

AN ASSESSMENT OF THE OCCUPATIONAL HEALTH AND SAFETY (OHS) CHALLENGES OF OFFSHORE OIL PRODUCTION IN GHANA.



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(FREIBERG ALUMNUS)



Introduction

- The world's search for reliable oil supplies outside the Middle East has brought about an oil boom in many African countries like Angola, Nigeria, Equatorial Guinea and Gabon.
- Increased exploration activities along the West African coast in recent times have led to the substantial discovery of oil in Ghanaian offshore waters in commercial quantities.



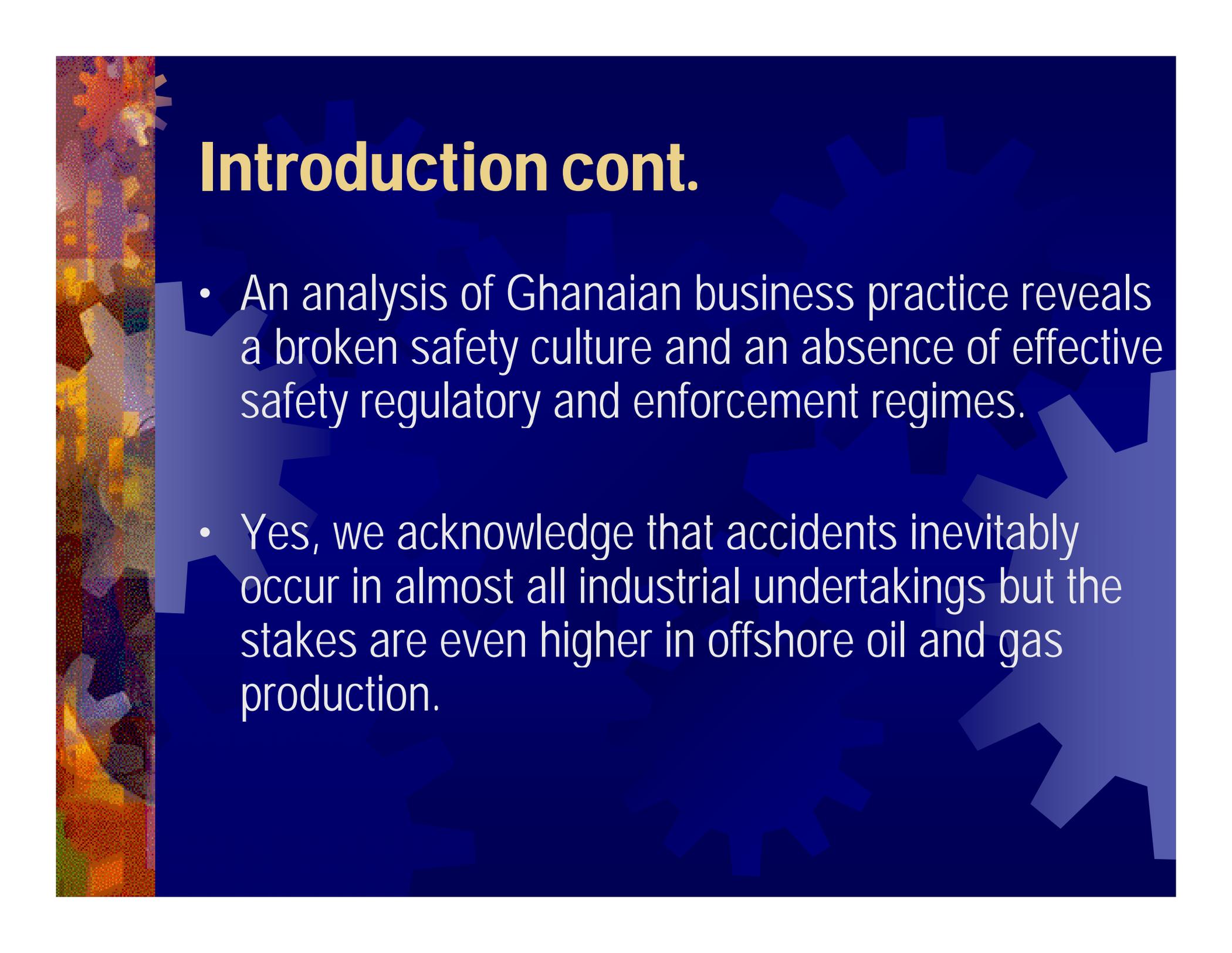
Introduction cont.

- Ghana is therefore poised to join the ranks of world oil and gas producers from 2010.
- However the production activities that shall follow this successful exploration programme will involve some safety and health risks to oil production personnel and neighbouring communities, and potential adverse impacts on the environment.



Introduction cont.

- Meanwhile, most of Ghana's pre-independence and post-independence industrial operations, including oil refining and products distribution, have mostly been conducted onshore.
- These onshore activities, under the watchful eyes of the government and regulators, have however not been spared their share of catastrophic incidents that have often resulted in serious injuries, multiple fatalities, property damage and business disruption.



