

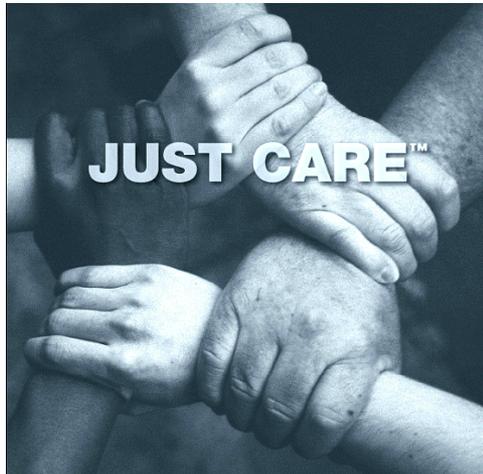
PCA Forum & Members Meeting Aker Solutions and ISO15926

Jann K. Slettebakk
VP CIO

Health, Safety and Environment

Driven by care

- HSE a core value
- We take personal responsibility for HSE because we care
- We believe that all incidents can be prevented

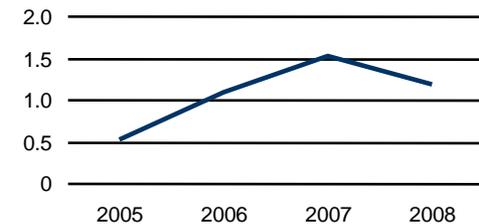


Systematic efforts

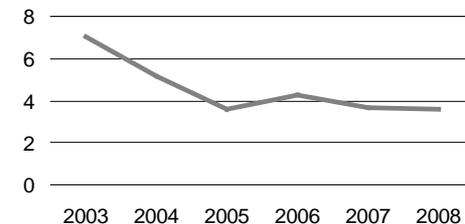
- HSE leadership programme
driving change through leadership behaviours
- HSE eLearning
getting the message out in an efficient fashion
- HSE operating system
assessing and addressing gaps
- Just Rules
specific safety rules for specific work operations
- HSE networks
sharing our learning and supplying the tools

Getting results

- Leading KPIs
(eg HSE training (%))



- Lagging KPIs
(eg TRIF)



- Recognising the best annual Just Care™ awards

Where we are

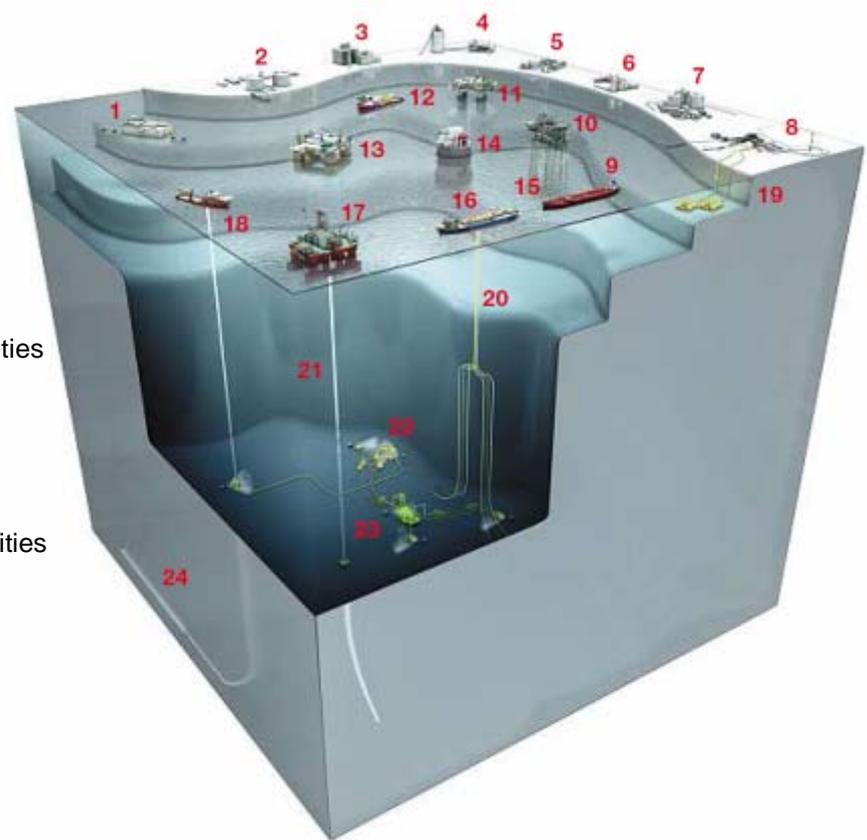


Only key locations marked

Aberdeen	Durban	Melbourne	Solent
Ågotnes	Egersund	Mobile	St John
Arendal	Erkelenz	Moscow	Stavanger
Arkhangelsk	Horten	Moss	Stjørdal
Baku	Houston	Mumbai	Stockton
Barcelona	Kakinada	Muscat	Stord
Batam	Köln	Oslo	Tokyo
Beijing	Krakow	Paris	Toronto
Bergen	Kristiansand	Perth	Tranby
Brisbane	Kristiansund	Porsgrunn	Tucson
Calgary	Kuala Lumpur	Pune	Ulvila
Canonsburg	Kyungnam	Pusan	Vancouver
Charleston	Lagos	Raesfeld	Verdal
Copenhagen	Linz	Rio de Janeiro	Warrington
Curitiba	Louisville	Santiago	Zoetermeer
Dhahran	Luanda	Seoul	
Dubai	Macaé	Shanghai	

