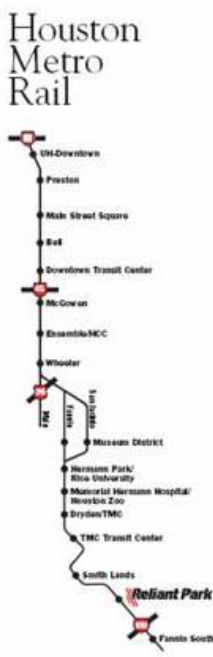


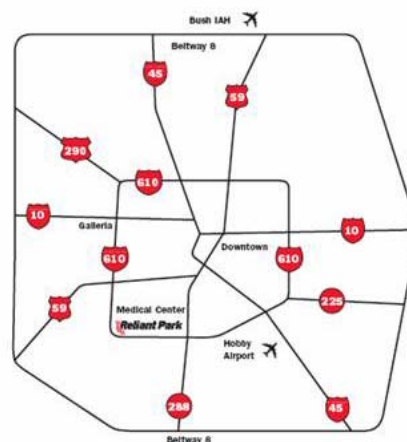
## 一、前言



本屆海域石油探採技術會議為OTC(Offshore Technology Conference)第40週年年會，於98年5/4~5/7在美國德州休士頓 610 Loop內環西南的



Reliant Park 舉行，交通便利，並有頻繁的電車往返其間。休士頓是美國德克薩斯州的第一大城，全美國第四大城，墨西哥灣沿岸最大



的經濟中心。休士頓以其能源(特別是石油)、航空工業和運河聞名世界。休士頓是德克薩斯醫療中心的所在地，係世界最大和最重要的研究和治療機構的集中地。年會議程包括：廠商設備與服務之展示、論文發表會、技術研討會。討論之議題：增進產、官、學間能源資訊之交流、在沙烏地阿拉伯開發更大型之油田、北極地區環境風險與管理、鑽井技術、三維技術之視覺化、加拿大於大西洋開採油氣之初步成果、海底整體管理、油價影響重大投資計畫、完井技術、結構整體管理、設備技術等。

此行目的著眼於獲取全球油氣發展最新技術及連絡管道，適時引進適用設備，於推動高雄外海 F 構造油氣田開發投資案、台灣海域鑽探開發、兩岸合作海域開發、國外合作經營礦區之海域礦區探勘生產時，提供合約規範、設計、工程等評估建議，加強專案管控品質，提昇公司探採水準。

## 二、石油成因與開發

自1859年，美國賓州利用1千5百多年前中國人開發成功的鹽井鑽鑿技術(此技術於1830年後傳至歐洲)，建立了第一口抽汲式油井至今，大規模地工業開採石油卻只有100多年，其間開採出來的石油已有數千億噸，人類的吃穿用行樣樣均離不開石油。由於石油的價值越來越被重視，石油需求量與日俱增，以經濟

規模尋找新的油田已成為當務之急。地球即將面臨石油的枯竭，石油的探勘及開發日益加速，油藏愈來愈少，新油氣田的發現必須付出更高的投資和技術，探勘活動亦逐漸往叢林沙漠等惡劣環境之內陸區域及海域發展。

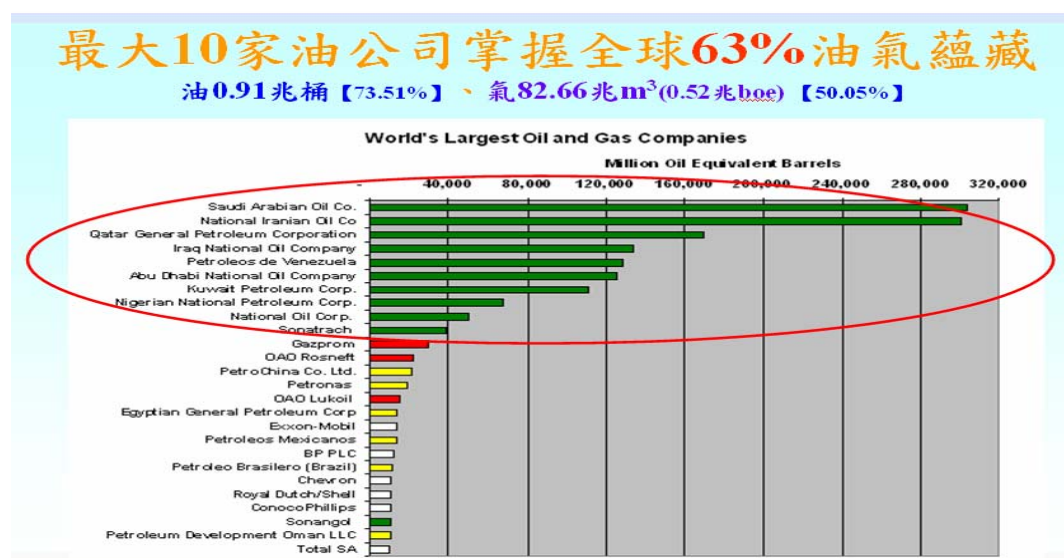
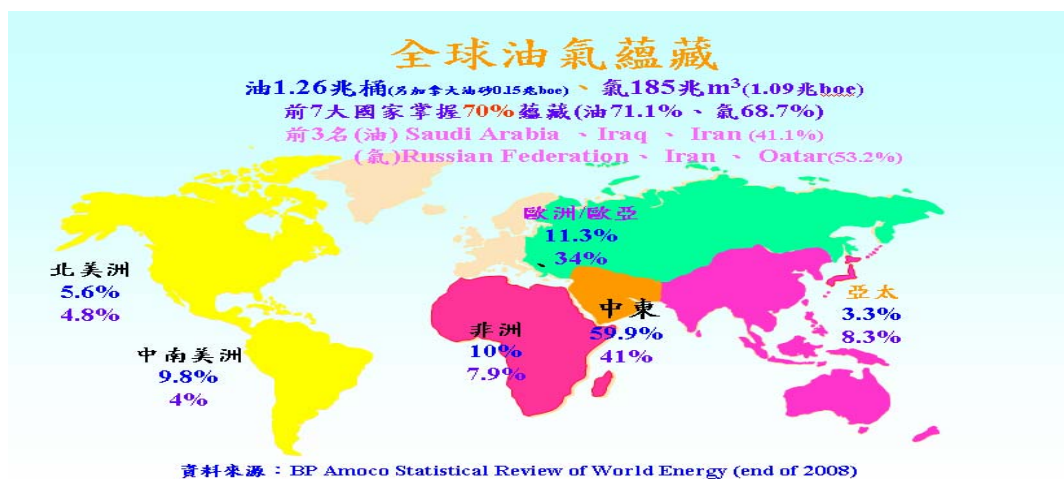
1960 年成立石油輸出國組織(Organization of Petroleum Exporting Countries，簡稱 OPEC)。1974 年前共同成立國際能源署(International Energy Agency，簡稱 IEA)，使國際能源事務能達成共識與共同政策。而地下的儲油構造並不一定代表有經濟價值的油藏。得視該探勘區的石油系統的體質(生油岩層分布、潛能和成熟度、油氣移棲途徑、蓋層的封閉能力和油藏品質，以及油氣生成和油藏封閉形成的時間等)。

全球油氣蘊藏集中於相關儲集層，而有限的資源掌握在少數的大公司手上(如後頁)；新興工業國的崛起，耗用資源漸劇，油氣蘊藏量替代率需藉由探採技術的提昇，並將非傳統性油氣資源(如油砂、油頁岩、煤層氣、水合物等)達到經濟開發規模，除非新的主要能源及時出現，在不久的將來再度面臨能源危機是不可避免的，因此藉由國際探採合作及油氣田併購等相關財務槓桿與風險管理係為全球趨勢。

海域探勘無法像一般陸地石油探勘透過野外地質調查，做地質研究及尋找適於儲存油氣的封閉地質，先以地球物理方法探測，供石油地質研究，指出可能的儲油氣構造所在，勘定鑽探的目標。震波測勘技術、資料處理及解釋應用，近年來進步極大。地球化學測勘主要為評估礦區生油岩的油氣生成潛能評估係油氣經濟價值的先決條件。

海域鑽井需克服海洋環境問題，遠較陸上者艱巨、成本高且具挑戰性。石油供應關係國計民生甚巨，因此海域石油探勘開發需就時間因素、投資風險、環境保護等全盤考慮，而技術的最適化取舍更為其核心要項，以達到工時、成本、品質之專案工程管控要求。





台灣中油公司自民國 57 年開始在台灣海峽進行有系統的地球物理測勘作業與區域石油地質研究，顯示有數個可能儲聚石油的沈積盆地。62 年開始鑽探，多年來的積極探勘，至今已鑽獲數個儲油氣構造，散布於台灣北方海域及台灣海峽各處如新竹、澎湖、鹿港及高雄等地外海，含油氣層多在新生代新第三紀地層，以產天然氣為主帶少量凝結油，部分地區亦曾發現原油。新竹外海長康構造已於 75 年開發，進行油氣生產，為我國第一個開發成功的海域油氣田。目前台灣海域的石油探勘工作仍積極進行中，期望早日有更大的收穫。

