Middle East to India Deepwater Pipeline

Progress Update Meeting with NIGEC

6th and 7th February 2011

February 2011

NIGEC Progress Update FEB 2011

AGENDA

1. Introductions
2. Progress of Conceptual design studies
    I. Completed studies
    II. Ongoing and Planned Studies for 2011
    III. Schedule for 2011 Activities
    IV. Project Schedule
3. Example Study Results
4. CastorOne Visit
5. AOB

The SAGE Project – Key team members

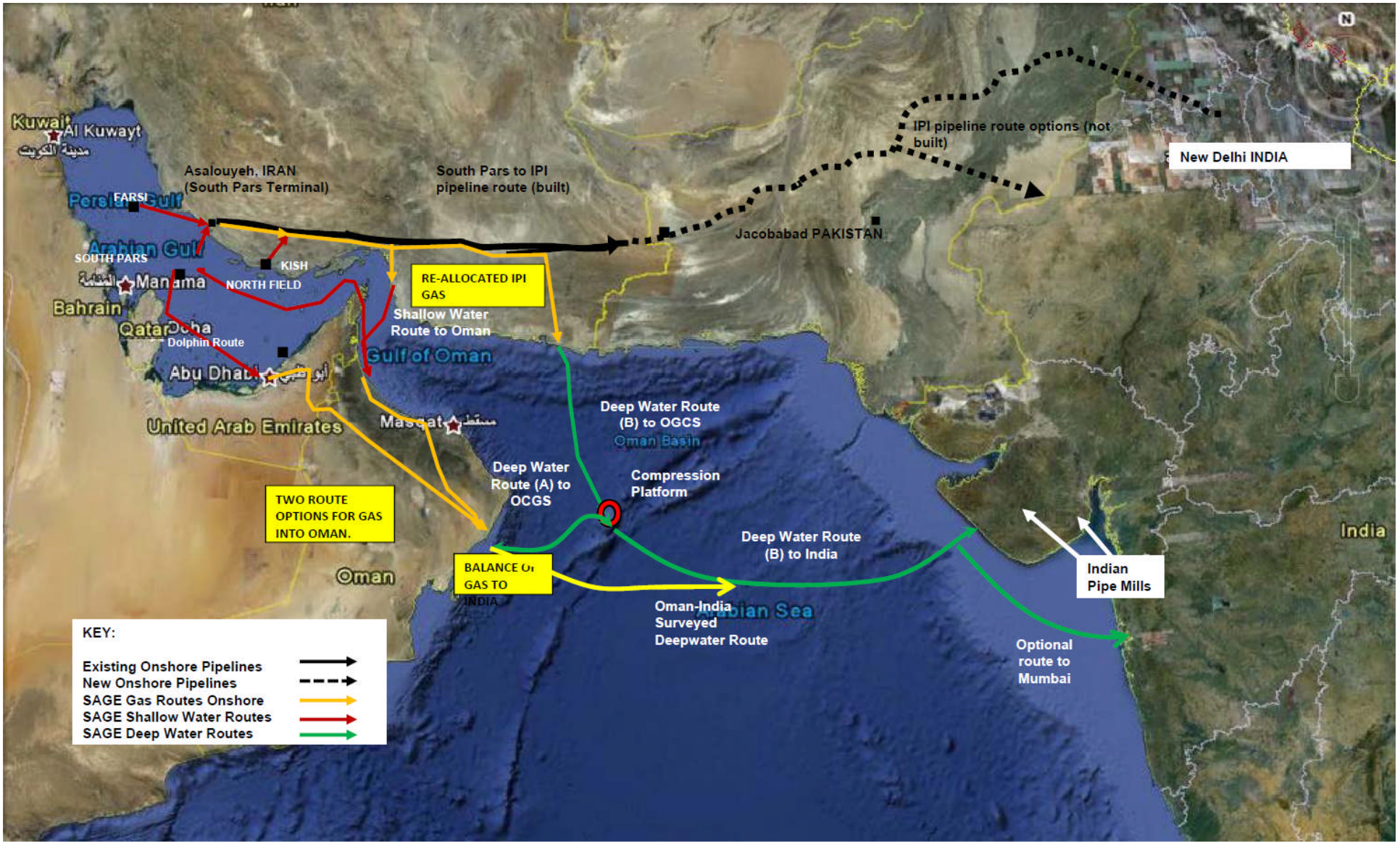
Mr. T.N.R. Rao	▪ Former Petroleum Secretary, Govt. of India and "Architect of the Oman-India Pipeline" ▪ Chairman of the SAGE Advisory Board ▪ Founder Chairman, Hydrocarbons Education & Research Society, Indian School of Petroleum ▪ Founder Chairman – University of Petroleum & Energy Studies
Subodh Jain	▪ Director: INOX-AIR PRODUCTS Ltd. ▪ Director: South Asia Gas Enterprise PVT Ltd ▪ Director: Siddho Mal & Sons, New Delhi ▪ Former Senior Advisor to original Oman-India Pipeline team
Peter M Roberts	▪ Director: South Asia Gas Enterprise PVT Ltd ▪ Managing Director: VerdErg Ltd, London ▪ Former Project Director of original Oman-India Pipeline ▪ Former Director Project & Construction Services at JP Kenny and Managing Director INTEC (UK)
Dr Herman Franssen	▪ Senior Consultant to SAGE ▪ Member of the SAGE Advisory Board. ▪ President, International Energy Associates, USA ▪ Former Economic Advisor to the Oman-India Pipeline project ▪ Former Economic Advisor to the Sultanate of Oman, Ministry of Petroleum
Ian Nash	▪ Business Acquisition and Operations Director, Peritus International (UK) Ltd. ▪ Managing Director INTECSEA (UK) Ltd. ▪ Engineering Manager for MEDGAZ FEED. ▪ Engineering Manager (Saipem Inc) for Canyon Express design EPIC. ▪ Project Manager (SASP UK) for Europipe 2, 42-inch 650 Km Gas Trunkline detailed design.
Dr Alastair Walker FRS	▪ Leading International Expert on Marine Pipeline Engineering ▪ Senior Consultant to SAGE ▪ Member of the SAGE Advisory Board ▪ Professor Emeritus, University of Surrey UK ▪ Visiting Professor, University College London

The SAGE Project – Key Partners

MOUs/Agreements to Co-operate in developing SAGE have been signed with:

- Indian Oil Corporation
- Oman Ministry of Oil and Gas
- GAIL
- NIGEC
- Engineers India Ltd
- Peritus International (UK) Ltd.
- INTECSEA Engineering (UK) Ltd.
- Saipem spa Milan
- Heerema Marine Contractors, Leiden.
- CORUS steel, UK
- WELSPUN
- FUGRO GeoConsulting Ltd.UK
- Det Norske Veritas, Oslo

Gas Routes to India



February 2011

Completed studies

- Design Basis definition
- Flow Assurance Studies
- Mechanical Design
- Onshore Compression Station Definition
- Offshore Compression Station Definition
- Quantified Risk Assessment - OIP Update
- Geohazard and Fault Crossing Assessment Phase 1
- Metocean data Phase 1
- GIS Data collection Phase 1

Ongoing and planned 2011 studies

- Geohazard and Fault Crossing Assessment Phase 2 (Ongoing)
- Metocean data Phase 2 (Ongoing)
- GIS Data collection (Ongoing)
- Riser and Subsea By-Pass definition (Ongoing)
- Pipeline Intervention Review (Ongoing)
- Vessel & Equipment Capabilities review (Ongoing)
- Onshore Compression Station review (Planned)
- Offshore Layout Optimisation (Planned)
- Insurance Risk Review (Planned)
- Survey Definition and scope of work (Planned)
- Define Survey ITT and tender (Planned)
- Environmental Statement (Planned)
- Establish no Hydrotest principle (Planned)
- Emergency Repair Equipment Review (Planned)
- Examine the effect of moderate heat treatment (Planned)