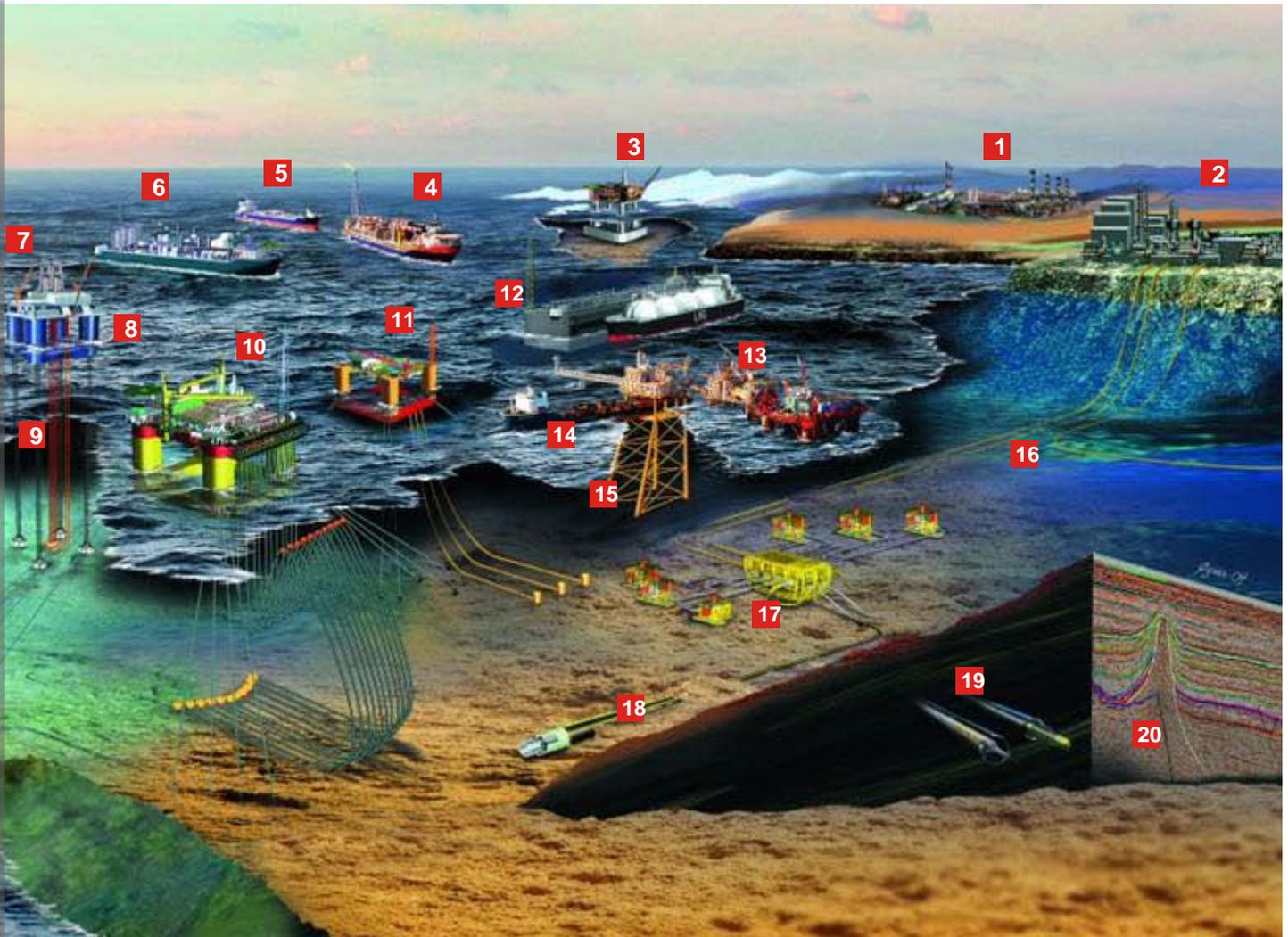
An impressive portfolio of proven solutions

1. Concrete structure ConGas, supporting LNG storage and an LNG regasification plant
2. Onshore liquefied natural gas (LNG) receiving terminals
3. Power generation
4. Mining and metals processing facilities
5. Petrochemical/chemical processing plants
6. Decommissioning, waste management and clean-up services for nuclear power facilities
7. Water and wastewater treatment facilities
8. Onshore gas receiving, processing and export plant
9. Marine deck machinery and steering gear
10. Jacket structure for shallow waters, with drilling and production facilities
11. Tension leg platform for production and drilling
12. Marine operations and subsea installation services
13. Semisubmersible production platform for extreme water depths, may include drilling facilities
14. Harsh environment CONDEEP™ MonoFloater, with production facilities and storage capacity
15. Mooring, offshore bow loading and offloading systems
16. FPSO with process system
17. Aker H-6e, advanced semisubmersible drilling unit with RamRig™
18. Well intervention vessel
19. Shallow water subsea production system
20. Steel tube umbilicals
21. Marine drilling risers
22. Subsea processing and boosting
23. Deepwater subsea production system
24. Well services



Oil & Gas - From reservoir to processing facility

- 1** Land-based production and processing
- 2** Terminals
- 3** Marine concrete structures for harsh environments
- 4** Floating production, storage & offloading (FPSO) vessels
- 5** Mooring and transfer systems
- 6** Floating LNG and methanol systems
- 7** Drilling systems
- 8** Tension Leg Platforms (TLP)
- 9** Riser and tether technologies
- 10** Semisubmersibles
- 11** Deep draft semisubmersibles
- 12** LNG terminals, onshore and offshore
- 13** Topsides and modules
- 14** Installation and removal (floatover/mating)
- 15** Jacket technology
- 16** Pipelines and flow assurance
- 17** Subsea solutions
- 18** Umbilicals and flowlines
- 19** Downhole technologies
- 20** Reservoir modelling and interpretation



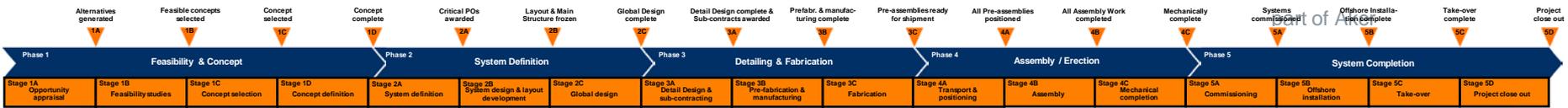
Project Execution Model (PEM)

PMI based

Stage objectives



- Service & Assistance Agreements
- Warranty Handling
- Insurance and Legal Handling
- Acceptance & Contract Close-out