### 三、年會

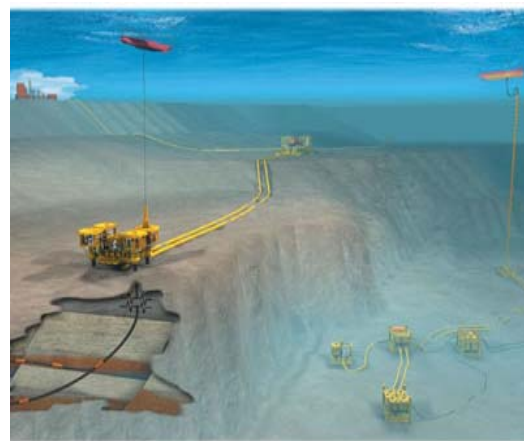
展覽分別在 Reliant Center、Reliant Stadium 及室外，以看板、模型、機具及現場展示，並搭配有獎猜謎、立體電影、贈品搶答，帶動熱絡人氣與源源



商機，近 50 種類別(如下表)之超過 2400 個攤位，各種海域儀器設備之實體、動畫及電腦輔助設備配置超大螢幕與聲光效果，臨櫃服務之專人親切的服務與詳盡的解說，使遠道由世界各地來的產業界人士意興高昂，全程毫無冷場。

1	Accommodation and Facilities	25	Lighting
2	Airlifts, Helidecks and Refuelling systems	26	Linings, Seals and Gaskets
3	Bulk and Materials Handling Systems	27	<b>LNG Terminals</b>
4	Cables, Umbilicals and Accessories	28	Logistics
5	<b>Chemicals, Fluids and Lubricants</b>	29	Mooring, Chains, Ropes and Anchors
6	Communications	30	Noise, Shock and Vibration Control
7	Controls, Consoles and Panels	31	<b>Offshore Contractors</b>
8	Corrosion, Cathodic Protection, Coatings and Insulation	32	Pipeline Inspection and Maintenance
9	<b>Design, Engineering and Construction</b>	33	Pipelines and Piping Components
10	Dredging, Piling and Trenching	34	Power Generation and Propulsion Machinery
11	<b>Drilling and Well Completion</b>	35	Processing, Separation, Filtration and Water Treatment
12	Emergency Control and Shutdown Systems	36	<b>Professional Services, Training and Recruitment</b>
13	Environmental and Oil Spill Response Equipment	37	<b>Project Management</b> , Consultancy, R&D
14	Events and Publications	38	Pumps and Compressors
15	Fire Protection Systems and Materials	39	<b>Reservoir and Production Monitoring</b>
16	<b>Flare Systems</b> and Equipment	40	<b>Rig</b> Fabrication, Repair and Decommissioning
17	<b>FPSO</b> Vessels and Equipment	41	<b>ROVs</b> , Diving and Cameras
18	<b>Hardware, Software and Information Management</b>	42	<b>Safety</b> , Survival and Protection for Hazardous Areas
19	HVAC Systems	43	Steel, Special Metals, Composites and Welding Alloys
20	<b>Hydraulics</b> and Electromechanical Equipment	44	<b>Subsea Production and Well Equipment</b>
21	<b>Hydrographic, Meteorological, Seismic</b> , DP and Survey	45	Surplus and Used Equipment
22	Inspection, Maintenance and Repair	46	Tools and Workshop Equipment
23	Instrumentation	47	Valves and Actuators
24	Lifting Equipment, Cranes and Winches	48	<b>Well Servicing Equipment</b>

各家展示攤位各有擅場，尤以 FMC 公司以水下生產(Subsea Completion)為主題所製作的#1941 攤位最為搶眼及吸聚人潮，雙層四面八個角落別出心裁地展示重要設備並設立 270 度弧度每半小時作 1 次動畫介紹(如後頁)。每組設備均有經驗豐富的工程人員作詳盡的說明並當場示範機件的活動耦合；動畫則可以不同角度切入、旋轉、放大，油氣在設備組件與跨過海溝一路躍動奔騰的畫面，久久停留於腦中，對於概念設計、技術工法的模組設計有著具體的瞭解，GE-Vetcogray 亦有同屬性的產品，對於將來海域開發的選項更有助益。

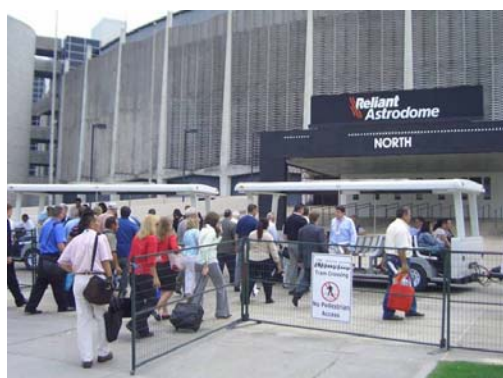
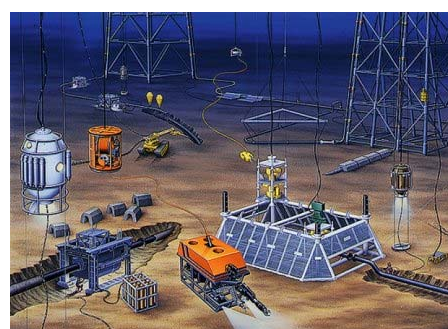
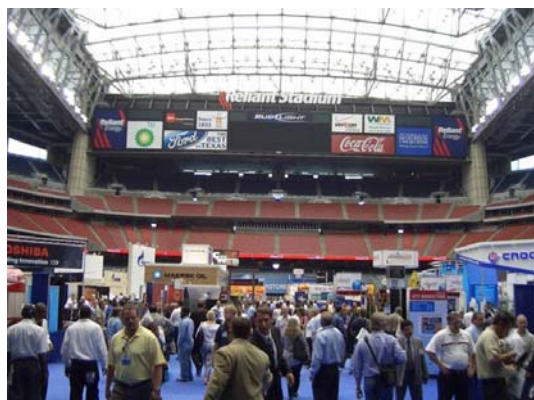


年會排程(如後頁)緊湊有緻，事前的規劃與現場大批的服務人員及簡明的標示與指引，讓來賓可輕易獲得所需的資訊與協助。不同主題的研討更引領全球海域未來的走勢。

除展覽外，並就各大廳圓桌，以專屬中央廚房供餐方式，餐間研討業界正視熱門議題。園區到停車場及週邊旅館提供完善的接送服務，第三天夜間還安排了球賽觀賞。現場也提供了寄放行李、旅程安排、住宿及旅遊介紹。來訪的不僅是業界，也開放與各大學免費參加，就學術界研究業相關的學會及圖書服務亦見其承辦老練經驗，各種油氣相關雜誌及折頁都無限量免費供應，各個攤位莫不卯足了勁，提供精美禮品及優雅服務加強訪客印象，提昇到訪率。

<p><b>Monday, 4 May</b>            0700–1700 Registration            0800–1730 Pavilion and Stadium Exhibition            0900–1730 Reliant Center and Outdoor Exhibition            0930–1200 <a href="#">Technical Sessions</a>            1215–1345 <a href="#">Topical Luncheons</a>            1400–1630 General Session            1400–1630 <a href="#">Technical Sessions</a>            1600–1700 <a href="#">Spotlight on New Technology</a> Presentation</p>	<p><b>Tuesday, 5 May</b>            0730–1700 Registration            0730–0900 <a href="#">Morning Report</a>            0730–0900 <a href="#">Ethics Breakfast</a>            0730–0900 <a href="#">Industry Breakfast</a>            0800–1730 Pavilion and Stadium Exhibition            0900–1730 Reliant Center and Outdoor Exhibition            0930–1200 <a href="#">Technical Sessions</a>            1215–1345 <a href="#">Awards Luncheon</a>            1400–1630 General Session            1400–1630 Technical Sessions</p>
<p><b>Wednesday, 6 May</b>            0730–1700 Registration            0730–0900 <a href="#">Industry Breakfast</a>            0800–1730 Pavilion and Stadium Exhibition            0900–1400 <a href="#">The Next Wave Young Professionals Program</a>            0900–1730 Reliant Center and Outdoor Exhibition            0930–1200 <a href="#">Technical Sessions</a>            1215–1345 <a href="#">Topical Luncheons</a>            1400–1630 General Session            1400–1630 <a href="#">Technical Sessions</a>            1600–1900 <a href="#">The Next Wave Reception</a>            1900–2100 OTC Night at the Ballpark</p>	<p><b>Thursday, 7 May</b>            0730–1400 Registration            0730–0900 <a href="#">Industry Breakfast</a>            0800–1400 Pavilion and Stadium Exhibition            0900–1400 Reliant Center and Outdoor Exhibition            0930–1200 <a href="#">Technical Sessions</a>            1200–1400 <a href="#">MMS SAFE Awards Luncheon</a>            1215–1345 <a href="#">Topical Luncheons</a>            1400–1630 General Session            1400–1630 <a href="#">Technical Sessions</a>            1530–1800 OTC Closing Reception</p>

