

MCEED

DEEPWATER DEVELOPMENT

28 - 30 March 2023 | Millennium Gloucester Hotel | London, UK

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Quest Offshore

World Oil®

Salamander Solutions

Bringing the Heat to Subsea

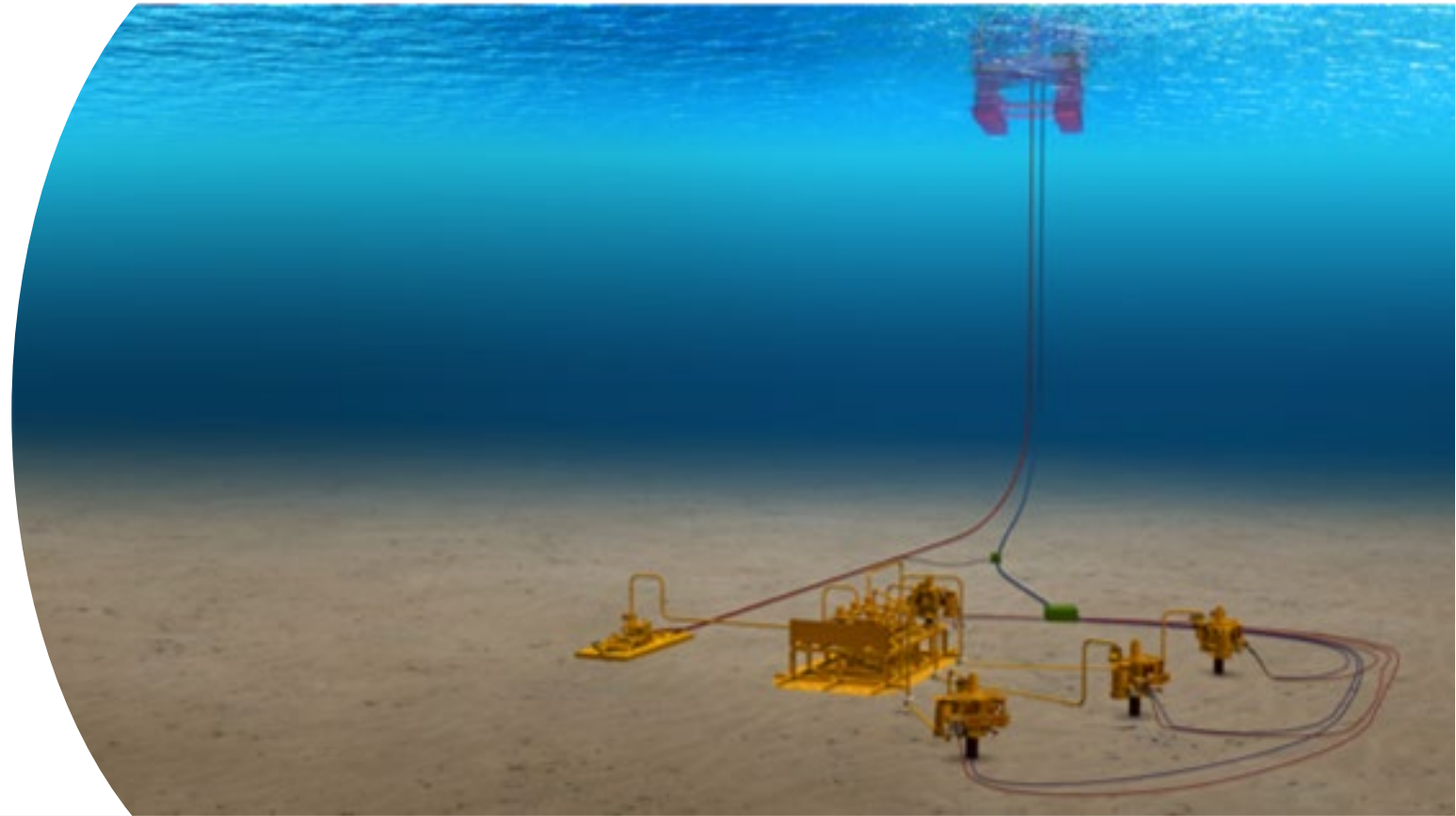
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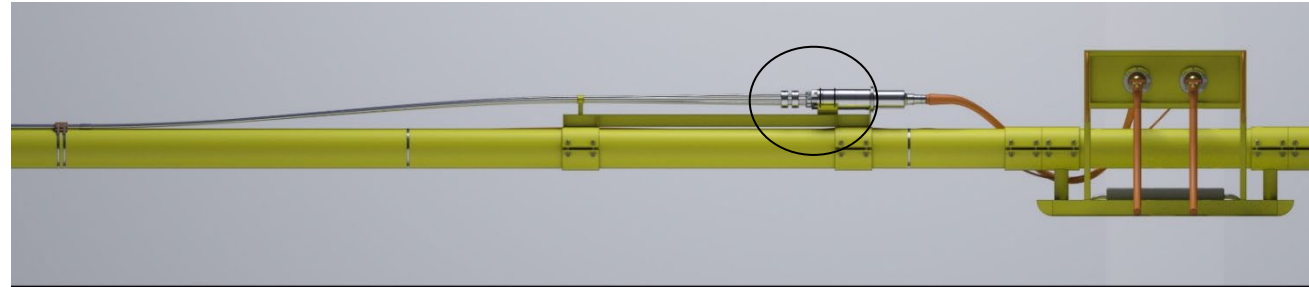


