

How safe is the New Zealand petroleum industry

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HOW SAFE IS THE NEW ZEALAND PETROLEUM INDUSTRY?

2002 NEW ZEALAND PETROLEUM CONFERENCE
AUCKLAND, NEW ZEALAND
24-27 FEBRUARY 2002

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DEPT OF LABOUR
NEW ZEALAND

FEBRUARY 2002

HOW SAFE IS THE PETROLEUM INDUSTRY?

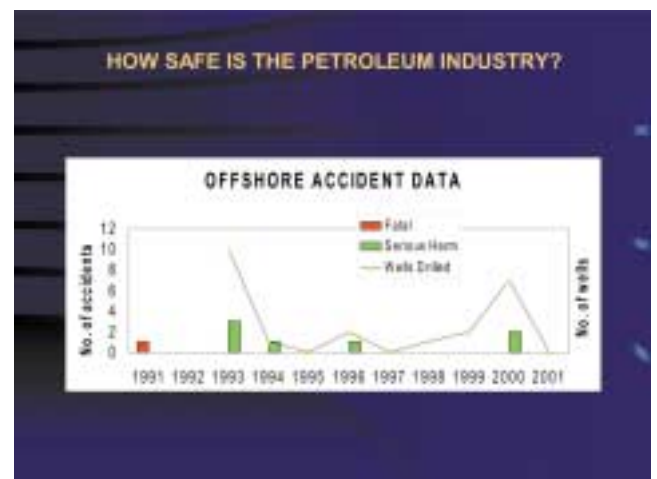
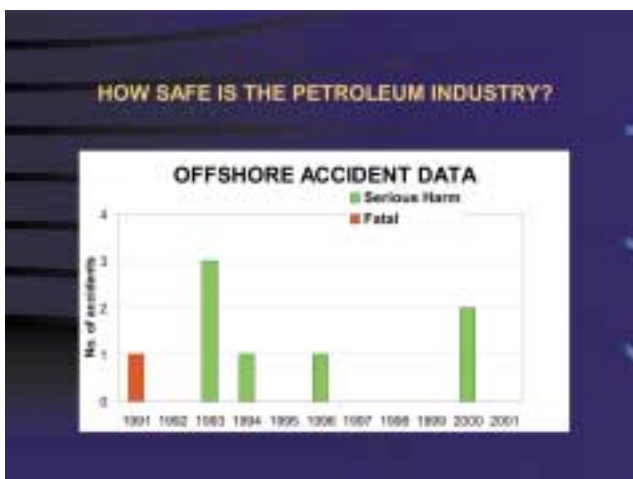
- **AGENDA**
 - DEFINE WHAT IS MEANT BY "SAFE"
 - LOOK AT THE PETROLEUM ACCIDENT RECORD
 - REVIEW POTENTIAL MAJOR ACCIDENT EVENTS
 - CONSIDER CHALLENGES
 - PROVIDE A REPORT CARD

HOW SAFE IS THE PETROLEUM INDUSTRY?

- What do we mean by "safe"
 - Safe is defined by the HSE Act 1992 as "not exposed to, or free from hazards".
 - Never completely safe in life, always some risk
 - Petroleum industry is associated with major hazards - must identify hazards and reduce risk to ALARP (as low as reasonably practicable)
 - Unacceptable risk is 1 in 1 thousand per year
 - Acceptable risk is 1 in 1 million per year
 - Risk reduction to ALARP must be applied in the range of 1:1,000 - 1:1,000,000

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- **PETROLEUM ACCIDENT RECORD**
 - What are we measuring?
 - Legislation requires reporting of serious harm (as defined by HSE Act 1992) and fatalities
 - However Industry measures LTI (lost time injuries)
 - Many injuries not recorded - light duties or rostered off - not recorded as an LTI
 - Under-reporting of serious harm - est. 20-30%
 - No legislative ability to capture minor accident/workhours/significant incidents
 - Fatalities are the most reliable data



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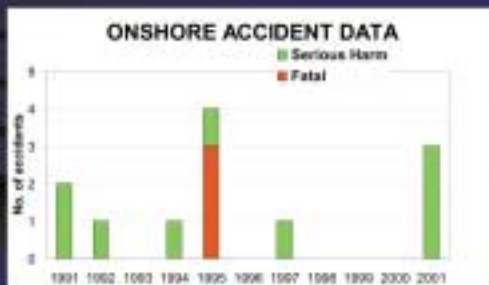
- Offshore Accident Data
 - Fatality in 1991 to a crane driver when a crane broke free from the pedestal and fell into the sea
 - Serious harm accidents show a close correlation to the number of wells drilled and worked over
 - Maui B drilling campaign in 1993, high level 2000
 - Degree of injury generally on lower end of scale
 - All accidents reported, except one in 1996 on a production platform, were drilling accidents

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Loss of crane from pedestal - drillship

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- Onshore Accident Data
 - Shows a different pattern to that offshore
 - High level of drilling activity in the early 1990's peaked in 1995
 - In 1995 had three fatal accidents -
 - Two falls from height - fell from the derrick
 - One struck by equipment falling onto the drillfloor
 - hazards were not fully identified and sufficient controls were not in place
 - and a well blowout
 - management of change in casing design not implemented

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- Onshore accident data cont'd
 - In 1995 - complete review of safety systems, equipment, and management undertaken
 - Very good safety record post 1995 considering level of onshore activity peaking in 2000
 - Anomaly in early 2001 with downturn in activity - three serious harm accidents in 8 weeks
 - Contributing factors - inexperience, inadequate supervision, and reduced hazard identification
 - Compares with worldwide trends in petroleum accident data - figures have plateaued and are trending upward

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- However the Accident record does not show the full picture, we must also consider
- MAJOR ACCIDENT EVENTS (MAE's)

HOW SAFE IS THE PETROLEUM INDUSTRY?