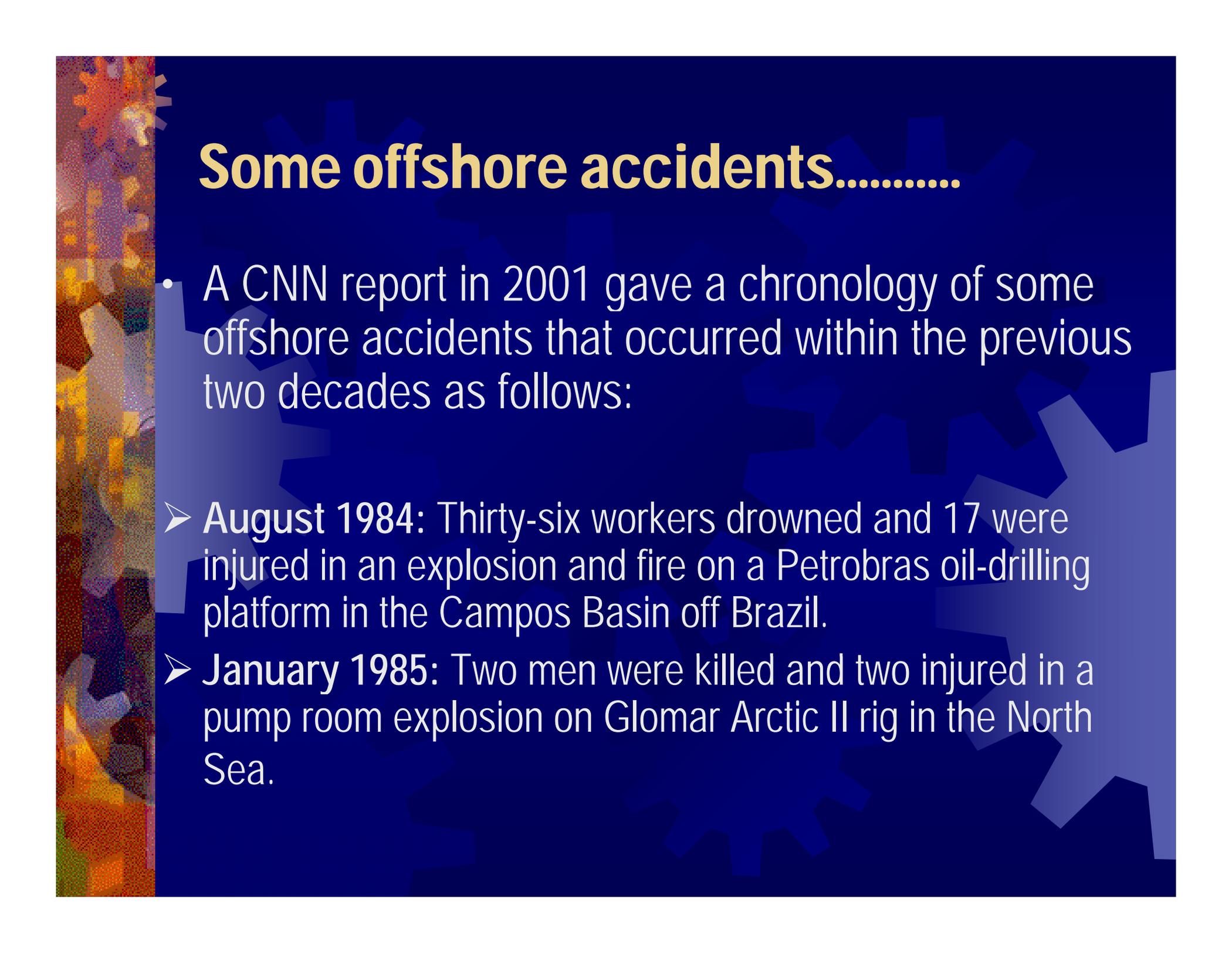
Introduction cont.

- An analysis of Ghanaian business practice reveals a broken safety culture and an absence of effective safety regulatory and enforcement regimes.
- Yes, we acknowledge that accidents inevitably occur in almost all industrial undertakings but the stakes are even higher in offshore oil and gas production.



Introduction cont.

- It is worth noting that even countries with good sense of safety culture and better regulatory framework have experienced accidents and tragedies in their offshore operations.



Some offshore accidents.....

- A CNN report in 2001 gave a chronology of some offshore accidents that occurred within the previous two decades as follows:
 - **August 1984:** Thirty-six workers drowned and 17 were injured in an explosion and fire on a Petrobras oil-drilling platform in the Campos Basin off Brazil.
 - **January 1985:** Two men were killed and two injured in a pump room explosion on Glomar Arctic II rig in the North Sea.



Offshore accidents cont.

- **July 1988:** In the world's worst oil rig disaster, 167 people were killed when Occidental Petroleum's Piper Alpha oil rig in the North Sea exploded after a gas leak.
- **September 1988:** Four workers were killed when an oil rig owned by Total Petroleum Company of France exploded and sank off the southeastern coast of Borneo.
- **September 1988:** One person was killed and 66 people rescued uninjured after American-owned Ocean Odyssey drilling rig burst into flames in the North Sea.



Offshore accidents cont.

- **May 1989:** Three people were injured in an explosion and fire on an offshore oil platform owned by Union Oil Company of California. The rig was operating on the Cook Inlet, southwest of Anchorage, Alaska.
- **November 1989:** An explosion on a Penrod Drilling Company oil rig in the Gulf of Mexico injured 12 workers, one seriously.
- **August 1991:** Three people were injured in an explosion on Fulmar Alpha platform in the North Sea, owned by Shell.

And just this week.....

In Australian offshore waters... West Atlas oil rig on fire



Courtesy: <http://discuss.epluribusmedia.net/content>



West Atlas oil rig fire!!!

- On 21 August 2009, West Atlas oil rig owned and operated by Thai company PTTEP Australasia, drilling in the Montara oil field offshore 200km from Western Australia, suffered a failure and started leaking.
- The leak has been spilling oil and gas into the sea at an estimated rate of 400 barrels a day.
- After trying multiple times to plug the leak, the platform caught fire on Sunday Nov 1, 2009, with the leaking hydrocarbons now fueling the inferno.
- However, no fatalities have been reported since the rig caught fire.

