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Learning from Losses to Mitigate Risks in Energy & Power Sectors

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XL Insurance Reinsurance

Agenda

1. Introduction / AXA XL Presentation
2. Lessons Learnt: from incidents to prevention
3. Risk Engineering: role to play
4. Energy Surveys – Insurance Considerations
5. Conclusions

ENERGY & CONSTRUCTION (RE)INSURANCE CONFERENCE 2025

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Introduction / AXA XL Presentation

Numbers
we're proud of...

No. 1
We're part of the No.1 P&C commercial insurance lines platform*

*Based on revenues for AXA XL and AXA GI commercial business combined.

400
Network of 400 Risk Consulting experts worldwide

208+
Serving clients in more than 208 countries and territories

Country capability count is based on the International Organization for Standardization (ISO.org) country code listing – ISO 3166

30+
We offer more than 30 different lines of business

4,500+
Through our network we manage over 4,500 global programs for clients from AXA XL, AXA General Insurance and external insurer partners

9,000+
Colleagues empowered and committed to serving our clients and brokers

30bn
In 2023, we reached €30bn in green investments, exceeding our goal of €26.2bn by 15%

USD $8.28B
Total Indemnity Paid for 2023*

The Americas:	$3.44B
Asia & Europe:	$3.52B
UK & Lloyd's:	$1.32B

*Based on full-year 2023 figures for AXA XL, EUR 18.4 billion Gross Written Premiums (GWP).

92%
Claims handled locally*

The Americas:	99.7%
Asia & Europe:	85.9%
UK & Lloyd's	91.1%

*Includes claims handled by third parties

60,000+
Claims per year

A.M. Best A+, S&P AA-
AXA XL's core operating insurance and reinsurance companies have one or more of the following financial strength ratings:
A.M. Best A+, S&P AA-

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Risk Consulting
Energy

The energy sector is a cornerstone of the global economy, yet it operates within a highly complex and risk-intensive environment. Our team of experienced risk consultants understands the unique challenges facing energy companies and offers tailored solutions to help manage and mitigate these risks effectively.

We provide specialized services across key risk domains, including:

- **Property Risks**
  Fires, explosions, natural hazards, and machinery breakdown
- **Construction and Engineering**
  Project-related exposures and operational risks
- **Casualty Risks**
  Third-party liabilities and environmental liability exposures

With deep sector knowledge and a practical, solutions-driven approach, we support our clients in building resilience and ensuring continuity in an increasingly dynamic risk landscape.

Expertise you can trust

We're here to support you through every stage of your energy transition, backed by the expertise to lead in managing risks from new and emerging technologies.

As the top participant in global standards bodies like NFPA and SFPE, we don't just follow best practices – we help shape them.

Our experts are well-versed in both local and international codes and standards -from APSAD in France, LPC in the UK, VdS in Germany, and VKF in Switzerland, to internationally recognized frameworks like the European Insurance Association (CEA), the US National Fire Protection Association (NFPA), and FM Global Data Sheets.

Your benefits

We help you assess appropriate liability insurance limits based on potential third-party impacts, such as toxic releases, oil spills, or fire and explosion events.

Our project risk engineering reviews support you in identifying and mitigating risks throughout design, construction, and operation, helping you protect people, assets, and reputation.

How we can help you

Chemical Risk Assessment:

- Review of process safety, mechanical integrity, maintenance, and emergency response programs
- Evaluation of hardware risks: layout, construction, process control, and fire protection systems
- Analysis of complex loss scenarios (e.g., vapor cloud explosions) using industry-standard tools

