Smart Solutions for Today’s Geoscientist

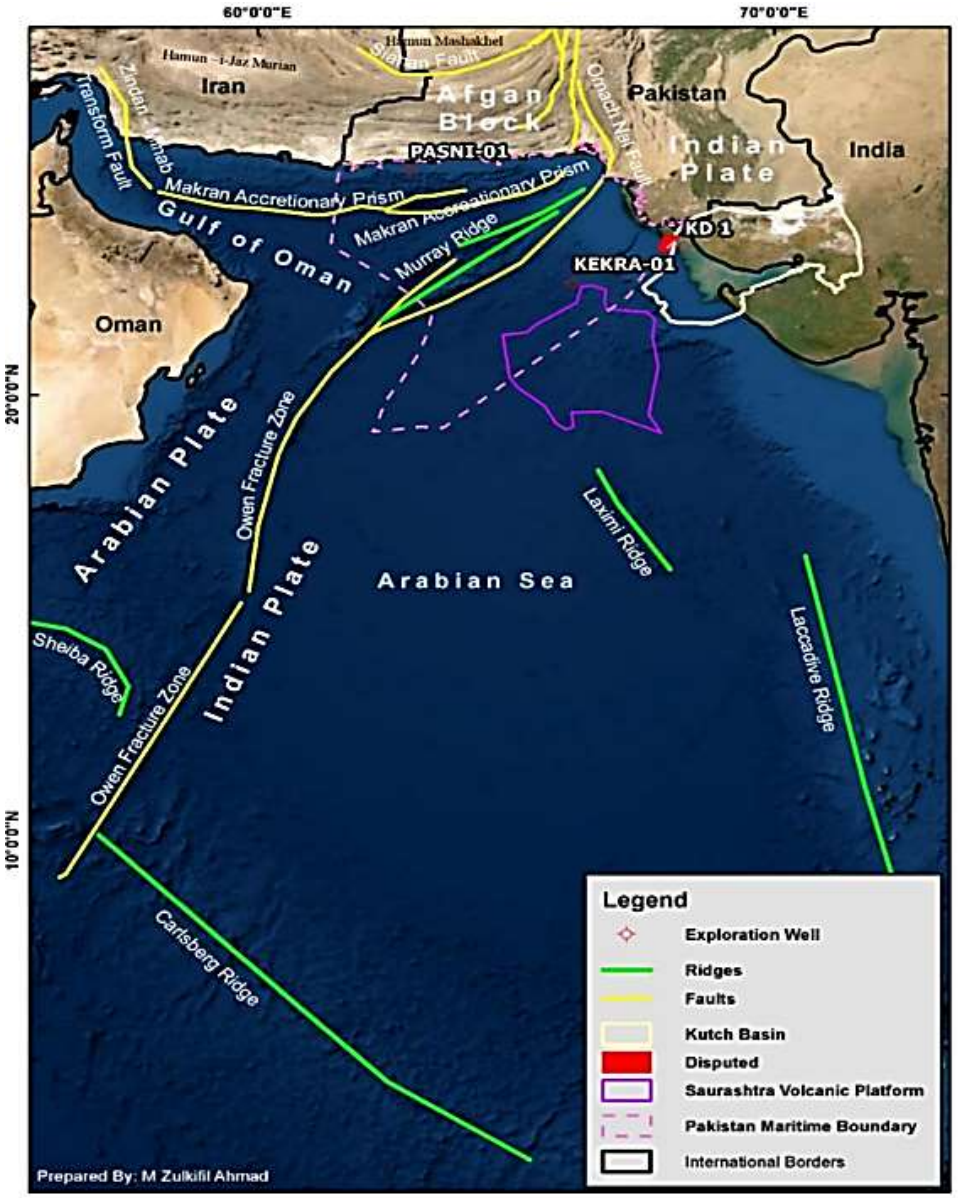
INDUS OFFSHORE BLOCKS

OFFSHORE BLOCK BIDDING ROUND 2025

MINISTRY OF ENERGY PETROLEUM DIVISION (DGPC)

TECTONIC SETTINGS

- Pakistan Offshore extends from south 700 km long coastal line along Arabian Sea.
- Offshore Indus Basin located between Murray Ridge and Laccadive Ridge is mainly a Passive Margin basin.
- Arabian Sea extends from border of Oman in west to Laccadive Ridge in east toward India; in South to Carlsberg Ridge.
- Owen Fracture Zone - Murray Ridge divides Arabian Sea crust into Arabian Plate in west and Indian Plate in east.
- Pakistan Offshore divided into Indus Offshore (Saurashtra Volcanic Arc in SSE) in east, extend toward west as Murray Ridge, Dalrymple Trough and Makran Accretionary Prism.
- Arabian plate is in the south of Makran Accretionary Prism.



Adeel Nazeer et, al., (2022) An Overview of Petroleum Potential of Pakistan Offshore: PAPG/SPE Annual Technical Conference.
N Khan et al., 2016) Sequence stratigraphic analysis of Eocene Rock Strata, Offshore Indus, southwest Pakistan: Mar Geophysics

PETROLEUM SYSTEM

- **Source Rock**:

1. Paleocene section with TOC ranging from 1-3%.

- **Play Types Miocene Delta**

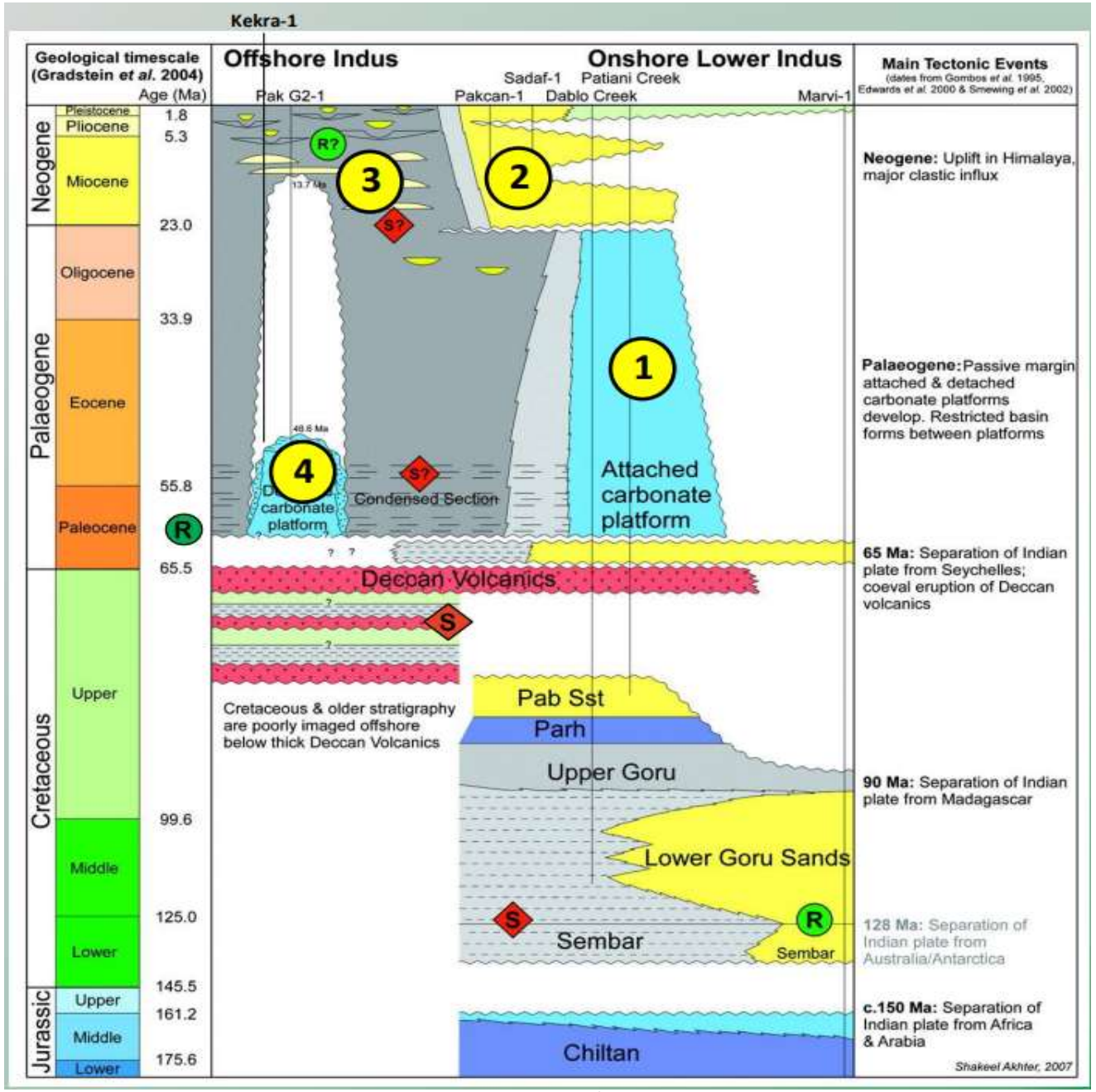
1. Tested by 5 wells.
2. Few off structure & and few didn't find reservoir.

- **Reservoir and Seal Pairs**:

1. Miocene deltaic sands act reservoir.
2. The mud-clay dominated sediments.
3. Intra-formational shales packages of Miocene.
4. Oligocene may act as seal for potential reservoirs.

- **Trap Geometries**:

1. Fault block and rollover against growth faults in shelf margin basin.
2. Pinch outs are also observed.



Carmichael, S. M., et al. "Geology and hydrocarbon potential of the offshore Indus Basin, Pakistan." *Petroleum Geoscience* 15.2 (2009): 107-116.

RESERVOIR CORRELATIONS INDUS & ADJACENT AREAS

Plays Types

Shelf Edge Carbonate Buildup	• Undrilled
Seal	• Intra-formational shales of Miocene and Oligocene my act as top seal.
Miocene Delta	• Tested by 5 wells, few were off structure & some didn't land in reservoir Pakcan-01 (flowed @ 3.7 MMscfd)
Channel Levee	• Untested –A vast Frontier
Deep Water Carbonate Buildup	• Drilled in Pak G2-1 & Kekra-01, excellent reservoirs but limited knowledge about charge

Basin / Well	Age	Lithology	Net Thickness (m)	Phi (v/v)	K (md)	Remarks
Offshore Indus Basin	Miocene	Deltaic Sands	10-20	18-25, with an average of 22	100-500, with an average of 514	Pakcan -01 Good reservoir is present
	Eocene	Reef Limestone				PakG2-01 Excellent reservoir
	Eocene	Reef Limestone		20-28		Kekra-01 Excellent reservoir
Indus Basin	Lower Eocene	Limestone	25	4-30	4	Excellent reservoir
	Paleocene	Sandstones	10	10-25		Good reservoir
	Cretaceous	Sandstones	15	15-22		Excellent reservoir
Kutch Basin	Cretaceous Naliya & Bhuj Formations	Fluvial-Deltaic Sands	30	25	32.8	GK-39-1 Very good reservoir
				18		GK-22C -1
	Lower Paleocene	Fluvial Sands		20-25	100-1000	GK-29A-1 Excellent reservoir
	Lower Eocene	Limestone	15			KD-1 (Good reservoir)
Bombay Basin	Miocene	Limestone		18-35	50-500	Good to very good reservoir
	Upper Eocene	Limestone		14-22	20-1000	

Modified after Gong, J. M., Liao, J., Liang, J., Lei, B. H., Chen, J. W., Khalid, M., & Meng, M. (2020). Exploration prospects of oil and gas in the North-western part of the Offshore Indus Basin, Pakistan. China Geology, 3(4), 633-642

SOURCE ROCK CORRELATIONS INDUS BASIN & ADJACENT AREAS

Paleocene

Drilled only in Karachi South-01 well with TOC ranging from 1 -3%. Pakcan-01 adjacent block.

Miocene

■TOC ranges from 1% - 3.5% in Indus Marine A-1.

300m of source rock interval with TOC range of 1.26% - 3.24% drilled in Pakcan-01 well, however it turned out to be immature.

Basin / Well	Age	Lithology	TOC %	Type	R_0 (%)	Remarks
Indus Basin	Lower Cretaceous	Shale	3.5	II and III	0.87	Proven Hydrocarbon reserves exist with good to very good source rock.
	Upper Cretaceous	Shale / Mudstone	2.55 – 1.72	II and III	2.06 - 1.27	
	Paleocene	Shale	1.38 – 1.72	I	1.07 – 1.29	
	Eocene	Shale	1.19 – 6.19		1.01 – 1.11	
	Oligocene	Shale	9.75		1.44	
Kutch Basin	Lower Eocene	Shale / Lagoonal Lignite	0.86	II and III	0.94	Proven GKH1 well. In Cretaceous thin layers are observed.
	Paleocene	Calcareous Shale / Lignite Seams	0.58 – 0.37	II and III	>1.1	
	Cretaceous	Interbedded Shale and Coal	0.35 - 3	III and II	<0.5	
	Upper Jurassic	Shale	0.1 – 10.65	III and II	0.34 – 0.49	
	Lower Cretaceous	Shale	0.5 – 3			
Pakcan-1	Lower Miocene	Mudstones	0.55 – 3.24		0.6 – 0.9	Potential source rock is present.
Bombay Basin	Paleocene – Lower Eocene	Shale / Coal Seams	0.55-1			Good and mature source rock.
	Oligocene	Shale	≥1			
KS1-1	Paleocene – Eocene	Shale / Mudstones	3-4.5	III		Black Shale (~3m)
Karachi Offshore	Paleocene	Mudstone		III		Good source rock.

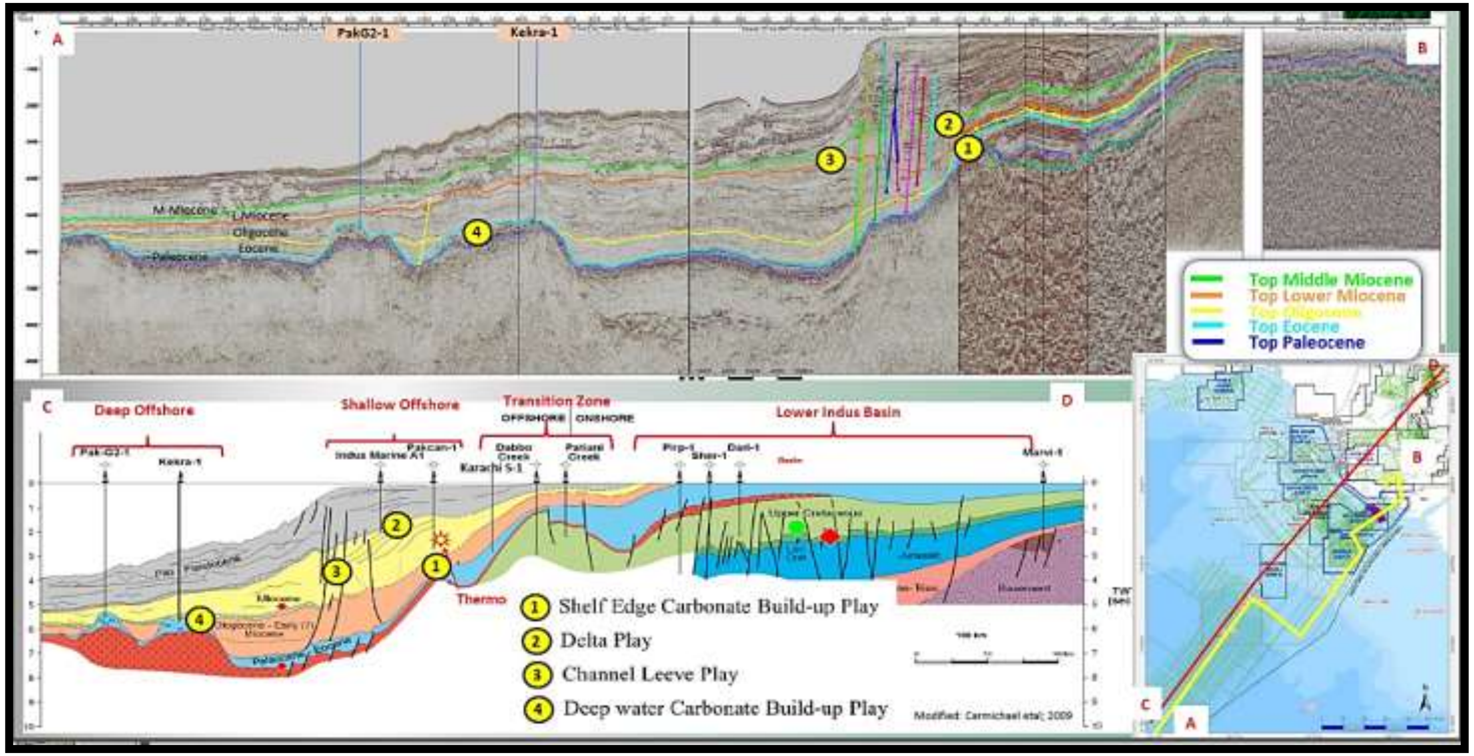
Modified after Gong, J. M., Liao, J., Liang, J., Lei, B. H., Chen, J. W., Khalid, M., & Meng, M. (2020). Exploration prospects of oil and gas in the North-western part of the Offshore Indus Basin, Pakistan. China Geology, 3(4), 633-642.

OPPORTUNITIES

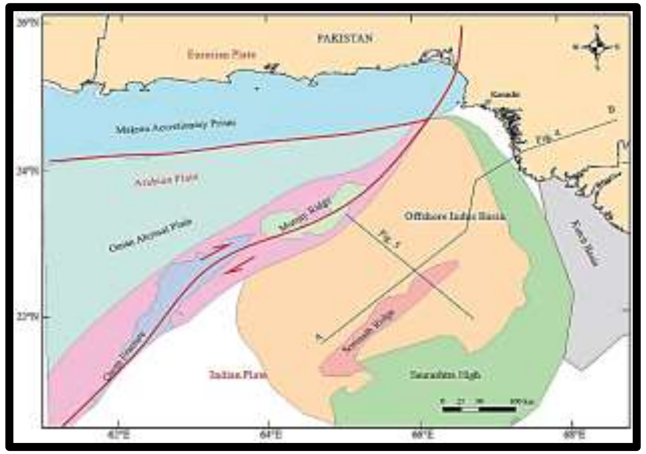
- Pakistan Offshore basin is divided into two major basins with multiple plays.
- Indus Offshore is the largest and least-explored basin with estimated Resource potential of 10-40 TCF.
- The wells drilled in the near vicinity are Pakcan-01, Indus Marine-1B, Indus Marine-1C, PakG2-01 and Indus Kekra-01.
- Indus Offshore has a working petroleum system proven by non-commercial flow of 3.7 MMcfd at Pakcan-01.
- Indus Marine-1B indicated gas shows but failed due to mechanical issues. (Gong et al., 2020).
- Results from Indus Marine 1C indicate a mature source (medium to light oil); modern well control can overcome the high formation pressures in Eocene reservoir.
- PakG2-01 primary target tertiary carbonate. Lack of charge (Gong et al., 2020).
- Kekra-01 reached TD Formation i.e., Paleogene Carbonate. Good reservoir but a lack of charge hampered further development (Gong et al., 2020).
- Majority is Gas play with Possibility of oil play in the eastern periphery.

GEOLOGICAL PERSPECTIVE

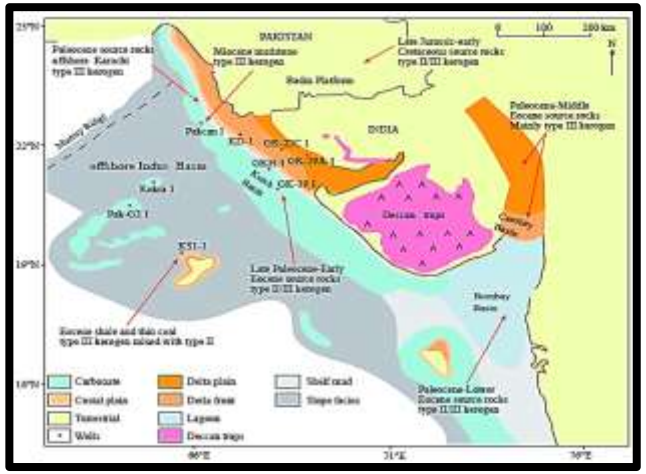
Indus Offshore Shallow:



A - Offshore Indus Geological Profile



B - Geotectonic location of Pakistan offshore (modified from Smith GL, 2013).

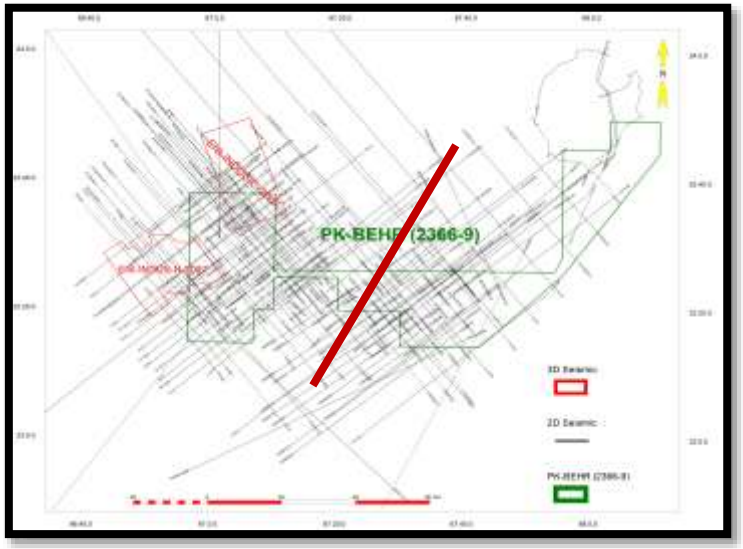


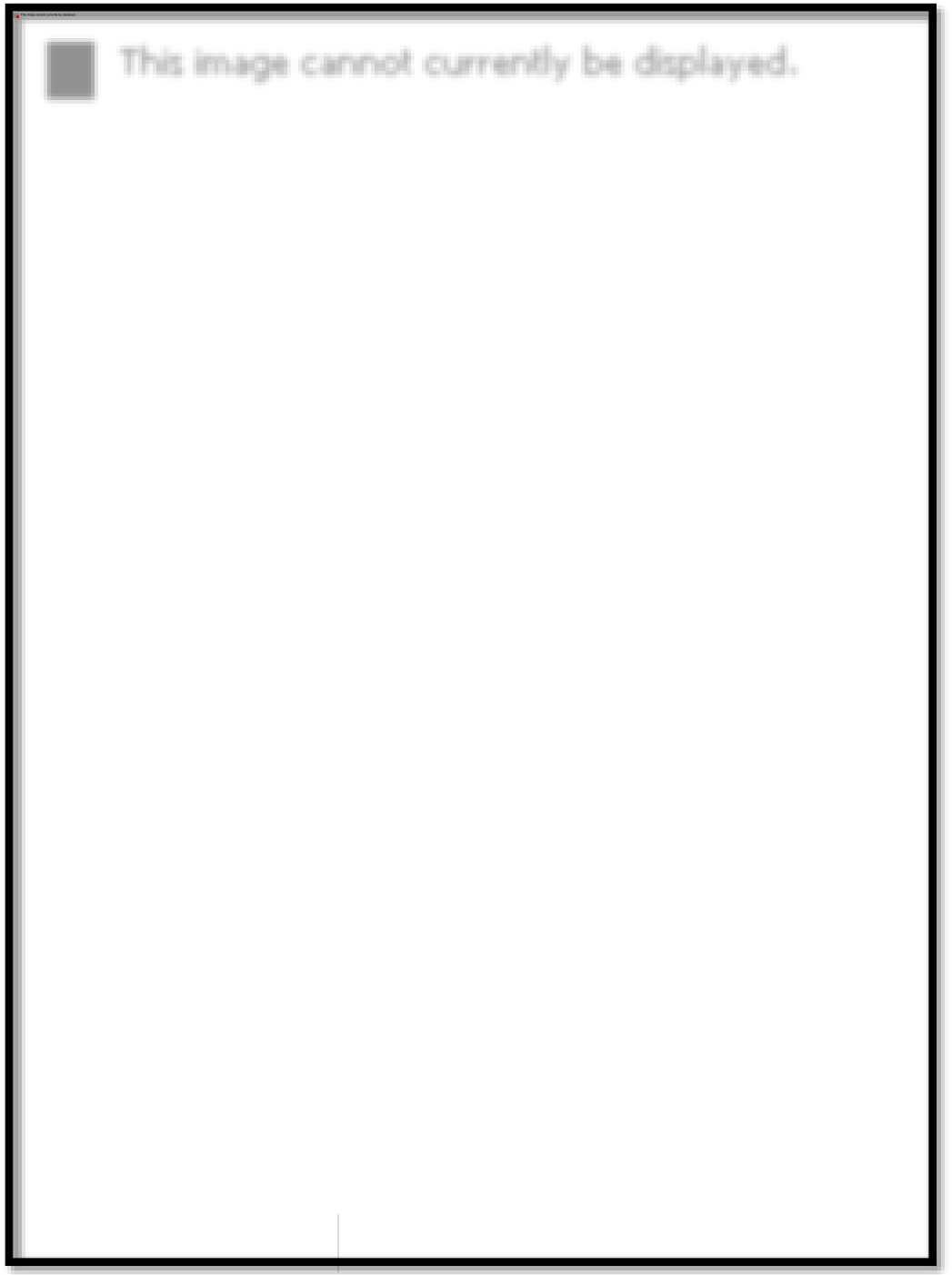
C - Sedimentary environment of source rocks in the Offshore Indus Basin and its adjacent areas in the Paleocene–Eocene

Modified after Gong, J. M., Liao, J., Liang, J., Lei, B. H., Chen, J. W., Khalid, M., & Meng, M. (2020). Exploration prospects of oil and gas in the North-western part of the Offshore Indus Basin, Pakistan. China Geology, 3(4), 633-642.

