

HALLIBURTON

Congo River Crossing (CRX)
Pre-Commissioning Project

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Technical Professional

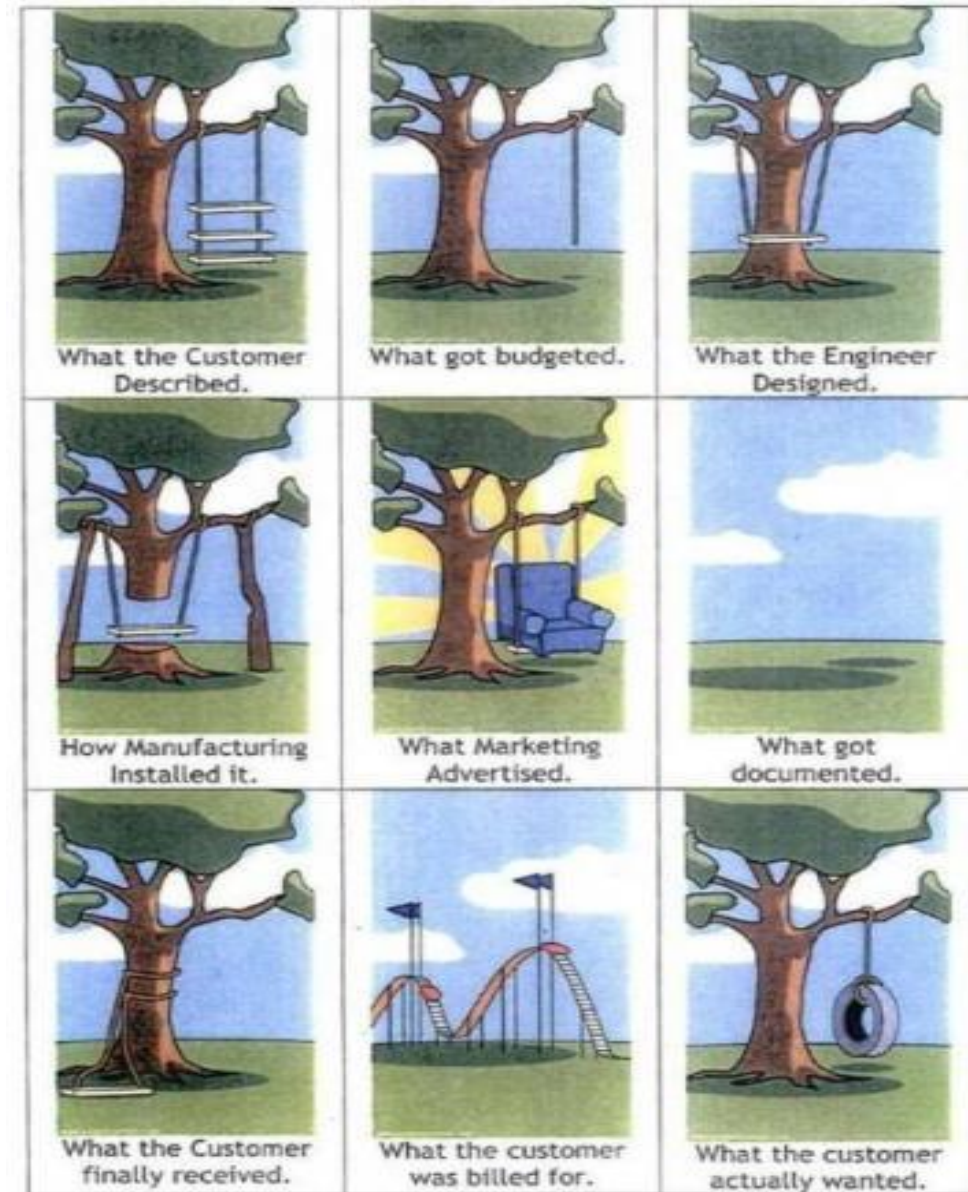
PPSA Seminar 16th November 2016, Aberdeen

