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“Offshore, Brownfield Execution in West Africa”
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1. Introduction: AMEC at a glance

- **Employees:** 27,000
  - Americas: 13,000
  - Europe: 9,800
  - Growth Regions: 3,700

- **Operating in over 40 countries**

- **Serving four markets:**
  - Oil & Gas
  - Mining
  - Clean Energy
  - Environment & Infrastructure

- **Market cap:** c. $6 billion (USD) (£3.6 billion)

- **Revenue:** $6.2 billion (USD)
  - £4 billion (GBP)
  - $6.6 billion (AUS)
  - $6.4 billion (CAD)

*Proud 100+ year history

*As at 24 April 2014
2. Definitions

Greenfield: a new development with no existing production infrastructure other than completed wells.

Brownfield: modifications to an existing facility. Typically, facility is in active production operation.

FPSO: floating production, storage, and offloading vessel
Focus on Angola

3. Local Understanding, Local Office, Local Content
Angola and Oil

1955-90s: Oil discovered; produced at modest levels.

1961-74: War of Independence

1975: End of nearly 500 years of Portuguese influence

1975-2002: Civil War

2002-present: Relative political stability;
               Discovery, development of numerous offshore fields

2003-present: Steadily expanding local content requirements

2007: Joins OPEC
Establishing a Local Company


2003: Major Angolan project award

2004: Establishment of Paragon Angola in partnership with major local company
Addressing Challenges – Achieving Sustainability

- Improving and maintaining essential communications, electrical, and utility systems
- Managing extremely high cost of living
- Dealing with in-country travel/logistical challenges
- Establishing reliable security
- Expediting complex Visa process
- Attracting and retaining Expats
- Attracting, training, and retaining Nationals
- Demonstrating commitment to local community, professional development, and infrastructure
- Establishing and continually promoting culture of safety – in office and at project sites
- Understanding cultural differences and taking them into account in work with partner and local personnel
4. Example Project

Modifications to Two FPSOs Offshore Angola
Project Description

Modifications to 13 topsides modules

Development of new fields with subsea tiebacks to the two FPSOs.

- Nearly 1 million AMEC man-hours
- Added more than 2,000 mT topsides weight
- More than 800 Purchase Orders
- More than 7,000 mt shipped
Design

- Reduced size and rating of key piping component
- Relocated riser to reduce structural requirements
- Eliminated need for major equipment items

Results:

- Lower cost
- Reduced weight
- Reduced offshore installation scope and risk
- Reduced likelihood of need for shutdowns
Fabrication

- Capitalized on opportunities to build full assemblies onshore
- Performed significant portions of required E&I testing, hydrotesting and painting onshore

Result:

Reduced potential for offshore safety incidents through reductions in offshore fabrication and testing scopes
Offshore Execution

- Reduced peak offshore manhours
  - Carefully planned early works
  - Accommodation vessel savings & reduction in operating facility impact

- Optimized timing of material deliveries and fabrication

Result:

Ongoing production at planned rate without interruptions
Project Outcome

- Largest brownfield project executed by customer
- Delivery on time and within budget
- Minimal impact to ongoing operations
- Recognition from highest level of customer’s management organization for health, safety, security, and environmental achievements

More than 5 million man-hours worked without a lost-time incident (including all contractors)
5. Offshore Brownfield Principles
- Maximize early works
- Consolidate scope areas
- Laser scanning and point-cloud technologies
- Dimensional control
- Construction optimization during design
- Avoid offshore hot work
- Avoid shutdowns through careful planning of tie-ins
- Limited offshore lift capacities
- Closing spool / clear access around umbilical pull-in
- 3-plane closing spools
- Flanged / hubbed spools

Planning and Design
Supply Chain Management

- Number of shipping hubs
- Freight forwarding
- Customs clearance and hand-over process
- Ongoing reporting of materials status
- Logistics for import and transfer of materials
- Inspection of materials entering the country
Construction Optimization

- Starts early in design
- Reduce number of work faces
- Reduce material, fabrication, and installation man-hours
- Minimize job cards
- Reduce tool and equipment hiring requirements
- Reduce number of work permits