Behr Block (2366-9)

- **Area:** Behr block covers an area of 2481.44 Sq. Kms.
- **Geological Basin**: Offshore Indus basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- The Block is surrounded by Keti Bandar and Eastern Off Indus-C (North), and Zrrar (South).
- NOIP, TEP,BP and CE acquired some 2D data approximately 7046.89 (L. Kms) and seismic 3D data of about 809 (Sq. Kms) in the block within the years 1969-2009.

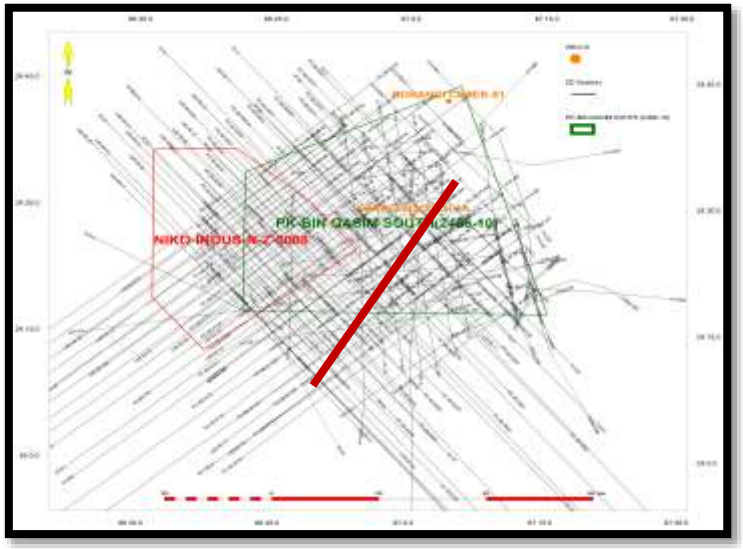




*Riaz Ahmed 1998, Hydrocarbon Resource Base of Pakistan, Pakistan Journal of Hydrocarbon Research, Vol 10, 1-10

Bin Qasim South (2466-10)

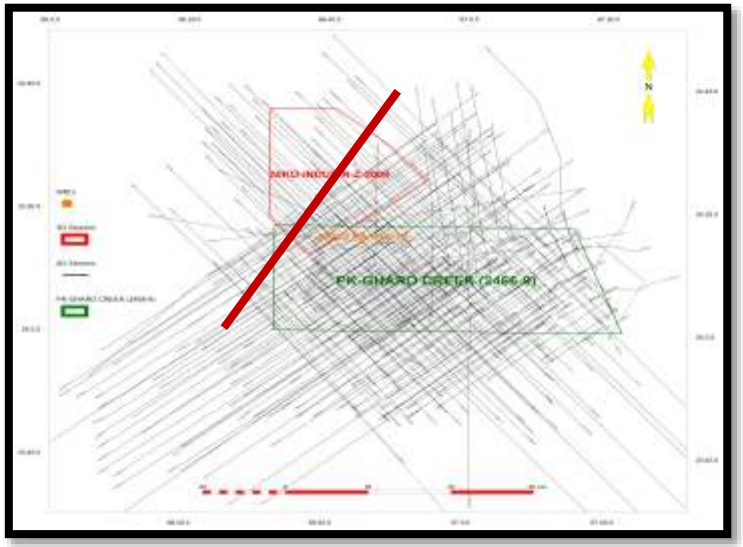
- **Area:** Bin Qasim South covers an area of 2021.69 Sq. Kms.
- **Geological Basin**: Offshore Indus basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- The Block is surrounded by Gharo Creek (South) and Offshore Deep K (West) blocks.
- NOIP, TEP, BP and CE acquired seismic 2D data of about 7701.96 (L. Kms.), and seismic 3D data of about 340 (Sq. Kms.) in the block within the years 1969-1998.
- Two wells drilled in the vicinity are Karachi South and Korangi Creek.

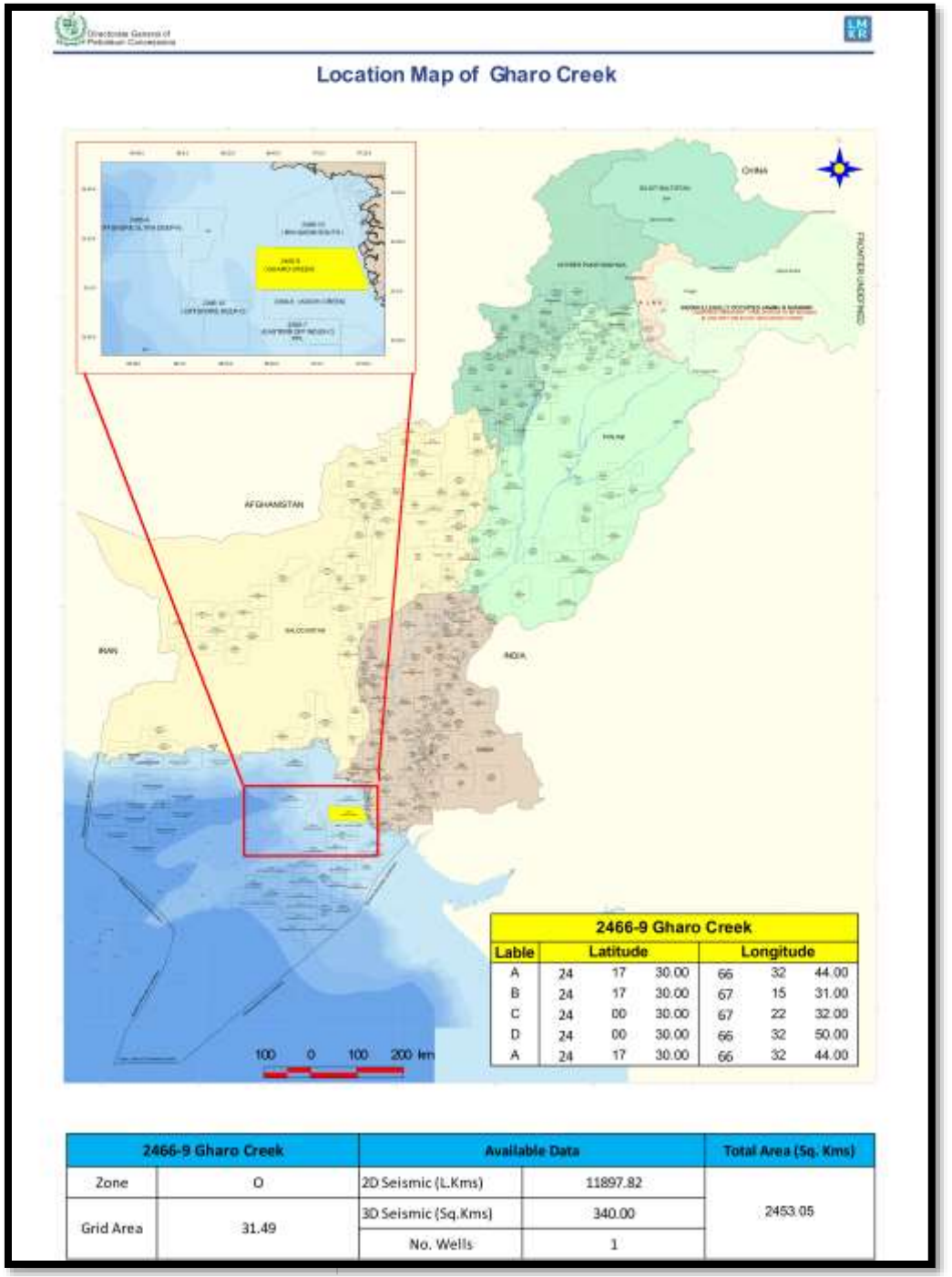


**Riaz Ahmed 1998, Hydrocarbon Resource Base of Pakistan, Pakistan Journal of Hydrocarbon Research, Vol 10, 1-10*

Gharo Creek (2466-9)

- **Area:** Gharo Creek covers an area of 2453.05 Sq. Kms.
- **Geological Basin**: Offshore Indus basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- The Block is surrounded by Bin Qasim South (North), Kochi Creek (South), and Offshore Deep C (West) blocks.
- NOIP, TEP,BP and CE acquired some 2D data approximately 11897.82 (L. Kms) and seismic 3D data of about 340 (Sq. Kms) in the block within the years 1969-2009.
- The well drilled in the vicinity is Indus Marine-1B.





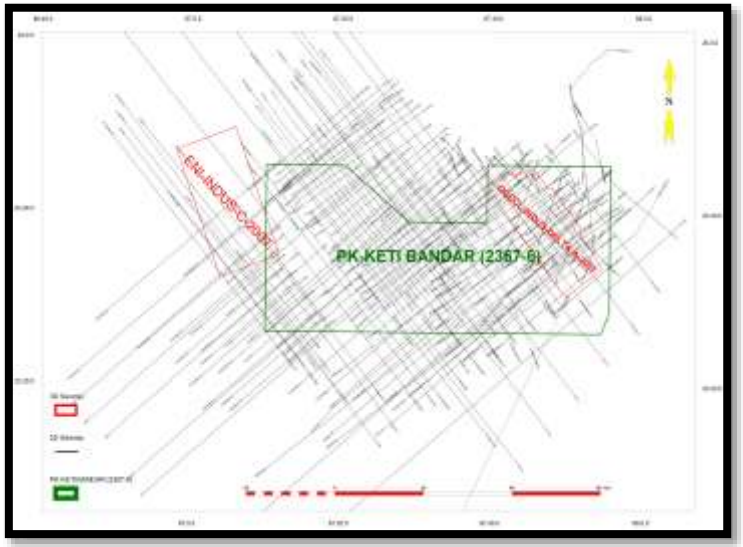
2466-9 Gharo Creek						
Lable	Latitude			Longitude		
A	24	17	30.00	66	32	44.00
B	24	17	30.00	67	15	31.00
C	24	00	30.00	67	22	32.00
D	24	00	30.00	66	32	50.00
A	24	17	30.00	66	32	44.00

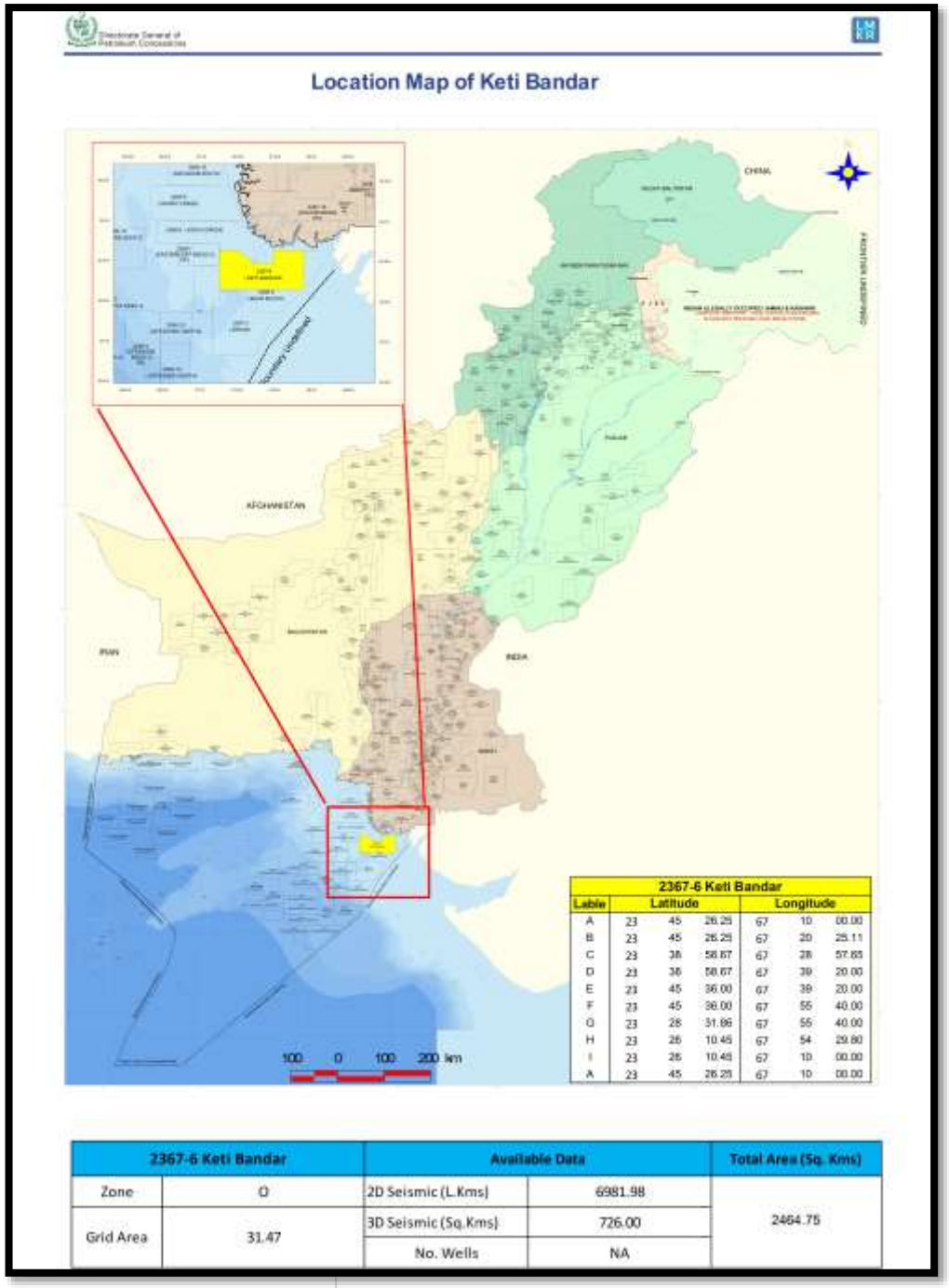
2466-9 Gharo Creek		Available Data		Total Area (Sq. Kms)
Zone	O	2D Seismic (L.Kms)	11897.82	2453.05
Grid Area	31.49	3D Seismic (Sq.Kms)	340.00	
		No. Wells	1	

*Riaz Ahmed 1998, Hydrocarbon Resource Base of Pakistan, Pakistan Journal of Hydrocarbon Research, Vol 10, 1-10

Keti Bandar (2367-6)

- **Area:** Keti Bandar covers an area of 2464.75 Sq. Kms.
- **Geological Basin**: Offshore Indus basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- The Block is surrounded by Behr Block and Zrrar (South), and Offshore Deep C (West) blocks.
- NOIP, TEP,BP and CE acquired some 2D data approximately 6981.98 (L. Kms) and seismic 3D data of about 726 (Sq. Kms) in the block within the years 1969-2009.

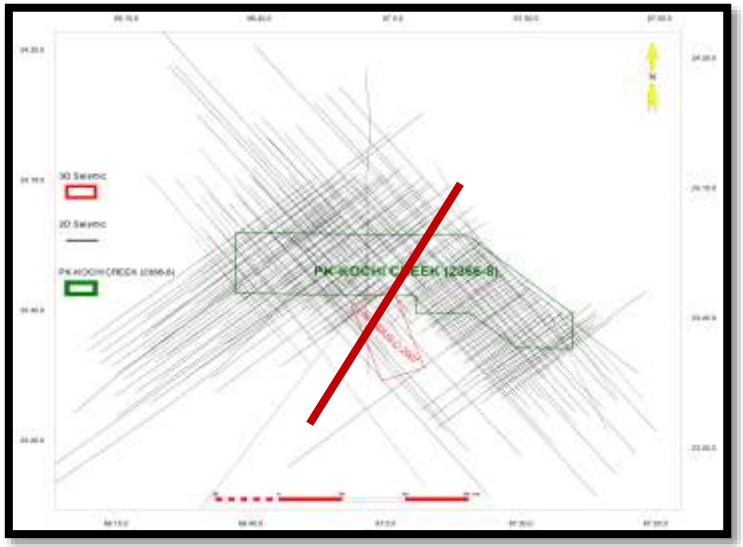


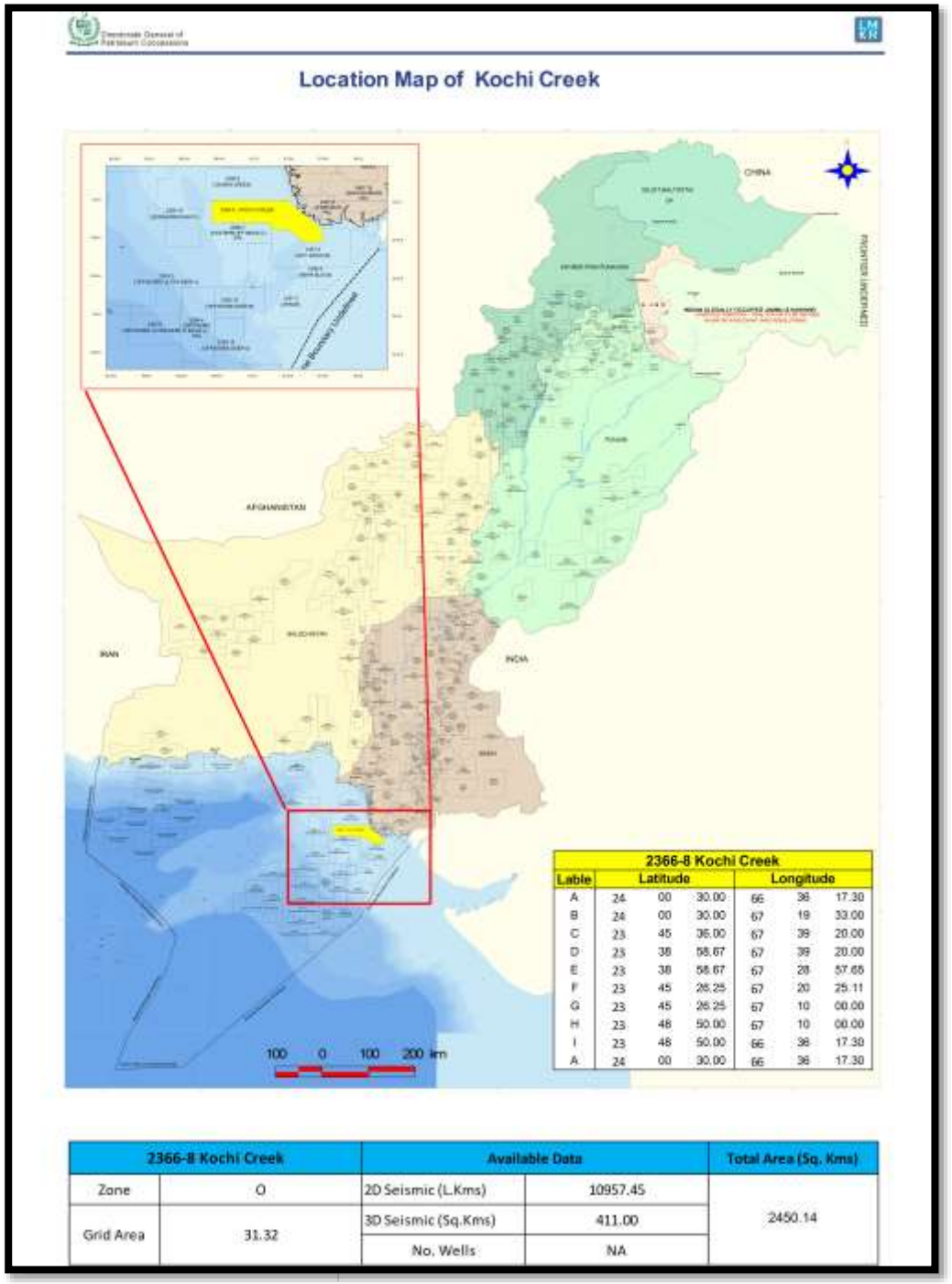


*Riaz Ahmed 1998, Hydrocarbon Resource Base of Pakistan, Pakistan Journal of Hydrocarbon Research, Vol 10, 1-10

KOCHI CREEK (2366-8)

- **Area:** Kochi Creek covers an area of 2450.14 Sq. Kms.
- **Geological Basin**: Offshore Indus basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- The Block is surrounded by Gharo Creek (North), Eastern Off Indus-C and Keti Bandar (South) blocks.
- NOIP, TEP,BP and CE acquired some 2D data approximately 10957.45 (L. Kms) and seismic 3D data of about 411 (Sq. Kms) in the block within the years 1969-2009.