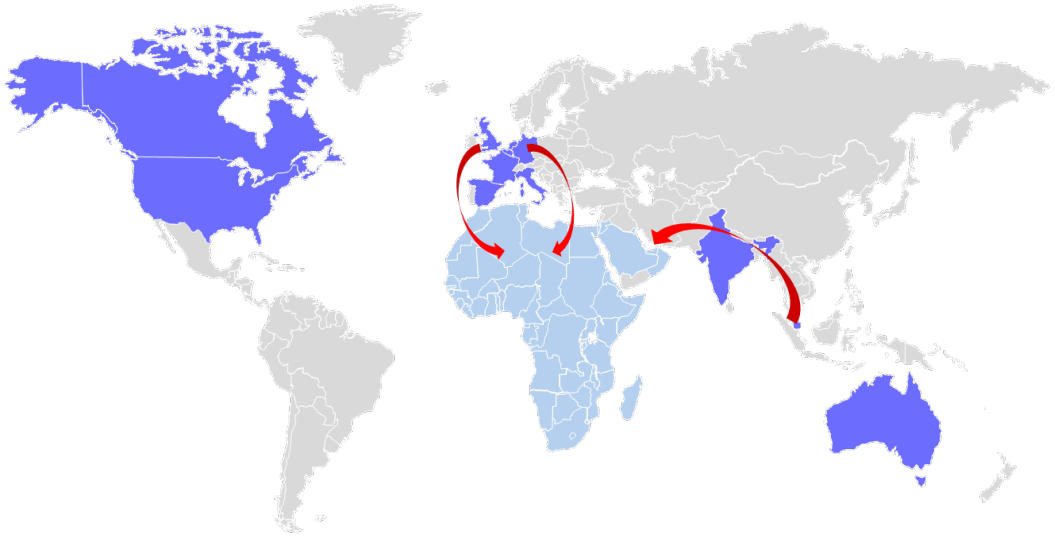
Loss prevention services:

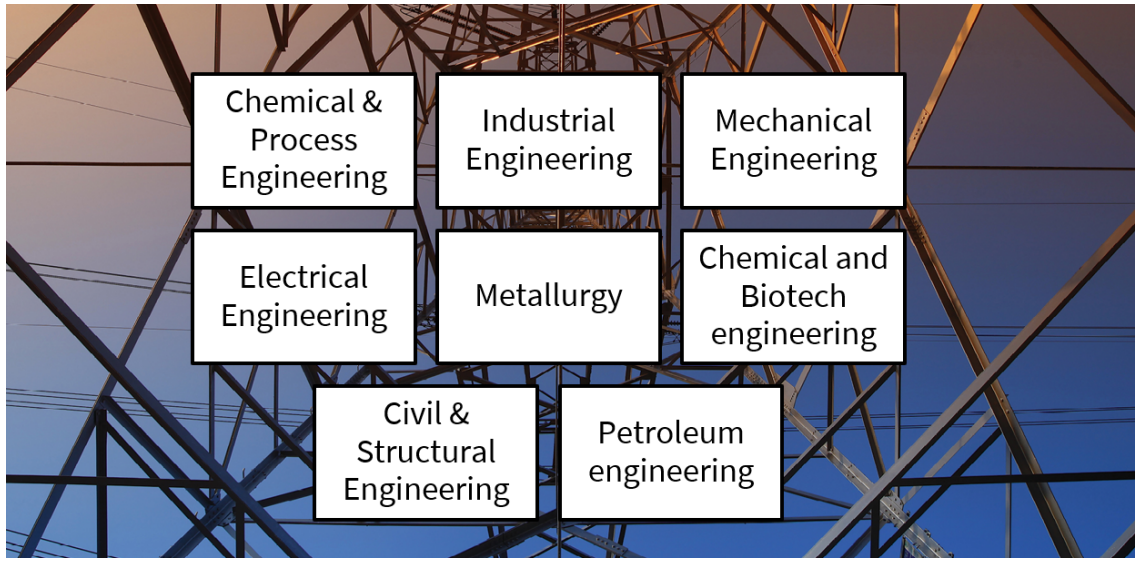
- On-site surveys to identify fire, explosion, and related hazards
- Risk engineering reports estimating site vulnerability and loss potential (NLE, EML, MPL), including business interruption risks
- Practical recommendations to prevent and mitigate the release of flammable or explosive substances

