出國報告（出國類別：開會）

國際石油工程技術研討會

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國際石油工程技術研討會

摘　要

國際石油工程技術研討會(2011 Offshore Europe Conference)在英國阿伯丁舉辦，會中有有數十篇以上之論文發表，並有來自世界各地超過 1500 家以上之石油公司與石油服務公司參展。開會期間本人主要參加鑽採類相關之論文主題與展覽之研討與觀摩。

由於研討會發表的論文範疇頗廣且有時相關論文會在同一時間不同會場發表，因此僅能選擇與鑽採類相關之論文，聽取其觀念與技術。參加完研討會及參觀各公司展覽，個人感到受益良多，茲將開會及參觀與鑽採相關之議題分成深海(Deepwater)鑽探技術、控壓鑽井技術及 Landmark 軟體解釋技術最新進展等三項作心得報告。

受到深海探油高成功率及高利潤之激勵，深海油氣鑽探技術隨著特殊鑽井及開發技術之持續突破與改進，不斷締造深海世界紀錄，不斷締造深海世界紀錄，也將探勘領域向極深海邁進。控壓鑽井技術是此次國際石油工程技術研討會(Offshore Europe Conference)重點之一，亦是本出國計畫主要目的之一，彙整有關控壓鑽井技術論文，供低壓氣田開發鑽井參考，以降低地層污損及鑽井風險。

此次亦參觀了 Landmark 公司展覽攤位，聽取有關軟體分析技術及最新進展之簡報及研討，該公司發展之軟體已將鑽井、油層、生產及探勘等整合，其軟體是被國際石油公司採用最多的軟體之一。本組將於明年引進 Landmark 公司軟體中有關鑽井工程之 R5K 鑽井設計軟體，預期對 F 構造開發工作及陸上鑽井工程會有很大助益。

國際石油工程技術研討會

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壹、目的

雖然石油探勘越來越困難，新發現油氣田越來越不容易，但今世界消耗石油天然氣之數量卻隨著大多數國家包括中國大陸、印度等大量人口國家之發展而益顯緊迫。我國亦不能等閒視之，須積極提昇石油鑽探技術，參與國外油氣田開發工作，以及提高國內或海域油氣田的採收率。

配合 100 年度石油基金補助計劃「低污損鑽井技術研究」工作需要，爲了提昇本公司鑽探技術，需要參加國際石油工程技術研討會(Offshore Europe Conference)，並與有關之專家交換研究心得，吸取他們之技術經驗，引進新穎鑽井技術及設備，以提升鑽探技術及增加公司油氣蘊藏量。本次出國國際石油工程技術研討會之主要目的如下:

1. 藉由參與國際石油工程技術研討會(2011 Offshore Europe Conference)，以因應未來公司國內外探採之需求及。引進相關鑽井新設計方法及新技術，可降低開發風險。

2. 研討及蒐集有關鑽井工程技術，如控壓鑽井技術等相關鑽探新技術資料，以降低泥漿污損及鑽井風險，並提高探採效益。

3. 經由參加研討會和與會專家交換經驗，並且建立溝通管道及人脈。引進鑽探新技術及設備，以提昇公司鑽探工程技術及提昇本所研究水準。

貳、過程

過程詳如出國行程表(表 1)。

表 1、出國行程表

預定起迄日期	天數	到達地點	地區等級	詳細工作內容
100/9/4	1	台北－倫敦－阿伯丁	266	啓程
100/9/5~100/9/8	4	阿伯丁	266	參加國際石油工程技術研討會 (Offshore Europe Conference)
100/9/9	0	請假	0	因於歐洲停留 6 晚，航空公司可以「旅遊票價」計算，否則以年票票價計算，二者價差高達 36440 元。故 9/9~9/10 於當地休假（私人行程，不支用公費）以節省公帑。
100/9/10	0	例假日	0	
100/9/11~100/9/12	2	阿伯丁－台北	266	返程
合計	7			

參、心得

此次之參加在英國舉辦之國際石油工程技術研討會(2011 Offshore Europe Conference)，附錄一爲 2011 Offshore Europe Conference 研討會議程。圖 1 爲本人攝於 2011 Offshore Europe Conference 研討會會場報到處之照片，會中有有數十篇之技術論文發表，此外並有來自世界各地超過 1500 家以上之石油公司與石油服務公司參展。此次研討會經費由國際石油公司及服務公司贊助，雖然不必繳註冊費(國際研討會之註冊費通常 300 美元以上)，但此次研討會內容及展覽規模不輸需繳註冊費之其他國際石油工程技術研討會。

圖 1、2011 Offshore Europe Conference 研討會會場報到處

附錄一爲 2011 Offshore Europe Conference 研討會之議程，共分成環境工程、先進鑽井技術、探勘、油層工程、石油工程設備、油層處理、油層處理安全問題等方面。由於研討會發表的論文範疇廣泛且在同一時間有不同會場發表，因此僅能選擇與鑽採類相關之論文，聽取其觀點與技術，

圖 2 及圖 3 爲 2011 Offshore Europe Conference 研討會論文發表及交流之現場。

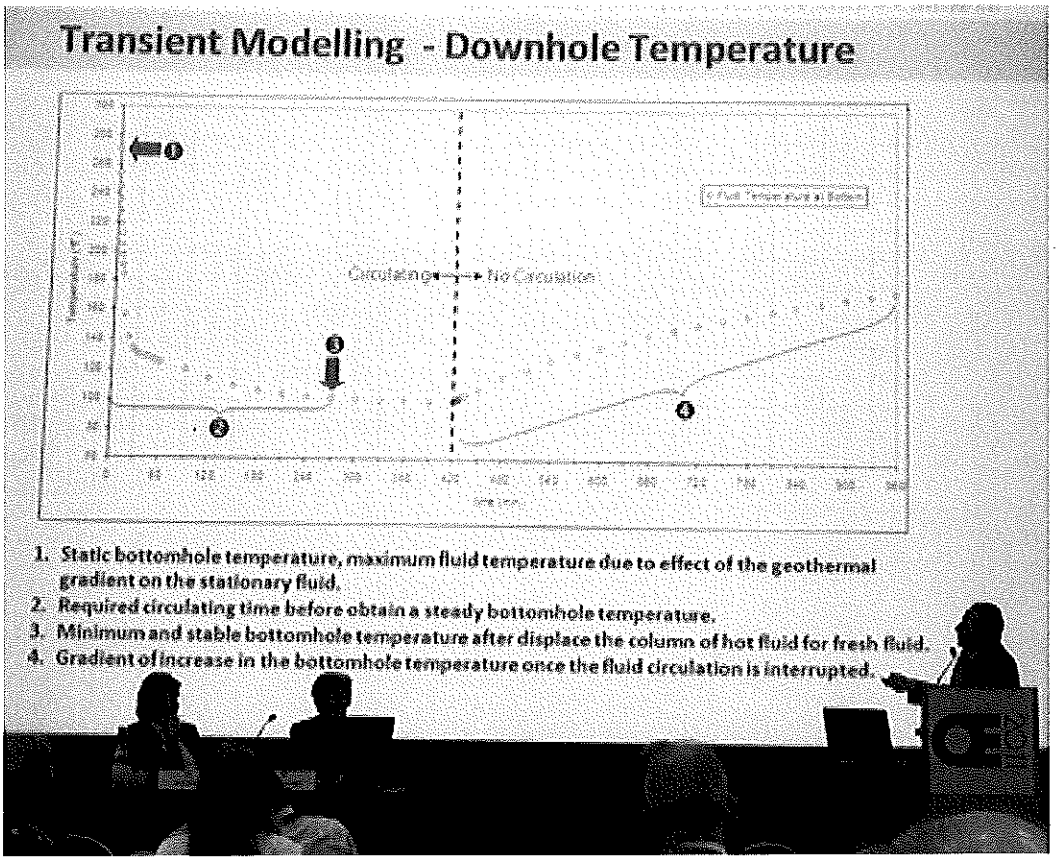


圖 2、2011 Offshore Europe Conference 研討會論文發表及交流之一

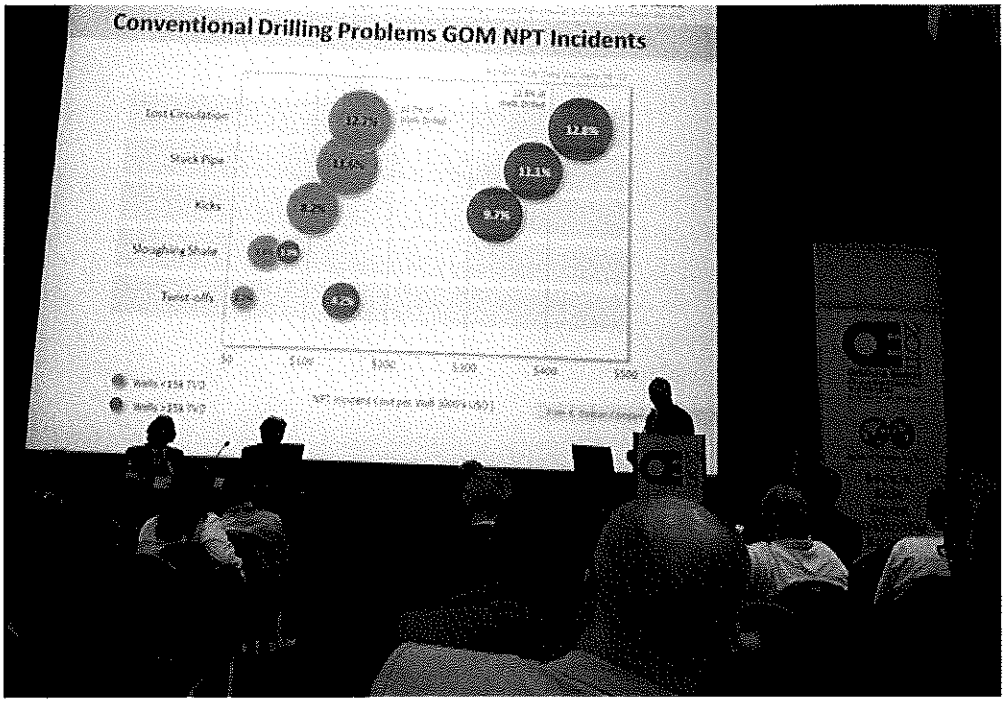


圖 3、2011 Offshore Europe Conference 研討會論文發表及交流之二

附錄二爲 2011 Offshore Europe Conference 研討會之內容，此外並有來自世界各地超過 1500 家以上之石油公司與石油服務公司參展。因此聽取論文發表期間亦抽空至各參展公司參觀展覽之產品，圖 4 爲參展公司之實體展覽產品(鑽井設備)，並交換意見以獲取相關資訊。參觀了 Landmark 公司有關軟體解釋技術及最新進展之簡報，該公司目前在石油界的鑽井、油層、生產及探勘應用軟體是被國際石油公司採用最多的軟體之一。

圖 4、參展公司之實體展覽產品(鑽井設備)

參加完研討會及參觀各公司展覽，個人感到受益良多，茲將開會及參觀與鑽採相關之議題分成深海(Deepwater)鑽探技術、控壓鑽井技術及 Landmark 軟體解釋技術最新進展等分成三項做一摘要心得報告如下：

一、深海(Deepwater)鑽探技術

此次研討會除了共分成環境工程、先進鑽井技術、探勘、油層工程、石油工程設備、油層處理、油層處理安全問題等方面發表論文外，並針對深海(Deepwater)鑽探技術作早餐簡報(Breakfast Briefings)，茲將重點摘要心得報告。

深海(Deepwater)的觀念，從早期的水深 200 公尺，隨著鑽探技術之進步發展，水深逐漸加深至 300 公尺、500 公尺、1,000 公尺、甚至 2,000 公尺。目前全球石油工程界較通用的深海定義爲水深超過 500 公尺者。至於「超深海」(Ultra Deep Water)的定義則爲水深超過 1,500 公尺者。受到深海探油高成功率及高利潤之激勵，深海油氣鑽探技術(圖 5)隨著特殊