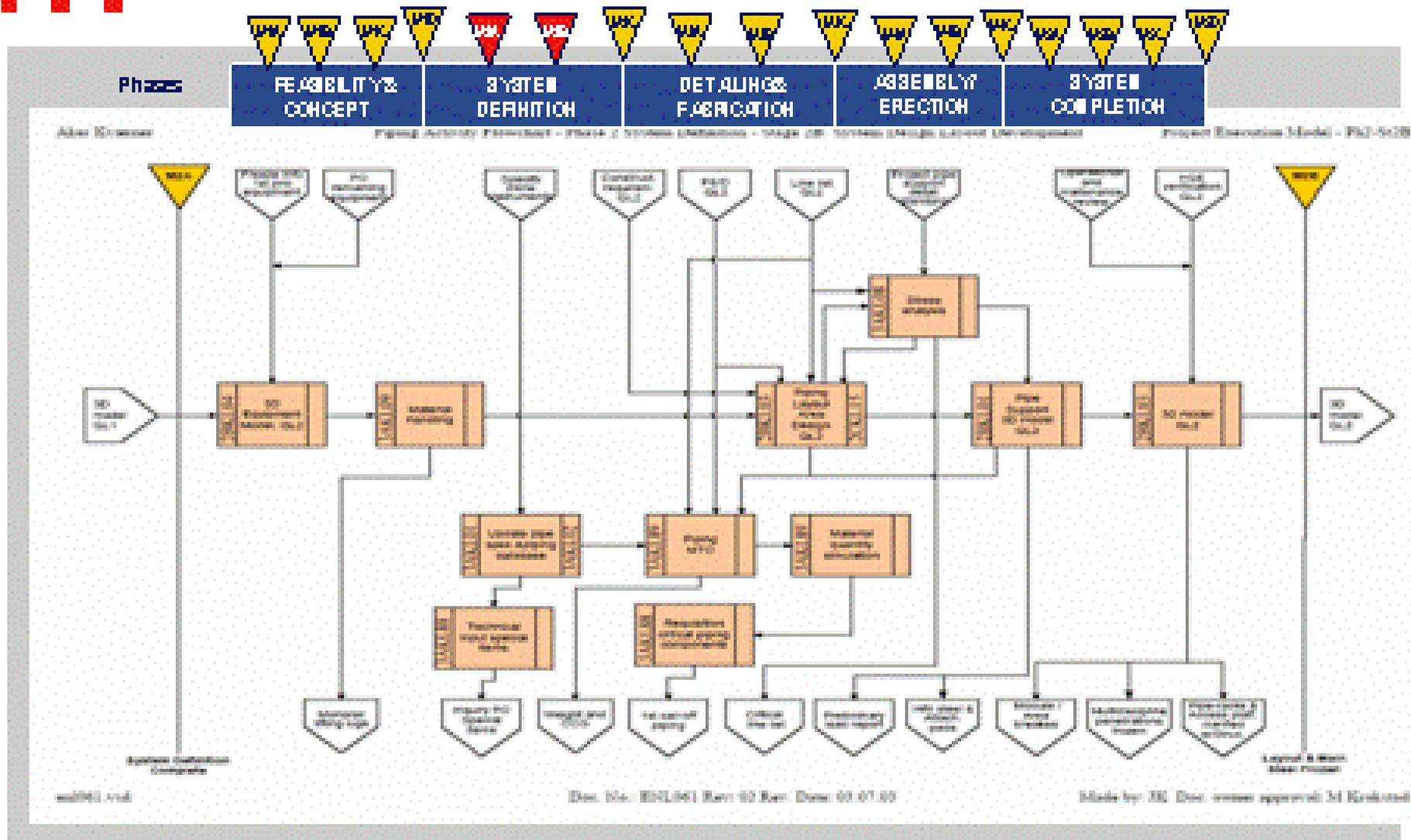
Phase 1	Phase 2			Phase 3			Phase 4			Phase 5						
Feasibility & Concept			System Definition			Detailing & Fabrication			Assembly / Erection			System Completion				
Stage 1A	Stage 1B	Stage 1C	Stage 1D	Stage 2A	Stage 2B	Stage 2C	Stage 3A	Stage 3B	Stage 3C	Stage 4A	Stage 4B	Stage 4C	Stage 5A	Stage 5B	Stage 5C	Stage 5D
Opportunity appraisal	Feasibility studies	Concept selection	Concept definition	System definition	System design & layout development	Global design	Detail Design & sub-contracting	Pre-fabrication & manufacturing	Fabrication	Transport & positioning	Assembly	Mechanical completion	Commissioning	Offshore installation	Take-over	Project close out
Project Management <ul style="list-style-type: none"> • Project Charter established • Define HSE requirements • Evaluate business opportunity • Identify product, markets • Establish first cost estimate • Scope definition / scope statement Project Execution <ul style="list-style-type: none"> • Define HSE requirements • Identify product, markets • Establish possible process solutions • Identify infrastructure requirements • Identify environmental requirements • Identify key process/product interfaces 	Project Management <ul style="list-style-type: none"> • Develop HSE Strategy • Identify technically & commercially feasible concepts • Establish general execution philosophy/strategy • Update cost estimate • Define screening criteria • Rank alternative concepts • Perform Risk assessment for the alternative concepts Project Execution <ul style="list-style-type: none"> • Define HSE goals • Perform preliminary simulation & flow diagrams • Size key equipment • Layout, block model and unit arrangements • Define preliminary construction methods 	Project Management <ul style="list-style-type: none"> • Establish preliminary project execution strategy & schedule • Determine Sourcing categories and scenarios • Update quantity/weight estimate/ scope and plan • Update cost estimate concept • Perform risk assessment for concepts (financial & schedule) Project Execution <ul style="list-style-type: none"> • Perform HSE studies to verify the concepts and environmental impact assessment for permitting • Consolidate the final design basis. • Optimize process/system simulation and flow diagrams • Freeze functional requirements, design basis, overall system description and layout • Update equipment list, flow diagrams • Prepare electrical single line diagram. Prepare preliminary P&IDs • Inquire 1st priority equipment POs • Finalise overall layout and unit arrangement • Update construction and completion methods • Site enabling subcontract package complete & awarded • Define Local requirements 	Project Management <ul style="list-style-type: none"> • Finalise execution strategy & schedule • Definitions for potential design components • Pre-qualification of main Sub-Contractors • Update quantity/weight estimate defined concept • Cost estimate defined concept • Update risk assessment • 1st priority packages identified • Contract close-out report (if relevant) Project Execution <ul style="list-style-type: none"> • Perform HSE studies to verify the concepts and environmental impact assessment for permitting • Consolidate the final design basis. • Optimize process/system simulation and flow diagrams • Freeze functional requirements, design basis, overall system description and layout • Update equipment list, flow diagrams • Prepare electrical single line diagram. Prepare preliminary P&IDs • Inquire 1st priority equipment POs • Finalise overall layout and unit arrangement • Update construction and completion methods • Site enabling subcontract package complete & awarded • Define Local requirements 	Project Management <ul style="list-style-type: none"> • Project Charter established / updated • Project Scope defined • Project Mgmt Plan established / updated at all subsidiary Knowledge Area plans, schedules and budgets (HSE, Scope, Time, Cost, Quality, People and Team, Communication, Risk and Procurement & Subcontracting) • Issue HSE design documents for approval and safety risk assessment checked • Contract & Design Basis reviews performed • All Systems & Methods established • Reporting routines established • Procurement /Subcontract Strategy defined • Project schedule, cost, quantity/ weight, etc estimator budgets established • Team Alignment program started • Stakeholder expectation analysis & alignment performed • Finalize HSE philosophy and perform preliminary HSE design • Perform preliminary process HAZOP • Incorporate vital vendor information from 1st Priority POs in system and area engineering • Layout / 3D model Q1 • Establish engineering database • 1st priority Equipment POs awarded • Procurement/ Subcontracting plan complete • 1st priority E/EPC subcontracts awarded • Finalize fabrication/ construction methods with preliminary schedule • Completion strategy confirmed • Issue P&IDs for approval (QL1) 	Project Management <ul style="list-style-type: none"> • Detailed delivery schedule established • Project Mgmt Plan updated (for next phase) • Risk assessment updated • Milestones and detailed construction schedule verified • Current estimates updated • Scope changes identified and implemented • Issue HSE and safety risk assessment for design • HAZOP (vendor information included) • Frozen vendor information from 1st & 2nd priority POs incorporated in System and Area Engineering • Layout / 3D model Q2 • Issue P&IDs for design (QL2) • 2nd priority equipment POs awarded • 1st bulk material POs awarded • 2nd priority E/EPC subcontracts awarded • 1st priority FC subcontracts awarded • Issue P&IDs post HAZOP (QL3) • 1st priority FC subcontracts awarded • 2nd priority FC subcontracts awarded • Fabrication/Construction schedule and methods finalised. • Completion requirements incorporated in design 	Project Management <ul style="list-style-type: none"> • Project Management Plan updated (for next phase) • Milestones and detailed construction schedule continued • Team Alignment program continued • Project Execution • HSE risk assessment complete • Close out HAZOP action items • Final vendor information from all POs incorporated in System and Area Engineering • Layout / 3D model documentation issued for construction (QL4) • Relevant System Engineering documentation issued for construction • Material take off finalized and bulk material top up orders placed • 3rd priority equipment PO's awarded • All Bulk materials orders placed (frame agreements) • Layout and 3D model are Clash free • All major interfaces frozen. • Issue P&IDs post HAZOP (QL3) • 1st priority FC subcontracts awarded • 2nd priority FC subcontracts awarded • Fabrication/Construction schedule and methods finalised. • Completion requirements incorporated in design 	Project Management <ul style="list-style-type: none"> • Implementation of subcontracts HSE & QA programs reviewed • Engineering databases complete • All fabrication Bulk Material delivered • Shop engineering detailing and work preparation for fabrication • Pipe spools, Steel sections and concrete sections prefabricated. • Deep/major foundations & trenches completed. • Construction site temporary facilities completed • Hook-up/Commissioning Subcontracts awarded 	Project Management <ul style="list-style-type: none"> • Management Plan documents, schedules and budgets updated for next phase • Project Execution • Layout and 3D Model as built mark up of part assemblies/modules • All Bulk Material available to support the Assembly / Erection sequence • Part assemblies and modules/packagings fabricated and mechanically complete • Commissioning commenced on selected systems 	Project Management <ul style="list-style-type: none"> • Management Plan updated (for next phase) • HSE requirements for Assembly & MC stages established & implemented • Work permit system established • Cost, schedule & risk program updated • Team Alignment program continued • Temporary Services & Power Distribution in place and Site roads complete up to sub-base. • Major equipment, Pre-assemblies & modules transported to site and final positioned. • On site fabrication and erection of major vessels and process equipment. • Main Structures & Bridges Complete 	Project Management <ul style="list-style-type: none"> • Management Plan updated (for next phase) • HSE requirements for Assembly & MC stages established & implemented • Work permit system established • Cost, schedule & risk program updated • Team Alignment program continued • Temporary Services & Power Distribution in place and Site roads complete up to sub-base. • Major equipment, Pre-assemblies & modules transported to site and final positioned. • On site fabrication and erection of major vessels and process equipment. • Main Structures & Bridges Complete 	Project Management <ul style="list-style-type: none"> • Implementation of HSE requirements verified • Project Execution • Major equipment, Pre-assemblies & modules assembly installed • Install Balance of Plant Equipment and interconnecting piping systems. • Minor structures, E & I installation and Main insulation complete. • Final Labelling & Identification started. • Operation & Maintenance Manuals available. 	Project Management <ul style="list-style-type: none"> • Updated Project Mgmt Plan implemented • Relevant documentation (LIC/DFI/DFO) updated with As-built and commissioning information • Team Alignment program continued • Project Execution • Platform and finalise all commissioning activities • Temporary items removed. • Relevant documents updated with "as commissioned" information • Punch List cleaned for start-up 	Project Management <ul style="list-style-type: none"> • HSE requirements implemented • Preparation for start up • Complete installation of substructure / moorings / ladders • Complete installation of the production facility • Document offshore installation hook-up work MC complete • Offshore commissioning 	Project Management <ul style="list-style-type: none"> • Total HSE program implemented • Service assistance agreement established • Operational responsibilities (if any) formalised • Delivery protocol executed project contract object handed over • Habitate and maintain resources for Contract Close Out Phase • Project Execution • All project work completed to enable issue of delivery protocol • Final Account established including identification of carry over work including POs and subcontracts • Method and schedule to close punch lists (COW) agreed with Client • Completion Certificate established. • Project Close-out report issued • Punch list / COW including PO and subcontractor scope completed • Complete and release hand-over documentation • Subcontractor and third party invoices closed out • Completion of Sub-contracts and POs Final Accounts and Completion Certificates • POs assigned to Client if required 	Project Management <ul style="list-style-type: none"> • Establish agreements on execution of post start-up performance and HSE measurements and restrictions • Management Plan documents as-built, with lessons learned • All As-built and LCI documentation handed over • Key experience figures summarised and transferred to BUIBS • Issue of Delivery Protocols and commercial closing of POs and subcontracts • Final Account established including identification of carry over work including POs and subcontracts • Release documentation, BGS / POGs and systems handed over to warranty organisation • Completion Certificate established. • Project Close-out report issued • Punch list / COW including PO and subcontractor scope completed • Complete and release hand-over documentation • Subcontractor and third party invoices closed out • Completion of Sub-contracts and POs Final Accounts and Completion Certificates • POs assigned to Client if required 	



