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From Shallow Hazard to Productive Opportunity: Opening a New Gas Play in the North Malay Basin

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ABSTRACT

Lawit field operated by ExxonMobil E&P Malaysia (EMEPMI) in the Malay Basin was discovered in 1979. Due to the shallow and unconsolidated nature of the Group-B sands, the sands were considered a potential shallow hazard, thus the initial field development plan implemented in 1997 only targeted the deeper, and major gas bearing Group-D and E reservoirs. After 9 years of production, the major producing reservoirs, particularly the aquifer supported reservoirs, indicated signs of depletion.

As a result of a Lawit full-field study conducted in 2005, the asset level technical team appraised the development opportunity in Group-B reservoirs by re-completion of existing wells that were originally completed in the deeper Group-D and E reservoirs, now depleted, in order to sustain gas production from the field and utilize existing facilities capacity.

This paper will describe the multi-disciplinary Geoscience, Reservoir, and Subsurface Engineering technical work flow and strategies used in the successful development of the first Lawit shallow gas Group-B reservoirs in EMEPMI offshore operations. The assessment included estimates of in-place gas, gas deliverability and recovery, and thorough consideration of completion strategies to mitigate the potential for high sand production. The collaborative effort also resulted in the first successful application of Frac-Pack completion in EMEPMI operations, yielding sustainable and prolific gas production.

Key implications of this successful venture include potential development of the Group-B reservoirs in other EMEPMI operated fields in the Malay Basin.

INTRODUCTION

The Lawit field is a non-associated gas (NAG) producing field in the Malay Basin located offshore Peninsular Malaysia in an average water depth of 60 meters. The field was discovered in May 1979 by the Well 1 wildcat well which encountered multiple gas-bearing reservoirs.

The Lawit structure is a domal anticline with an aerial extent of about 30 square kilometers at its major reservoir level. The field is separated from neighboring Bintang field to the west by a major north – south trending normal fault.

Malay Basin production is primarily from Early to Late Miocene-age clastic reservoirs. These reservoirs often occur in stacked stratigraphic sequences which are grouped and labeled alphabetically. Lawit field accumulations are normally pressured and contain non-associated, lean wet-gases.

Lawit-A is a large manned production, compression and quarters platform. Lawit-A is also a mother platform to two unmanned Satellite Field Development (SFD) platforms, Bintang-A and Bintang-B. These platforms accommodate production from the Bintang field where the gas produced is sent to Lawit-A for processing, then transported to shore.

The initial development of Lawit field was driven by the deeper group D and E reservoirs with larger gas in-place volumes. Development in the shallower reservoirs was only conducted after ten years of field production. This paper will focus on the