Day 2: External Expert Panel

10:30-10:40
Introduction of panelists and purpose of panel

10:40-11:15
Introductory remarks by panelists

11:15-11:45
Moderated discussion between panelists

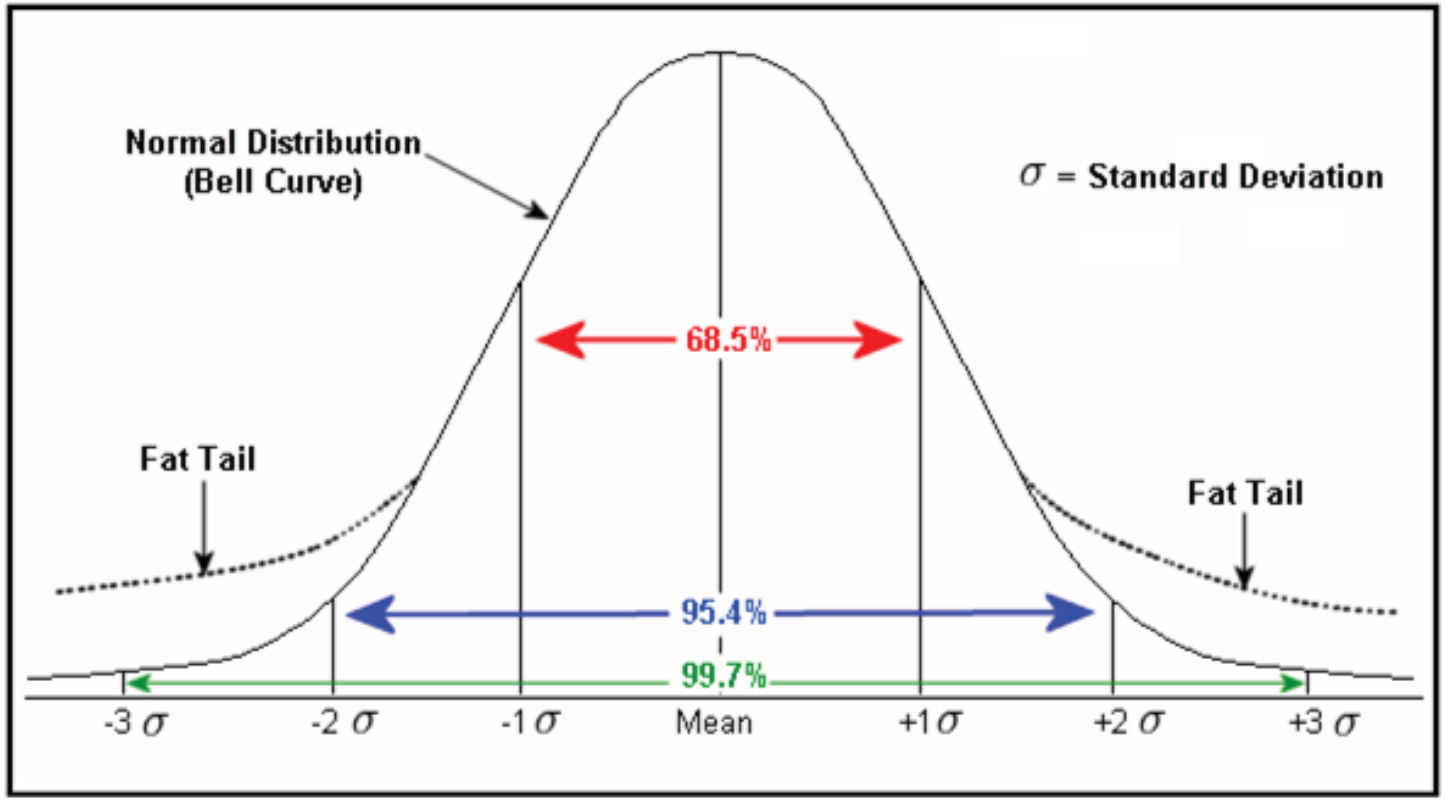
11:45-12:00
Audience Q&A

John McWilliams	Enterprise risk management
Kenneth Wee	Learnings from risk management in financial services
Ned Morse	Safety and operational risk management in oil and gas industry

