TEEKAY PETROJARL

Maintenance and Operational Excellence

Magnus Drøpping – Maintenance Management Engineer

ESRA – 04.04.2013

Contents

Teekay Corporation

- Founded 1973 by the late Torben Karlshoej
- Transnational company with 6,800 employees
- Transporter of more than 10% of the world's seaborne oil

The Teekay Fleet

Offshore

10 FPSO's

40 Shuttle Tankers

5 FSO's

Conventional

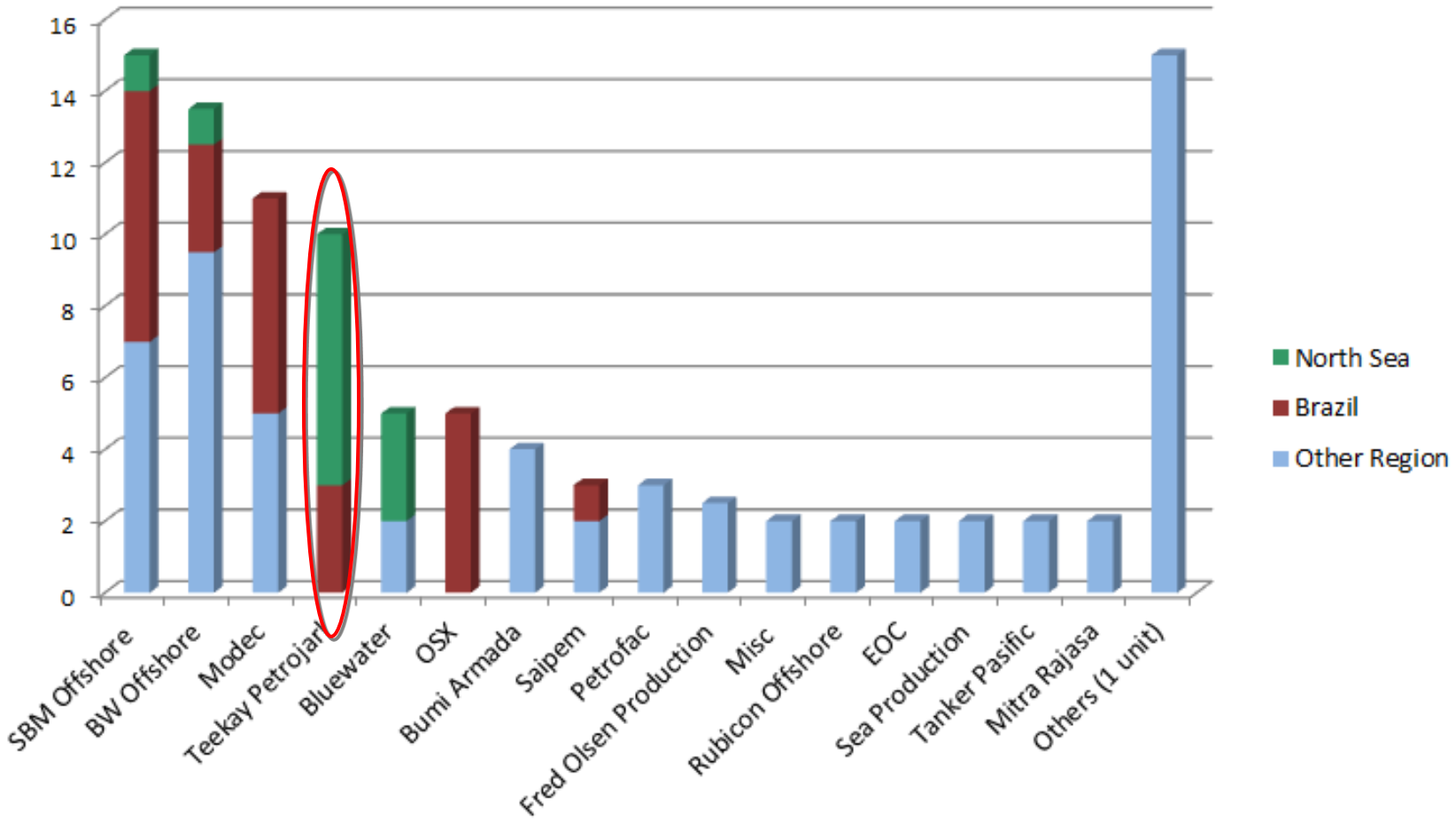
62 Crude Oil Tankers

26 Gas Tankers

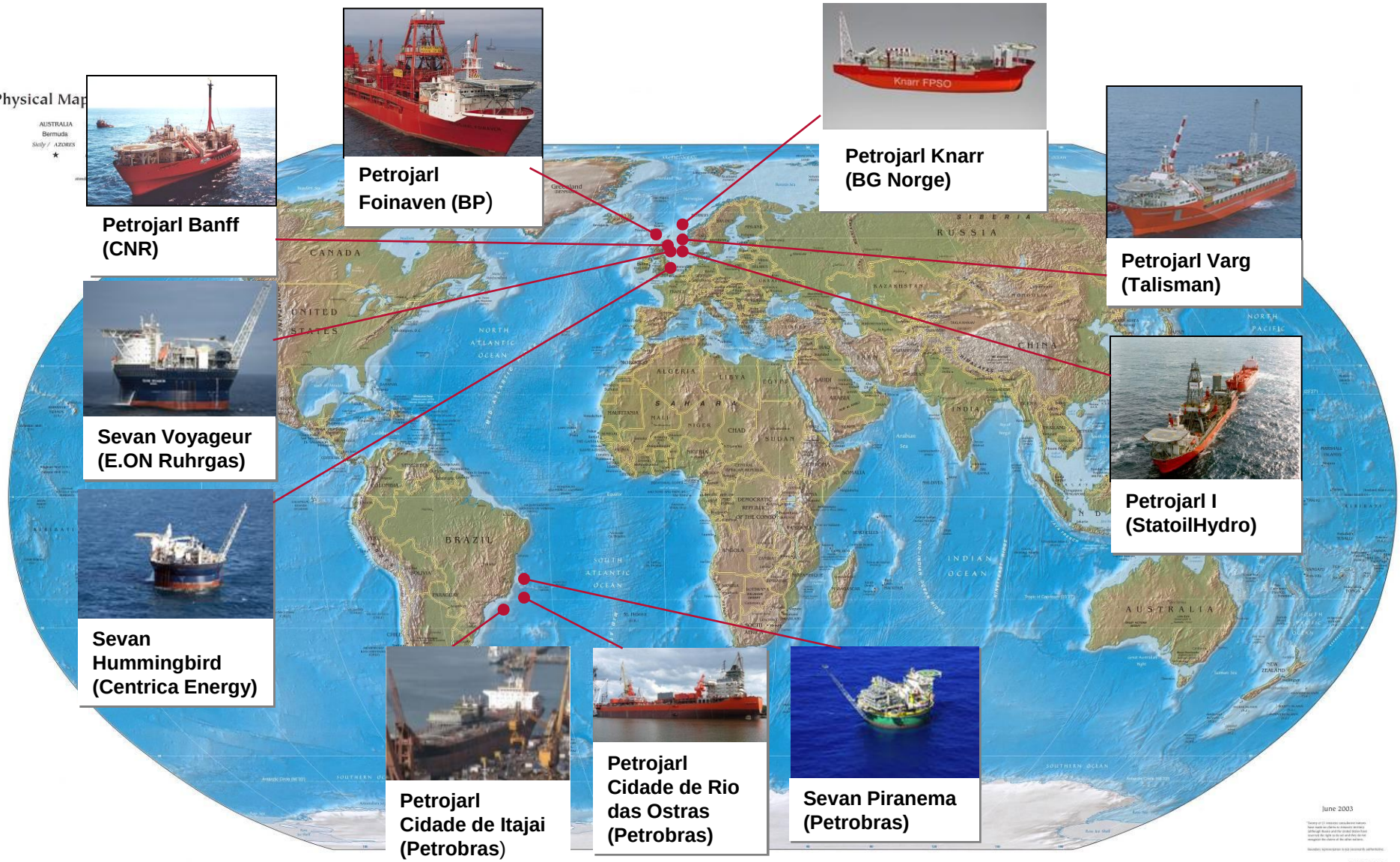
9 Product Tankers

Total of 153 Vessels

Teekay Petrojarl – A Major Player



Teekay Petrojarl - FPSO Fleet & Customers



Petrojarl Banff (CNR)

Petrojarl Foinaven (BP)

Petrojarl Knarr (BG Norge)

Petrojarl Varg (Talisman)

Sevan Voyageur (E.ON Ruhrgas)

Petrojarl I (StatoilHydro)

Sevan Hummingbird (Centrica Energy)

Petrojarl Cidade de Itajai (Petrobras)

Petrojarl Cidade de Rio das Ostras (Petrobras)

Sevan Piranema (Petrobras)

Asset Integrity Management in TKPJ

Our definitions:

- Asset Integrity is the ability of the asset to perform its required function effectively & efficiently whilst safeguarding health, safety & the environment

- Asset Integrity Management is the means of ensuring that the people, systems, processes & resources are in place, are fit for purpose, and are being applied effectively over the whole lifecycle of the asset