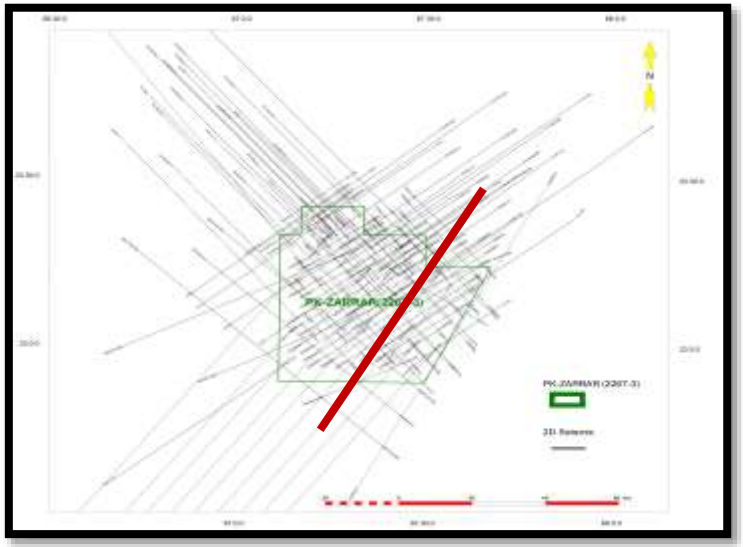


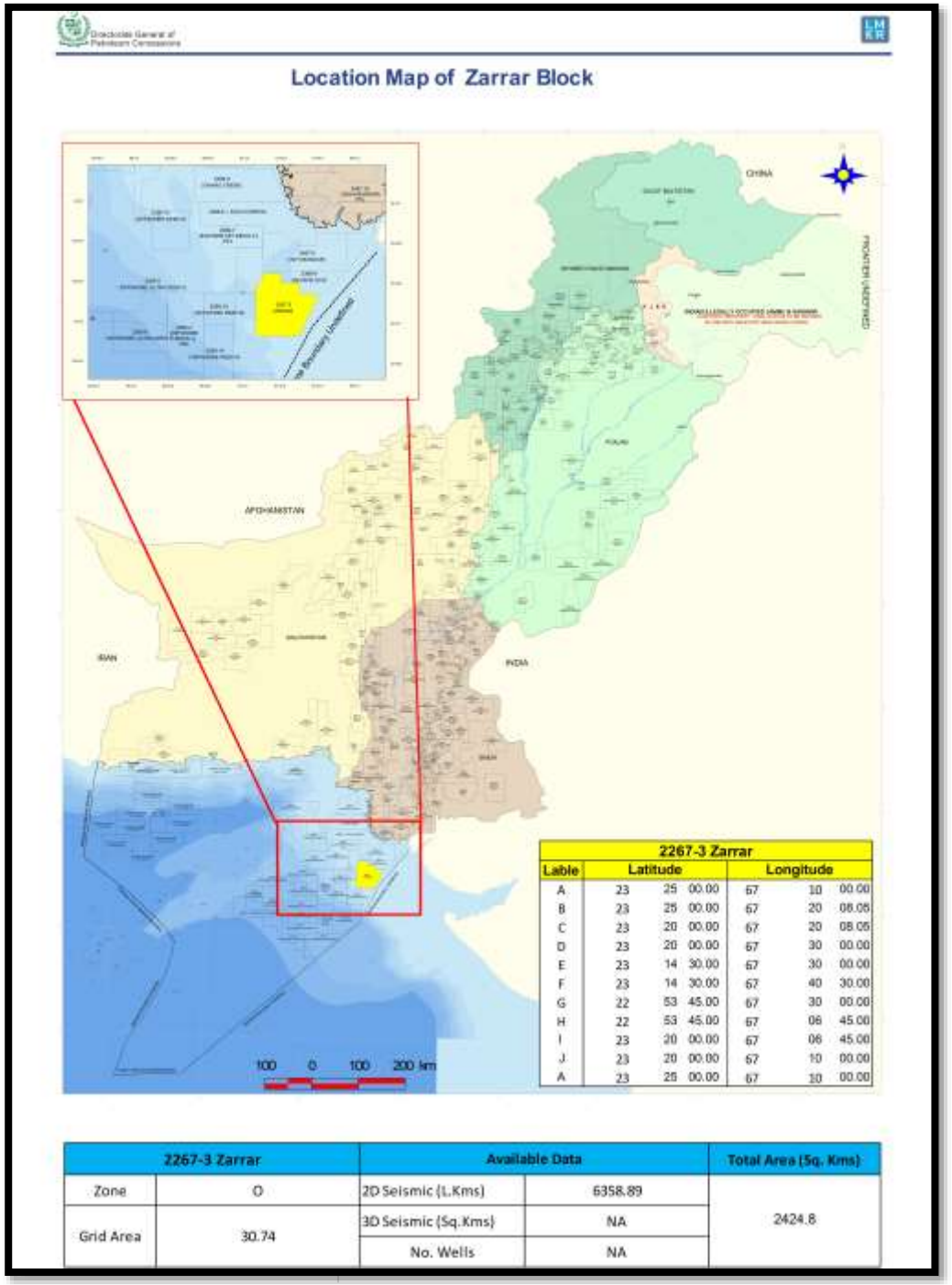
2366-8 Kochi Creek		Available Data		Total Area (Sq. Kms)
Zone	O	2D Seismic (L.Kms)	10957.45	2450.14
Grid Area	31.32	3D Seismic (Sq.Kms)	411.00	
		No. Wells	NA	

*Riaz Ahmed 1998, Hydrocarbon Resource Base of Pakistan, Pakistan Journal of Hydrocarbon Research, Vol 10, 1-10

Zarrar (2267-3)

- **Area:** Zarrar covers an area of 2424.8Sq. Kms.
- **Geological Basin**: Offshore Indus basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- The Block is surrounded by Behr Block (North) and Offshore Deep-B (West) blocks.
- NOIP, TEP,BP and CE acquired some 2D data approximately 6358.89 (L. Kms) in the block within the years 1969-2009.



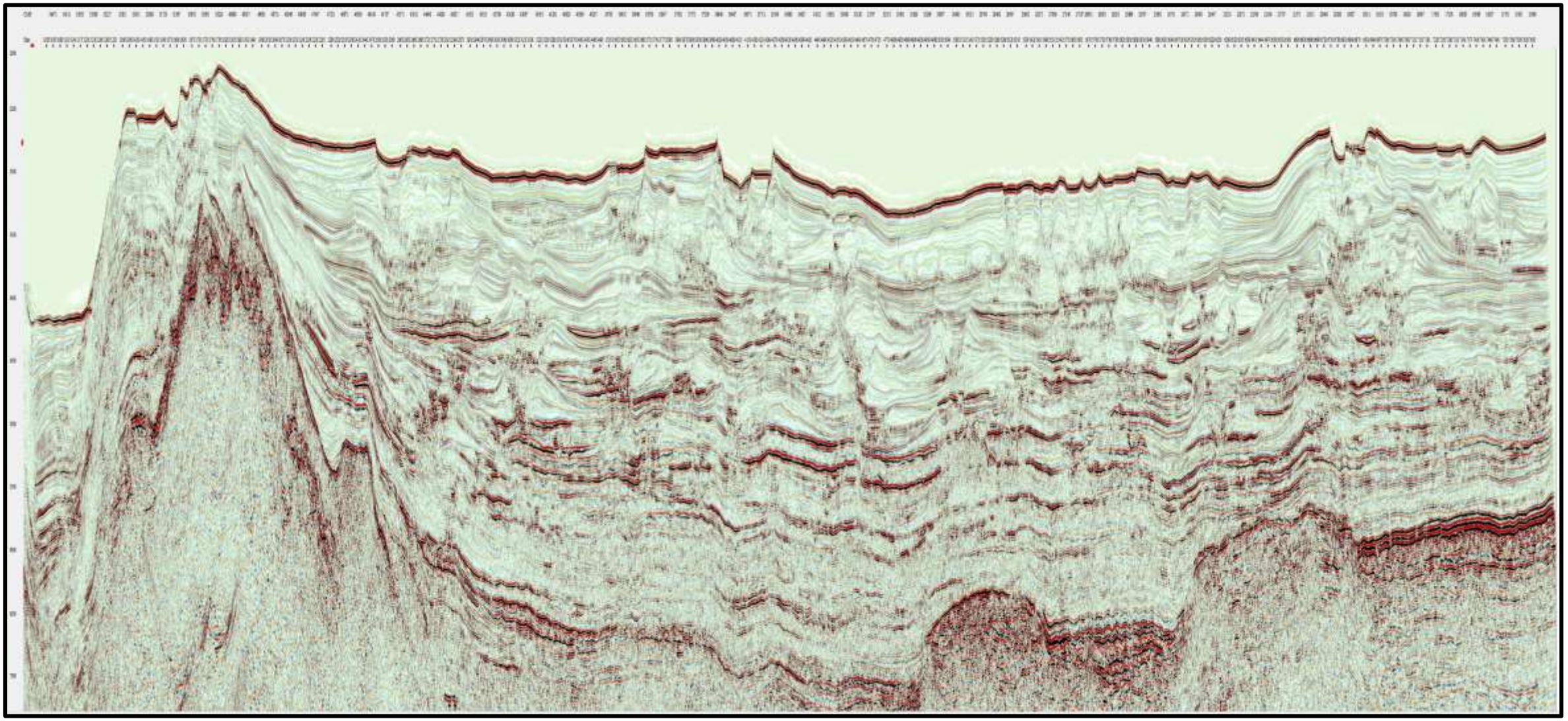


2267-3 Zarrar				
Lable	Latitude		Longitude	
A	23 25 00.00		67 10 00.00	
B	23 25 00.00		67 20 00.00	
C	23 20 00.00		67 20 00.00	
D	23 20 00.00		67 30 00.00	
E	23 14 30.00		67 30 00.00	
F	23 14 30.00		67 40 30.00	
G	22 53 45.00		67 30 00.00	
H	22 53 45.00		67 06 45.00	
I	23 20 00.00		67 06 45.00	
J	23 20 00.00		67 10 00.00	
A	23 25 00.00		67 10 00.00	

2267-3 Zarrar		Available Data		Total Area (Sq. Kms)
Zone	O	2D Seismic (L.Kms)	6358.89	2424.8
Grid Area	30.74	3D Seismic (Sq.Kms)	NA	
		No. Wells	NA	

*Riaz Ahmed 1998, Hydrocarbon Resource Base of Pakistan, Pakistan Journal of Hydrocarbon Research, Vol 10, 1-10

PROSPECTIVITY



Fault block and rollover against growth faults in shelf margin basin.
Pinch outs are also observed.

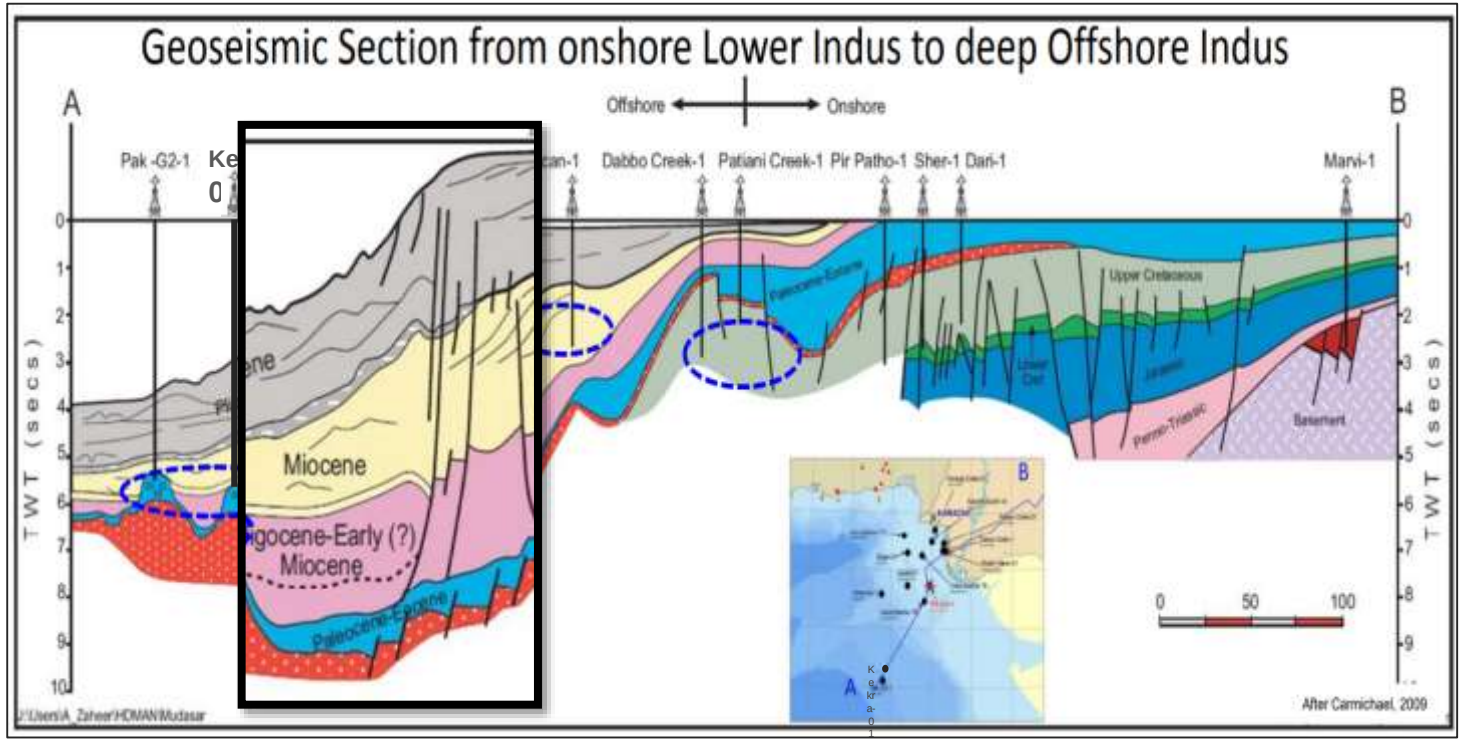
EXPLORATION RISKS

- Source & Charge: Low to Medium risk.
- Reservoir: Low to Medium risk.
- Seal: Low to Medium risk.
- Trap: Low to Medium risk.
- Key challenges for future exploration in Tertiary Petroleum System are to establish:

1. Distribution and timing of effective source intervals' development within the drainage area of prospect.
2. Timing of over-pressuring (up to 7000 psi at 2800m in Indus Marine-1A well) within Miocene section (for Miocene and younger targets) with respect to source rock maturation and expulsion.

GEOLOGICAL PERSPECTIVE

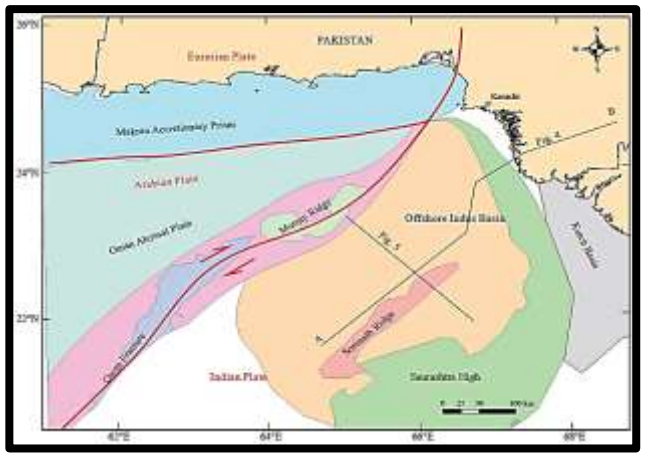
Indus Offshore Deep



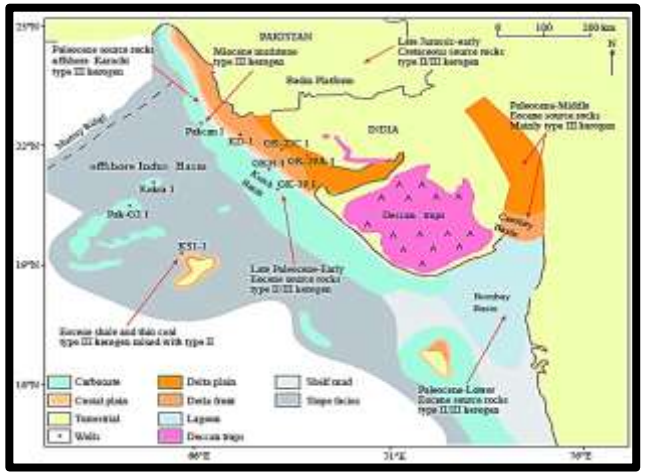
A – Geoseismic Section from Onshore to deep offshore Indus

Play Types: Carbonate Buildups

- Tested by 1 well (Indus Marine-1C).
- Mechanical Failure prevented reaching target.



B - Geotectonic location of Pakistan offshore (modified from Smith GL, 2013).

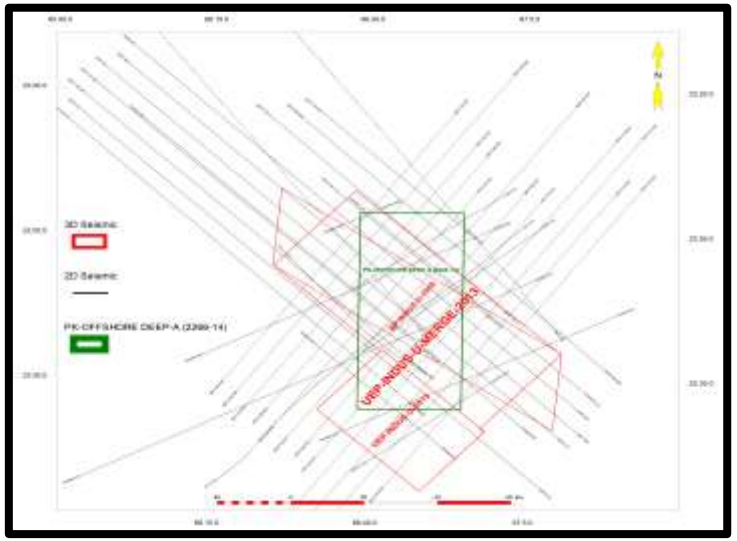


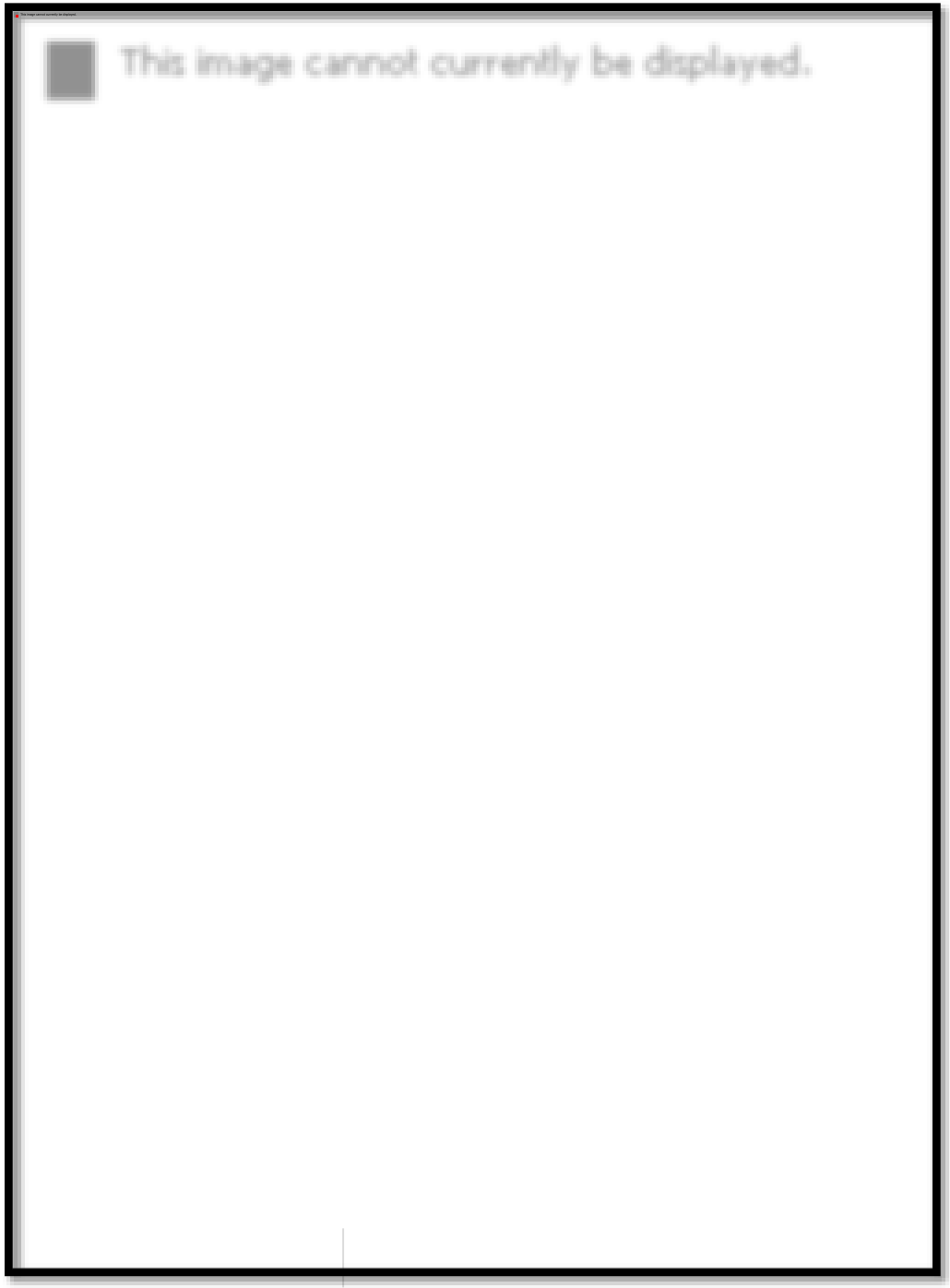
C - Sedimentary environment of source rocks in the Offshore Indus Basin and its adjacent areas in the Paleocene–Eocene

Modified after Gong, J. M., Liao, J., Liang, J., Lei, B. H., Chen, J. W., Khalid, M., & Meng, M. (2020). Exploration prospects of oil and gas in the North-western part of the Offshore Indus Basin, Pakistan. China Geology, 3(4), 633-642.

Offshore Deep-A (2266-14)

- **Area:** Offshore Deep-A covers an area of 1774.2 Sq. Kms.
- **Geological Basin**: Offshore Indus basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- The Block is surrounded by offshore Deep-B (North), Offshore Ultra Deep-B (South) , Offshore Indus-J (West) and Zrrar (East) blocks.
- NOIP, TEP,BP and CE acquired some 2D data approximately 4929.49 (L. Kms) and seismic 3D data of about 2996 (Sq. Kms) in the block within the years 1973-2007.

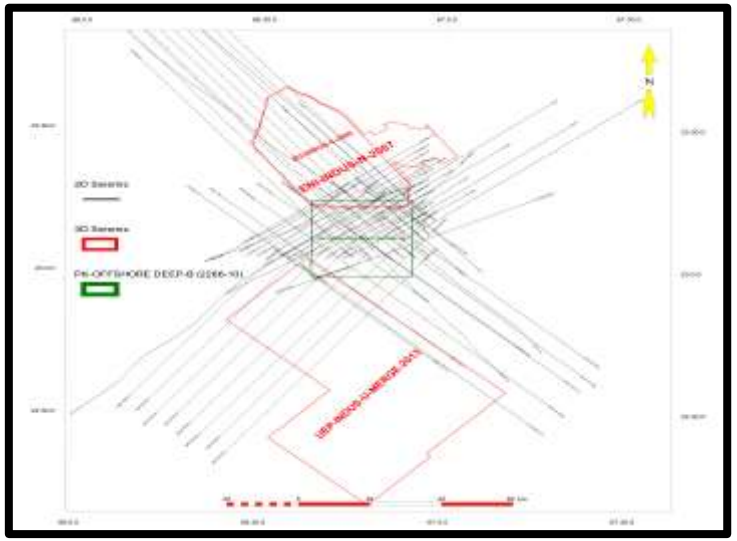




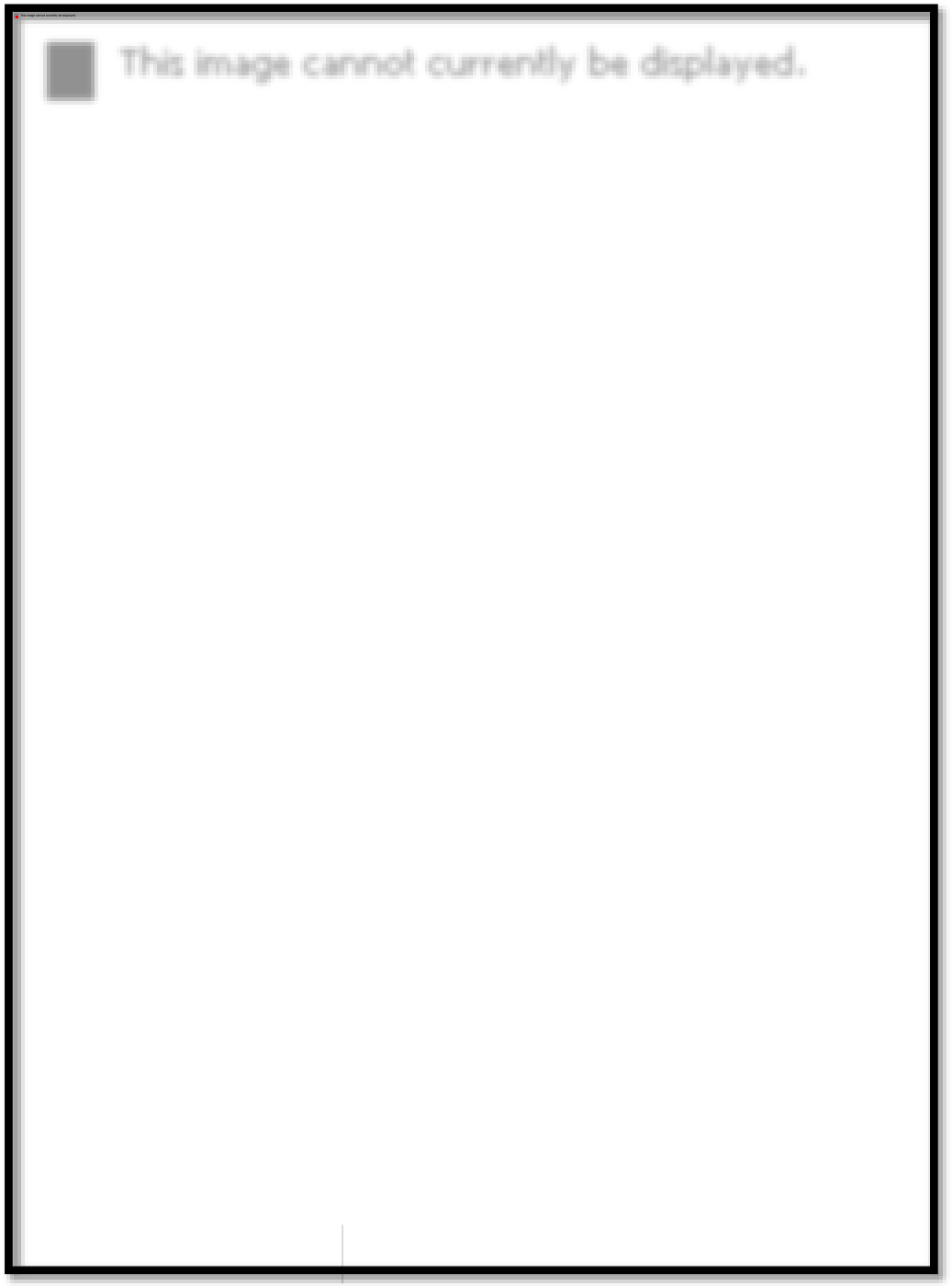
*Riaz Ahmed 1998, Hydrocarbon Resource Base of Pakistan, Pakistan Journal of Hydrocarbon Research, Vol 10, 1-10

Offshore Deep-B (2266-10)

- **Area:** Offshore Deep-B covers an area of 833.78 Sq. Kms.
- **Geological Basin**: Offshore Indus basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- The Block is surrounded by Offshore Ultra Deep-J (North), Offshore Ultra Deep-A (South) , Offshore Indus-J (West) and Zrrar (East) blocks.
- NOIP, TEP,BP and CE acquired some 2D data approximately 4528.27 (L. Kms) and seismic 3D data of about 2072.6 (Sq. Kms) in the block within the years 1969-2009.

