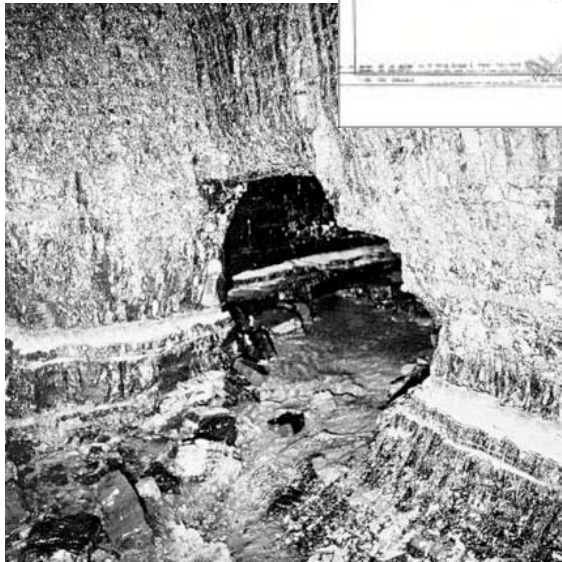
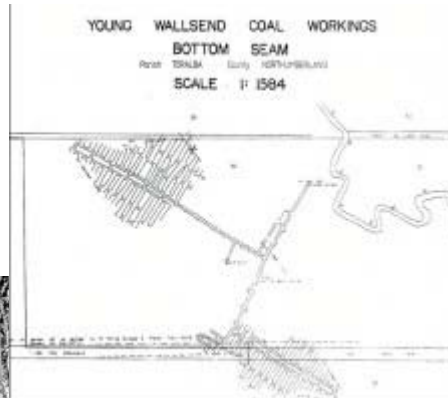


# Accidents, Incidents and the Human Factor

John Thorogood

# Gretley Mine Disaster, Australia 1996

Andrew Hopkins, "Lessons from Gretley", CCH, 2007



- Failed to check data
  - assumptions
- Failed to heed warning signs
  - Normalisation of deviance
  - Overlooked evidence
- Trigger Action Response Plans
  - Clear rules and actions
- Mindfulness
  - Chronic unease

**Persecution, Not Prosecution**  
Judge Blasts WorkCover Legal Tactics

# Black Hawk Shoot Down – Iraq 1994

Scott Snook, “Friendly Fire”, Princeton, 2000

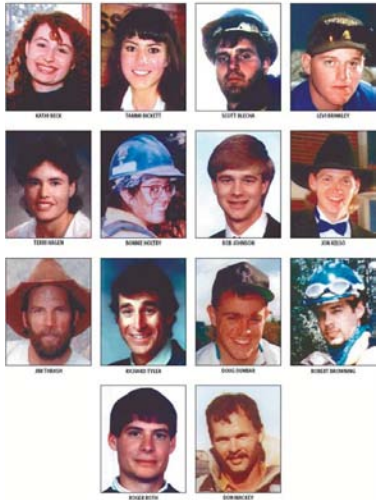


- “Normal”: was an inherent property of the system
  - Unreported precursor incident
- F15s: saw what they wanted to see
  - Sense making
- AWACS: failed to intervene
  - “Min comm”, only new information
- Lack of organisational integration
  - Coordination failures: Radios, IFF codes, flight scheduling
- General conditions:
  - Cannot learn from trial & error
  - Time allows practical drift to occur
  - Likelihood of convergence

# South Canyon Fire, Colorado 1994

Margaret Crichton, personal communication, February 2011

STORM KING 14

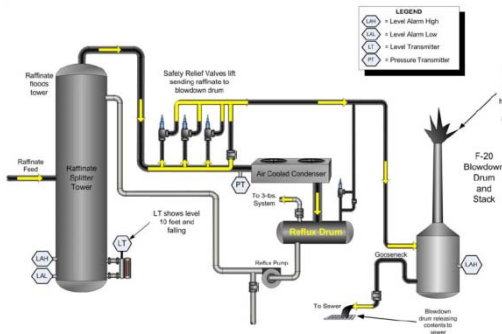


- 14 fire fighters killed
- 10 critical decisions of which 5 were “sub-optimal”
- Lack of leadership training or preparation
- Poor situation awareness, teamwork and communication
- Ambiguous authority and accountability
- Leadership training programme implemented