Commissioning and Operational Pipeline Pigging

DID YOU KNOW

COMMUNICATION IS TWO WAY

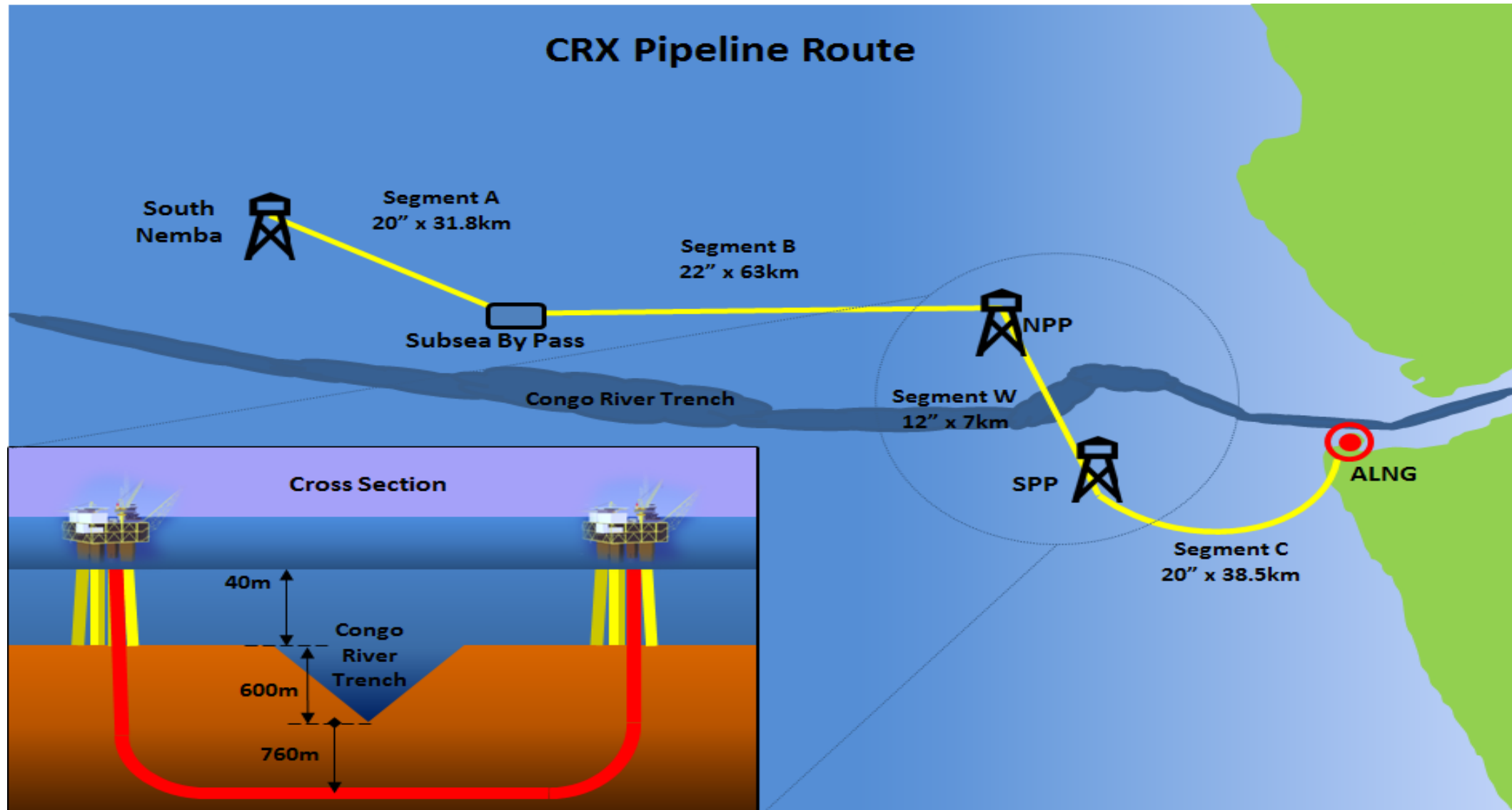
- Understanding is Key
 - Language Differences
 - Cultural Differences
- Check, Be Aware
 - Specifications
 - Talk
 - Listen



Presentation Contents

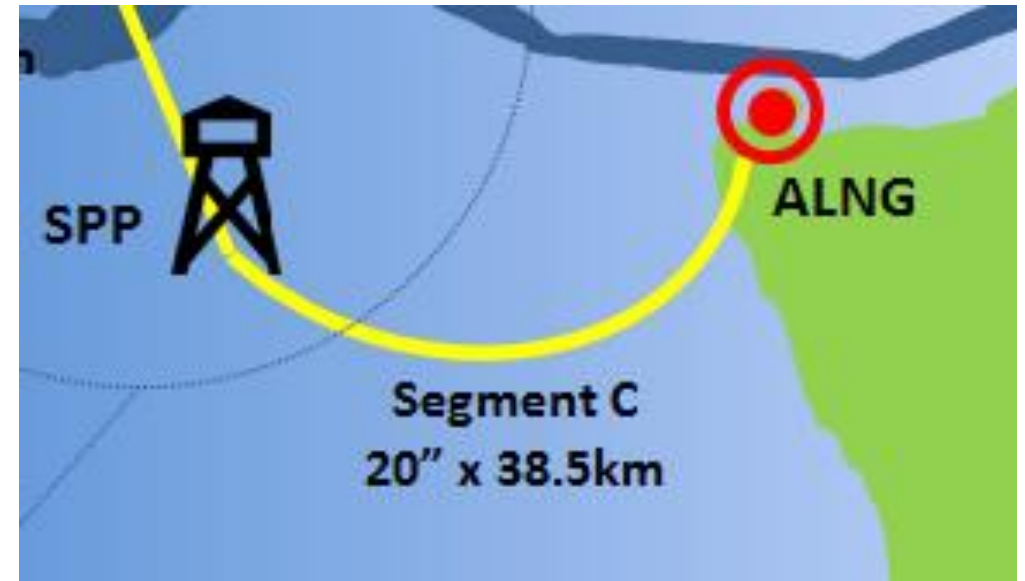
- Introduction & Field Overview
- Scope Of Work
 - Segment C
 - Segment W
 - Segment A+B
 - Full System Commissioning
- Summary & Conclusion
- Lessons Learned