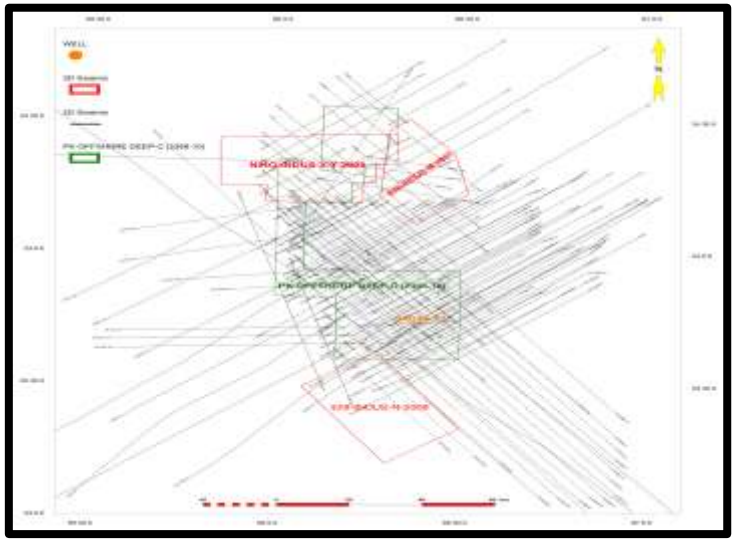


**Riaz Ahmed 1998, Hydrocarbon Resource Base of Pakistan, Pakistan Journal of Hydrocarbon Research, Vol 10, 1-10*

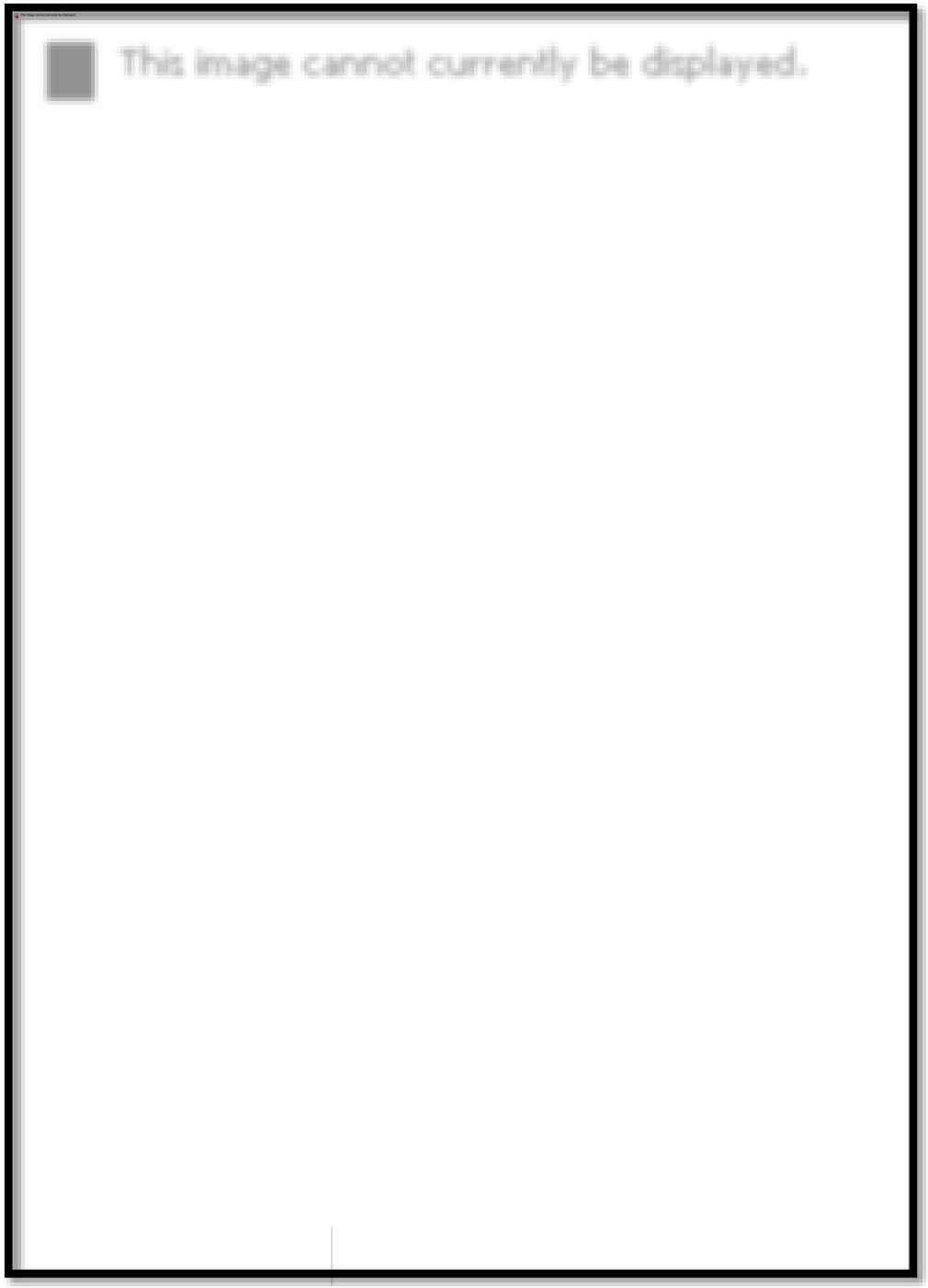


Offshore Deep-C (2366-10)

- **Area:** Offshore Deep-C covers an area of 2482.83 Sq. Kms.
- **Geological Basin**: Offshore Indus basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- The Block is surrounded by offshore Deep-K (West), Offshore Deep-F (South) , and Bin Qasim South, Gharo Creek and Kochi Creek (East) blocks.
- NOIP, TEP,BP and CE acquired some 2D data approximately 8570.77 (L. Kms) and seismic 3D data of about 2809 (Sq. Kms) in the block within the years 1969-2009.
- The well drilled in the vicinity is Sadaf-01.

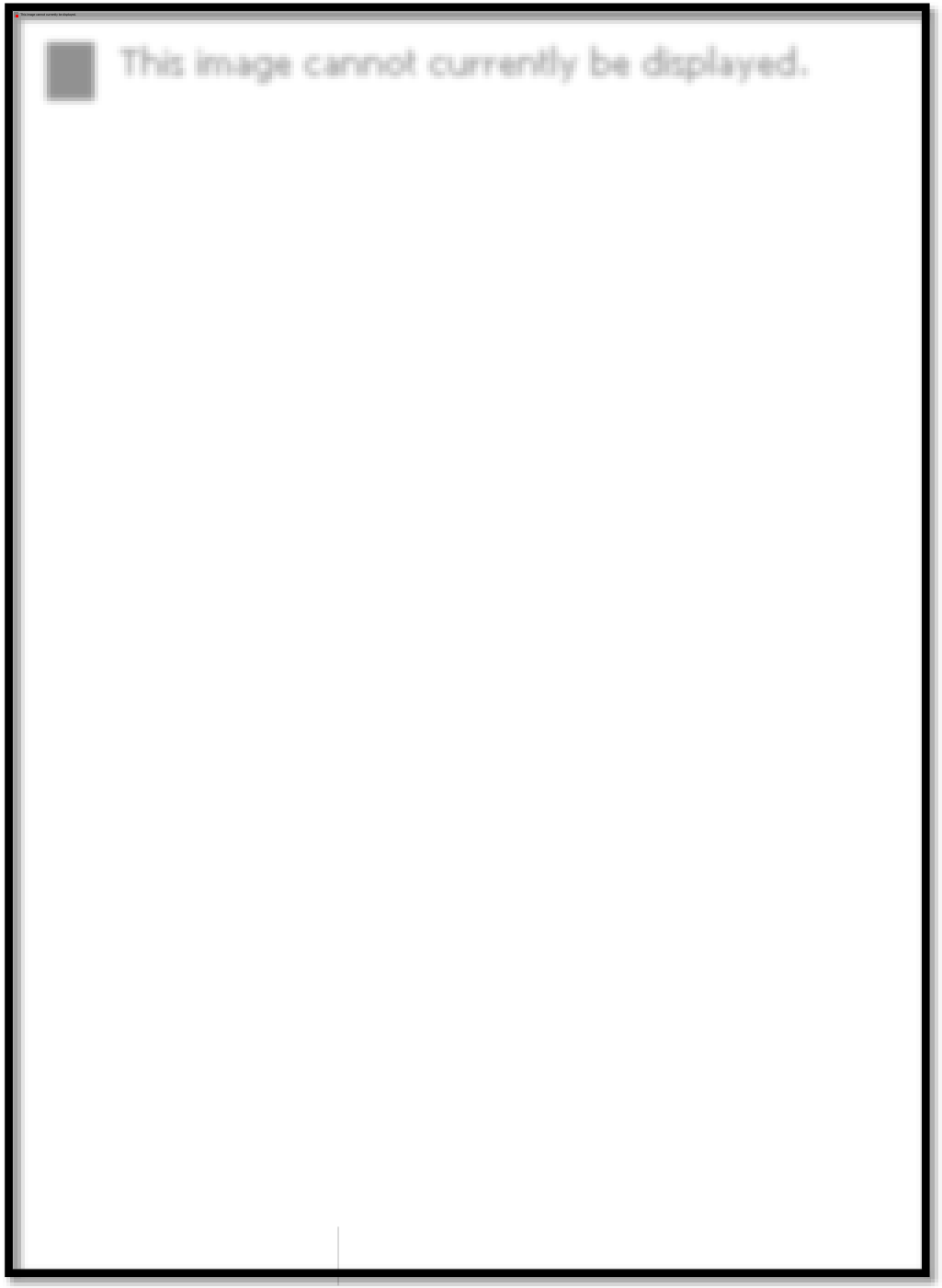


**Riaz Ahmed 1998, Hydrocarbon Resource Base of Pakistan, Pakistan Journal of Hydrocarbon Research, Vol 10, 1-10*



Offshore Deep-D (2366-11)

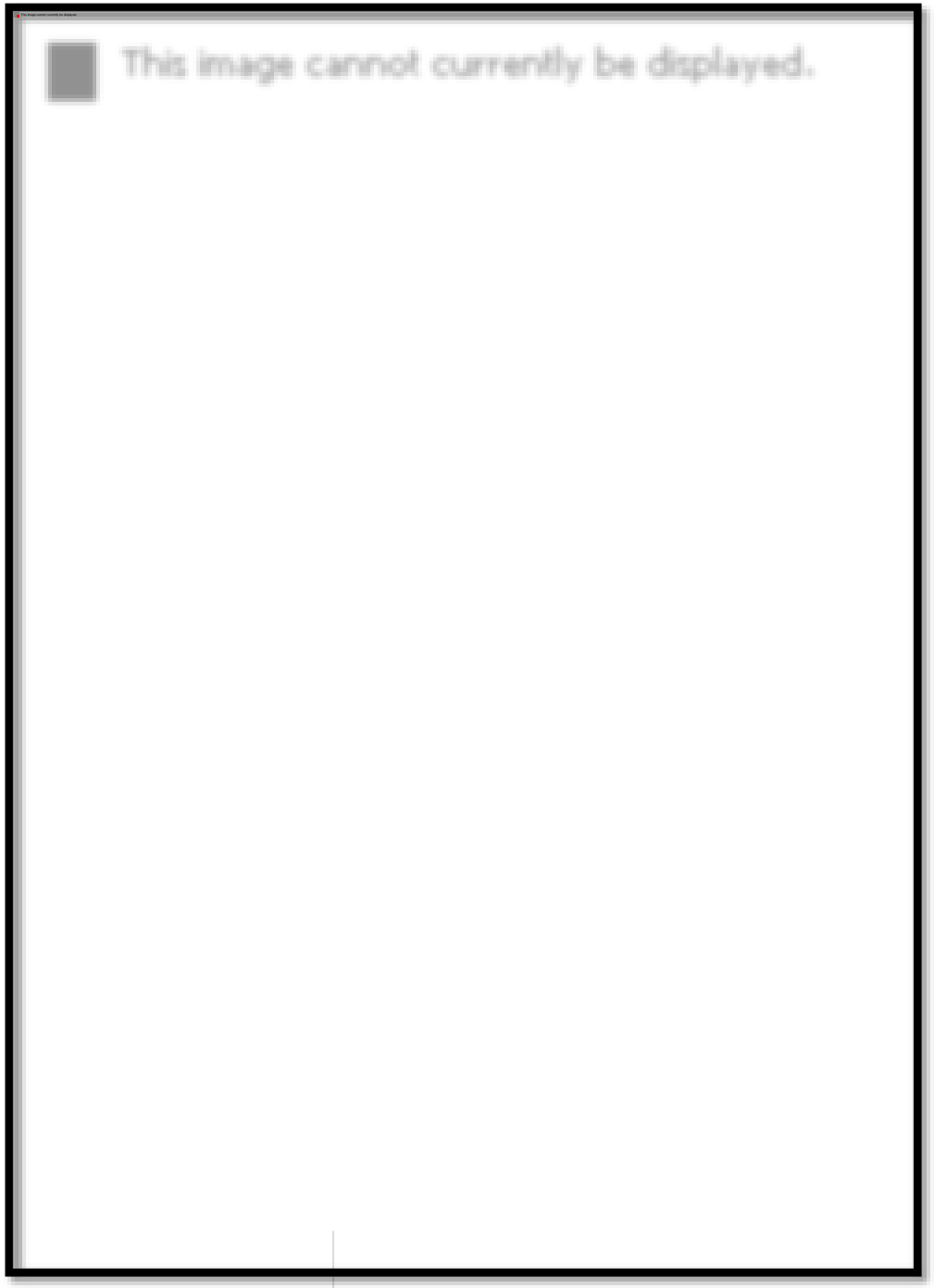
- **Area:** Offshore Deep-D covers an area of 2495.57 Sq. Kms.
- **Geological Basin**: Offshore Indus basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- The Block is surrounded by offshore Kochi Creek (North), Offshore Ultra Deep-B (South) , Offshore Indus-C and Offshore Deep-F (West) and Eastern Off Indus-C (East) blocks.
- NOIP, TEP,BP and CE acquired some 2D data approximately 11239.62 (L. Kms) and seismic 3D data of about 1606.72 (Sq. Kms) in the block within the years 1969-2021.
- The well drilled in the vicinity is Indus Marine-1A.



**Riaz Ahmed 1998, Hydrocarbon Resource Base of Pakistan, Pakistan Journal of Hydrocarbon Research, Vol 10, 1-10*

Offshore Deep-E (2266-15)

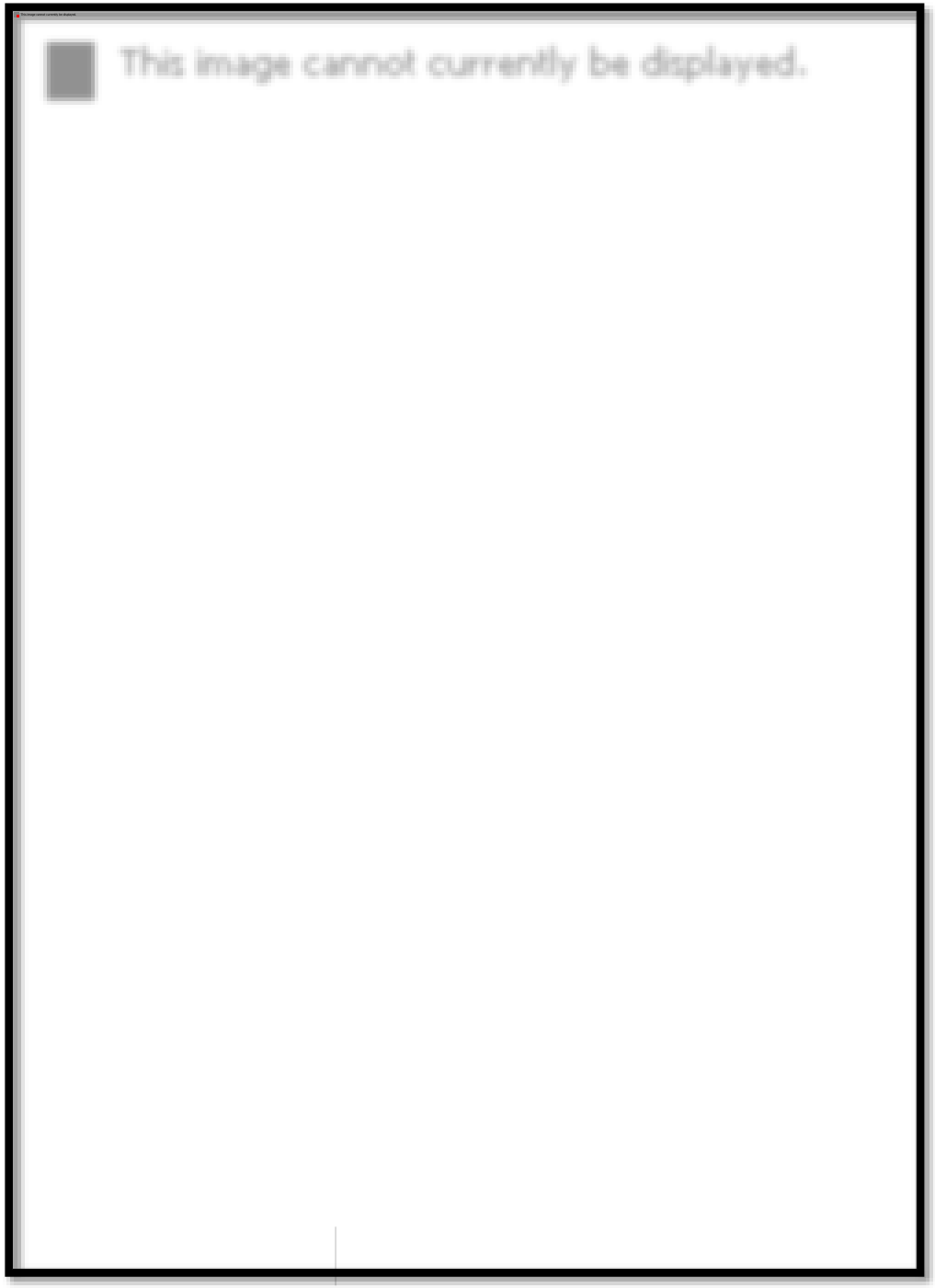
- **Area:** Offshore Deep-E covers an area of 2440.87 Sq. Kms.
- **Geological Basin**: Offshore Indus basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- The Block is surrounded by Behr Block (North), Offshore Ultra Deep-B (South) , Offshore Deep-A and Offshore Deep-B (West) and Zrrar (East) blocks.
- NOIP, TEP,BP and CE acquired some 2D data approximately 6047.11 (L. Kms) and seismic 3D data of about 5473 (Sq. Kms) in the block within the years 1969-2021.



**Riaz Ahmed 1998, Hydrocarbon Resource Base of Pakistan, Pakistan Journal of Hydrocarbon Research, Vol 10, 1-10*

Offshore Deep-F (2366-12)

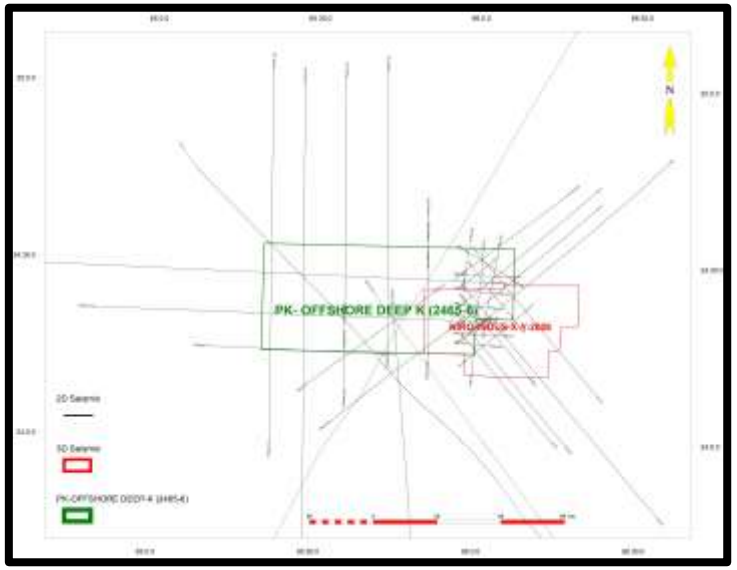
- **Area:** Offshore Deep-F covers an area of 2455.08 Sq. Kms.
- **Geological Basin**: Offshore Indus basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- The Block is surrounded by offshore Deep-C (North), Offshore Ultra Deep-J (South) and Offshore Deep-D (East) blocks.
- NOIP, TEP,BP and CE acquired some 2D data approximately 7764.89 (L. Kms) and seismic 3D data of about 5372.25 (Sq. Kms) in the block within the years 1969-2021.