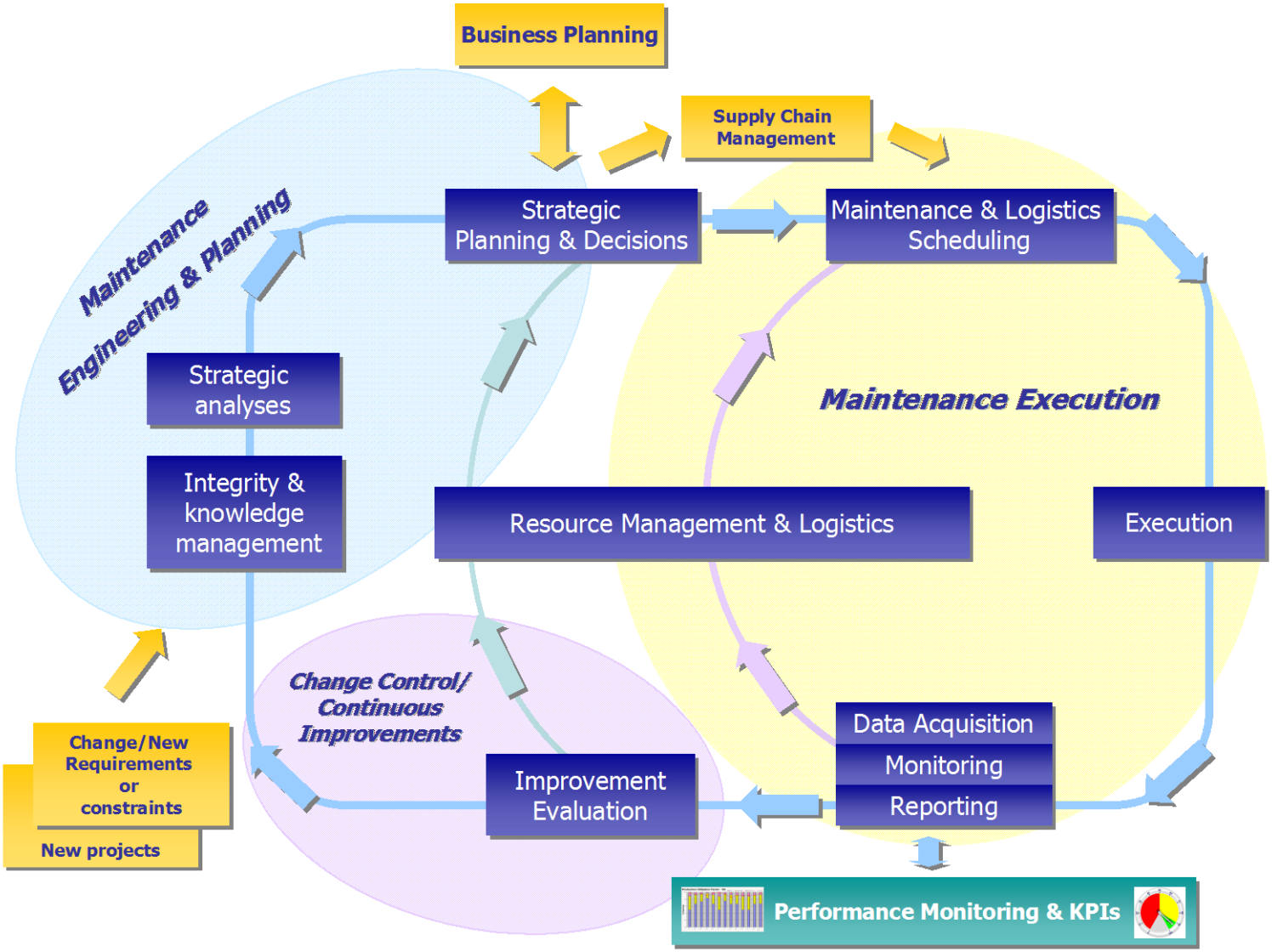
Asset Integrity Management in TKPJ

Asset Integrity Management

Objectives :

1. To reduce risk for major accidents to an accepted level
2. To ensure maximal production
3. To optimise maintenance and operation costs

Teekay Maintenance Management



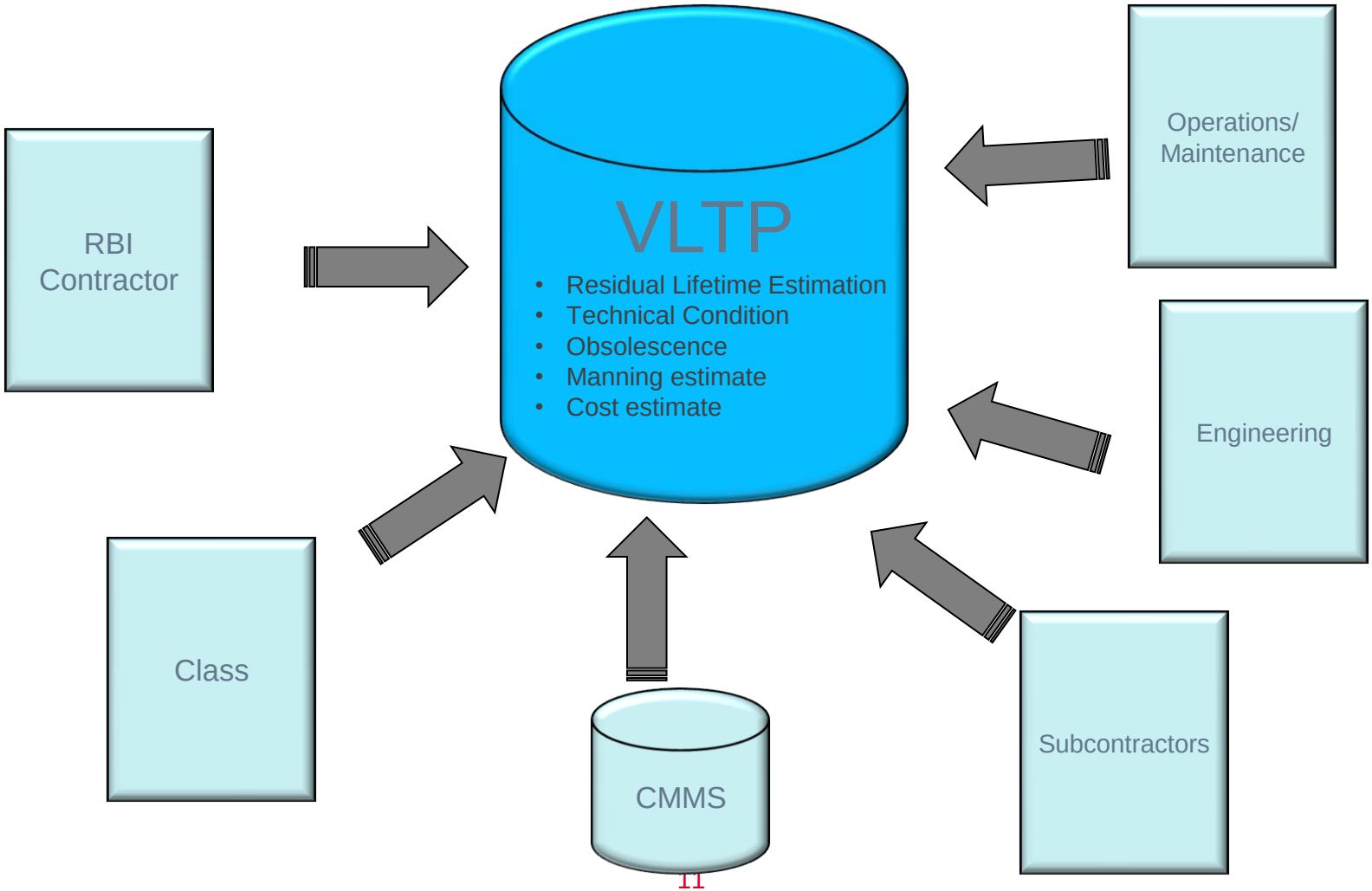
Key Asset Integrity Challenge Areas for TKPJ