Introduction & Field Overview



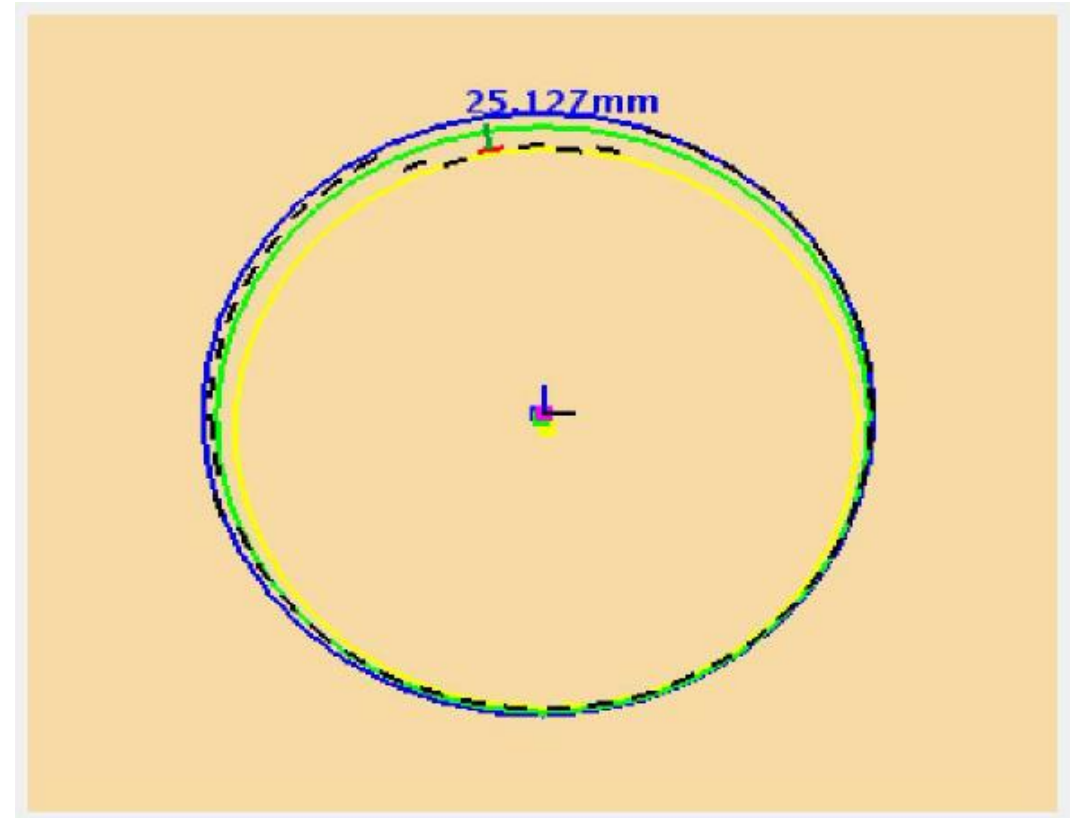
Scope of Work – Segment C March 2013

- 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



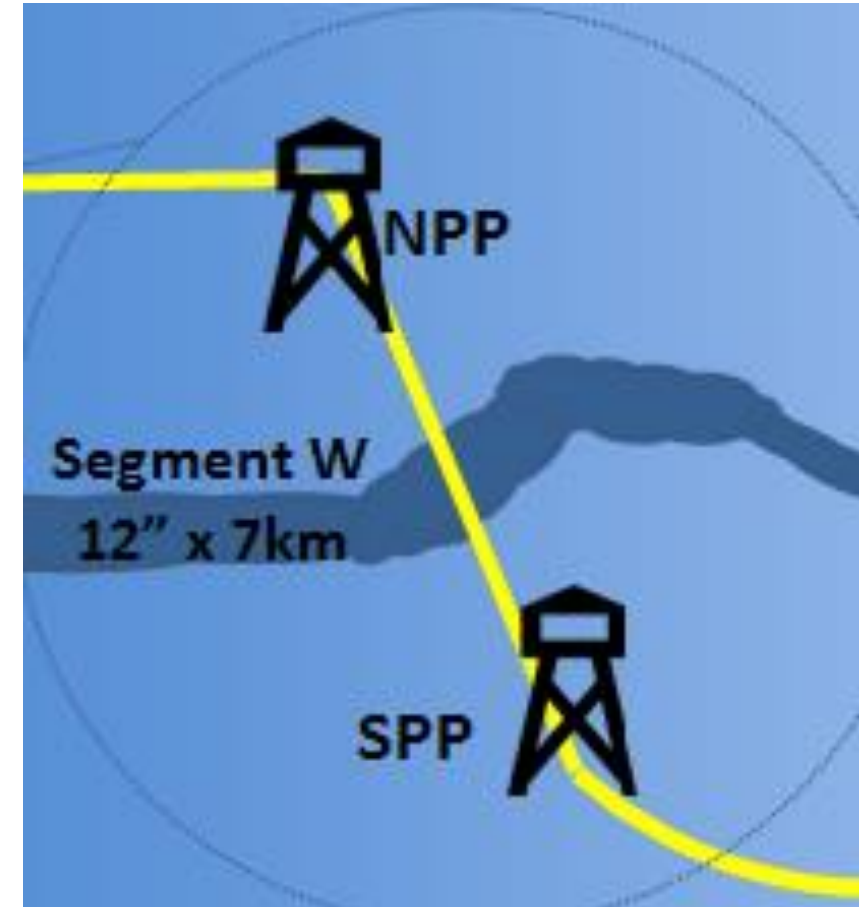
Scope of Work – Segment C July 2015

- 8m pipeline section cut out
- Flanged spool installed
- Segment topped up and re-tested