年會現場的規劃、服務、餐飲、行政支援、園區交通、動線及時間管理均有完善規劃，亦僱用殘障人士與中高齡人士，場場的導覽、提款、西式簡餐均十分便利，專業書籍與雜誌讓年會更有學術味。早餐及午餐時段均充份運用研討，其他時段的研討會及簡報，分場分項熱烈討論探討過去的經驗及未來的發展，瞭解最新趨勢及發展。不同形式的研討方式，讓不同需求的來賓都能各取所需。會期因德州的聖安東尼及達拉斯亦有 3 例新流感(H1N1)疫情病例，惟當地並未宣布為疫區，仍如期舉行，會場亦提供充足的清潔服務。



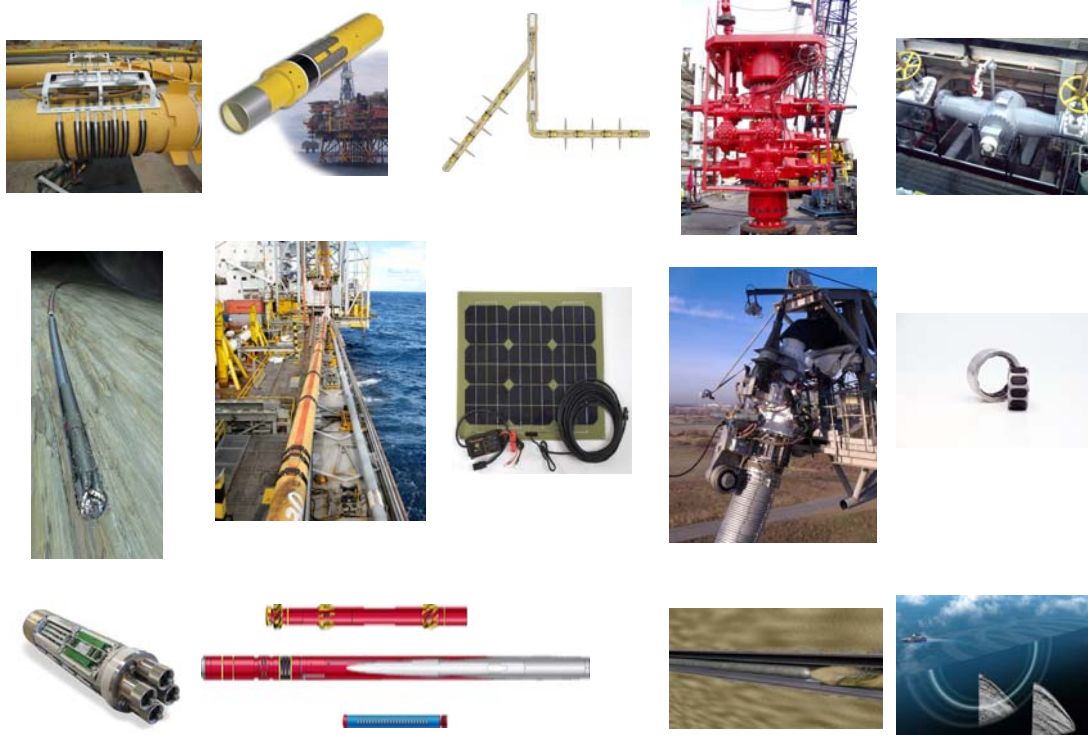
會場出入口頗多，均設有註冊報到處，報到時的所發予的磁卡係 BJ 公司提供，至各攤位資洽詢資訊、參觀特殊設備及簡報、進入研討會場均會留下紀錄，而通行證之吊帶係由 GE 公司提供，走道則為各學會及當地旅遊業攤

位，將產業、商業及學術業充份結合，也創造無限商機。

年會的另一任務為鼓勵創新，重頭戲在於頒發今年度 14 項研發獎，除永遠登錄在網站外更可提昇其品牌與商業價值。今年獲獎公司的產品、技術為：



(1) 2H Offshore- [INTEGRistick™ Dynamic Curvature Sensor](#)、(2) Baker Hughes Incorporated- [TORXS™ Expandable Liner Hanger System](#)、(3) Baker Hughes Incorporated - [Frac-Hook™ Multilateral System](#)、(4) Cameron-[Nautronix -NASMUX](#)、(5) ProPure AS-[ProSalt](#)、(6) Reelwell AS - [Reelwell Drilling Method \(RDM\)](#)、(7) Schlumberger-Subsea [subC-strip and subC-collar](#)、(8) Specialized Products - [Pulse Technology-Battery Maintenance, Conditioning and Charging](#)、(9) Technip France- [Amplitude-LNG Loading System \(ALLS\)](#)、(10) US Synthetic Bearings - [Diamond Radial Bearings](#)、(11) VetcoGray, a GE Oil & Gas Company - [SemStar5](#)、(12) Weatherford International, LTD - [OneTrip StarBurst™ Multilateral System](#)、(13) Welltec®- [Well Cleaner® PST](#)、(14) WesternGeco, a business unit of Schlumberger - [Coil Shooting](#)。(依序如下圖，由左而右-由上而下)



中國大陸油氣廠商參展為 CNPC、COSL、CNOOC、COOEC、CSSC、BGP、SINOPEC、SINOCEM 等油氣探勘、震測、平台、海管、造船、製造、石化、服務大小廠近 30 家，而其近年在國際舞台的表現(SINOPEC-17<sup>th</sup>、CNPC-52<sup>nd</sup>、



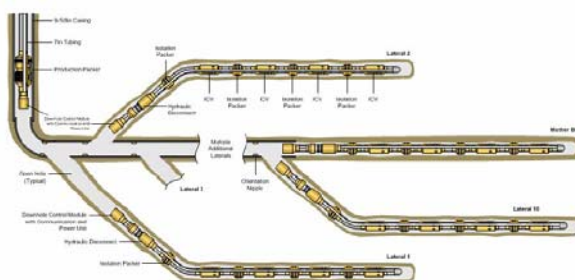
SINOCHEM-257<sup>th</sup>、CNOOC-406<sup>th</sup> 均進入 FORTUNE 2008 全球 500 大行列)顯見其雄心。

探勘技術近年來發展迅速，深海地區的探探技術突飛猛進，尤其在墨西哥灣、西非洲及巴西已相繼開發了深海油氣田，未來趨勢朝此方向前進。論文涵括地球物理、地質、鑽井及完井技術、油層、油氣田開發、油氣田生產管理等領域，並包括在全球各地實際應用之案例，在各研討室展開 291 個子題的報告與討論。(如附件)

沈積盆地的石油系統，在地質學家和地球化學家的研究下，已有較清楚的輪廓。在新實驗技術和高速電腦的協助下，可模擬石油的生成和含油沈積盆地的形成和演化，準確地算出生油岩層在地質年代所掩埋的深度和溫度及有機物的成熟度，並推測該生油岩的產油氣量與石油成分等。

海域石油的探勘與開發是人類開發海洋資源的一大突破，最早海域石油探勘可追溯至 1923 年美國加州外海淺水區發現可開發的油田。然而完整的現代海域鑽探技術則遲至 1949~1961 年間才發展成功，但由於當時油價低廉，陸上探勘成本低，因此延緩了海域石油的開發。直到 1970 年代兩次世界性能源危機造成油價暴漲，方有大規模的海域石油探勘與開發。現今全球各國莫不積極投入海域石油的探勘與開發以尋找新的油源。

探勘技術藉電腦處理、多維影像、電子脈衝及高溫高壓材料的發展，將地質探勘資料判讀品質、鑽井工程井徑、叢式鑽井/水平鑽井、困擾地區鑽探-裂縫/異常地壓梯度產生的漏泥及井噴的工程可行性及經濟可行性、深海完井的可靠性、海洋工程的可控性等導入一新的紀元。相關作業均可進入數值分析、正規化，圖表化，並以動態資料庫及時修正走向。



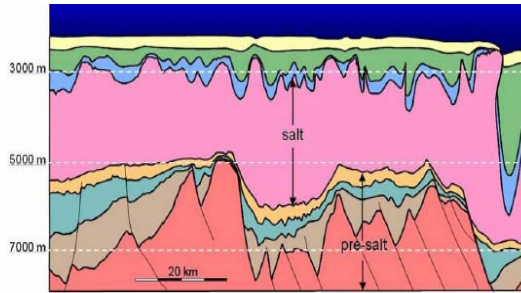


Figure 1 – Massive salt sections in the Santos Basin.