- Harsh environment & challenging operations
- Significant prolongations to expected duration of contracts from extended tail-end production
- Re-deployment of units
- How to handle unforeseen events

How to obtain the full picture of the integrity of the vessels?

Solution?

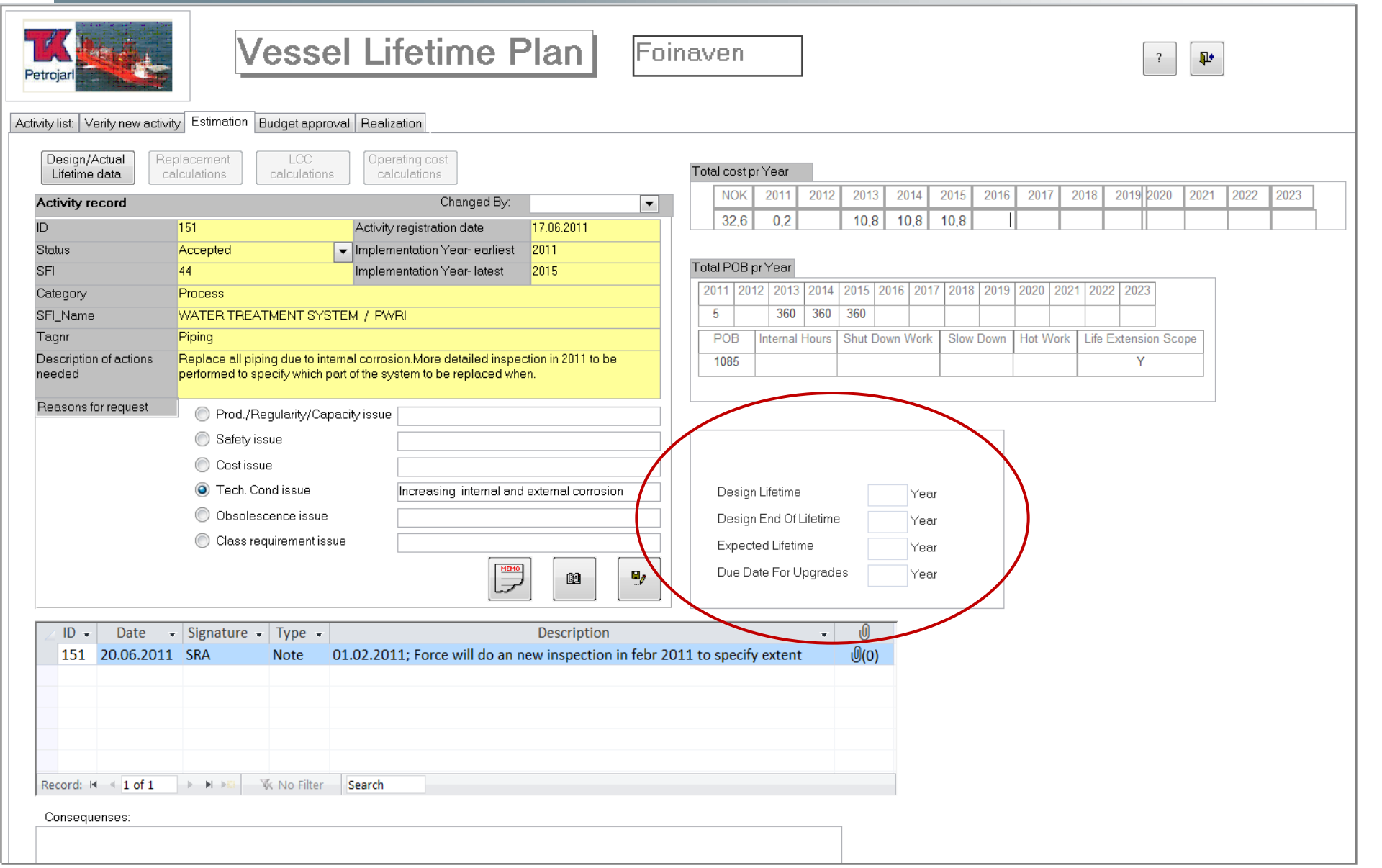
Many different sources for asset integrity information