The way we work and deliver projects!

PEM Execution Level M2A – M2B

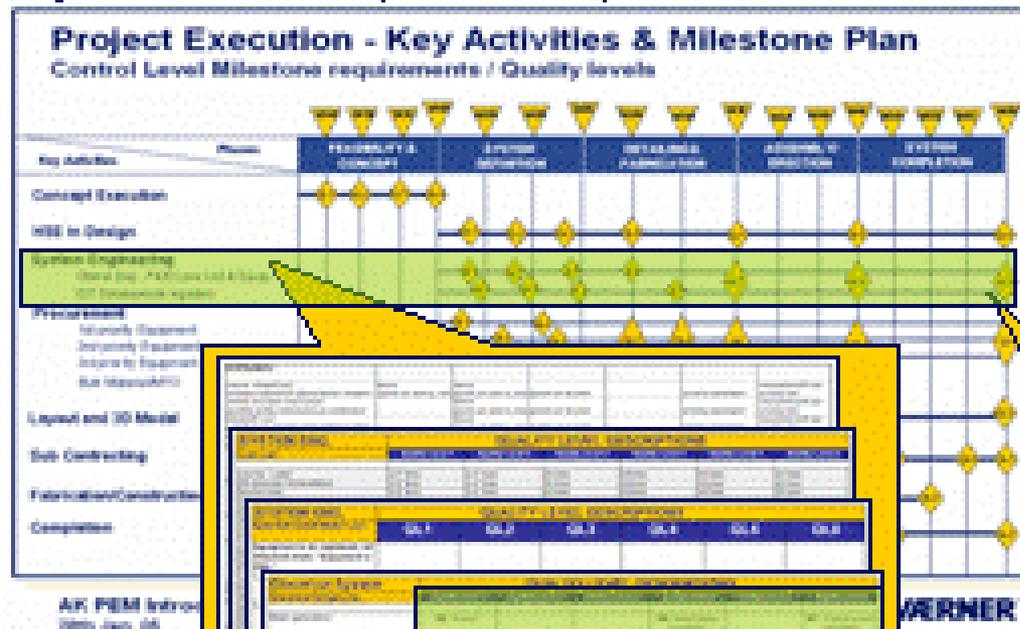
Piping Discipline Flowchart and Activity Description



Link between Control level and Execution Level

Summary: Quality assurance in time, interface & detailed planning

Major milestones and Key deliverables (procedure)