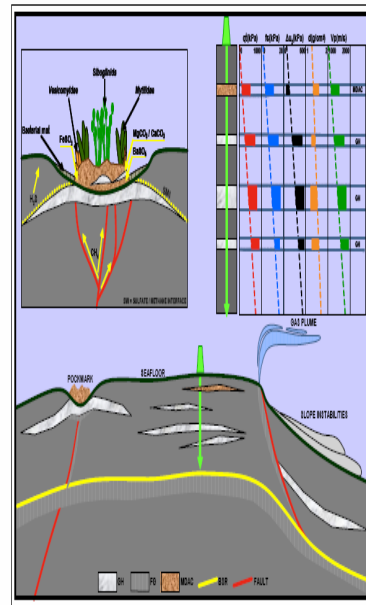
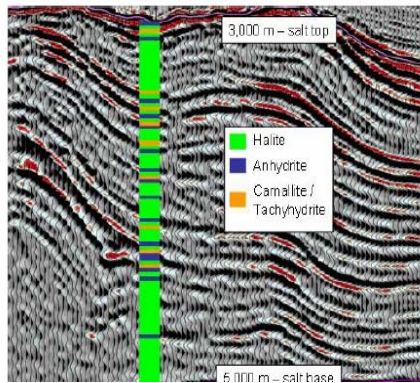


Fig. 3: Gas hydrate conceptual geological model for seafloor and subsurface (details of pockmark and geotechnical responses)

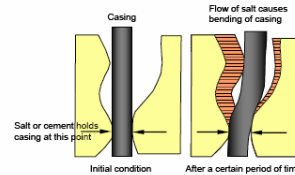


Figure 2 - Bending of Casing (Cheatham Jr. & McEever, 1964)

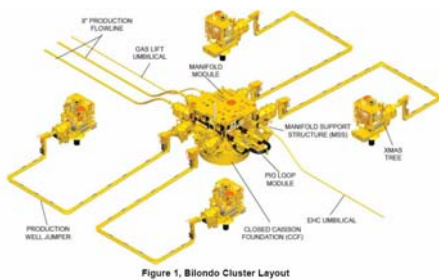
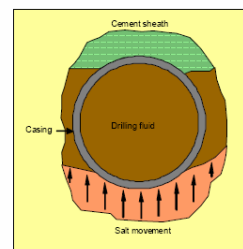


Figure 1, Bilondo Cluster Layout

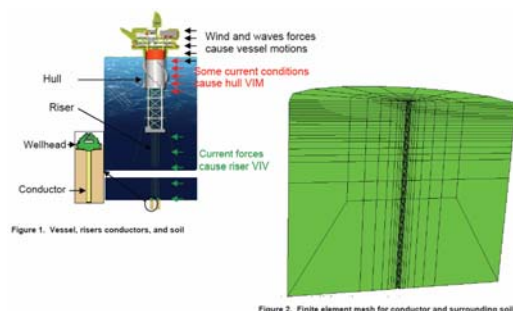


Figure 1. Vessel, risers conductors, and soil

Figure 2. Finite element mesh for conductor and surrounding soil

AVO Stack Creations - Near and Far Corridor Stacks

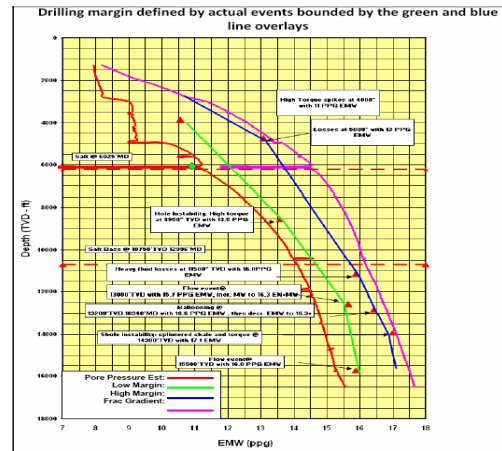
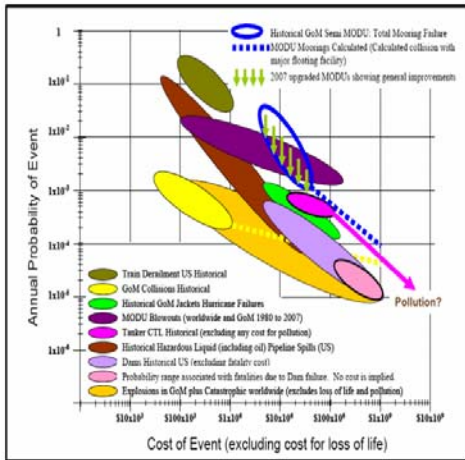
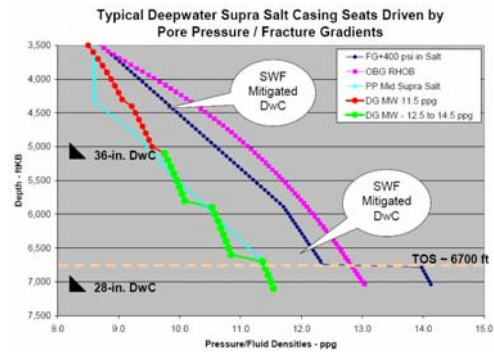
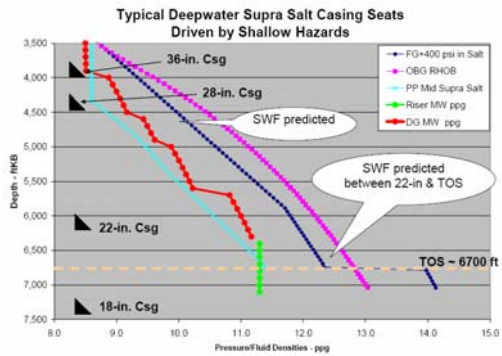
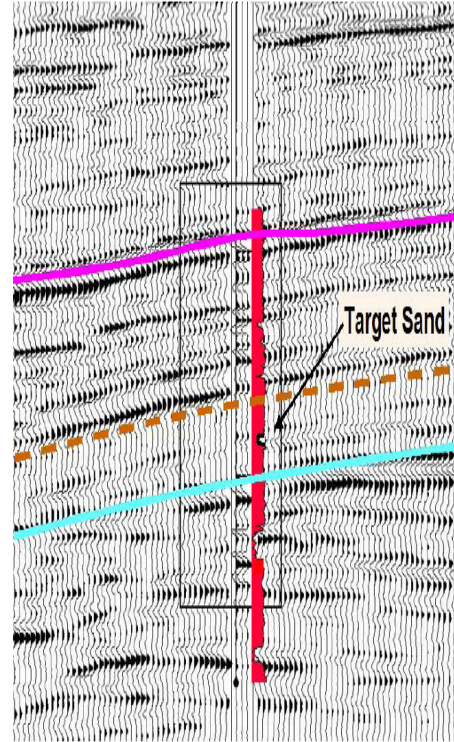
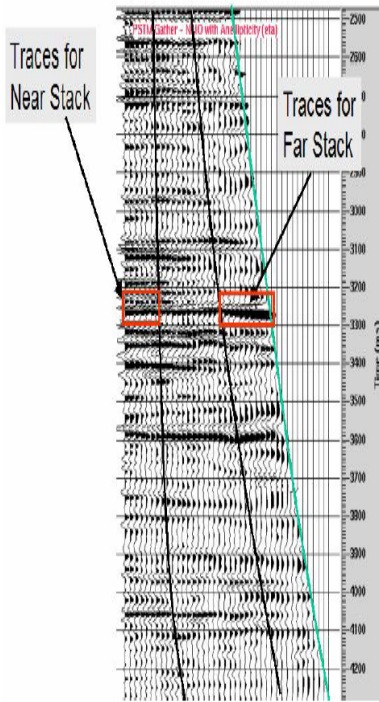




Fig. 1 - Resource Triangle

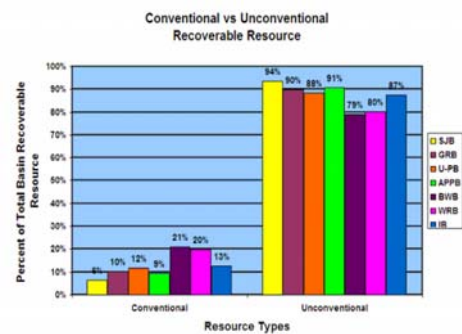
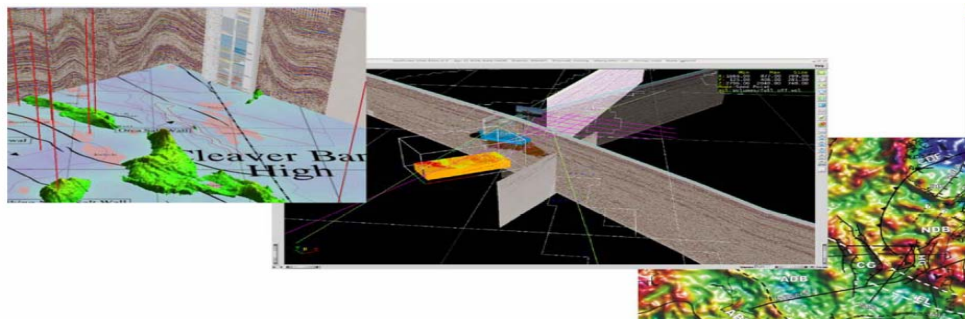