鑽井及開發技術之持續突破與改進，不斷締造深海世界紀錄，不斷締造深海世界紀錄，也將探勘領域向極深海邁進。

深海油氣的探勘與開發技術遠較 100 至 200 公尺之傳統淺海困難得多，除了海域鑽機和生產平台不易穩固在井位上，將深海海床上的油氣利用昇導管輸送油氣上生產平台，或依賴敷設在深海海床上之管線輸送上岸，其工程技術均受水深之影響或限制頗鉅，尚待不斷地改進與突破。深海油氣田之鑽井費用及開發成本均較淺海及陸上高出甚多，須靠審慎評估及周延風險管理，方能確保投資效益。圖 6 爲深海(Deepwater)探勘時，應用地質導向技術(Geological Steering Technology)：使用能轉向的井底馬達(Down-hole Motor)結合隨鑽測井儀(MWD、LWD)，以便能立即提供地層特性、鑽頭轉速、井斜及方向等資料，使鑽井工程人員能隨時修正井程，使鑽頭能沿著生產層或油水界面（或氣水界面）即時鑽進。由於個人電腦功能的提升及能精確快速的計算，已被廣泛應用於鑽井工程設計及模擬工作，並將進一步發展成整合式鑽井操作系統(Intergrated Drilling System)。

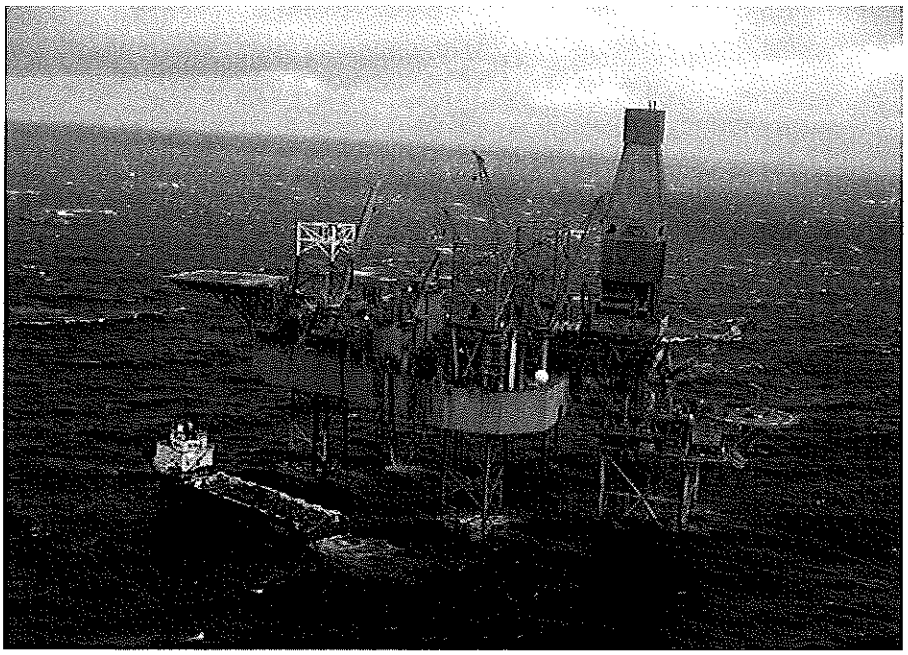


圖 5、深海油氣鑽探工程

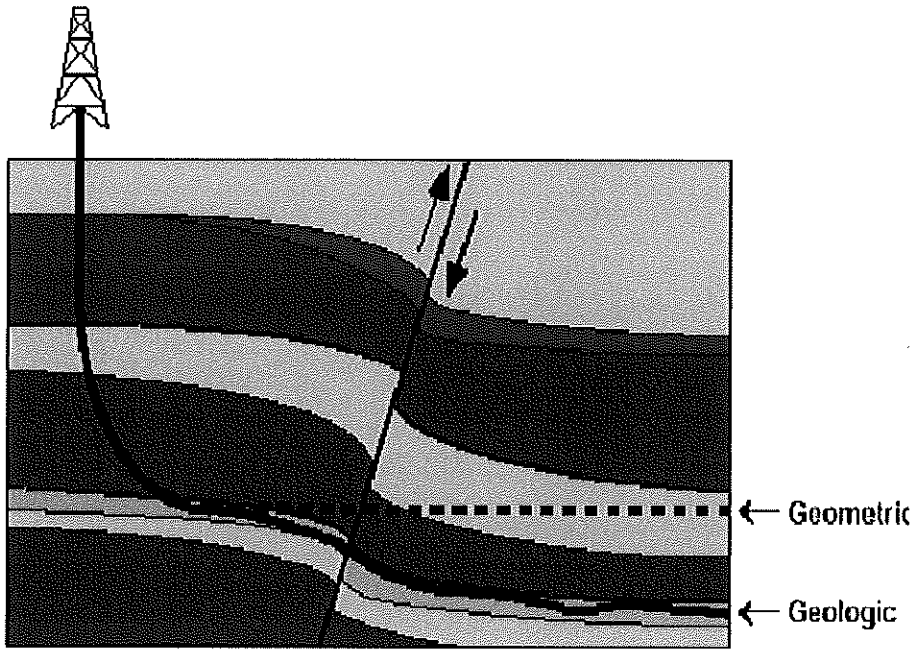


圖 6、海域油氣田鑽探作業示意圖

二、控壓鑽井技術

爲了增加油氣蘊藏量，本公司近年來在竹苗地區及南部泥岩區相繼鑽鑿數口井，其中竹苗地區的井像栗林 1 號井及出磺坑 145 號井之深度均超過 3,000 公尺，鑽井過程或遭遇井孔崩塌，或地層污損問題，造成鑽進相當大的困擾，因此如何降低地層污損及鑽井風險爲重要課題。近年來，國際石油工程界由於控壓鑽井(Managed Pressure Drilling，MPD)技術之應用，已可改善上述問題。控壓鑽井技術是此次國際石油工程技術研討會(Offshore Europe Conference)重點之一，亦是本出國計畫主要目的之一，此次有下列二篇有關控壓鑽井技術之論文，均是由 Weatherford 公司專家所發表：

1. S.K. Naesheim, F. Lefdal and T.W. Oftedal, BG; H. Sveinall, Weatherford, How MPD with Advanced Flow Detection System was

Successfully Applied on an eHPHT Well in the Norwegian North Sea.

2. F. Kernche, D. Hannegan, E. Sammat andM. Arnone, Weatherford, Managed Pressure Drilling Enables Drilling Beyond the Conventional Limit on an HP/HT Deepwater Well.

Weatherford 公司爲目前國際石油工程界應用控壓鑽井技術最多且最先進的公司，擁有業內最全的控制壓力鑽井設備，圖 7 爲 Weatherford 公司控制壓力鑽井設備。故以後要引進控制壓力鑽井技術時，可聘請該公司技術指導或代訓鑽井工作人員。

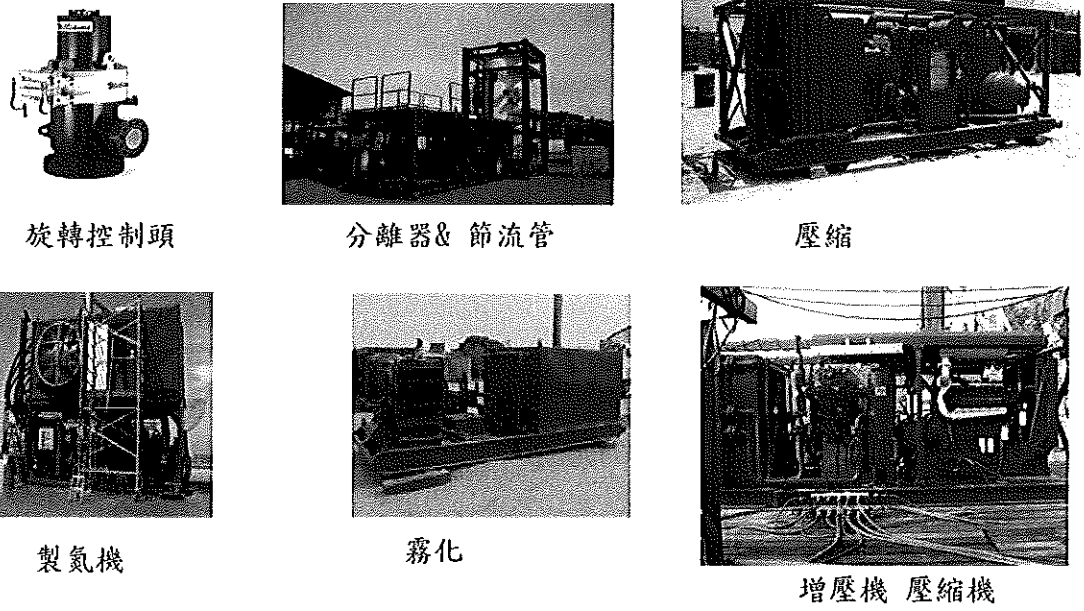


圖 7、Weatherford 公司控壓鑽井設備

上述論文介紹如何成功應用控制壓力鑽井(MPD)技術於 Rowan Gorilla 鑽井船上，探勘挪威北海大陸棚的實際例子，“Mandarin East”井是屬於高溫和高壓的環境，圖 8 爲“Mandarin East”位置圖，圖 9 爲“Mandarin East”井現場之控壓鑽井系統，圖 10 爲“Mandarin East”井之控壓鑽井安裝設備。控制壓力鑽井(MPD)技術是在靜態平衡/過平衡條件

情況下進行。該井鑽達垂深 5933 公尺(RKB)的三疊紀地層。該井的位置，經精心挑選，以避免通過高風險的海床條件。爲避開附近的鄰近井，“Mandarin East”井較深且位置偏移。