- A MAJOR ACCIDENT EVENT (MAE) is any event connected with work activities that could cause multiple fatalities arising from hydrocarbon releases, or other events whether immediate or delayed
- There is a real danger that the industry focuses too much on reducing LTI's and pays too little attention to the low frequency, high potential MAE

HOW SAFE IS THE PETROLEUM INDUSTRY?

- A reported low LTI rate may mean that the Company is effectively managing minor hazards or is under reporting injuries
- How does the Company manage major hazards that can lead to potential MAE's?

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- NOTE - Recent incidents overseas
 - Maersk Victory jackup leg collapse
 - Trident jackup rig blowout in Indonesia
 - Griffin Venture engine room explosion/fire
 - Longford Plant fire and explosion
- all occurred with Companies that had very low LTI rates.

HOW SAFE IS THE PETROLEUM INDUSTRY?

- Potential MAE's in recent years in New Zealand include;
 - well blowout and partial rig cratering on a land well
 - failure of a choke body on a production platform
 - dropped top drive and drillstring due to a failure in a sub in the hoisting equipment
 - fall of drilling blocks due to brake failure
 - cracked weldolet on a gas export manifold

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- It is notable that a significant root cause in many of the potential MAE's involved issues of DESIGN and/or MATERIAL SELECTION whereas common causes in the LTI's often result from HUMAN FACTORS

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- MAE's must be controlled under a robust regime
- The Safety Case has been found to be the most effective tool to manage MAE's following the Piper Alpha disaster
- The Safety Case also fulfils the requirements of the Health and Safety in Employment Act 1992 - the overarching Act for workplace safety in New Zealand
 - Hazard identification
 - training
 - employee involvement

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A SAFETY CASE

- Is a consistent and structured method (usually written) of IDENTIFYING, ASSESSING & CONTROLLING the major HAZARDS and RISKS associated with a facility
- Is a presentation to Government (the Regulatory) to make a case demonstrating an ability to control or manage risks in the workplace
- Has its origins in the Cullen inquiry into the Piper Alpha tragedy



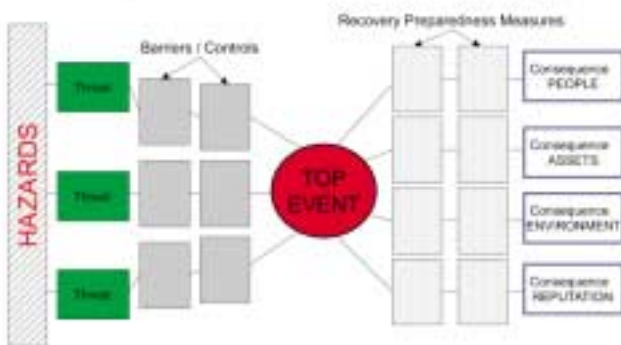
HOW SAFE IS THE PETROLEUM INDUSTRY?

- In addition to the Safety Case for high hazard and high reliability installations, verification has been identified and legislated for as an additional safeguard.
- Verification involves the identification and management of safety critical elements from the Safety Case and includes a third party review and validation

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- Safety Critical elements must have at least three barriers
- Some of the potential MAE's in New Zealand were prevented from escalating due to the remaining preventative barriers and the recovery barriers still in place
- These barriers are best graphically displayed in a BOW TIE diagram

HAZARDS BOWTIE DIAGRAM



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- CHALLENGES FOR THE PETROLEUM INDUSTRY

HOW SAFE IS THE PETROLEUM INDUSTRY?

- Ageing workforce
 - the “Big Crew Change” in 5-10 years
- Graduate recruitment
 - industry less attractive due to boom/bust history
- Fatigue and stress in the workplace
- Health issues - more difficult to manage
- Risk reduction to ALARP
 - not AHARA (as high as the Regulator allows)
- Identifying good lead indicators to measure safety performance

HOW SAFE IS THE PETROLEUM INDUSTRY?

- Achieving world’s best practice
- Implementing rigorous auditing
 - to uncover deficiencies and correct
- Rig mechanisation
 - less personnel in danger areas BUT increased dropped objects including shims, lights, antennae, brackets, bolts, and even top drives
- Lack of continuity in exploration drilling
 - loss of experienced personnel and crews both overseas and out of the industry

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• CHALLENGES FOR THE PETROLEUM REGULATORS

HOW SAFE IS THE PETROLEUM INDUSTRY?

- Under reporting of injuries/accidents
 - results in a lack of investigation to find and correct root causes. Potential longer term injury to victim if not reported
- Smaller Operators entering industry
 - tend to carry a higher level of risk
- Goal setting regulations
 - more demonstration and assessment
 - what is the minimum I can get away with?
- Contract labour
 - accountability, lines of reporting, culture

HOW SAFE IS THE PETROLEUM INDUSTRY?

- Inadequate hazard identification
 - wait for the Inspector to identify - risk shutting down the operation
- Dependence on third party classification societies
 - Assets always remain the owners responsibility, third parties provide some level of assurance for the Regulator
- Good lead indicators for safety performance

HOW SAFE IS THE PETROLEUM INDUSTRY?

• INDUSTRY REPORT CARD

- CAN DO BETTER!
 - eliminate all accidents
 - adopt world’s best practice
 - strive for continuous improvement
 - reduce risk to ALARP
 - involve employees
- Let’s have a safer 2002 and future.