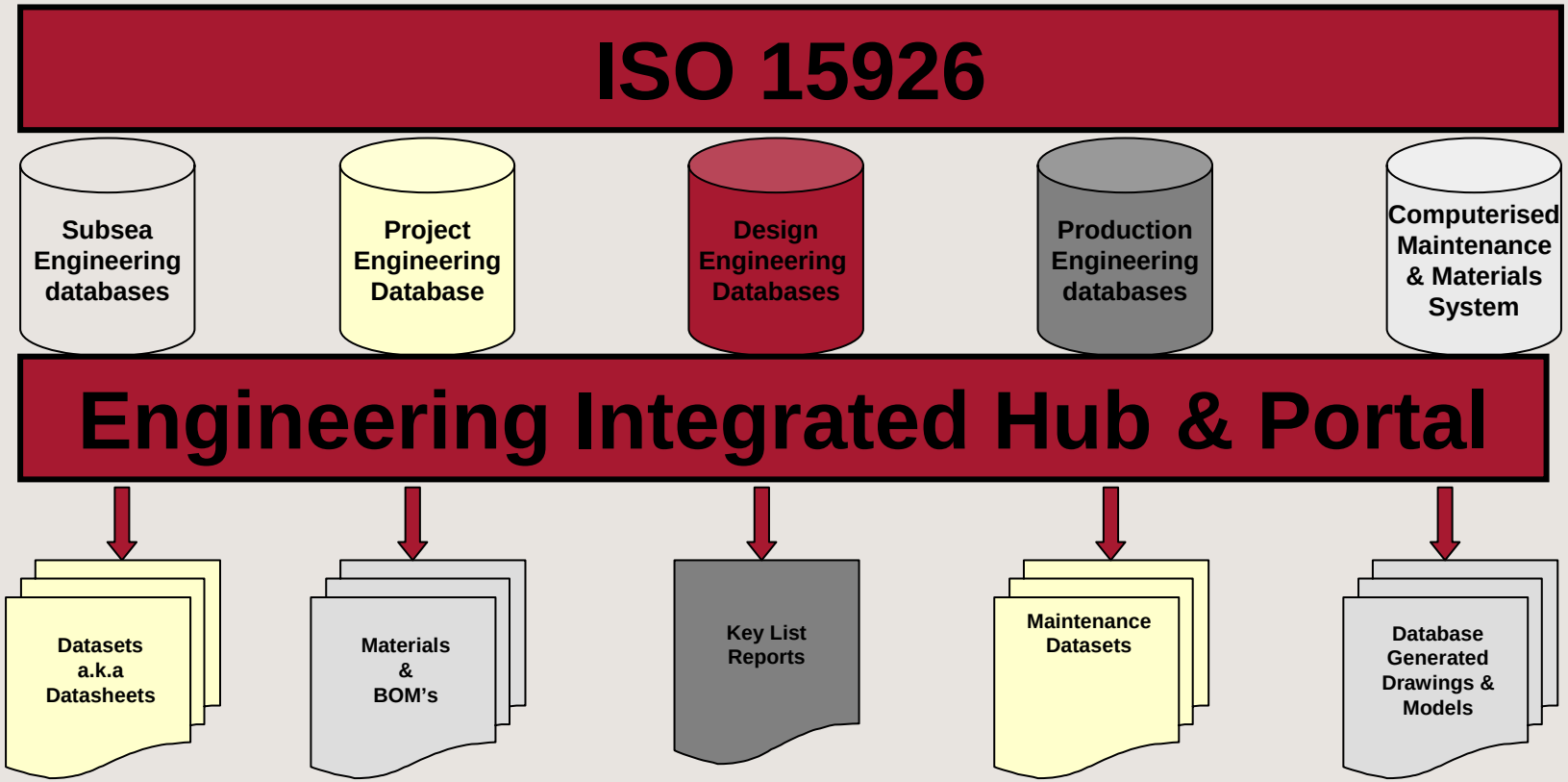
Many project design tools have become primary production systems for operating and modifying facilities.

Summary Keep It Short & Straightforward

KISS : The most reliable, quickest to implement, easiest to use & lowest cost solution !