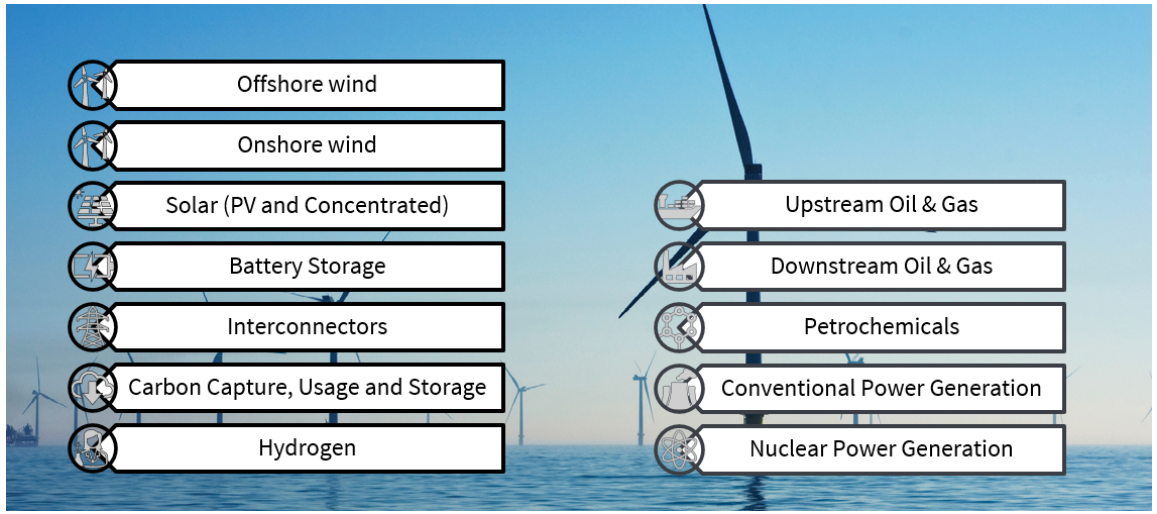
We support clients across the energy and chemical value chain:

- Energy Transition: Wind, solar, BESS, CCUS, and more
- Upstream: Exploration and production
- Midstream: Transport and storage
- Downstream: Refining
- Chemicals: Base and heavy chemical industries

Energy Team - Disciplines & Technologies Covered







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Lessons Learnt: from incidents to prevention

Fire in powerplant

INCIDENT :

- Fire in Flue Gas Desulphurization (FGD) Unit of Line #4. Line was shutdown for conversion works (dual fuel coal and natural gas).
- Fire occurred during maintenance works (not specifically linked with the conversion project) performed by a subcontractor.
- Welding works were conducted on the upper part of the FGD, and sparks fell and ignited plastic components inside the FGD unit. According to preliminary investigation, the FGD appears total loss (metal structure affected by heat).
- Line#3 and Line#4 share same chimney, directly connected to respective FGD sections. If the fire damaged the chimney (internal liner protecting concrete structure of the chimney), also Line #3 may be incapable of generation.

Cause – Hot work performed by the maintenance contractor

Root Cause Analysis: non-compliance with (or lack of) HWP. New recommendation was addressed in risk engineering report (visit performed few weeks before the loss) to improve duration of post-work fire watch.

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Fire in Waste-to-Energy plant

INCIDENT:

- Flames were noted in the morning, near hot oil and steam pipelines in the E-building (4 Steam Turbine sets, controls, electrical installations, water treatment and further BoP)
- The fire was able to spread via massive cable trays throughout the entire E-building.
  - Equipment in the E-Building considered a total loss.
- Emergency service was in operation for two days continuously
- A second fire occurred six days the first event, which was also extinguished by the fire brigade, which caused even larger damage

Cause – Massive Diesel oil leakage from Diesel fuel pipe which was most likely ignited by contractors' works (current assumption)

Root Cause Analysis

In 2018, it was determined that the Diesel oil supply pipe should be fully replaced and that this action was included on the 'reliability list; but the works had always been postponed.