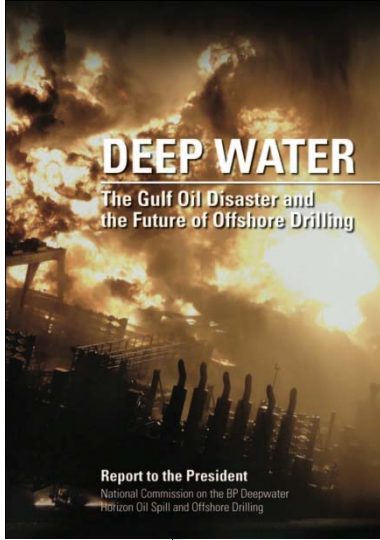
# Texas City – 2005

Andrew Hopkins, “Failure to Learn”, CCH, 2009



- Casual compliance
  - Procedures known to be inadequate
- Risk Blindness
  - Focus on personal safety
  - Institutional inability to learn
- On-site Risk Assessment
  - Bias to desired outcome
- Cost cutting
  - Discretion versus Compliance
- Organisational Culture
  - Talking versus doing

# Oil Industry 2009 - 2010



## North Sea blow-out averted just months before Gulf disaster

SECRET PAPERS SHED LIGHT ON INCIDENT

BY RYAN CRIGHTON

AN INCIDENT similar to the one which caused the Gulf of Mexico oil spill happened on a North Sea platform just four months before the environmental disaster, secret papers have revealed.

Transocean was operating BP's Deepwater Horizon rig when it suffered a blow-out, killing 11 workers and releasing millions of barrels of oil in the Gulf in April.

An internal company report revealed yesterday that four months before the disaster, the Sedco 711 rig in the North Sea, which is leased by Shell and operated by Transocean, experienced similar problems.

In this case, however, the blow-out preventer - which is believed to have failed on the Deepwater Horizon - worked effectively, preventing oil and gas from spurting up the rig's pipe.

The incident on December 23, 2009, was investigated by the Health and Safety Executive and Transocean drew up an internal report.

It is understood that a potentially major spill was avoided when the blow-out preventer was activated, capping off the well.

In a statement, Transocean said: "Any (safety) related events that occur on a rig anywhere in the world, including the one on December 23, 2009, are immediately reported to management, fully investigated and the valuable information gleaned from that investigation is used to improve existing safety systems across the fleet."

Tim Yeo, chairman of the House of Commons energy committee, reacted to the leaked document yesterday, saying: "I think what we need to try to understand is how frequently this sort of thing is happening offshore and whether there is, therefore, a



"It may have been more luck than judgment that got this under control"

TIM YEO

risk of a much more serious spill occurring.

"It is not clear that this was something which had been properly prepared for, but it may well have been more luck than judgment that got this under control."

According to media reports, the Transocean document details a series of errors and misjudgements that led to the North Sea blow-out.

In a marked parallel with the Deepwater Horizon disaster, key indicators that something was going badly wrong were either misinterpreted or discounted - in this case in favour of a positive pressure test from a valve at the base of the well.

That valve had been dislodged, or damaged, in earlier operations.

By the time the crew realised there was a problem, oil and gas from the reservoir was forcing its way up the drill shaft and out on to the rig.

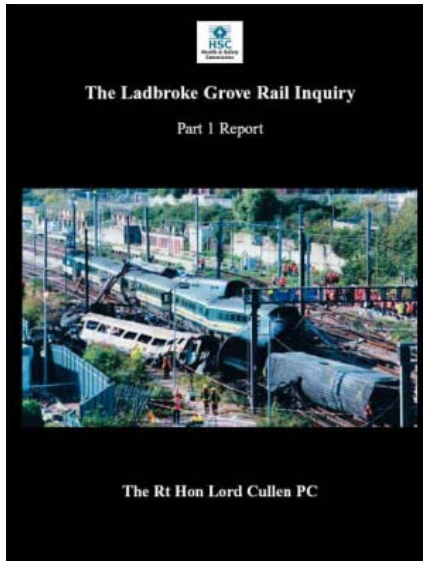
Crucially, there was not enough heavy mud available to pump back down into the well.