The Piper Alpha Incident

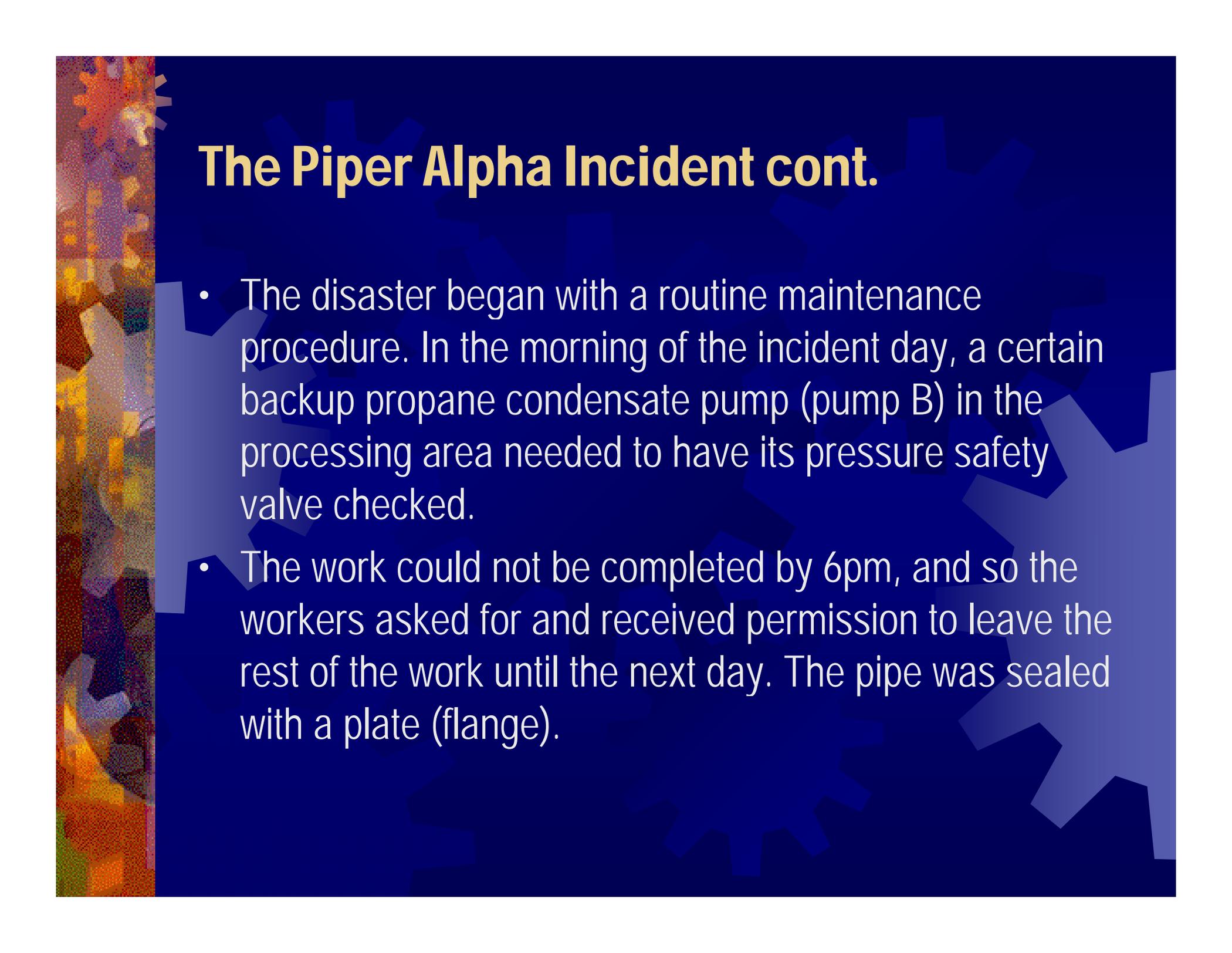


- Courtesy: <http://www.exponent.com>



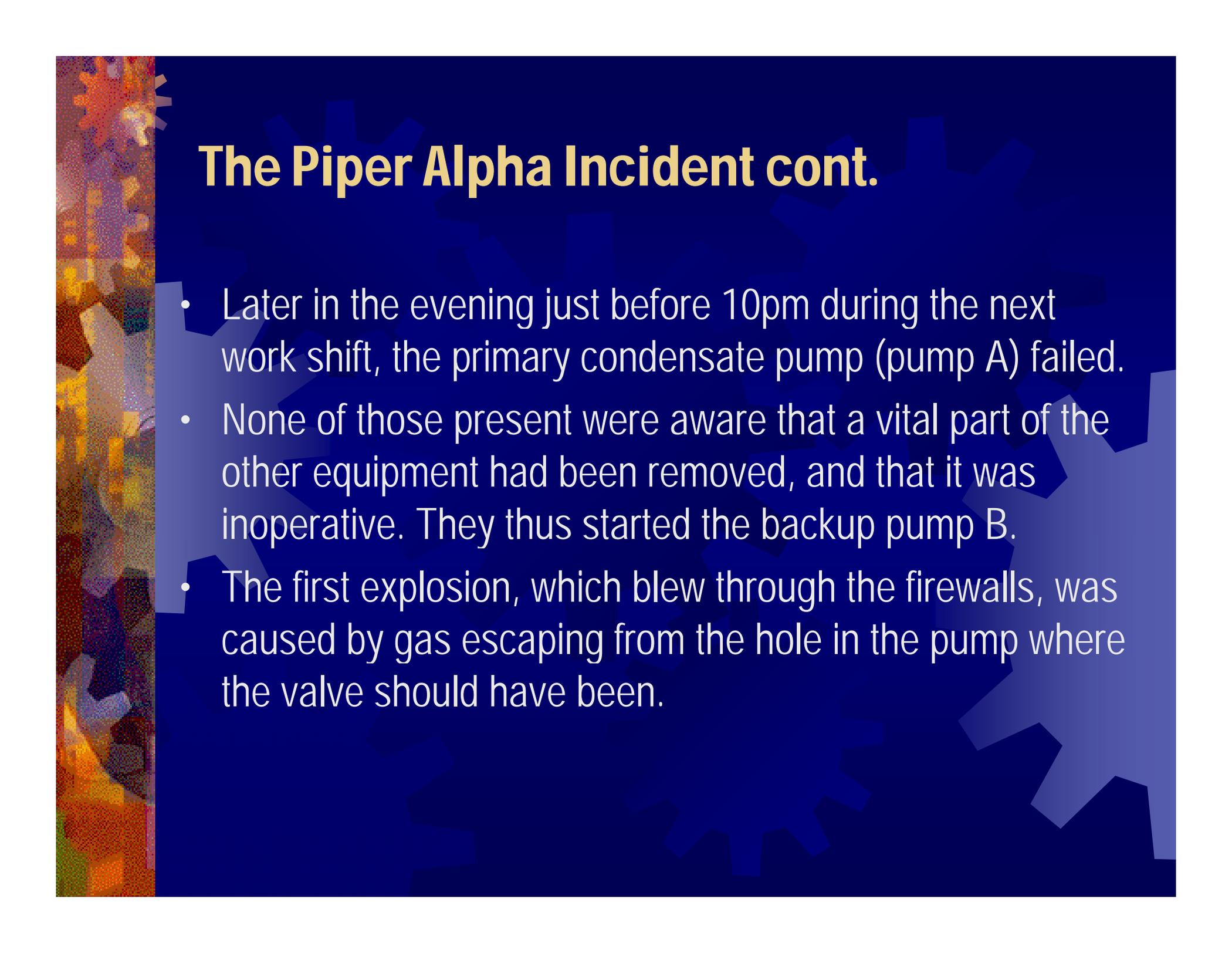
The Piper Alpha Incident cont.

- On the night of July 6, 1988, a series of violent explosions and a large fire destroyed the Piper Alpha oil platform in the North Sea. Only 62 