

BSEE 2015 Domestic & International standards Workshop

Emergency Disconnect Session UKCS Recent Experience of DP

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Introduction

- HSE Energy Division (Offshore)
 - Government regulatory body responsible for safety regulation across all oil and gas operations on the UKCS
- Safety case assessment (fixed platforms, FPSOs, MODUs)
- Inspection & incident investigation
- Standards & guidance (with industry)
- Partner with Dept. of Environment (DECC) as Offshore Safety Directive Regulator (OSDR)

Recent experiences of DP failures

- Shuttle tanker / FPSO collision, West of Shetland, Oct 2009
- DSV drift-off, West of Shetland, October 2010
- FPSO loss of heading, Northern North Sea, February 2011
- DSV drive-off, Central North Sea, March 2015

Shuttle tanker / FPSO collision, Oct 2009



Shuttle tanker / FPSO collision, Oct 2009



- Tanker – DP class 2
- Recent DP upgrade – Fanbeam replaced with Radascan
- Radascan not tested in DP trials
- Radascan selected when approaching FPSO
- Collision – damage to FPSO offloading reel
- £100 million loss to FPSO operator

DSV drift-off, October 2010



DSV drift-off, October 2010

- IMO class 2 DP
- 2 divers working 90m subsea on drilling template
- DP control lost due to DP control system failure
- Vessel drift-off position – 1 diver umbilical severed
- Position re-established under manual control – both divers recovered
- Jamming of internal comms. caused overall system failure

DSV drift-off, October 2010

- *FMEA – “Today there is no established good method available for analysing software failures and field bus communication failures. Hence, this study’s dealing with such failures is very limited. This is according to common practise in the industry and accepted by all the Classification Societies”*
- Vendor firmware upgrade
- IMCA Safety flash 02/13
- HSE Safety Notice OSD 1-2013

FPSO Loss of heading, Feb 2011



FPSO Loss of heading, Feb 2011

- SDPMDP in POSMOOR mode
- 60 knots wind, 10-15m wave height
- Mooring line break due to chain link weld failure (below design load) – not detected
- Drive-off heading
- Loss of electrical power due to turbine and DG trips
- 3 further mooring line failures due to overload
- Extensive riser damage (wells shut-in)
- Major overhaul required (dry dock)

FPSO Loss of heading, Feb 2011

- Anemometers reading 20%-30% low
- Ineffective transfer from auto to manual
- Insufficient redundancy in position referencing systems and electrical supply
- Inadequate operator training
- Inadequate FMEA
- Data recording problems

DSV drive-off, March 2015

- Drive-off with divers sub-sea
- Azimuth thruster found to 180° out of position
- 2 ground faults found in thruster control system

Questions

- Are current FMEA methodologies and reliance on fault tolerance adequate for complex electronic systems in safety critical applications?
- Should there be greater emphasis on design processes? eg
 - DNV Integrated Software Dependent Systems DNV-OS-D203
 - ABS Integrated Software Quality Management