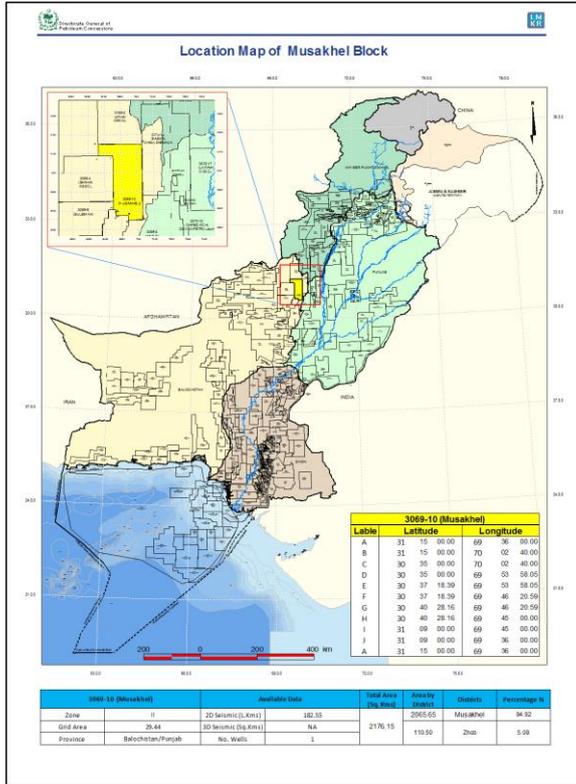


MUSAKHEL BLOCK (3069-10)

Introduction

Musakhel Block covers an area of 2176.15 sq km and is located in Musakhel and Zhob districts of Balochistan and Punjab Pakistan. Geologically, it lies in the Central Indus Platform Basin of Pakistan. The block falls in Prospectivity Zone II.

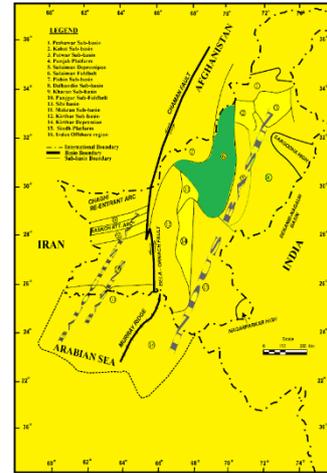


Geology and Tectonics

The Central Indus Platform Basin is divided into Sulaiman fold belt and Sulaiman Fore deep. Sulaiman characterizes a blind thrust front which suggests that all frontal folds of the fold belt are cored by blind thrust. The passive roof duplex is represented by the deformation front of Sulaiman Lobe which is set beneath the frontal passive roof thrust. The passive roof thrust spreads into interior of fold belt having a back thrust sense of motion. Kingri Fault, which is left lateral, splits Eastern and Central Sulaiman fold belt. The deformation front moved further towards fore deep in Central Sulaiman fold belt as compared to Eastern Sulaiman. The trend of the structures is roughly towards east west direction perpendicular to tectonic direction. In

Eastern Sulaiman Range, the base is progressively dipping eastward beneath the deformation front.

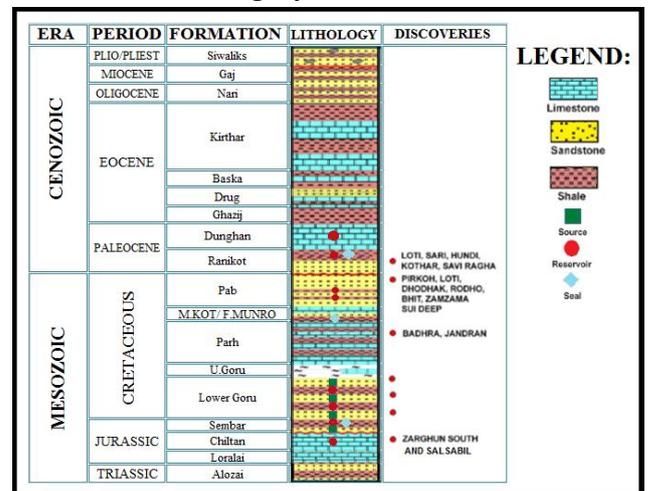
Geological Map (Modified after Ahmed et al, 1994)