Detailed Activity Plan (DAP)

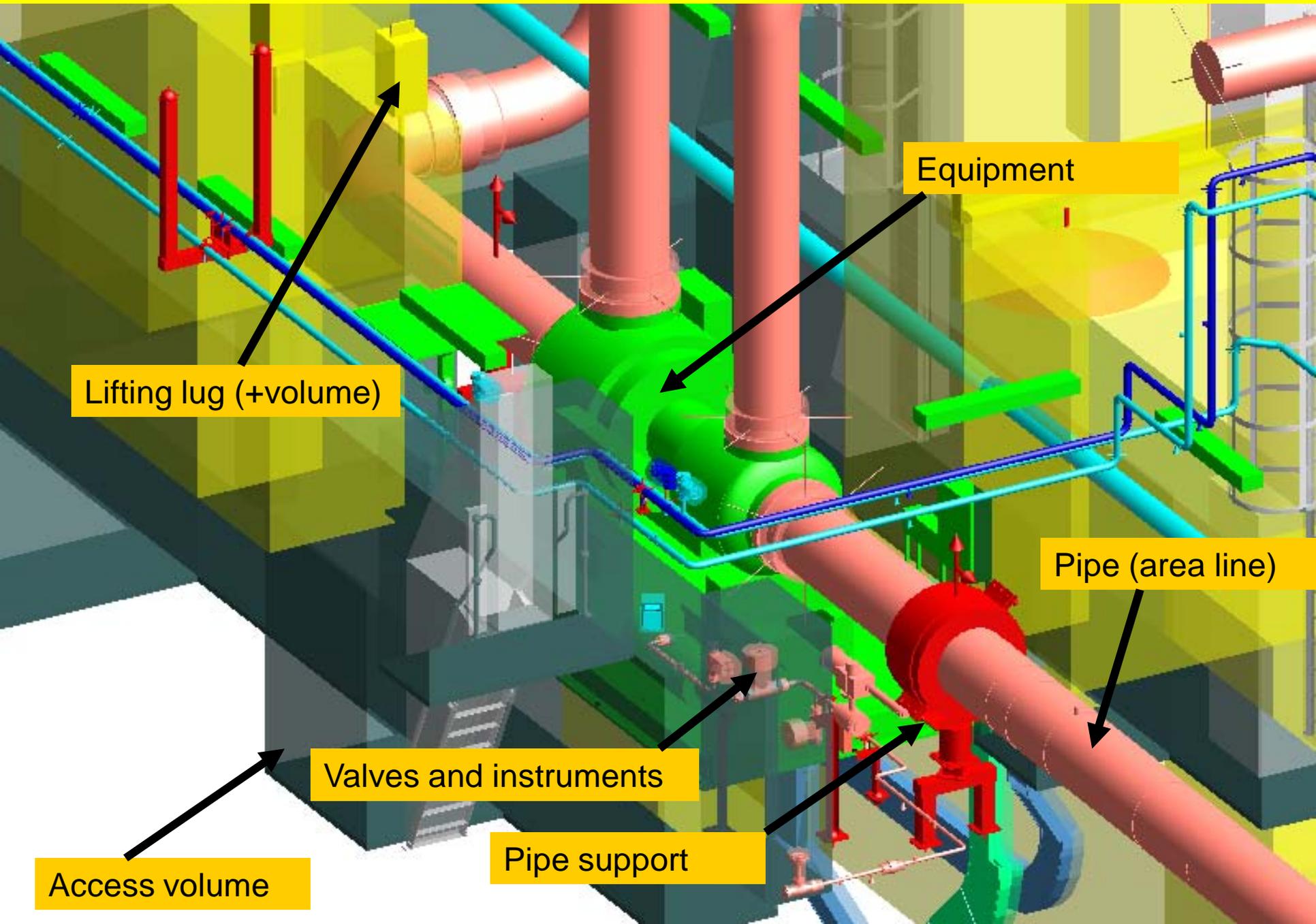


Quality Level (QL) descriptions

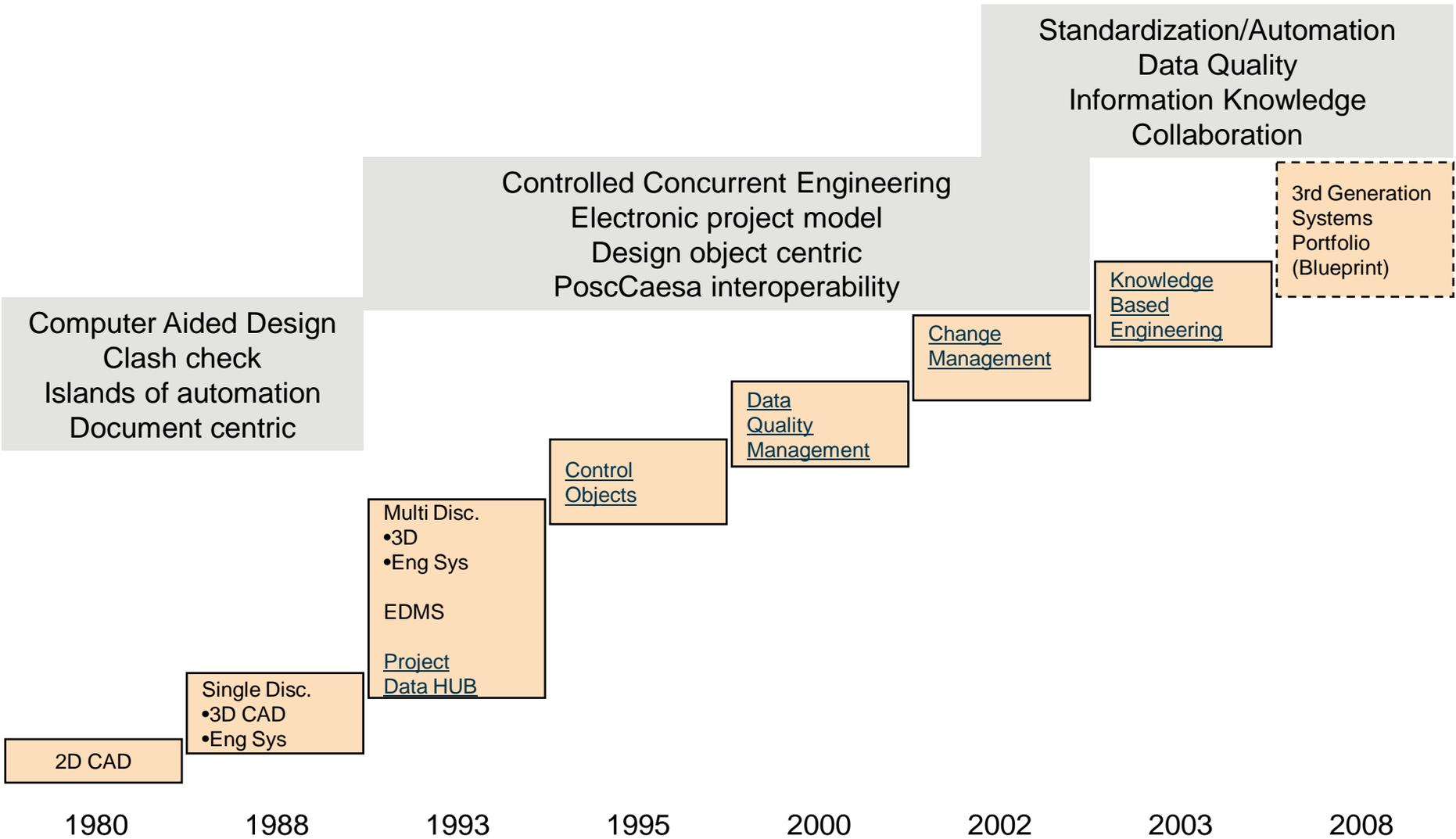


Status Check Lists (work instructions)