Flowline Applications

- Designed for 12" pipe, 40km, single circuit
- Prevent/remove plugs
- New or Existing Flowlines
- Potential to lower capex, opex, improve HSE
- Rated to 10,000' WD



Heater System – Only 4 Components



Crossover/Wet Connect

Cable



Connector Joint

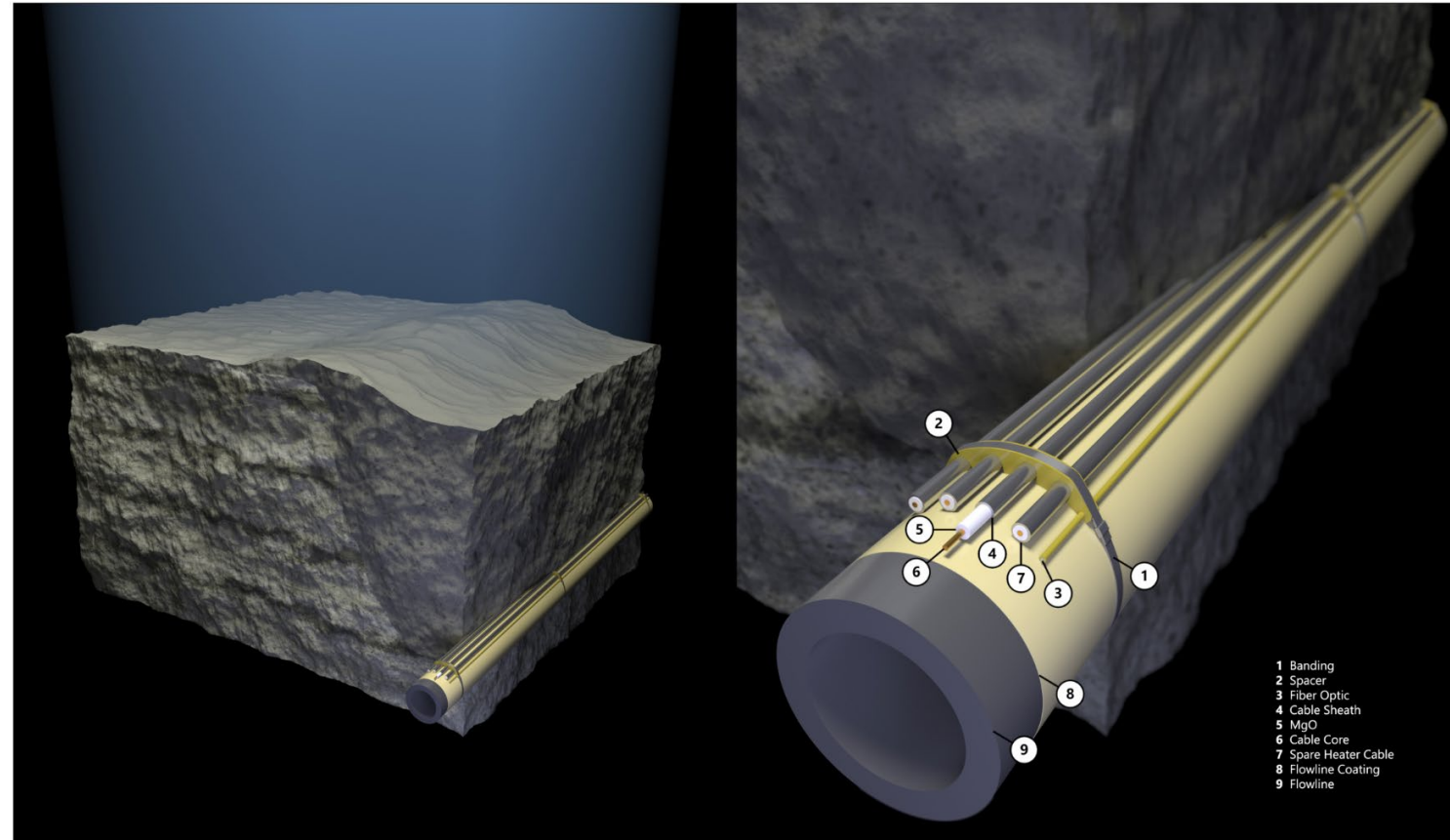


End Termination



Subsea Flowline Heater System