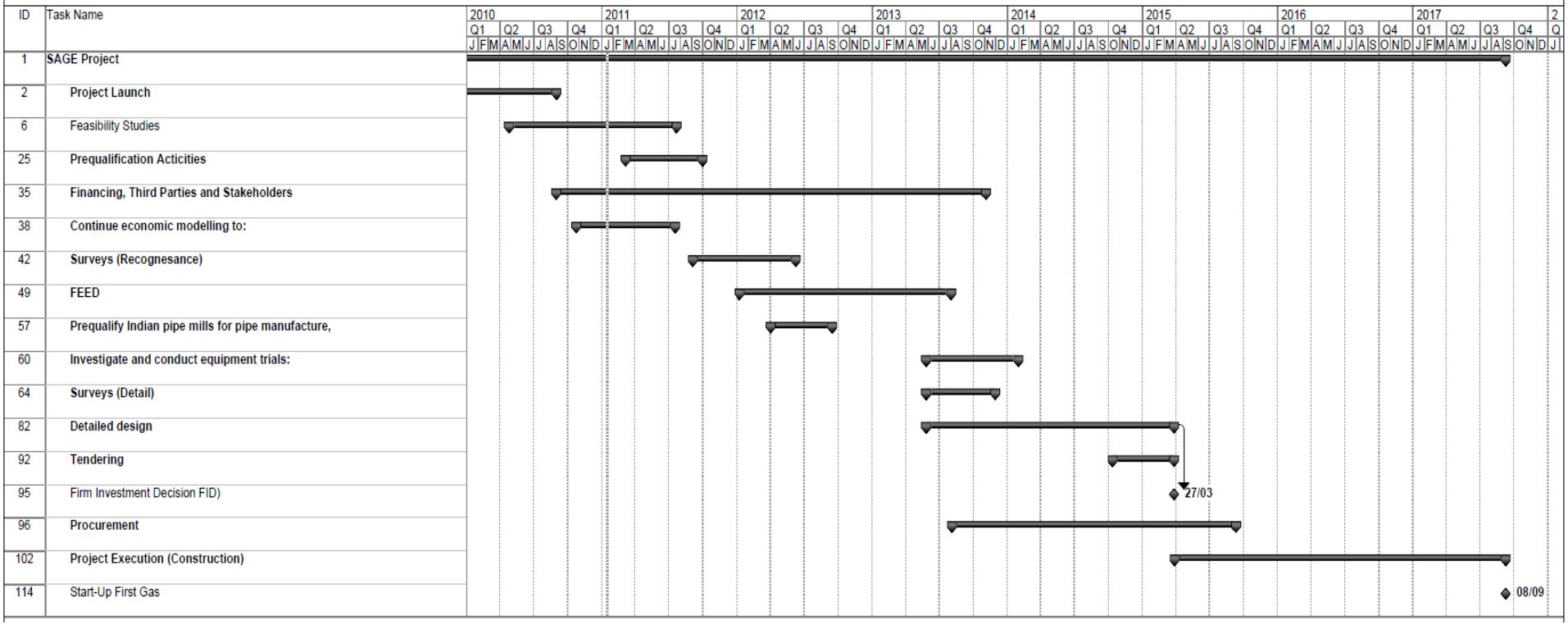
Schedule for 2011

Development Activities 2010-2011

No.	*Activity*	*Who*	*Status*	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Project Management	Peritus	Ongoing														
2	Route Study Oversight	Peritus	Ongoing														
3	QRA Update	Peritus	Complete														
4	Pipeline intervention review	Peritus	Ongoing														
5	Equipment capabilities review	Peritus	Ongoing														
6	Riser and Subsea Bypass definition	Peritus	Ongoing														
7	EPRS Status Update (Medgaz, Transmed, Bluestream and Greenstream projects).	Peritus															
8	Prequalify Indian pipe mills	Sage/Per															
9	Prepare comprehensive cost estimates for each routing option and diameter /compression combinations.	Peritus															
10	Prepare scope of work for FEED contracts & Tender	Peritus															
11	Prepare Survey ITT and Tender	Peritus															
12	Route Corridor Desk Study Phase 1	Fugro	Ongoing														
13	Route Corridor Desk Study Phase 2	Fugro	Ongoing														
14	Establish no Hydrotest principle with DNV	DnV															
15	Insurance Risk (DnV cover at commercial rates)	DnV															
16	Examine the effect of moderate heat treatment on collapse strength of the pipe	Wellspun /Corus															
17	Continue economic modelling	SAGE															
18	Environmental Baseline Survey	Fugro/M															
19	Preliminary Environmental Statement.	Fugro/M															
20	Onshore Compression Verification	Petrofac															
21	Offshore Layout Optimisation	Petrofac															
22	Receiving Terminal Definition	Petrofac															

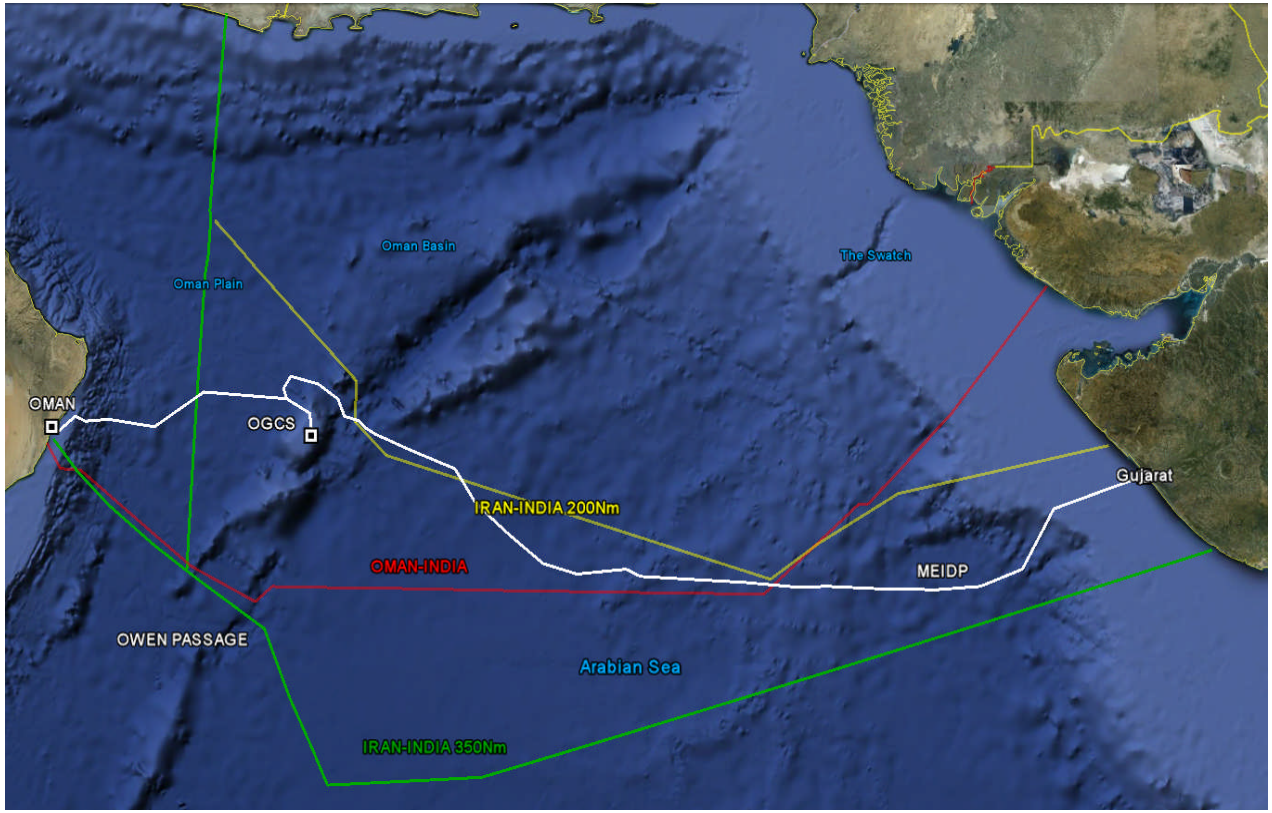
Project Development Schedule

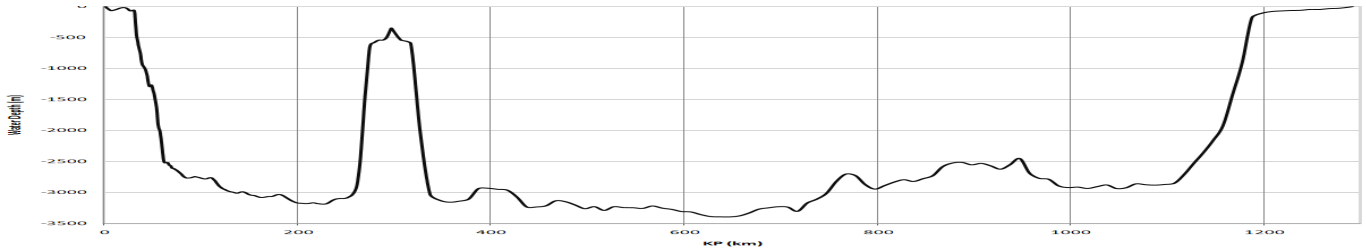
SAGE
Middle East to India Deepwater Pipeline
Development Schedule



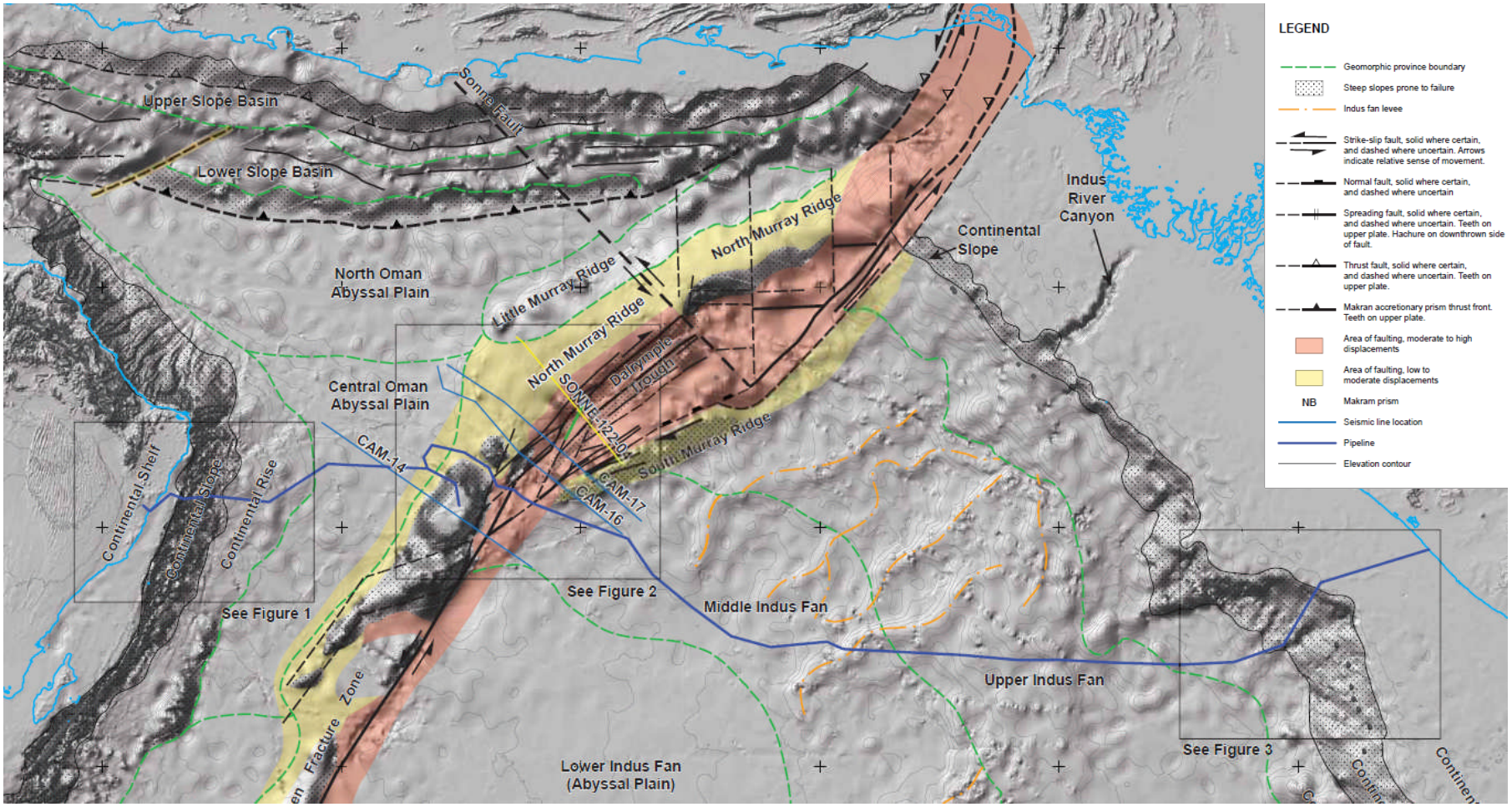
Historical Route Options

- Historically many routes have been considered.
- All are considered to be Installable.





Deep Water Routes to India



Possible route direct from gas export landfall via Compression Platform on Sea Mount. Two shorter, smaller lines laid by existing barges can be used on this route. Note there is no 3rd Party Jurisdiction crossing.

The route stays to the South to avoid expensive, difficult crossings of the Murray Ridge and Indus Fan.

