# REVIVAL OF IDLE WELLS THROUGH ADDING PERFORATION IN MATURED FIELD

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# ABSTRACT

Over 70% of the present world oil production is from brownfield. Nearly 50% of the oil reserves are from 30 giant matured field. With the hard to find huge new oil field in South East Asia, it is exceptionally challenge for this region to keep up its oil production. Consequently, improvement of this develop field has been, and will progressively be, an alluring subject. Develop field advancement practices can be isolated into two noteworthy group (1) well engineering and (2) reservoir engineering. Well intervention activity has turned into the primary action to guarantee production sustainability and guaranteeing persistent reservoir management strategy is properly captured especially for the low reserves field which endeavouring to reduce the production rate. This study focuses on the well engineering where it will address and discuss the planning and evaluating the work flow applied in bring back life to the wells through adding perforation. Several aspects are taken into consideration including reserves associated with the string; well integrity assessment; Possibility of success; and cost estimation. Consequently, adding perforation in is the most efficient technique in improving production of matured field. This includes the production gain and cost value analysis. In a nutshell, the workflow serves as a guideline and this case serves as reference for future add perforation job in the region.

# ABSTRAK

Lebih 70% daripada hasil pengeluaran minyak dunia sekarang adalah dari reservoir yang matang  Hampir 50% daripada reservoir minyak adalah dari 30 reservoir gergasi. Dengan itu sukar untuk mencari medan minyak baru besar di Asia Tenggara, ianya adalah satu cabaran bagi rantau ini untuk bersaing dengan pengeluaran minyak. Oleh yang demikian, peningkatan ini membangunkan bidang telah menjadi, dan secara beransur-ansur akan, subjek yang ada. Membangunkan kemajuan bidang amalan boleh ke dalam dua katogeri (1) Kejuruteraan Telaga Minyak dan (2) Kejuruteraan. Manakala aktiviti intervensi telah bertukar menjadi tumpuan utama untuk menjamin pengeluaran mapan dan menjamin reservoir berterusan. Pengurusan strategi dengan sesuai dikaji terutama bagi medan reservoir yang rendah untuk mengurangkan kadar pengeluaran. Kajian ini memberi tumpuan kepada kejuruteraan telaga minyak di mana ia akan menangani dan membincangkan perancangan dan menilai aliran kerja yang digunakan dalam membawa kembali hidup ke telaga melalui menambah perforasi. Beberapa aspek perlu diambil kira termasuk reservoir yang dikaitkan dengan rentetan; baik penilaian integriti; Kemungkinan kejayaan; dan anggaran kos. Justeru, menambah perforasi di adalah teknik paling berkesan dalam meningkatkan pengeluaran bidang matang. Ini termasuk pengeluaran keuntungan dan kos analisis nilai. Secara ringkas, aliran kerja yang padat and sesuai dijadikan sebagai garis panduan dan kes ini berkhidmat sebagai rujukan masa depan kerja perforasi di rantau ini.

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# CHAPTER 1

# INTRODUCTION

## 1.1 Background of Study

Developed fields, in fact, are still representing the foundation of worldwide oil generation. Mature fields produce about two thirds of worldwide daily average oil production and this rate is expanding with time. Oil fields after a specific production period are called brown fields. A more particular meaning of develop fields is the fields achieving the pinnacle of their creation or delivering fields in declining mode. The next definition could be the fields achieving their monetary cut off after primary and secondary recovery efforts. Increasing water and gas production, decreasing pressure, and maturing re different pointers of development.

From broad experience and review of late literatures improvement of develop fields could be incorporated into noteworthy classifications: (a) well engineering, including well integrity and well construction since maturing of the utilized materials such as corrosion of casing; failure of cement and/or scaling through tubing or perforations can be reasons for the field maturity, (b) surface facilities; including manifolds, pipe lines, separators (c) reservoir engineering; involving reservoir parameters such as reservoir initial and current pressures, water and oil production volumes, initial and residual oil and gas saturation.

This study concentrates on well integrity aspects by studying steps taken to revive idle wells in a matured field. Criteria such as selection of idle well to revive till execution of perforation is discussed.