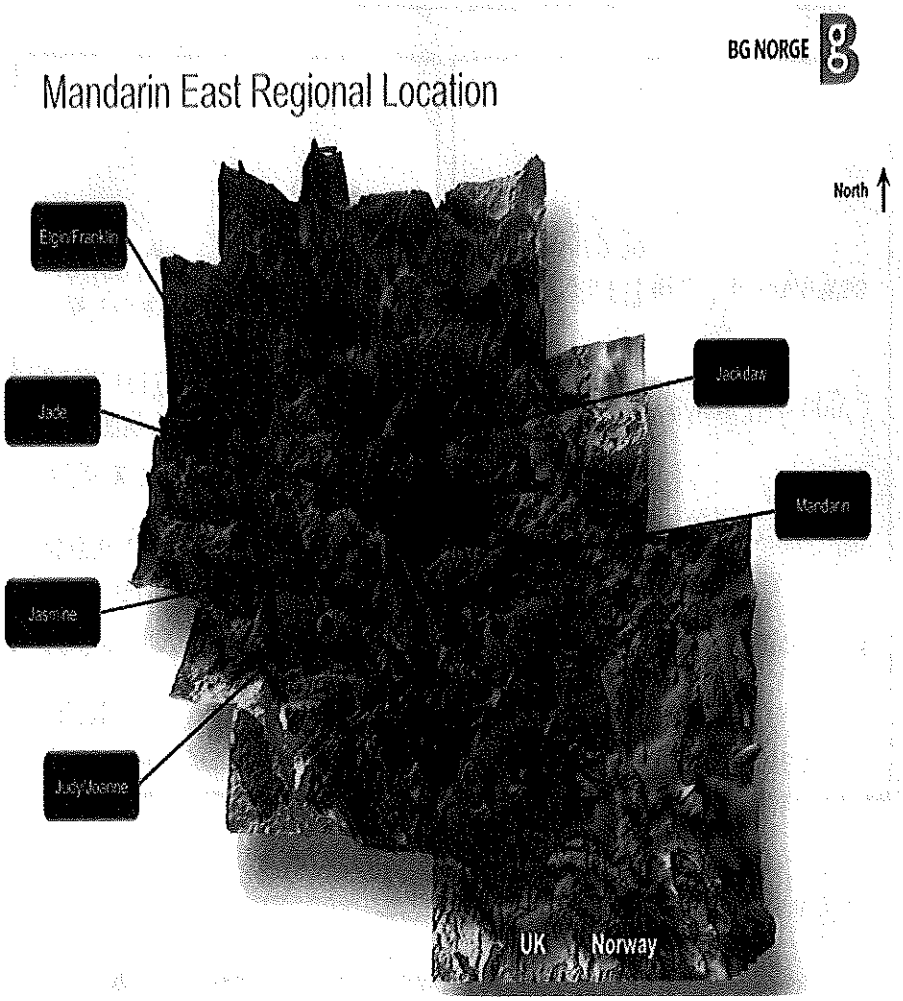


圖 8、“Mandarin East”井位置圖

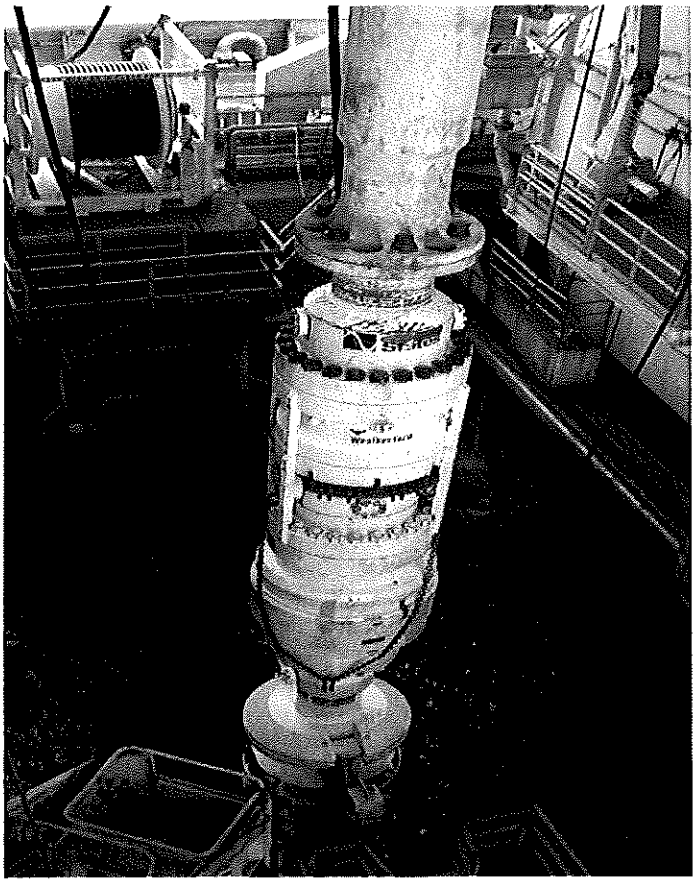


圖 9、"Mandarin East" 井現場之控壓鑽井系統

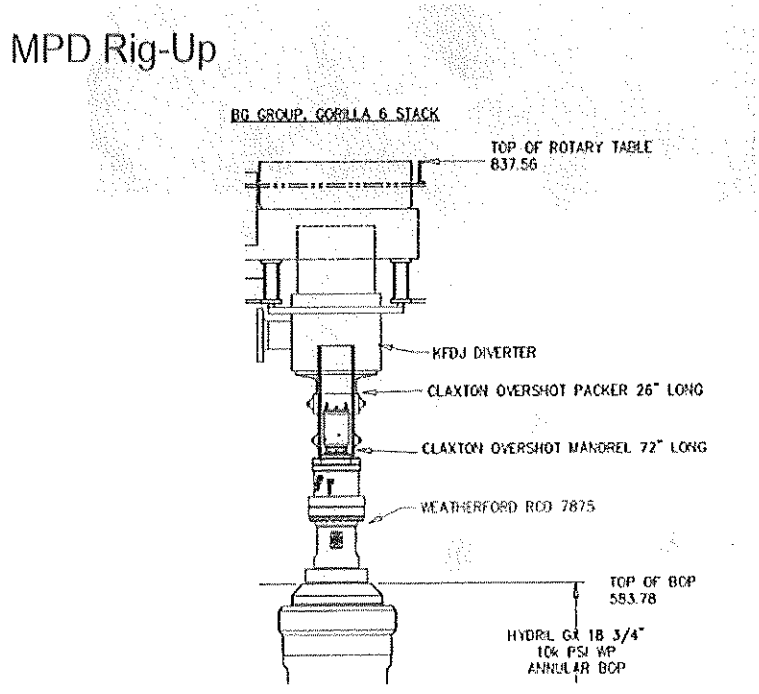


圖 10、"Mandarin East" 井之控壓鑽井安裝設備

鑽井作業時，因鑽井泥漿、濾液或鑽鑿固粒等侵入生產層，改變了生產層的特性，結果造成生產率的降低。地層污損幾乎在所有鑽井工程皆曾發生，只是影響程度的大小各有不同而已。在低壓地層的鑽井作業，因爲差壓的增高，更需特別留意地層污損的預防。

當開始鑽入生產層頂部後，隨時都有發生地層污損的可能。要減少地層污損發生，必須從選擇泥漿種類、各種添加劑和地層流體的親和性、鑽井及完井的操作要件等詳加探究。降低地層污損之方法，首先必須強調污損之防止，最有效的方法就是避免它的發生，這是最經濟有效的。

傳統鑽井技術之泥漿循環系統在地表附近是直接與空氣接觸，屬於開放式鑽井環境(Open-vessel Environment)，因此易導致卡鑽、漏泥、噴井及地層污損等問題，且在地層壓力產生變化時，若關閉防噴器，即無法繼續鑽進，因而提高無效益時間，延誤工期，並提高鑽井費用。

有別於此，控壓鑽井技術係屬於密閉式鑽井環境，並利用旋轉控制器、鑽進節流歧管與多相分離器等裝置，在鑽進過程中精確控制循環流體壓力，以使其接近地層壓力，可減少與壓力有關的鑽井問題，必要時還可邊鑽進，邊生產。圖 11 爲超壓鑽井、負壓鑽井與控壓鑽井之鑽井窗(Drilling Window)比較圖，黃色區域爲控壓鑽井所需之鑽井工作窗，遠較超壓鑽井與負壓鑽井之鑽井窗小，亦即較不會發生漏泥或噴井等事故。

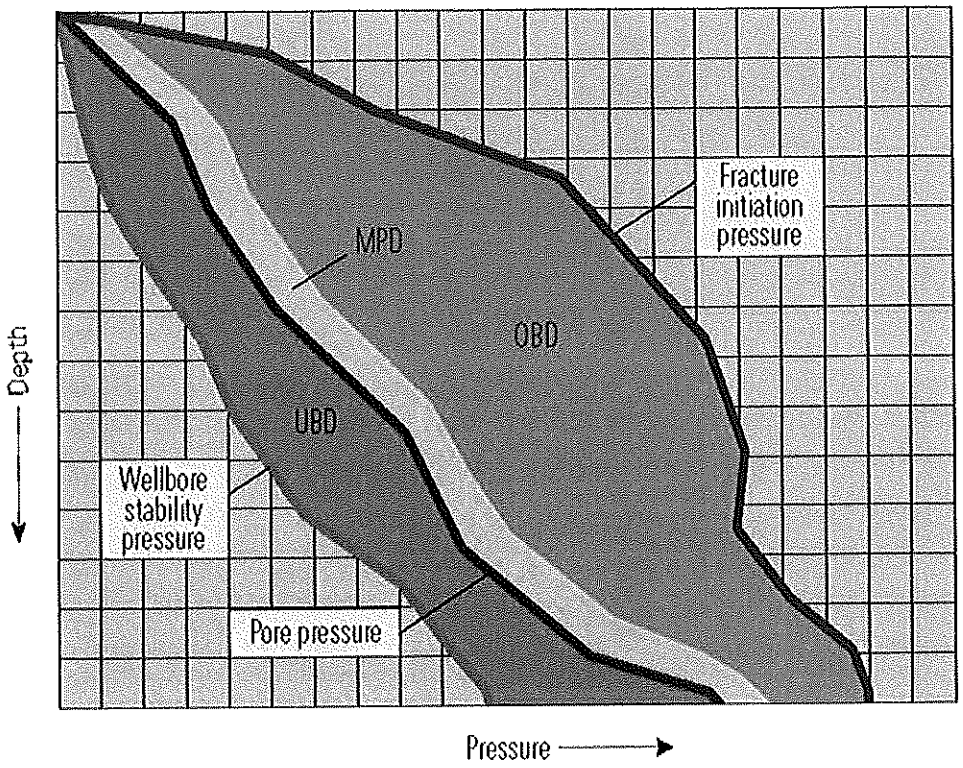


圖 11、超壓鑽井、負壓鑽井與控壓鑽井之鑽井窗(Drilling Window)比較圖

此外，控制壓力鑽井允許我們在鑽進過程中調整井眼壓力，從而可以減少與壓力有關的問題，還可以提高機械鑽 速，而且如果需要的話，還可以邊鑽進，邊生產。傳統鑽井技術與控壓鑽井技術之調整井底壓力的方法如表 2 所示，可知控壓鑽井技術具有較佳的即時調整能力。表 3 爲世界各主要地區之孔隙壓力梯度。

表 2、傳統鑽井技術與控壓鑽井技術比較

	傳統鑽井技術	控壓鑽井技術
原理	井底壓力=泥漿比重+泥漿動比重	井底壓力=泥漿比重+泥漿動比重+井口回壓
控	透過開泵、關泵及控制泵速來調整	透過控制地面壓力和井眼磨擦力可

制 方 法	井眼中的泥漿循環壓力	以顯著地調整井眼壓力，且很少需要中斷鑽井作業。

表 3、世界各主要地區之孔隙壓力梯度

	psi/ft	kg/m^3
West Texas	0.433	1.000
GOM Coastline	0.465	1.074
North Sea	0.452	1.044
Malaysia	0.442	1.021
Mackenzie Delta	0.442	1.021
West Africa	0.442	1.021
Auadarko Basin	0.433	1.000
Rocky Mountains	0.436	1.007
California	0.439	1.014

控壓鑽井技術的主要目的係藉由降低對鑽井工作沒有幫助的無效益時間(NPT)，以提升鑽井操作效率。無效益時間係指漏泥、差壓黏卡、井眼不穩定與井壓失控事件等，造成鑽井作業延宕之時間，根據統計，無效益時間(NPT)在墨西哥灣約占鑽井總時間 25%-33%，因此若能有效降低無效益時間(NPT)，將有助於改善鑽井效率，降低鑽井成本。圖 12 爲連續循環系統(CCS)之主要設備，圖 13 爲控壓鑽井(MPD)現場地表設備。