- 5 previous Diesel oil leakages were reported
- Latest Diesel leakage was covered by absorbent granules and repair orders were initiated. Lack of evidence that adequate measures were implemented to stop leaking before the start of repair works.
- Repair work was scheduled for the afternoon of the day the fire ignited

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Fire in electrical substation

INCIDENT :

- A fire at a National Grid substation in Hayes, west London, caused a major power outage that led to the closure of Heathrow Airport resulting in the cancellation of over 1,300 flights and affecting nearly 300,000 passengers.

Cause – Catastrophic failure of a high-voltage bushing, resulting in transformer fire

Root Cause Analysis (recent report published by NESO Final report from the review into the North Hyde Substation outage | National Energy System Operator)

- Moisture entering in the bushing, causing an electrical fault.
- An elevated moisture reading in the bushing had been detected in oil samples taken in July 2018, but mitigating actions appropriate to its severity were not implemented.
- Design and configuration of Heathrow Airport's private internal electrical distribution network meant that the loss of one of its three independent supply points would result in the loss of power to some of the airport's operationally critical systems.

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Risk Engineering: role to play

Why Risk Engineering?

Extreme Loss Event

Flixborough Explosion

Refinery Explosion

Seveso Toxic Release

Piper Alpha Explosion

Refinery Explosion

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Why Risk Engineering?

AWARENESS

Understand the Risk and Potential Loss

PREVENTION

Identify gaps in layers of protection

MITIGATION

Provide risk control recommendations

Follow up

Risk Grading and Benchmarking

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Role of Risk Engineering

For the underwriters

- Understand the risk and provide fair & representative profile of the risk

For the client

- Access to the engineer's industry and insurance based experience & knowledge to reduce risk

Overall Benefit

- Reduce frequency and extent of future losses

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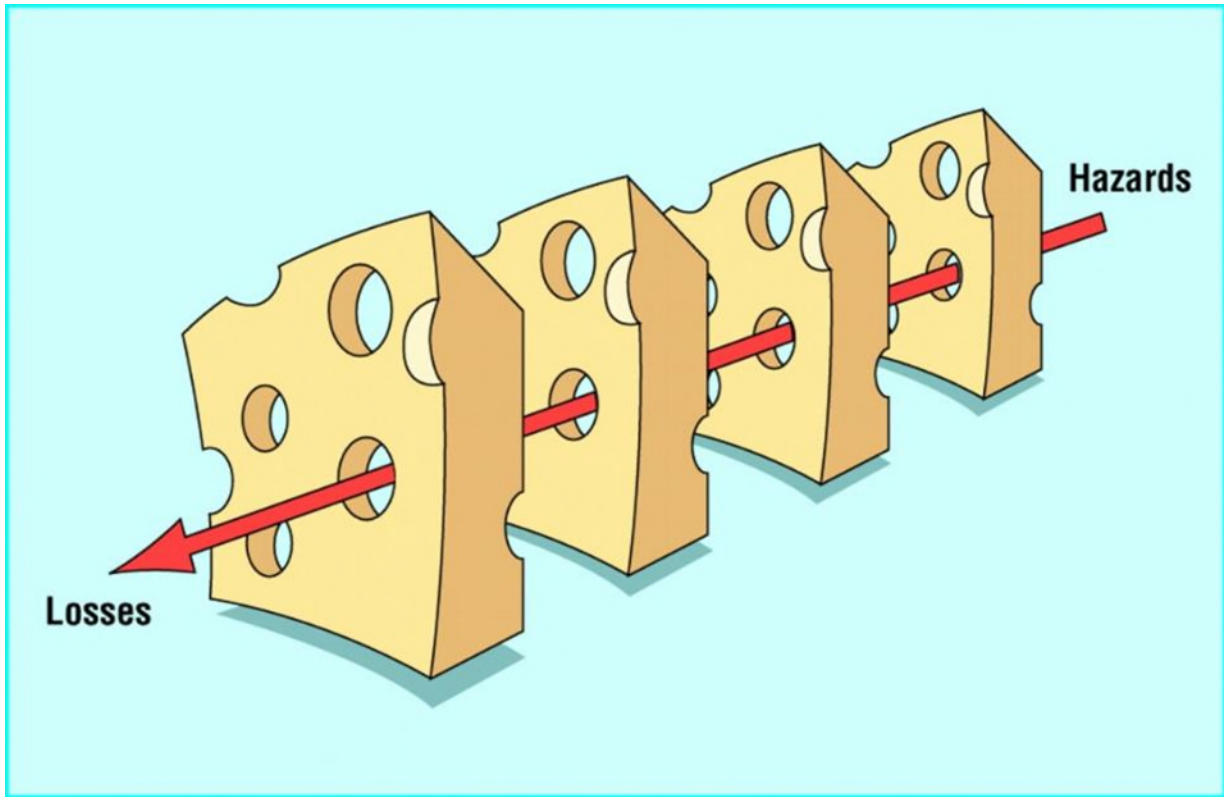
Swiss Cheese Model