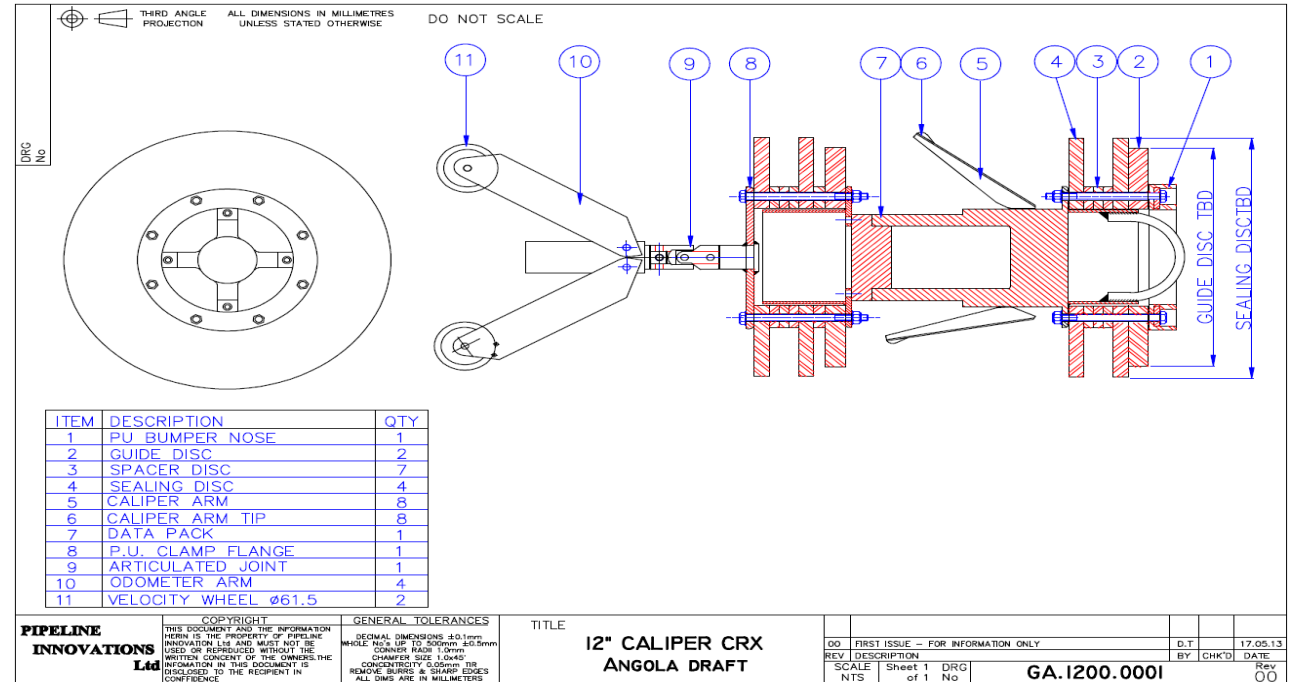
Scope of Work – Segment W August 2013

- 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

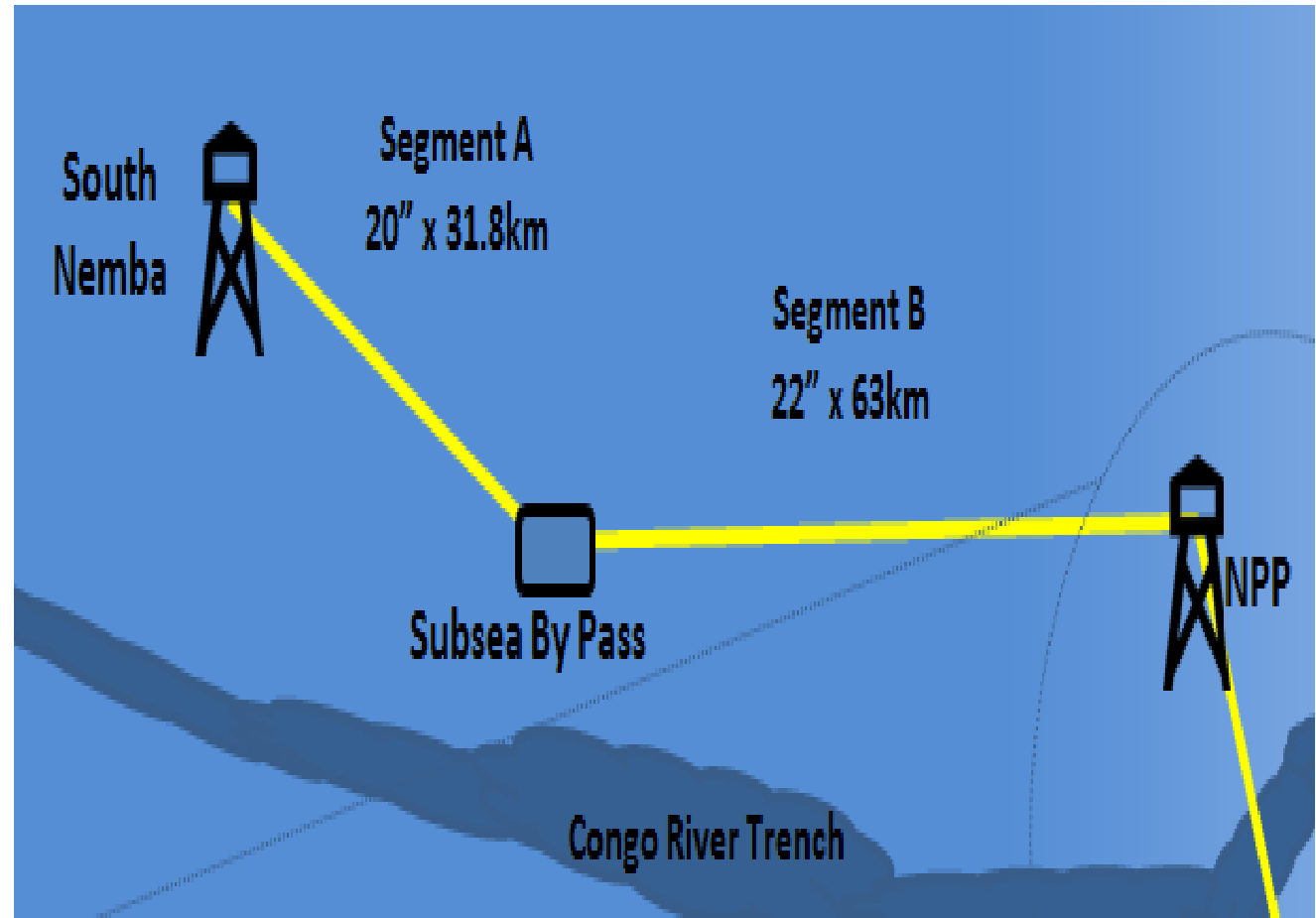


Scope of Work – Segment W August 2013

- 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



