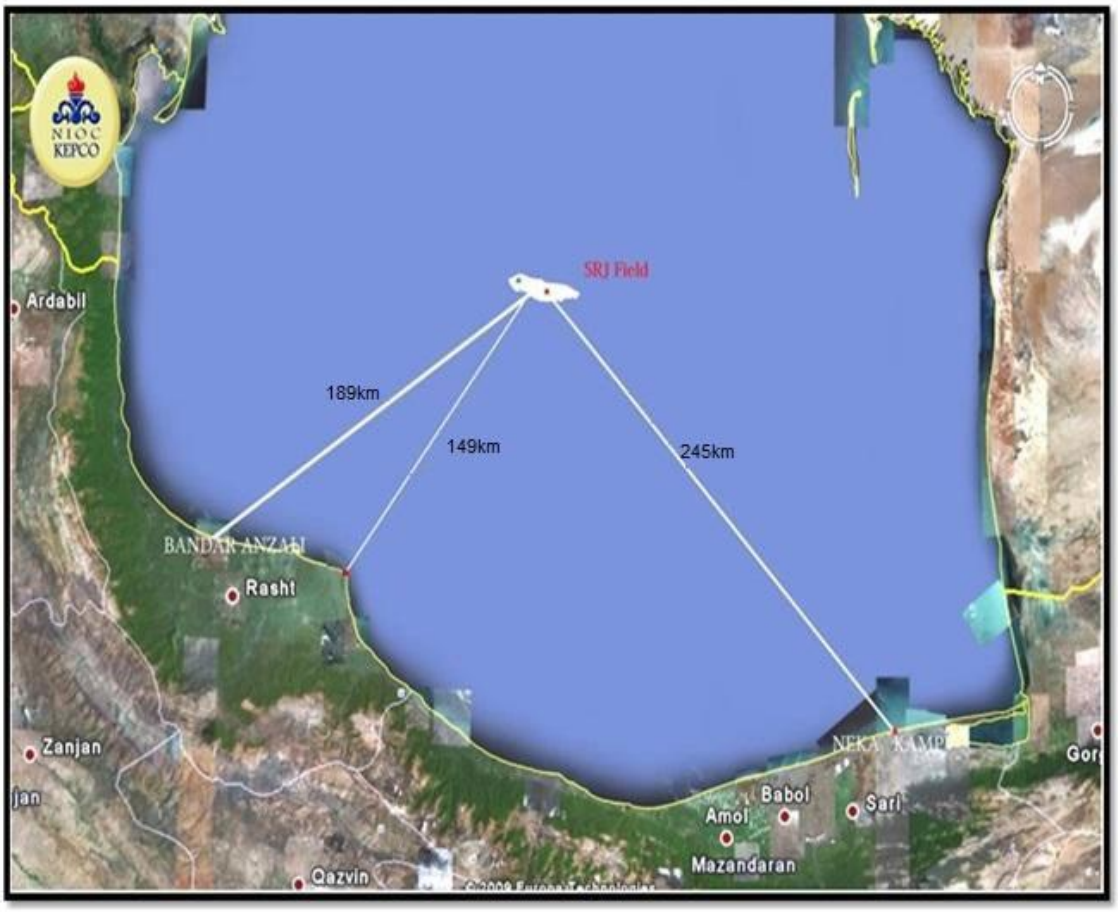
C A S E T R A

EXPRESSION OF INTEREST

Sardar Jangal Field



2017

Preface

The Exploration Agreement for the South Caspian Regional Study was signed on the 14th of December 1999 between NIOC, Shell, Veba and Lasmo. The intention of the agreement is to evaluate the prospectivity of the „Study Area", covering the South Caspian. For this purpose, a joint technical team, the South Caspian Study Group (SCSG) was established, consisting of representatives from all four companies under the supervision of a Steering Committee.

During the study, 10,000km of 2D seismic has been acquired and interpreted, a surface oil slick and sea bed coring program undertaken and reprocessing and interpretation of existing geophysical and geological data concluded.

A number of integrated approaches have been followed to try and determine potential reservoir presence and quality in the South Caspian as this remains one of the greatest risks on any commercial oil development in the area.

46 structures has been identified which 8 of them (6.2, 29, 6.1, 8.1, 7.1, N10, N9 and N3) have the priority for further exploration activities.

Engineering studies have been undertaken to identify the most appropriate technology for operating in the deepest parts of the Caspian Sea. Numerous possible development scenarios have been made and are presented.

During 2003-2005, 3D seismic in an area of about 4000km2 has been acquired, covering blocks 6, 7, 8 and 29.

In 2003 a risk analysis on reservoirs of the main South Caspian structures was performed by DNV. From the result of this study the ranking of the prospects was done.

In 2004 Strategic master development plan for the main prospects was studied by Petro-Consultant-Mai. Different development concepts were analyzed and economic evaluation was performed.