Utilization of LifeTimePlan

- State of the vessel (major 10 Y activities)
- Technical condition
- Remaining lifetime
- Repair/Modification/Renewal evaluation
- Long term planning of activities
- Budget process
- Input to Asset Tracker (business model)
- Input to docking planning

TKPJ Vessel Lifetime Plan



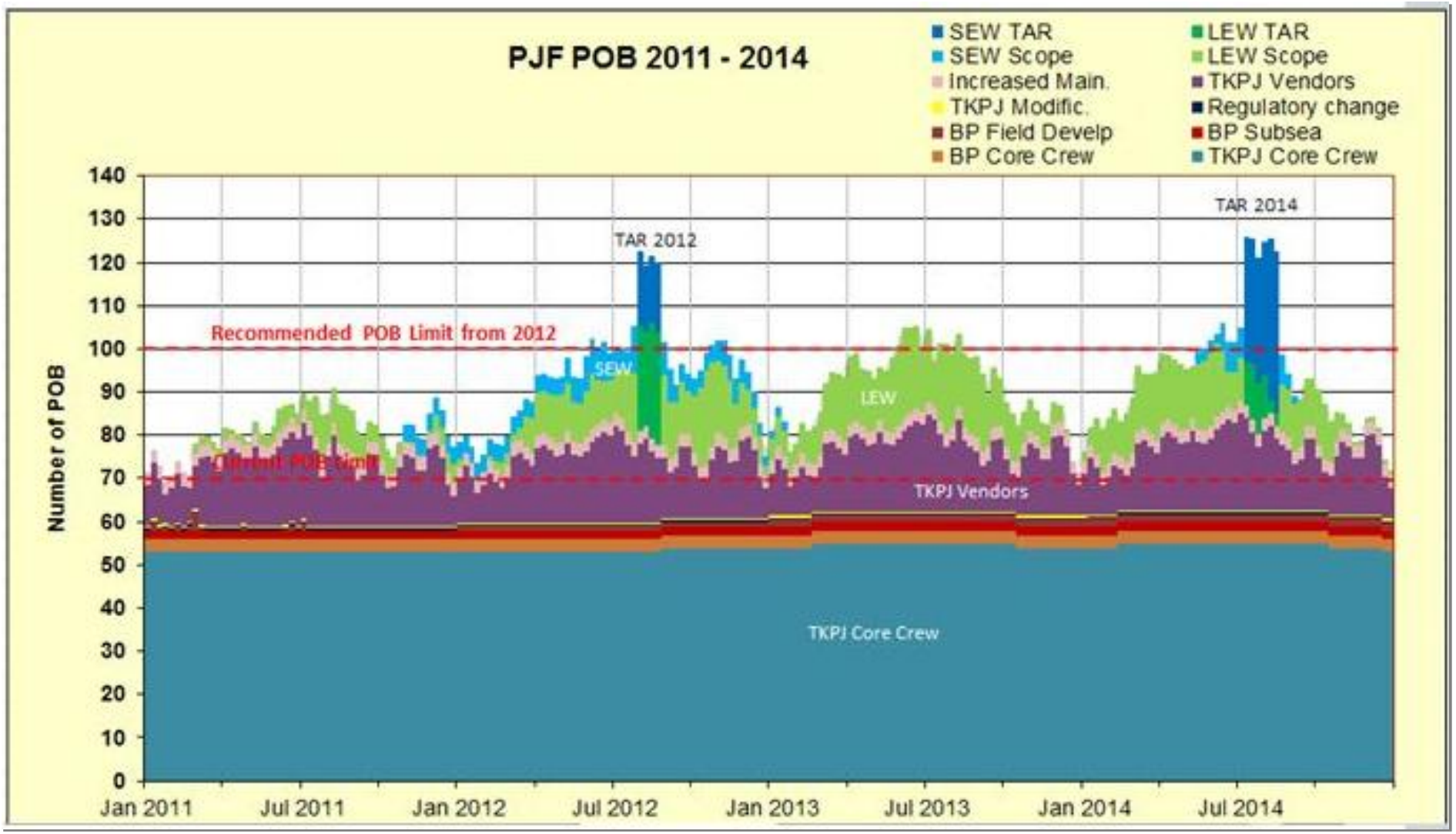
Examples of VLTP

ID	Status	SFI	Category	SFIName	Tagnr	Description	Earliest	Latest
249	Accepted	41	Process	PROCESS FLOW TRAIN 1 (A)		Painting Program6 Y program	2009	2015
151	Accepted	44	Process	WATER TREATMENT SYSTEM / PWRI	Piping	Replace all piping due to internal corrosion.More detailed in	2011	2015
193	Accepted	66	Machinery Main Component & ICSS	GENERATORS FOR POWER PLANT		Program for onshore change out/repair all 8 generators du	2011	2015
228	Accepted	81	Ballast, bilge, fire fighting, ESD, PSD, HIF	EMERGENCY ALARMS- FIRE FIGHTINGS AND ES		Deluge piping main deck to be replaced.Started in 2008 - o	2008	2013
225	Accepted	80	Ballast, bilge, fire fighting, ESD, PSD, HIF	BALLAST AND BILGE SYSTEM	Piping	Piping around pumps have internal corrosion, many spools	2014	2015
200	Accepted	72	Utility	COOLING WATER - SEA & FRESH WATER SYST		Seawater system - sea chest: port and starboard main se	2011	2011
250	Accepted	41	Process	PROCESS FLOW TRAIN 1 (A)		Services required to painting program, see act. ID 249	2009	2015
153	Accepted	44	Process	WATER TREATMENT SYSTEM / PWRI	Piping	Open Drain piping - no regular inspection program today. D	2011	2011
139	Accepted	43	Process	GENERAL - GAS COMPRESSION AND GAS TREA	04-C-003	Replace machinery protection system(GE fanuc) due to ob	2012	2015
172	Accepted	53	Cargo, lifesaving, mooring, lifting, naviga	MOORING AND ANCHORING EQUIPMENT (INCLU		Mooring system to be replaced in 3-4 years	2013	2014