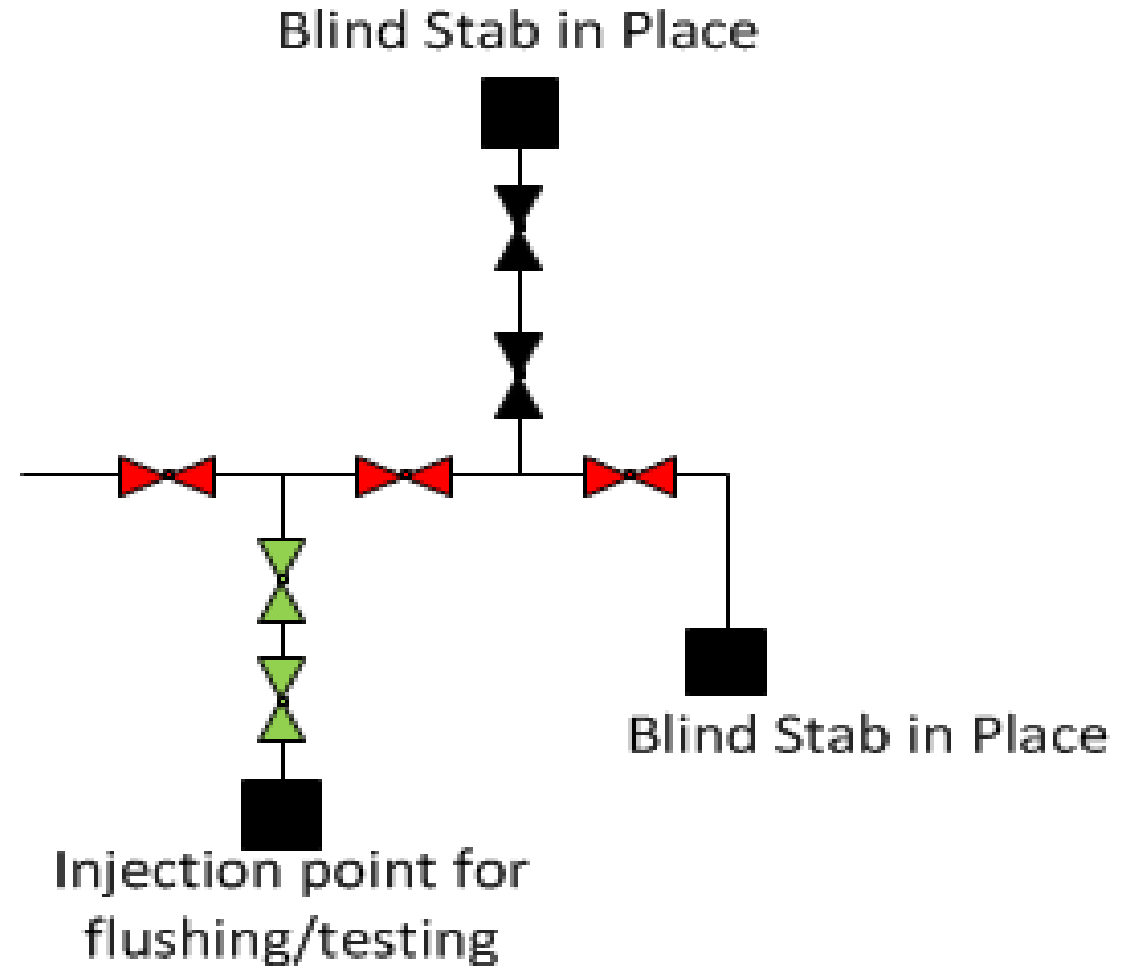
Scope of Work – Segment A+B November 2014

- Unexpected volume of debris in line when pigs recovered
- Required a fast mobilisation to perform additional cleaning runs completed by others