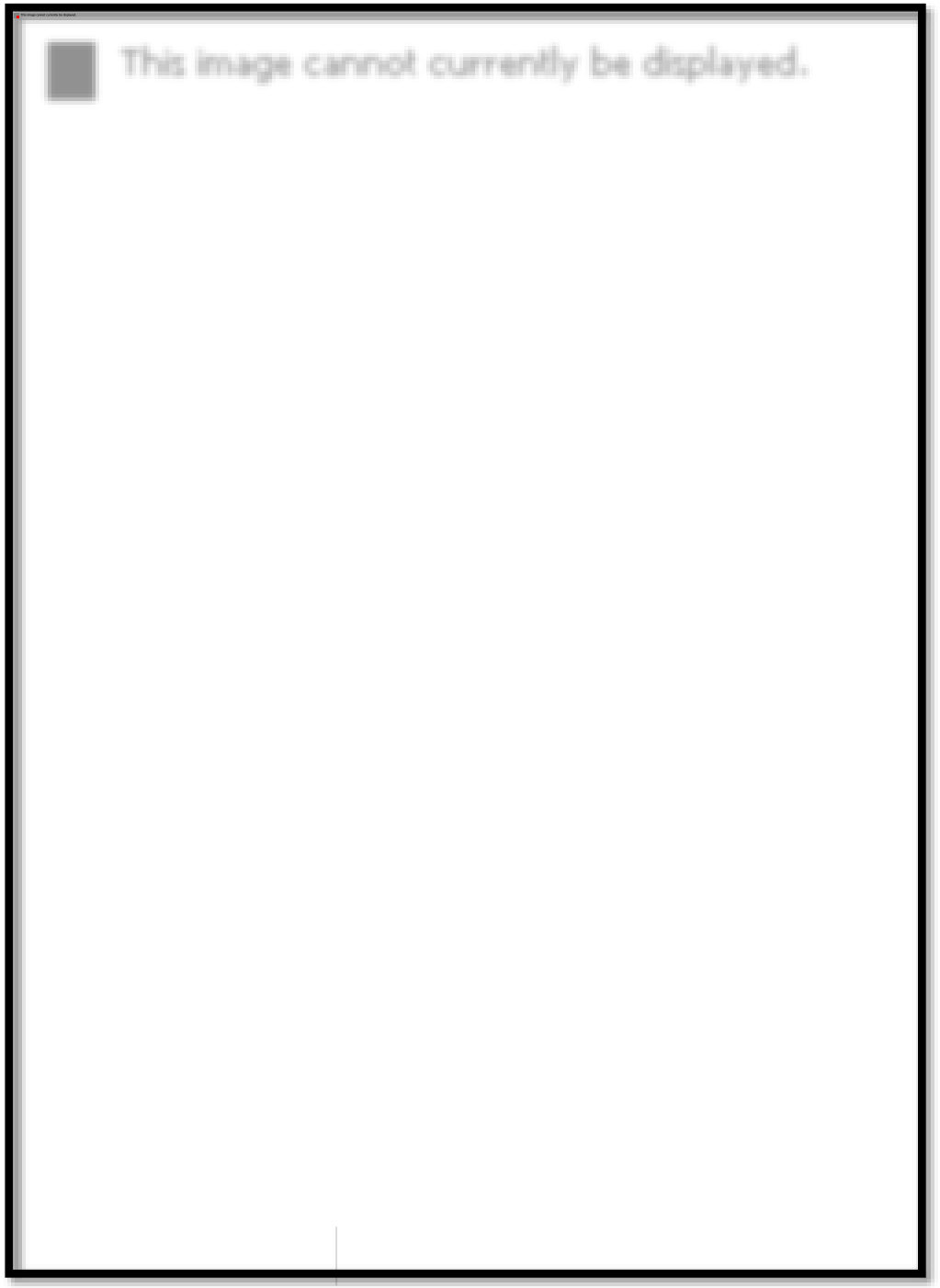
**Riaz Ahmed 1998, Hydrocarbon Resource Base of Pakistan, Pakistan Journal of Hydrocarbon Research, Vol 10, 1-10*

Offshore Deep-K (2465-6)

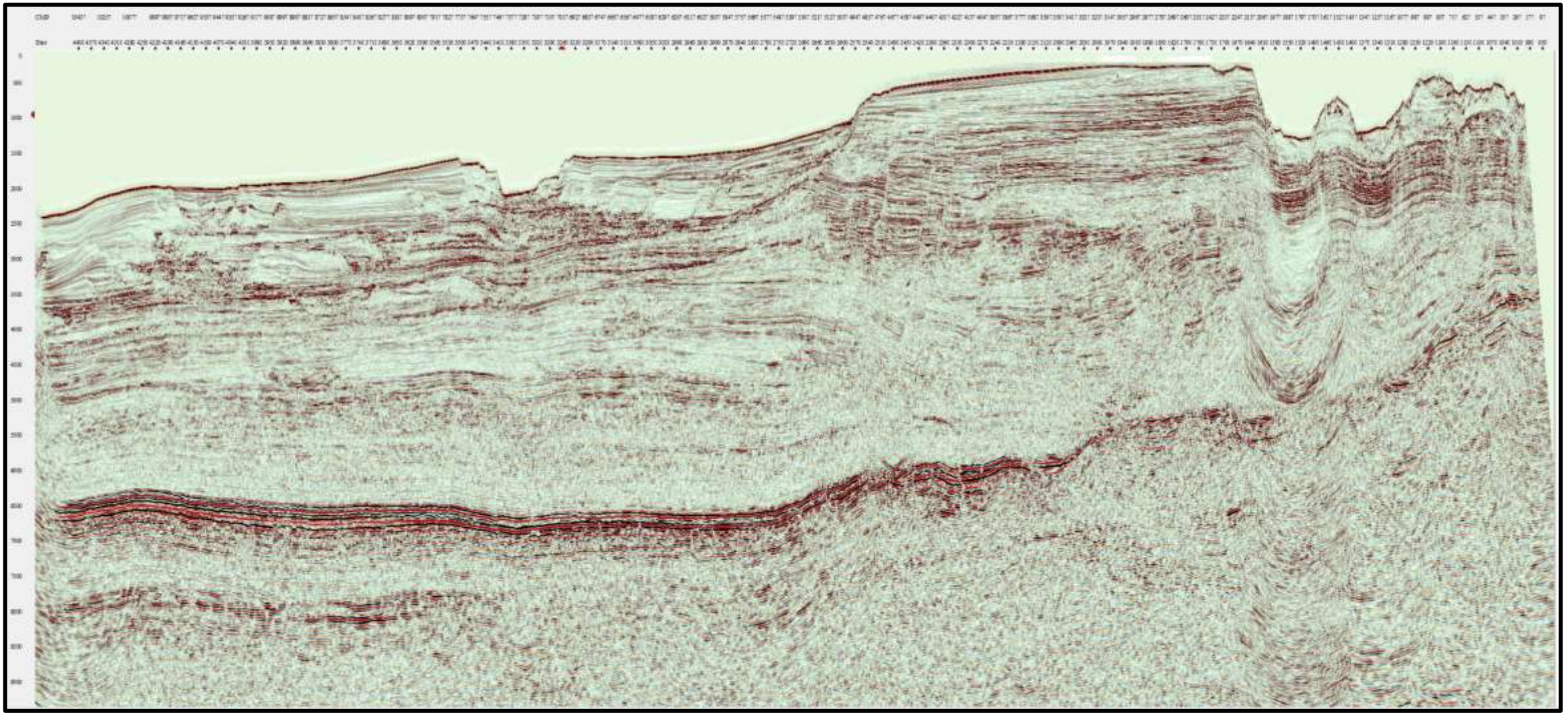
- **Area:** Offshore Deep-K covers an area of 2482.33 Sq. Kms.
- **Geological Basin**: Offshore Indus basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- The Block is surrounded by Sapat Bandar (North) and Offshore Deep-C (East) blocks.
- NOIP, TEP,BP and CE acquired some 2D data approximately 2586.13 (L. Kms) and seismic 3D data of about 1136.73 (Sq. Kms) in the block within the years 1969-1999.



**Riaz Ahmed 1998, Hydrocarbon Resource Base of Pakistan, Pakistan Journal of Hydrocarbon Research, Vol 10, 1-10*



PROSPECTIVITY



Fault block and rollover against growth faults in shelf margin basin.
Pinch outs are also observed.

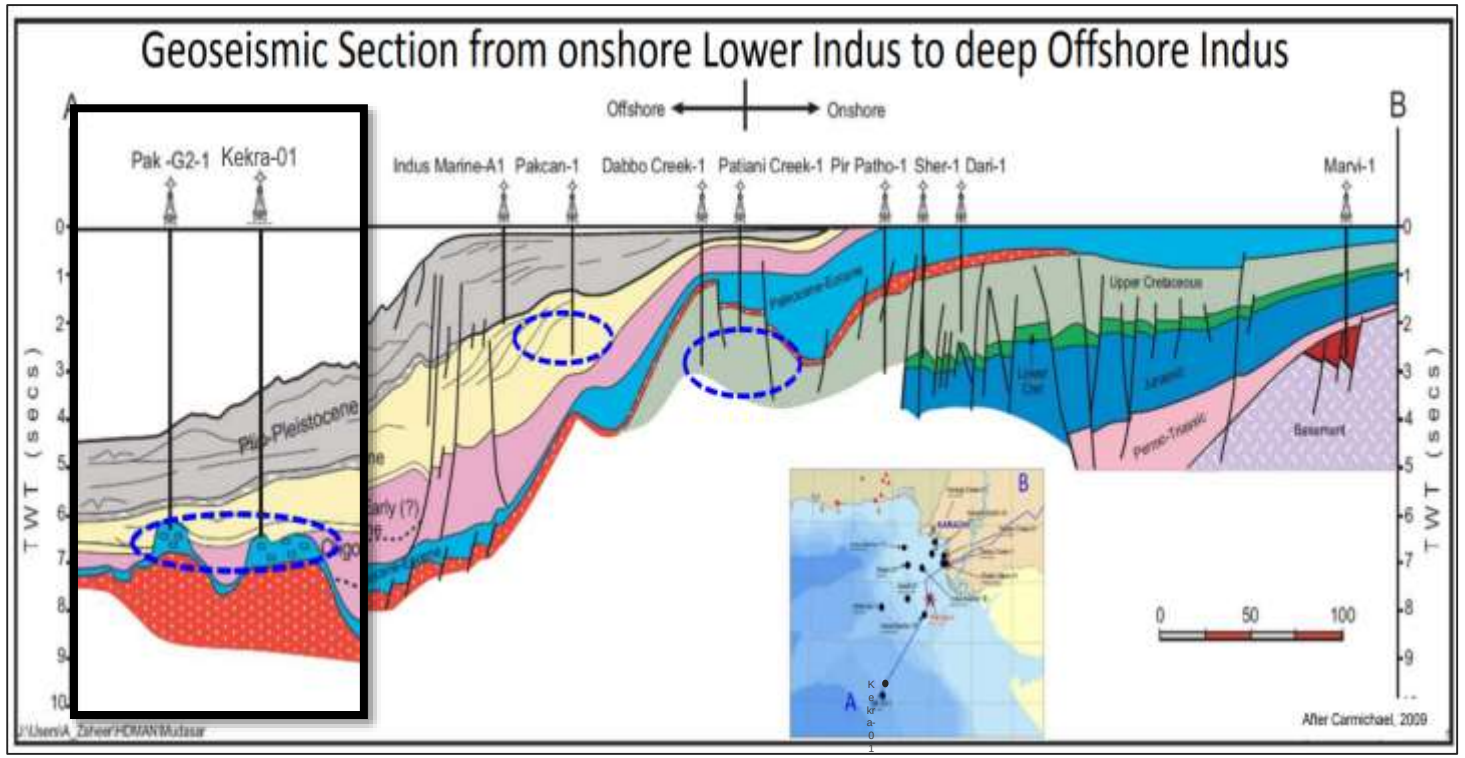
EXPLORATION RISKS

- Source & Charge: Moderate risk.
- Reservoir: Moderate risk.
- Seal: Moderate risk.
- Trap: Moderate risk.
- Key challenges for future exploration in Tertiary Petroleum System are to establish:

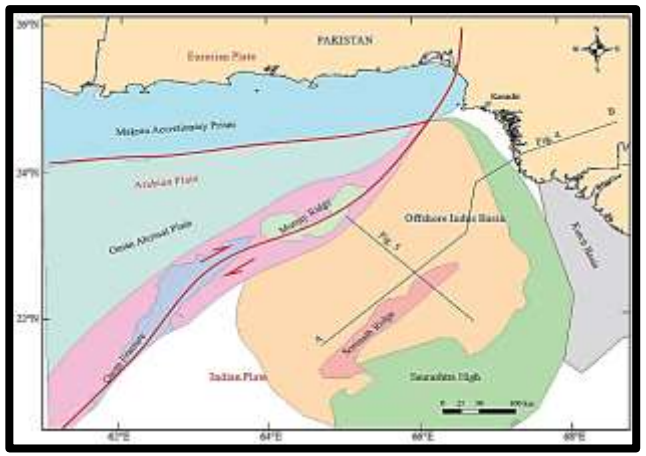
1. Distribution and timing of effective source intervals' development within the drainage area of prospect.
2. Timing of over-pressuring (up to 7000 psi at 2800m in Indus Marine-1A well) within Miocene section (for Miocene and younger targets) with respect to source rock maturation and expulsion.

GEOLOGICAL PERSPECTIVE

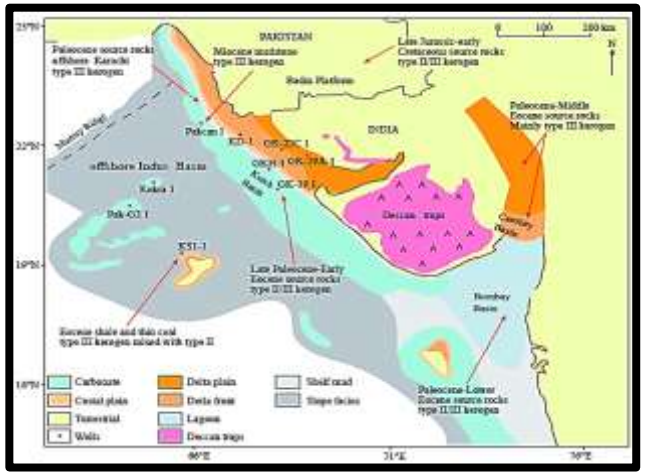
Indus Offshore Ultra-Deep



A – Geoseismic Section from onshore lower Indus to Deep Offshore Indus



B - Geotectonic location of Pakistan offshore (modified from Smith GL, 2013).



C - Sedimentary environment of source rocks in the Offshore Indus Basin and its adjacent areas in the Paleocene–Eocene

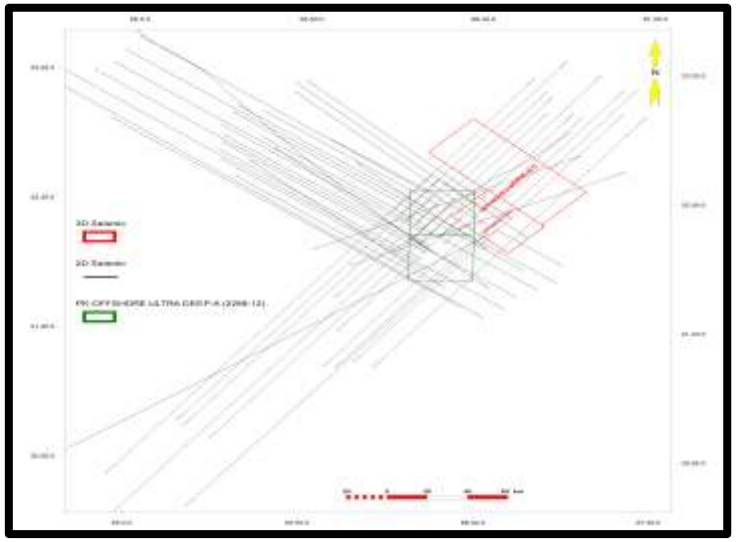
Play Types: Deep water Carbonate buildup and turbidities

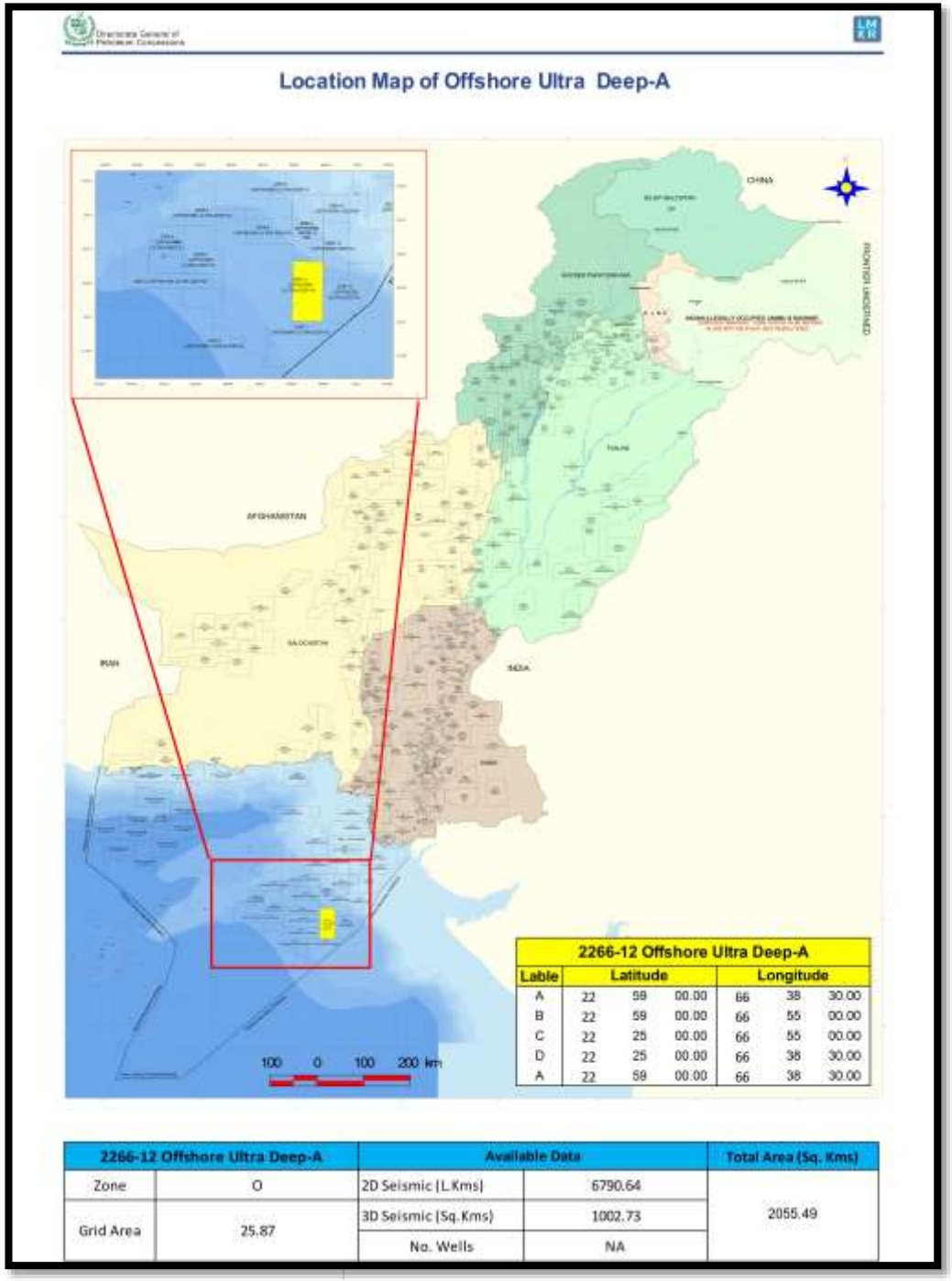
Drilled in Pak G2-1 & Kekra, excellent reservoirs but lack of charge

Modified after Gong, J. M., Liao, J., Liang, J., Lei, B. H., Chen, J. W., Khalid, M., & Meng, M. (2020). Exploration prospects of oil and gas in the North-western part of the Offshore Indus Basin, Pakistan. China Geology, 3(4), 633-642.

Offshore Ultra Deep-A (2266-12)

- **Area:** Offshore Ultra Deep-A covers an area of 2055.49 Sq. Kms.
- **Geological Basin**: Offshore Indus basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- The Block is surrounded by Offshore Indus-J (North),Offshore Ultra Deep-B and Offshore Deep-A (East), Offshore Ultra Deep-C (South) and Offshore Ultra Deep-L, Offshore Ultra Deep-M and Offshore Ultra Deep-N (West) blocks.
- NOIP, TEP,BP and CE acquired some 2D data approximately 6790.64 (L. Kms) and seismic 3D data of about 1002.73 (Sq. Kms) in the block within the years 1977-2007.





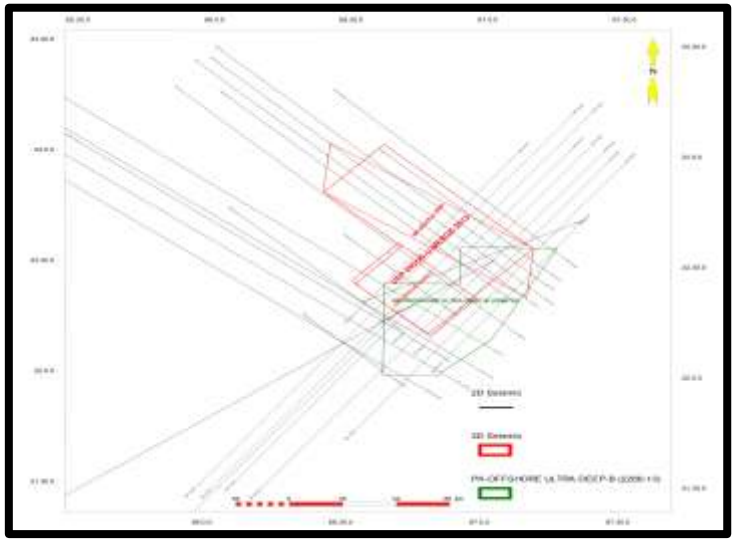
2266-12 Offshore Ultra Deep-A						
Lable	Latitude			Longitude		
A	22	59	00.00	66	38	30.00
B	22	59	00.00	66	55	00.00
C	22	25	00.00	66	55	00.00
D	22	25	00.00	66	38	30.00
A	22	59	00.00	66	38	30.00

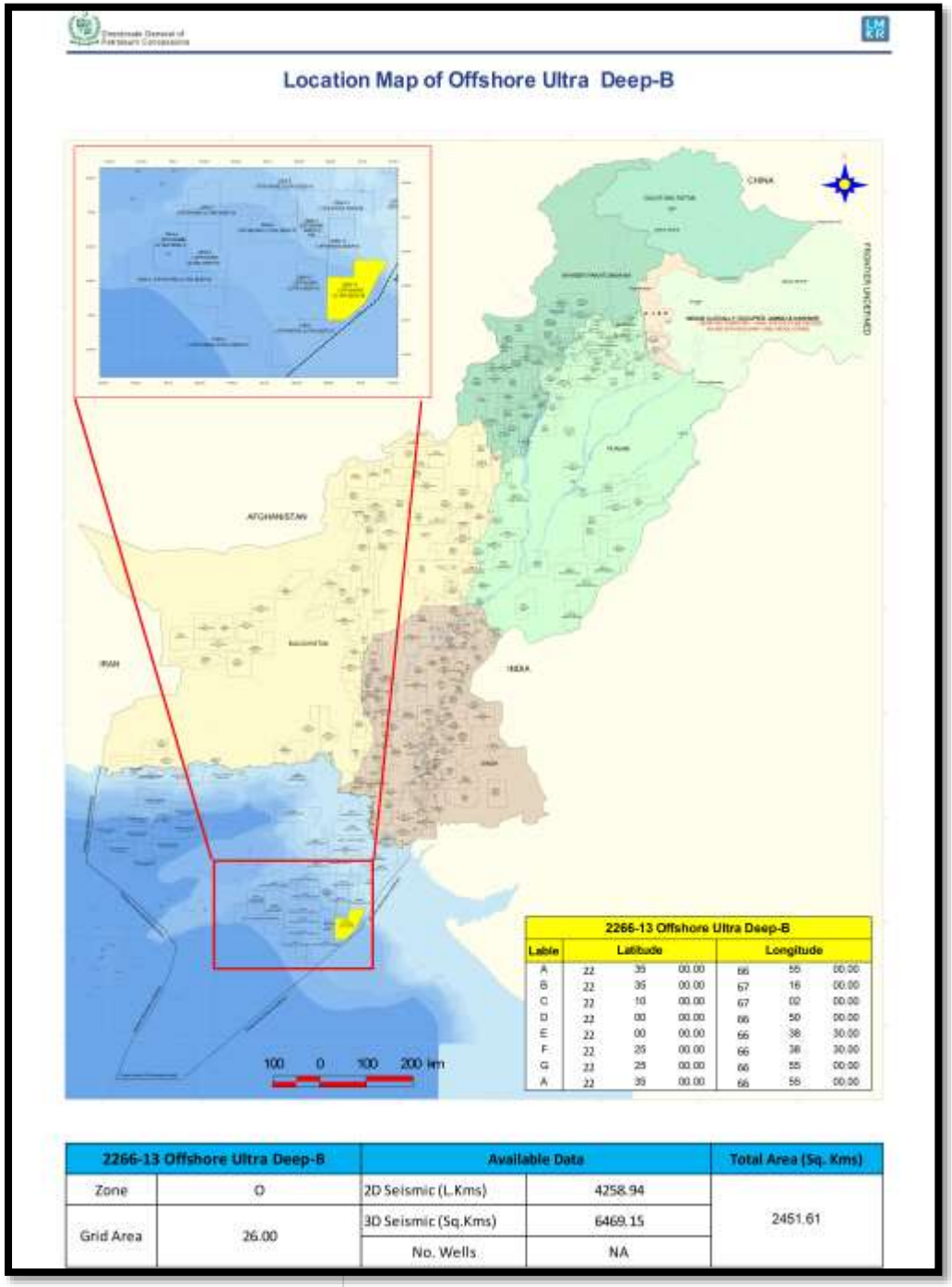
2266-12 Offshore Ultra Deep-A		Available Data		Total Area (Sq. Kms)
Zone	O	2D Seismic (L.Kms)	6790.64	2055.49
Grid Area	25.87	3D Seismic (Sq.Kms)	1002.73	
		No. Wells	NA	

Riaz Ahmed 1998, Hydrocarbon Resource Base of Pakistan, Pakistan Journal of Hydrocarbon Research, Vol 10, 1-10

Offshore Ultra Deep-B (2266-13)

- **Area:** Offshore Ultra Deep-B covers an area of 2451.61 Sq. Kms.
- **Geological Basin**: Offshore Indus basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- The Block is surrounded by Offshore Deep-A (North), Offshore Ultra Deep-A (West) and Offshore Ultra Deep-C (South) blocks.
- NOIP, TEP,BP and CE acquired some 2D data approximately 4258.94 (L. Kms) and seismic 3D data of about 6469.15 (Sq. Kms) in the block within the years 1997-2007.