## 1.2 Field Background

The Seligi field is located in the 1995 PSC/2008 PSC area, approximately 240 km North east of Kerteh (Figure 1.1). Seligi was discovered in 1971 by the Seligi 1 exploration well, and a total of 11 appraisal wells were drilled to delineate the field. More than 225 wells were drilled to develop the field over a period of 14 years via 8 platforms. Seligi field is a large, relatively low relief, anticlinal multifaceted with five main closures: Central, Northwest, South, Southwest, and Southeast (Figure 1.2). The entire field area encompasses approximately 80 square kilometres

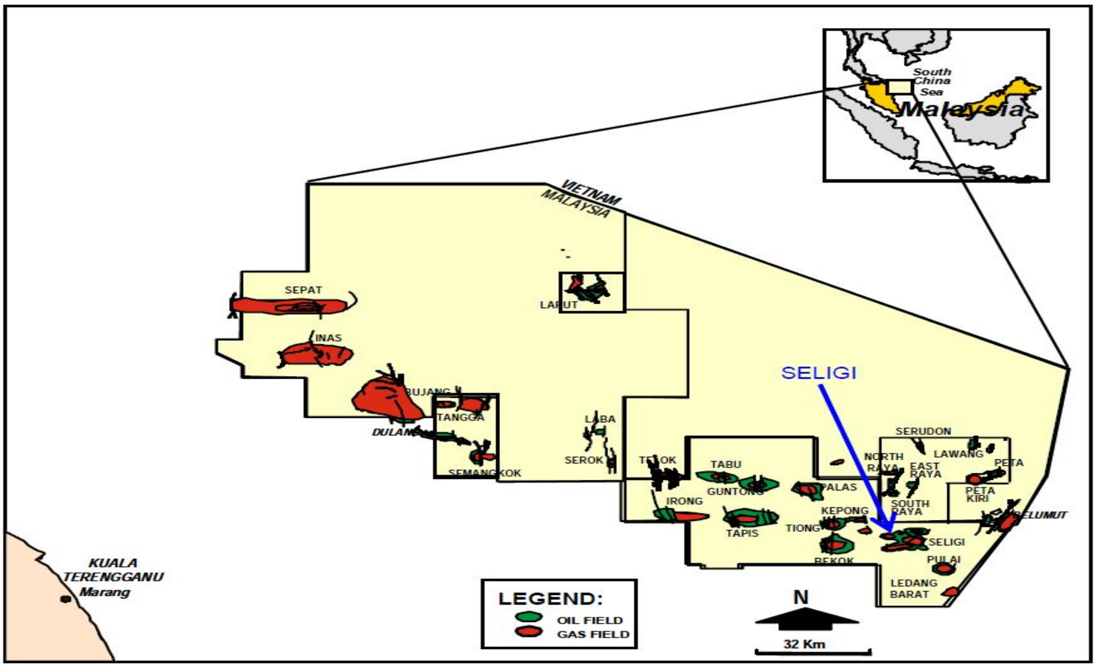


**Figure 1.1**: Location of the field with respect to Peninsular Malaysia and other fields in the Malay Basin. (Zhu, 2004)