crew members survived out of the 229 personnel on board.
- Many workers were trapped because rescue helicopters could not approach when confronted with flames 100 meters high. The majority of those who survived jumped from the platform into the rough sea.



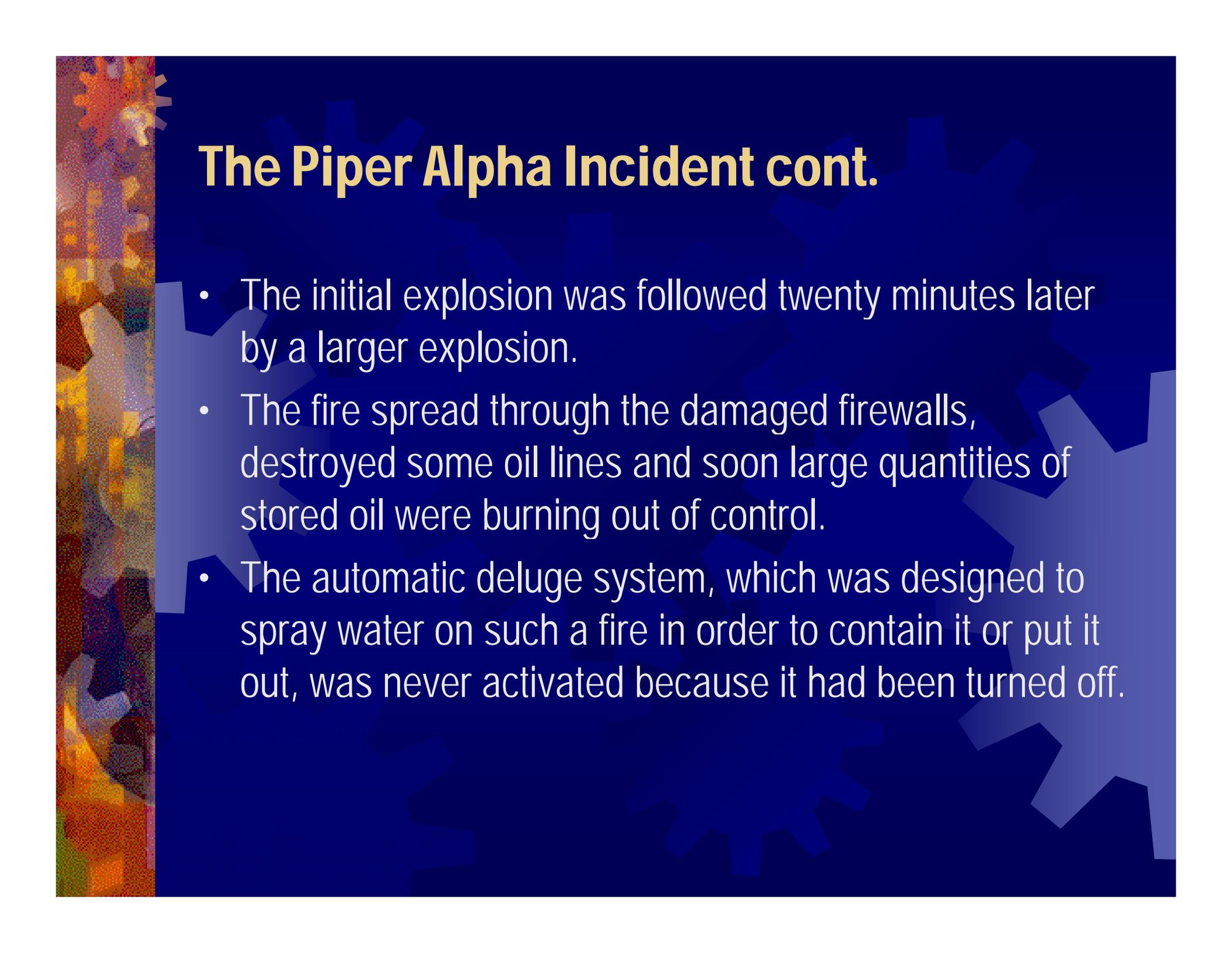
The Piper Alpha Incident cont.

