



**UNIVERSITI PUTRA MALAYSIA**  
***BARAM B COMPLEX EMERGENCY DRILLS***

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**FK 2001 70**

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UNIVERSITI PUTRA MALASYIA**

**SEPTEMBER 2001**

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This study is dedicated for all the offshore oil and gas workers whom had sacrificed almost half of their lifetime offshore, away from the comfort of home and family in rendering their services, rain or shine, for the benefit of their nation and mankind.

This study is also especially dedicated for my family; my beloved wife Hajejah, my daughters Dayana and Aida, my inspirational father and my caring mother; whom had been very supportive and continuously provide encouragement throughout; which catalysing the completion process of this study.



# Acknowledgement

Firstly I wish to record my gratitude towards all the key drivers of the MS ERP programme; a world first; namely Dr Mohammed, Ir Fuad, Dr Fakhrul and Dr Nor Mariah from the Engineering Faculty of UPM. All these knowledgeable individuals are the change agents which successfully makes the major paradigm shift on my general understanding of emergency and disaster management from a typical incident and hazard management science towards a wider perspective which covers every aspect of loss control management of the elements of natural resources, environment, financial and security.

My most sincere gratitude for my project supervisor, Dr Fakhrul, whom had been providing invaluable guidance, advise, understanding and patiently expedite me to complete this project. My utmost gratitude for Puan Aini whom had never fail to encourage me throughout and 'Thank you very much' on the invaluable technical advise on the project survey questionnaire preparation.

I also would like to say 'Thank you' for all members of the Baram Bees crew whom had been candid in their participation of my research; Head of Operations for Northern Sector, Abdullah Webb, whom had been very supportive during my project data gathering and acquisition process; and Head of Operations Southern Sector, Salahuddin Sulaiman, whom had been providing guidance and encouragement throughout my study period.

Other individuals which I would like to say 'Thank you' for providing assistance throughout my research are Dilah, Rosni, Brinda, Nora, Taib, Junaidi, Zubaidi, Satar and Musa. Thank you to all of you for your most invaluable corporation and support.

Last but not least all my fellow classmates whom never fail to provide encouragement and continue to motivate me to complete this study especially considering all the constraint and hardship that I have to manage during my remote offshore tour of duty.

# **Baram B Complex Emergency Drills**

## **INTRODUCTION**

In the extreme volatile oil and gas industry mining and refining environment, emergency drill exercises are commonly used as a hands-on practical means in developing its industrial work force competency in damage and loss control management. During these drills exercise, simulated emergency scenario associated with the daily business operation activities is used as an emergency event, which warrant the activation of an appropriate prompt response.

The emergency drill's primary objective is to condition both mentally and physically human resources in responding and managing emergency that may trigger at any time in their business operations. It is also aimed at maintaining state of preparedness and used as a practical assessment of the business organisation established Emergency Response Plan procedures in meeting its objectives. Notably these objectives are common throughout the industry globally and are described as followings

- (a) protection of life
- (b) protecting the environment from the polluting effects of hydrocarbon matters and products spillage
- (c) protecting investment and property against damages



Any observations made which identify elements which hinders smooth emergency respond operations during drills are required to be analyses and verified for improvement. Procedure amendment follow suit and this process is an ongoing process throughout the business life cycle. It is failure in managing this very critical aspect in the high risks business venture would resulted in a major catastrophic disaster. Global example is the Piper Alpha tragedy in the North Sea off the United Kingdom in 1988.

The emergency drills conducted in the remote Baram B Complex of Petronas Carigali Sdn Bhd in the Baram Delta Operations, offshore Miri, Sarawak is being modeled in this study. The objectives of the study are

- to determine compliance to of emergency drills exercise conducted in meeting with the in-house standards requirement and objectives
- to determine general level of competency of the present human resources in responding to an emergency on the platform

In summary, this study is a basic evaluation on the implementation of planned emergency drills in the Baram B complex where emergency response competency achieved for the platform human resources is review and analyse. This is to ensure that emergency drills essentially remain as an effective tool in enhancing state of preparedness to respond for any emergencies, natural or man-made disasters.

