

FPSOs Present and Future Workshop

Presentations

Session II

Panel of Industry Representatives

June 7, 2000



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Tony Fantauzzi
Chevron Oil





Operational Experience

- 25 Years of F(P)SO International Experience
- 105 Years of U.S. and International Tanker Operations

Operational Experience

- **Since 1976:**
 - **16 F(P)SO development projects**
 - 11 in operation
 - **13 conversions**
 - **3 new purpose-built F(P)SOs**

Operational Experience

Country/Field Name	Years	Vessel Name	New or Conversion
UK, North Sea, Alba Field	1994 to ongoing	ALBA FSU	New Built
Angolo, Nemba	1995 to 1998	FPSO JAMESTOWN	Conversion
Australia, Cossack	1997 to ongoing	FPSO COSSACK PIONEER	Conversion
P.R. Congo, N'Kossa	1997 to ongoing	LPG FSO N'KOSSA II	Conversion
Nigeria, Escravos	1997 to ongoing	ESCRAVOS LPG FSO	New Built
Thailand, Tantawan	1998 to ongoing	Oil and Gas FPSO TANTAWAN	Conversion
Thailand, Benchamas	1999 to ongoing	FSO BENCHAMAS	Conversion
Angola, Block 14, Kuito	1999 to ongoing	FPSO KUITO	Conversion



Operational Experience

Country/Field Name	Years	Vessel Name	New or Conversion
Zaire / D. R. Congo	1976 to 1981	FSO <i>SOLEN</i>	Conversion
Zaire/D. R. Congo	1981 to ongoing	FSO <i>CHEVRON ZENITH</i>	Conversion
Angola, Block 0	1981 to 1987	LPG FSO <i>BERGE SISAR</i>	Conversion
Angola, Takula Field	1981 to 1988	FSO <i>CHEVRON OCEAN</i>	Conversion
UAE, Ras Al Khaimah	1983 to 1986	FSO <i>AFRAN ZODIAC</i>	Conversion
Angola	1988 to ongoing	LPG FPSO <i>BERGE TROLL</i>	Conversion
Indonesia, Anoa Field	1990 to ongoing	FPSO <i>ANOVA NATUNA</i>	New Build
China, Huizhou	1990 to ongoing	FPSO <i>NAN HAI FA XIAN</i>	Conversion

Excellent Operational Record

- **Example: Escravos LPG FSO**
 - **1050 days without shutdown since startup**
 - **1071 days without a lost time injury**
 - **986,000 M³ LPG produced**



Keys to F(P)SO Success

- **Know What You Want**
 - **Well-defined design basis and technical requirements**
 - **Definition of standards for construction and conversion**
 - **Clear operating philosophy**
 - **manning, nationalization, maintenance, safety, custody transfer, etc.**

Keys to F(P)SO Success

- **Project Management**
 - **Operator involvement from concept development onward**
 - **Communications and teamwork**
 - **Management of interfaces**



F(P)SO Design & Operation

Chevron F(P)SOs are designed, built and operated in compliance with our Policy 530 --
“Protecting People and the Environment”
-- applied globally



F(P)SO Design & Operation

- **Effective and Proven Processes are Followed to Validate:**
 - **Design basis**
 - **Operational hazards**
- **Input From Independent Sources and Lessons Learned Used**

F(P)SO Design & Operation

- **Unique Challenges, Risks, and Uncertainties**
 - Reservoir & field characteristics
 - Local environment
 - Local regulatory requirements

F(P)SO Design & Operation

- **Designed for Specific Application**
 - Design basis and technical requirements formulated on a case-by-case basis
 - mooring and process oil and gas export systems customized for each field
- **Redeployment is feasible, but requires changes**



Standards & Technology

- **Gap Between Existing Standards & Regulations and New Technologies**
 - Offshore technology is evolving rapidly
 - Development and implementation of standards & regulations takes time

Standards & Technology

- **Chevron's Solution**
 - Work closely with interested parties to resolve gaps and gray areas on a case-by-case basis
 - Host country authorities
 - Classification societies
 - Flag state administrations



Standards & Technology

- **Success Story: Han Hai Fa Xian**
 - **Chevron developed and pioneered a new offshore technology for a specific application**
 - **Worked with appropriate authorities to develop an inspection schedule for the prototype disconnectable mooring system**

F(P)SOs The Chevron Way

- **Marine standards, with selective upgrades, adopted for hull & marine systems**
- **Applicable offshore standards adopted for topsides**
- **Stricter of the two standards is adopted for interface areas**



F(P)SOs The Chevron Way

- **Marine and Production Cultures
“Shake Hands”**
 - **Recognize that each culture has its strengths and limitations**
 - **Work together from concept development through construction and installation, to ultimate operation**

F(P)SOs The Chevron Way

- **Cross-Functional Operations
Training**
 - **required for platform operators and seafarers to reliably manage and operate F(P)SO facilities**
 - **Brings together best of both cultures, experience, and best practices**



Conclusions

- **Chevron has developed global processes and policies that result in safe, successful F(P)SO operations**
- **Local and international rules, regulations and guidelines must be selectively adopted in consultation with regulatory bodies to support reliable and cost effective projects**



Garth Harrison

Texaco – Brasil Team



FPSO PRESENTATION

Mineral Management Services & Offshore Technology Research Centre Workshop June 2000