- The disaster began with a routine maintenance procedure. In the morning of the incident day, a certain backup propane condensate pump (pump B) in the processing area needed to have its pressure safety valve checked.
- The work could not be completed by 6pm, and so the workers asked for and received permission to leave the rest of the work until the next day. The pipe was sealed with a plate (flange).



The Piper Alpha Incident cont.

- Later in the evening just before 10pm during the next work shift, the primary condensate pump (pump A) failed.
- None of those present were aware that a vital part of the other equipment had been removed, and that it was inoperative. They thus started the backup pump B.
- The first explosion, which blew through the firewalls, was caused by gas escaping from the hole in the pump where the valve should have been.

The background of the slide is dark blue with several large, semi-transparent gears of various shades of blue scattered across it. On the left side, there is a vertical strip with a textured, fiery appearance in shades of orange, yellow, and red, suggesting a fire or explosion. The title 'The Piper Alpha Incident cont.' is written in a bold, yellow, sans-serif font at the top left.

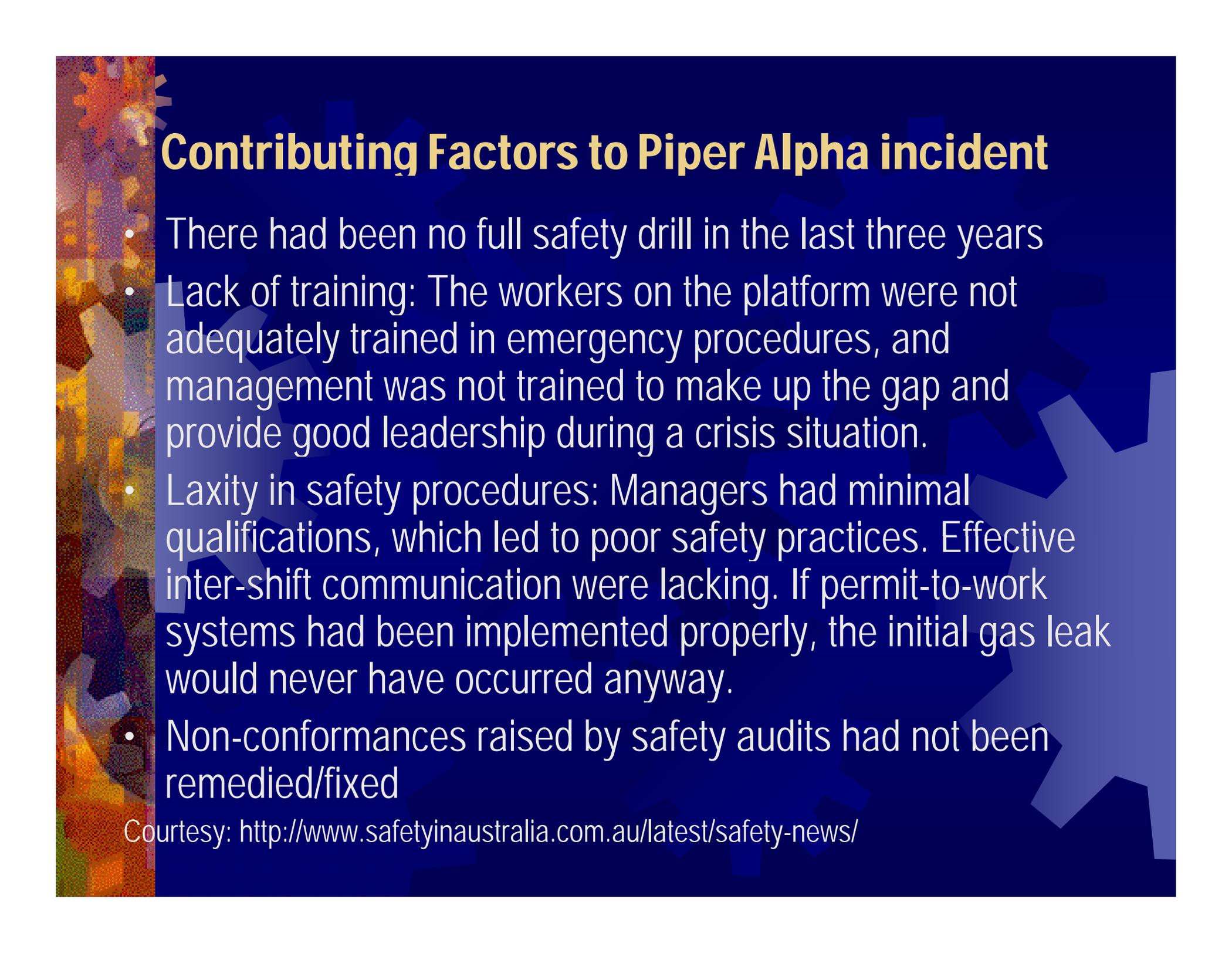
The Piper Alpha Incident cont.