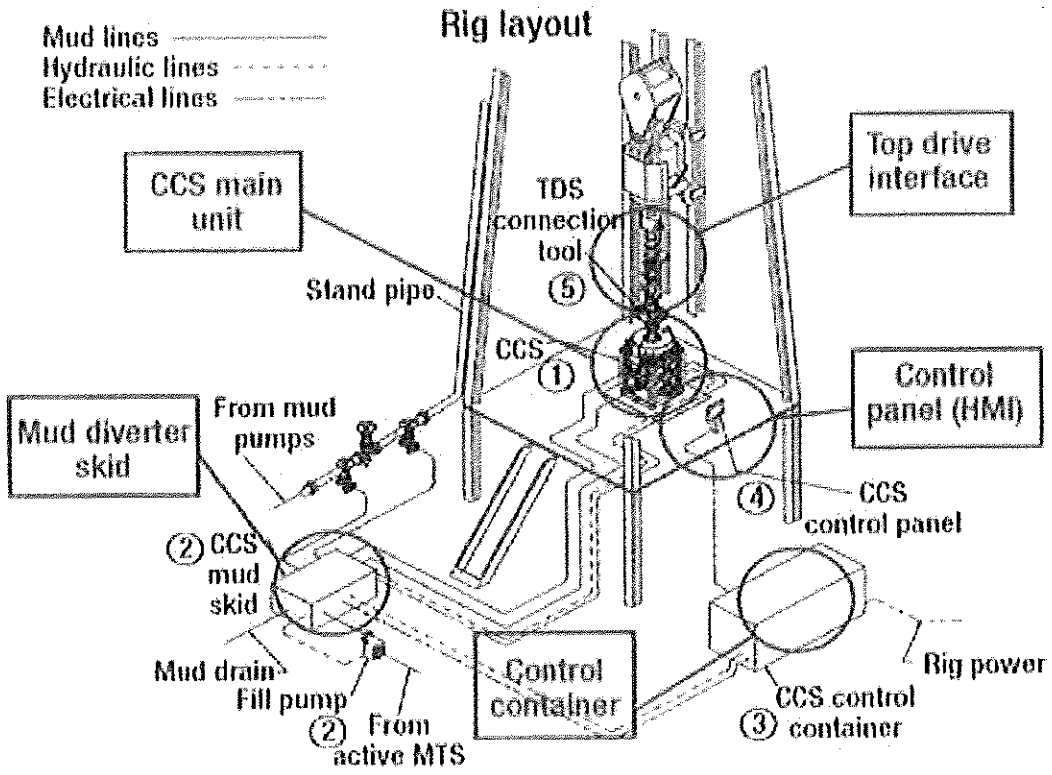


圖 12、連續循環系統(CCS)之主要設備

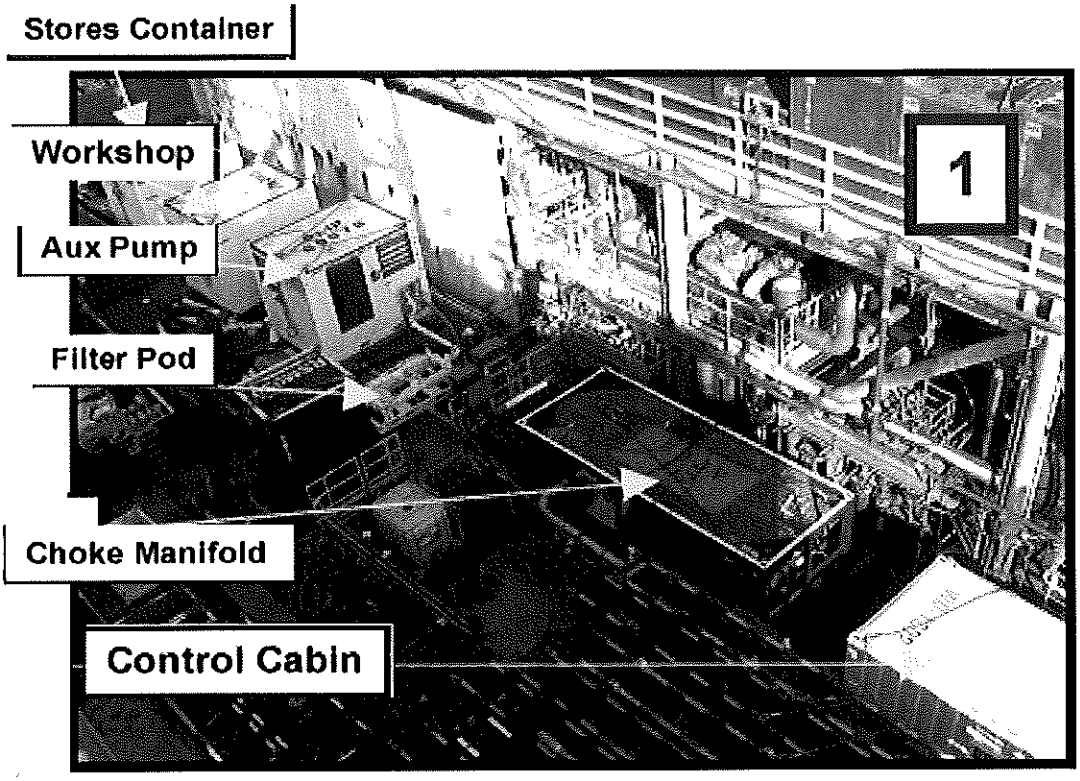


圖 13、控壓鑽井(MPD)現場地表設備

上述控制壓力鑽井技術與傳統鑽井技術不同處爲需使用旋轉控制器、鑽進節流歧管與多相分離器等三項特殊設備，各項設備之功能說明如下：

1.旋轉控制器(Rotating Control Device；RCD)

功能類似傳統防噴器，但其關閉後仍可繼續旋轉鑽進。圖 14 爲膠塞密封旋轉控制頭，圖 15 爲液壓密封旋轉控制頭。

2.鑽進節流歧管(Drilling Choke Manifold；DCM)

主要的功能在於排除鑽進過程中產生之鑽屑。

3.多相分離器(Multiphase Separator)

視所採用的鑽井流體而異，主要將循環出的流體進行多相分離，並重新調配後，再繼續循環與鑽進。

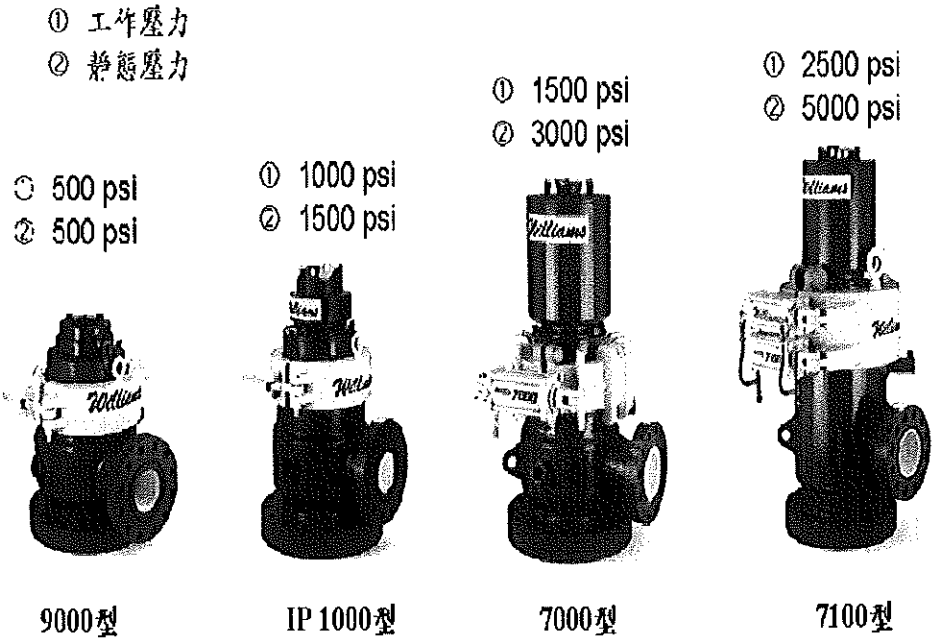


圖 14、膠塞密封旋轉控制頭(Rotating Control Device；RCD)

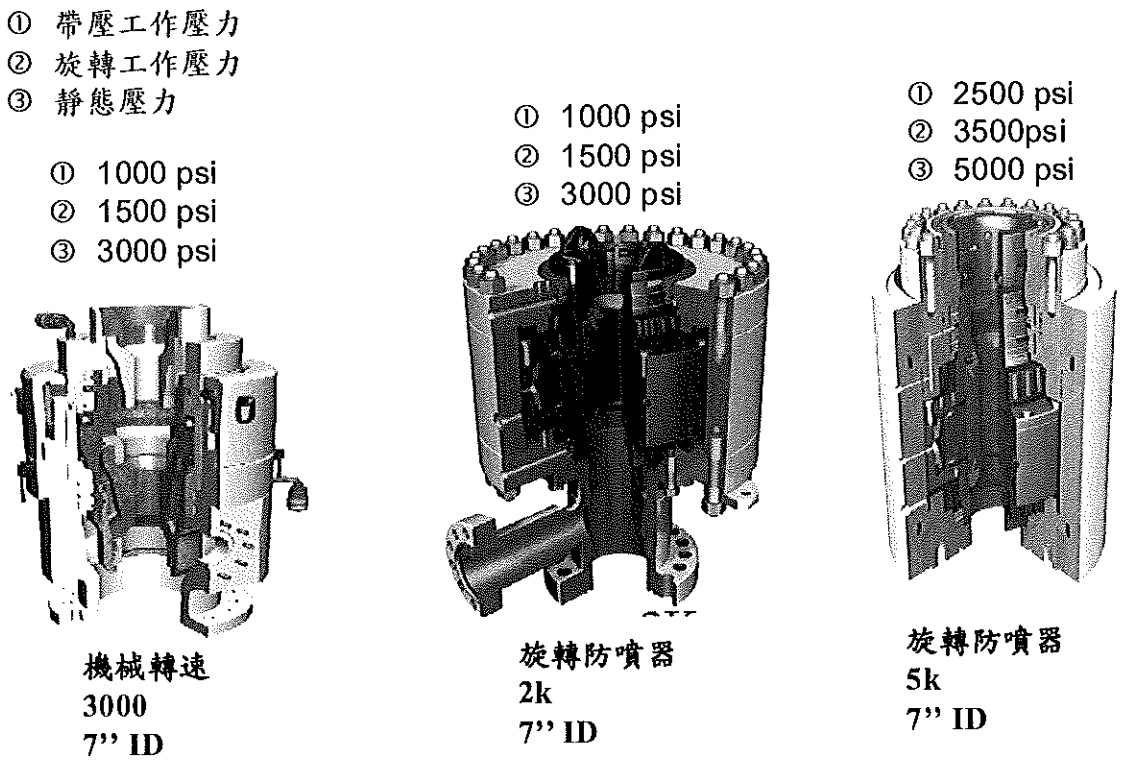


圖 15、液壓密封旋轉控制頭(Rotating Control Device；RCD)

控壓鑽井技術有四種施工方法，分別爲：

1.維持井底壓力法(Constant Bottom hole Pressure Method；CBPM)

適用於大位移井、高溫高壓井或小井眼井等。圖 16 爲 Shell 公司之 DAPC 系統可維持固定的井底壓力(BHP)。

2.泥漿帽法(Mud-cap Method)

適用於易漏泥地層。

3.降低循環泥漿密度法(Circulating Density Reduction Method)

適用於裂縫性或孔洞性等泥漿漏失較嚴重的儲層。

4.雙梯度法(Dual-gradient Method)

適用於深水或海上開發薄而淺的油氣層。

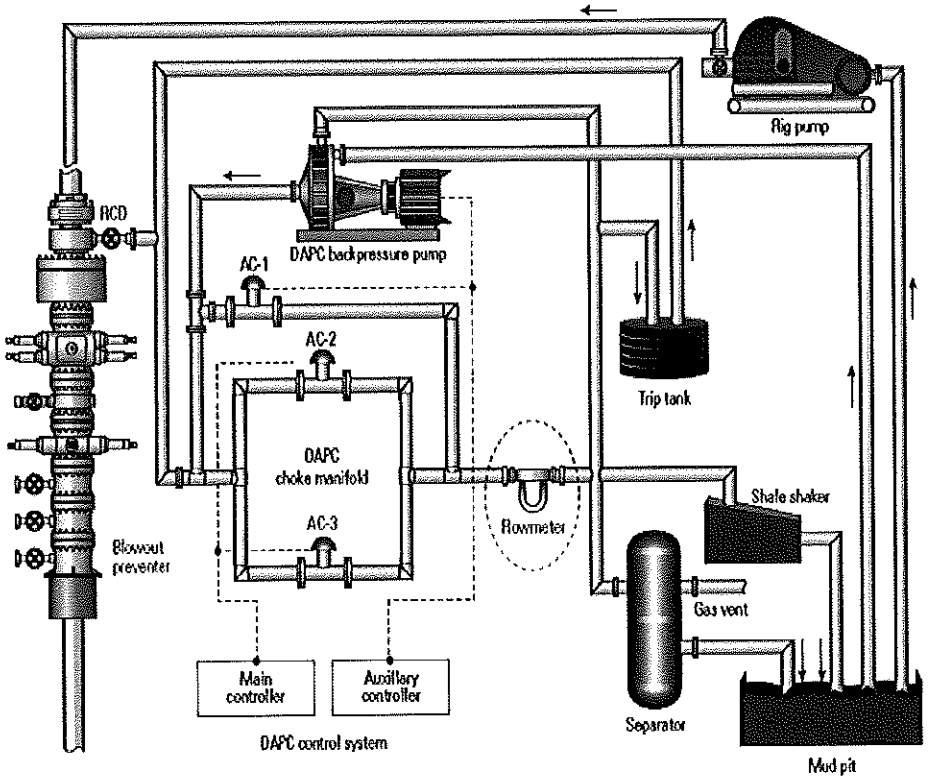


圖 16、DAPC 系統可維持固定井底壓力(BHP)

