

FGV ENERGIA DECOMMISSIONING WEBINAR

TSB OFFSHORE, INC. DECOMMISSIONING CHALLENGES & KEYS TO SUCCESS

Rio de Janeiro, Brasil

19 June 2020

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TSB Offshore Webinar Agenda

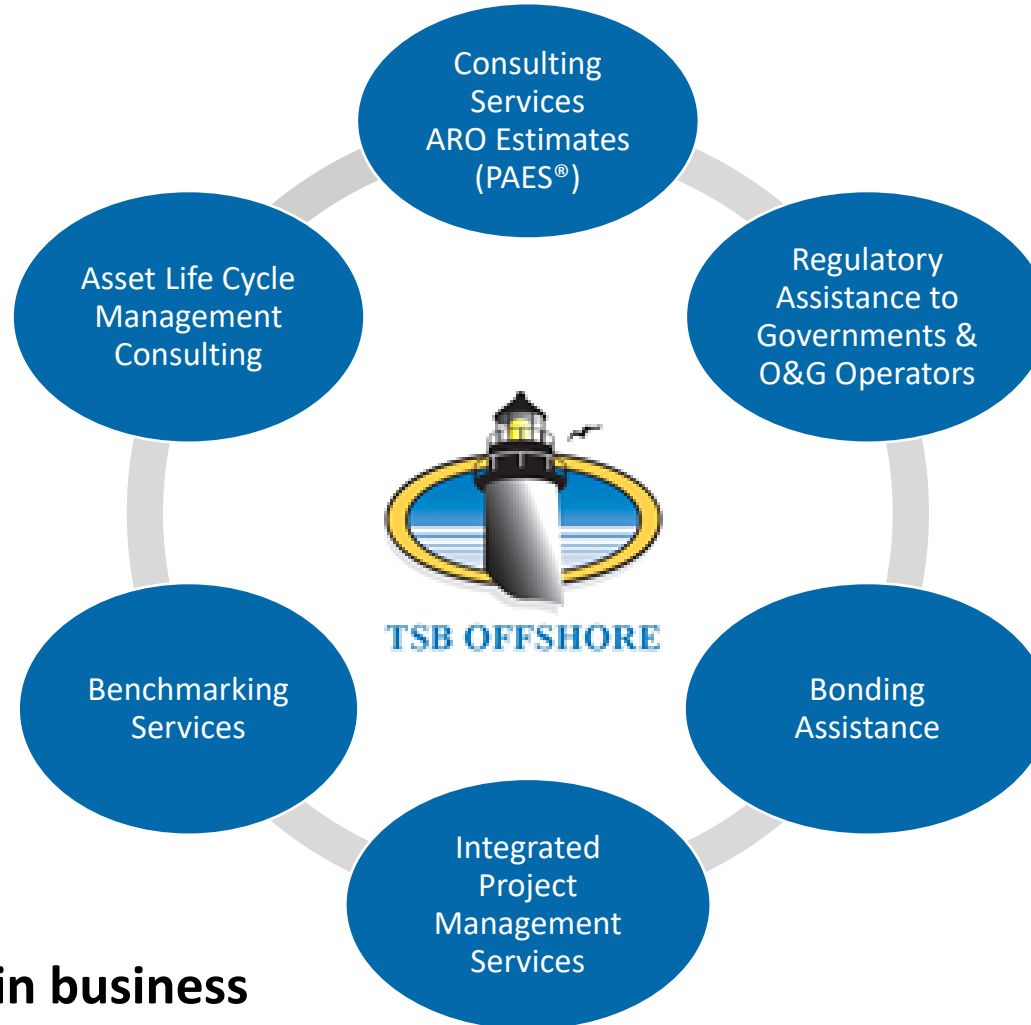


- TSB Introduction & Consulting Activity
- The Decommissioning Process
- Decommissioning ~~Challenges~~ Principles
- Other Key Decommissioning Challenges to be Addressed
- Key Steps to Ensure a Positive Project Outcome
- Results of Using Experience & Lessons Learned
 - PetroRio Polvo Platform Wells P&A Study
 - Petrobras Cação Field Decommissioning of Fixed Platforms



Q&A Session to Follow

TSB Offshore - Introduction

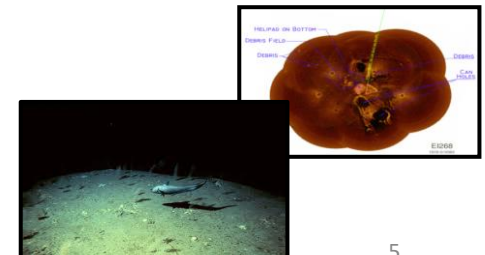


**TSB has been in business
since 1987**

- Over 200 worldwide and US Consulting Customers (40 + active for consulting projects in 2019 / 2020)
- Major Consulting Projects over the last year in the US, Brazil, Argentina, West Africa, Dubai, Trinidad, India, Thailand, New Zealand and Malaysia
- Current decommissioning updates and consulting support underway for numerous worldwide clients including PTTEP Thailand, CVX Thailand, Arena and Addax, with additional work in Brunei and Timor Leste
- Completed initial worldwide regulatory study research and wrote initial decommissioning draft regulations for the Department of Minerals & Fuels (DMF) in Thailand and the Directorate General for Hydrocarbons (DGH) in India
- Project Management support to ExxonMobil on the Lena Guy Tower Removal currently underway in the US GoM