A major spill was averted only when the blowout preventer was activated, capping off the well on the sea floor.

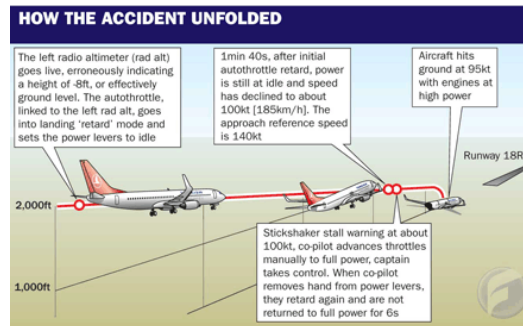
- Three incidents within 8 months
- Surprises: all in cased hole
- Failure to react to ambiguous or weak signals
- Multiple causes?
- Distractions?
- External pressure?
- Unique to BP?

# Vulnerable System Syndrome

James Reason, "The Human Contribution", Ashgate, 2008

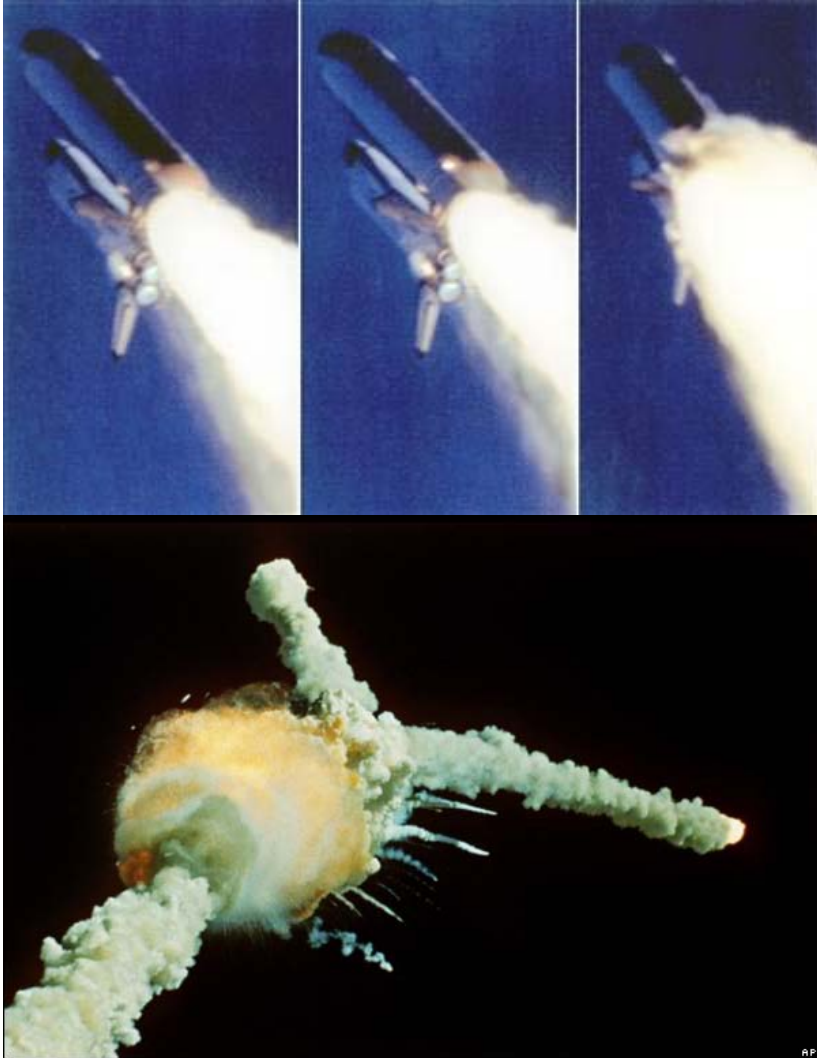


- Blame
  - Enemy of understanding
  - Destroys trust vital to reporting
- Denial
  - It couldn't happen here
  - We have an excellent safety culture
- Wrong Focus
  - Single minded, blinkered focus
  - Cost, on-time running