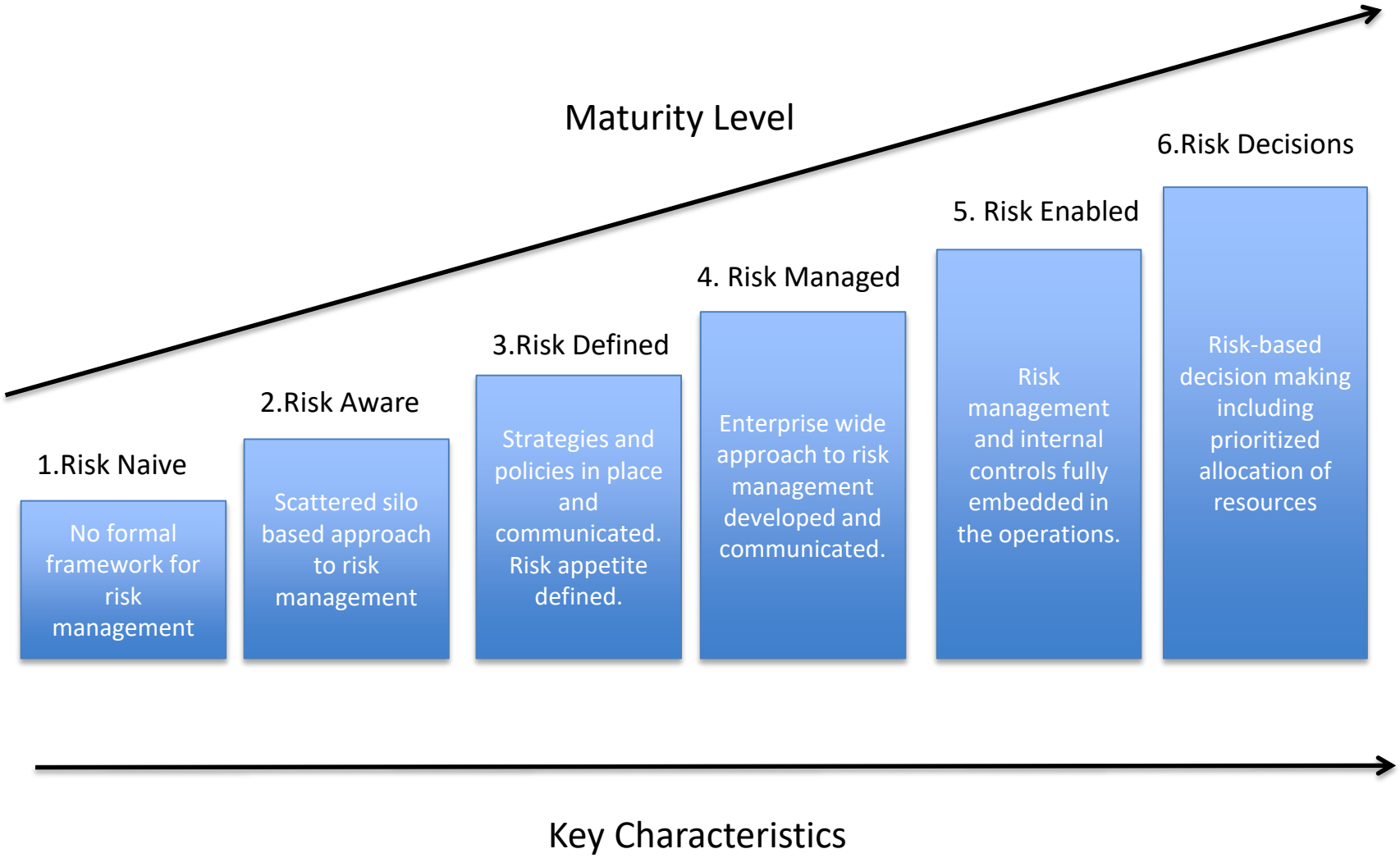
John McWilliams

Enterprise risk management

Understanding the Distribution of Risk



Enterprise risk management maturity model



Kenneth Wee

Learnings from risk management in financial services

Leading institutions manage risk through a governance process linking risk management to business planning

Business Planning
Bringing risk awareness into the next round of strategic planning

Risk Identification
Identify risks and comprehensively describe them, especially emerging risks