不管採用上述那一種施工方法，應用控壓鑽井技術時，鑽井循環系統的監控模擬均極爲重要，圖 17 爲“Mandarin East”井控壓鑽井之監控模擬系統。圖 18 爲鑽井循環系統的監控系統，當其測得微滲流，會發出警訊系統會自動警告鑽井人員。

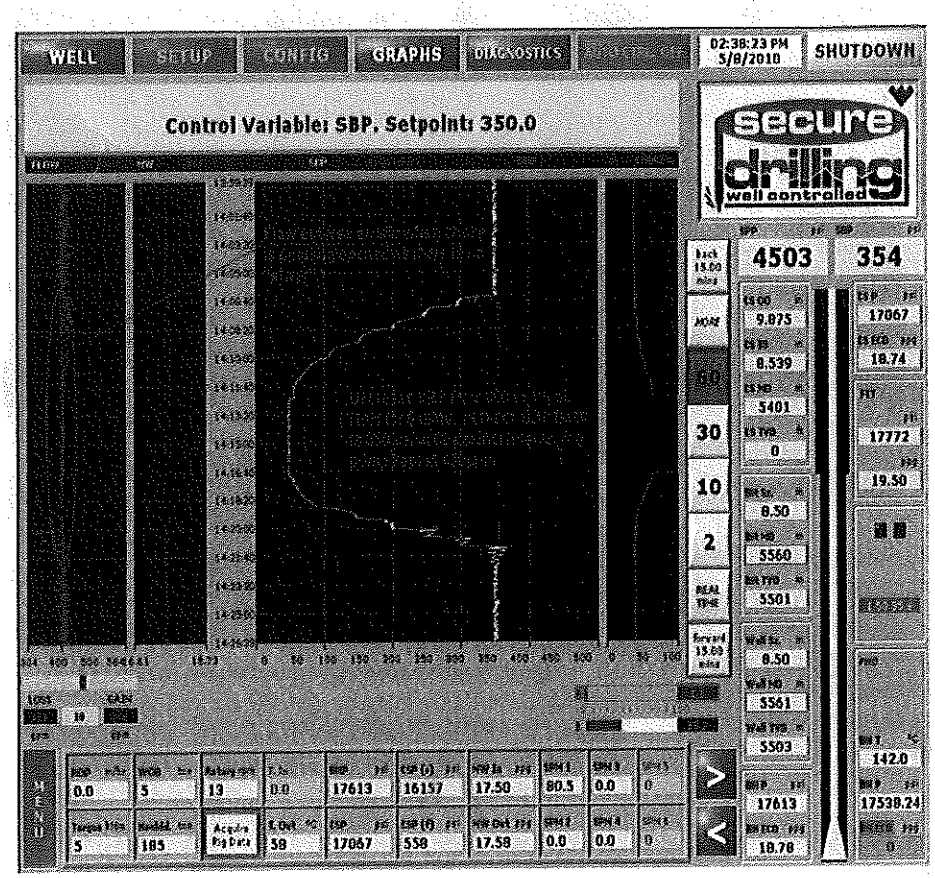


圖 17、“Mandarin East”井控壓鑽井之監控模擬系統

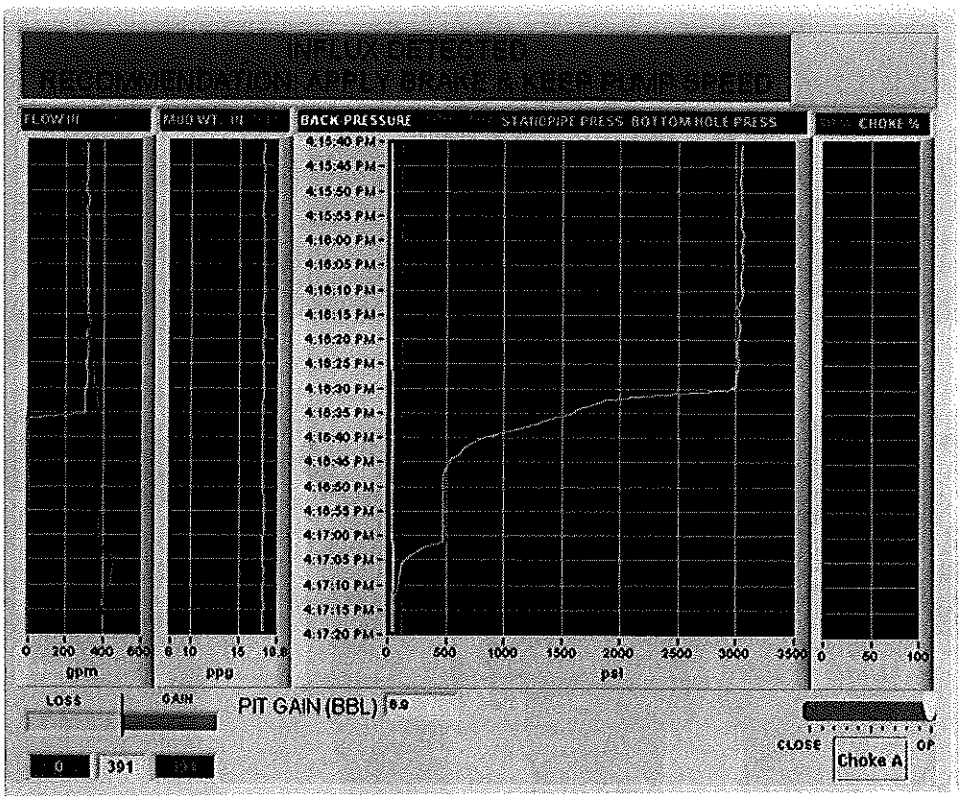


圖 18、監控模擬系統測得微滲流發出警訊

三、Landmark 軟體解釋技術及最新進展

Landmark 公司有關探採軟體的解釋及模擬技術，在國際石油工程界名列前矛，該公司發展之軟體爲整合鑽井、油層、生產及探勘之應用軟體，是被國際石油公司採用最多的軟體之一。本組將於明年引進 Landmark 公司有關鑽井工程設計模擬之軟體(R5K 鑽井工程設計軟體)，預期對 F 構造開發工作會有很大助益。此次特地參觀了 Landmark 公司展覽攤位，聽取有關軟體分析技術及最新進展之簡報及研討，茲簡述如下：

(一) Landmark 軟體概況

Landmark 的軟體與服務是哈里伯頓公司(Halliburton)的一個重要部門，同時也是石油天然氣軟體業重要供應商之一。 Landmark 的技術可以快速發現新的油氣田，延長老油田的壽命，降低較小、較深油氣田的開發

風險，加速關鍵決策並提高投資回報率。

其軟體產品涵蓋整個油氣田探勘、鑽井、完井與生產生命週期，包括：

地震處理。

地質、地球物理。

油層模式建置。

數值模擬。

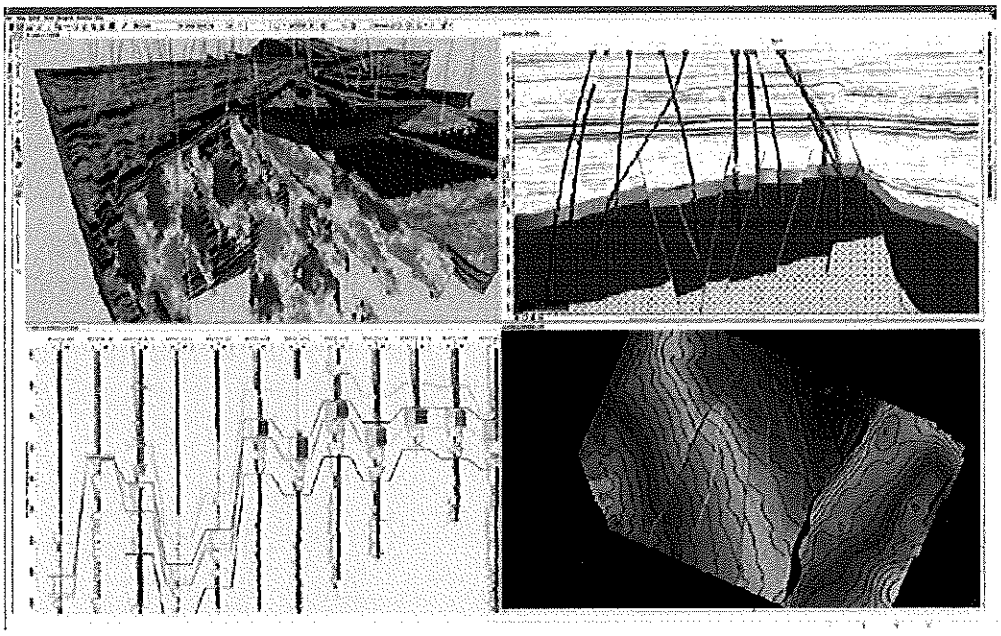
開發生產。

鑽井與完井。

液裂增產。

數據管理與 IT 基礎設施。

當前，軟體產品有 Discovery、R2003、R5K、和最新正式發布的 DecisionSpace® Desktop(圖 19)四個系列。



DecisionSpace® Desktop

圖 19、新一代工作平台 DecisionSpace® Desktop

(二) 新一代工作平台及其應用軟體 DecisionSpace® Desktop

DecisionSpace® Desktop 是 Landmark 經過 10 年堅持不懈努力，採用當今最先進的科學技術成果，全新推出整合多領域工作環境的應用軟體(圖 20)。

DecisionSpace® Desktop 爲多領域工作建立了統一的工作區，其基礎是整個公司的數據管理體系。重新設計了探勘與開發生產軟體(圖 21)。爲什麼？因爲要建立原先不可能實現的多領域整合的一體化工作流程；因爲要提供吸納所有當今科學精華的應用軟體，並確保其簡單易用；因爲要確保技術指標的精度，加速關鍵決策並最終提高投資回報率。