## **CHAPTER 1**

### **BACKGROUND**

#### **1.1 PIPER ALPHA TRAGEDY**

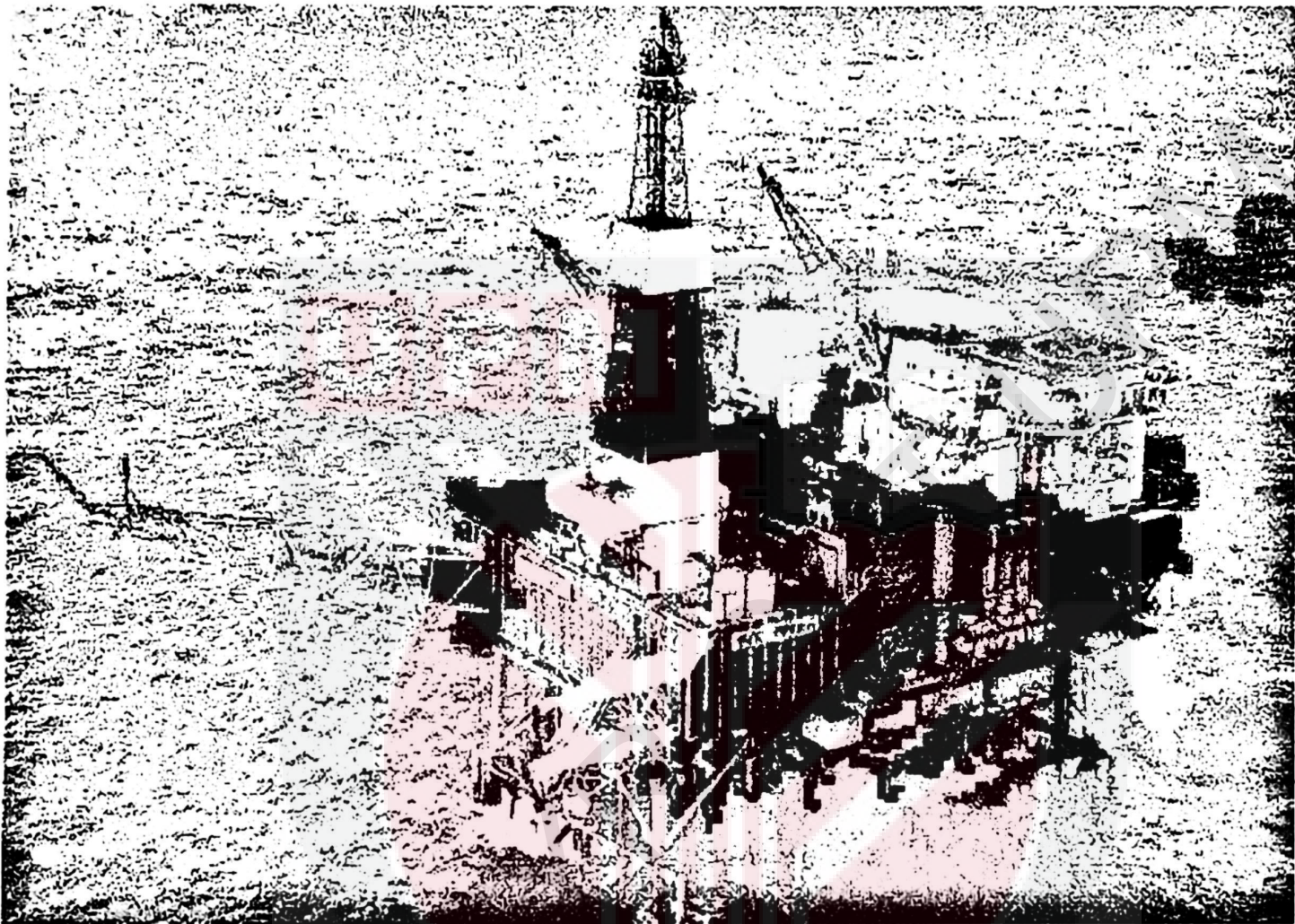
In the oil and gas industry history, the Piper Alpha tragedy chapter is a very significant disaster event in the hazardous and high risk business venture. The Piper Alpha tragedy is a globally benchmarked of what would be resulted from an unorganised emergency response.