Fig. 2 - Percent of conventional and unconventional total recoverable resource volumes in seven reference basins



## 四、心得

海域油氣開發工程在油價支撐及人類對其依賴的供需機制下蓬勃發展，舉凡鑽機、鑽井、定向、泥漿工程與材料、泥漿測錄、隨鑽測井、叢式鑽井、深海鑽井、下水泥及添加劑、電測、井口裝置、套管、試油氣、水下服務、補給船、工作船、制噴堵漏、完井、平台與油氣處理設備、海管製造與鋪設、接收站規劃設計、激勵增產等都需油公司掌握正確資訊、精確的經濟分析、良好的市場需求調查才能獲取油氣藏最大利基。

年會論文除了技術、設備、環境、極帶與案例，也著眼於儲運、溝通、管理、風險與氣象的探討。也對傳統的鑽井、完井、結構、油層、海管、海洋工程及非傳統油氣資源設立專章。對於地質、石油開採、海洋工程、結構設計、天然氣儲運等領域有著不錯的導引。對於學術理論與實務的結合、經濟與環境的平衡點抉擇、損益兩平後的財務利得，均可引進現有商業化之技術。

未來與台灣海域開發可由相關的參展公司 3M、ABB、ABS、Aker Solutions、Allseas、Baker Hughes、BJ、Cameron、CNOOC、CNPC、COOEC、Cooper、Cudd、DNV、DQ、Fugro、GE Vetcogray、Halliburton、Maersk、McDomott、M-I、National、Oceanering、Petronas、Schlumberger、SINOPEC、Technip、Tideway、Varco、Weatherford 等公司網佔取得初步資料，篩選後進一步評估，供基本設計與開立採購規範(Specifications)及需求(Requisitions)參考。

Petrobras 係世界排名 50 強的油公司(FORTUNE 2008 排名第 63)，在油氣產業上對於超過 200ppm 的 H<sub>2</sub>S 以脫除器(scavenger)、輸出氣含 3~5%的 CO<sub>2</sub> 以胺類(amine)、分子(molecular)技術、三乙化二醇(TEG-Tri-Ethylene-Glycol)藉露點(dew point)控制器脫除水份，避免酸蝕；優質企業文化及善盡社會責任的中油公司(FORTUNE 2008 排名第 327)之海域開發規劃亦具此類國際標準。

本公司自新竹長康田油氣田開發案後，已歷十餘年。而高雄外海 F 構造油氣田開發案除引用相關正向經驗外，須更務實地掌握市場行情與油氣價波動趨勢，進行適當開發時機之最佳化開發設計並強化其界面管理。本次與會所吸納的資訊對於規範開立適切性及相關技術理念接軌有著重要的意徵。

## 五、建議

1. 各大油公司的開發經驗及各個專業協會(OTC、SPE、AAPG、API、ASTM、ASME 等)都提供知識庫，案例學習之管理機制對於台灣海峽油氣探採開發工程在專案管理、界面融合、成本管控為重要參考依據。
2. 有關開發油氣田專案管理機制，Schlumberger 的 IPM(Integral Project Management)、COSL 的一體化，可提供油公司較可靠管理整合界面的服務。
3. 三維影像與其解釋已成為石油探採工業標準作業規範，這是一個在軟硬體都有長足進步的技術，可增強尋找油氣藏的機遇，逐步應用在石油系統。此種技術可將現場資料有效且動態聯結，提昇解讀性，中油公司亦在 2008 年建立軟硬體設備，提供決策支援系統參酌。
4. 透過衛星與光纖網路的即時監控系統已漸次運用在油氣開採現場可減少現場人力並提昇決策支援系統，海域油氣市場以 Schlumberger 公司的 Schlumberger Information Solutions (SIS)與 BHI 公司的 Livewire Real Time 為服務大宗。
5. 大陸各大油公司的發展經驗為我公司突破及成長的最佳教材與對比，可分別就其實績、企業文化、雄心及整合併購實例作進程對比與學習。
6. 探採事業部新進人員因缺乏臨場經驗，對於攸關龐大經費及不斷突破進步的海域工程未能深窺其境，將運用所獲資料在運作海域開發作業中，予以推廣。
7. 本次年會讓參加人員獲取最新之豐富資訊，將就專業工程與管理技術發生乘數效應，對於海域油氣探勘、開發、生產工程及平台構建、海管鋪設與風險管理均可提出視覺化教材，以增強本公司海域智識學能。
8. 大會的成功在於嚴謹的規劃前置作業與現場事務的貼心不著痕跡的安排，更重要的是環節的掌控與注意細節的敏銳度，臨場的應變計畫與危機處理則是使整個過程完美所不可或缺的領導特質。
9. 掌握資訊就是掌握先機，將資訊轉化成知識再內化為智能更推廣為常識，使基層操作人員均可按此標準作業程序與規範工作，以確保工安與節省成本。

## 附件-年會研討論文題目

**5/4(61 seminars)**

- 306 Improving **communication** among consumers, academia, NGOs, oil Co & Gov
- 604 Developing the largest oil fields in Saudi Arabia
- 602 A world-class project in a frontier arctic environment
- 312 **Drilling** Technology
- 610 Petrotechnical **Visualization I**
- 606 New petroleum initiatives and results in Atlantic Canada
- 600 Subsea integrity management
- 306 Coping with price volatility How will it affect major capital project
- 604 Presalt challenges:Exploration and Development
- 602 Well **Completion** Technology
- 610 Petrotechnical **Visualization II**
- 606 Structural integrity management
- 600 Facilities Technology

**5/5(77 seminars)**

- 306 Management of Technology
- 604 Delivering the largest oil increment in the world
- 602 MODU Anchor
- 312 Advances in flexible riser technology
- 610 **SPAR Technology**
- 606 Future **seismic imaging Reverse** time migration and full waveform inversion
- 600 Geohazard risk assessment
- 306 Navigating long-term business in the face of short-term uncertainty
- 604 MOHO-Bilondo project
- 602 MODU Hurricane risk and experience
- 312 Deepwater riser technology
- 610 Offshore pipelines
- 606 Marine geosciences and geohazards
- 600 Ocean mining developments

**5/6(73 seminars)**

- 306 Climate change
- 604 Field development optimization
- 602 Advances in flow assurance: Technologies and field applications
- 312 Offshore pipelines
- 610 Arctic exploration, production, and transportation
- 606 Advances in Jackup technology
- 600 Offshore-related modeling/testing
- 306 Arctic energy challenges and development
- 604 Advances in mooring systems and materials
- 602 Advances in flow assurance: Technologies and field optimization
- 312 Riser and pipeline seafloor interaction
- 610 Subsea compression, separation, and pumping
- 606 Prospect exploration using modern **geophysical technology**
- 600 Research partnership to secure energy for America(RPSEA)

**5/7(80 seminars)**

- 306 Ocean thermal energy plants and plantships
- 604 TAHITI project
- 602 Deepwater technology
- 312 Unconventional oil and gas resources
- 610 Subsea: Inspection, maintenance, repair
- 606 CNG and LNG transportation technology in 2009
- 600 Methods in geophysics and petrophysics
- 306 Managing megaprojects in the current environment
- 604 Agbami project
- 602 Floating offshore LNG
- 312 Modeling/testing for the offshore
- 600 Cryogenic pipeline technology
- 610 Dynamic design issues for deepwater development
- 606 Offshore exploration and production

**Technical Program: Monday, 4 May (61 篇)****PANEL: MEETING THE ENERGY CHALLENGE: IMPROVING COMMUNICATION AMONG CONSUMERS, ACADEMIA, NGOs, OIL COMPANIES, AND GOVERNMENT(306)**

20304 Meeting the Energy Challenge

**DEVELOPING THE LARGEST OIL FIELDS IN SAUDI ARABIA(604)**[19800](#) **Medium-Radius Horizontal Sidetrack Reduces Time**, Cost, and Risk in Deep HT Gas Wells19801 Application and **Recycling** of Sodium and Potassium Formate Brine Drilling Fluids for Ghawar Field HT/HP Gas Wells20112 **Extended-Reach Drilling** and Causeway Utilization in the Development of a Shallow-Water Oil Field in an Environmentally Sensitive Area F[20136](#) **Advanced Completion Technologies** Maximize Recovery[20129](#) **Optimizing Horizontal-Well** Performance in Nonuniform-Pressure Environments Using Passive Inflow-Control Devices20128 Technology and Team-Based Approach Yields Saudi Arabia's Longest Fully **Cemented Horizontal Liner**