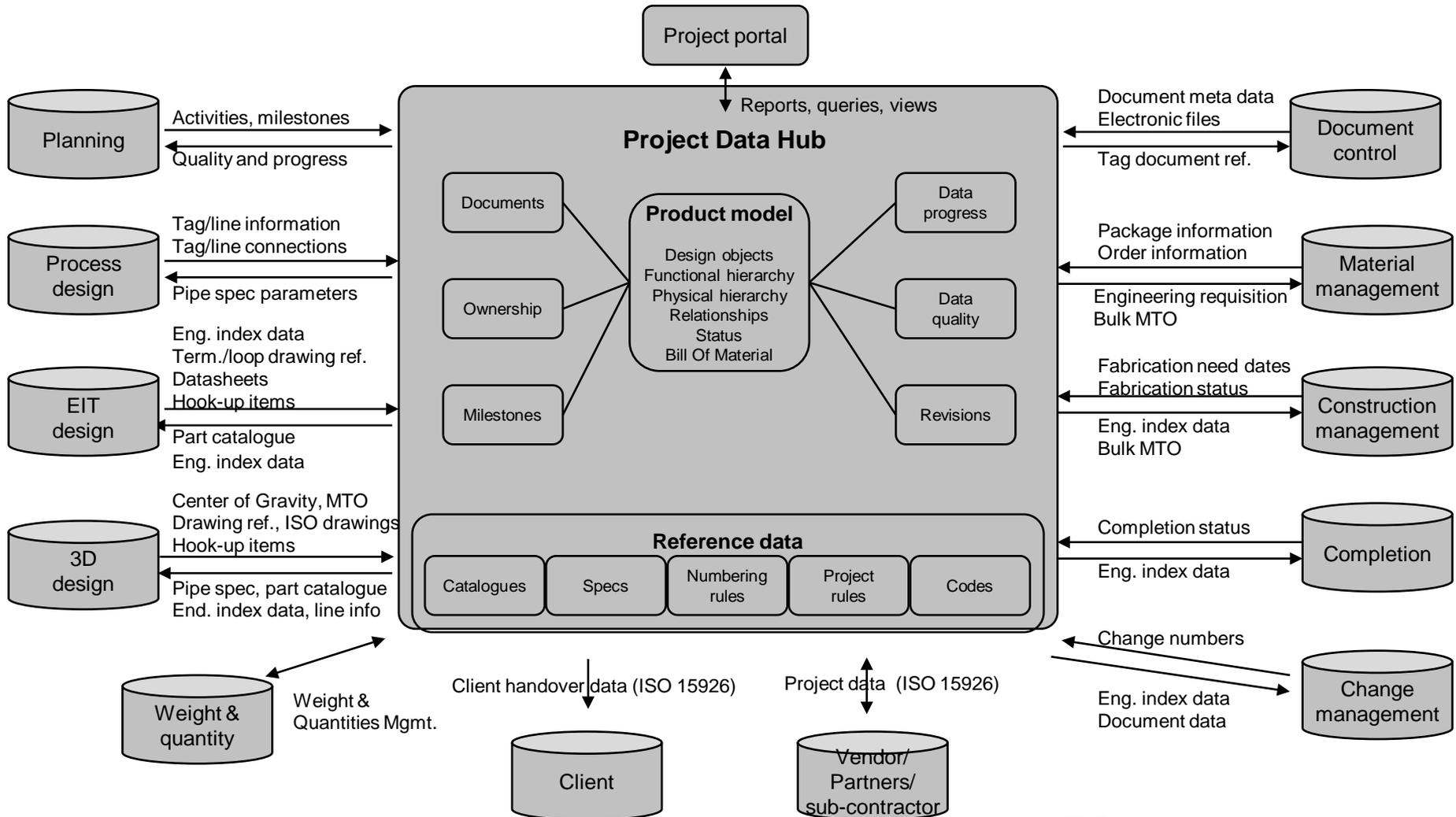
Examples of Piping & Layout's Control Objects