The Piper Alpha oil platform stood one hundred feet above some of the fiercest waters in the North Sea and in the middle of crude oil export pipelines network. She was pumping back to shore thousands of tonnes of crude oil worth around £3.5 million a day and this production rate accounted for 10% of the United Kingdom's North Sea oil production. On July 1988, this marvel of engineering was reduced to a blackened, smoking, stump. Most of the rig structure elements melted and fell away into the sea. Of the 225 men on board, 167 died and estimated loss of £1.6 billion in revenue.

In his post accident Public Enquiry report, Lord Cullen reveals that bad communication and administration of the paperwork allowed a pump to be turned on while it was still under maintenance which causes an explosion. The explosion was uncontrollable and warrant an oil fire to ignites and quickly took hold. Two other rigs feeding into the same oil export line did not shut down until one hour after the initial May Day call, which meant oil from



the other rigs flowed continuously towards Piper Alpha and fuelled the fire. Gas pipelines ended in the area where the oil fire had started were eventually ruptured by the oil fire heat and caused an explosion which engulfed the rig in thousands of tonnes of burning gas.



**Photo 1.0** The Piper Alpha Platform





**Photo 2.0** Moments after the incoming Tartan gas pipelines ruptured.

The dozens of men helplessly trapped in the accommodation block awaiting to be rescued by helicopter as all routes to the lifeboats are blocked or inaccessible. However rescue helicopters unable to land on the platform due to the blazing heat and raging fire which poised great risks for helicopter landing operations. There was no evacuation instruction over the public address system and most stayed until overcame by smoke and gas fumes. The survivors jumped 100 feet into the open sea for survival, contrary to the minimal training they had been given.



Additional findings from the post tragedy Lord Cullen's Public Inquiry report highlighted two major primary critical root causes of the tragedy, both pre and post contacts. First it is a result of management failure to urgently rectify reported engineering design safety flaws (no blast wall and no Emergency Shutdown Valves installed at the incoming pipeline riser). Secondly, the most important and critical root cause, the tragedy is a result of failure of first line emergency response and contingency plan implementation, which resulted in the catastrophic disaster.

The potential of another similar catastrophic disaster to occur in the same industry is predicted unless proactive measures are implemented to iron out incompetency in executing appropriate response during an emergency. A very useful and critical proactive measure is through regular planned emergency response drills on offshore oil and gas platforms especially remote installation.



**Photo 3.0** Piper Alpha after the mayhem.

## **1.2 BARAM B COMPLEX**

Within Malaysia's offshore territorial water, the resemblance of Piper Alpha in terms of national strategic importance as a major oil and gas producer as well as its physical facility installation configuration is the Baram B Complex of the Petronas Carigali Sdn Bhd offshore Miri, Sarawak. The Baram B Complex of Petronas Carigali Sdn Bhd in the Baram Field offshore Miri in Sarawak is an integrated oil and gas production platform. It is also the main operations administration platform for all the 11 Baram platforms and the main communication base with the outside world.