20218 Delivering the Largest Oil Increment in the World: Innovation, Solutions, and Rewards

**SAKHALIN-1: A WORLD-CLASS PROJECT IN A FRONTIER ARCTIC ENVIRONMENT (602)**

20207 Managing a PSA Environment in Russia: A Success Story

20208 Technology Development for Frontier Arctic Projects

20209 Chayvo Field Subsurface Development and Learnings

20308 Key Chayvo Drilling Results and Planning the Interfield Move of the World's Largest Land Rig on Sakhalin Island

[20210](#) Regulatory and Environmental Management[20211](#) World-Class Safety Performance[20212](#) **Project Execution Risks and Management****DRILLING TECHNOLOGY(312)**[20056](#) Establishing a Competency Development System To Improve Return on Investment in Training[19991](#) Improving **Rotary-Steerable Borehole** Quality Using Innovative Imaging Techniques[19915](#) Bit Selection Using **Mathematically** Modeled Indices Deliver Significant Improvement in **Directional Drilling Performance**[20220](#) Eliminating **Nonproductive Time** Associated With **Drilling Through Trouble** Zones[20067](#) **Intelligent Wired Drillpipe System** Provides Significant Improvements in Drilling Performance on Offshore Australia Development20059 **Deepwater BOP Control** Monitoring: Improving BOP Preventive Maintenance With Control Function Monitoring**PETROTECHNICAL VISUALIZATION I (610)**20008 **3D Petroleum Visualization: Workflows** and **Collaborative** Solutions To Identify New Exploration Plays, Enhanced **Reservoir** Characterization, and **Improved** Drilling and Wellbore Placement**NEW PETROLEUM INITIATIVES AND RESULTS IN ATLANTIC CANADA(606)**

20240 What's New in Offshore Nova Scotia

20264 Technological Advances To Assess, Manage, and Reduce Ice Risk in Northern Developments

[20241](#) **Minimal Fixed Platforms for Marginal Fields in Offshore** Nova Scotia

20265 The Value of Wellness



- 20263 Conversion of a Fishing Vessel to a **3D-Seismic** Vessel
- 20266 The Sydney Basin of Eastern Canada, an Overlooked Carboniferous Basin With Demonstrated Petroleum Potential: Thoughts, Facts, and Musings
- 20298 East Coast Canada **R&D** and Offshore Development in Northern Frontiers

#### **SUBSEA INTEGRITY MANAGEMENT(600)**

- 19890 Asset Performance Management for Increased **Reliability and Profitability**
- 20049 Flow-**Assurance** Benchmarking: Bridging the Gap Between Initial Design and Ongoing Operations
- 20168 H2S Scavengers Injection: A Novel Evaluation Protocol To Enhance the Integrity of Production Lines
- 20216 Asset Management: From Condition Monitoring to Condition Management
- 19872 Predictive Condition Monitoring for Subsea Pumping Systems

#### **GENERAL SESSION PANEL:**

#### **COPING WITH PRICE VOLATILITY: HOW WILL IT AFFECT MAJOR CAPITAL PROJECTS?(306)**

#### **PRESALT CHALLENGES: EXPLORATION AND DEVELOPMENT(604)**

- 20124 From Turbidites to Carbonates: Breaking Paradigms in Deep Waters
- 20177** Well Construction **Learning-Curve** Acceleration
- 19886 **Extended Well-Test** and Production Pilot in the Tupi Area: The Planning Phase
- 19880** Challenges and New Technologies for the Development of the Presalt **Cluster**, Santos Basin, Brazil
- 19992 Presalt: The Brazilian Opportunity To Take Local Industry to the Next Level
- 20100 Presalt Cluster **Long-Term Supply Strategy**
- 19953 Presalt **Reservoirs Development**: The Way Ahead

#### **WELL COMPLETION TECHNOLOGY(602)**

- 20157 Design Methodology for Swellable **Elastomer Packers** in Fracturing Operations
- 20113 **Sand Control in Long Horizontal**-Section Wells
- 20156 Case Study in Sarawak: The Disappearing Plug Provides Cost-Efficient Horizontal Completions
- 19811 New **Inflow-Control** Device **Reduces Fluid Viscosity Sensitivity** and Maintains Erosion Resistance
- 19783 Novel Single-Trip Upper Completion System **Saves Rig Time** in Deepwater Offshore Brazil
- 19870 Subsurface Safety Valve **Control System** for **Ultradeepwater** Applications

#### **STRUCTURAL INTEGRITY MANAGEMENT(606)**

- 20184 **Developing a Process**
- 20172** Experience on FPSO Structural Integrity Management
- 20137 Floating Systems Integrity Management: **Gulf of Mexico** Deepwater Production Facilities
- 20231 Fleet Management Strategy for Improved Performance .
- 19841 Practical Application of Probabilistic Fracture Mechanics for Structural Integrity Management
- 20004 Noninvasive **Magnetic Inspection** of Flexible Riser Structural Integrity
- 20051 Offshore Integrity Management 20 Years On: An Overview of Lessons Learned Post

#### **FACILITIES TECHNOLOGY(600)**

- 19885 An Overhead Receiver for **Capture, Reformation, Transportation**, and **Gasification** of Natural Gas Hydrates Produced From Deepwater Sediments
- 19767** Use of Dynamic Simulation To Refine Well Testing Procedures and **Optimize** the Data Required for Deconvolution Techniques. A Virtual Downhole Gauge Case Study

- 20246 Hybrid Screw Compressor
- 20029 A Cyclone-Based Low-Shear Valve Concept for Improved Oil/Water Separation and Reduced Environmental Impact
- 20132 Assessment of Platform Cognac Using Instrumentation Data
- 20006 Future Vision: The Next Revolution in **Production Operations**

**Technical Program: Tuesday, 5 May(77 篇)**  
**PANEL: MANAGEMENT OF TECHNOLOGY(306)**

- 20307 Management of Technology

**EMERGING TECHNOLOGY FOR THE OIL AND GAS INDUSTRY: DELIVERING THE LARGEST OIL INCREMENT IN THE WORLD(604)**

- 20133 Application of **Artificial-Lift** Technology in the Giant Khurais Field A.A.
- 20131** **Simulation Optimization of Wells** With Complex Architecture
- 20125 I-Field Implementation Enables **Real-Time Reservoir Management** of Newly Developed Saudi Fields
- 20123 **Reservoir Management** Practices in the Offshore Oil Fields of Saudi Arabia
- 20111 **Leveraging Technology** and Best Practices To Develop the Giant Khurais Field
- 20013 Operation of the **Multiphase-Flow Meters** on the Sour Environment of the QTIF Field: Case Study

**MODU ANCHOR(602)**

- 20115 Analytical and Experimental Modeling of Out-of-Plane Loading of Plate Anchors
- 20062 Changes in Anchoring Rules and Regulations for MODUs
- 20081 Soil Impact on Nonstationary Anchor Performance
- 20117 Efficient Gravity Installed Anchor for Deepwater Mooring
- 20073 An Approach for Using Integrated **Geoscience** Data To Avoid Deepwater Anchoring Problems
- 20065 Regional Analysis of Seafloor and Near-Surface Sediments for MODU Anchors
- 20085 Improved Predictions of MODU Fluke Anchors Increases the Confidence in Mooring System Design

**ADVANCES IN FLEXIBLE RISER TECHNOLOGY(312)**

- 20099 Flexible Riser Outer Sheath Full-Scale Wearing Simulation and Evaluation
- 20027 Meeting the Future Challenges of Flexible Pipe Technology: Advances in Industry Standards
- 19950 Beneficial Influence of a Very Low Supply of H<sub>2</sub>S on the Hydrogen Embitterment Resistance of Carbon Steel Wires in Flexible Pipe Annulus
- 19901 **Fiberoptic** Gas Monitoring of Flexible Risers
- 20174 MA D6: Going Beyond the Limits of Deepwater Fast-Track Projects
- 20101 Flexible Flowline Thermal Exchange Coefficient Test Performed at High External Pressures
- 19904 Flow-Induced Pulsation of Flexible Risers

**SPAR TECHNOLOGY(610)**

- 20234 Internationalization of the **Spar Platform**
- 20230 Measurement: Hindcast and Prediction of Holstein Spar Motions in Extreme Seas
- 20238 Contemporary Challenges and Solutions for Post-Katrina Gulf of Mexico Spar Design
- 20232 Marine Operations During **Transport and Discharge** of Spar Hulls
- 20237 Developments in Deepwater Spar Installation
- 20235 Introducing the Closed **Centerwell Spar**
- 19797 A Comparison of the Spar and **Single-Column** Floater in an Arctic Environment

