Congo River Crossing (CRX)
Pre-Commissioning Project

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PPSA Seminar 16th November 2016, Aberdeen
Commissioning and Operational Pipeline Pigging
DID YOU KNOW
COMMUNICATION IS TWO WAY

- Understanding is Key
  - Language Differences
  - Cultural Differences

- Check, Be Aware
  - Specifications
  - Talk
  - Listen
Presentation Contents

- Introduction & Field Overview
- Scope Of Work
  - Segment C
  - Segment W
  - Segment A+B
  - Full System Commissioning
- Summary & Conclusion
- Lessons Learned
Introduction & Field Overview

CRX Pipeline Route

South Namba

Segment A
20” x 31.8km

Subsea By Pass

Congo River Trench

Segment B
22” x 63km

Congo River Trench

Segment W
12” x 7km

SPP

Segment C
20” x 38.5km

NPP

ALNG

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Scope of Work – Segment C March 2013

- Flood, Clean and Gauge from ALNG to SPP Riser Base with:
  - Bi-Di Brush Pig
  - Combined Bi-Di Brush/Gauge Pig
  - Bi-Di Gauge Pig

- Caliper pig from ALNG to SPP Topside Receiver

- Hydrotest from ALNG to SPP Blind Test Flange
Scope of Work – Segment C March 2013

- Anomaly was discovered during the full analysis

- Feature showed a sharp profile indicating it was a foreign object rather than a dent

- After various discussions with Client and Company it was believed a welding shoe had attached itself to a girth weld
Scope of Work – Segment C July 2015

- 8m pipeline section cut out
- Flanged spool installed
- Segment topped up and re-tested
Scope of Work – Segment W August 2013

- Pre-Flood with 3 poly coated foam pigs

- Flood, Clean and Gauge with:
  - Bi-Di Flooding pig
  - Bi-Di Brush Pig
  - Bi-Di Gauge Pig
Scope of Work – Segment W August 2013

- Caliper Survey from SPP launcher to NPP receiver
- Hydrotest from SPP to NPP temporary PLR’s
Scope of Work – Segment W August 2013

- During preparations for the drilling operations the PN6 drill rig lost its footing whilst setting into position

- As a result the drill rig struck the SPP platform

- Incident caused a delay in the overall project pre-commissioning scope
Scope of Work – Segment A+B November 2013

- Flood, Clean and Gauge:
  - 2 x Bi-Di Brush Pig
  - Bi-Di Gauge Pig

- Caliper Survey from NPP to South Nemba

- Hydrotest from NPP to South Nemba

- Operations due to start following completion of FCG but due to vessel availability re-scheduled to November 2014
Scope of Work – Segment A+B November 2014

- Unexpected volume of debris in line when pigs recovered

- Required a fast mobilisation to perform additional cleaning runs completed by others
Scope of Work – Segment A+B November 2014

- Possible leaks through dummy hotstabs
- Initial operation required secondary vessel to complete valve operations
- A new campaign developed to flush and test each dead leg section
- On successful completion caliper run complete and line hydrotested
Scope of Work – Full System Commissioning November 2015
Scope of Work – Full System Commissioning November 2015

- Segment C Bulk Dewatering
  - 1 x Hi-Seal Bi-Di propelled with 250m³ (1190m) of freshwater injected at ALNG
  - 1 x Hi-Seal Bi-Di propelled with dry air
  - Discharge routed overboard at NPP

![Diagram of Direction of Pigging with sections for Dry Air, 250m³ FW, and Seawater]
Scope of Work – Full System Commissioning November 2015

- Segment W Bulk Dewatering
  - 250m³ (5000m) of freshwater from Segment C
  - 1 x Hi-Seal Bi-Di propelled with dry air
  - Discharge routed overboard at NPP
Scope of Work – Full System Commissioning November 2015

- Segment C Final Dewatering
  - 5 x Hi-Seal Bi-Di propelled with 1km with dry air
  - Discharge routed overboard at SPP
Scope of Work – Full System Commissioning November 2015

- Segment W Final Dewatering
  - 5 x Hi-Seal Bi-Di propelled with 1km of dry air
  - Discharge routed overboard at NPP
Scope of Work – Full System Commissioning November 2015

- Segment A+B Bulk & Final Dewatering
  - 1 x Hi-Seal Bi-Di propelled with 200m³ (1000m) of freshwater injected at NPP from vessel
  - 5 x Hi-Seal Bi-Di propelled with 1km of dry air
  - Discharge routed overboard at SNA
Scope of Work – Full System Commissioning November 2015

- Following receipt of all pigs system vacuum dried:
  - Dew point of -31.7°C
Scope of Work – Full System Commissioning November 2015

- N2 packing in preparation for first gas:
  - 51.8 barg
  - 95% N2 purity and dewpoint of -20°C
Summary & Conclusion

- Halliburton completed Q1 2016 ready for first gas with:
  - No LTI’s
  - No injury to personnel
  - No damage to plant or environment
Summary & Conclusion

- Halliburton were able to manage change effectively:
  - Varying schedules
  - Workscopes
  - Equipment availability
  - Change of Client
Lessons Learned

- Projects to be awarded well in advance to allow:
  - The ability to work collaboratively with our clients maximize efficiencies and minimize schedule impacts during engineering
  - Time for the procurement of long lead items

- Proper pigging programs developed to ensure:
  - Debris removed effectively
  - Water removed and pipeline left suitable for product
  - Reduce chance of restricted flow or even blockages and loss of production
THANK YOU