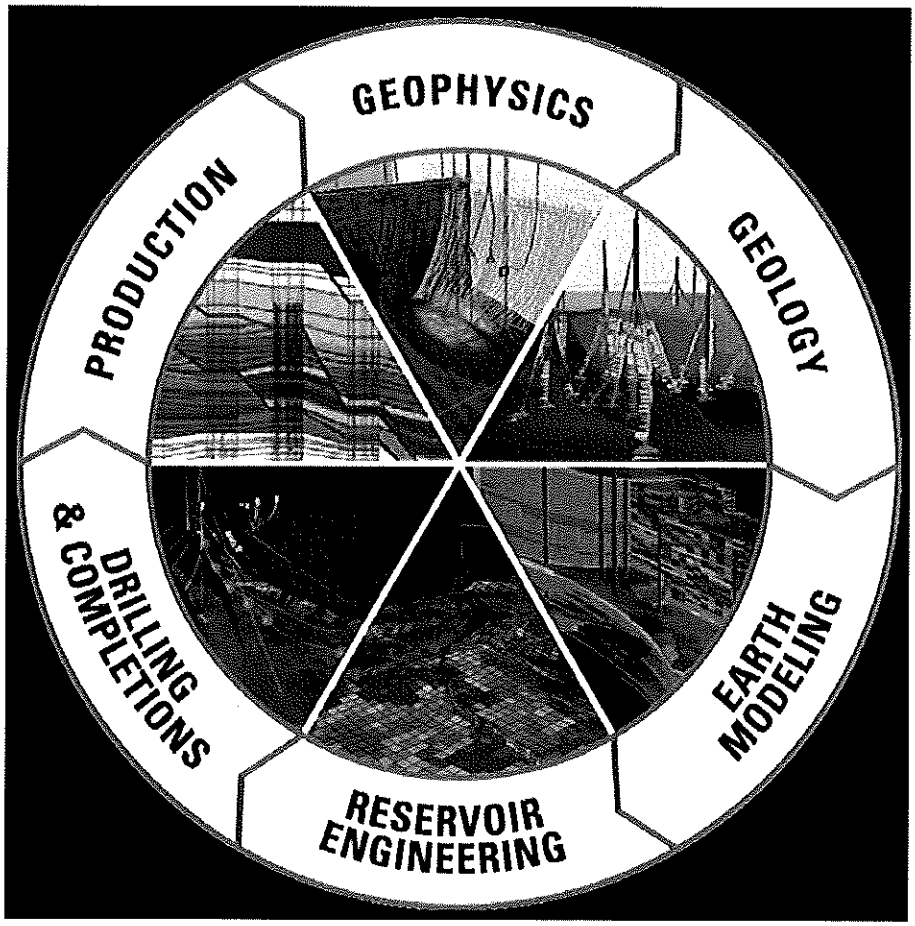


圖 20、整合多領域工作環境的應用軟體 DecisionSpace® Desktop

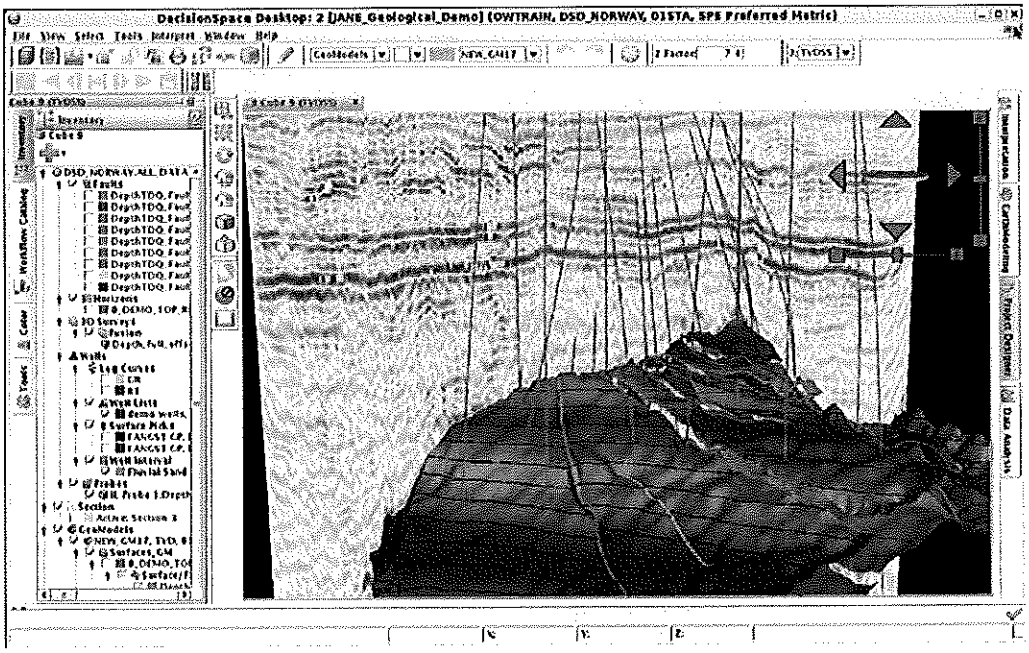


圖 21、DecisionSpace® Desktop 是探勘與鑽井開發之應用軟體

(三) 技術發展方向

Landmark 公司爲建立一種非常科學的工作流程，從盆地探勘研究開始，進而深入油層展開精細描述。

1. 整合性。
2. 科學性。
3. 實時性。
4. 高效性。
5. 開放性。
6. 知識與經驗傳承性。
7. 盆地區域研究與油層精細描述的統一性。

配合海域 F 構造開發，本組將引進 Landmark 公司之 R5K 鑽井工程設計模組(圖 22)。R5K 鑽井工程設計模組爲目前世界各大石油公司及研究機構採用最佳鑽井設計分析軟體之一，該軟體可應用於國內外油氣田，應用

於鑽井程設計、防碰撞分析、套管強度分析、水馬力分析、卡鑽分析等，以改善鑽井工程設計及降低卡鑽及打撈等鑽井事故，爲鑽井設計分析之最佳之工具。利用 R5K 鑽井設計軟體，可協助國內外油氣田之探勘及開發計畫。應用 R5K 鑽井設計軟體以協助海域 F 構造開發之鑽井程設計、防碰撞分析、套管強度分析、水馬力分析、卡鑽分析等，促進鑽井工程設計電腦化，以增進鑽井效率及安全。

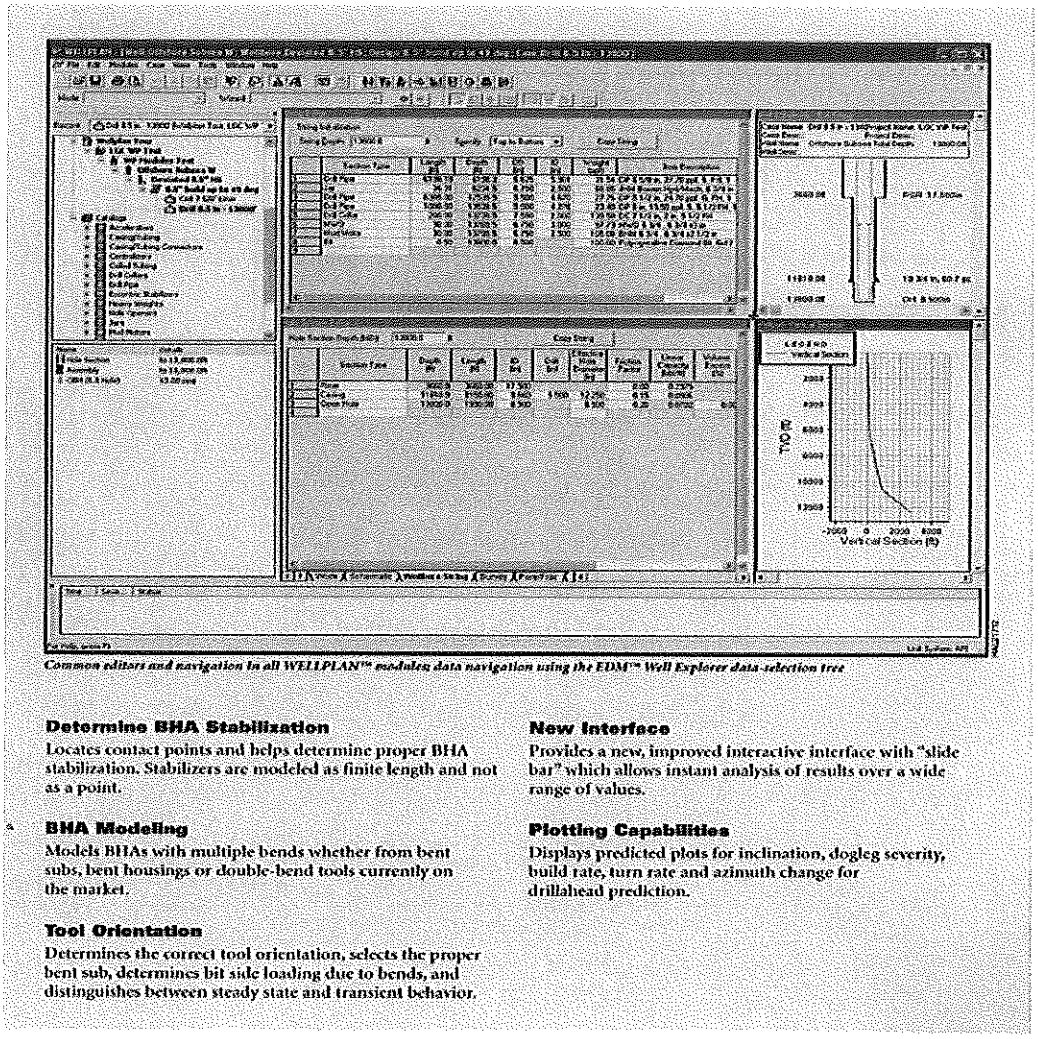


圖 22、R5K 鑽井工程設計軟體

肆、建議

2011 Offshore Europe Conference 在英國舉辦，會中有數十篇以上之論文發表，並有來自世界各地超過 1500 家以上之石油公司與石油服務公司參展。此次出國除了聽取論文發表，另外參觀了各石油公司與石油服務公司之展覽。茲歸納出下列之建議：

1. 受到深海探油高成功率及高利潤之激勵，深海油氣鑽探技術隨著特殊鑽井及開發技術之持續突破與改進，不斷締造深海世界紀錄，不斷締造深海世界紀錄，也將探勘領域向極深海邁進。

2. 由此次研討會所發表有關控壓鑽井技術的論文可知， Weatherford 公司爲目前國際石油工程界應用控壓鑽井技術最多且最先進的公司，故以後要引進此技術時，可聘請該公司技術指導或代訓鑽井工作人員。

3. 控壓鑽井所需之鑽井工作窗(Drilling Window)較超壓鑽井小，亦即較不會發生漏泥或噴井等事故。相較於傳統的超壓鑽井技術 (Overbalanced drilling)，控壓鑽井技術在鑽井時能夠分辨生產力較佳的生產層，且能降低鑽井流體對儲集層產生的汙染與危害，進而提高生產率。

4. 控壓鑽井技術適合應用於國內低壓生產層，但需引進旋轉控制器、鑽進節流歧管與多相分離器等三項特殊設備，採購費用較高。因目前每年國內鑽井數較少，若暫時不採購，可俟以後有現場單位有實際需要時，再配合現場單位應用於現場鑽井作業。

5. 在尚未引進控壓鑽井技術前，國內生產末期之低壓地層氣田，可先採用傳統鑽井法配合鑽入泥漿(Drill-in Fluid) 先以傳統方式鑽井，俟鑽入目標層二至三公尺即下套管水泥隔離。打鹿砂層部份則改用鑽入泥

漿(Drill-in Fluid)鑽進，因這種泥漿造壁性極佳，完井時泥壁去除容易不致堵塞孔隙，且不必再購買或租用負壓鑽井之設備器材，較符合目前每年鑽井數不多之經濟效益。

6. 此次特地參觀了 Landmark 公司展覽攤位，聽取有關軟體分析技術及最新進展之簡報及研討，該公司發展之軟體爲整合鑽井、油層、生產及探勘之應用軟體是被國際石油公司採用最多的軟體之一。

7. 配合海域 F 構造開發，本組將於明年引進 Landmark 公司有關鑽井工程設計模擬方面軟體。利用 R5K 鑽井設計軟體，可協助國內外油氣田之探勘及開發計畫。應用 R5K 鑽井設計軟體以協助海域 F 構造開發之鑽井程設計、防碰撞分析、套管強度分析、水馬力分析、卡鑽分析等，促進鑽井工程設計電腦化，以增進鑽井效率及安全，預期對 F 構造開發工作會有很大助益。

8. 藉由參與國際會議機會，引進新設計方法及新技術，並與有關之專家研討及交換研究心得，吸取他們之技術經驗、增加資訊及知識的雙向交流，使深度與廣度都得以提昇、拓展人脈關係及研究資源、提昇公司知名度與形象。

附錄一 2011 Offshore Europe Conference 研討會之議程

Oil and Gas Conference and Exhibition

6th-8th September 2011 | Aberdeen | UK

Aberdeen Exhibition & Conference Centre
Ellon Road, Bridge of Don,
Aberdeen, AB23 8BL

- Welcome
- Visitor Information
- Conference
  - Conference Programme
  - Executive Committee
  - Programme Committee
  - Breakfast Briefings
  - Topical Lunches
  - SPE Training Courses
- Exhibition
- Exhibitor List
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SPE Offshore Europe Conference 2011 Conference

SPE are offering 4 Training Courses prior to and during the event aimed at engineers within the oil and gas industry. Each attendee will receive 0.8 CEU's (Continuing Education Units) on completion of the course.