**THE FUTURE OF SEISMIC IMAGING: REVERSE TIME MIGRATION AND FULL WAVEFORM INVERSION(606)**

- 19875 Multistep Reverse **Time Migration**
- 19877 Subsalt Imaging Using TTI Reverse Time Migration
- 19879 Reverse Time Migration Imaging and Model Estimation
- 19897 3D Prestack Full Waveform Inversion
- 20215 Wave Equation-Based Model Building and Imaging in Complex Settings

**GEOHAZARD RISK ASSESSMENT(600)**

- 20274 Deciding Risk Acceptance for Hazard
- 20206 Pipeline Integrity in Geohazard-Prone Seabed Terrain: What Is the Real Risk?
- 20014 **Risk Matrix** for Nonrecurrent Geohazards: A Tool for Risk Management
- 20090 Vulnerability of Subsea Structures to Geohazards: Risk Implications
- 20022 Geohazard Assessment in a Deepwater Subsea Development: A Contractor's Perspective
- 20245 Managing Geohazards on Offshore Oil and Gas Projects

**GENERAL SESSION PANEL:****NAVIGATING LONG-TERM BUSINESS IN THE FACE OF SHORT-TERM UNCERTAINTY(306)**

- 20306 Navigating Long-Term Business in the Face of Short-Term Uncertainty

**MOHO-BILONDO PROJECT(604)**

- 20277 Moho Bilondo:1<sup>st</sup> **Offshore Deepwater Development** in the Republic of Congo
- 20279 Flow-Assurance Challenges for Offshore Deepwater Republic of Congo
- 20280 Moho Bilondo: **Subsea Production System**
- 20282 Moho Bilondo Compact Development: **Layout and Planning Management**
- 20277 Management of **Commissioning** and Startup Activities in the Moho Bilondo Integrated Project

**MODU HURRICANE RISK AND EXPERIENCE (602)**

- 20141 MODU Mooring Strength and Reliability JIP Overview
- 20144 Analysis of Hurricanes Katrina and Rita
- 20143 MODU Mooring Comparative Risk Assessment
- 20147 MODU Mooring Reliability Analysis for Hurricane Condition in the Gulf of Mexico
- 20164 Evaluation of Low-Frequency Damping and Analysis Methods for MODU Moorings
- 20165 Moored MODU Risk Assessment
- 20299 MODU Risk Assessment: Regulatory Perspective

**DEEPWATER RISER TECHNOLOGY(312)**

- 20180 Improvements in Dynamic Loading of Ultradeepwater Catenary Risers
- 19974 The Development of Deepwater Riser Recovery Technology in the Liuhua Oil Field
- 19899 Qualification of the Grouped **SLOR** Riser System
- 19929 The Greater Plutonio Riser Tower
- 20066 Recommended Practice on Riser **Interference**
- 20122 **SCR** Technology: 16-in Oil Export SCR CVA Verification

**OFFSHORE PIPELINES I(610)**

- 19888 Global Buckle Control With Dual Sleepers in HP/HT Pipelines
- 19862 Evaluation and Mitigation of Axial Walking With a Focus on Deepwater Flowlines
- 19900 **Polymer Liner** and Connector Qualification for Use in Subsea Pipelines
- 20043 Optimizing Reeled-Pipe Design Through Improved Knowledge of Reeling Mechanics
- 19944 Pipe/Soil Interaction Models in Deepwater Very-Soft Clays
- 19934 **Integrated Design** and Qualification of Flowline and Riser Technology on AKPO Project

**MARINE GEOSCIENCE AND GEOHAZARDS(606)**

- 19826 Risk Mitigation of Chemical Munitions in a Deepwater Geohazard Assessment
- 19906 Local Scour for Offshore Pile Foundations
- 20150 A Pioneering Approach for Determining Field Layout in the Absence of Survey Data and Making It Work, Jubilee Development, Offshore Ghana
- 20293 Effect of Slide Deformation and Geometry on Waves Generated by **Submarine Landslides**: A Numerical Investigation
- 20060 New Design Method for Estimating Spudcan Bearing Capacity-Depth Profile in Sand Overlying Clay
- 19957 Marine Unexploded Ordinance Identification and Avoidance for a Shallow-Water Pipeline Route
- 19998 Cyclic Stiffness Degradation in Nonlinear Jackup Dynamics

**OCEAN MINING DEVELOPMENTS(600)**

- 19849 The Science of Seafloor Massive Sulfides in the Modern Ocean: A New Global Resource for Base and Precious Metals
- 20047 Deep-Sea Mining: A New **Horizon for Dredging** Technology
- 19912 Extending Deepwater Technology to Seafloor Mining
- 19806 Developing the World's First Deepwater Metaliferous Hard-Rock Mine
- 19823 Seafloor Massive **Sulfide** Mining Concept
- 19935 Development of Environmental Research According to Future Deep-Sea Mining: Are Concerns Justified? What Should Be Done?
- 19825 The World's First Large Floating Concentrator Concept for Underwater Mining

**Technical Program: Wednesday, 6 May(73 篇)****PANEL: CLIMATE CHANGE(306)**

- 19795 Climate Change

**FIELD DEVELOPMENT OPTIMIZATION(604)**

- 19731 Full-Field Development With Openhole Concept at SUDP
- 19940 The Intentions and Achievements of the Angola Deepwater Consortium
- 20261 Streamlining Offshore System Development and Life-Cycle Management
- 19762 Case Study: How Modern Decline Analysis and Material Balance Technique Can Be Used To Answer One of the Most Important Questions: Are We Leaving Oil Behind?
- 20139 Installation and Operation of the **Mono-Column FPSO**, Sevan Piranema, in Brazilian Waters
- 20030 Ormen Lange Subsea Compression Pilot: Subsea Compression Station
- 20052 Required Developments Toward Ultra-HP/HT Subsea Tree System Solutions

**ADVANCES IN FLOW ASSURANCE: TECHNOLOGIES AND FIELD APPLICATIONS(602)**

- 19864 Challenges in the Papa-Terra Project
- 20204 Impact of Reservoir Fluid Compositional Variation and Valid Sample Acquisition on Flow-Assurance Evaluation
- 20171 Innovative Technique for Flowline Plug **Remediation**
- 19990 Improved Predictions of Hydrate Plug Formation in Oil-Dominated Flowlines
- 19869 Understanding Kinetic Hydrate Inhibitor and Corrosion Inhibitor Interactions
- 20189 Successful LDHI Qualification for Produced Fluids in a Flexible Riser at 10°F
- 20167 Nonacid Solution for **Mineral Scale** Removal in Downhole Conditions

**OFFSHORE PIPELINES II(312)**

- 19764 Deepwater Subsea Tie-In Between Two Export Pipelines H.T. Phan, Williams Field Services
- 19805 Deepwater Inline SLED Installation Method and Its Application to Frade Project

- 19881 Henning Devices: A New Class of VIV Suppression Apparatus for Offshore Tubulars
- 19951 Design, Fabrication, and Installation of the First Reeled Pipe-in-Pipe System in Offshore Brazil
- 19985 Estimating Extreme Currents From Topographic Rossby Waves and Joint Loop-Hurricane Events
- 20126 Global Buckling** and Axial Stability Study for HP/HT Flowlines
- 20256 Analytical Estimation of Pretension Requirement to Inner Pipe of Pipe-in-Pipe Flowline in Ultradeepwater Using J-Lay Installation

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- 20001 Parametric Study of Ice-Class Ship Structure
- 19954** Goal-Based Solution to Offshore Drilling Challenges in Arctic Environments
- 19948 New Challenges in the **Arctic** Offshore: A Classification Society Perspective
- 20053 Functional Requirements for an Arctic Construction and Intervention Vessel
- 20002 **Scenario**-Based Assessment of Risks to Ice-Class Ships A. Kendrick, BMT Fleet Technology
- 20151 Application of the Newly Adopted **IACS** Polar Class Rules to Offshore Support Vessels of Small Tonnage

#### ADVANCES IN JACKUP TECHNOLOGY(606)

- 20291 Improved Guidelines for the Prediction of Geotechnical Performance of Spudcan Foundations During Installation and Removal of Jackup Units J. Osborne, RPS Energy
- 19907 New Mechanism-Based Design Approach for Spudcan Foundations on Stiff-Over-Soft Clay
- 20297 Further Work on the Effects of 3D Nonlinear Wave Spreading on **Jackup Loading** and Its Impact on Current Assessment Practice
- 20012 New Simplified **Conceptual Model** for Spudcan Foundations on Sand Overlying Clay Soils
- 20255 Summary of Analysis Methods and Results for the Assessment of Jackup Survival in **Severe Storms**