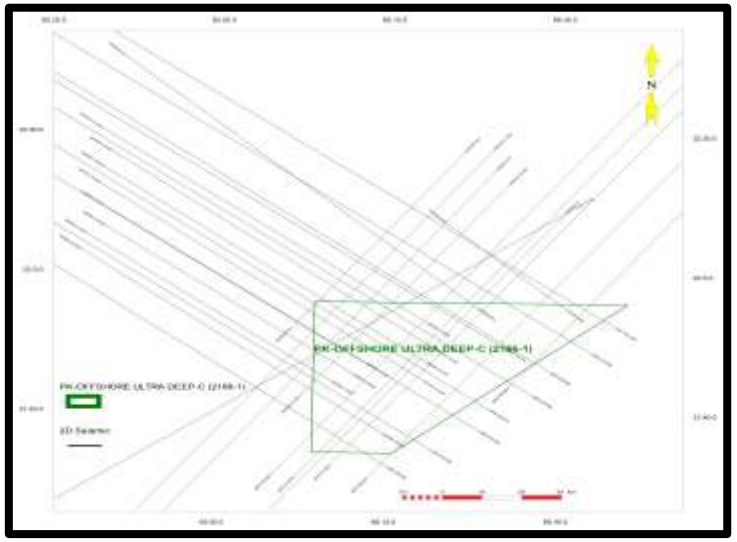


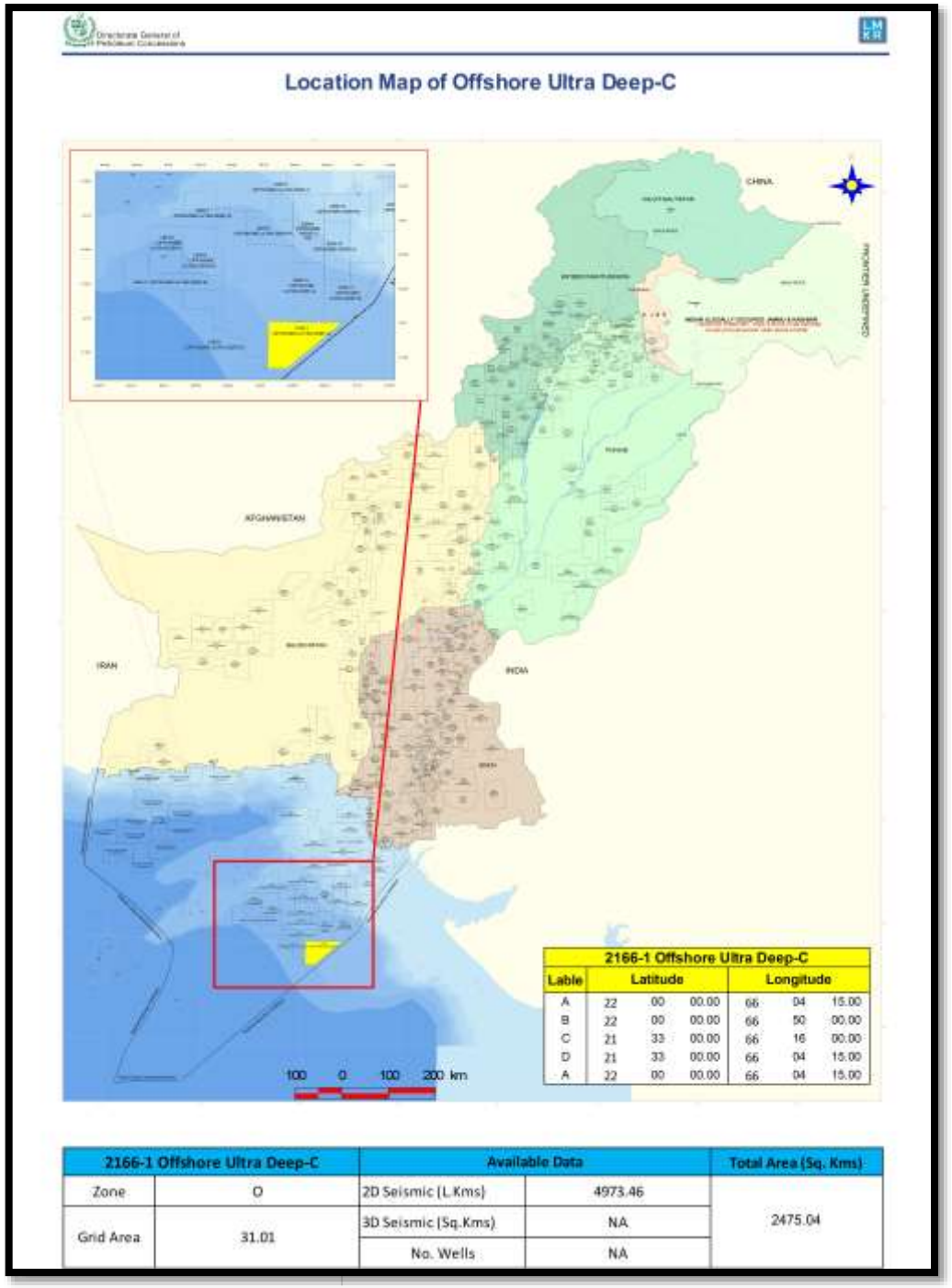
2266-13 Offshore Ultra Deep-B		Available Data		Total Area (Sq. Kms)
Zone	O	2D Seismic (L.Kms)	4258.94	2451.61
Grid Area	26.00	3D Seismic (Sq.Kms)	6469.15	
		No. Wells	NA	

Riaz Ahmed 1998, Hydrocarbon Resource Base of Pakistan, Pakistan Journal of Hydrocarbon Research, Vol 10, 1-10

Offshore Ultra Deep-C (2166-1)

- **Area:** Offshore Ultra Deep C covers an area of 2475.04 Sq. Kms.
- **Geological Basin**: Offshore Indus basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- The Block is surrounded by Offshore Ultra Deep A (North) and Offshore Ultra Deep D (West) blocks.
- NOIP, TEP,BP and CE acquired some 2D data approximately 4973.46 (L. Kms) in the block within the years 1999-2007.





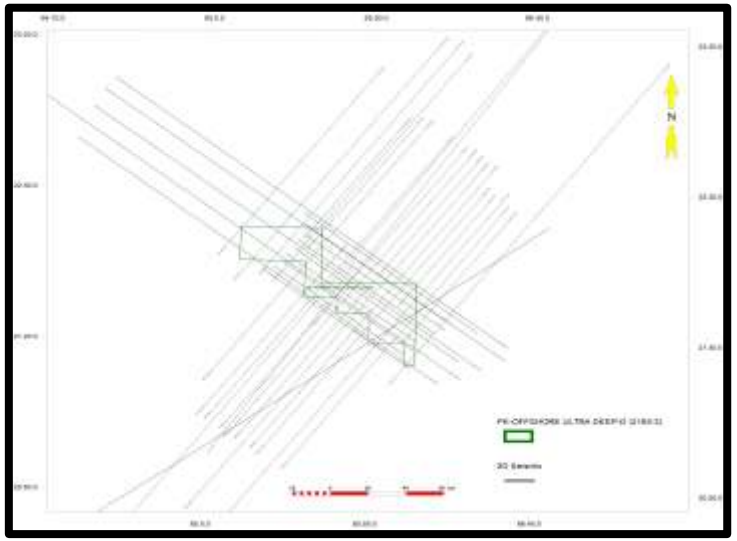
2166-1 Offshore Ultra Deep-C							
Lable	Latitude			Longitude			
A	22	00	00.00	66	04	15.00
B	22	00	00.00	66	50	00.00
C	21	33	00.00	66	16	00.00
D	21	33	00.00	66	04	15.00
A	22	00	00.00	66	04	15.00

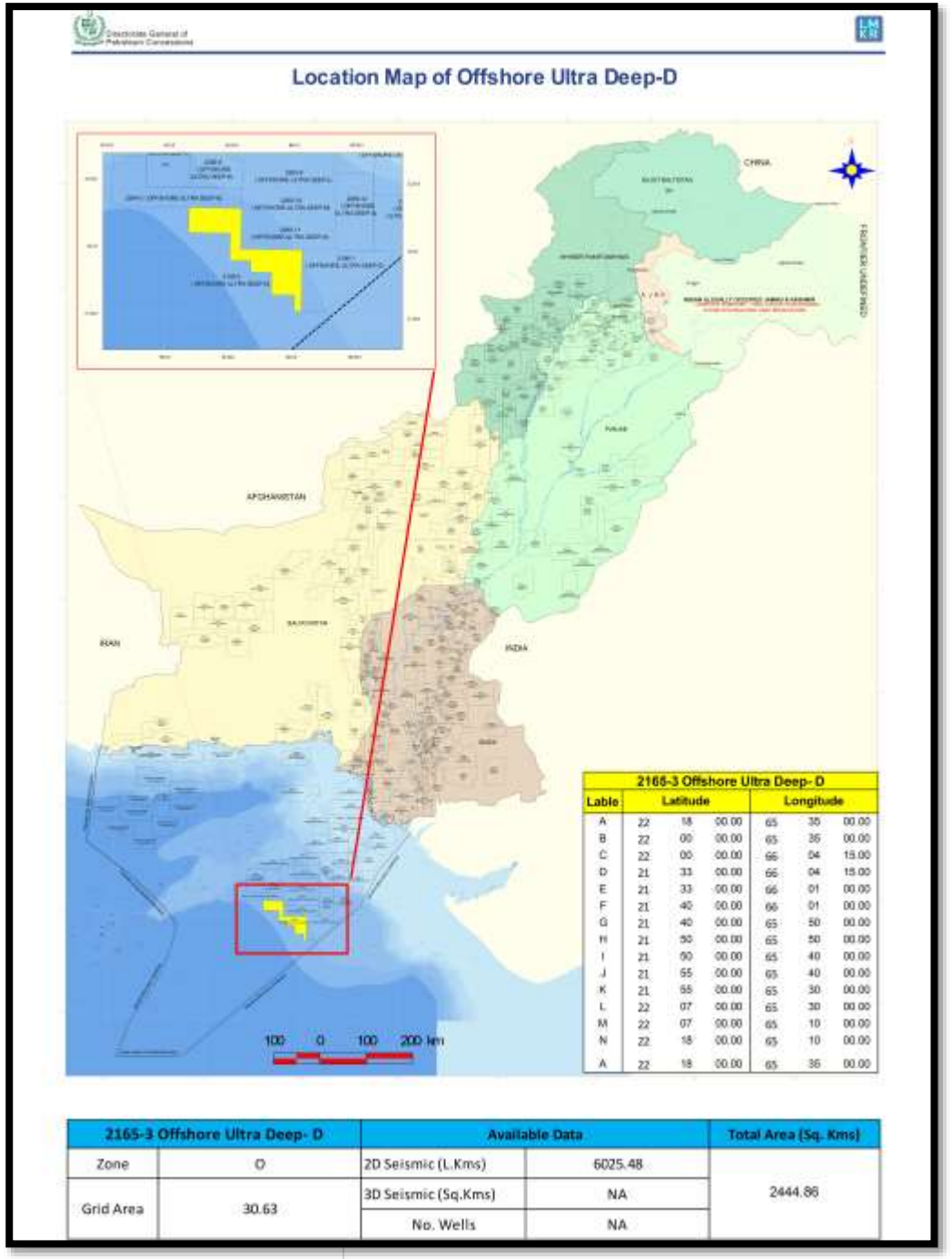
2166-1 Offshore Ultra Deep-C		Available Data		Total Area (Sq. Kms)
Zone	O	2D Seismic (L.Kms)	4973.46	2475.04
Grid Area	31.01	3D Seismic (Sq.Kms)	NA	
		No. Wells	NA	

**Riaz Ahmed 1998, Hydrocarbon Resource Base of Pakistan, Pakistan Journal of Hydrocarbon Research, Vol 10, 1-10*

Offshore Ultra Deep-D (2165-3)

- **Area:** Offshore Ultra Deep-D covers an area of 2444.86 Sq. Kms.
- **Geological Basin**: Offshore Indus basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- The Block is surrounded by Offshore Ultra Deep-E (North) and Offshore Ultra Deep-M, Offshore Ultra Deep-N and Offshore Ultra Deep-C (East) blocks.
- NOIP, TEP,BP and CE acquired some 2D data approximately 6025.48 (L. Kms) in the block within the years 1997-2007.





2165-3 Offshore Ultra Deep- D

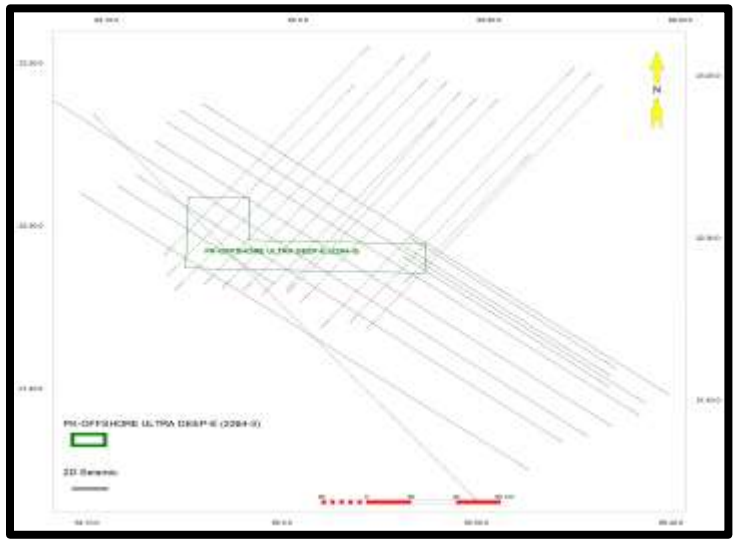
Lable	Latitude	Longitude
A	22 18 00.00	65 35 00.00
B	22 00 00.00	65 35 00.00
C	22 00 00.00	66 04 15.00
D	21 33 00.00	66 04 15.00
E	21 33 00.00	66 01 00.00
F	21 40 00.00	66 01 00.00
G	21 40 00.00	65 50 00.00
H	21 50 00.00	65 50 00.00
I	21 50 00.00	65 40 00.00
J	21 55 00.00	65 40 00.00
K	21 55 00.00	65 30 00.00
L	22 07 00.00	65 30 00.00
M	22 07 00.00	65 10 00.00
N	22 18 00.00	65 10 00.00
A	22 18 00.00	65 35 00.00

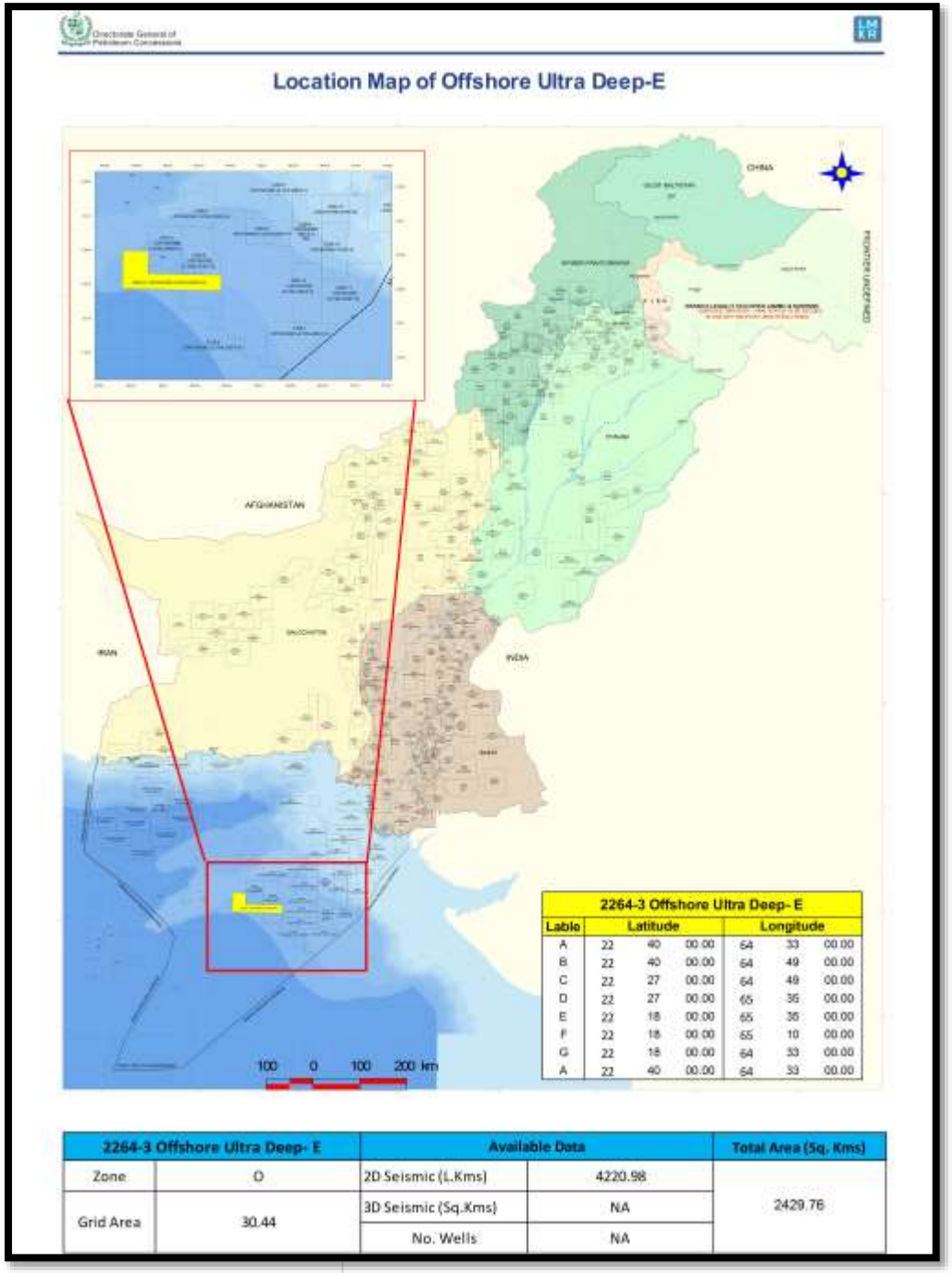
2165-3 Offshore Ultra Deep- D		Available Data		Total Area (Sq. Kms)
Zone	O	2D Seismic (L.Kms)	6025.48	2444.86
Grid Area	30.63	3D Seismic (Sq.Kms)	NA	
		No. Wells	NA	

*Riaz Ahmed 1998, Hydrocarbon Resource Base of Pakistan, Pakistan Journal of Hydrocarbon Research, Vol 10, 1-10

Offshore Ultra Deep-E (2264-3)

- **Area:** Offshore Ultra Deep-E covers an area of 2429.76 Sq. Kms.
- **Geological Basin**: Offshore Indus basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- The Block is surrounded by Offshore Ultra Deep-I and Offshore Ultra Deep-H (East) blocks.
- NOIP, TEP,BP and CE acquired some 2D data approximately 4220.98 (L. Kms) in the block within the years 2000-2007.





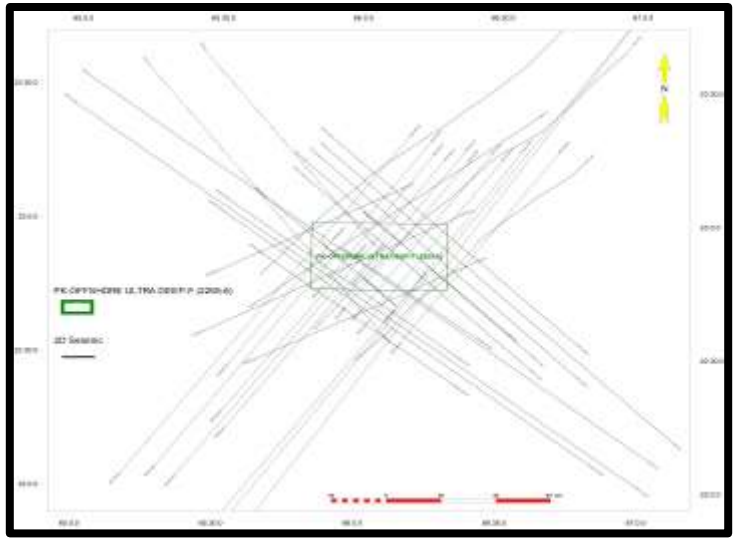
2264-3 Offshore Ultra Deep- E							
Lable	Latitude			Longitude			
A	22	40	00.00	64	33	00.00
B	22	40	00.00	64	49	00.00
C	22	27	00.00	64	49	00.00
D	22	27	00.00	65	35	00.00
E	22	18	00.00	65	35	00.00
F	22	18	00.00	65	10	00.00
G	22	18	00.00	64	33	00.00
A	22	40	00.00	64	33	00.00

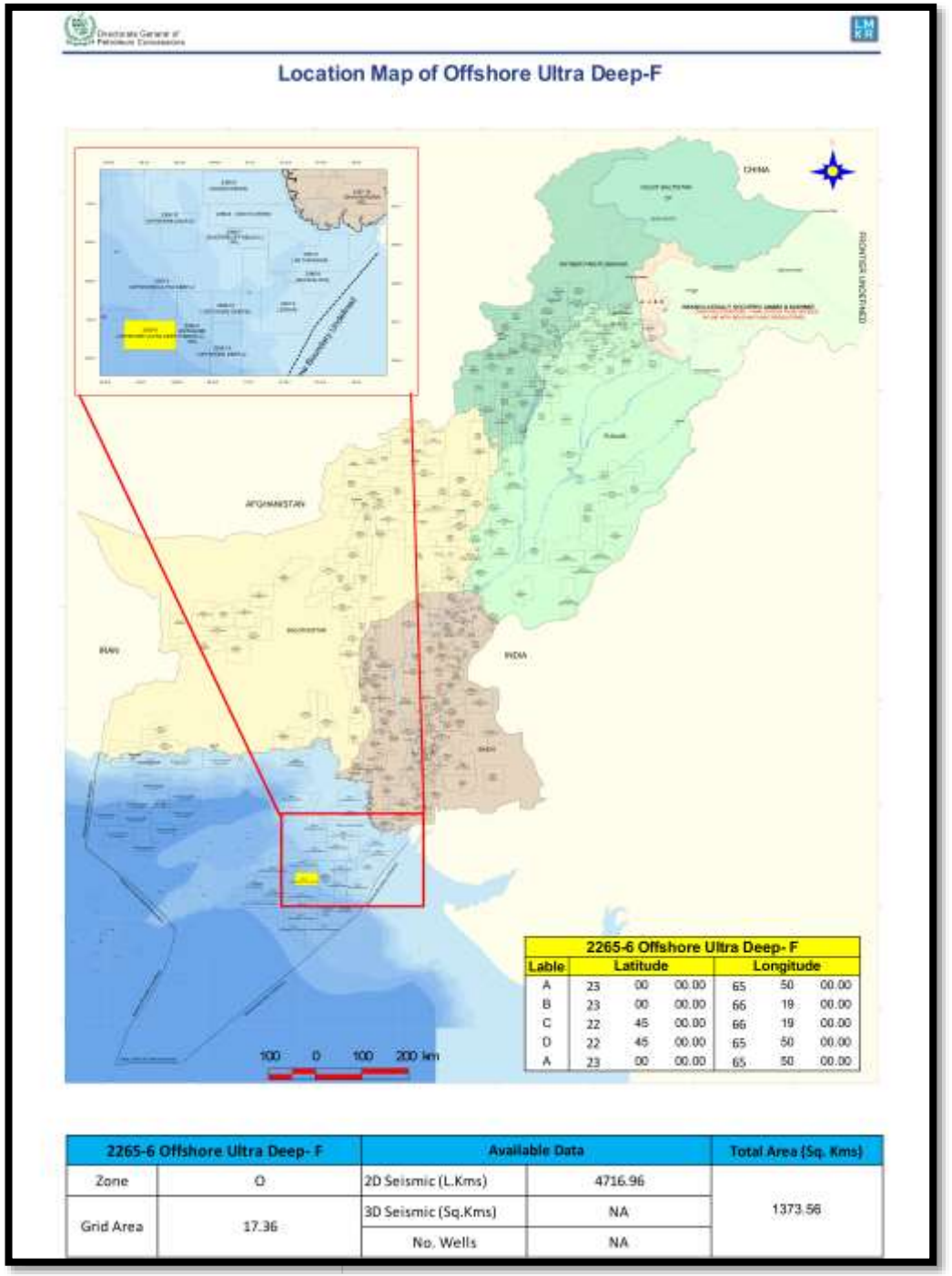
2264-3 Offshore Ultra Deep- E		Available Data		Total Area (Sq. Kms)
Zone	O	2D Seismic (L.Kms)	4220.98	2429.76
Grid Area	30.44	3D Seismic (Sq.Kms)	NA	
		No. Wells	NA	

**Riaz Ahmed 1998, Hydrocarbon Resource Base of Pakistan, Pakistan Journal of Hydrocarbon Research, Vol 10, 1-10*

Offshore Ultra Deep-F (2265-6)

- **Area:** Offshore Ultra Deep-F covers an area of 1373.56 Sq. Kms.
- **Geological Basin**: Offshore Indus basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- The Block is surrounded by Offshore Ultra Deep-J (North) and Offshore Indus-J (East), Offshore Ultra Deep-L (South) and Offshore Ultra Deep-H (West) blocks.
- NOIP, TEP,BP and CE acquired some 2D data approximately 4716.98 (L. Kms) in the block within the years 1977-2007.