Monday / Tuesday 5th – 6th September, 09.00 – 18.00

Modern Well Design

Monday 5th September, 09.00 – 16.30

Introduction to Underbalanced Drilling

Monday 5th September, 09.00 – 18.00

Offshore and Onshore Oil Spill Prevention, Control and Countermeasures

Monday 5th September, 09.00 – 18.00

Geological Sequestration of CO2

For a full course description and to book your place click here.

Free Conference Programme

The SPE peer reviewed technical conference - featuring over 100 sessions - is FREE to

attend for all visitors. Panel sessions addressed by industry leaders and influencers

will include:

Conference

Below is a list of the sessions taking place during SPE Offshore Europe. The conference is free for all attendees to the event

Tuesday 06 Sep 2011

10:00 - 12:30 Plenary: Managing Complexity

Fleming Auditorium

14:30 - 17:00 Panel Session 1: Operating Models for the Future

Fleming Auditorium

Panel Session 1: Operating Models for the Future seminar

14:30 - 18:00 Technical Session 1: Environmental

Gordon A

Technical Session 1: Environmental seminar

14:30 - 18:00 Technical Session 2: Advanced Drilling Technology

Gordon B

Technical Session 2: Advanced Drilling Technology seminar

Wednesday 07 Sep 2011

09:30 - 13:00 Technical Session 3: Exploration

Gordon A

Technical Session 3: Exploration seminar

09:30 - 13:00 Technical Session 4: Reservoir Management I

Gordon B

Technical Session 4: Reservoir Management I seminar

09:30 - 13:00 Panel Session 2: Ageing and Life Extension of Installations

Fleming Auditorium

Panel Session 2: Ageing and Life Extension of Installations seminar

14:30 - 16:30 Panel Session 3: Industry Oil Spill Prevention and Response Capabilities

Fleming Auditorium

Panel Session 3: Industry Oil Spill Prevention and Response Capabilities seminar

14:30 - 18:00 Technical Session 5: Reservoir Management - Field Development

Gordon A

Technical Session 5: Reservoir Management - Field Development seminar

14:30 - 18:00 Technical Session 6: Fixed Facilities

Gordon B

Technical Session 6: Fixed Facilities seminar

14:30 - 18:00 Technical Session 7: Process Safety

Room 10 & 11

Technical Session 7: Process Safety seminar

Thursday 08 Sep 2011

09:30 - 13:00 Technical Session 8: Reservoir Management 3

Gordon A

Technical Session 8: Reservoir Management 3 seminar

09:30 - 13:00 Technical Session 9: FPSOS

Gordon B

Technical Session 9: FPSOS seminar

09:30 - 13:00 Panel Session 4: The Changing Role of NOCs - International Expansion and Engagement

Fleming Auditorium

Panel Session 4: The Changing Role of NOCs - International Expansion and Engagement seminar

09:30 - 13:00 Technical Session 10: Carbon Reduction

Forbes Room

Technical Session 10: Carbon Reduction seminar

14:30 - 18:00 Technical Session 11: Risk/Behaviour

Gordon A

Technical Session 11: Risk/Behaviour seminar

14:30 - 18:00	Technical Session 12: Advanced Well Architecture
	Gordon B

Technical Session 12: Advanced Well Architecture seminar

14:30 - 18:00	Technical Session 13: Subsea
	Forbes Room

Technical Session 13: Subsea seminar

14:30 - 18:00	Panel Session 5: Achieving Emissions Reduction - The Upstream Challenge
	Fleming Auditorium

Over 1500 Confirmed Exhibitors

The earlier you start to plan your day at SPE Offshore Europe the better and the exhibitor list on the show website now includes detailed information on the companies exhibiting - over 1500. Click here to view the latest exhibitor list where you can view case studies, product videos and audio, download product guides and brochures and view detailed accounts of the services supplied.

'Securing Safe, Smart, Sustainable Supply'

The overall theme of the 2011 Conference is 'Securing Safe, Smart, Sustainable Supply.'
Samir Brikho, Chief Executive of AMEC plc is the Conference Chairman. He will be joined by some of the biggest minds in the industry who will provide insight to the SPE Offshore Europe Conference 2011 **Conference**. SPE Offshore Europe Conference 2011 represents an excellent opportunity via its extensive programme to hear about the latest technical developments and thinking in the upstream world.
The Plenary, Panel and Technical Sessions are **FREE** to attend for all badge holders. To register for your free entrance badge, **click here.**

Programme Committee

The SPE peer-reviewed technical conferences – featuring over 100 papers – are FREE to attend for all visitors and exhibitors. The 2011 technical committee will be headed by leaders and influencers from the E&P industry, each providing a wealth of experience and knowledge.

View the 2011 Technical Committee

Executive Committee

The SPE Offshore Europe Conference 2011 conference will be headed by **Samir Brikho**, Chief Executive of AMEC plc and will be programmed by a committee of leading industry figures.

附錄二 2011 Offshore Europe Conference 研討會之內容

Conference

Below is a list of the sessions taking place during SPE Offshore Europe. The conference is free for all attendees to the event

Tuesday 06 Sep 2011

Plenary

10:00 - 12:30 Plenary: Managing Complexity

Fleming Auditorium

Plenary: Managing Complexity seminar

Panel Session

14:30 - 17:00 Panel Session 1: Operating Models for the Future (2011 - 2040)

Fleming Auditorium

Panel Session 1: Operating Models for the Future (2011 - 2040) seminar

Technical Session 1: Environmental

14:30 - 15:00 The Activities and Recommendations of the UKCS OSPRAG Technical Review Group Following the Deepwater Horizon, Macondo Incident

Gordon A

The Activities and Recommendations of the UKCS OSPRAG Technical Review Group Following the Deepwater Horizon, Macondo Incident seminar

15:00 - 15:30 Will Performance Based Safety Processes Prevent future Oil Spill Disasters?

Gordon A

Will Performance Based Safety Processes Prevent future Oil Spill Disasters? seminar

15:30 - 16:00 Minimising HSE Impacts During Design and Construction of a Major Gas Pipeline Through the Baltic Sea

Gordon A

Minimising HSE Impacts During Design and Construction of a Major Gas Pipeline Through the Baltic Sea seminar

16:30 - 17:00 Environmental Regulations in the North Sea: What the Future Will Be?

Gordon A

Environmental Regulations in the North Sea: What the Future Will Be? seminar

17:00 - 17:30 The Enhanced Safety Case Approach for Incorporating Environmental Impact

Gordon A

The Enhanced Safety Case Approach for Incorporating Environmental Impact seminar

17:30 - 18:00 Cross Industry Hydrocarbon Release Analysis

Gordon A

Cross Industry Hydrocarbon Release Analysis seminar

Technical Session 2: Advanced Drilling Technology

14:30 - 15:00 Deployment of Reelwell Drilling Method in Shale Gas field in Canada

Gordon B

Deployment of Reelwell Drilling Method in Shale Gas field in Canada seminar

15:00 - 15:30 How MPD with Advanced Flow Detection System was successfully applied on an eHPHT well in the Norwegian North Sea

Gordon B

How MPD with Advanced Flow Detection System was successfully applied on an eHPHT well in the Norwegian North Sea seminar

15:30 - 16:00 Managed Pressure Drilling Enables Drilling Beyond the Conventional Limit on an HP/HT Deepwater Well in the Mediterranean Sea

Gordon B

Managed Pressure Drilling Enables Drilling Beyond the Conventional Limit on an HP/HT Deepwater Well in the Mediterranean Sea seminar

16:30 - 17:00 High Speed Acoustic Telemetry Network Enables Real Time Along String Measurements, Greatly Reducing Drilling Risk

Gordon B

High Speed Acoustic Telemetry Network Enables Real Time Along String Measurements, Greatly Reducing Drilling Risk seminar

17:00 - 17:30 Increasing Reliability of Cutting/Pulling Casing in a Single Trip

Gordon B

Increasing Reliability of Cutting/Pulling Casing in a Single Trip seminar

17:30 - 18:00 Qualification of the Deepwater Subsea Well Intervention System for 10,000ft Operations

Gordon B

Qualification of the Deepwater Subsea Well Intervention System for 10,000ft Operations seminar

Wednesday 07 Sep 2011

Panel Session

09:30 - 10:00 Panel Session 2: Ageing and Life Extension of Installations - Part 1

Fleming Auditorium

Panel Session 2: Ageing and Life Extension of Installations - Part 1 seminar

10:00 - 10:45 Panel Session 2: Ageing and Life Extension of Installations - Part 2

Fleming Auditorium

Panel Session 2: Ageing and Life Extension of Installations - Part 2 seminar

11:00 - 11:45 Panel Session 2: Ageing and Life Extension of Installations - Part 3

Fleming Auditorium

Panel Session 2: Ageing and Life Extension of Installations - Part 3 seminar

11:45 - 13:00 Panel Session 2: Ageing and Life Extension of Installations - Part 4

Fleming Auditorium

Panel Session 2: Ageing and Life Extension of Installations - Part 4 seminar

14:30 - 16:30 Panel Session 3: Industry Oil Spill Prevention and Response Capabilities

Fleming Auditorium

Panel Session 3: Industry Oil Spill Prevention and Response Capabilities seminar

Technical Session 3: Exploration

09:30 - 10:00 12 Days Under The Ice With An AUV

Gordon A

12 Days Under The Ice With An AUV seminar

10:00 - 10:30 The Maule Field: An Economic Small Field Development

Gordon A

The Maule Field: An Economic Small Field Development seminar

10:30 - 11:00 Sourceless LWD Service Provides Unique Petrophysical Measurments for the first time in Offshore Environment: A Case Study from Libya

Gordon A

Sourceless LWD Service Provides Unique Petrophysical Measurments for the first time in Offshore Environment: A Case Study from Libya seminar

11:30 - 12:00 Applications of Accurate In-Situ Fluid Analysis in the North Sea

Gordon A

Applications of Accurate In-Situ Fluid Analysis in the North Sea seminar

12:00 - 12:30 Innovative Web Portal Reservoir Knowledge Base Integrates Engineering, Production, Geosciences and Economic Data Sets

Gordon A

Innovative Web Portal Reservoir Knowledge Base Integrates Engineering, Production, Geosciences and Economic Data Sets seminar

12:30 - 13:00 Drilling Challenges in the Atlantic Margin

Gordon A

Drilling Challenges in the Atlantic Margin seminar

Technical Session 4: Reservoir Management - Physics and Modelling

09:30 - 10:00 Investigation of Wettability Alteration by Low Salinity Water

Gordon B

Investigation of Wettability Alteration by Low Salinity Water seminar

10:00 - 10:30 Consideration Factors in Defining an Effective Scale Management Strategy During Early Stages of Field Development Planning

Gordon B

Consideration Factors in Defining an Effective Scale Management Strategy During Early Stages of Field Development Planning seminar

10:30 - 11:00 Experimental Investigation of Near Miscible Water Alternating Gas (WAG) Performance in Water Wet and Mixed Wet Systems

Gordon B

Experimental Investigation of Near Miscible Water Alternating Gas (WAG) Performance in Water

Wet and Mixed Wet Systems seminar

11:30 - 12:00 Gas Diffusivity Measurement in Reservoir Fluid at Elevated Pressures Systems for Transient Shut-in Modeling

Gordon B

Gas Diffusivity Measurement in Reservoir Fluid at Elevated Pressures Systems for Transient Shut-in Modeling seminar

12:00 - 12:30 Benefits and Limitations of Assisted History Matching

Gordon B

Benefits and Limitations of Assisted History Matching seminar

12:30 - 13:00 Reliable LWD Calliper Measurements

Gordon B

Reliable LWD Calliper Measurements seminar

Technical Session 5: Reservoir Management - Field Development

14:30 - 15:00 Forties Infill Drilling Eight Years On; Continued Success through the Application of Thorough Development Geoscience Driven by 4DSeismic