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Indus Fan and Indian Slope

- The Indus Fan is formed in a 2500m thick pile of sediment covering the greater part of the Arabian sea.
- It was formed by the Indus river which drains the local topography from the western Himalayas and feeds the erosional outwash into the Arabian Sea
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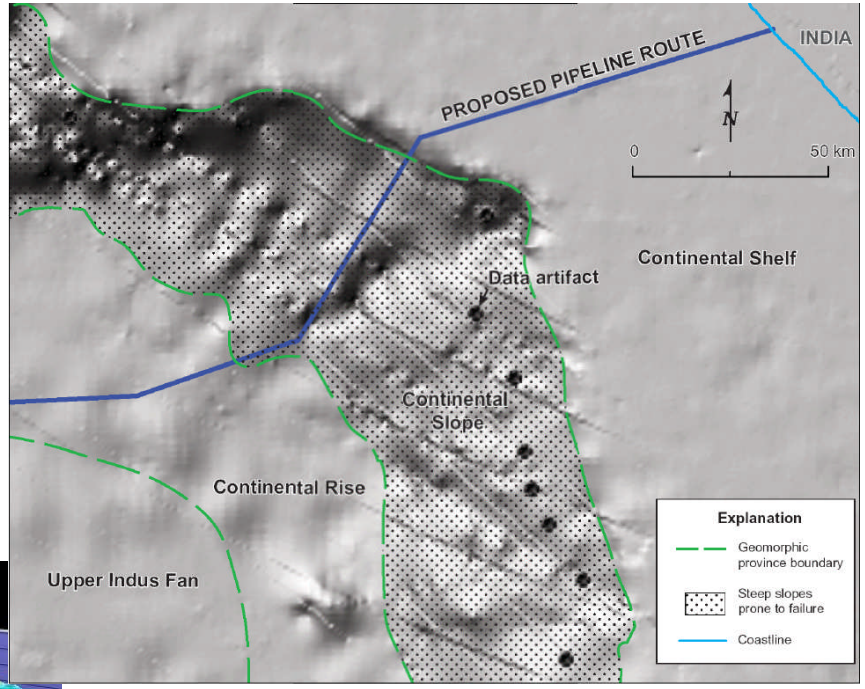
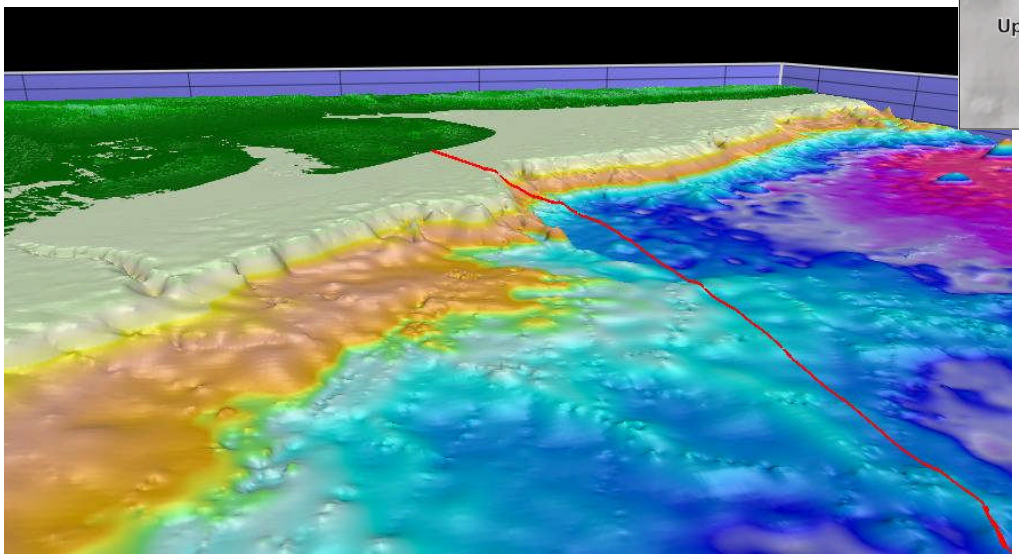
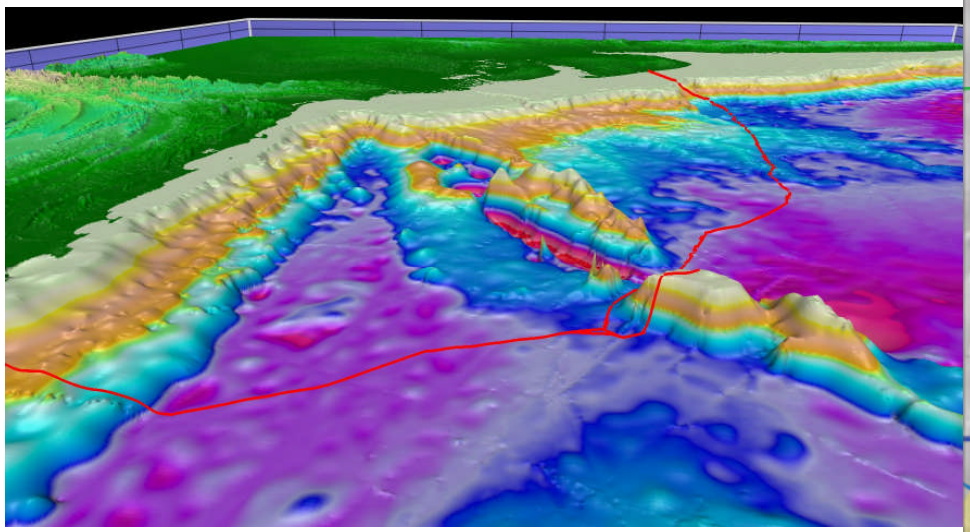
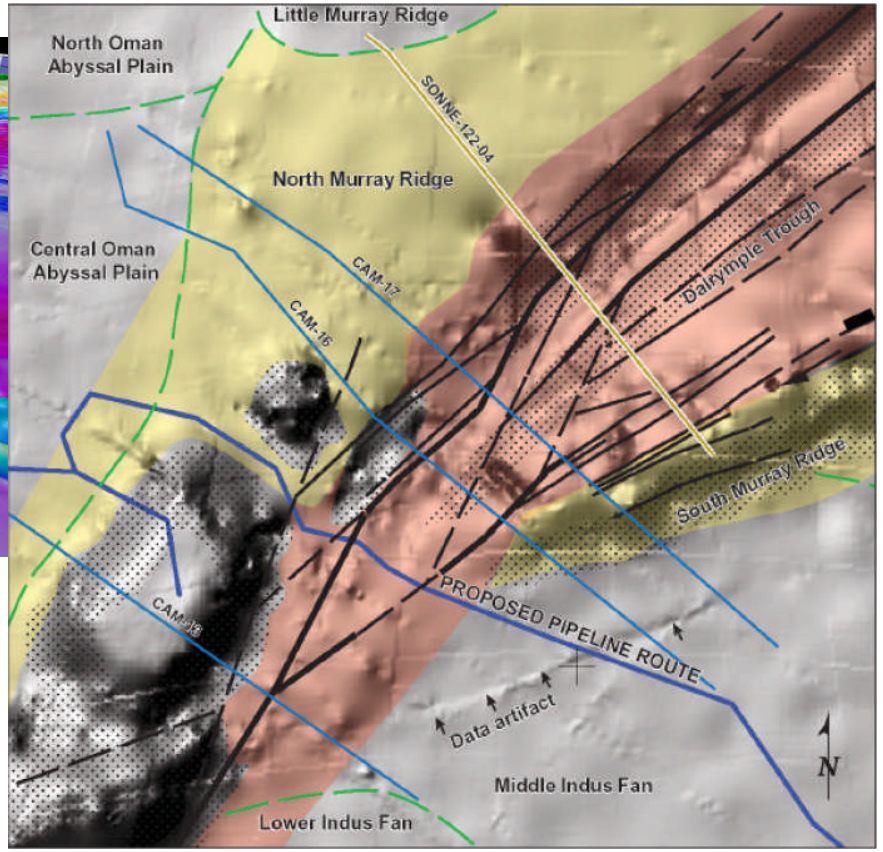




The Indus is comparable in size and discharge to the Mississippi and is one of the major geological features of the Indian Ocean