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- 20045 Optical Permanent Monitoring System Meets the Subsea Challenge
- 20077 Field Testing of Hybrid Choke and Kill Lines
- 20108 Emerging Roles for Subsea Trees: Portals of Subsea System Functionality
- 20182 Frade Field Dynamic **Umbilicals** Design and Testing
- 20192 Measuring Oil in Water: A Sanity Check
- 19836 Materials, Manufacturing, and Testing Requirements for Offshore Mooring Steel Wire Ropes, Sockets, and Pins

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- 19844 Arctic Energy Developments and Challenges

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- 20294 Design Predictions and Measurements During Installation of Suction Anchors With and Without Water-Supply System To Help the Installation Through a Layered Soil Profile
- 20202 Casting and Forgings for Offshore Structures and Moorings
- 19922 Recovery and Rehookup of Liu Hua 11-1 FPSO Mooring System
- 20155 Hurricane-Proof Mooring System:** Enabling Technology Through the Use of Synthetic Ropes
- 19821 Performance Analysis of Mooring Hawser Prototypes Manufactured With Different Kinds of Constituent Materials

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- 20140 Experiences Implementing a Real-Time Production Management System Offshore Gulf of Mexico
- 19808 Research on **Paraffin Deposition** of Two-Phase Oil/Water System
- 19730 Removal of a Hydrate Plug From a Subsea Xmas Tree Located in Ultradeepwater With the Aid of a Heat-Releasing Treating Fluid
- 20018 Cold Flow: Living With **Hydrate and Wax** in New Field Developments
- 20084 Advanced Flow-Assurance System for the Ormen Lange Subsea Gas Development
- 19941 **Pigging Operation** of Single Production Lines in Deepwater Field

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- 20181 Coupled Eulerian Lagrangian Formulation for SCR-Seabed Interaction
- 20197** **Finite Element Analysis** of Conductor/Seafloor Interaction J.S. Templeton, Sage USA
- 20158 Reassessment of P-Y Curves for Soft Clays From Centrifuge Testing and Finite Element Modeling
- 20096 Safebuck Guidance on Pipe/Soil Resistance Modeling for Analysis of Expansion and Lateral Buckling
- 19871 Effect of Remodeling and **Reconsolidation** on the Touchdown Stiffness of a Steel Catenary Riser: Guidance From Centrifuge Modeling
- 19925 Prediction of Breakout Forces for Deepwater Seafloor Objects
- 19882 **P-Y Model** Describing the Interaction of Piles and Saturated Degradation Sands

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- 20146 **Deep Multiphase** Boosting Made Possible
- 20135 Back From the Abyss: Case Study of the Condition of a Thermoplastic-Hose Umbilical After Extended Service in Deep Water
- 20080 Comparison of Subsea Separation Systems
- 20186 Subsea Processing and Boosting: Building-Block Scenarios

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- 19980** **AVO Scanning**: Large Datasets and Little Time
- 19976 Success in Amplitude Anomalies and AVO: Technology Has the Might, But the Basics Must Be Right
- 19983 **DHI Threshold Effect** in Prospect Risking
- 19981 A Methodology To Identify and Prioritize Exploration Focus Areas in the Gulf of Mexico Using 3D Volumes of Pressure, Temperature, and Other Subsurface Data
- 19984 Hydrocarbon Prospecting in Deepwater Trinidad Using AVO and Spectral Decomposition
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19856 Tahiti Development Overview

19878 **Fabrication and Installation** of Tahiti Truss Spar Belly Side Strakes

19859 Tahiti Project Subsea System Design/Qualification

19861 Tahiti Subsurface: Technology Challenges and Accomplishments

19860 Tahiti Online Monitoring System for Steel Catenary Risers and Flowlines

19857 Tahiti **Spar as a Wet Tree**

19858 Fatigue Sensitive Flowlines: Design and Installation

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19770 **Integrated Team Approach** to Gulf of Mexico Deepwater Subsalt Drilling

19914 **Drill-in-Surface Casings**: A New Paradigm for Deepwater Well Design

20005 Conductor Preinstallation, Deepwater Brazil

19810 An Investigation of Heavy Foam Properties for **Deepwater Drilling**

20295 SBOP Drilling Enables **Efficient Drilling** in Extreme Water Depths

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20269 The Effect of Laminated Heterogeneity in Wellbore Stability and Completion of **Tight Gas Shale Reservoirs**

20271 **Technical Evaluation** of Resource Plays: A Look at the Bakken Shale D.

20272 **Potential for Oil Shale Development** in the United States

19787 Oil Recovery and **Surfactant Adsorption** During CO<sub>2</sub>-Foam Flooding

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19930 Innovative IMR AUV

19943 SiRCoS: A Deepwater Pipeline Repair System Available to the Industry

20154 Innovative Solution for Emergency **Repair** of a Deepwater Riser: Case Study of Independence Hub Flex-Joint Repair

20121 **New Monitoring Technology** for Detection of Flexible Armor Wire Failure

20058 Design of Subsea Production Systems for Reliability and Availability

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20145 Marine CNG: Why Hasn't It Happened?

19738 Distributed Compressed Natural Gas Sea Transport

19866 **LNG** Transfer in Harsh Environments: Introduction of a New Concept S. Hoog, H. Koch, IMPaC Offshore Engineering

20048 LNG STS Operations in Arctic Waters

20063 **Mechanical Behavior** of a Multicomposite Hose for STS LNG Transfer

20149 The Application of a New Tank Containment System to Ultralarge LNG Carriers

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- 20289 Rapid Inversion-Based Interpretation of Seabed Logging Data
- 19792 Using Remote Sensing Technology for Oil Seep Determination in West Black Sea
- 19812 Prediction of Shear and Compressional Wave Velocities Utilizing Genetic Algorithm Technique: Case Study in the Persian Gulf
- 19910 The Longest Challenge: Overview of a **Groundbreaking Horizontal Well** in Gimboa Field, Angola

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- 20251 Subsea Installation Contract: Overcoming the Challenges
- 20285 Agbami Offloading System: Worldwide Design and Fabrication Challenges
- 20287 Agbami Nigerian Content Execution: Successes, Challenges, and Lessons Learned

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- 19785 Offshore LNG Value-Chain Optimization
- 19845 The LNG Producer: A Generic Design With Great Adaptability
- 19854 Operational Experience With Ship-to-Ship Transfer of LNG
- 19855 Safety Risk Assessment of Floating Concepts
- 19884 Choices for LNG FPSOs
- 20102 **LNG FPSO**: Solving the Supply Shortfall

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- 19933 Preprocessing of **Offshore Platform Integrity** Marine Monitoring System Data: What To Do With Unusual Values or Trends?
- 19978 Accurate Wind, Wave, and Current Generation and a Link With **Numerical Simulations** as Important Aspects in Modern Model Testing
- 19835 Comparison of Tank Testing and Numerical Analysis for the Design of a Catamaran for Deck Installation by the Float-Over Method
- 20019 **Philosophies for Dynamic Positioning** in Ice-Covered Waters
- 20035 The Value of Model Testing in Understanding the Behavior of Offshore Anchors: Towards New-Generation Anchors
- 19962 Benefits of Physical Modeling Deepwater Pipeline and Riser Installations
- 19918 An Experimental Study of Pipeline Flotation

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- 19824 Managing Contraction and Stress in an Ambient Pressure Insulated 9%Ni Subsea Cryogenic Pipeline
- 20223 How the Use of Cryogenic Piping Can Reduce the Impact of LNG Transfer Terminals on Environment and Local Communities, While Increasing Site Safety and Security
- 20226 Mechanical Design of Subsea and **Buried LNG Pipelines**
- 20301 **Risk Assessment and Technology** Qualification Process for Offshore LNG Pipelines
- 20224 Risk Analysis of LNG Pipe-in-Pipe Options
- 20302 Defining the Next Generation for LNG Loading: Decision Analysis and Risk Assessment of Technology Management of New Technology vs. Conventional Trestle System

**DYNAMIC DESIGN ISSUES FOR DEEPWATER DEVELOPMENT(610)**

- 20098 Design and Installation of the Submerged Loading System



- 20217 Advanced Pipeline Riser Pull-In Analysis for a Fixed Offshore Production Platform
- 19883 An Analysis of the Challenges of Manufacturing and Installing One of the World's Deepest Pipelines
- 20200 Engineering Analysis of an Offshore Pipeline on **an Escarpment in a Seismically-Active Zone**: A Case Study in the Caspian
- 19937 Plastic Liners for Hydrocarbon Transport: A Qualified and Cost-Efficient Alternative to CRAs
- 19784 Development of a Large-Bore **Umbilical for Deepwater** Dynamic Service
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- 19909 Evaluation of Reservoir Connectivity of Gimboa Field, Deepwater West Africa
- 20021 Gimboa: First Deepwater Challenge for the Angola National Oil Company
- 20134 Siri Pilot Project: First Offshore Extra-Heavy Oil Ever Produced
- 20024 Focused Sampling and Downhole Fluid Analysis **With Wireline Formation Testers**: Perspective From Offshore West Africa