- Burial is equivalent to ~2 ½” wet insulation
- Eliminating insulation offsets cost of burial and heater system
- Burial stores heat in soil, extending no-touch time



Burial Study

- Unit below completed ~40km on BC-10 flowlines in ~2000m WD (2016)
- System Rated depth 3000m

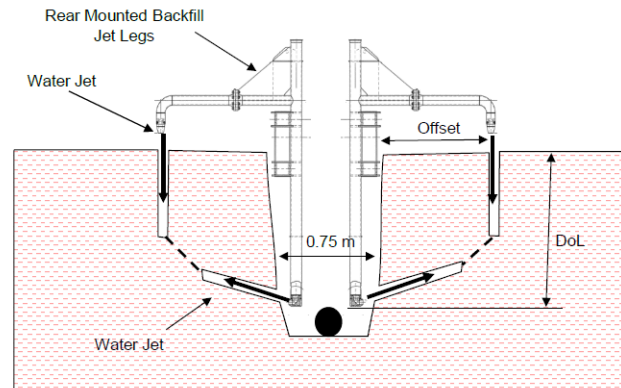
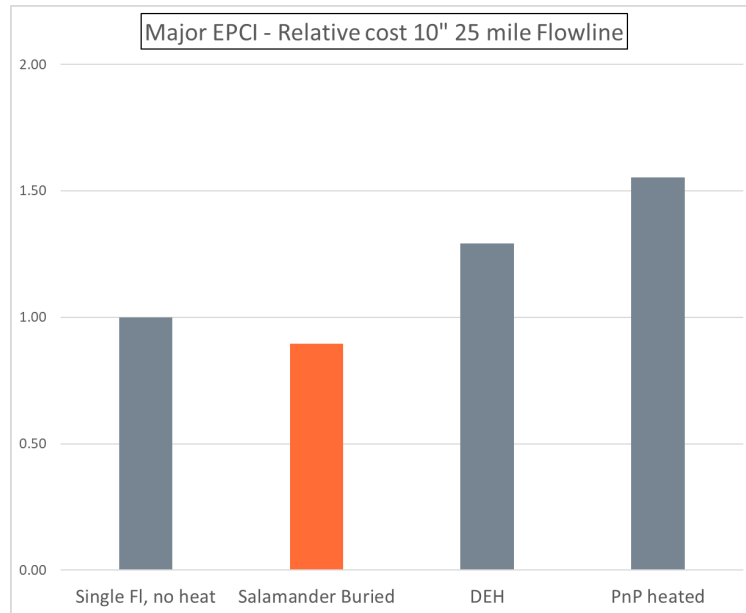