245	Accepted	25	Hull	TURRET CONSTRUCTION		Repair turret from findings from fatigue review	2015	2017
198	Accepted	69	Machinery Main Component & ICSS	ENGINE/PROSESS/DECK CONTROL - ICSS (SIEM		Woodward Control and monitoring system - Upgrade of sy	2011	2012
163	Accepted	46	Process	RELIEF AND FLARE SYSTEM / CLOSED DRAIN	6"-DC-15	Replace remaining piping not beeing part of replacement pı	2013	2014
194	Accepted	66	Machinery Main Component & ICSS	GENERATORS FOR POWER PLANT		Preparation and installation work for generators change oı	2011	2015
138	Accepted	43	Process	GENERAL - GAS COMPRESSION AND GAS TREA	04-C-003	Dry gas seal problem issue - too short lifetime	2011	2013
136	Accepted	43	Process	GENERAL - GAS COMPRESSION AND GAS TREA	Gas com	Replace gas injection line(to swivel)	2012	2014
104	Accepted	24	Hull	HULL - FORE PART		Need for fatigue analysis of fore part.	2014	2016
182	Accepted	61	Machinery Main Component & ICSS	MANOUVERING MACHINERY	MP-TTE0	Thruster replaced in 2009, due to internal leakages. Can e:	2015	2016
192	Accepted	64	Machinery Main Component & ICSS	STEAM & BOILER PLANT		BMS system, Control & burner System: New system to be	2011	2012
165	Accepted	50	Cargo, lifesaving, mooring, lifting, naviga	CRUDE OIL STORAGE AND DISCHARGE SYSTEI		Metering - ObsolenceFlow computer to be replaced 2011	2012	2012

Case Petrojarl Foinaven

- On Foinaven field since 1996
- New contract in 2009
- 10 + years extension on field without going to dock
- Extensive upgrade activities

PJF – justification for accommodation and lifeboats



Case Petrojarl Banff

- Incident in December 2011
  - 5 anchor chains broke in storm beyond design criteria
- At yard in September 2012
- Back on field Mid 2013
- Field abandonment date is uncertain
- Opportunities:
  - What to do during yard stay?
  - Estimated residual lifetime and obsolescence are issues