**GARTH HARRISON
TEXACO COMMERCIAL DEVELOPMENT
BRASIL TEAM HOUSTON**

FPSO SUCCESS STORY

BACKGROUND & EXPERIENCE

- **12 Years Tanker Service - Command - Worldwide**
- **7 Years (Tanker) Terminal Management - Trinidad**
- **3 Years Fleet Operations Management - London**
- **8 Years (Tanker) Terminal Operations - Bahamas**
- **5 Years Arctic Offshore Exploration - Canada**
- **4 Years FPSO Operations - S. China Sea**
- **4 Years Offshore Project Development - Houston**



FPSO SUCCESS STORY

AGENDA

- **DESIGN BASIS**
- **KEY DATES**
- **KEY FACTS**
- **CONCLUSIONS**

FPSO SUCCESS STORY DESIGN BASIS

- **Converted 1974 Vintage VLCC**
- **116 Meters Water Depth**
- **Hostile Environment**
 - **>20 Named Storms Annually**
 - **>6 Months/Year NE Monsoons**
- **Internal Turret - Weathervaning**
- **Submerged Buoy Mooring**
 - **8 Legs - Wire/Chain**



FPSO SUCCESS STORY

DESIGN BASIS

- **1,500 MB Storage**
- **Tandem Offloading**
 - **Floating 16” Hose**
- **Fully Integrated Marine/Topsides Utilities**
- **Tied-Back to 2 Platforms**

FPSO SUCCESS STORY

KEY DATES

- **Late 1989 On Site**
- **1990 First Production - 20 MB/Day**
- **1991 Production Increased to 60 MB/Day**
- **1995 Field Shutdown for 2 x Wellhead Platforms Installation**



FPSO SUCCESS STORY

KEY DATES

- **1995 - Drydock FPSO (during S/D)**
 - De-Bottlenecking
 - Process Additions
- **1995 - Production Increased to 120 MB/Day**
- **2000 - 10 Year ABS Re-Certification of Vessel & Mooring System**

FPSO SUCCESS STORY

KEY FACTS

- **536 Liftings (Exports) to May 2000**
- **About 250,000,000 Bbls Exported**
- **About \$5 Billion Gross Sales**
- **No Production Shut-Downs Resulting From Unscheduled Marine Systems Service Outages**



FPSO SUCCESS STORY

KEY FACTS

- **No Adverse Environmental Events**
- **No Sustainable Demurrage Claims**
- **Expected to Remain on Site Beyond 2006**

FPSO SUCCESS STORY

CONCLUSIONS

- **Relatively Simple Design Basis**
- **Low Technology**
- **Cost Effective (~\$0.31/Bbl Op Costs)**
- **Efficient**
- **Safe**
- **Environmentally Friendly**





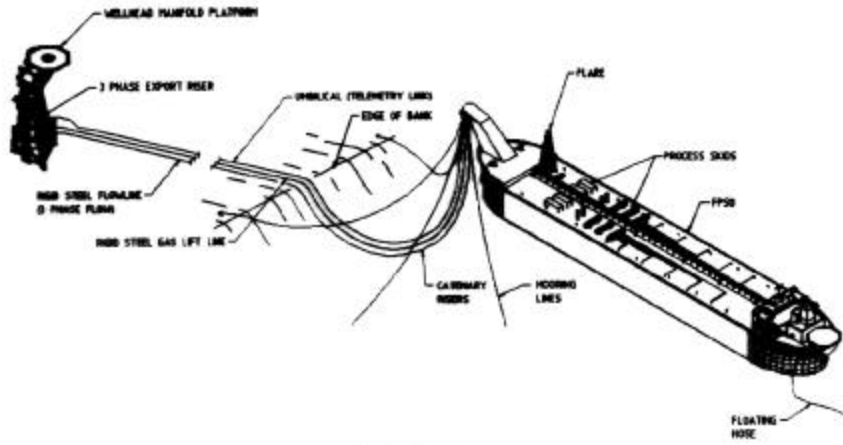
Garry Walker
BHP Petroleum



BUFFALO DEVELOPMENT



FINAL OVERVIEW - FEBRUARY 1999

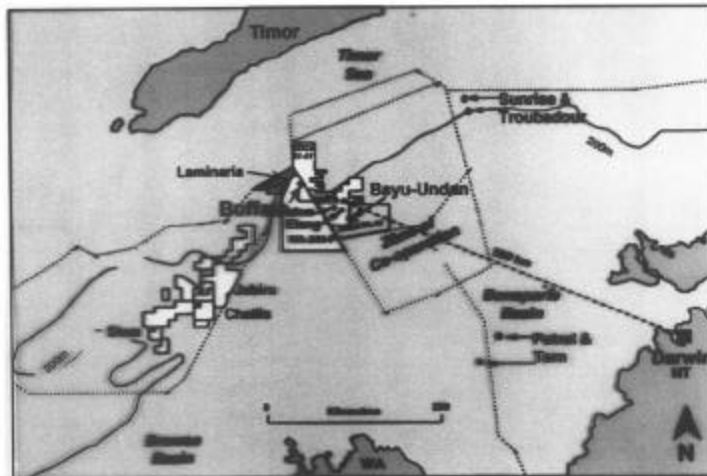


4 February, 2000
Final Overview



AOAT Asset Team
BHP Petroleum

BUFFALO DEVELOPMENT Regional Location Map



Final Overview



AOAT Asset Team
BHP Petroleum