Stratigraphic Sequence

In this block area Permian to Recent clastics and carbonates sediments are present, and probably the Cambrian succession is similar to the one that occurs in the Kohat-Potwar fold Belt. In southeast, the succession is younger as compared to the northwest direction. In Permian and Jurassic there is distinct break in the intraformational sediments, while there is regional unconformity in Cretaceous and Tertiary strata. Jurassic rocks are exposed in some part of the basin because of intense erosion.

Generalized Stratigraphic Chart



Petroleum Geology

A proven petroleum system is present in Sulaiman fold belt and Fore deep region. The carbonates and sandstones of Jurassic to Eocene age are mainly gas reservoirs whereas in some parts of the basin Cretaceous and Eocene reservoirs are gas or condensate producers. In Upper Goru (Cretaceous), Upper Ranikot claystone (Paleocene), and Ghazij shales (Eocene) thick sealing shales are present in addition to intraformational shale/claystone seals in the entire stratigraphic column. The proven hydrocarbon traps in fold belt region are the thrust anticlines of Oligocene and younger strata but in the fore deep region none of the identified structures is a commercial producer.

Source Rock

Datta Formation (Jurassic) and older rocks are uncommon in the region under discussion. The main source intervals revealed by the results of outcrops and well cuttings geochemistry are Sembar and Lower Goru (Cretaceous) shales. Sembar Formation is found throughout most of the Sulaiman region and its source quality varies widely. Fair to good organic carbon contents are found in outcrops in some areas.

Reservoirs

The primary reservoirs are Pab (Cretaceous) and Ranikot (Paleocene) sands. Secondary targets may include, from older to younger, Chiltan (M. Jurassic), Goru (Cretaceous), Sembar (Cretaceous), Dungan (Paleocene), Habib Rahi (Eocene) and Pirkoh (Eocene). Both the primary as well as the secondary reservoirs are proven reservoirs in different parts of the Sulaiman Region. In this block, Alozai Sands (Triassic) can also act as reservoir.

Seal

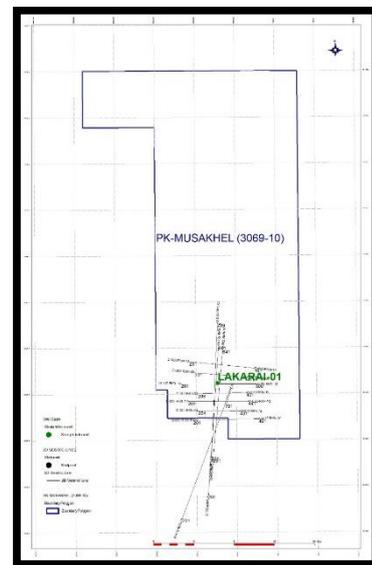
In Sulaiman fold belt region, major shale/claystone intervals exist which can act as

effective top seal in their respective plays. For the Chiltan Play, the proven seal is Sembar shale (~600ft) in the entire region. Besides this, Ranikot shale, intraformational shales, transition zones over Parh, and Chiltan act as seal.

Traps

The structural traps (thrust anticlines) are trending in NE-SW direction with four way closure formed by compressional as well as transpressional forces resulting from Indian Plate collision with Eurasian Plate. The faults are considered as migration pathway.

Musakhel Block Base Map



Well Data

WELL NAME	SPUD DATE	OPERATOR	WELL TD(m)	TD FORMATION	PRIMARY TARGET
LAKARAI-01	02/06/2003	OGDCL	2550	Goru (Cretaceous)	Pab, Mughal Kot & Parh

Seismic Data

2D SEISMIC DATA	3D SEISMIC DATA
Line km = 182.55	3D data is not available