ISO 15926 Parts 4,5,6 – Engineering Reference Data

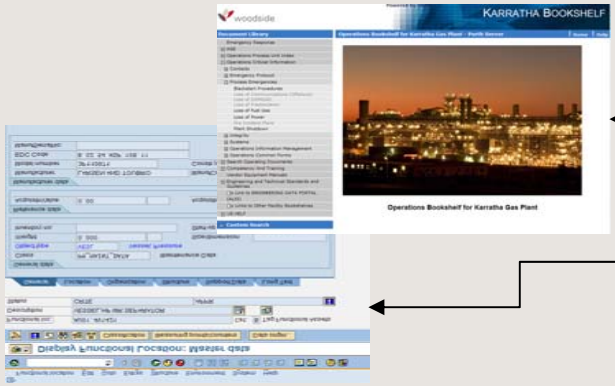
- ***70% + of the data we use every day to operate a facility is based on Engineering Reference Data***
- ***Our primary focus is to create a universal standard set of data used to Operate & Maintain facilities***

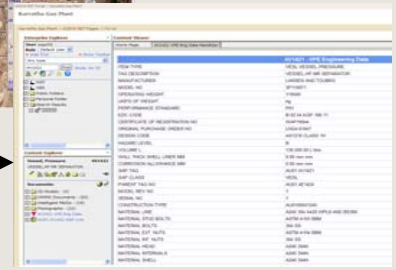


Production Engineering Data - Top "5" Project Deliverables

1. Engineering Systems to support on going operations
2. Engineering Drawings & Documents
3. Maintenance Management System
4. Material System
5. Live Production Data (Plant Historians)