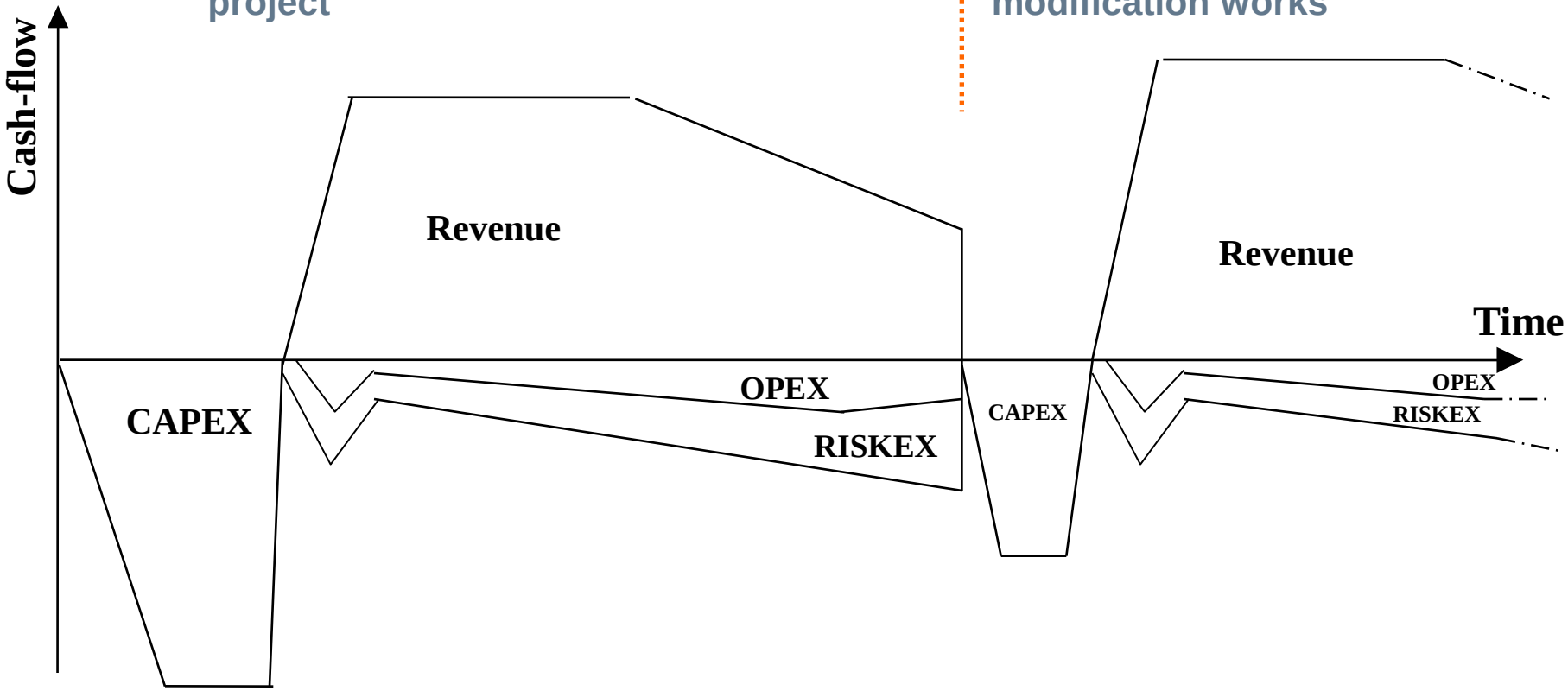
Case Petrojarl I

- Over 25 years in service on 10 fields
- Old lady with a lot of ageing issues
- Leaving Glitne field Q2 2013
- A number of opportunities are considered for re-deployment
- Very important to have a good overview of the asset integrity status.

A pragmatic view on FPSO Asset Management

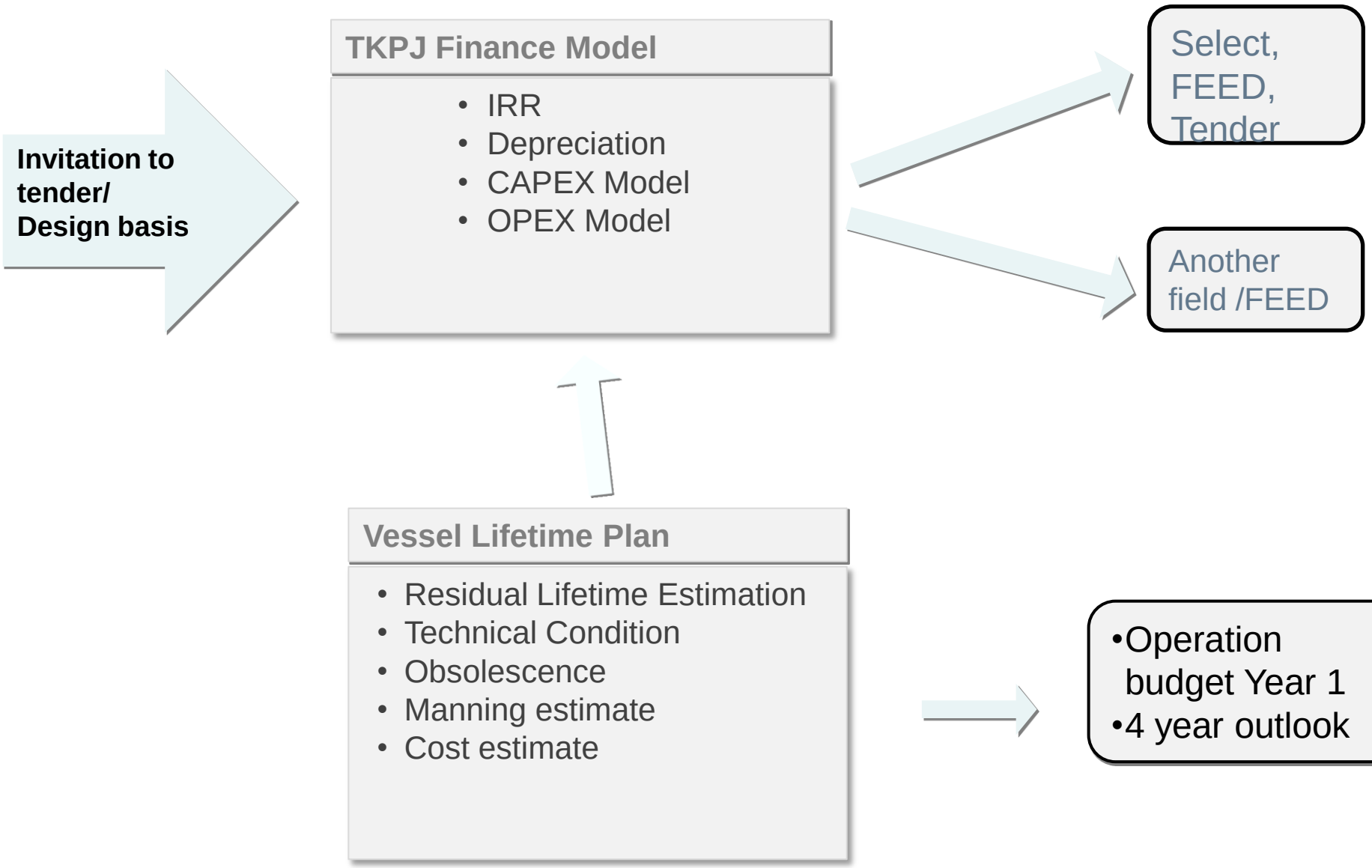
Initial Investment as a new build project or a tanker conversion project