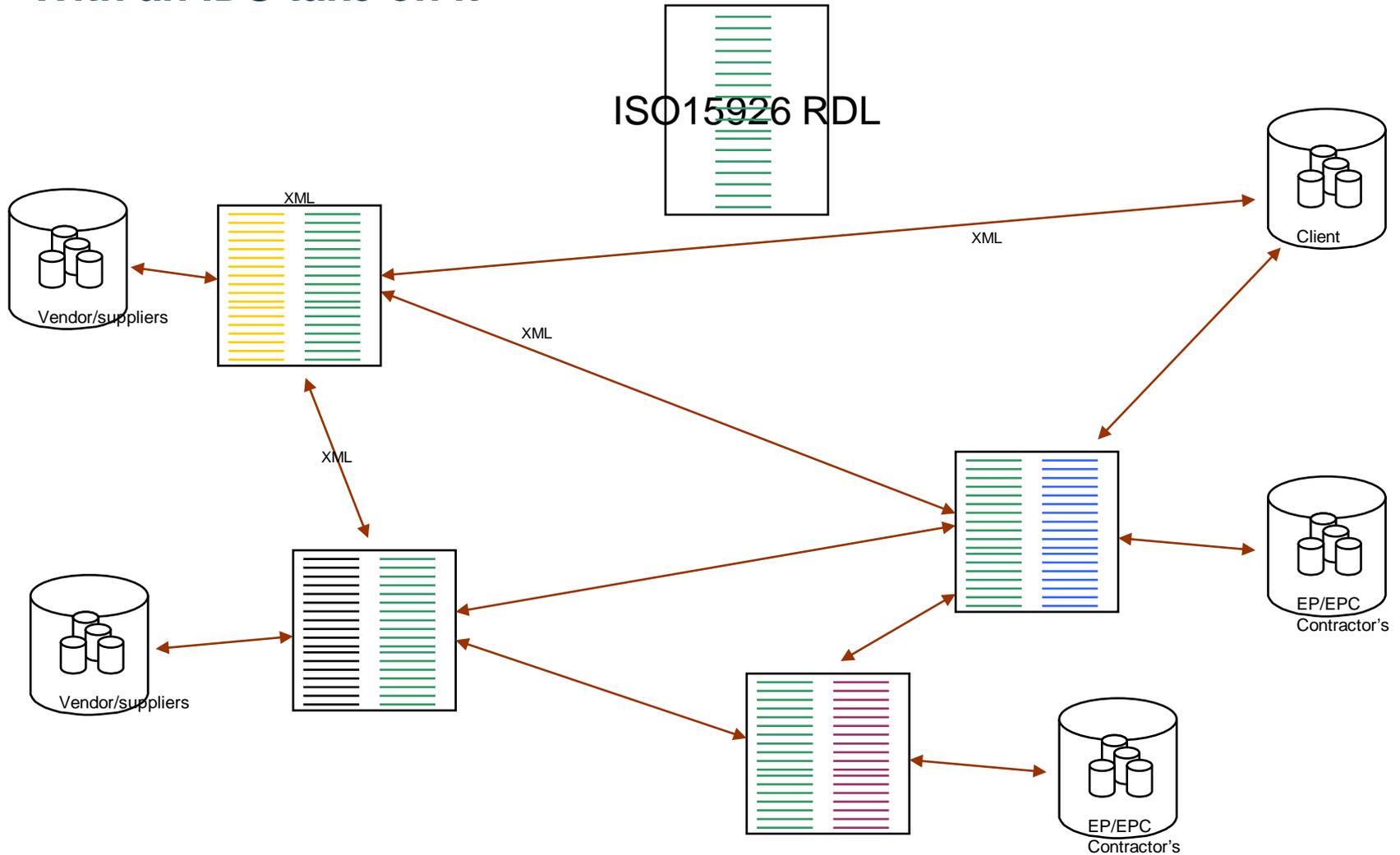
AK FD Methods & Tools – Step changes



Aker Solutions Conceptual Data Model



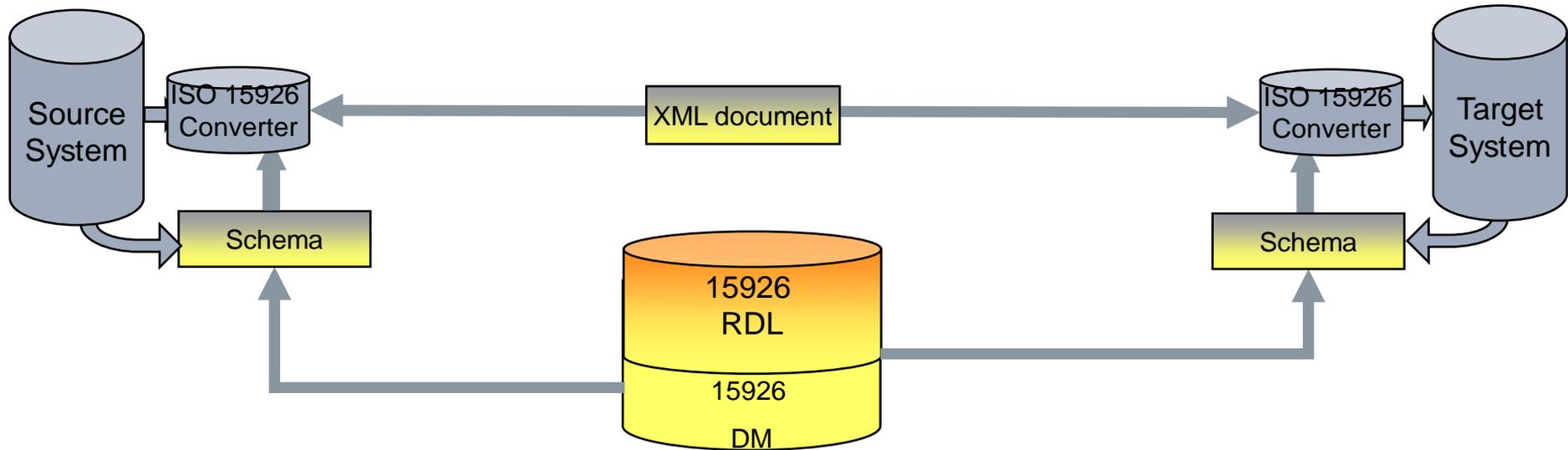
“Word Book” (ISO15926 RDL) in the industry With an IDS take on it



Aker Solutions Take on ISO 15926

- Aker Solutions internal “data model” to be “RDL compliant”
- Procurement ITT’s to specify delivery of information on ISO 15926 “RDL format”
 - Clients (Owner/Operators) to support EPC contractors (specify ISO 15926) in the industry adoption process
 - Coordination between EPC companies is required
- Further development of ISO 15926 product domains is of key importance
- Aker Solutions will invest in knowledge and work processes for data exchange on ISO 15926

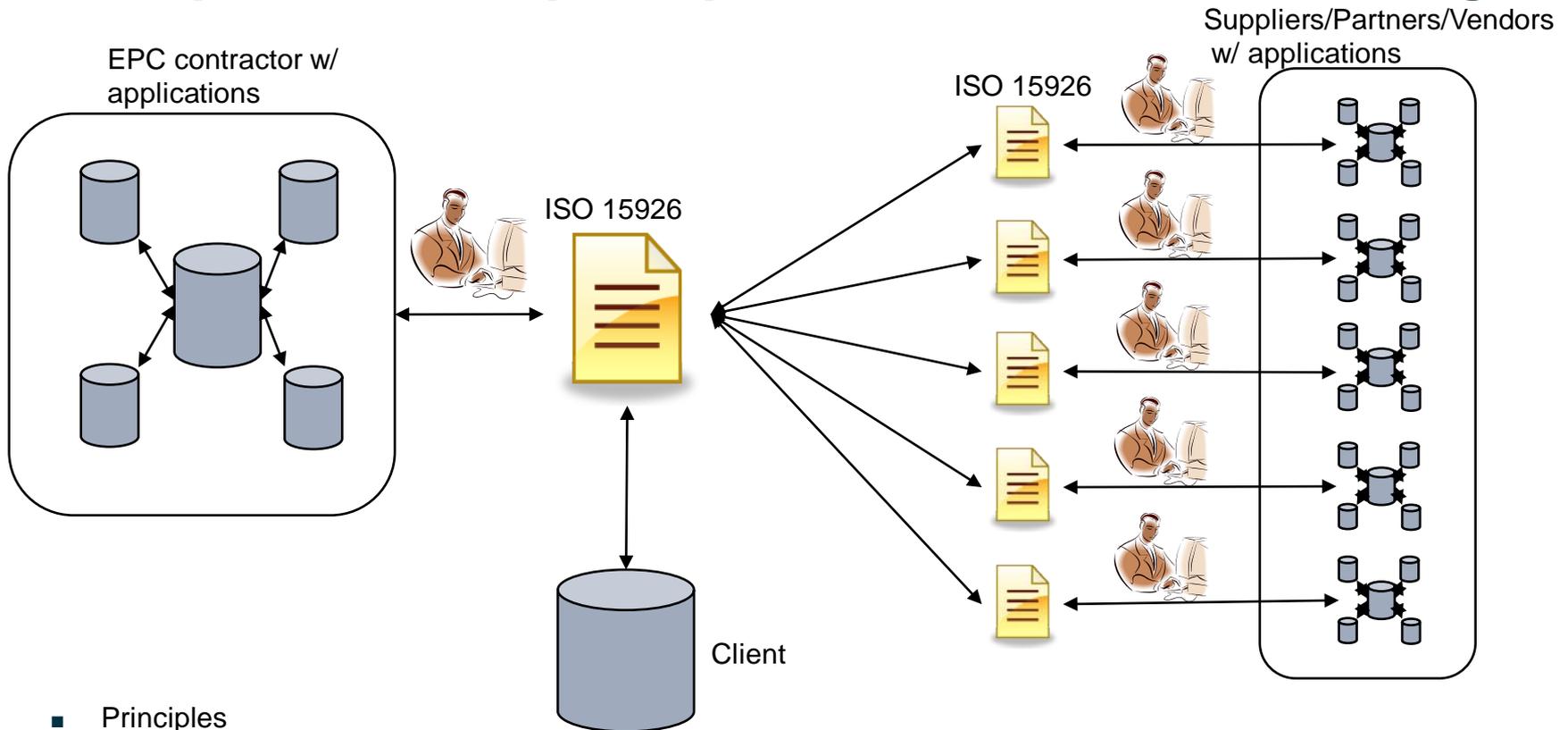
Aker Solutions View on ISO 15926 Data Exchange



