Session – Risk

Title: **Fire & Gas Detection – ESD Design Philosophy and their impact on Asset Management. Analysis of risks ESD / AVS / APS systems create high risk for DP vessels.**

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Abstract

The biggest threat for station keeping in the last few years on the new build drill-ships is the designing of Fire & Gas and ESD systems without necessarily taking account the impact on other safety critical functions. In the past, the Fire & Gas Detection systems were alarm and monitoring systems, but in the new builds over the last 5 years we have seen Fire & Gas systems automatically shutting down engine-rooms (engines) and thrusters. The design engineers for these vessels cross the line of station keeping, rather than respecting equipment protection design boundaries.

The interpretation of class rules by automation engineers has led to a design philosophy of placing control capability where only condition monitoring should be used. One other system that is becoming over-engineered is the AVS (Abandon Vessel Shutdown) or APS (Abandon Platform Shutdown). This system does not belong on a DP vessel such as a (drill-ship or semi-submersible. This system will actually put more lives in danger through its operation. In history these systems were made for platforms (production) or MODU's to kill all systems and protect lives after a large gas kick or blowout. These rules were developed from common sense and industry practice, however, many engineers inside and outside class are only using the rules to make their system the "best in the world" but are forgetting that this system is on a DP vessel.

Other station keeping threats include water-mist installations in 11kV switch board rooms and bridges. On top of the equipment issues there is the lack of DPO experience on the Bridge. (There are too many new builds and not enough DPO's with experience).

A recent incident occurred on a new 6th generation drill ship on 28-12-2011, in which a crew member accidently operated the AVS switch near a lifeboat and blacked out the vessel while it was drilling and connected to the well. After 8.5 hours the power was restored. The crew member confused the AVS switch with the reset button for the lifeboat davit. He had lowered the lifeboat about 1 meter and was trying to get it back. The total loss for the operator was 10 million dollars. The drilling contractor was lucky that the drill ship did not hit a nearby FPSO. This is the fifth known case of an AVS/APS causing unintended downtime.

Continued over page

There have also been incidents during blowouts in which the DP drill-ship did not use the APS-AVS button. In the MTS paper from October 2009 “ESD in a DP Vessel - For Safety, not for Blackout”, the organization explains that DNV’s safety analysis resulted in a similar conclusion, to not activate the AVS. Station keeping to secure the well should take priority over shutting down all rig systems.

The solution to this problem is to have IMO and all class societies (ABS, DNV, LR and others) make an exception for DP drilling vessels on the rule to install an APS or AVS or ESD zero system. Class has to consider that one rule can have a big impact to the design of these new systems. The fire & gas systems try to take out the human factor, but forget the overall risk for loss of station-keeping and therefore may present a larger environmental risk or risk to personnel. In this paper I intend to discuss the various scenarios and failure cases associated with using APS/AVS systems, and examine the impact of industry design best practices on the overall goal of drilling and completing wells safely.

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