



OGA Collaboration and Innovation in Decommissioning Event

12th September 2018



What are we trying to achieve

- BP is aligned with the OGA MER target to reduce decommissioning costs by 35%
 - Deeper collaboration with stakeholders and supply chain
 - Increased efficiency of execution
 - Different contracting models that offer greater value to all stakeholders



- Technology innovation
 - Embedded digitisation of data, linked to control of work processes and offshore execution procedures
 - Maximise the use of cutting edge technology to strengthen the decommissioning process

Exemplar Miller platform removal – Case study

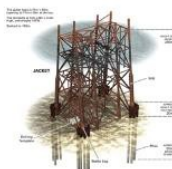
- Developed a high performing team comprising licensee, duty holder and engineer, prepare, remove, disposal (EPRD) contractors
- Team agreed a mission to deliver an exemplar decommissioning project
- Delivered this over 2017/2018 by deep collaboration focusing on team integration to minimise interfaces with a common mission
- 3rd party duty holder model ring-fenced resources to support execution at pace with the EPRD contractor, largely co-located in one office
- Technical innovation in lifting flare with module and extended lift materially reduced offshore execution time and risk
- VIDEO

Miller scope and delivery



Scope

- 6 months removal preparations
- 28,200 tonnes Topsides removed
 - 12 Topsides lifts (2 extended lifts)
- 11,500 tonnes jacket removed
 - 1 Jacket lift extended lift, with 3 inshore lifts
- Total 15 heavy lifts, of which 3 were extended lifts over 150 nautical miles each



Delivery highlights

- Application of process to manage complex extended lift and carry
- Effective collaboration with DH and EPRD contractor
- M&T examples
- Focus on Safety and the Environmental



Rigorous Assurance Processes Applied to Extended Lift

- Complex Lift Operations
 - eg High Crane Utilisation, module clearances, weather forecast for transit route, identified pipeline crossings, suitability of lift and carry vs lift to barge
- Rigorous Assurance Process
 - Alignment through SME Collaboration for development of Bowtie and RAP
 - Several lift and transportation analysis and model testing
 - 3rd Party Verification of rigging design, weight/CoG data (incl marine growth)
 - Lift point checks (use of all original lift points except for 3 modules)
 - Marine Audit performed by BP (eg DP 3 checks)
 - Rigorous review of Removal Manuals during HAZOP (Saipem/BP/DnV/PF)





Collaboration on Miller and Don subsea scope

- Collaboration with other scope 8-12% through Project Management and mobilisation costs
- Gap to OGA MER target 23-27%
 - Incremental cost savings as supply chain matures
 - Contracting models that minimise non-productive time
 - Onshore costs
- What do operators need to do differently to facilitate the step change?

Miller

Pipeline	Item	Material	Weight (Te)	
16in Brae-Miller Linkline (PL-1971)	16in spool at Miller 367m (approx length)	Line pipe and bends	Steel	70
		Flanges	Steel	6
		Anodes	Zinc	<1
	SSIV structure	SSIV inc pipework, flanges, valves and fittings	Steel	45
			Protection Structure	Steel
		Anodes	Zinc	3
		Roof Panel	Steel	14
	Protection Features	43 Flexible Concrete mats on Miller Spoolpiece and umbilical	Concrete	180
		23 Grout Bags on Control Umbilical at Guide	Grout	<1
	Gas Export Pipeline SSIV Control Umbilical	Electro Hydraulic/ Control Umbilical	Composite	6
Brae-Miller Linkline SSIV Control Umbilical (PLU-1973)	Electro Hydraulic/ Control Umbilical	Composite	1	
	Umbilical Guide	Steel	<1	
Total estimated weight			1304	

Don

Item	Material	Weight in Air (tonnes)
Manifold	Steel	48.6
	Aluminium-zinc-indium anodes	1.3
Flowline Spoolpieces	Steel	1.3
Equipment Total Weight		51.2
Displaced Flexiweight Mattresses on/around Manifold		13.2
Stabilisation Total Weight		13.2
Item	Material	Weight in Air (tonnes)
Subsea Pipeline/Spoolpieces/ Valves/WI Tee	Steel	2766.0
	Aluminium-zinc-indium anodes	27.0
	Galvullum III anodes	28.0
	EPDM coating	373.0
	Concrete weight coat	43.0
3in Chemical umbilical and 4in control umbilical	Composite materials	440.0
Equipment Total Weight		3677.0
Stabilisation (excluding NLGP crossing)	Grout formwork/flexiweight mattresses	823.2
	Grout bags	34.3
	Rock dump	4621.0
Stabilisation Total Weight		5478.5