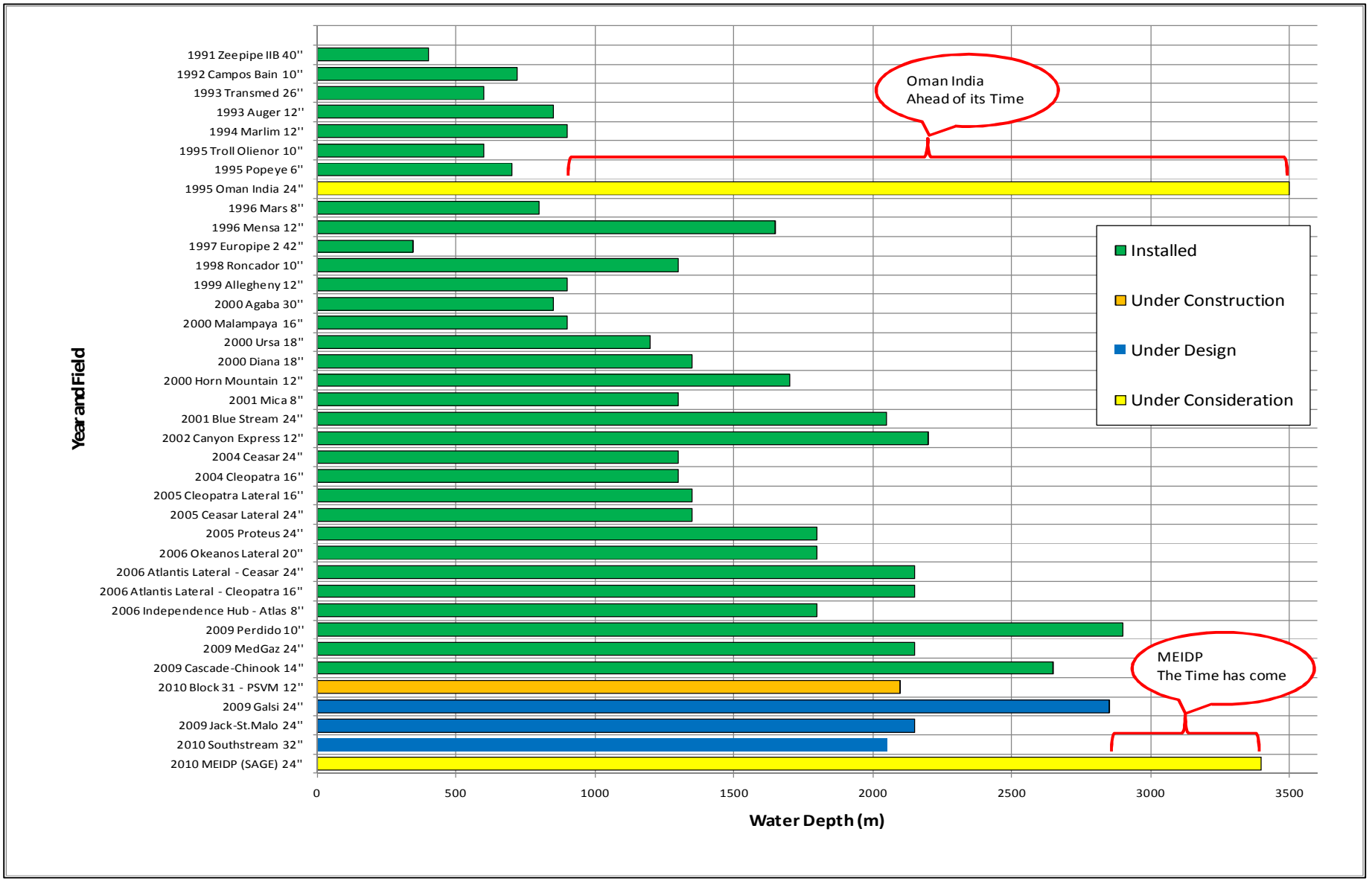
Murray Ridge and Qualhat Seamount



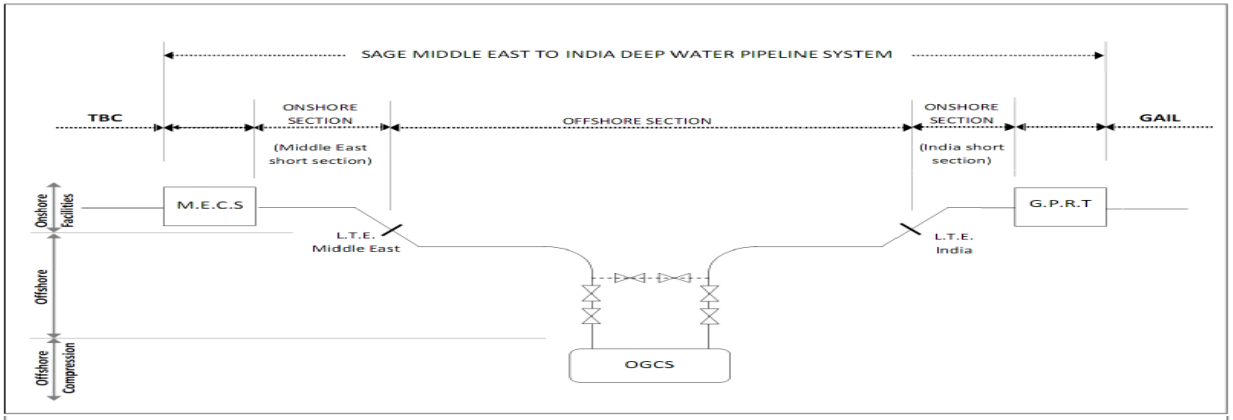


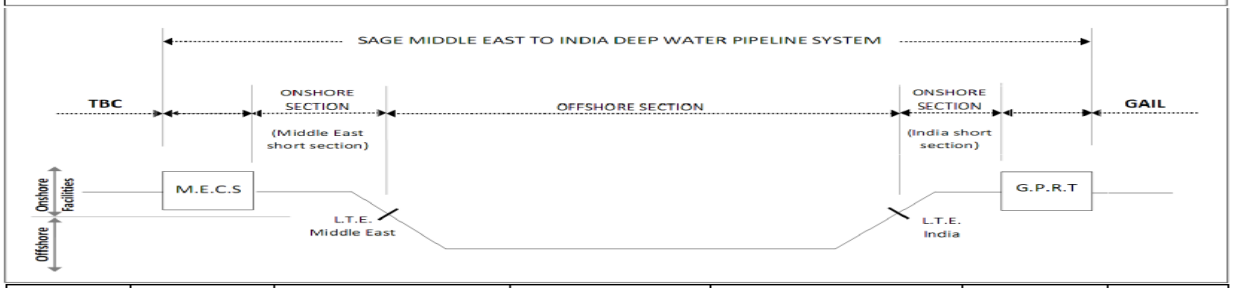
- The seamounts at the South-West end of the Murray Ridge present a near-ideal location for an in-line Compression Platform.
- These remarkable features reach to within 300m of Sea Level, as shown.
- Several examples of platforms in this water depth exist.
- Max Slope 20deg on Northern side similar to Landfalls.
- The Compression Platform will be outside of all Territorial Waters but within helicopter supply range.