A Robust / Phased Approach

- Phase 1 – Data Acquisition, Project Kick Off, Planning & Site Survey
- Phase 2 - Well Plug & Abandonment
- Phase 3 - Pipeline Abandonment
- Phase 4 - Platform / Facility Removal
- Phase 5 - Debris Removal and Final Site Acceptance
- Phase 6 - Project Closeout



Decommissioning ~~Challenges~~ Principles



- To provide safe and environmentally sound decommissioning processes
- To balance environmental protection with safety, technology, and economic considerations
- To address the needs of the stakeholders (Governmental Regulators, O&G Operators, Contractors, their personnel & the general public)
- To ensure that the latest fit for purpose and environmentally safe technology is used
- To ensure that the O&G industry is able to meet its end of lease obligations

Other Key Decom Challenges to be Addressed



- Global -- National -- Local Factors
- Diverse Stakeholder Interests
- Science vs. Emotions
- Technological Innovations
- Governmental requirements and local practices
- Remote Locations
- Scarce Equipment / In-Country Resources
- Third party influence & special interest groups



Key Steps to Ensure a Positive Project Outcome



- Robust Contracting Plan (Lump Sum / Target Price / Unit Rate)
- Access to accurate facility data, well schematics, installation plans & other key information required for planning
- Detailed Project Execution Plan (PEP), Cost Estimate & Integrated Schedule (Level 2/3)
- An open culture of cooperation between the O&G operator, contractors and regulatory agencies
- Offshore processes and procedures covering key execution activities

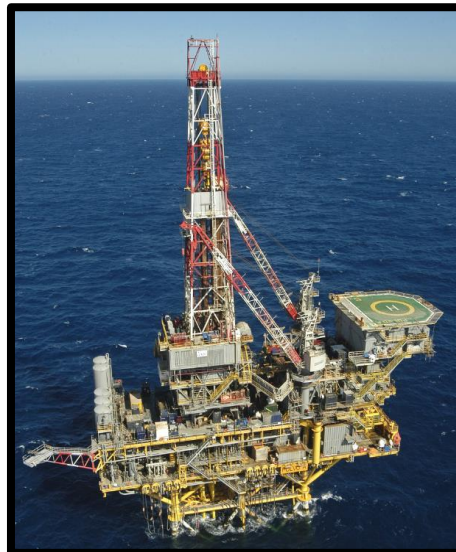
Key Steps to Ensure a Positive Project Outcome



- Safety & Environmental processes and procedures in accordance with applicable regulatory requirements
- Robust Project Management processes and procedures utilized across all aspects of Contractor's operations
- Monitor performance & document results
- Develop and track "Key Performance Indicators"
- Customer & Contractor Feedback – "Lessons Learned" for future projects

PetroRio Polvo Platform Wells P&A Study

- TSB utilized actual well abandonment durations for 17 wells on 3 US GoM platforms to prepare a benchmarking comparison of well abandonment costs from a platform such as Polvo A vs. subsea well costs.
- This benchmarking initiative was in support of bonding discussions between PetroRio and ANP.



Influence on Recent Brazil Tenders

PETROBRAS Cação Field Decommissioning of Fixed Platforms

- Established a robust “Consortium Team” with TSB in the Project Management Role and a Brazilian Consortium Partner supplying In-Country support and logistics
- Established (and vetted) a strong Brazilian “Nominated Subcontractor” Team for key support areas:
 - Platform Salvage & Disposal
 - Support Vessels & Cargo Barges
 - Diving & Survey Services
 - Marine Warranty Surveyor
 - Construction Engineering Support
- Robust review of existing Brazilian Regulations to ensure compliance
- Detailed Project Execution Plan (PEP) and Level 3 Schedule developed at Tender Stage to support project cost estimate.

Influence on Recent Brazil Tenders

PETROBRAS Cação Field Decommissioning of Fixed Platforms

- Developed a robust / competitive mobilization plan for a “Fit for Purpose” DP Heavy Lift Vessel (DP HLV).
- Relied on TSB’s extensive experience / knowledge of Offshore decommissioning and Onshore disposal in developing estimate.
 - Previous assistance to governments in developing and analyzing decommissioning regulations
 - Reliance on “Lessons Learned” from involvement in the decommissioning of hundreds of Gulf of Mexico platforms, pipelines and wells
 - Experience from developing and executing decommissioning methodologies prepared for numerous NOCs and IOCs worldwide for development of abandonment liability estimates (AROs).
 - Development of an experienced Team with knowledge of US and Brazil working processes to both develop the estimate / proposal for the work and be able to continue on to the Execution Phase of the work.

Influence on Recent Brazil Tenders

PETROBRAS Cação Field Decommissioning of Fixed Platforms

- Maintained an aggressive and flexible pricing strategy
 - Accurate assessment of risks involved
 - Proper evaluation of competitor capabilities vs. customer needs
 - Key focus on the competitive nature of the market at that time

Using Experience / Lessons Learned played a major part in the bidding outcome

- At the public opening, the Consortium was the low bidder (20% lower than the next bidder) – Initial Bid Price approx. US\$30 mil (+).
- After adding in the proper allowance for equipment importation (approx. US\$2.5 mil), this difference was revised to 14% lower.

The Key to a Successful Project...



- Work Safe
- Plan the Work, Work the Plan
(Document Your Work)
- Take Ownership, Be Proactive
- Make Sure
- Communicate, Communicate, Communicate



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Follow TSB on Linked In | www.tsboffshore.com for further updates on our upcoming Three-Day Rio de Janeiro Decommissioning Training Workshop Tentatively Scheduled for 3Q / 4Q 2020 (travel restrictions pending) (in collaboration with PetroRio S.A.)