Learning & Stress testing
Ensure they can withstand certain extreme events

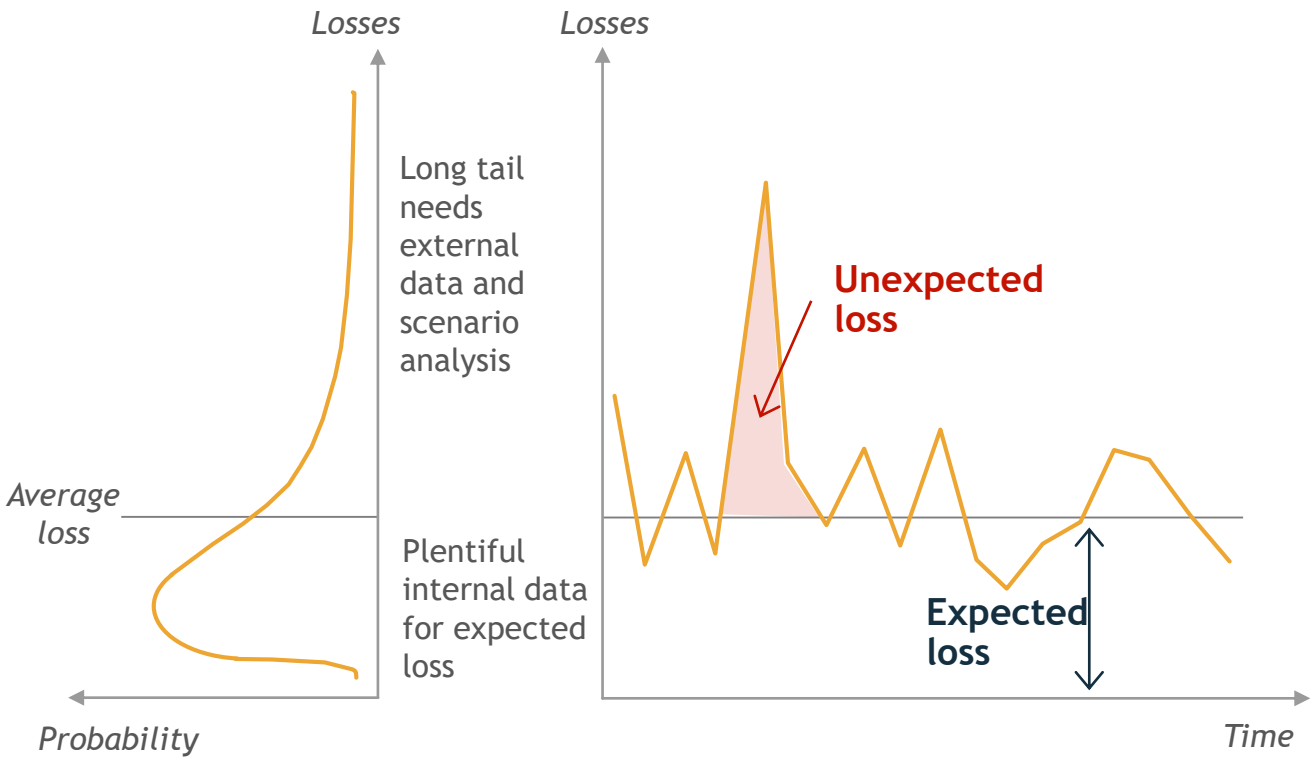


Risk Assessment and Inventory
To assess and track how a risk might manifest in your footprint

Risk Policy and Controls
Set roles, control the risk to within your desired Appetite

Risk Appetite
How much of each Risk are you willing to take as part of your business model

A comprehensive risk management strategy needs to target both everyday losses and infrequent events that can lead to large losses



Examples of risks with long tails: internal fraud, cyber risk, market illiquidity, concentration risk, unexpected correlations, wrong-way risk

Sources of everyday data

- Loss database: banks maintain records of operational risk losses
- Manager self-assessments: managers are required to create Risk Control Self-Assessments

Tail risk events and data

- Investment needs to be made in understanding how big events happen and increasing resiliency to those
- With climate change tail risk can only go up, either in frequency or severity of tail events

Tail Risk can be hard to identify!

“Right now everything on my screen is flashing red. That doesn't make me nervous… The machine works.”

Former CRO of Bear Stearns, June 2006

Model risk: How confident are you in the model and the data behind it? Disciplined model risk management is now in place at most large banks

		Year
GE Capital	Liability modeling and assumptions were flawed and remained unresolved over years in the long-term care insurance which resulted in **$15B** additional reserves	2018
TRANSAMERICA	Charged **$98M** by the SEC - "for their failure to take reasonable steps to ensure the models worked as intend and for contributing to the company's compliance failings"	2018
JPMORGAN CHASE & CO.	Flawed risk management models allowed a trader to accumulate huge short positions on CDX products distorting market prices. **$6.2B** loss incurred by the company and congressional hearings and investigations by the Federal Reserve, SEC, FBI followed	2012

When you use a model, do you know what its key assumptions are?
Do you know its limitations? How much data was it built on?
What manual adjustments does it contain (to data, coefficients, etc.?)
Do you know when it needs re-calibrating?