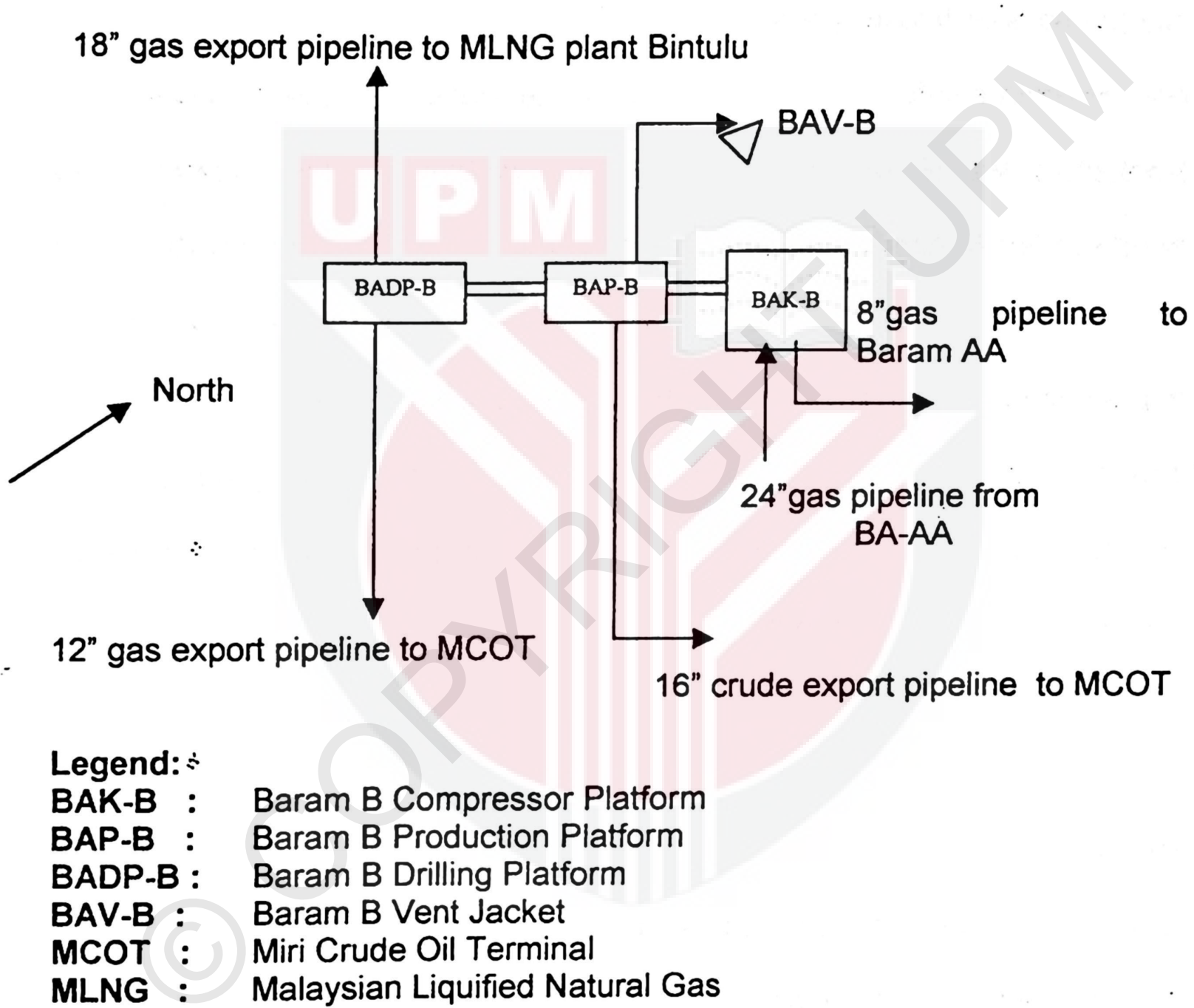
Baram B complex platform's process and export facilities were designed for a production of 100 million standard cubic feet of gas per day and 10 thousand barrels of oil per day.



**Photo 4.0**    General view of the Baram B Complex

1.2.1 Baram B Complex platform location layout

The non-scale schematic diagram of the Baram B complex platform location layout as illustrate in Sketch 1.0 below. Note the oil and gas pipelines network connected to the complex.



Sketch 1.0 Baram B Complex Platforms Location Layout



### **1.2.2 Baram B Complex general process overview**

Oil produced from the earth sub surface is piped into separation vessels and then pumped to shore terminal via 16 inches diameter subsea pipeline for export or refinement purposes. Associated gas produce is scrubbed in a liquid scrubber vessel and then compressed in a centrifugal compressor for export to shore terminal via a 12 inches subsea pipeline. The gas then sold for Miri electrical power generation by the Sarawak Electrical Supply Corporation(SESOCO) via Petronas Gas Berhad, Miri. Another export pipeline is to the Malaysian Liquefied Natural Gas(MLNG) plant in Bintulu via a 24 inches 350 kilometers subsea pipeline. Besides export, some of the gas is use to run generator sets to generate electrical power for the platform and compress in reciprocating compressors for re-injection into the selected oil wells for pressure lifting oil from the earth sub surface.

### **1.2.3 Mode of operation**

Baram B Complex is a remote unmanned platform. Personnel operating the platform visit the platform in the morning from the Baronis offshore living quarters platform which about 50 nautical miles to the west of the Baram B complex. The personnel are transported using a fast crew boat and in case of adverse weather condition, which does not permit traveling by boat, helicopter is used. In the evening, the personnel would adjourn back to the living quarters.

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