The Drive into deeper Water



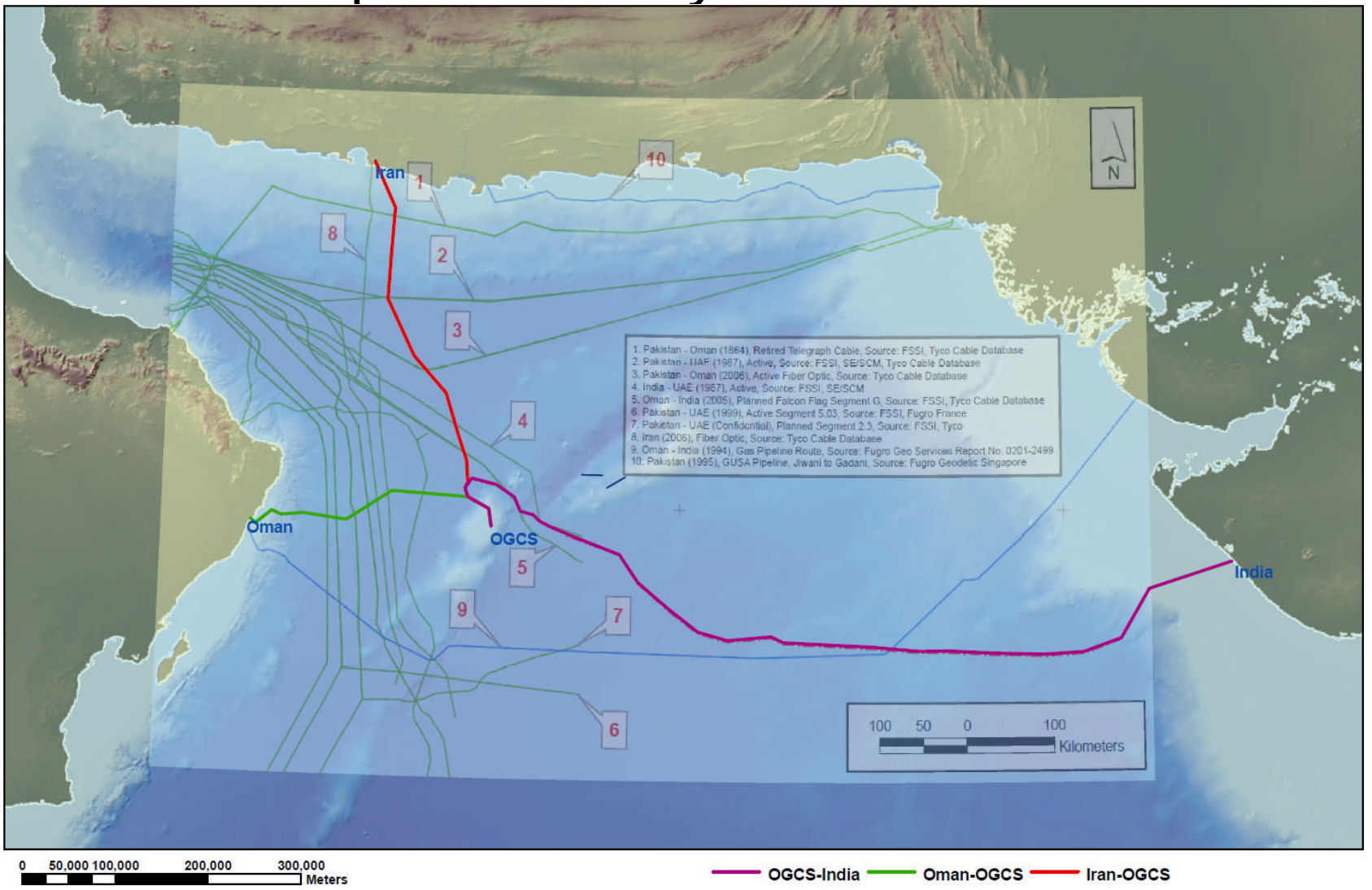
Completed studies – Design Basis



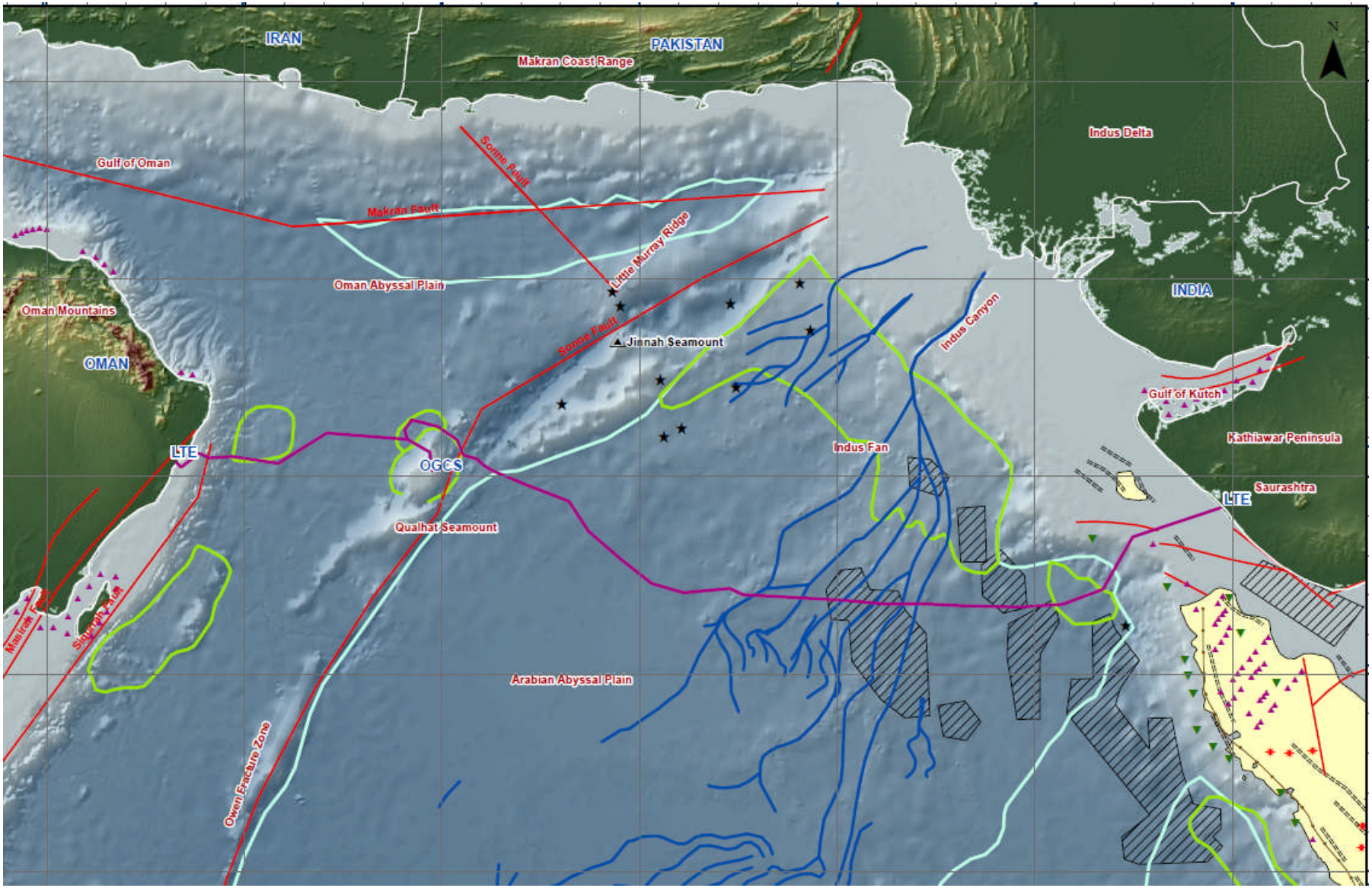


50barg →	M.E.C.S.	400barg → 50barg	OGCS	400barg → 50barg	G.P.R.T. (India)	TBD →
50barg →	M.E.C.S	400barg → 200barg	OGCS	400barg → 50barg	G.P.R.T. (India)	TBD →
50barg →	M.E.C.S.	400barg → 50barg			G.P.R.T. (India)	TBD →
50barg →	M.E.C.S.	400barg	OGCS	Reduced pressure &	G.P.R.T. (India)	TBD →
50barg →	M.E.C.S.	400barg → 200barg	OGCS	400barg → 50barg	G.P.R.T. (India)	TBD →
				400barg → 50barg	Mumbai (India)	TBD →

Cable and Pipeline Survey Data



Completed Studies – Geohazards Phase 1



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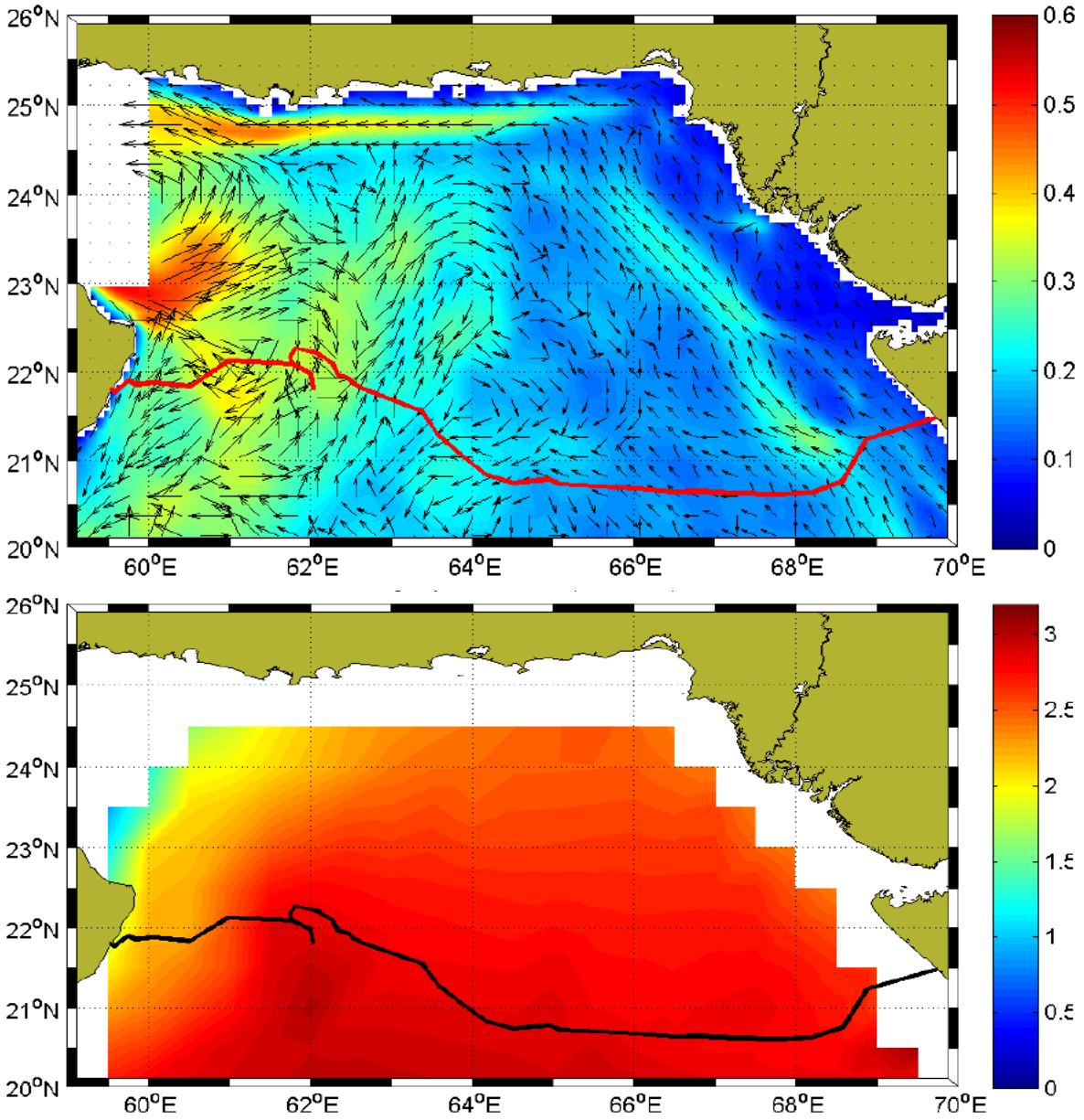
Completed Studies – Metocean Phase 1

Environmental Parameters

- Wave Heights
- Currents (Seabed-Surface)
- Temperatures
- Winds



Flow Assurance Results (1)

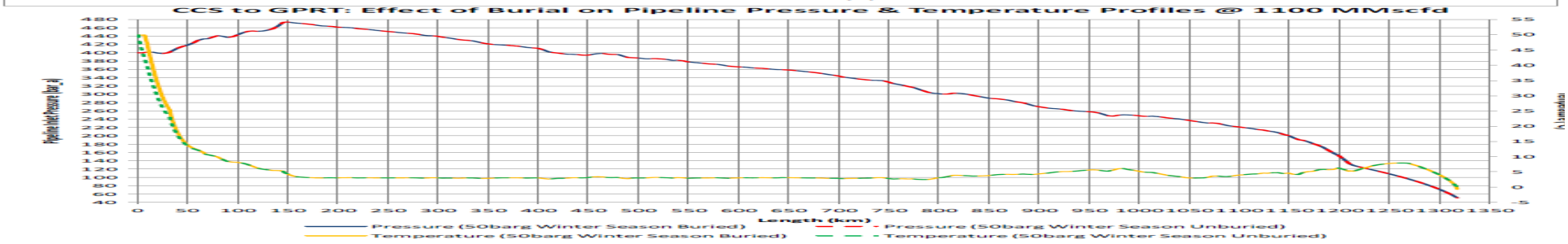
The following line sizes have been selected for the various options considered for the Middle East to India deepwater pipeline from Chabahar to Gujarat for an export (sizing case) flowrate of 1100 MMscfd or 31.1 MMSCMD :

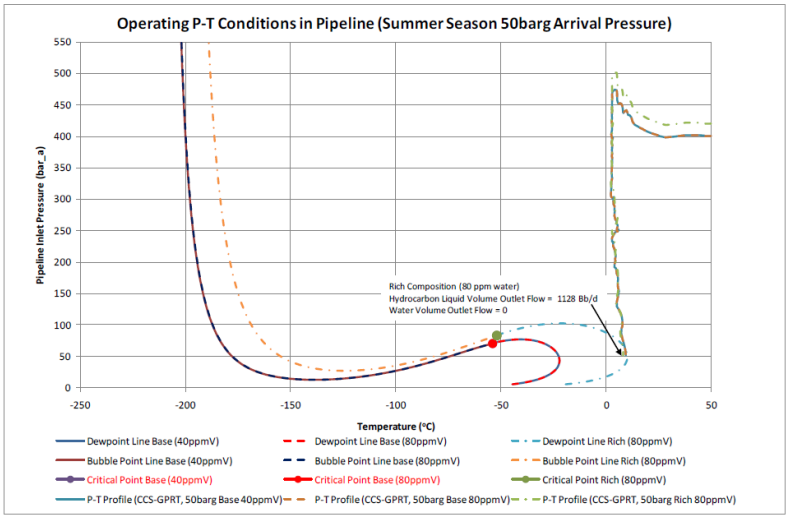
- CCS to OGCS, 400barg-50barg, ID=487mm
- CCS to OGCS, 400barg-200barg, ID=530mm
- OGCS to GPRT, 400barg-50barg, ID=579mm
- CCS to GPRT, 400barg-50barg, ID=610mm

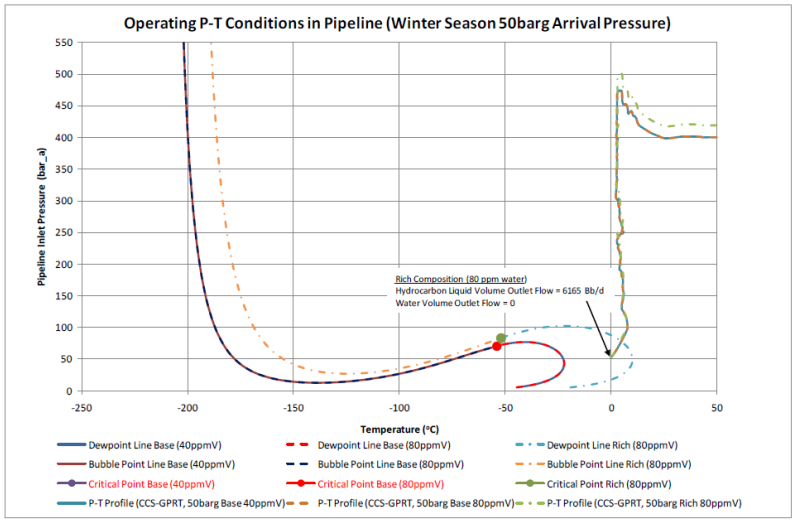
- Of the two OGCS arrival pressures considered in Option 1, the high arrival pressure case is the preferred option for the following reasons:
  - By operating in dense phase, the velocities are manageable (6 m/s).
  - By operating at lower velocities the gas arrival temperature at the offshore station is approximately 7°C which is manageable.
  - By operating in Dense Phase a larger pipeline (530 mm ID) will be required.

