Geology of the Cored Deepwater Palaeocene Forties Sandstone Member of the 22/14b Huntington Oil Discovery, UK Central North Sea

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Summary

In May 2007, Oilexco and partners had a significant oil discovery in the Palaeocene Forties deepwater sands and Jurassic shallow Marine Fulmar sands of the UK Central North Sea called Huntington. The discovery well, 22/14b-5, was drilled to a total depth of 13,325 feet. The Paleocene Forties sand at 8,960 feet was drill stem tested through perforations from 8,975 feet to 9,025 feet in 98 feet of oil bearing Forties sand. The test flowed 41º API oil at up to a maximum rate of 5577 Bbls/d and associated gas at an estimated rate of 3.4 MMscf/d through a 72/64 inch choke with a flowing tubing pressure of 395 psi. There was no water or sand produced during the test. Flow rates were severely restricted by the test equipment utilized for the test. Subsequently, 9 further penetrations to delineate the Forties oil accumulation structure were drilled in late 2007.

As part of this appraisal programme, two wells were cored within the Upper Forties Sandstone Member of wells 22/14-6q and 22/14-8, and are about 1.5 km apart from eachother.

Seismic attribute data display several deepwater low sinuosity channel-like features and apparent depositional lobes in the Upper Forties and cored interval. One such channel is intersected by cored Forties well 22/14-6q and is interpreted as an erosive sand/conglomerate base with subsequent mud filled channel sequence and finally a predominantly back filled sandy turbidite channel fill with

minor slurry beds. 1.5 km to the west, cored Forties well 22/14-8 is laterally off axis of this channel and appears to record a mix of sandy turbidites and muddier slurry beds, either as part of a winged edge of this same 22/14-6q channel axis or a sequence that is being cut into by the 22/14-6q channel.

Turbidite sands have higher porosity and permeability than the dirtier slurry facies in the Huntington Forties Sandstone Member. Both rock types however are excellent reservoirs for oil, and only in the very muddy cases will these act as reservoir baffles. Strontium isotope work indicates that the 22/14-6q and 8 well Forties is in fluid communication, which is good news for future hydrocarbon production. The field wells exhibit an upper high resistivity and a lower low resistivity pay. These field wide resistivities maybe caused by a none facies related subtle diagnesis that was related to a palaeo oil filling, subsequent structuration and continued oil filling of the new structure leaving an upper high resistivity zone (original oil column with suppressed diagenesis) and a lower resistivity zone which was within the palaeo water leg (and may have been affected by subtle diagenesis) and subsequently became part of an extended oil leg after a secondary charge (with suppression of diagenesis at this time). Finally, the discovery of a field wide low resistivity pay at the base of the high resistivity pay, has increased the volume of recoverable oil at Huntington significantly.