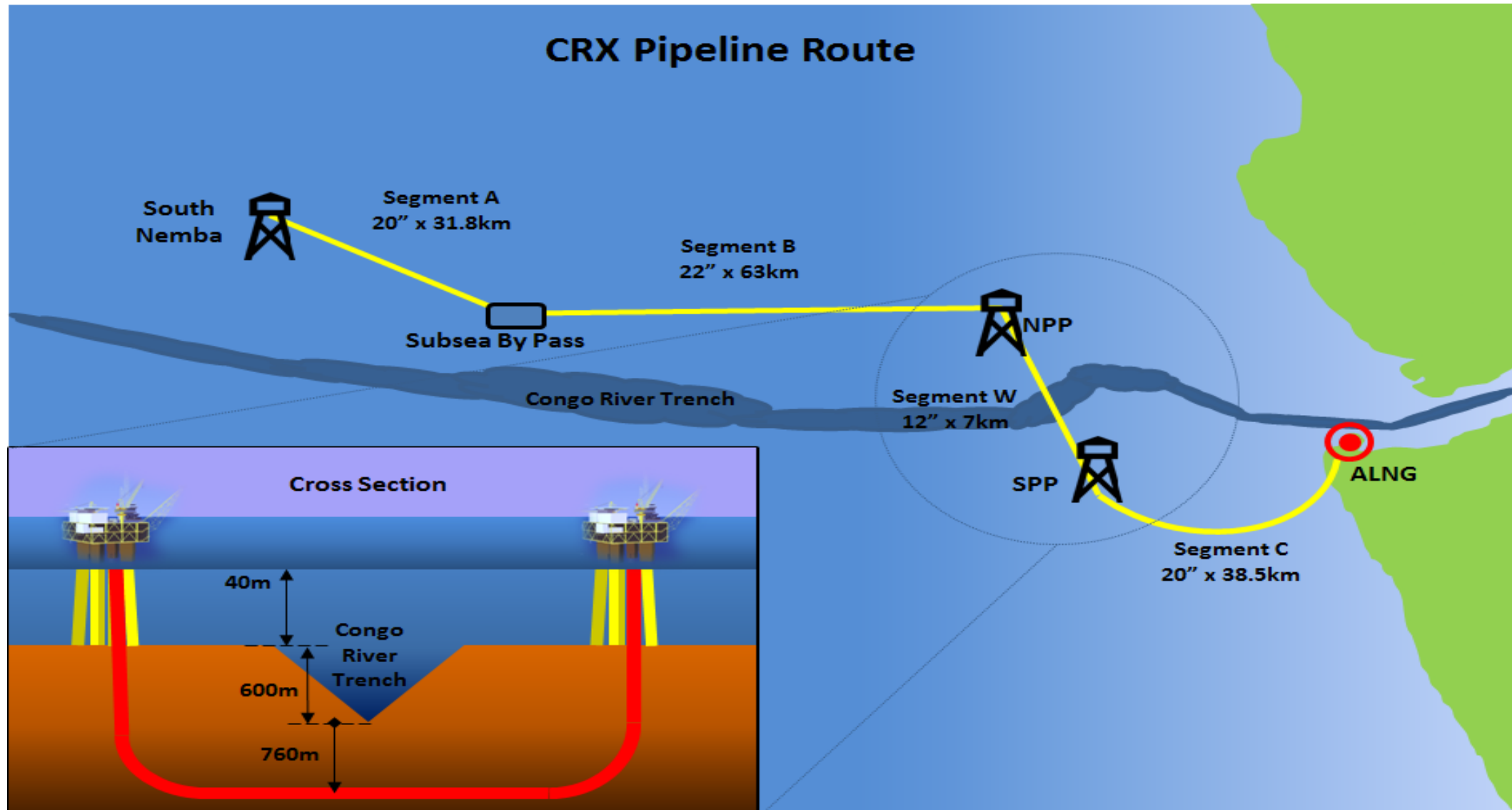


Scope of Work – Segment A+B November 2014

- 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



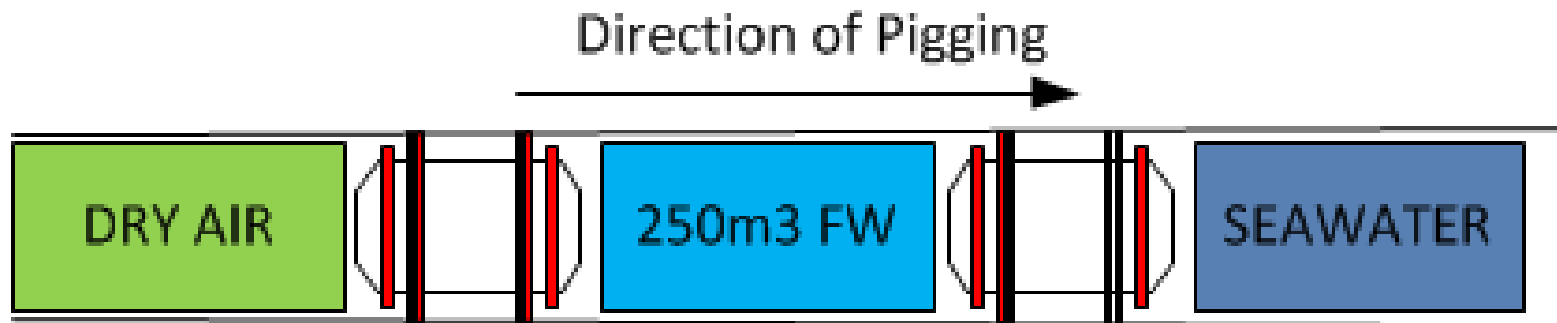
Scope of Work – Full System Commissioning November 2015