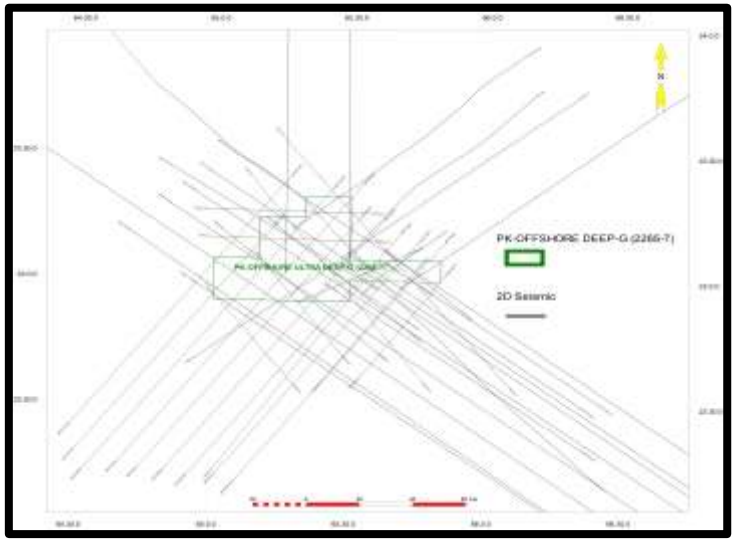


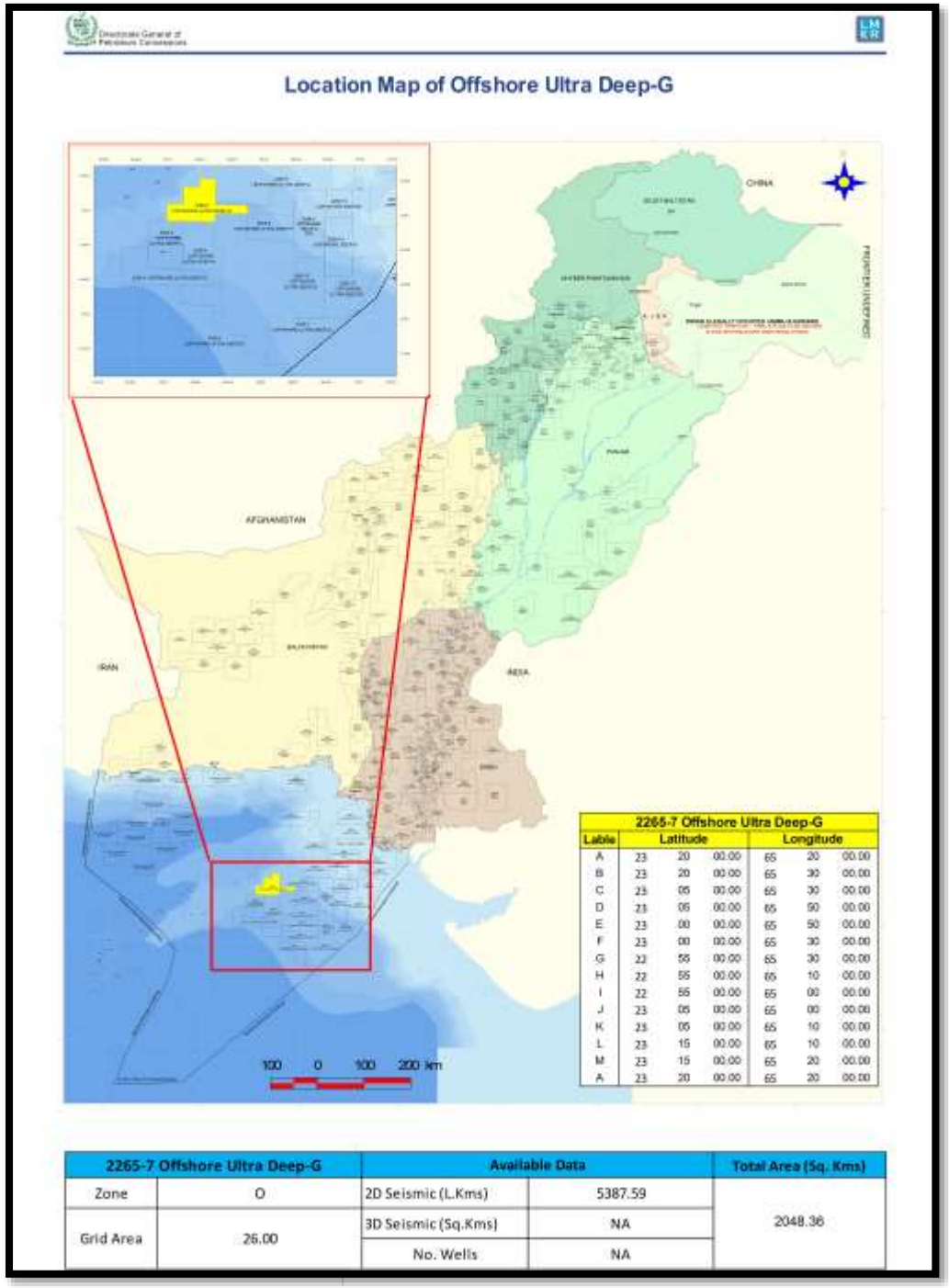
2265-6 Offshore Ultra Deep- F		Available Data		Total Area (Sq. Kms)
Zone	O	2D Seismic (L.Kms)	4716.96	1373.56
Grid Area	17.36	3D Seismic (Sq.Kms)	NA	
		No. Wells	NA	

*Riaz Ahmed 1998, Hydrocarbon Resource Base of Pakistan, Pakistan Journal of Hydrocarbon Research, Vol 10, 1-10

Offshore Ultra Deep-G (2265-7)

- **Area:** Offshore Ultra Deep-G covers an area of 2048.36 Sq. Kms.
- **Geological Basin**: Offshore Indus basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- The Block is surrounded by Offshore Ultra Deep-J (East) and Offshore Ultra Deep-I and Offshore Ultra Deep-H (South) blocks.
- NOIP, TEP,BP and CE acquired some 2D data approximately 5387.59 (L. Kms) in the block within the years 1977-2007.



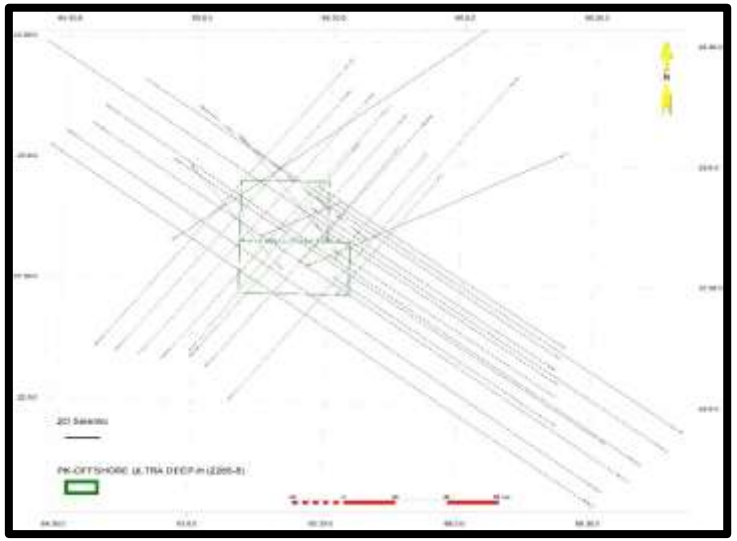


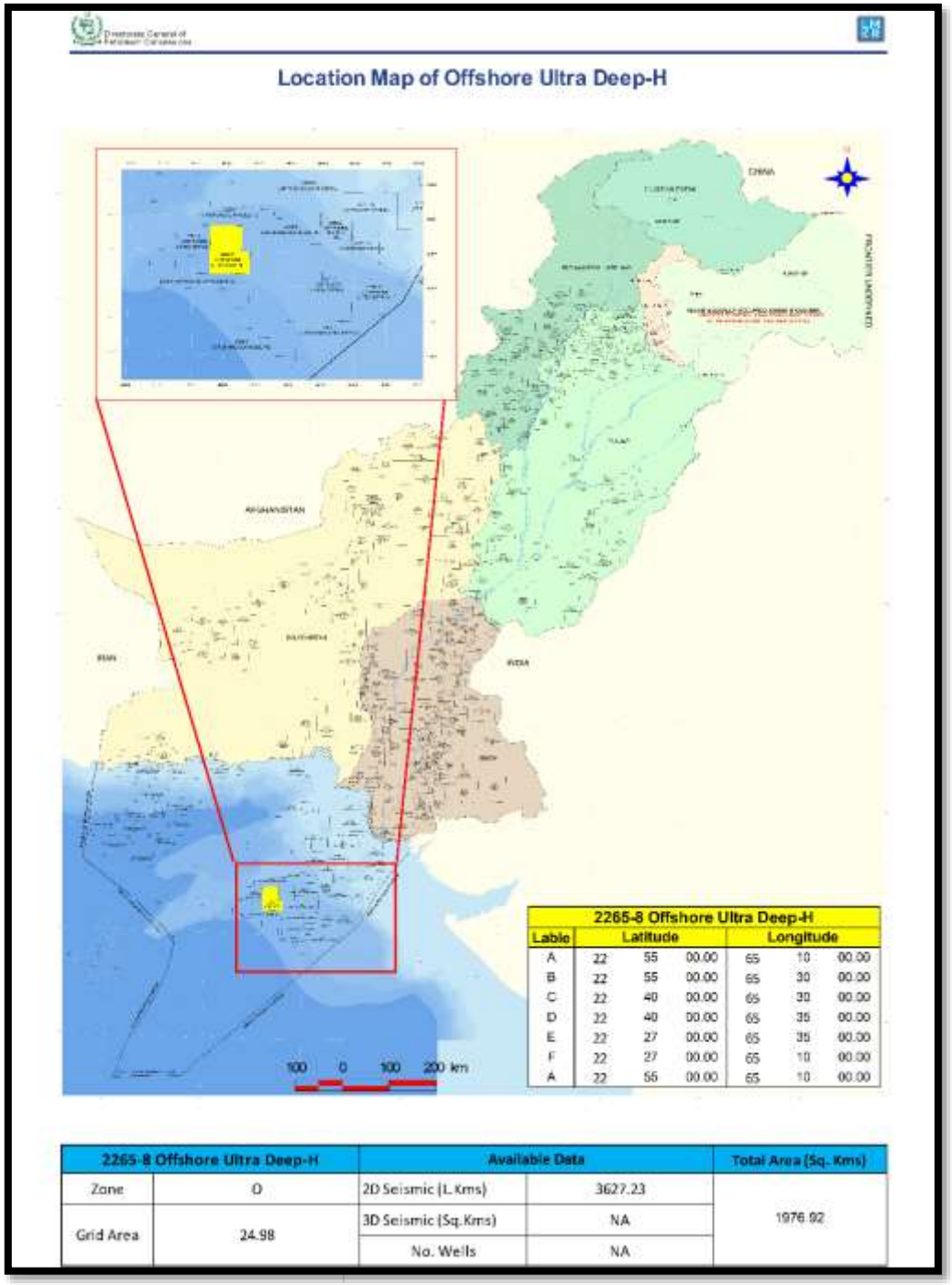
2265-7 Offshore Ultra Deep-G		Available Data		Total Area (Sq. Kms)
Zone	O	2D Seismic (L.Kms)	5387.59	2048.36
Grid Area	26.00	3D Seismic (Sq.Kms)	NA	
		No. Wells	NA	

*Riaz Ahmed 1998, Hydrocarbon Resource Base of Pakistan, Pakistan Journal of Hydrocarbon Research, Vol 10, 1-10

Offshore Ultra Deep-H (2265-8)

- **Area:** Offshore Ultra Deep-H covers an area of 1976.92 Sq. Kms.
- **Geological Basin**: Offshore Indus basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- The Block is surrounded by Offshore Ultra Deep-G (North), Offshore Ultra Deep-I (West), Offshore Ultra Deep-E (South) and Offshore Ultra Deep-F (East) blocks.
- NOIP, TEP,BP and CE acquired some 2D data approximately 3627.23 (L. Kms) in the block within the years 1977-2007.





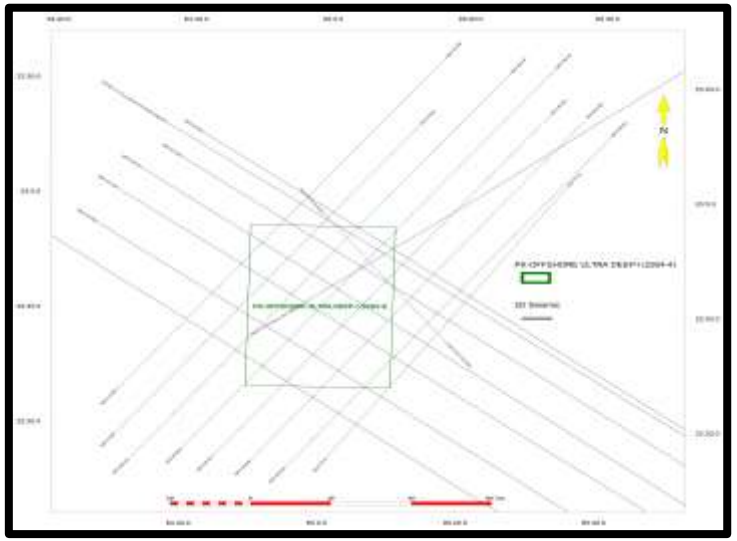
2265-8 Offshore Ultra Deep-H							
Lable	Latitude			Longitude			
A	22	55	00.00	65	10	00.00
B	22	55	00.00	65	30	00.00
C	22	40	00.00	65	30	00.00
D	22	40	00.00	65	35	00.00
E	22	27	00.00	65	35	00.00
F	22	27	00.00	65	10	00.00
A	22	55	00.00	65	10	00.00

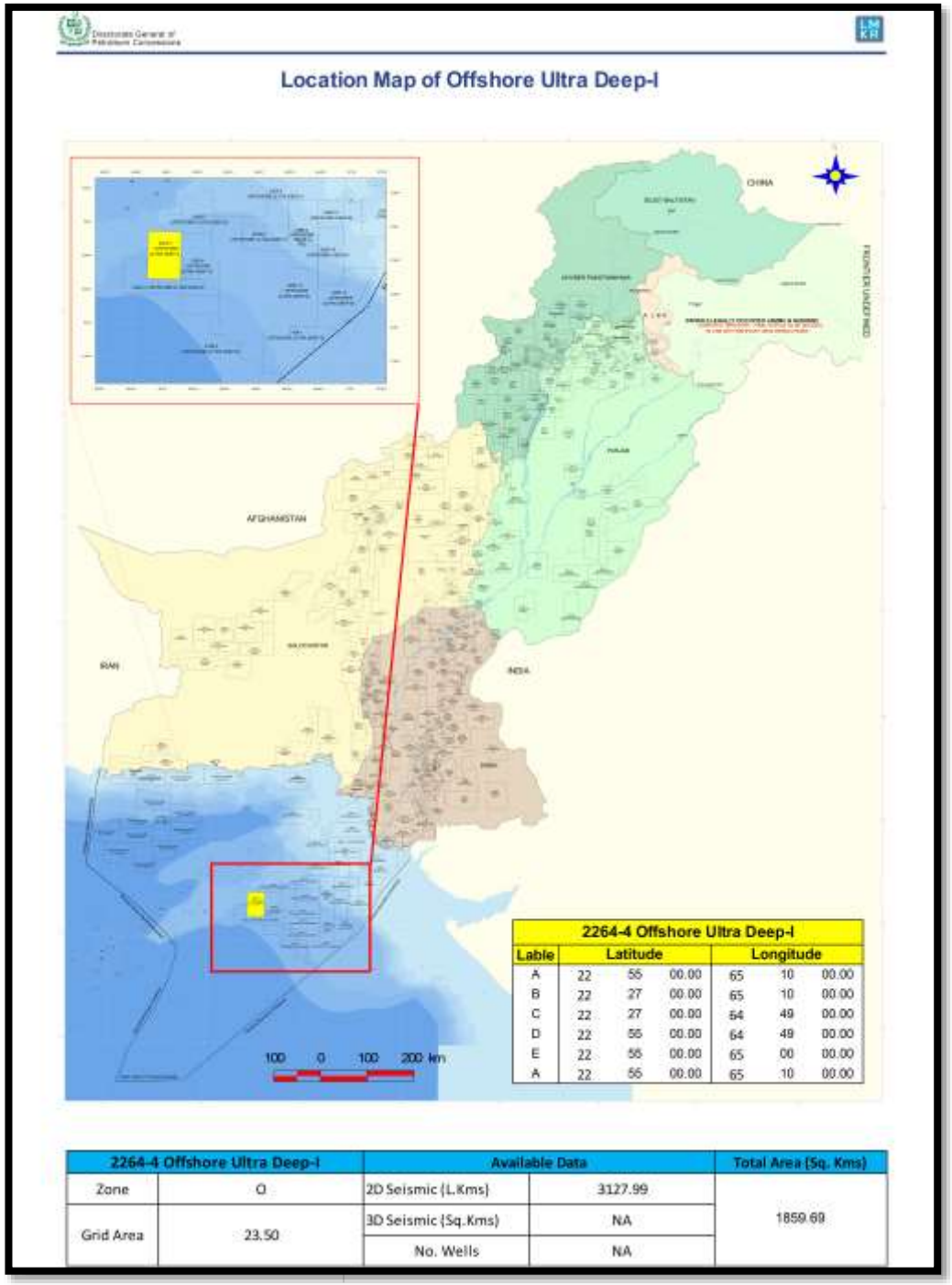
2265-8 Offshore Ultra Deep-H		Available Data		Total Area (Sq. Kms)
Zone	O	2D Seismic (L.Kms)	3627.23	1976.92
Grid Area	24.98	3D Seismic (Sq.Kms)	NA	
		No. Wells	NA	

*Riaz Ahmed 1998, Hydrocarbon Resource Base of Pakistan, Pakistan Journal of Hydrocarbon Research, Vol 10, 1-10

INTRODUCTION

- **Area:** Offshore Ultra Deep-I covers an area of 1859.69 Sq. Kms.
- **Geological Basin**: Offshore Indus basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- The Block is surrounded by Offshore Ultra Deep-G (North) and Offshore Ultra Deep-H (East) and Offshore Ultra Deep-E (South) blocks.
- NOIP, TEP,BP and CE acquired some 2D data approximately 3127.99 (L. Kms) in the block within the years 1977-2007.





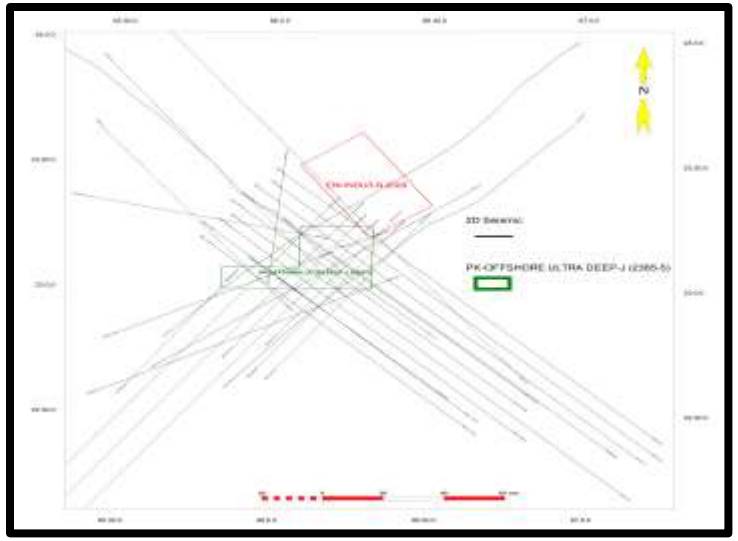
2264-4 Offshore Ultra Deep-I							
Lable	Latitude			Longitude			
A	22	55	00.00	65	10	00.00
B	22	27	00.00	65	10	00.00
C	22	27	00.00	64	49	00.00
D	22	55	00.00	64	49	00.00
E	22	55	00.00	65	00	00.00
A	22	55	00.00	65	10	00.00

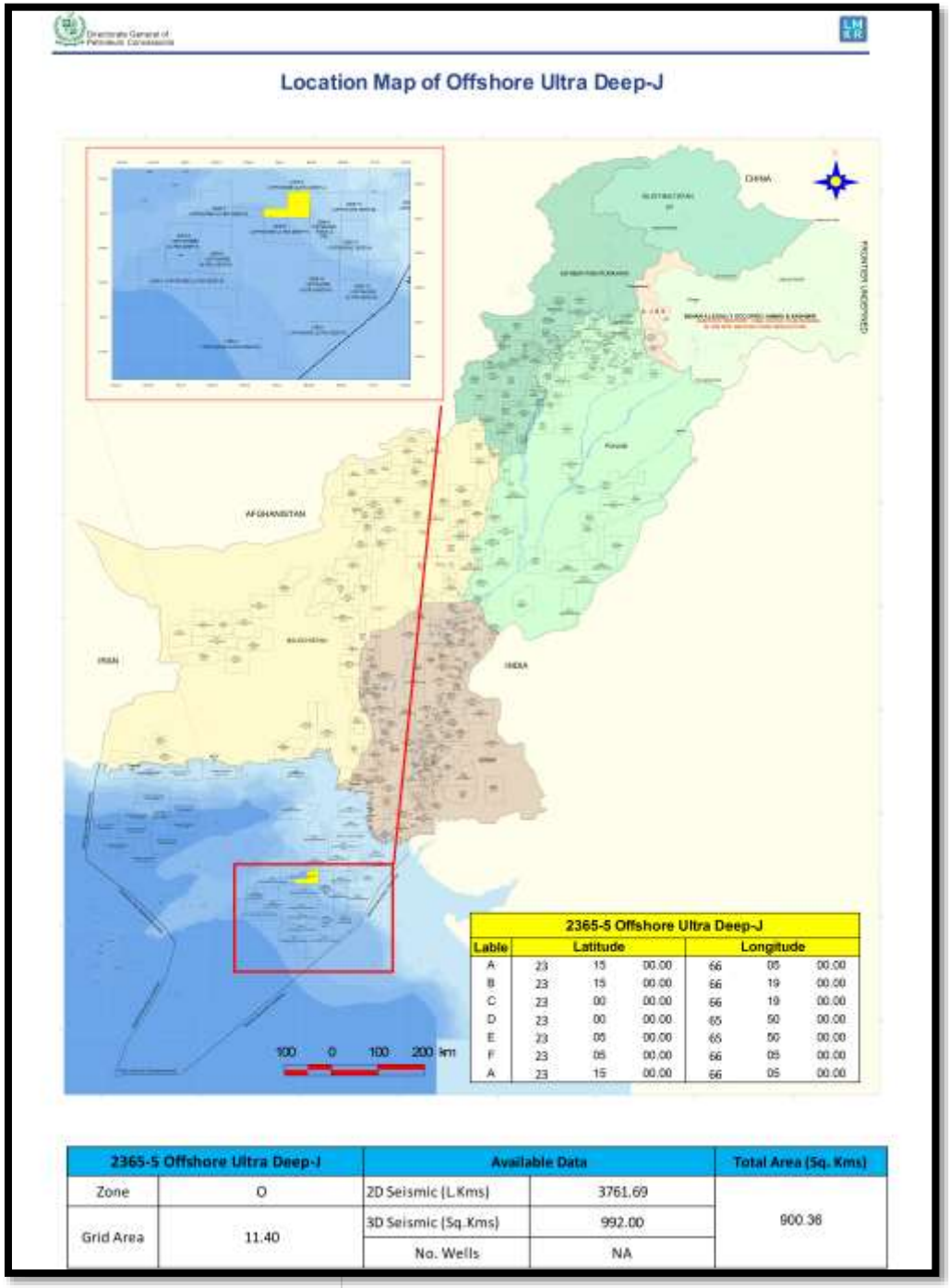
2264-4 Offshore Ultra Deep-I		Available Data		Total Area (Sq. Kms)
Zone	O	2D Seismic (L.Kms)	3127.99	1859.69
Grid Area	23.50	3D Seismic (Sq.Kms)	NA	
		No. Wells	NA	

*Riaz Ahmed 1998, Hydrocarbon Resource Base of Pakistan, Pakistan Journal of Hydrocarbon Research, Vol 10, 1-10

Offshore Ultra Deep-J (2365-5)

- **Area:** Offshore Ultra Deep-J covers an area of 900.36 Sq. Kms.
- **Geological Basin**: Offshore Indus basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- The Block is surrounded by Offshore Ultra Deep-F (North), Offshore Ultra Deep-G (West), Offshore Indus-J (East) and Offshore Ultra Deep-F (South) blocks.
- NOIP, TEP,BP and CE acquired some 2D data approximately 3761.69 (L. Kms) and seismic 3D data of about 992 (Sq. Kms). in the block within the years 1977-2007.