■ Main principles

- The value of ISO 15926 is closely linked to the exposure of the standard into “neutral” ISO 15926 XML formats
- Source and target systems to be able to exchange information directly between each other based on “neutral” ISO 15926 XML format
- “Neutral” ISO 15926 XML format to be compliant with ISO 15926 RDL and data model
- Aker Solutions will try to adapt to the ISO 15926 RDL in their own information systems as far as possible, to ease the transformation efforts during data extraction and import

Best practice and principles for information exchange



■ Principles

- Information exchange between parties based on ISO15926 industry standard
- Human control through visualization before import into legacy databases
- Suppliers will only relate to ISO15926 within their own domains
- EPC contractor main information exchange hub

■ Advantages

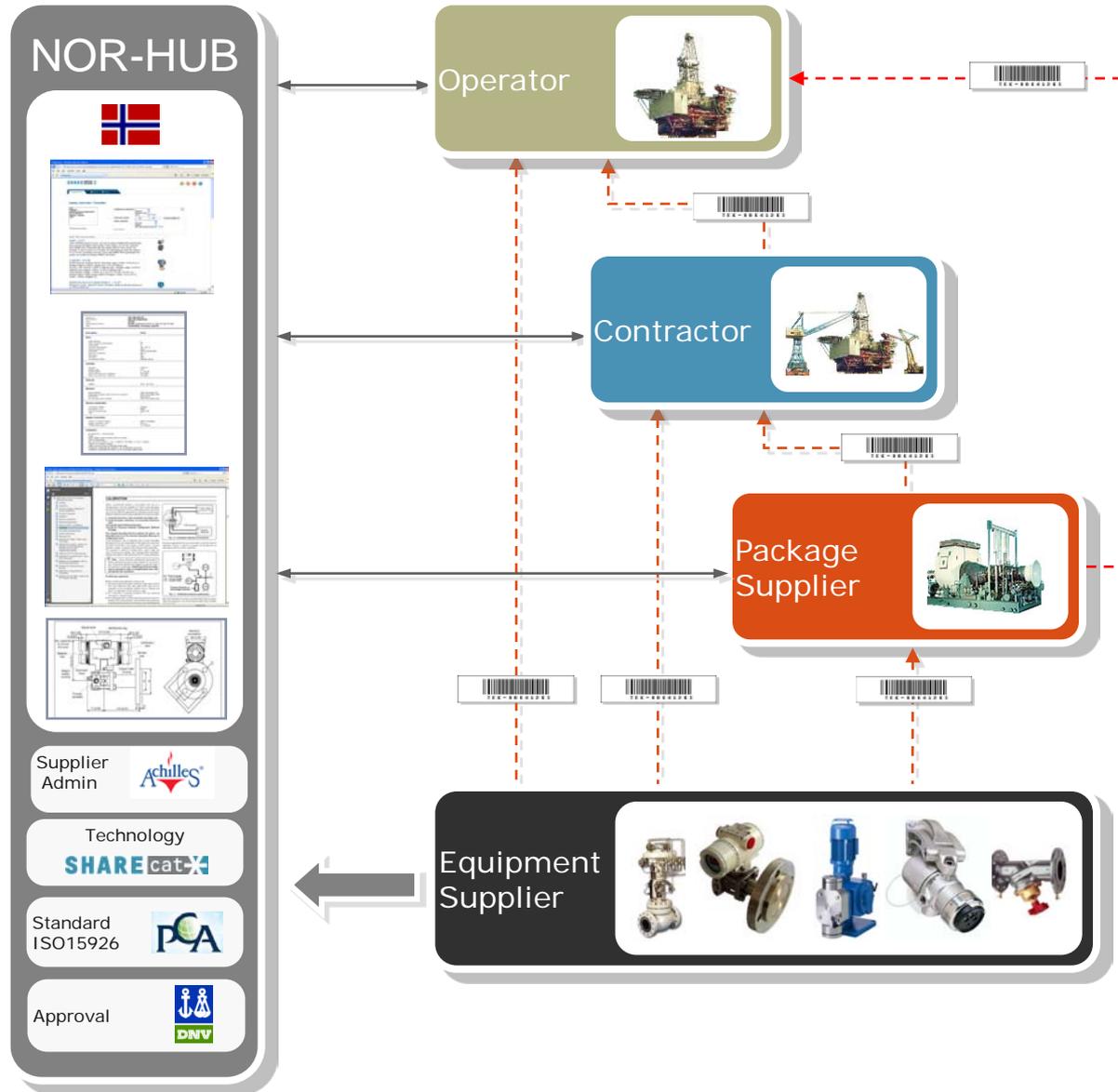
- Client: Quality controlled data, more efficient information exchange through industry standard information format
- EPC contractor: Quality controlled data, one industry standard exchange format to relate to
- Supplier: One industry standard exchange format to relate to

Some elements in the way forward

- Extend product coverage
 - E.g. improve definition quality in domains like, Instrumentation, Electrical, Mechanical etc.
- Engage clients on new projects
 - E.g. Petronas, StatoilHydro, BP, ConocoPhillips, Shell, ExxonMobile, Enie.....
- Aker Solutions to embrace and fully control ISO 15926 data exchange, e.g.
 - Receive vendor information on ISO 15926 formatted XML files and carry out configuration/mapping towards internal systems own experts
 - Deliver information to clients on ISO 15926 format
- Where applicable, Implement ISO 15926 RDL definitions into the Aker Solutions Project Data Hub

NOR-HUB

pre-qualified information delivered once and for all



PCA Forum & Members Meeting Aker Solutions and ISO15926



Thank You!