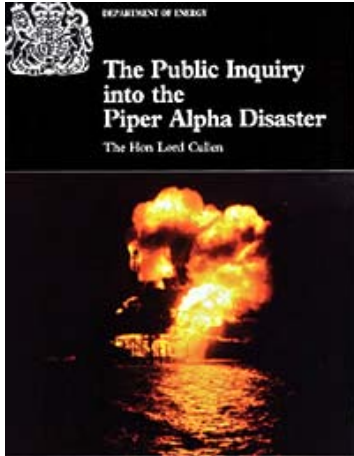
# Characteristics of Risk Denial

Andrew Hopkins, "Safety Culture and Risk", pp 20-22, CCH, 2005



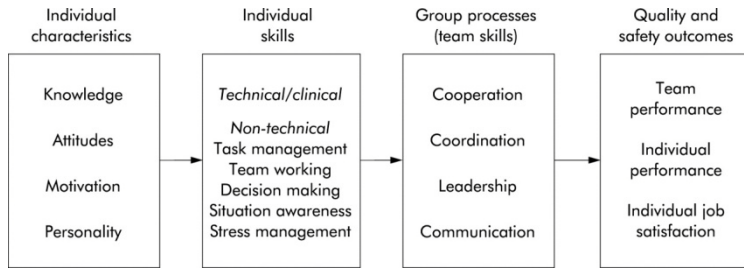
- Can't happen here
- Normalising the evidence
- Confirmation bias, expect to see what you see.
- Ad-hoc criteria
- Downgrading of intermittent warnings
- Onus of proof
- Group-think

# Risks in Wellbore Placement



- Ignoring inconsistent data
- Casual compliance with procedures
- Lack of detailed planning
- Failing to follow the plan
  - Being pushed off plan
  - Distracted from SOPs
- Vague roles and responsibilities
- Haphazard MoC

# Attributes of a Future Wells Team



THE MILITARY INTERPRETATION OF A COMMAND AND CONTROL SYSTEM

This consists of the following components:

ORGANIZATION

DOCTRINE

METHODS

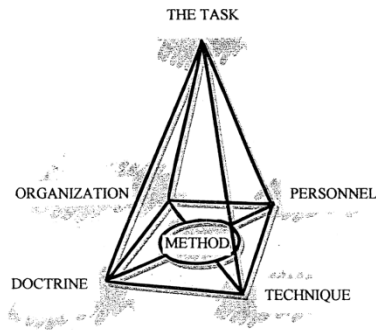
PERSONNEL

TECHNIQUE

Managed by

THE TASK

and tied together by their internal relations



- CRM training and immersive exercising
- Competency assessment
- Process safety performance metrics
- Defined command structure
- Detailed planning
- Discipline to follow the plan
- Rigorous MoC Procedure
- Mindfulness: chronic unease

# Conclusions

- Disasters will repeat as underlying causes not being tackled
- Complex socio-technical systems require focus on the human contribution
- Short term focus:
  - Acknowledge the problem
  - Structure, process, practice, discipline
- Longer term:
  - No quick fixes, research the human aspects, understand our problems in our domain

“Hubris leads to Nemesis”

# Further Reading

- James Reason, “Managing the Risks of Organisational Accidents”, Ashgate, 1997
- James Reason, “The Human Contribution”, Ashgate, 2008
- Scott Snook, “Friendly Fire”, Princeton, 2000
- Diane Vaughan, “Challenger Launch Decision”, Chicago, 1996
- Andrew Hopkins, “Safety Culture and Risk”, CCH, 2005
- Andrew Hopkins, “Lessons from Gretley”, CCH, 2007
- Andrew Hopkins, “Failure to Learn”, CCH, 2009
- Borthwick, “Report of the Montara Commission of Enquiry”, 2010
- Flin, O’Connor, Crichton, “Safety at the Sharp End”, Ashgate, 2007
- Thorogood, Crichton and Henderson, “Command Skills for Drilling and Completion Teams”, SPE 89901