OFFSHORE SURVEY IN DEVELOPMENT PROJECTS

Ian Douglas
Head, Offshore Surveys,
Shell Projects & Technology Europe
GOLDENYE FACTS

- Gas Condensate Field
- Located in Outer Moray Firth, only 100km NE of St Fergus Gas Terminals
- Low safety risks due to normally unmanned operations offshore
- Total lifetime production expected to be in excess of 500 Billion scf Gas and 17 Million barrels Condensate over a 10 Year period
- Greatest water depth (120 metres) in which a Jack-Up rig will be used for production well drilling
TIMELINE

- Exploration seismic Acquisition
- Interpretation
- Exploration Drilling
- Appraisal
- Final Investment Decision
- Concept Select
- Route Survey & Site Investigation
- Front End & Detailed Design
- Offshore Construction
- Development Drilling
- Production Start Up
EXPLORATION & APPRAISAL
CONCEPT SELECT

Distribution of geology

Proximity to infrastructure

Geographic restrictions (legal, environmental, physical)

Location of markets
CONCEPT SELECT
CONCEPT SELECT & FEED
ROUTE SURVEY
CONSTRUCTION OPERATIONS

- Pre-Award Survey Input
- Pre-Construction Survey Activities
- Pipelay – Shore Pull – Near shore / Offshore Operations
- Trenching
- Backfilling
- Tie-In & Pre-Commissioning Works
- Rock dumping – Crossings and Pipeline Protection
- Platform Installation
- Drilling Phase
THE HARDWARE

Laybarge

Survey Vessel

Heavy Lift Barge

Inshore Survey Vessels

Rock Dumper

Trenching Support

Dive Support Vessel
PRE-INSTALLATION SURVEY

Ensures route / site is free of obstructions
Side Scan Sonar and MBES
ROV centre line / site visual survey
- Digital Terrain Model
- Route Topography Analysis
- Array visibility Analysis

ROV visual surveys
SURVEY SUPPORT FOR CONSTRUCTION OPS

- Pipelay Barge Navigation
- Tug Management
- Shore Pull
- Pipeline crossing
- Pipe lay down
- Trenching & Backfill for service line
- Heavy lift vessel positioning
- Acoustic positioning USBL or LBL of structures
- EDM (Total Station) positioning of structures
Landfall Preparation & Plant Construction
Pre-Lay Survey – Onshore, Inshore & Offshore
Liaison with local stakeholders e.g. fishermen
3rd Party Agreements
Crossing Construction
- 36” Flags Brent - approx. KP 8.72
- 32” Frigg/2 - approx. KP 13.42
- 32” Frigg/1 - approx. KP 13.60
- 30” Miller - approx. KP 14.63
- 28” Britannia - approx. KP 17.16.
Plan of Pipeline Crossing

Elevation of Pipeline Crossing

Mattresses
A Work vessel or barge to place “mat” at required location: Vessel and mat positioning.
Main Features:

- Semi submersible pipelay barge
- Deep & shallow water capability with dedicated pipelay ramp
- Dual lay and piggyback lay capabilities
- Large diameter pipelay capability
- Lay rate up to 7km/day
- Semi automatic welding system
- Self propelled vessel
- Certified with NMD, HSE Letter of Compliance
- 12 point mooring system & thruster assistance
SHORE PULL OF PIPELINE
SET UP AND LAY AWAY

PIPEDLINE START-UP
ST. FERGUS
KP -0.2
WATER DEPTH = M.L.W.S.

PROPOSED WINCH SITE

ST. FERGUS

200M EXCLUSION ANCHOR EXCLUSION ZONE

WATER DEPTH = M.L.W.S.
Note: Pipelay barge to place “pipe” at required location: Pipelay barge and pipe positioning
PROPOSED 20" SPOOLPIECE

PROPOSED 4" SPOOLPIECE

20" EXPORT LINE LAYDOWN

4" SERVICE LINE LAYDOWN

GOLDENEYE PLATFORM
(Not Installed)

WATER DEPTH = 120m
Note: Pipelay barge to place “pipe end” at required location: Pipelay barge and pipe-end positioning
ST. FERGUS
KP
101.2
4" SERVICE LINE TRENCHED to GOLDENEYE
WATER DEPTH = 120m

GOLDENEYE
PLATFORM
(Not Installed)
WATER DEPTH = 120m

ST. FERGUS
KP
10
20
30
40
50
60
70
80
90
100
101.2

4" SERVICE LINE TRENCHED to GOLDENEYE
LAUNCHING PLOUGH - PL2
PROPOSED 20" SPOOLPIECE

PROPOSED 4" SPOOLPIECE

PERFORM METROLOGY FOR 20" & 4" SPOOLS AT PLATFORM

GOLDENEYE PLATFORM (Installed)

WATER DEPTH = 120m

PLATFORM TIE-IN WORKS
PLATFORM TIE-IN WORKS

- PROPOSED 20" SPOOLPIECE
- PROPOSED 4" SPOOLPIECE
- INSTALL 20" + 4" SPOOL, FLANGE PROTECTOR AND SSIV
- 20" + 4" HYDROTEST
- 150m PIPE LENGTH
- 80m pipe
- PROPOSED 20" SPOOLPIECE
- PROPOSED 4" SPOOLPIECE
- PROPOSED 4" SERVICE LINE ROUTE
- PROPOSED 20" PIPELINE ROUTE
- 20m T.B.A.
Typical Rockdumping Vessel – Rollingstone
ROCK DUMP - CROSSINGS

Plan of Pipeline Crossing

Elevation of Pipeline Crossing

Mattresses
Q + A