Completed studies – Flow Assurance

Seabed Profiles, Temperatures and Pressures (MECS to GPRT)







Rich-Upset (Summer)

Rich-Upset (Winter)

Completed Studies – Mechanical Design

The wall thickness design is performed in accordance with DNV-OS-F101 using DNV 485 DSAW linepipe

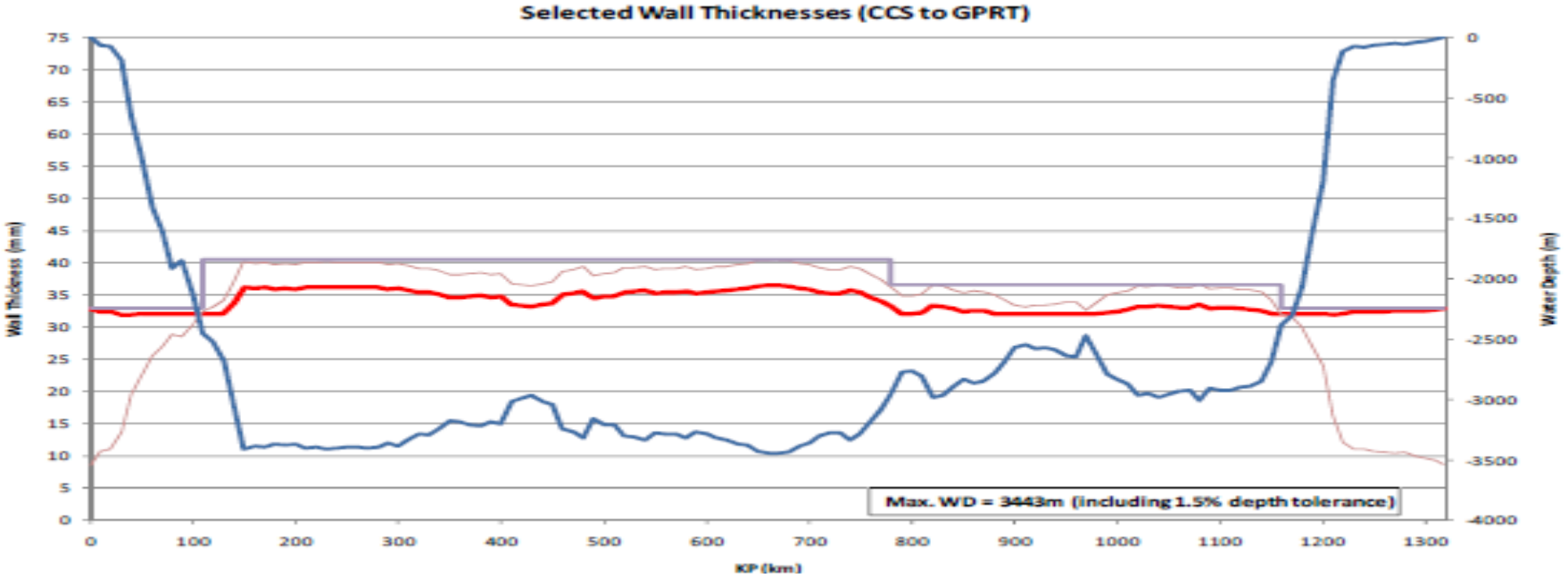
For long distance deep water gas transmission pipelines, linepipe material and installation costs are significant parts of the overall project cost. The base case has assumed that all possible DNV Quality Control (QC) factors have been set to their maximum criteria.

These QC criteria are described below:

- Supplementary requirement U material strength factor
- Fabrication factor for UOE pipe (afab) = 1.0, based on the conclusion made in the DNV technical report that a modest heat treatment during the pipe coating application can increase fabrication factor for UOE from the default value of 0.85 to 1.0.
- Ovality = 0.5%

Completed Studies

- Mechanical Design

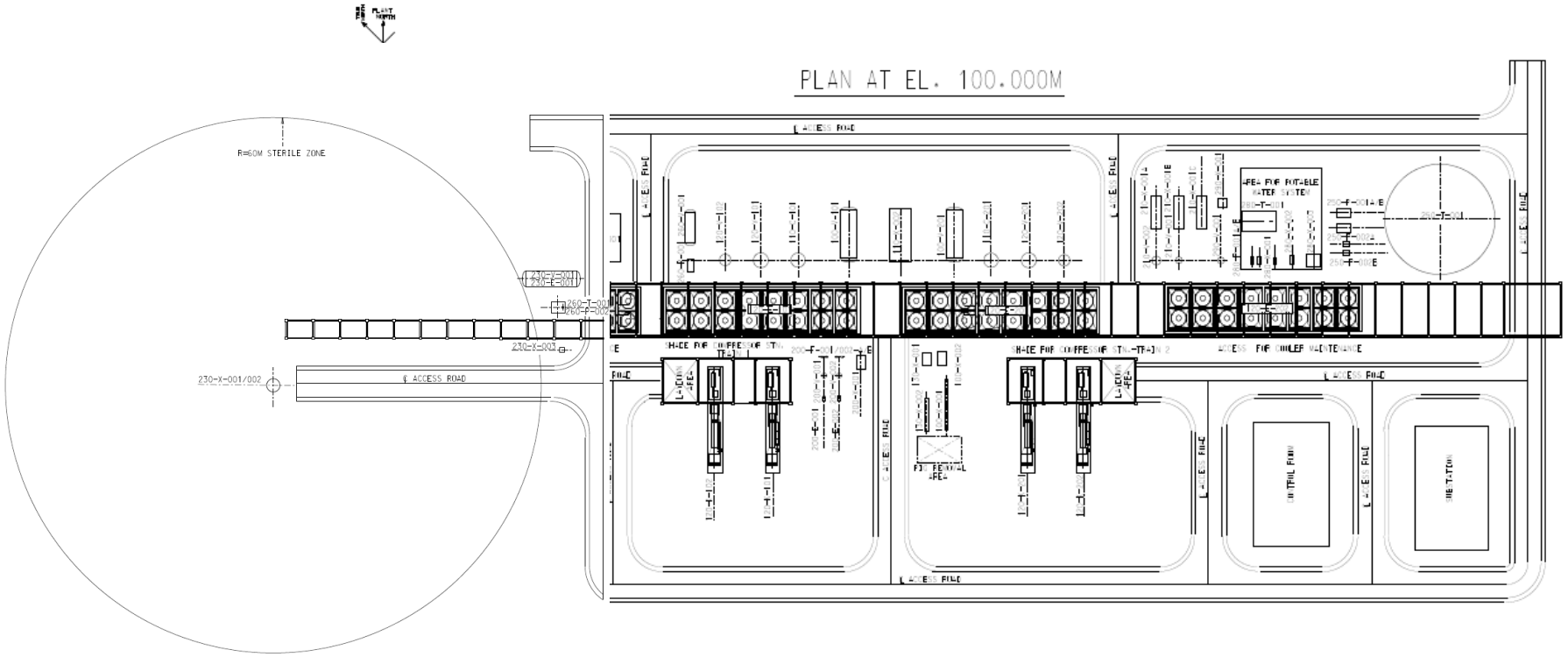


KP Range (km)	WD Range (m)	Section Length (km)	Pipe ID (mm)	Selected Wall Thickness (mm)	Buckle Arrestor Required	Tonnage of Steel Required for Line Pipe (Tonne)
0 – 6.8	-82 - 8.8	6.8	610	40.5	No	4,418
6.8 - 40	8.8 - 659	33.2	610	32.9	No	17,318
40 - 110	659 - 2448	70	610	32.9	Yes	36,514
110 - 770	2448 - 3084	660	610	40.5	Yes	428,811
770 - 1150	3084 - 2690	380	610	36.6	Yes	221,779
1150 - 1210	2690 – 361	60	610	32.9	Yes	31,298
1210 - 1317.5	361 – 1.5	107.5	610	32.9	No	56,075
1317.5 - 1318	1.5 - 0	0.5	610	40.5	No	325
					Total	796,537