An ideal scenario analysis process links risk factors to the value of business and mitigation strategies, to aid in capital allocation

1 **Risk Identification**

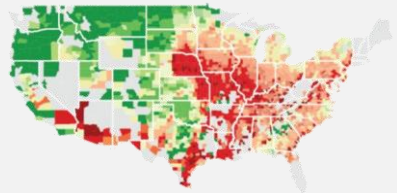
- E.g. Wildfires, climate change, fraud, cyber, counterparty risk

2 **Mega Trends**

- E.g. Urbanization rate, migration patterns, demographics

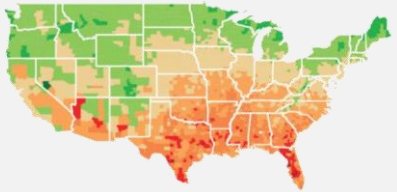
3 **Environmental Scenarios…**

- E.g. Land use, temperatures, rainfall



… and Socioeconomic Scenarios

- E.g. Growth path of MSAs and industry



4 **Macroeconomic and Market Responses**

- E.g. Changes in Housing Prices by county



- E.g. Changes in Employment by sector



5 **Modeled P&L & Balance Sheet outcomes**

- E.g. Impact on EBITDA 2020-40 in three scenarios



6 **Value of different adaptation and mitigation strategies**

What can we do to improve risk management throughout an industry?