Scope of Work – Full System Commissioning November 2015

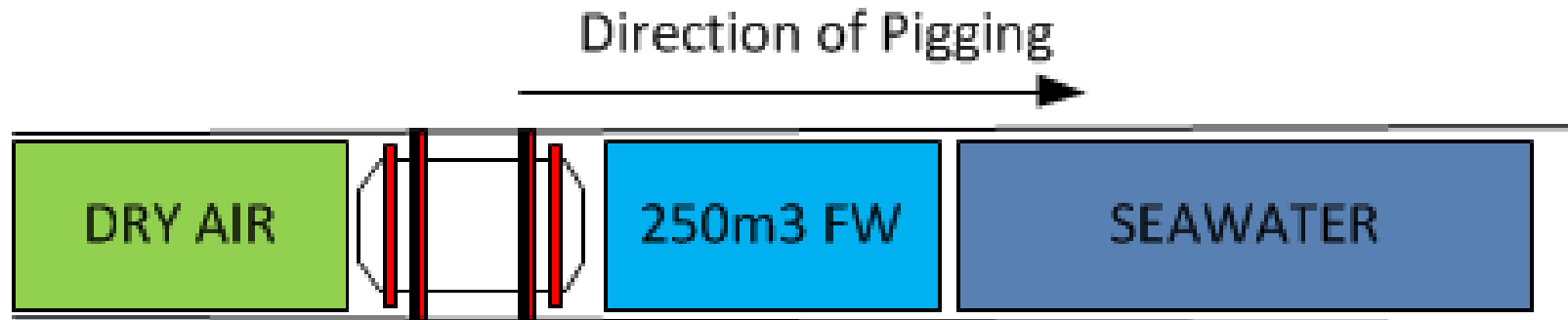
- Segment C Bulk Dewatering

- 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



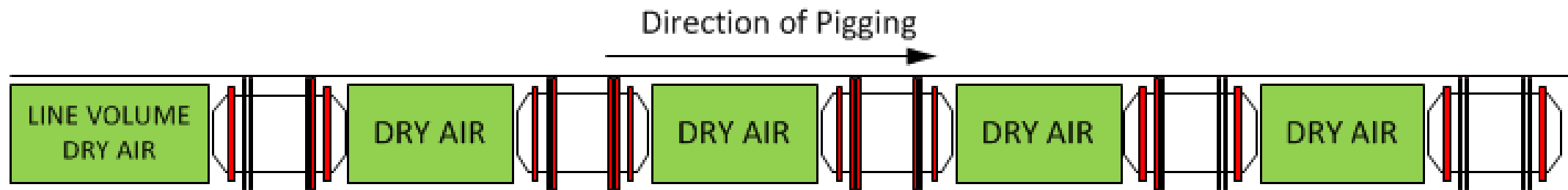
Scope of Work – Full System Commissioning November 2015

- 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



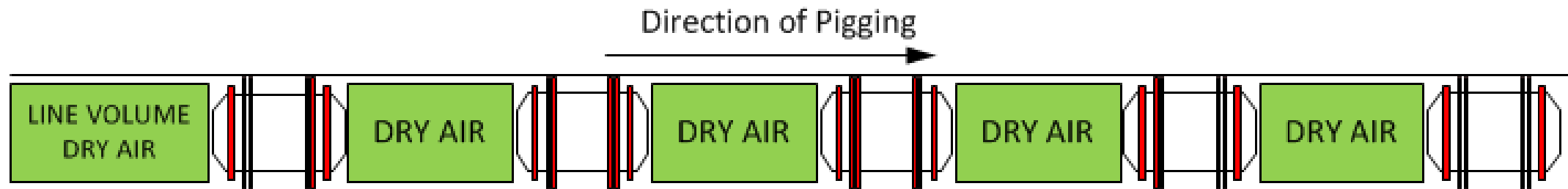
Scope of Work – Full System Commissioning November 2015

- Segment C Final Dewatering
 - 5 x Hi-Seal Bi-Di propelled with 1km with dry air
 - Discharge routed overboard at SPP



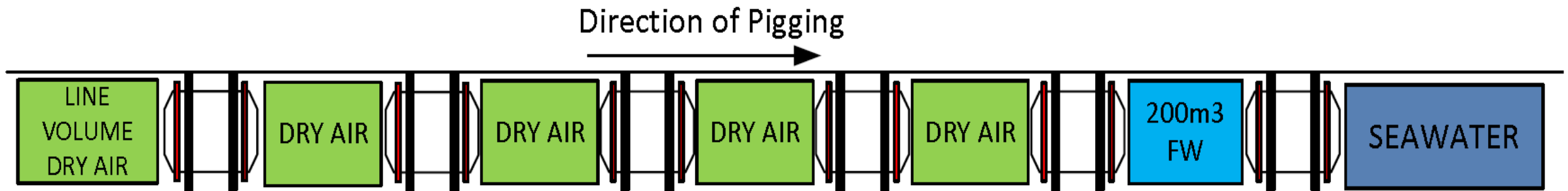
Scope of Work – Full System Commissioning November 2015

- Segment W Final Dewatering
 - 5 x Hi-Seal Bi-Di propelled with 1km of dry air
 - Discharge routed overboard at NPP