Basic Engineering Reference Data





Data Hub / Warehouse

Object Current Cert # Mechanical Database M3/hr Deg C Object

EX IP Instrument Database KPAG RPM 3D Databases Line RATS

MM Electrical Database Volts Amps Code Tag P&ID Database Schedule

Amps Tag Phase CDSP Object

Reference Data Library

Current - Woodside engineering Characteristic Library

Name	Cell Name	BCC	Datasheet Name	Controlled Ref No	Page	Cell Ref	Units U.O.M	Alpha /Numeric	Decimal	Negative	Field Length	SAP CharVal	API Button/	Source	Discipline
Vessel No.	Vessel No.	3	Relief Valve	W1000KP001.0030	1	G12		Alpha	No	No	30		No	SPI	PROCESS
Line No.	Line No.	2	Relief Valve	W1000KP001.0030	1	M12		Alpha	No	No	30		No	SPI	PROCESS
Operating Case Number:	Operating Case Number: - Case 1	4	Relief Valve	W1000KP001.0030	1	K15		Alpha	No	No	30		No	SPI	PROCESS
Operating Case Description:	Operating Case Description: - Case 1	4	Relief Valve	W1000KP001.0030	1	K16		Alpha	No	No	30		No	SPI	PROCESS
Relieve Case	Relieve Case - Case 1	4	Relief Valve	W1000KP001.0030	1	K17		Alpha	No	No	30		No	SPI	PROCESS
Toxicity/Hazardous Handling	Toxicity/Hazardous Handling - Case 1	4	Relief Valve	W1000KP001.0030	1	K18		Alpha	No	No	30		No	SPI	PROCESS
Design Temperature: (Min)	Design Temperature: (Min) - Case 1	4	Relief Valve	W1000KP001.0030	1	K20	°C	Numeric	Yes	Yes	15		No	SPI	PROCESS
Design Temperature: (Max)	Design Temperature: (Max) - Case 1	4	Relief Valve	W1000KP001.0030	1	M20	°C	Numeric	Yes	Yes	15		No	SPI	PROCESS
Design Pressure: (Min)	Design Pressure: (Min) - Case 1	4	Relief Valve	W1000KP001.0030	1	K21	kPag	Numeric	Yes	No	15		No	SPI	PROCESS
Design Pressure - Max	Design Pressure - Max - Case 1	4	Relief Valve	W1000KP001.0030	1	M21	kPag	Numeric	Yes	No	15		No	SPI	PROCESS
Operating Temperature:	Operating Temperature: - Case 1	4	Relief Valve	W1000KP001.0030	1	K23	°C	Numeric	Yes	Yes	15		No	SPI	PROCESS
Operating Pressure	Operating Pressure - Case 1	4	Relief Valve	W1000KP001.0030	1	K24	kPag	Numeric	Yes	No	15		No	SPI	PROCESS
Design Code	Design Code - Case 1	4	Relief Valve	W1000KP001.0030	1	K26		Alpha	No	No	30		No	SPI	PROCESS
Fluid state	Fluid state - Case 1	4	Relief Valve	W1000KP001.0030	1	K27		Alpha	No	No	30		No	SPI	PROCESS
Relieving Pressure	Relieving Pressure - Case 1	4	Relief Valve	W1000KP001.0030	1	K28	kPag	Numeric	Yes	No	15		No	SPI	PROCESS
Relieving Temperature	Relieving Temperature - Case 1	4	Relief Valve	W1000KP001.0030	1	K29	°C	Numeric	Yes	Yes	15		No	SPI	PROCESS
Downstream Pressure:	Downstream Pressure: - Case 1	4	Relief Valve	W1000KP001.0030	1	K30	kPag	Numeric	Yes	No	15		No	SPI	PROCESS
Downstream Temperature:	Downstream Temperature: - Case 1	4	Relief Valve	W1000KP001.0030	1	K31	°C	Numeric	Yes	Yes	15		No	SPI	PROCESS
Wt % Vapour: (In)	Wt % Vapour: (In) - Case 1	4	Relief Valve	W1000KP001.0030	1	K32	%	Numeric	Yes	No	15		No	SPI	PROCESS
Wt % Vapour: (Out)	Wt % Vapour: (Out) - Case 1	4	Relief Valve	W1000KP001.0030	1	M32	%	Numeric	Yes	No	15		No	SPI	PROCESS
Mass Flow:	Mass Flow: - Case 1	4	Relief Valve	W1000KP001.0030	1	K33	kg/h	Numeric	Yes	No	15		No	SPI	PROCESS
Molecular Weight	Molecular Weight - Case 1	4	Relief Valve	W1000KP001.0030	1	K34	kg/kmol	Numeric	Yes	No	15		No	SPI	PROCESS
Compressibility factor	Compressibility factor - Case 1	4	Relief Valve	W1000KP001.0030	1	K35		Numeric	Yes	No	15		No	SPI	PROCESS
Specific Heat Ratio: (Vapour)	Specific Heat Ratio: (Vapour) - Case 1	4	Relief Valve	W1000KP001.0030	1	K36	Cp/Cv	Numeric	Yes	No	15		No	SPI	PROCESS
Specific Heat Ratio	Specific Heat Ratio - Case 1	4	Relief Valve	W1000KP001.0030	1	M36	Cp/Cv	Numeric	Yes	No	15		No	SPI	PROCESS
Density at T & P: (Vapour)	Density at T & P: (Vapour) - Case 1	4	Relief Valve	W1000KP001.0030	1	K37	kg/m³	Numeric	Yes	No	15		No	SPI	PROCESS
Density at T & P:	Density at T & P: - Case 1	4	Relief Valve	W1000KP001.0030	1	M37	kg/m³	Numeric	Yes	No	15		No	SPI	PROCESS
Viscosity at T & P: (Vapour)	Viscosity at T & P: (Vapour) - Case 1	4	Relief Valve	W1000KP001.0030	1	K38	cP	Numeric	Yes	No	15		No	SPI	PROCESS
Viscosity at T & P: (Liquid)	Viscosity at T & P: (Liquid) - Case 1	4	Relief Valve	W1000KP001.0030	1	M38	cP	Numeric	Yes	No	15		No	SPI	PROCESS
Latent Heat of Vapourisation:	Latent Heat of Vapourisation: - Case 1	4	Relief Valve	W1000KP001.0030	1	K39	kJ/kg	Numeric	Yes	No	15		No	SPI	PROCESS
Valve Type	Valve Type - Case 1	4	Relief Valve	W1000KP001.0030	1	K41		Alpha	No	No	30		No	SPI	PROCESS
Set pressure	Set pressure - Case 1	4	Relief Valve	W1000KP001.0030	1	K42	kPag	Numeric	Yes	No	15		No	SPI	PROCESS
% Over Pressure (Gauge):	% Over Pressure (Gauge): - Case 1	4	Relief Valve	W1000KP001.0030	1	K43	%	Numeric	Yes	No	15		No	SPI	PROCESS
Back pressure - constant	Back pressure - constant - Case 1	4	Relief Valve	W1000KP001.0030	1	K44	kPag	Numeric	Yes	No	15		No	SPI	PROCESS
Back pressure - variable	Back pressure - variable - Case 1	4	Relief Valve	W1000KP001.0030	1	K45	kPag	Numeric	Yes	No	15		No	SPI	PROCESS
Built Up Pressure	Built Up Pressure - Case 1	4	Relief Valve	W1000KP001.0030	1	K46	kPag	Numeric	Yes	No	15		No	SPI	PROCESS
Material of Construction:	Material of Construction: - Case 1	4	Relief Valve	W1000KP001.0030	1	K47		Alpha	No	No	30		No	SPI	PROCESS
Area - calculated	Area - calculated - Case 1	4	Relief Valve	W1000KP001.0030	1	K49	mm²	Numeric	Yes	No	15		No	SPI	PROCESS
Area - selected	Area - selected - Case 1	4	Relief Valve	W1000KP001.0030	1	K50	mm²	Numeric	Yes	No	15		No	SPI	PROCESS
Orifice Designation	Orifice Designation - Case 1	4	Relief Valve	W1000KP001.0030	1	K51		Alpha	No	No	30		No	SPI	PROCESS

Questions & Answers!