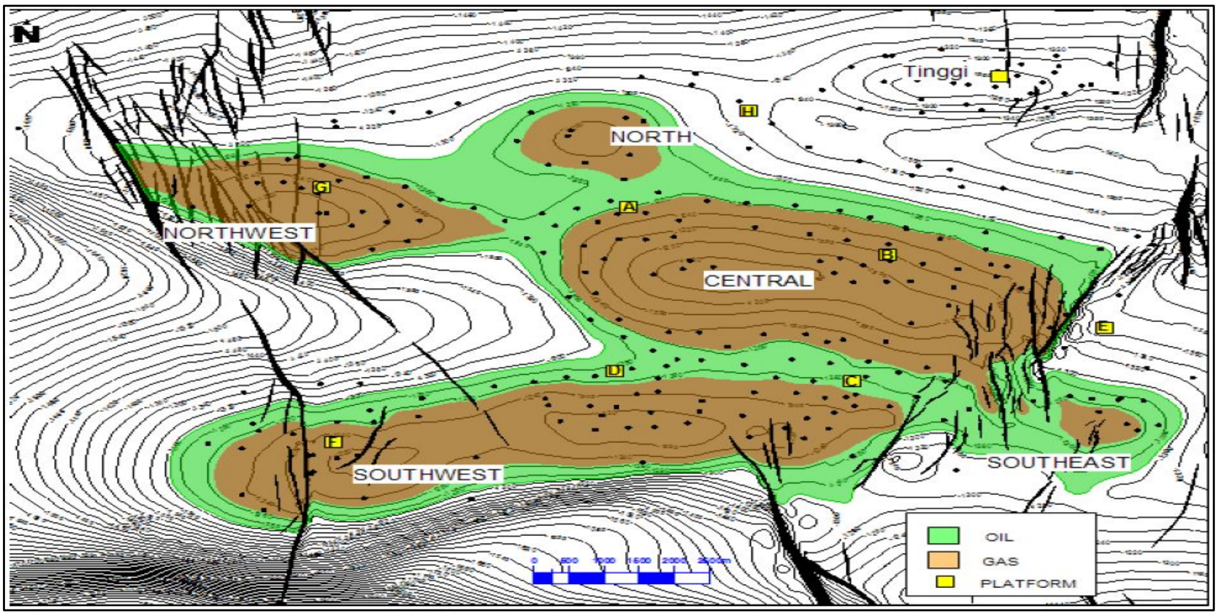


**Figure 1.2**: Seligi J-18/70 Structure Map (Zhu, 2004)

The main oil producing reservoirs are the J15/16, J-18/70, K-10, K-20 and L-20, ranging from early Miocene to late Oligocene. Minor oil reserves are also found in J-3/5, L-10, L-50, and L-60/70 as shown in Figure 1.3.

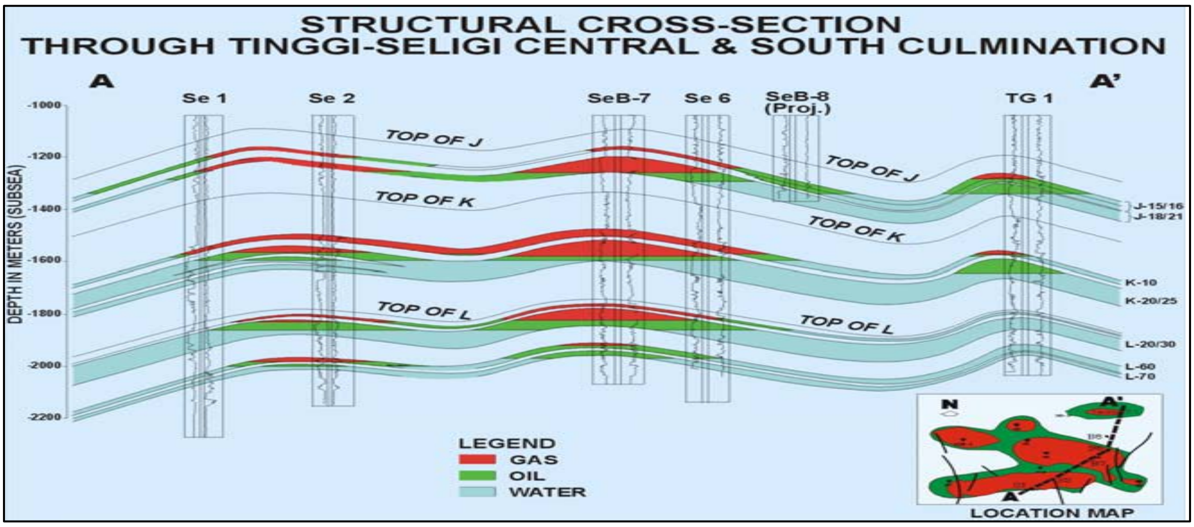


**Figure 1.3**: Seligi Cross Section Map (Zhu, 2004)

## 1.3 Problem Statement

Regardless of what sort of mechanism, there are constantly huge part of oil always high than 60% of original oil in place, unrecovered in developed oil fields. To tap the potential of develop oil field has has turned into a vital subject in the business. Oil production decline has been seen in main fields of Malaysia. Most the extensive scale develop fields in Malaysia were found 25 to 30 years prior. The commercial flow standard of oil wells in 1990 to 2000 is much greater than that in 2010s and today. In spite, a few advancements as far as innovation here, it is very common to see immense hydrocarbon production potential still remains trapped up in to idle/closed in wells. These well is becomes idle/closed because of well integrity or reservoir condition such as high water cut or oil has exhausted.

There are a few techniques to recuperate the rest of oil in idle well/closed in wells. This proposal presents an established workflow for add perforation jobs in matured field by emphasizing methodologies / techniques used to identify potential opportunities that may be overlooked in a brownfield. The systematic workflow applied displayed success in a well using rigless intervention and has achieved economic return in short time.

## 1.4 Objectives

The main objectives of this study can be summarized as following: -

- To develop a work flow for selection of candidates wells for add perforation jobs in matured field
- To study the effect of perforation in improving production in a matured field

## 1.5 Scopes of Project

To support the above objectives, there are several scopes that need to be studied:

- Evaluating the best strategy applied in bring back life to the wells through perforation.
- Analysing the effect of perforation in improving production of the matured field based on the result gathered from the field.

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