Encourage data collection and pooling



Publish best practices, conduct horizontals



Invest in technology, front-to-back reporting



Tone-from-the-top: risk governance is important



Embed risk management into operational culture



Create KRIs and a link to compensation



Creating consistency in stress scenarios



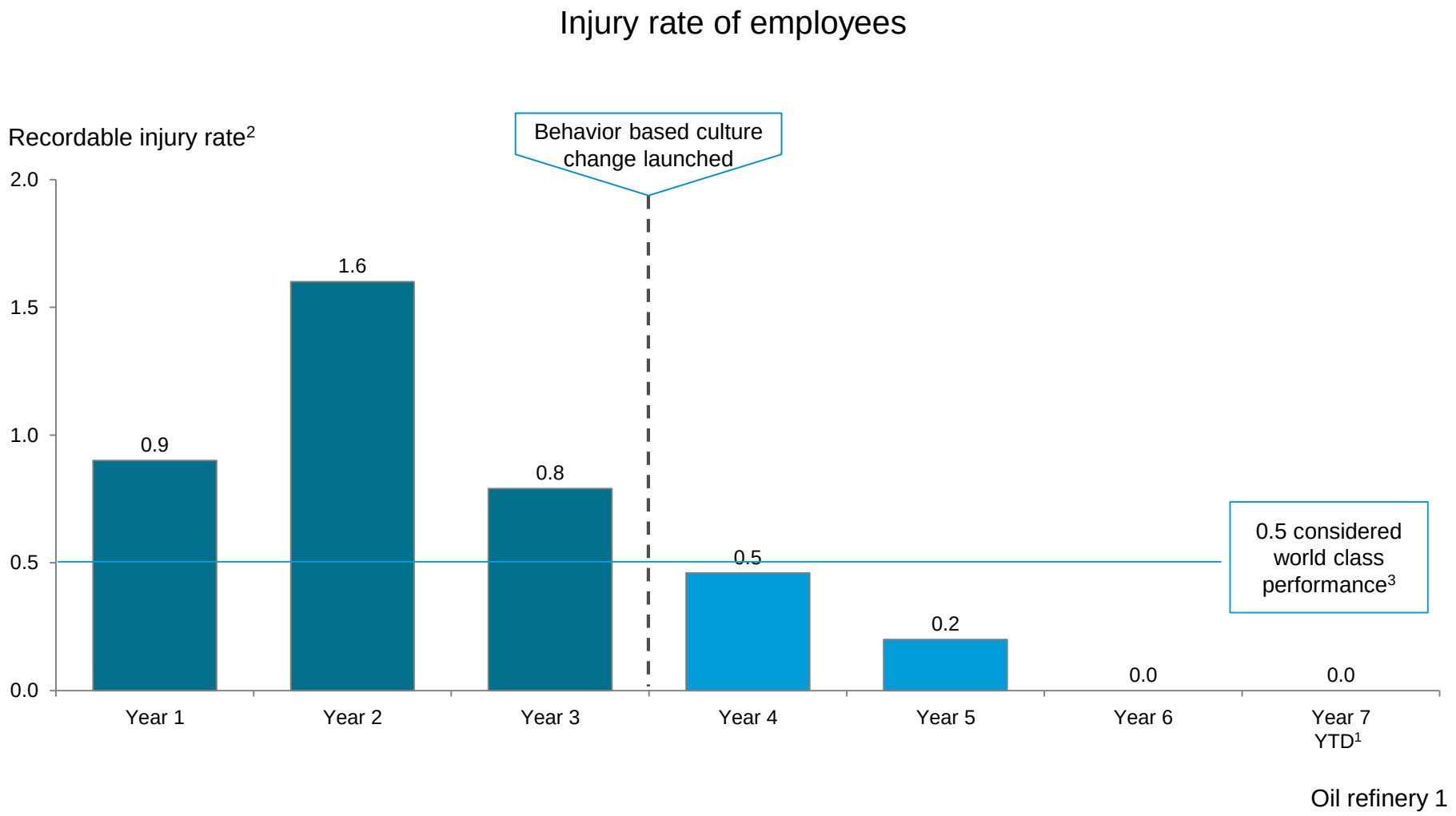
Taking a risk-based selective approach

Ned Morse

Safety and operational risk management in oil and gas industry

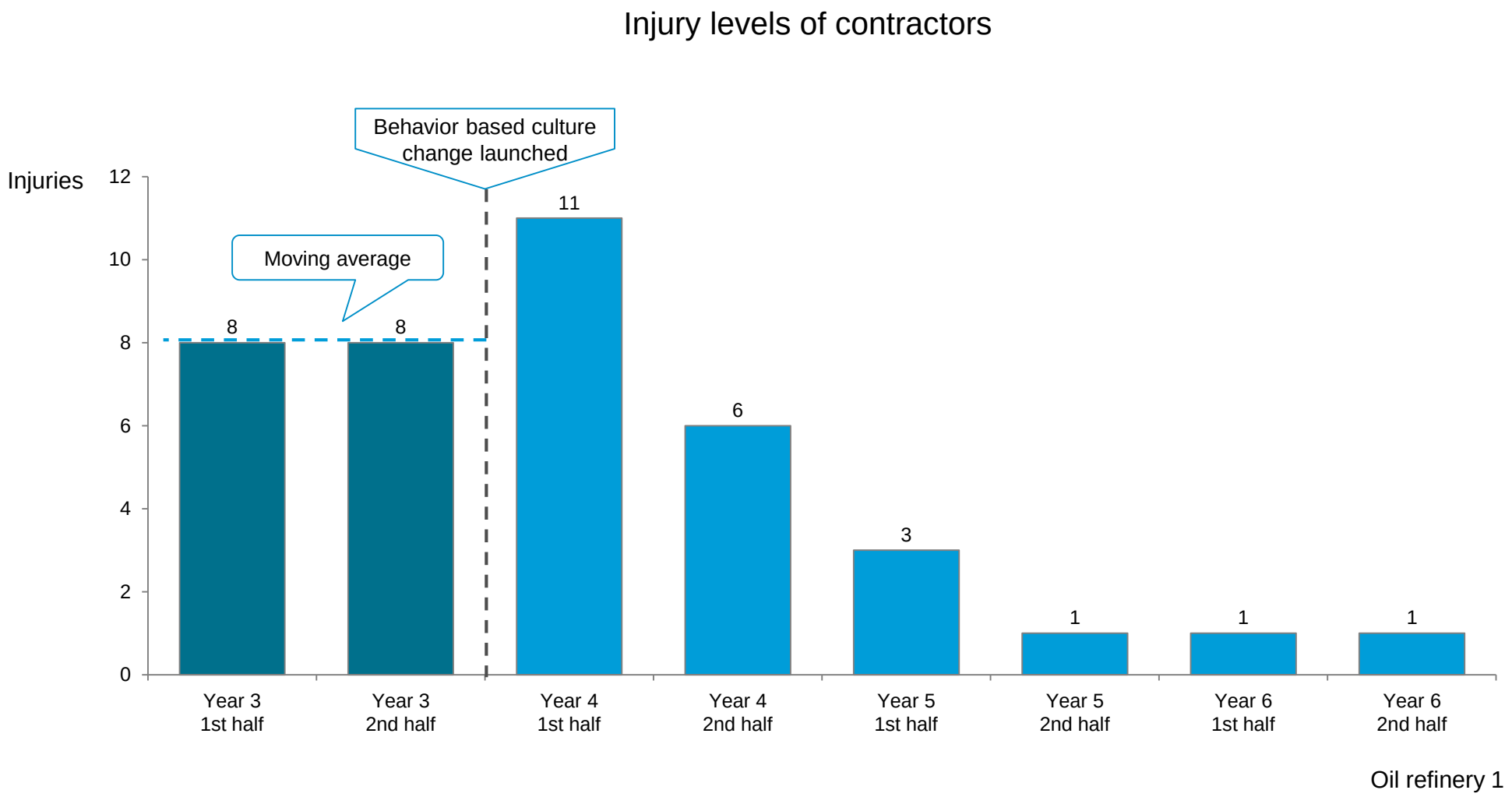
Dramatically improved safety at major West Coast refinery