Completed studies – Onshore Terminal

Concept Definition

- Equipment Lists
- PFD's
- UFD's
- Weight Take-off
- Layouts
- Cost Estimate



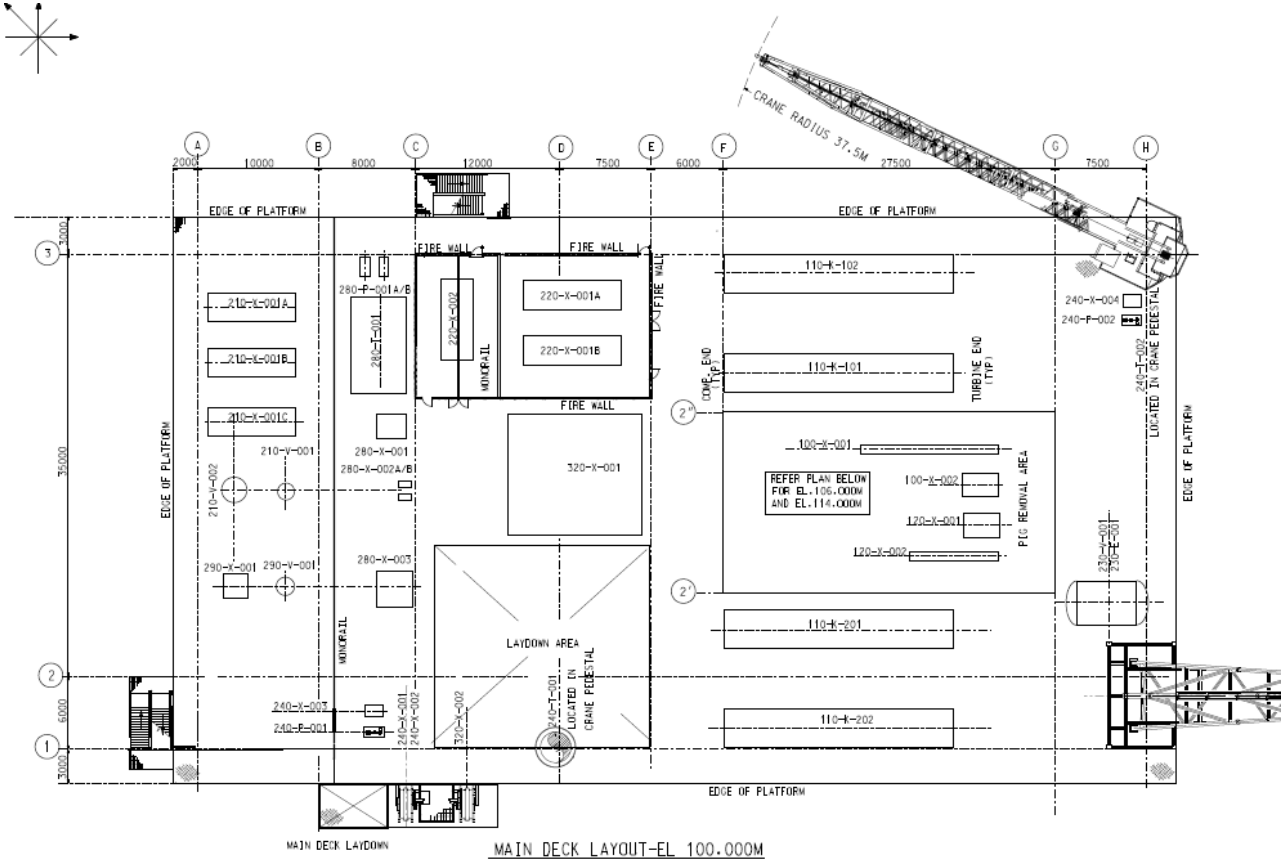
Onshore Equipment

EQUIPMENT NO.	DESCRIPTION	SIZE(LXWXH OR IDXT/T)
100-X-001	PIG RECEIVER	0.7M X 11.40M
100-X-002	NATURAL GAS METERING PKG.	3.0M X 2.0M X 1.0M
100-V-101/201	INLET SEPARATOR	3.7M X 11.0M
130-X-001	EXPORT GAS METERING PKG.	3.0M X 2.0M X 1.0M
130-X-002	PIG LAUNCHER	0.8M X 7.3M
110-C-101/201	TEG CONTRACTOR	3.25M X 9.0M
110-X-002	TEG REGENERATION PACKAGE	12.0M X 5.0M
120-V-101/201	IST STAGE COMP. SUCTION DRUM	3.4M X 5.1M
120-K-101/201	IST STAGE COMPRESSOR	24.0M X 3.2M X 3.8M
120-E-101/201	IST STAGE COMP. AFTERCOOLER	44.8M X 12.0M
120-V-102/202	2ND STAGE COMP. SUCTION DRUM	2.6M X 4.1M
120-K-102/202	2ND STAGE COMPRESSOR	24.0M X 3.2M X 3.8M
120-E-102/202	2ND STAGE COMP. AFTERCOOLER	31.8M X 12.0M
200-X-001	FUEL GAS METERING PKG.	3.0M X 2.0M X 1.0M
200-V-001	LP FUEL GAS K.O. DRUM	1.2M X 2.6M
200-V-002	HP FUEL GAS K.O. DRUM	0.86M X 2.5M
200-E-001	LP FUEL GAS HEATER	0.74M X 1.4M
200-E-002	HP FUEL GAS HEATER	0.74M X 1.4M
200-F-001A/B	LP FUEL GAS FILTER	0.5M X 1.0M
200-F-002A/B	HP FUEL GAS FILTER	0.5M X 1.0M
210-X-001A/B/C	INSTRUMENT AIR COMP. PKG	2.3M X 7.3M X2.0M
210-V-001	INST. AIR RECEIVER	1.4M X 4.2M
210-V-002	PLANT AIR RECEIVER	2.1M X 6.5M
220-X-001A/B	GAS TURBINE POWER GEN PKG.	8.5M X 2.5M X 3.0M
220-X-002	EMER. POWER DIESEL GEN PKG.	3.4M X 2.0M X 2.1M
230-X-001	FLARE STACK	HOLD
230-X-002	FLARE TIP	HOLD
230-X-003	FLARE IGNITION SYSTEM	HOLD
230-V-001	FLARE K.D.DRUM	HOLD
230-E-001	FLARE K.D.DRUM HEATER	HOLD
240-T-001A/B	DIESEL BULK STORAGE TANK	2.0M X 2.0M X 1.5M
240-X-003	DIESEL FILTR./COALESCER PKG	HOLD
240-P-001A/B	DIESEL TRANSFER PUMP	1.0M X 0.8M X 0.8M
250-T-001	FIRE WATER TANK	25.0M X 10.0M
250-P-002A/B	FIRE WATER JOCKEY PUMP	1.2M X 1.4M X 0.4M
250-P-001A/B	FIRE WATER PUMP	1.3M X 3.1M X 1.4M
260-V-001	CLOSED DRAINS DRUM	2.3M X 6.9M
260-P-001	CLOSED DRAINS DRUM PUMP	3.0M X 1.5M X 1.5M
260-T-001	HAZARDOUS OPEN DRAIN TANK	3.0M X 2.5M X 1.5M
260-P-002	HAZARD. OPEN DRAIN TK. PUMP	3.0M X 1.5M X 1.5M
280-X-001	POTABLE WATER MAKER PKG.	HOLD
280-T-001	POTABLE WATER TANK	HOLD
280-P-001A/B	POTABLE WATER PUMP	HOLD
280-X-002	POTABLE WTR STERILLI. PKG	HOLD
280-X-003	HOT WTR CALORIFI. PKG	HOLD
290-X-001	NITROGEN GENERATION PKG	2.0M X 2.0M X 3.0M
290-V-001	NITROGEN RECEIVER	1.5M X 4.6M
320-X-001	METHANOL INJECTION PACKAGE	10.0M X 11.0M X 3.0M

Completed studies – Offshore Compression

Concept Definition

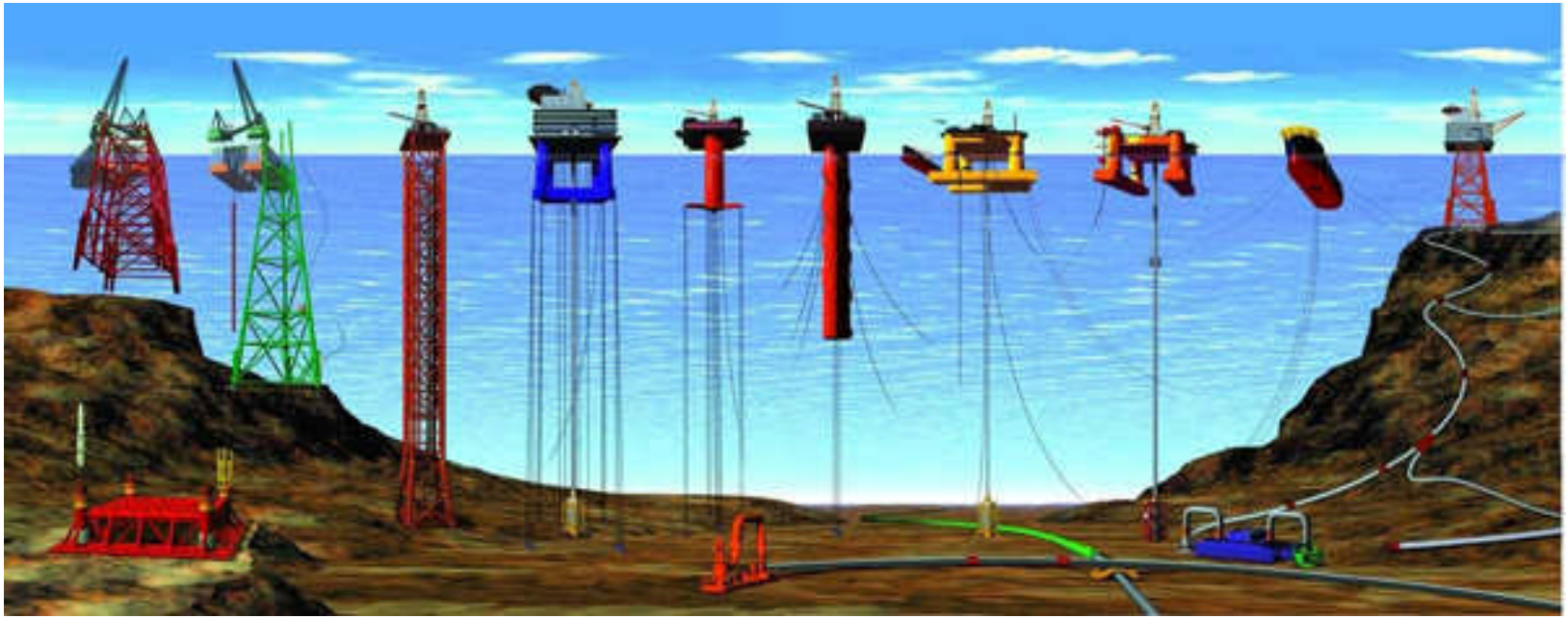
- Equipment Lists
- PFD's
- UFD's
- Weight Take-off
- Layouts
- Cost Estimate



Offshore Equipment

EQUIPMENT LIST		
EQUIPMENT NO.	DESCRIPTION	SIZE(LXWXH OR [DXT/T)
100-X-001	PIG RECEIVER	0.7 X 11.40
100-X-002	INLET GAS METERING PKG.	3.0 X 2.0 X 1.0
100-V-101/201	INLET SEPERATOR	3.66 X 11.00
120-X-001	EXPORT GAS METERING PKG.	3.0 X 2.0 X 1.0
120-X-002	PIG LAUNCHER	0.8 X 7.30
110-V-101/201	IST STAGE COMP. SUCTION DRUM	3.35 X 5.10
110-K-101/201	IST STAGE COMPRESSOR	19.0 X 3.2 X 3.8
110-K-102/202	2ND STAGE COMPRESSOR	19.0 X 3.2 X 3.8
110-E-101/201	IST STAGE COMP. DISCH. COOLER	1.91X 8.0
110-V-102/202	2ND STAGE COMP. SUCTION DRUM	2.59 X 4.10
110-E-102/202	2ND STAGE COMP. DISCH. COOLER	2.2 X 8.0
200-X-001	FUEL GAS METERING PKG.	3.0 X 2.0 X 1.0
200-V-001	LP FUEL GAS K.O. DRUM	1.22 X 2.60
200-V-002	HP FUEL GAS K.O. DRUM	0.86 X 2.50
200-E-001	LP FUEL GAS HEATER	0.74 X 1.35
200-E-002	HP FUEL GAS HEATER	0.74 X 1.40
200-F-001A/B	LP FUEL GAS FILTER	0.5 X 1.0
200-F-002A/B	HP FUEL GAS FILTER	0.5 X 1.0
210-X-001A/B/C	INST. AIR COMP. PKG	2.3 X 7.3 X 2.0
210-V-001	INST. AIR RECEIVER	1.4 X 4.2
210-V-002	PLANT AIR RECEIVER	2.1 X 6.5
220-X-001A/B	GAS TURBINE POWER GEN PKG.	8.10 X 2.45 X 4.0
220-X-002	DIESEL GENERATOR PKG.	6.7 X 2.7 X 2.6
230-X-001	FLARE BOOM	HOLD
230-X-002	FLARE TIP	HOLD
230-X-003	FLARE IGNITION SYSTEM	HOLD
230-V-001	FLARE K.O.DRUM	HOLD
230-E-001	FLARE K.O.DRUM HEATER	2.75 X 0.5
240-X-001	BUNKERING HOSE STATION	3.2 X 3.2 X 3.4
240-X-002	DIESEL LOADING HOSE	INCLUDED
240-T-001/002	DIESEL BULK STORAGE TANK	IN CRANE PEDESTAL
240-P-001/002	DIESEL TRANSFER PUMP	1.6 X 0.8 X 0.8
240-X-003/004	DIESEL FILTR./COALESCER PKG	1.5 X 1.0 X 1.0
250-X-001A/B	FIRE WATER PUMP PKG	1.8 X 6.8 X 2.8
250-C-001A/B	FIRE WATER PUMP CAISSON	HOLD
260-V-001	CLOSED DRAINS DRUM	1.6 X 4.80
260-P-001	CLOSED DRAINS DRUM PUMP	2.0 X 1.2 X 1.0
260-T-001	HAZARDOUS OPEN DRAIN TANK	5.0 X 1.75 X 1.45
260-P-003	HAZARD. OPEN DRAIN TK. PUMP	0.6 X 1.0
260-C-002	HAZARD. OPEN DRAIN CAISSON	HOLD
260-P-004	HAZ. OPEN DRN CAISSON PUMP	0.6 X 1.0
260-C-001	NON HAZARD. OPEN DR. CAISSON	HOLD
260-P-002	NON HAZ. OP DRN CAISSON PUMP	0.6 X 1.0
270-P-001A/B/C	SEAWATER LIFT PUMP	3.0 X 0.5
270-C-001A/B/C	SEAWATER LIFT PUMP CAISSON	HOLD
270-C-002	SEAWATER OUTFALL CAISSON	HOLD
270-X-001	SEAWATER FILTRATION PKG	7.6 X 5.4 X 3.6
270-X-002A/B/C	HYPOCHLORIDE GENERATION PKG	2.5 X 1.2 X 2.5
280-X-001	POTABLE WATER MAKER	2.45 X 2.1 X 2.4
280-T-001	POTABLE WATER STORAGE TANK	8.0 X 4.6 X 3.0
280-P-001A/B	POTABLE WATER PUMP	1.6 X 0.8 X 0.8
280-X-002A/B	POTABLE WTR STERILLI. PKG	1.1 X 0.5 X 2.5
280-X-003	POTABLE WTR CALORIFI. PKG	3.0 X 3.0 X 2.0
290-X-001	NITROGEN GENERATION PKG	2.0 X 2.0 X 3.0
290-V-001	NITROGEN RECEIVER	1.55 X 4.6
320-X-001	METHANOL INJECTION SKID	10.0 X 11.0 X 3.0
320-X-002	METHANOL BUNKERING HOSE STN.	7.0 X 3.15 X 3.35
–	PEDESTAL CRANES(2 NOS)	HOLD
–	SEWAGE DISPOSAL CAISSON (1NO)	HOLD

