

**2-D SEISMIC INTERPRETATION
OF
EASTERN LOTI STRUCTURE,
DERA BUGTI,
BALUCHISTAN, PAKISTAN**



BY

**UMAIR RABNAWAZ
MALIK HAIDER ABBAS BANGASH
FAHEEM SARWAR MALIK**

**Faculty of Earth and Environmental Sciences,
Bahria University, Islamabad**

TABLE OF CONTENTS

	Page No.
List of Figures	iv
List of Tables	v
Abstract	vi
Acknowledgements	vii
Chapter # 1 INTRODUCTION	1
1.1 General Introduction	1
1.2 Introduction To Study Area	2
1.3 Objectives Of Research	4
1.4 Data Obtained For Interpretation	5
Chapter # 2 GEOLOGY OF THE AREA	6
2.1 Regional Tectonic Settings	6
2.2 Geological Structure of the Indus Basin	7
2.2.1 Upper Indus Basin	9
2.2.2 Lower Indus Basin	9
2.3 Sulaiman-Kirthar Fold Belt	10
2.3.1 Sulaiman Arc	10
2.4 Regional Geological History	13
2.5 Stratigraphy	16
2.5.1 Mesozoic Stratigraphy	18
2.5.2 Cenozoic Stratigraphy	18
2.5.3 Sembar Formation	19
2.5.4 Guru Formation	19
2.5.5 Parrh Limestone	19
2.5.6 Mughal kot Formation	20
2.5.7 Pab Sandstone	20
2.5.8 Dungan Formation	21
2.5.9 Sui Main Limestone	21
2.5.10 Ghazij Formation	21
2.5.11 Habib Rahi Formation	21
2.5.12 Pirkoh Formation	22
2.5.13 Drazinda Formation	22
2.5.14 Nari Formation	22
2.5.15 Gaj Formation	23

Chapter # 3 PETROLEUM GEOLOGY OF THE AREA	24
3.1 Petroleum System	24
3.1.1 Central Indus Basin	24
3.1.2 Southern Indus Basin	24
3.2 Source Rocks	25
3.3 Reservoir Rocks	26
3.4 Traps	26
3.5 Seals	27
Chapter # 4 SEISMIC DATA ACQUISITION	29
4.1 Introduction	29
4.2 Recording Parameter	29
4.3 Seismic Energy Sources for Reflection Shooting	31
4.3.1 Dynamite	32
4.4 Seismic Detectors	33
4.4.1 Geophones	33
4.4.2 Geophone Interval	34
4.4.3 Geophone Group	34
4.4.4 Geophone Group Interval	34
4.5 Spread Geometry	35
4.5.1 Group Pattern	35
Chapter # 5 SEISMIC DATA PROCESSING	36
5.1 Introduction	36
5.2 Objectives	39
5.3 Processing of Interested Zone	40
5.4 Editing	40
5.5 Muting	40
5.6 Deconvolution	41
5.6.1 Predictive Deconvolution	41
5.7 Filtering	42
5.8 Datum Statics Correction	42
5.9 Normal Move Out Correction	42
5.10 Residual Static Correction	43
5.11 Velocity Analysis	43
5.12 Migration	44
5.12.1 Wave front Common-Envelop Method	44
5.12.2 Diffraction Migration	45
5.12.3 Wave Equation Migration	45
5.12.4 Finite Difference Migration	45
5.12.5 Frequency-Domain Migration	45
5.14 Display	46

Chapter # 6 SEISMIC VELOCITIES	47
6.1 Introduction	47
6.2 The nature of velocity data	47
6.3 Effects of physical properties of rocks on seismic velocities	47
6.4 Velocity Estimation	48
6.5 Types of velocities used in seismic exploration	49
6.5.1 Average Velocity	49
6.5.2 Interval Velocity	50
6.5.3 Root-Mean-Square (RMS) Velocity	50
6.5.4 Normal-Move out Velocity	51
6.5.5 Instantaneous velocity	51
6.6 Correlation between velocity types	52
6.7 Factors Affecting Velocity	53
Chapter # 7 SEISMIC DATA INTERPRETATION	54
7.1 Introduction	54
7.2 Structural analysis	55
7.3 Stratigraphic analysis	55
7.4 Some Important Steps	56
7.5 Interpretation of The Study Area	57
7.5.1 Base map	57
7.5.2 Time Section	58
7.5.3 Reflection Selection	58
7.5.4 Fault Identification	58
7.5.5 Time Contour Map	58
7.5.6 Dix Average Velocity Graph	65
7.5.7 Depth Section	65
7.5.8 Well Correlation	69
CONCLUSION	75
REFERENCES	76