Layers of Protection



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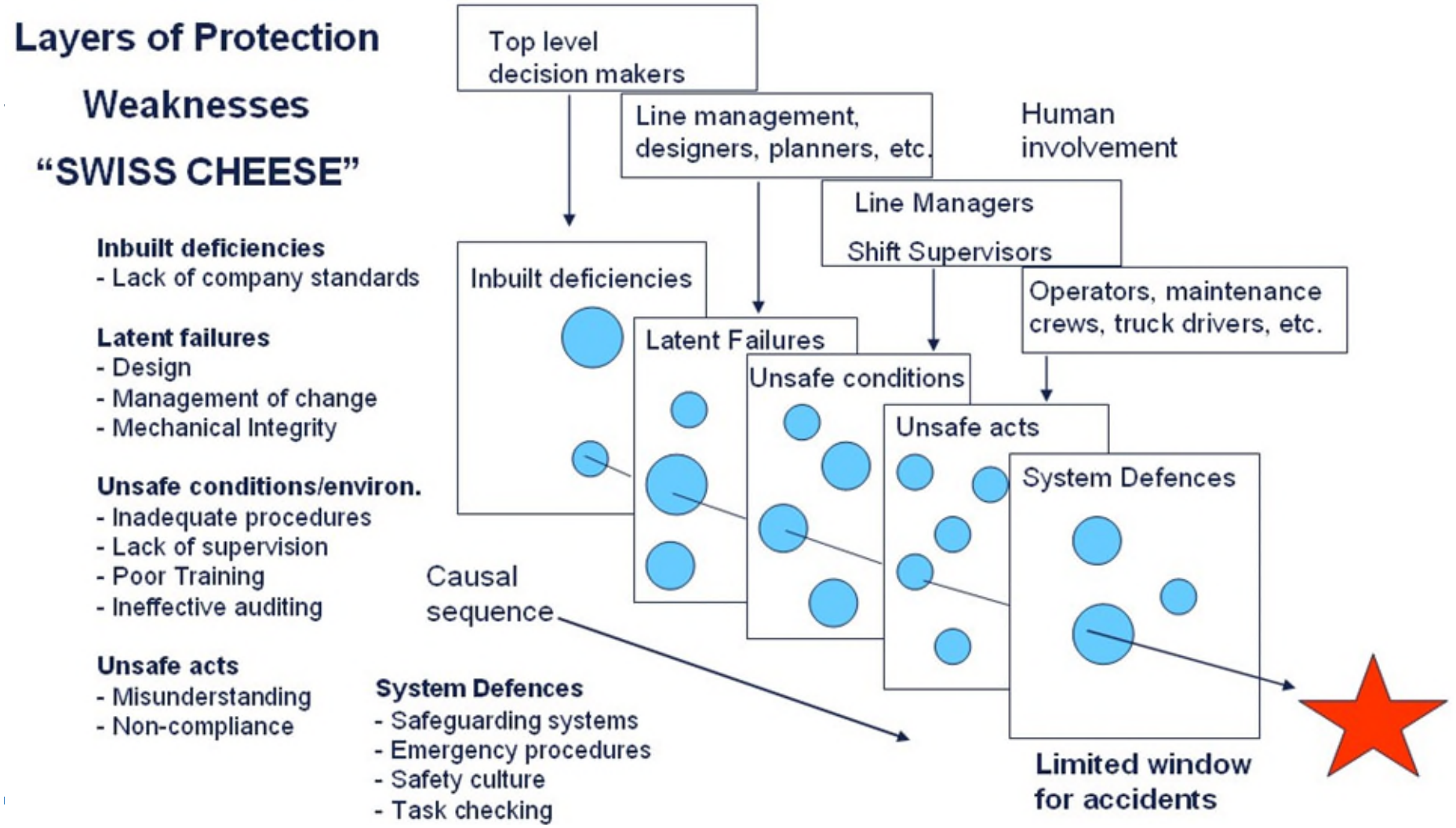
Layers of Protection



