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The Deepwater Tertiary Ulleung Basin Play, Korea: KNOC and Woodside Partnering for Success

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In February 2007 KNOC and Woodside signed a concession agreement to jointly explore a 13000km² area in the deepwater portion of the Ulleung Basin located off the east coast of the Korean peninsular. The block area is wholly within undisputed Korean territorial waters and represents the first involvement of a foreign oil company in Korea since 1985 and the first dedicated deepwater exploration program in Korean history.

The Ulleung Basin is a Tertiary basin which was initiated as a rift/pull apart basin in the late Oligocene related to the opening of the East Sea. A large hinterland drainage area from the east China shelf subsequently focused quartzose sands into the southern end of the basin during the Miocene leading to a large 8-10km thick prograding then aggrading deltaic wedge which partially filled the marine basin. This deltaic complex is analogous to the productive Kutei and Baram deltaic sequences which flank the east and northwest coasts of Borneo respectively. During the Middle Miocene the East Sea changed from an extensional to a compressional system caused by Back arc closure. This change in the regional tectonics resulted in a series of uplift, oblique slip and large scale fault reactivation/inversion events. A series of uplift pulses during the Mid - Late Miocene resulted in several low stand events, leading to a series of massive canyon incisions of the delta top and reworking of deltaic material into the deep basin area. As a result, large turbidite sequences were deposited to the north which have been identified and mapped on the available reconnaissance 2D seismic data. In the latest Miocene/Pliocene a regional phase of inversion, associated with the reactivation of large basin forming faults, has folded the

deepwater fan deposits in the deep basin area forming potential structural traps. This event also changed the hinterland drainage patterns re-routing the coarse clastic supply away from the Ulleung Basin and resulting in the deposition of thick open marine shales. ODP/DSDP wells indicate that high quality oil prone marine source rocks may be present throughout the Miocene-Pliocene section. The early Tertiary section is now within the oil and gas generative windows under the turbidite targets and was deposited within a partially silled basin. This marine source material is not present under the explored southern portion of the deltaic wedge where deltaic and fluvial sediments dominate.

Exploration to date has been led by KNOC in shallower shelfal areas where modest but significant gas-condensate discoveries have been made. These discoveries are in combination structural-stratigraphic traps within the non-marine to deltaic Miocene section. The deepwater area where the structured deepwater turbidite fans have been mapped remains untested and is the new focus of the KNOC/Woodside frontier exploration program in the new concession area which if successful will deliver a significant new indigenous hydrocarbon supply to the Korean people.