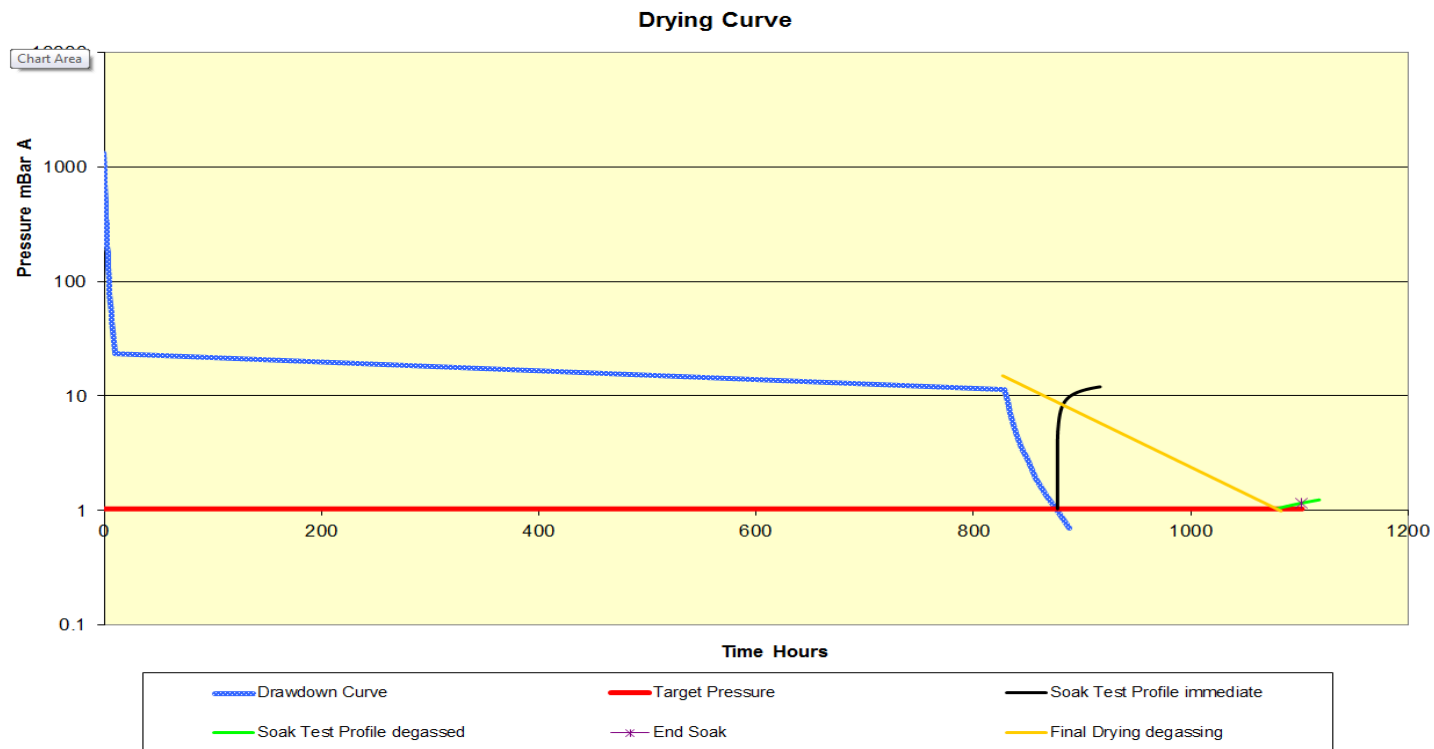
Scope of Work – Full System Commissioning November 2015

- 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:
 - 51.8barg
 - 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



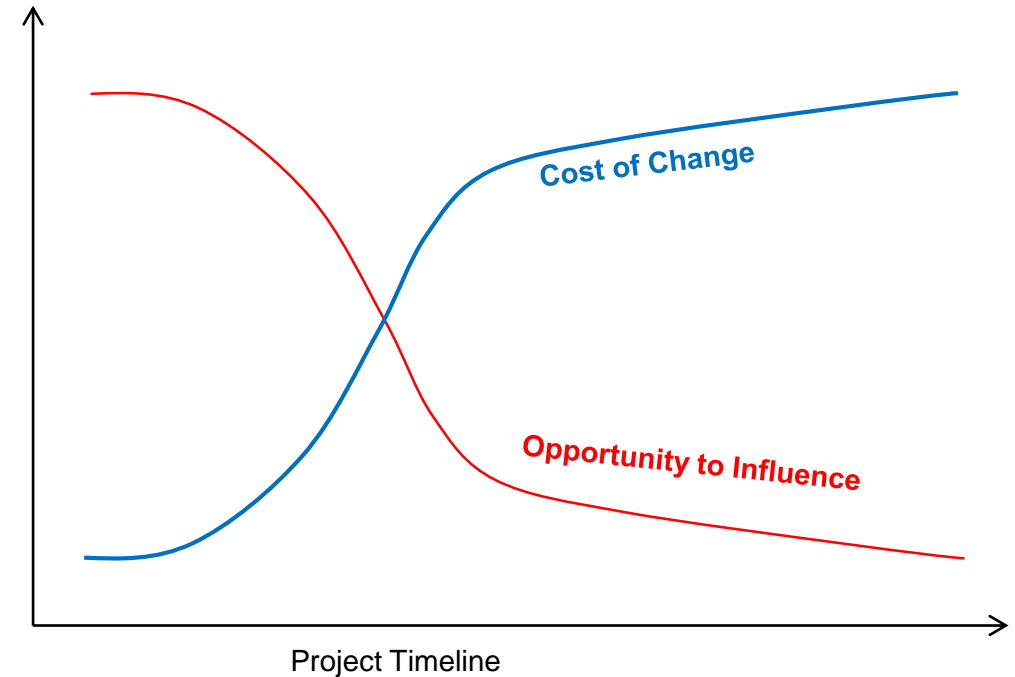
Summary & Conclusion

- 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