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Energy Surveys – Insurance Considerations

Risk Quality

Hardware Features

Prevention

- Minimise the potential for loss of primary containment
- Minimise the probability of ignition

Mitigation

- Safe separation distances
- Explosion overpressure mitigation
- Active and passive fire protection

Detection

- Gas and fire detection

Control

- Hazardous area classification
- Emergency isolation, ESD and blow-down
- Combustion Safeguards
- Machinery Safeguards
- Bunding, containment and drainage

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Risk Quality

Management Factors

Process Safety Management / Risk Management

- PSM Framework
- PHA / HAZOP studies
- MoC procedure
- Near misses recording / Incident investigations
- Process Safety Performance Indicators (PSPIs)

Operational Programs / System of Works

- Operations Management
- Training & Competency assurance
- Standard & Emergency Operating procedures
- Safe Work Permits & Isolation Plans
- Shift Handover and Trip Bypass Management

Inspection / Asset Integrity Management

- Qualifications & Competence Assurance
- Definition & Management of Damage Mechanisms
- Inspection Program Philosophy / Methodologies for Corrosion Monitoring
- Materials Management / Positive Material Identification (PMI)
- Performance & KPIs

Maintenance / Reliability

- Maintenance Philosophy and Planning
- Deferral Management
- Mechanical, Electrical & Instrumentation Maintenance

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Main Exposures – Operations

Fire

- Pool, Jet, Flash Fires

Explosion

- Vapour Cloud Explosion (VCE)
- Boiling Liquid Expanding Vapour Explosion (BLEVE)
- High Pressure Rupture

Machinery Breakdown

- Mechanical (Turbines, Compressors)
- Electrical (Transformers, Rectifiers)
- Explosion (Boilers, Pressure Vessels)

Natural Hazards

- NATECH – Natural Hazards Triggering Technological Accidents

Business Interruption

- Unavailability of Process Units or Critical Machinery

Undetected corrosion – hydrocarbon release

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Main Exposures – Projects

Technology

- Prototype, Unproven & Proven technologies or equipment

Software & Procedural

- Risk registers and Project Management, Contractor Control

Lifting

- Size, weight and dimensions requires heavy lift equipment exceeding 50tons, sometimes bespoke

Transit

- Damage during transit of large, heavy equipment

Storage

- Conditions and Protection Features

Commissioning

- Pre Start-Up Safety Review, status of Safety Critical Equipment, pending deficiencies (punch-list)
- Simultaneous construction and operation (SIMOPS)

Business Interruption

- Delay in Start-Up (DSU) / Advanced Loss of Profit (ALOP)

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Conclusions

Conclusions

Impact of Incidents

Energy Industry is a highly complex activity which involves **major hazards.**

Consequences can be **catastrophic.**

Not just extreme events to consider. **Smaller events can have a big impact.**

Reasons behind incidents

People will make mistakes – **“to err is human”.**

Layers of protection are not perfect.

Risk Prevention

Risk assessment is complex and requires **specific expertise**

Loss estimates needed to describe the worst-case credible event.

Process Safety is essential to manage risks.

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Q&A

Thank You