2365-5 Offshore Ultra Deep-J

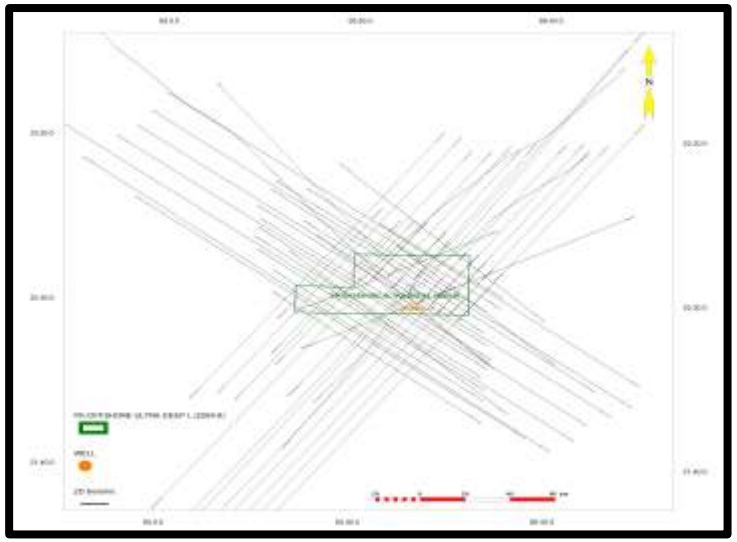
Lable	Latitude			Longitude		
A	23	15	00.00	66	05	00.00
B	23	15	00.00	66	19	00.00
C	23	00	00.00	66	19	00.00
D	23	00	00.00	65	50	00.00
E	23	05	00.00	65	50	00.00
F	23	05	00.00	66	05	00.00
A	23	15	00.00	66	05	00.00

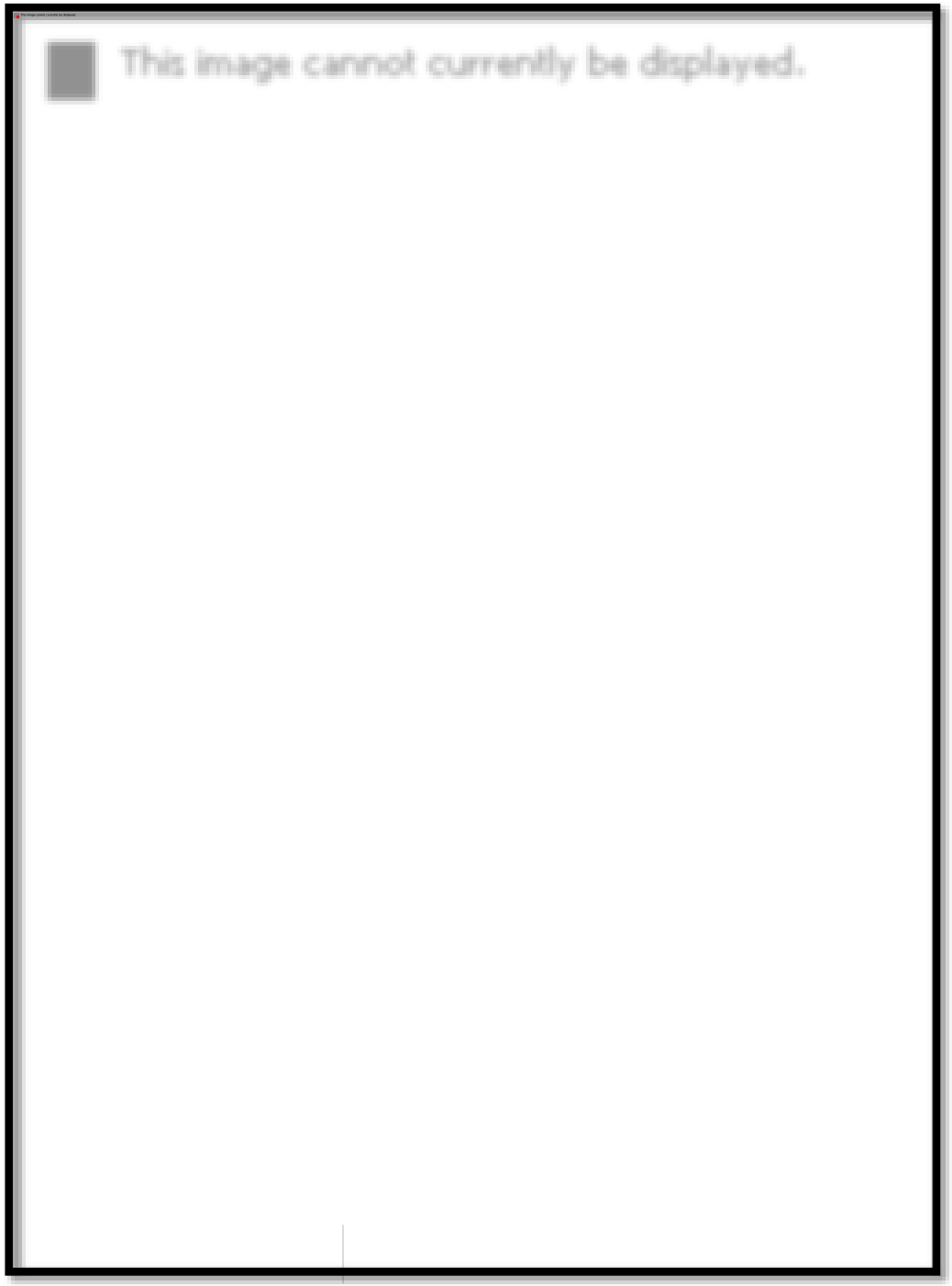
2365-5 Offshore Ultra Deep-J		Available Data		Total Area (Sq. Kms)
Zone	O	2D Seismic (L.Kms)	3761.69	900.36
Grid Area	11.40	3D Seismic (Sq.Kms)	992.00	
		No. Wells	NA	

**Riaz Ahmed 1998, Hydrocarbon Resource Base of Pakistan, Pakistan Journal of Hydrocarbon Research, Vol 10, 1-10*

Offshore Ultra Deep-L (2365-5)

- **Area:** Offshore Ultra Deep-L covers an area of 2087.59 Sq. Kms.
- **Geological Basin**: Offshore Indus basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- The Block is surrounded by Offshore Ultra Deep-F (North) and Offshore Ultra Deep-A (East), Offshore Ultra Deep-M (South) and Offshore Ultra Deep-H (West) blocks.
- NOIP, TEP,BP and CE acquired some 2D data approximately 7590.15 (L. Kms) in the block within the years 1977-2007.
- The well drilled in the vicinity is Indus Kekra-01.

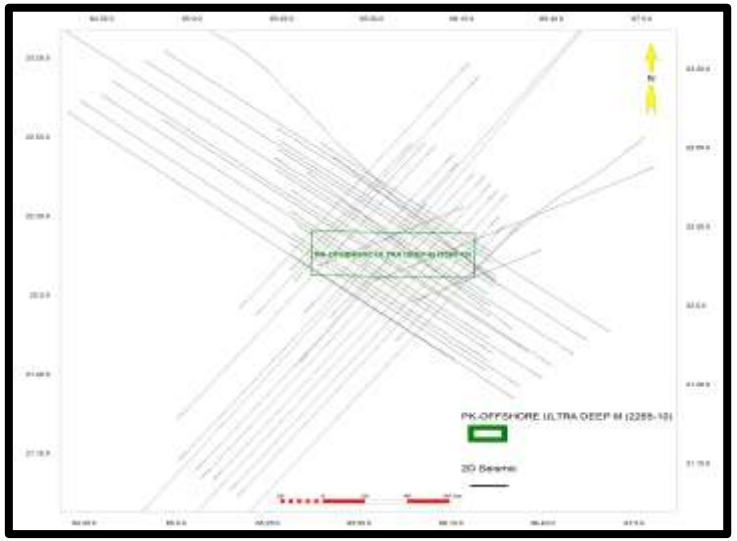


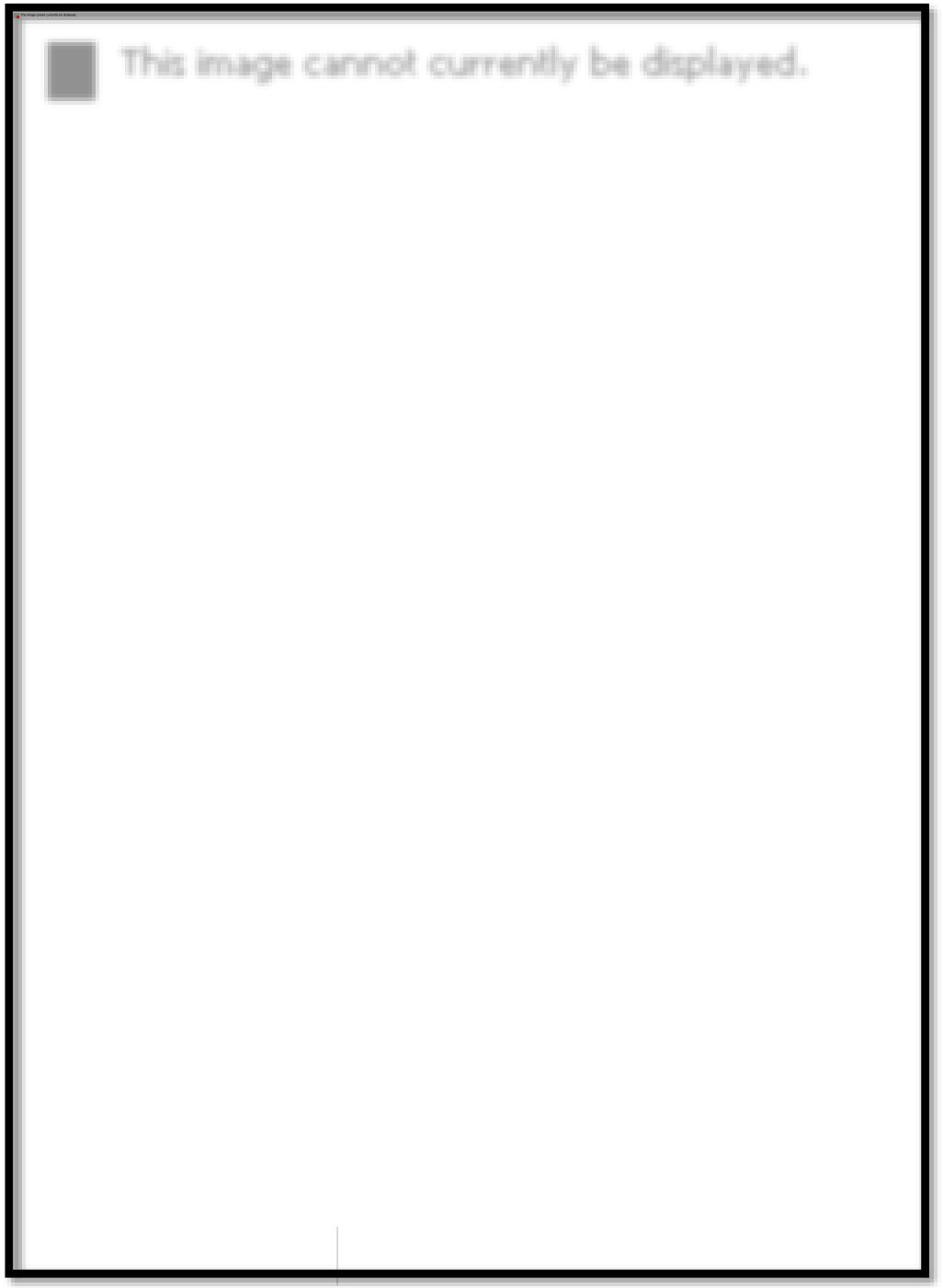


*Riaz Ahmed 1998, Hydrocarbon Resource Base of Pakistan, Pakistan Journal of Hydrocarbon Research, Vol 10, 1-10

Offshore Ultra Deep-M (2265-10)

- **Area:** Offshore Ultra Deep-M covers an area of 1999.10 Sq. Kms.
- **Geological Basin**: Offshore Indus basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- The Block is surrounded by Offshore Ultra Deep-L (North) and Offshore Ultra Deep-A (East), Offshore Ultra Deep-N (South) and Offshore Ultra Deep-E (West) blocks.
- NOIP, TEP,BP and CE acquired some 2D data approximately 7023.1 (L. Kms) in the block within the years 1977-2007.

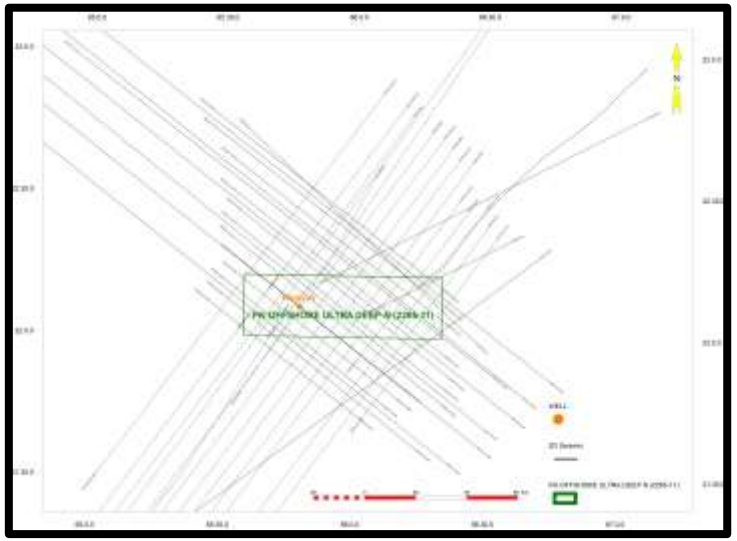


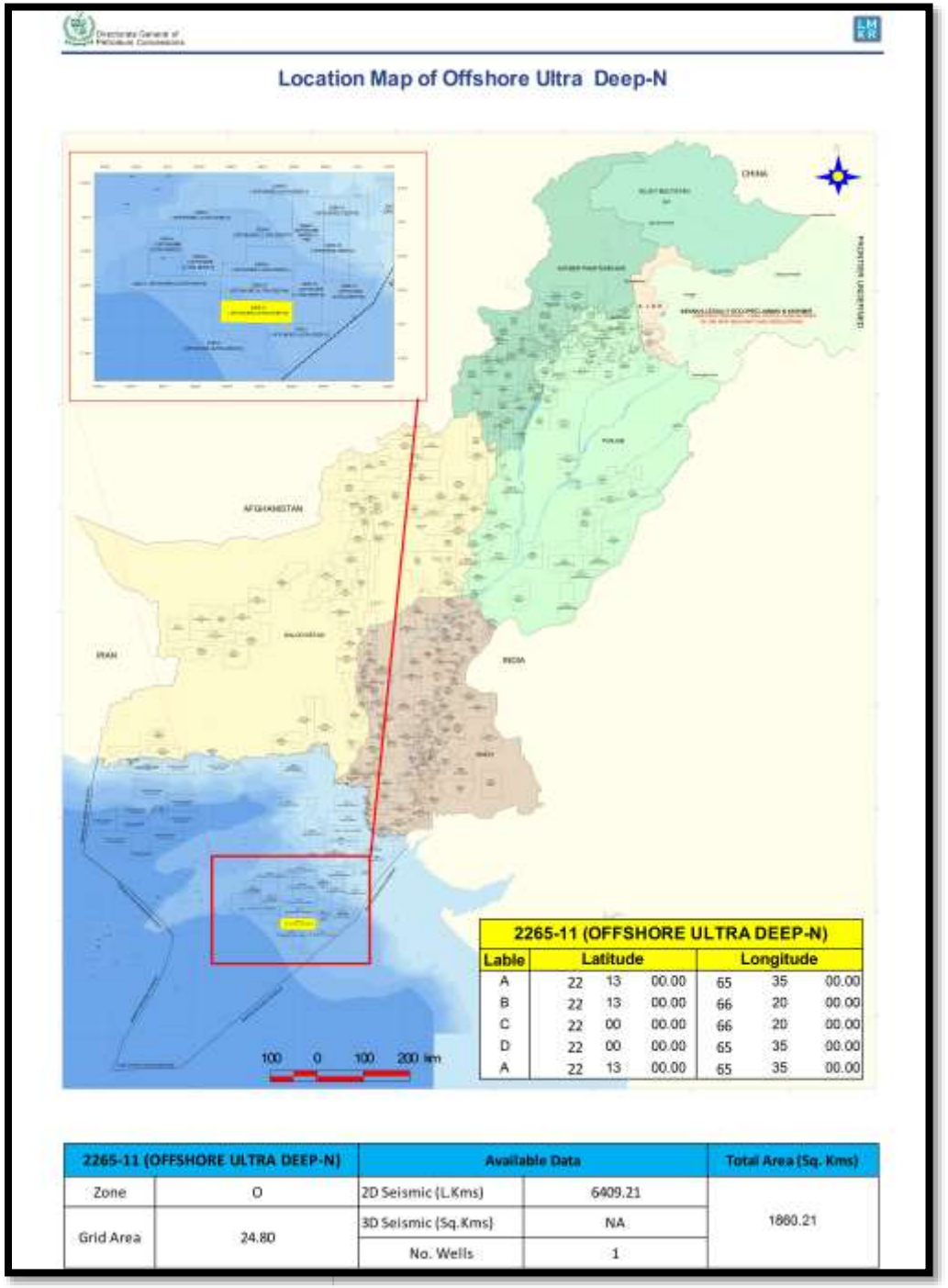


*Riaz Ahmed 1998, Hydrocarbon Resource Base of Pakistan, Pakistan Journal of Hydrocarbon Research, Vol 10, 1-10

Offshore Ultra Deep-N (2265-11)

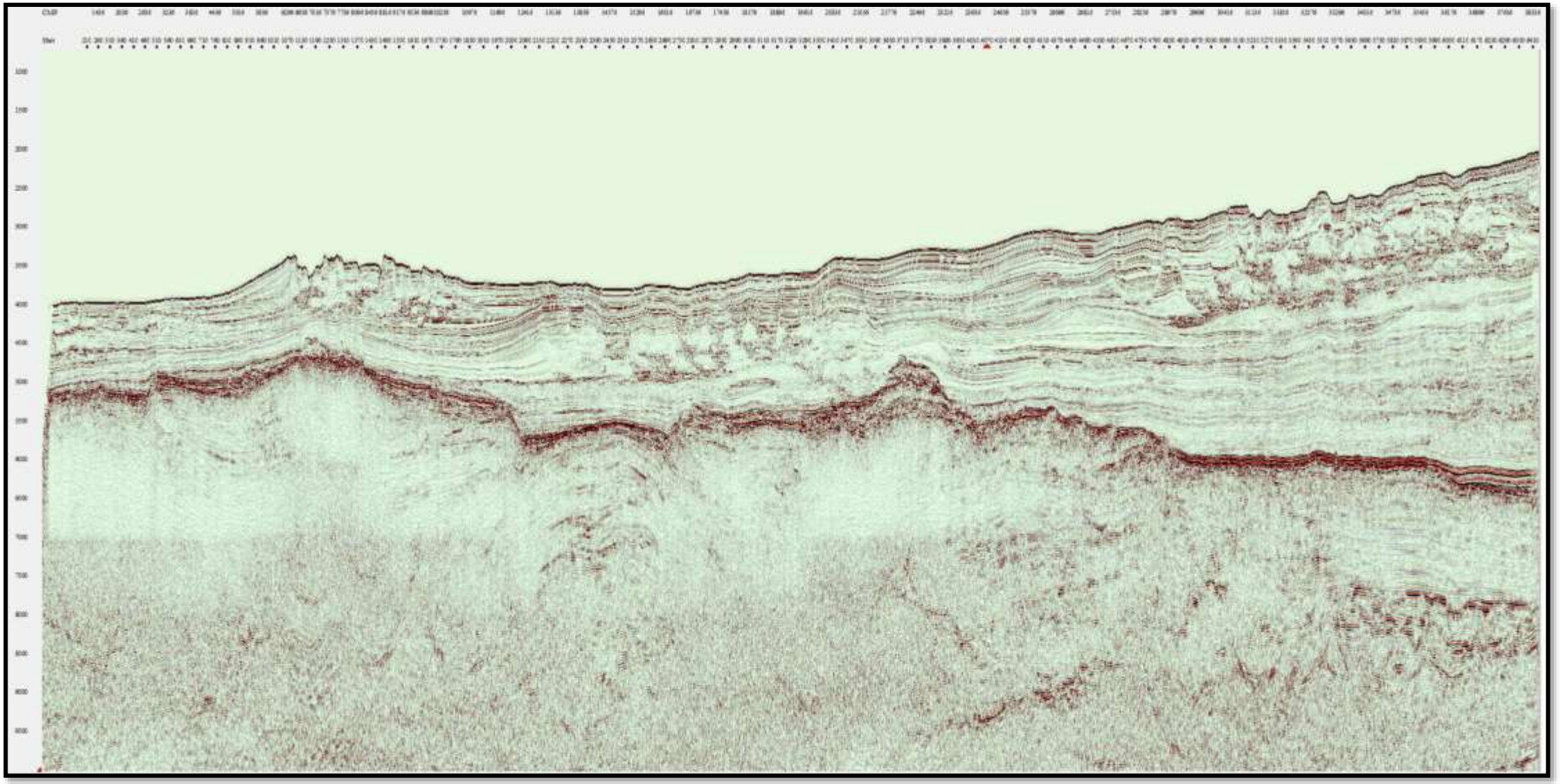
- **Area:** Offshore Ultra Deep-N covers an area of 1806.21 Sq. Kms.
- **Geological Basin**: Offshore Indus basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- The Block is surrounded by Offshore Ultra Deep-M (North) and Offshore Ultra Deep-A (East), and Offshore Ultra Deep-D (South)
- NOIP, TEP,BP and CE acquired some 2D data approximately 6409.21 (L. Kms) in the block within the years 1997-2007.
- The well drilled in the vicinity is PakG2-01.





**Riaz Ahmed 1998, Hydrocarbon Resource Base of Pakistan, Pakistan Journal of Hydrocarbon Research, Vol 10, 1-10*

PROSPECTIVITY



Carbonate Platforms and reefs deposits
Pinchouts are also observed

EXPLORATION RISKS

- Source & Charge: Medium to High risk
- Reservoir: Medium to High risk
- Seal: Medium to High risk
- Trap: Medium to High risk
- Key challenges for future exploration in Tertiary Petroleum System are to establish:

1. Distribution and timing of effective source intervals' development within the drainage area of prospect.
2. Timing of over-pressuring (up to 7000 psi at 2800m in Indus Marine-1A well) within Miocene section (for Miocene and younger targets) with respect to source rock maturation and expulsion.

THANK YOU