Gordon A

Forties Infill Drilling Eight Years On; Continued Success through the Application of Thorough Development Geoscience Driven by 4DSeismic seminar

15:00 - 15:30 Re-assessment of Reservoir Dynamic Behaviour to Assist the Fourth Drilling Campaign in Mature, Geologically Complex North Sea Field

Gordon A

Re-assessment of Reservoir Dynamic Behaviour to Assist the Fourth Drilling Campaign in Mature, Geologically Complex North Sea Field seminar

15:30 - 16:00 Success Story: Improving Reservoir Monitoring to Increase Production Offshore Marginal Oil Field

Gordon A

Success Story: Improving Reservoir Monitoring to Increase Production Offshore Marginal Oil Field seminar

16:30 - 17:00 Heavy Oil Offshore UK: Recommended Mariner Reservoir Development Strategy

Gordon A

Heavy Oil Offshore UK: Recommended Mariner Reservoir Development Strategy seminar

17:00 - 17:30 Marginal Field Life Extension: Goosander Field Case Study

Gordon A

Marginal Field Life Extension: Goosander Field Case Study seminar

17:30 - 18:00 Fit For Purpose and Cost Effective Integrated Operations Implementation For Mature Assets In Maersk Oil UK

Gordon A

Fit For Purpose and Cost Effective Integrated Operations Implementation For Mature Assets In Maersk Oil UK seminar

Technical Session 6: Fixed Facilities

14:30 - 15:00 KP4: Ageing, Life Extension Inspection Programme - The First Year

Gordon B

KP4: Ageing, Life Extension Inspection Programme - The First Year seminar

15:00 Ageing Infrastructure Offshore - A Risk-Based Approach to Supporting Investment/Divestment

Gordon B

Ageing Infrastructure Offshore - A Risk-Based Approach to Supporting Investment/Divestment seminar

15:30 - 16:00 Innovative Mono Column Support Structure

Gordon B

Innovative Mono Column Support Structure seminar

16:30 - 17:00 Component Inspection and Repair using 3D Modelling Photogrammetry Technology

Gordon B

Component Inspection and Repair using 3D Modelling Photogrammetry Technology seminar

17:00 - 17:30 The Frigg Cessation Project

Gordon B

The Frigg Cessation Project seminar

17:30 - 18:00 Problems with Operational Pigging In Low Flow Oil Pipelines

Gordon B

Problems with Operational Pigging In Low Flow Oil Pipelines seminar

Technical Session 7: Process Safety

14:30 - 15:00 Remote Operations - A Remote Possibility, or the Way We Do Things' Round Here?

Room 10,11

Remote Operations - A Remote Possibility, or the Way We Do Things' Round Here? seminar

15:00 - 15:30 Managing Process Safety to Enhance Business Performance

Room 10,11

Managing Process Safety to Enhance Business Performance seminar

15:30 - 16:00 Managing Process Safety of the Upstream Sector: Lessons Learnt from the DownstreamIndustry

Room 10,11

Managing Process Safety of the Upstream Sector: Lessons Learnt from the DownstreamIndustry seminar

16:30 - 17:00 The Role of Asset Integrity and Life Extension in Major Accident Prevention

Room 10,11

The Role of Asset Integrity and Life Extension in Major Accident Prevention seminar

17:00 - 17:30 BP North Sea: Introduction and Complience with BP's Aviation Group Defined Practice (Group Defined Practice 3.7 - Aviation)

Room 10,11

BP North Sea: Introduction and Complience with BP's Aviation Group Defined Practice (Group Defined Practice 3.7 - Aviation) seminar

17:30 - 18:00 Mobile Workforce Integration With Process Safety Management Framework Enables Sustained Improvement

Room 10 & 11

Mobile Workforce Integration With Process Safety Management Framework Enables Sustained Improvement seminar

Thursday 08 Sep 2011

Panel Session

10:00 - 13:00 Panel Session 4: The Changing Role of NOCs - International Expansion and Engagement

Fleming Auditorium

Panel Session 4: The Changing Role of NOCs - International Expansion and Engagement seminar

14:30 - 18:00 Panel Session 5: Achieving Emissions Reduction - The Upstream Challenge

Fleming Auditorium

Panel Session 5: Achieving Emissions Reduction - The Upstream Challenge seminar

Technical Session 8: Reservoir Management - Life of Field Optimisation

09:30 - 10:00 Fluid Composition Equilibrium; a Proxy for Reservoir Connectivity

Gordon A

Fluid Composition Equilibrium; a Proxy for Reservoir Connectivity seminar

10:00 - 10:30 Successful Closure of Zonal Sand Production

Gordon A

Successful Closure of Zonal Sand Production seminar

10:30 - 11:00 High-density OBC - a step change in reservoir imaging - a BP North sea view

Gordon A

High-density OBC - a step change in reservoir imaging - a BP North sea view seminar

11:30 - 12:00 Unlocking the Future for a Mature Asset: Surveillance and Complex Well work Combine to Extend Field Life

Gordon A

Unlocking the Future for a Mature Asset: Surveillance and Complex Well work Combine to Extend Field Life seminar

12:00 - 12:30 Practical Surveillance Analysis on Thermal Heavy Oil Projects: Integrating Seismic Data with Production (Case Studies)

Gordon A

Practical Surveillance Analysis on Thermal Heavy Oil Projects: Integrating Seismic Data with Production (Case Studies) seminar

12:30 - 13:00 Application of Particle Swarm Optimization for Parameter Estimation Integrating Production and Time Lapse Seismic Data

Gordon A

Application of Particle Swarm Optimization for Parameter Estimation Integrating Production and Time Lapse Seismic Data seminar

Technical Session 9: FPSOS

09:30 - 10:00 The Practical Application of Process Safety Principles to Determine and monitor Asset Integrity of Oil and Gas Facilities

Gordon B

The Practical Application of Process Safety Principles to Determine and monitor Asset Integrity of Oil and Gas Facilities seminar

10:00 - 10:30 Qualifying an External Turret and Mooring System for the Offshore Industry

Gordon B

Qualifying an External Turret and Mooring System for the Offshore Industry seminar

10:30 - 11:00 The Use of Unmanned Production Buoys to Develop Marginal or Submarginal Stranded Fields or End Of Life Hydrocarbon Resources

Gordon B

The Use of Unmanned Production Buoys to Develop Marginal or Submarginal Stranded Fields or End Of Life Hydrocarbon Resources seminar

11:30 Ageing and Life Extension of Offshore Oil and Gas Installations

Gordon B

Ageing and Life Extension of Offshore Oil and Gas Installations seminar

12:00 - 12:30 Offshore Replacement of A Damaged FPSO Fair lead

Gordon B

Offshore Replacement of A Damaged FPSO Fair lead seminar

12:30 Integrity of High Pressure Relief Systems

Gordon B

Integrity of High Pressure Relief Systems seminar

Technical Session 10: Carbon Reduction

09:30 - 10:00 CO2 Leakage Prevention Technologies

Forbes Room

CO2 Leakage Prevention Technologies seminar

10:00 - 10:30 Simulation of Two Phase Flow in Carbon Dioxide Injection Wells

Forbes Room

Simulation of Two Phase Flow in Carbon Dioxide Injection Wells seminar

10:30 - 11:00 CO2 Monitoring: Taking the Pulse of CO2 Storage Reservoirs

Forbes Room

CO2 Monitoring: Taking the Pulse of CO2 Storage Reservoirs seminar

11:30 - 12:00 Workflows and Considerations for CO2 Injection in a Highly Depleted Gas Field in the Southern North Sea

Forbes Room

Workflows and Considerations for CO2 Injection in a Highly Depleted Gas Field in the Southern North Sea seminar

12:00 - 12:30 Moving CO2 EOR Offshore

Forbes Room

Moving CO2 EOR Offshore seminar

12:30 - 13:00 Strategies for Minimising Carbon Emissions from Facilities whilst Improving Opex

Forbes Room

Strategies for Minimising Carbon Emissions from Facilities whilst Improving Opex seminar

Technical Session 11: Risk/Behaviour

14:30 - 15:00 The Cumulative Risk Assessment Barrier Model

Gordon A

The Cumulative Risk Assessment Barrier Model seminar

15:00 - 15:30 The State of Business Continuity Preparedness in the Supply Chain? An Operator's View

Gordon A

The State of Business Continuity Preparedness in the Supply Chain? An Operator's View seminar

15:30 - 16:00 An Operating Management System to Deliver Safe Operations

Gordon A

An Operating Management System to Deliver Safe Operations seminar

16:30 - 17:00 Learning the Lessons - Retrospective HAZOPs

Gordon A

Learning the Lessons - Retrospective HAZOPs seminar

17:00 - 17:30 Learning From Another Industry; Lessons From The International Media

Gordon A

Learning From Another Industry; Lessons From The International Media seminar

17:30 - 18:00 The Link Between Safety and Shift Handover

Gordon A

The Link Between Safety and Shift Handover seminar

Technical Session 12: Advanced Well Architecture

14:30 - 15:00 Statoil North Sea - Successful World Record MLT Installation

Gordon B

Statoil North Sea - Successful World Record MLT Installation seminar

15:00 - 15:30 Single and Multi-phase Flow Loop Testing Results for Industry Standard Inflow Control Devices

Gordon B

Single and Multi-phase Flow Loop Testing Results for Industry Standard Inflow Control Devices seminar

15:30 - 16:00 First True Tight Gas (<0.1mD) Horizontal Multiple Fracture Well in the North Sea

Gordon B

First True Tight Gas (<0.1mD) Horizontal Multiple Fracture Well in the North Sea seminar

16:30 - 17:00 The Autonomous RCP Valve - New Technology for Inflow Control In Horizontal Wells

Gordon B

The Autonomous RCP Valve - New Technology for Inflow Control In Horizontal Wells seminar

17:00 - 17:30 Ormen Lange: Delivering Production Optimisation and an Improved Reservoir Understanding Using a New Cableless Sandf ace Monitoring System

Gordon B

Ormen Lange: Delivering Production Optimisation and an Improved Reservoir Understanding Using a New Cableless Sandf ace Monitoring System seminar

17:30 - 18:00 Obtaining Real Time Flow Rate, Water Cut and Reservoir Diagnostics from ESP Gauge Data

Gordon B

Obtaining Real Time Flow Rate, Water Cut and Reservoir Diagnostics from ESP Gauge Data seminar

Technical Session 13: Subsea

14:30 - 15:00 Applying Fault Tolerant, Hot Swappable Control Architecture in Subsea Environments

Forbes Room

Applying Fault Tolerant, Hot Swappable Control Architecture in Subsea Environments seminar

15:00 - 15:30 How Advances in Diverless Pipeline Repair Technology Made it Possible for an Operator to Save CAPEX on the Construction of the Deepwater Field Export Pipeline to Transport the Newly Discovered Oil to Shore

Forbes Room

How Advances in Diverless Pipeline Repair Technology Made it Possible for an Operator to Save CAPEX on the Construction of the Deepwater Field Export Pipeline to Transport the Newly Discovered Oil to Shore seminar

15:30 - 16:00 Seaeye Sabertooth, A Hybird AUV/ROV Offshore System

Forbes Room

Seaeye Sabertooth, A Hybird AUV/ROV Offshore System seminar

16:30 - 17:00 Industrialization of Electrically Trace Heated Pipe-in-Pipe (ETH-PiP)

Forbes Room

Industrialization of Electrically Trace Heated Pipe-in-Pipe (ETH-PiP) seminar

17:30 - 18:00 Ensuring the Integrity of Subsea Hot Tap Welded Joints in Lieu of Hydro Testing

Forbes Room

Ensuring the Integrity of Subsea Hot Tap Welded Joints in Lieu of Hydro Testing seminar

17:30 - 18:00 Oil Field Developments- Long Tie-back Concepts

Forbes Room

Oil Field Developments- Long Tie-back Concepts seminar