Completed Studies – Substructure Options



Substructure Type	Technical Drivers								Commercial Drivers					Overall	
	Water Depth Range	Payload	Metocean - Environment	Riser Feasibility	Offshore Integration	Active Seismic Design	Score	Ranking	Reuse of Existing	Maximise Indian Content	Flexibility for Future Expansion	Score	Ranking	Score	Ranking
Semi Submersible	3	3	3	2	3	3	17	2	3	2	2	7	**1**	24	1
Tension Leg Platform	3	3	3	3	3	3	18	**1**	1	2	1	4	2	22	2
Fixed Jacket	3	3	3	3	1	2	15	4	1	3	3	7	**1**	22	2
Spar	3	3	3	3	1	3	16	3	1	1	1	3	3	19	3
Compliant Tower	2	3	3	3	1	3	15	4	1	1	1	3	3	19	3

CastorOne Visit

- There is a planned visit to see Saipem's new Ultra-Deepwater Installation Vessel the CastorOne.

CLASSIFICATION
ABS +A1 (E), pipelaying vessel, +ACCU, +DPS3, CRC, TCM, CM, ice class A0 (IA Baltic)

DIMENSIONS
Length (o.a.): 330 m excluding ramp/stinger and helideck
Moulded breadth: 39 m
Operational draft: min. 7 m, max.10 m
Transit draft: 8 m approx.
Displacement: 100,000 t at max. operational draft

PERFORMANCE
Transit speed: 13 knots
Fuel consumption (transit): 80 t/day
Fuel consumption (DP mode, max.): 130 t/day
Bollard pull (with main propellers): 180 t
Pipelaying capacity: triple joint 12 m or double joint 18 m; pipe size up to 48" (60" including coating)

CARGO/TANK CAPACITY
Clear deck area: 4,300 sq.m
Fuel oil: 6,500 cu.m
Fresh water: 1,500 cu.m
Ballast water: 36,000 cu.m
15,000 t pipe storage in cargo holds

DECK EQUIPMENT
Main crane: 600 t @ 30 m, 350 t @ 46 m
Pipe handling cranes: 2 x gantry cranes 52 t @ 35 m
Pedestal crane: 30 t @ 30m
S-Lay stern ramp: 120 m long hinged stinger composed of 3 articulated and adjustable sections
Tensioners: 3 x 250 t
A/R winch: 750 t
Working stations: 3 welding + 4 completion
Triple joint fabriction shop below deck
ROVs: 2 Work Class ROVs rated for 3,000 m of water depth

PROPULSION SYSTEM
Main gensets: 8 x 8,400 kW at 600 rpm each
Emergency generator: 1 x 1,200 kW
Power distribution: 2 separate switchboards 11 kV
Main shafts: 2 x 8,000 kW
Azimuthal thrusters: 6 x 92 t
Bow tunnel thrusters: 2 x 35 t
Stern tunnel thrusters: 35 t

ACCOMMODATION
702 persons
Mess room; offices; crew lifts; meeting rooms; gymnasium/recreation; television rooms

DYNAMIC POSITIONING SYSTEM
DP system: fully redundant, class 3
Reference system: 2 x Hipap 500 for 3,000 m of water depth; 2 x DGPS
Taut wire

HELIDECK
Suitable for Sikorsky S-61 N

J-LAY TOWER
Features for future installation of a fixed tower for pipe laying in J mode through the centre moon pool

- Saipem spa has confirmed that the SAGE deepwater pipeline is feasible and can be installed into water 3500m deep using its new laybarge CastorONE, currently in construction.
- An MOU under which Saipem will join the SAGE Consortium has been signed.

Allseas Pieter Schelte S-Lay Vessel

Pieter Schelte - under construction

- S-Lay.
- Tensioners - 2000t (4x500t)
- Length - 382 m, Length - 370 m
- Transit speed - 14 knots
- Accommodation - 571 men
- Dynamic positioning - LR DP (AAA)
- Stinger length - 170 m (558 ft)
- Total installed power - 95 MW
- Pipe diameters - From 6” to 68” O.D.
- Welding stations - Double joint factory with 5 line-up & 2 welding stations. Mainline with 6 welding stations for double joints, 1 NDT station and 6 coating stations

ALLSEAS Group S.A.

- Contract awarded June 2010, to Daewoo Shipbuilding and Marine Engineering Co., Ltd., Korea.
- The detail design of the vessel has been completed.
- Long-lead items, such as the power generation equipment and the thrusters, were ordered in March 2007.
- Delivery of the completed vessel is foreseen for 2013.

HMC New Deep Water Pipelay Vessel

HMC New Vessel - under construction

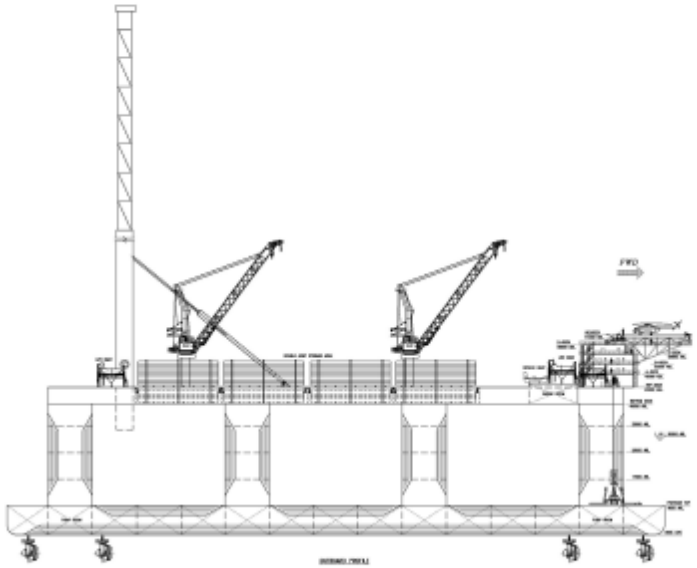
- J-Lay. & Reeling
- Tensioners - 2000t
- Maximum pipe payload is 4,500 metric tons.
- Length - 210m
- Transit speed - 14 knots
- Accommodation - 289 men
- Dynamic positioning - DP Class 3
- Designed for Pipelay to 3500m

Heerema Marine Contractors.

- Contract awarded July 2010, to Daewoo Shipbuilding and Marine Engineering Co., Ltd., Korea.
- The detail design of the vessel has been completed.
- Long-lead items, such as the power generation equipment and the thrusters, were ordered in March 2007.
- Delivery of the completed vessel is foreseen for 2013.

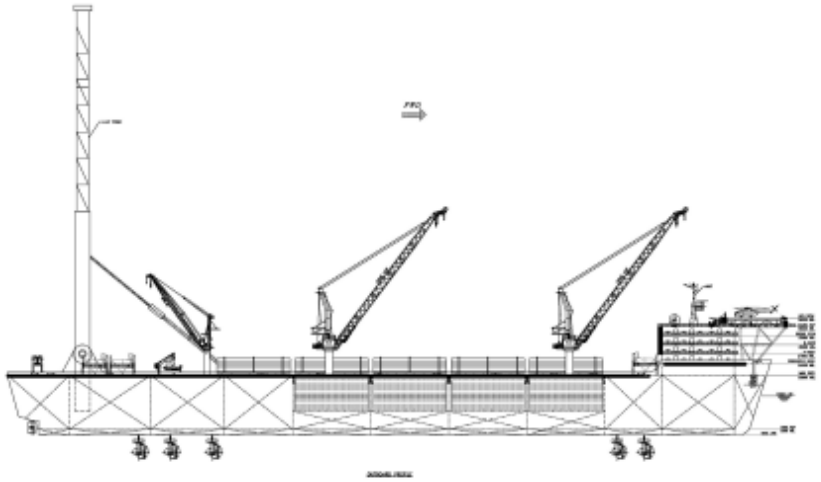
SAGE Pipelay Vessel (No large Cranes)

Dimensions & Displacements (Semi Hull)



DECK BOX	
Length of main deck	175 m
Width of main deck	90 m
Depth of deck box	5 m

Dimensions & Displacements (Ship Shape)



Length Overall	254m
Breadth molded	44m
Breadth Extreme	46.5m
Depth	20m

CAPEX for any such barge is around $850m.

SAGE would need to set up full PMC team - but multiple lines possible for a corridor.