Figure 7-5 Backfill Tool Configuration

Project	Trencher	Pipe Dia (mm)	Su (kPa)	Specification	As Trenched
BC-10 – B1	T1200	400	7 to 15	1.52 m DoC	Average DoC 1.15 m
BC-10 – B2	T1200	400	7 to 15	1.52 m DoC	Average DoC 1.17 m
BC-10 – P3	T1200	278	7 to 15	1.52 m DoC	Average DoC 1.19 m
BC-10 – P2	T1200	278	7 to 15	1.52 m DoC	Average DoC 1.30 m
BC-10 – P1	T1200	278	7 to 15	1.52 m DoC	Average DoC 1.18 m
Coulomb	T600	220 (8.625")	1.5 to 4.4	1.6 m DoL followed by backfill pass	93% within DoL specification DoC average 1.3 m
Glider	T750	220 (8.625")	2 to 5	0.9 m DoC	Specification achieved throughout
NT Project (SU31)	T750	366	5 to 10	0.8 m DoC	Specification achieved over 100% of pipeline
NT Project (SU38)	T750	366	5 to 10	0.8 m DoC	Specification achieved over 99% of pipeline
WG Project	T750	168 (6.625")	4 to 17.5	0.6 m DoC	Specification achieved over 87% of pipeline

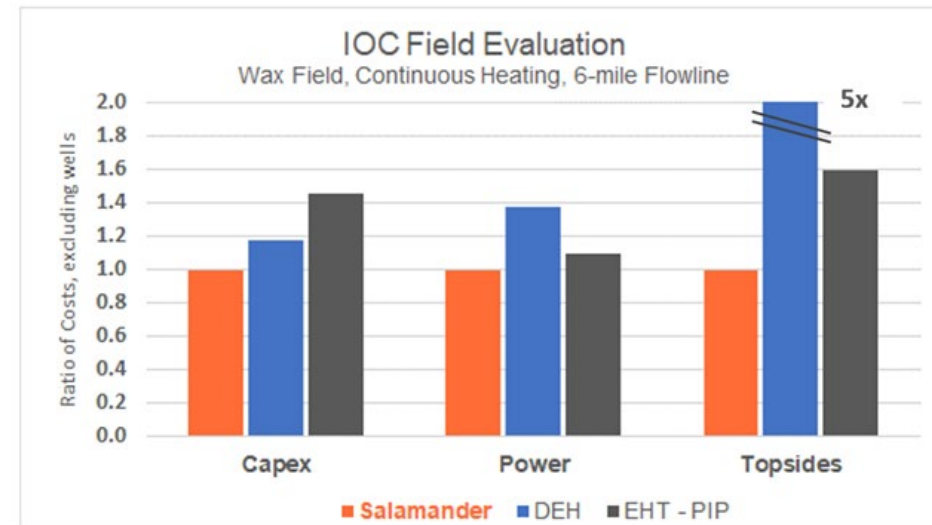
Table 6-1 Summary of Example Trench Backfilling Projects and Results

Installed Single Flowline Comparison



Major EPCI study indicates Salamander System is lowest, Total Installed FL Cost, even against single insulated case.

IOC study indicates Salamander System is best in class across Capex, Power use and Topsides required.



Remediation System Basis

- Deployable from a wide range of marine vessels
- Installable on 6-12” flowlines having 2.5” of wet insulation
- Water depths to ~5000’ water depth
- Heat flowline fluids to 50°C within 3 days over 600m
- Future flexibility for extended heated length, deeper water, etc.

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