- The initial explosion was followed twenty minutes later by a larger explosion.
- The fire spread through the damaged firewalls, destroyed some oil lines and soon large quantities of stored oil were burning out of control.
- The automatic deluge system, which was designed to spray water on such a fire in order to contain it or put it out, was never activated because it had been turned off.



The Piper Alpha Incident cont.

- The accommodation area was seen by many as the safest place to await rescue, due to some separation from the processing area.
- While it might have been the furthest point from the fire, it was not smoke-proof.
- For those who chose to stay, the decision proved fatal, and many personnel were rather saved after jumping into the sea.



Contributing Factors to Piper Alpha incident

- There had been no full safety drill in the last three years
- Lack of training: The workers on the platform were not adequately trained in emergency procedures, and management was not trained to make up the gap and provide good leadership during a crisis situation.
- Laxity in safety procedures: Managers had minimal qualifications, which led to poor safety practices. Effective inter-shift communication were lacking. If permit-to-work systems had been implemented properly, the initial gas leak would never have occurred anyway.
- Non-conformances raised by safety audits had not been remedied/fixed

Courtesy: <http://www.safetyinaustralia.com.au/latest/safety-news/>

Key Piper Alpha Lessons learned

- The Cullen Enquiry was set up in November 1988 to establish the cause of the disaster.
- Lord Cullen, who chaired the Committee of Enquiry, made the following observations:
- *“...The **failure in the operation of the Permit-To-Work system** was not an isolated mistake but that there were a number of respects in which the **laid down procedure was not adhered to** and **unsafe practices were followed**. One particular danger, which was relevant to the disaster, was the need to prevent the inadvertent or **unauthorised re-commissioning of equipment**, which was still under maintenance and **not in a state in which it could safely be put into service**. The evidence also indicated **dissatisfaction with the standard of information which was communicated at shift hand-over**”.*

Courtesy: New Zealand Safety Council; <http://www.safetycouncil.org.nz/>

Key Piper Alpha Lesson learned

❖ Regulatory control of offshore installations

- In addition to other very important lessons learned, the accident was instrumental in bringing about the Offshore Installations (Safety Case) Regulations in the UK.
- A safety case is a written document in which a company must demonstrate that an effective safety management system (SMS) is in place on a particular offshore installation.
- The implementation of this was handed over to the Health and Safety Executive (HSE) in 1991.