Achieving 2 years without a recordable employee injury[1]

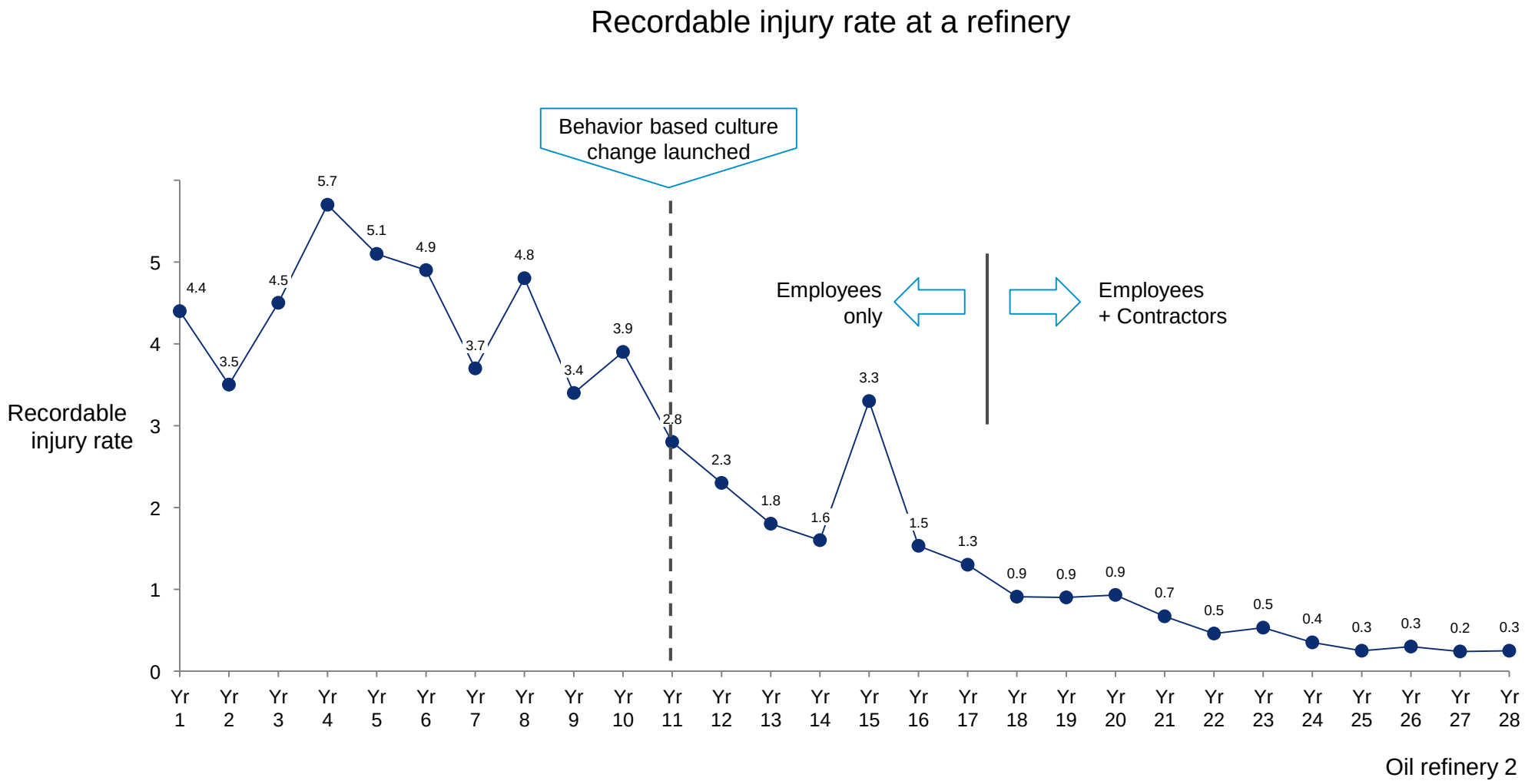


1. YTD at time analysis conducted 2. Injuries per 200,000 hours worked 3. Per Solomon benchmark report for EDC group 5 & 6

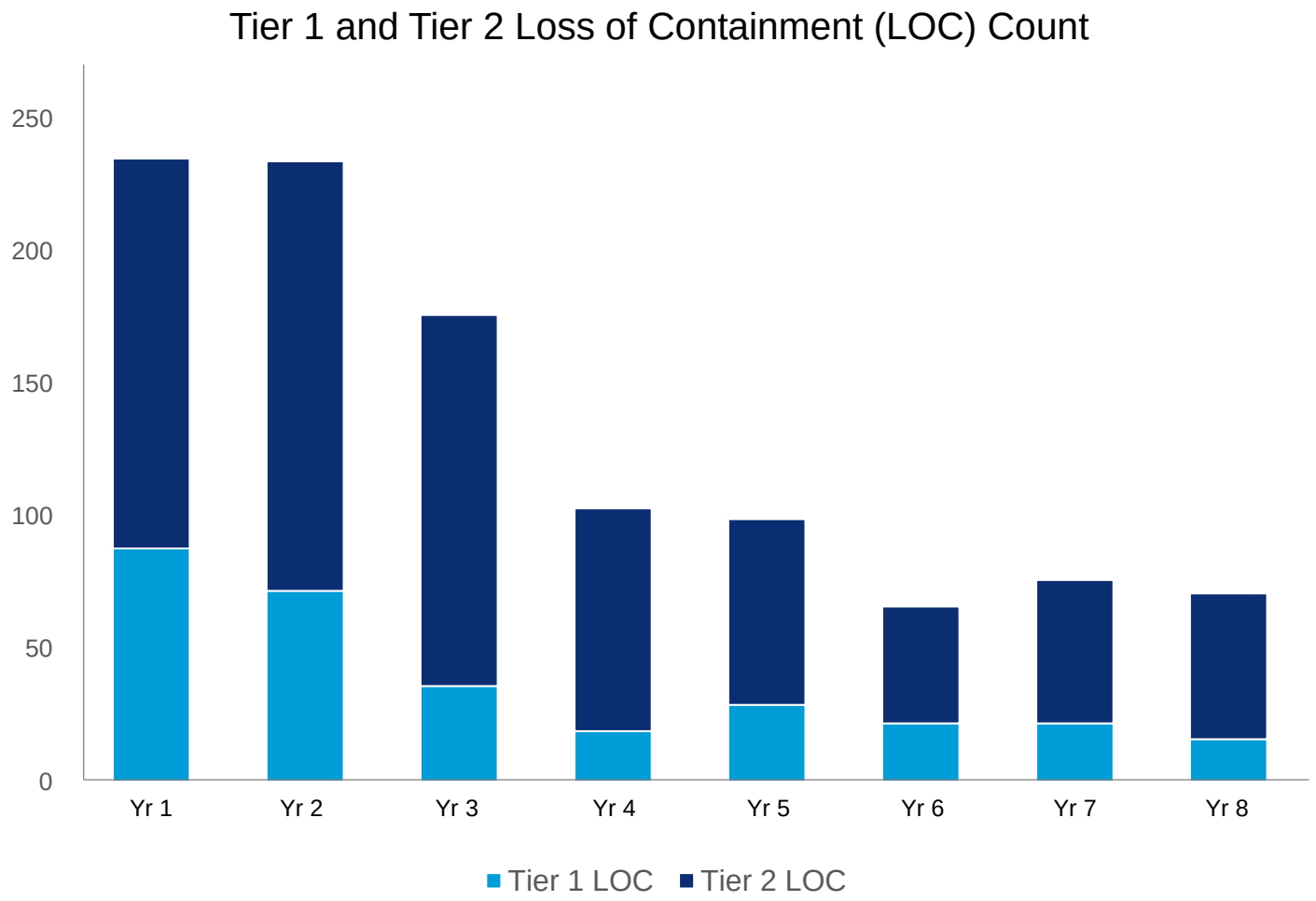
Reduction in number of injuries to contractors at major West Coast refinery