Redeployment of vessel with necessary upgrading & field specific modification works

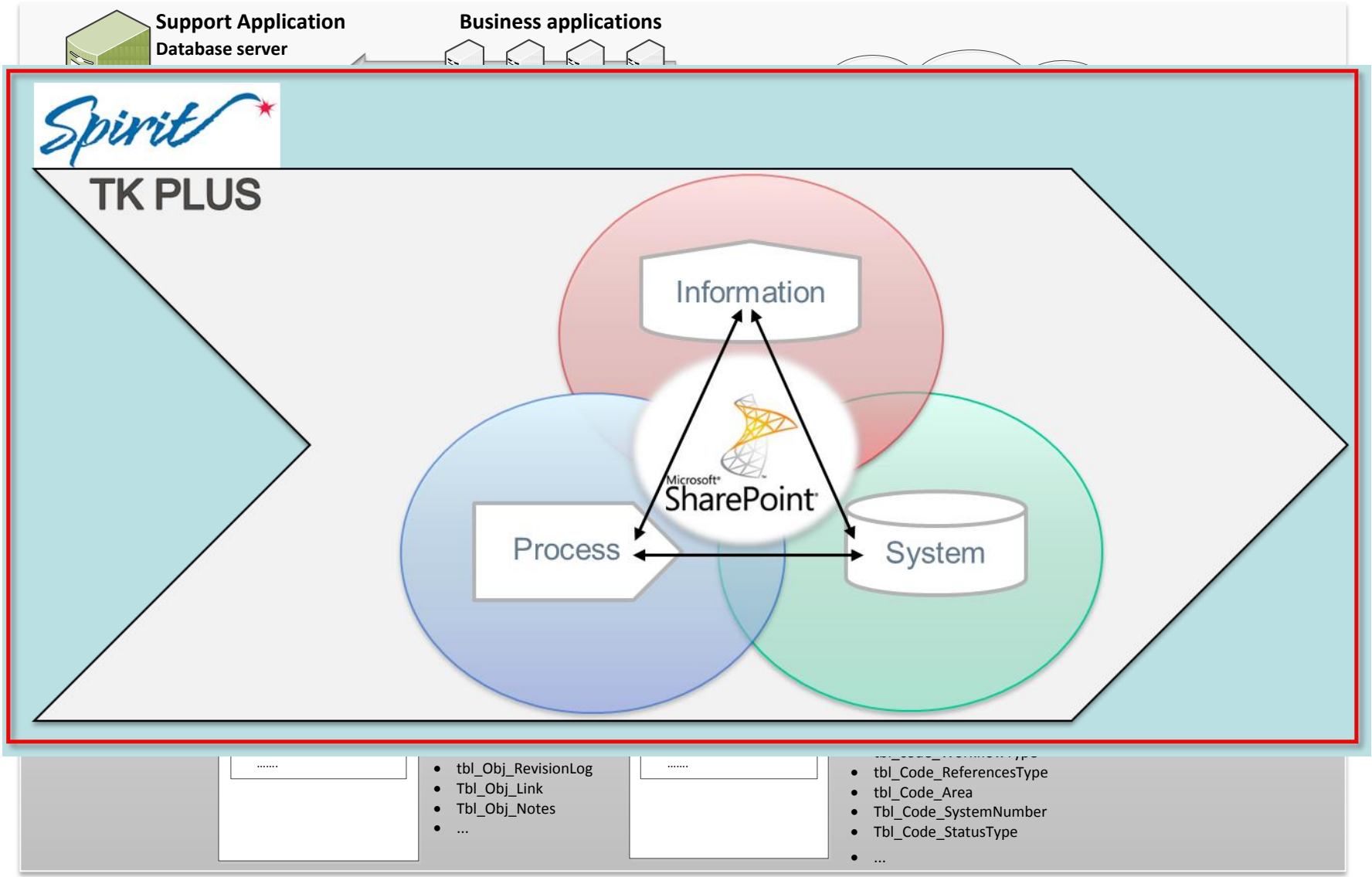


Maximizing Profit = Max {Revenue - CAPEX - OPEX - RISKEX}

TKPJ Business model in redeployments



Future development



Concluding Remarks

- Improving further within the areas of Asset Management and Integrity Management is seen as key to strengthen our position as World Class Operator of mobile production units.

- Success is not expected to come easy and will require strong focus on organizational agility and good leadership.

Thank You for Your Attention !

WE AIM TO BE SEEN AS A ROLE MODEL IN OPERATIONAL EXCELLENCE WITHIN OUR INDUSTRY AND SOCIETY AT LARGE!"

SVERRE W. STENVAAG
Senior Vice President Operations, Teekay Petrojarl ASA