Courtesy: Fire and Blast Information Group <http://www.fabig.com>

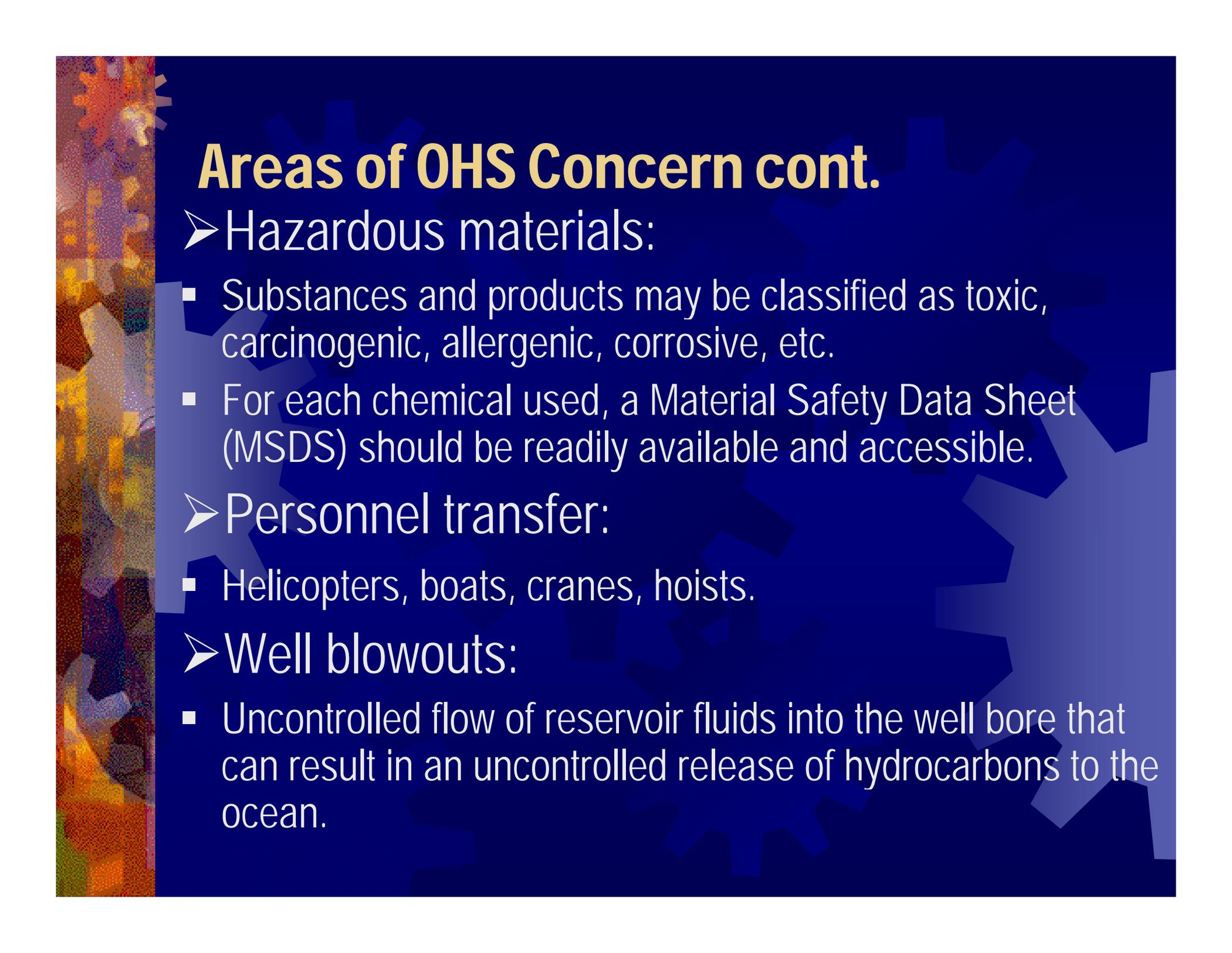


Ghana's Offshore OHS Challenges

- Since the Jubilee oil find was announced in 2007, all that people talk about mostly is the economic and employment benefits that will accrue to the nation.
- Sometimes mention is made of its potential environmental impacts, and EPA comes to mind.
- Little do we hear any discussions on Health and Safety, even from the regulatory perspective.
- However, health and safety is an important part of any industry, particularly in the offshore sector, which is classified as a major hazards industry.
- It is a fact that people still suffer work-related illnesses and injuries, or lose their lives in the offshore industry.

Offshore OHS Challenges cont.

- Major areas of OHS concern:
 - Fire and explosion:
 - This is the biggest threat to offshore installations. Prevent the release of flammable gases, and ensure early detection and interruption of leaks.
 - Potential ignition sources include hot works, e.g. cutting, welding, or grinding.
 - Air quality:
 - Hydrocarbon and hydrogen sulphide gases, and other emissions.



Areas of OHS Concern cont.

➤ Hazardous materials:

- Substances and products may be classified as toxic, carcinogenic, allergenic, corrosive, etc.
- For each chemical used, a Material Safety Data Sheet (MSDS) should be readily available and accessible.

➤ Personnel transfer:

- Helicopters, boats, cranes, hoists.

➤ Well blowouts:

- Uncontrolled flow of reservoir fluids into the well bore that can result in an uncontrolled release of hydrocarbons to the ocean.

Areas of OHS concern cont.

➤ Ship collision

- With support vessels and third party ships

➤ Emergency preparedness and response

- An emergency response team for offshore installations that is adequately trained and combat-ready to respond to potential emergencies, rescue injured persons, and perform emergency actions in conjunction with other agencies and organisations, where necessary.
- ❖ This is a big challenge in Ghana!!!