Sustained decline in recordable injury rate in very large Gulf Coast refinery

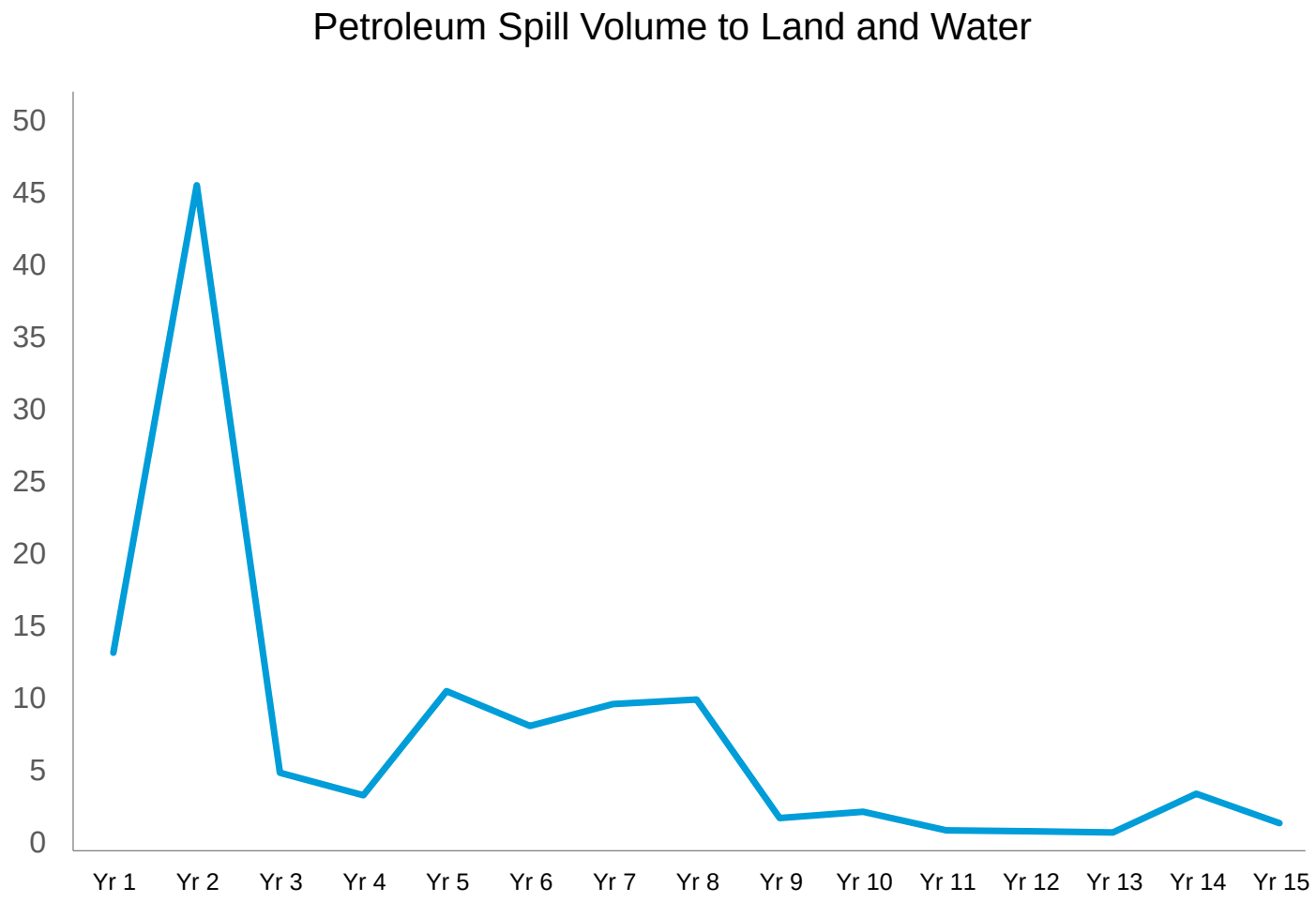


Oil major able to drive down LOC events and spills (I)



Oil Major

Oil major able to drive down LOC events and spills (II)



Oil Major

Discussion and Q&A