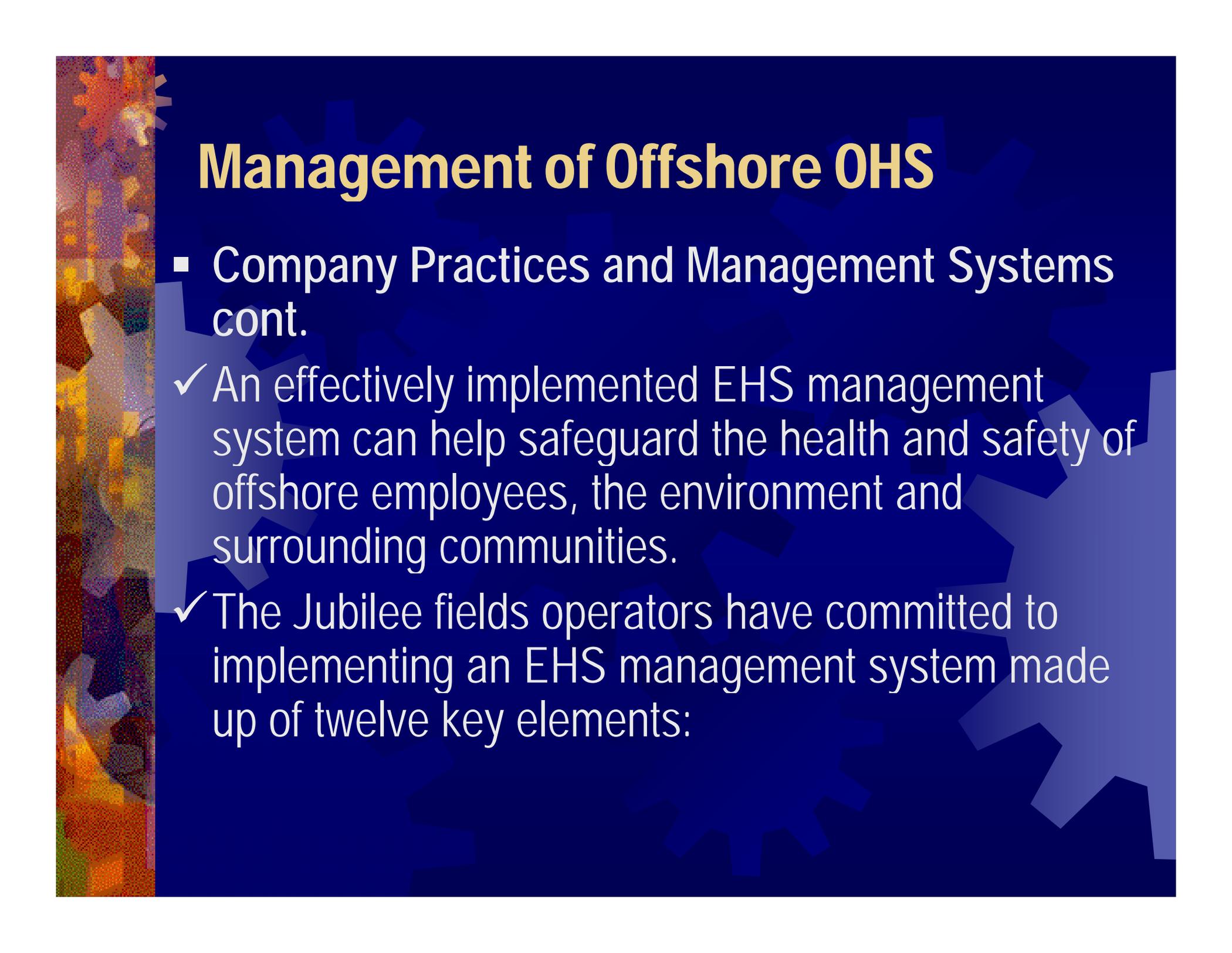
Other Offshore Platform Hazards

- Confined space entry
- Working at height
- Mobile equipment
- Manual handling
- Poor housekeeping
- Drowning



Management of Offshore OHS

- This can be approached from three key angles.
 - **Company Practices and Management Systems**
 - ✓ According to Dr. W. Edwards Deming, it is the "system" of work that determines how work is performed and only managers can create the system and improve it.
 - ✓ Part of managers' responsibilities are to allocate resources, provide training, equipment and tools, and create the environment necessary to achieve high standards of occupational health and safety.



Management of Offshore OHS

- Company Practices and Management Systems cont.
 - ✓ An effectively implemented EHS management system can help safeguard the health and safety of offshore employees, the environment and surrounding communities.
 - ✓ The Jubilee fields operators have committed to implementing an EHS management system made up of twelve key elements:



Management of Offshore OHS

- **Unit Operators' EHS Management System.**

1. Policy and Leadership
2. Risk Management (HAZID, HAZOP, Safety Case, etc)
3. Facilities Design and Construction
4. Information and Documentation
5. Personnel and Competence
6. Operations and Maintenance
7. Health and Safety
8. Environment Protection
9. Incident Reporting and Investigation
10. Emergency Response
11. Community Relations and Outreach
12. Continuous Improvement

Management of Offshore OHS cont.

■ Personnel Aptitude and Attitude

- ✓ Aptitude: Qualification, training, skill level, work experience.
 - ❖ Tullow's training programme for GNPC Engineers is a plus!!!
- ✓ Attitude: Workers' awareness of and value for safe work practices, their mannerisms and safe behaviours.
 - ❖ One other area where Ghana as a country has a problem is SAFETY CULTURE!!!



Management of Offshore OHS cont.

■ Regulatory Framework

- ✓ To ensure safety in offshore operations, oil-producing countries enact laws and regulations which industry players must comply with.

➤ USA

- ✓ Their regulatory framework ensures that offshore production and drilling are governed by laws and regulations that ensure safe operations and preservation of the environment.
- ✓ The Minerals Management Service (MMS) enforces compliance with these regulations in conjunction with the US Coast Guard.

Management of Offshore OHS cont.

- Regulatory Framework

- UK

- ✓ Health and safety legislation in the UK is set in the Health and Safety at Work Act 1974. The Act is supported by the Management of Health and Safety at Work Regulations (1999) which requires employers to carry out risk assessments for preventing accidents and cases of work-related illnesses.
- ✓ Further to that, the offshore regulatory regime is based on the Offshore Installations (Safety Case) Regulations 2005 which requires operators to produce a safety case for offshore installations which must be accepted by the Health and Safety Executive (HSE) before operating in UK waters.
- ✓ The Offshore Installations (Safety Case) Regulations 2005 replaced the Offshore Installations (Safety Case) Regulations 1992

Management of Offshore OHS cont.

■ Regulatory Framework

➤ Ghana

- ❖ The biggest challenge lies in this area!!!
- ✓ There are presently no OHS regulations governing the emerging offshore oil industry.
- ✓ No regulatory body so far is known to be armed with the authority and competence to ensure offshore safety.
- ✓ Current EHS regulations are focused on environmental protection, enforced by the EPA [which sometimes extends its tentacles to OHS issues. (competence???)]



Regulatory Framework

- In the absence of the requisite health and safety regulatory provisions in the country, the Jubilee Operators have agreed with the EPA, GNPC and the Energy Ministry in adopting, where applicable, the following international EHS standards:
 - World bank/IFC Standards/MARPOL
 - International Association of Oil and Gas Producers (OGP)
 - Safety Case Regulations of the UK
 - US Coast Guard Regulations
 - American Bureau of Shipping Classing Standards.



CONCLUSION

- Health and safety must take a pivotal place in our offshore operations.
- Government and industry players must give OHS the attention and priority it deserves to ensure that the emerging offshore industry is made one of the safest places to work in the country.

For More Information, please visit...

- IFC EHS Guidelines for Offshore Oil and Gas Development <http://www.ifc.org>
- Fire And Blast Information Group (FABIG) <http://www.fabig.com>
- Minerals Management Service <http://www.mms.gov>
- Health and Safety Executive (HSE) <http://www.hse.gov.uk>
- GNPC www.gnpcghana.com
- Tullow Oil Plc <http://www.tulloil.com>
- Institute for the Analysis of Global Security <http://www.iags.org>

- THANK YOU
- VIELEN DANK
- ME DA MO ASE