In 2010 the first wild cat well was drilled on the main culmination of 6.2 structures. An oil zone was explored at base of Aghchegil formation and tested. The second well was drilled in 2014 in 1400 meter to the west of the first well and the oil layer also was detected at 2562- 2605m at Aghchagil base. From the petro physics analysis for the 43 m reservoir thickness the value of Net to gross is about 86% and the average porosity is 27% and the average water saturation is 40%.

From formation testing (with MDT tools) of the reservoir the pressure and temperature at reservoir depth is 5070psi and 100"F respectively. Also the fluid sample at reservoir condition was gathered and lab tested in Orogenic Resources Lab. In Malaysia. From this lab tests the reservoir oil 37.2API with GOR of 873 (scf/sbl), and the formation volume factor is 1.35(rbbl/stb) at reservoir pressure.

Full-bore well test of the SRJ-X2C (the second well) at intervals 2563-2590m and 2600- 2605m. The maximum rate of 4793bbl/d with a down hole flowing pressure of 4100psi.

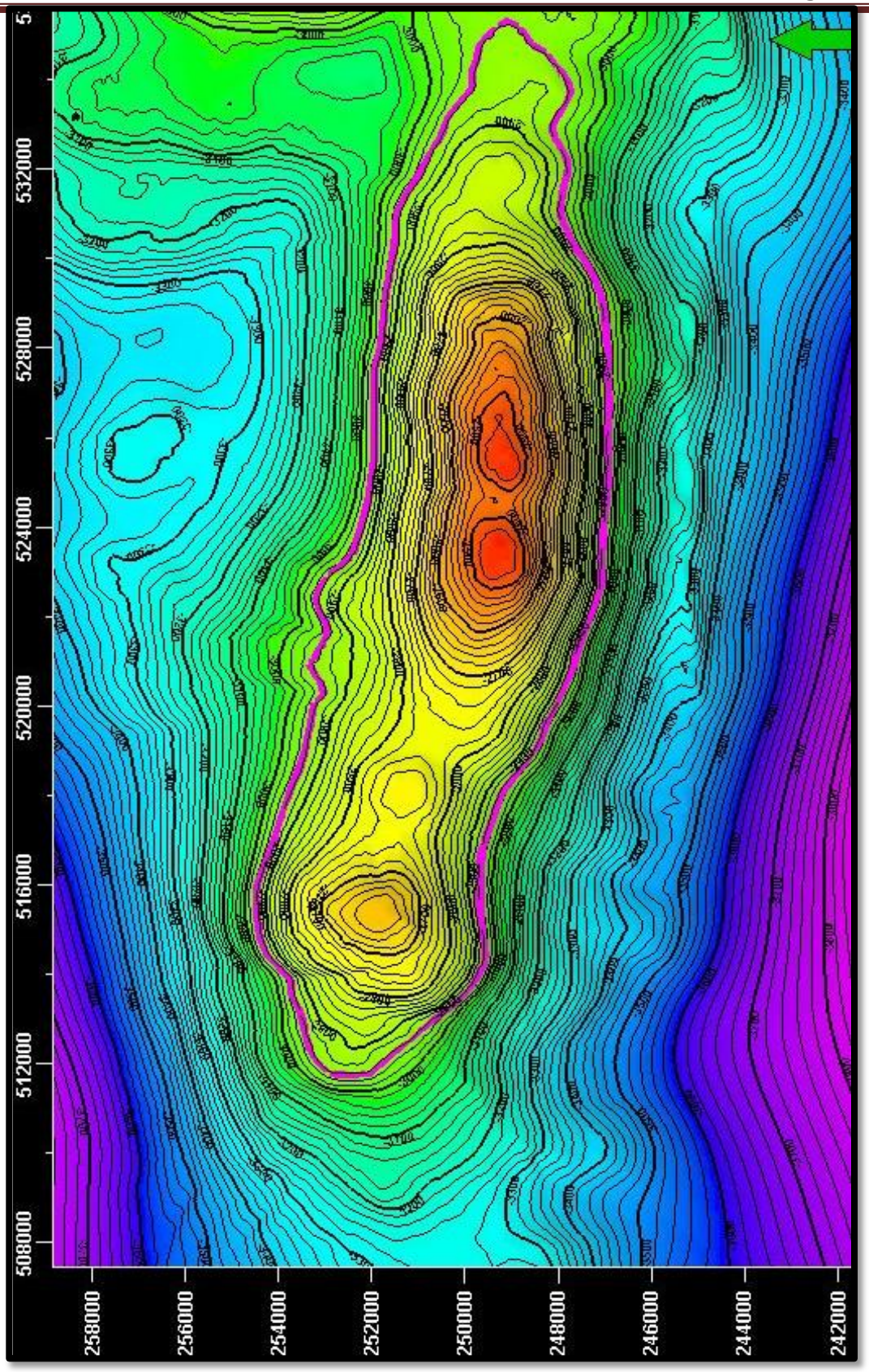
The pressure transient analysis calculates a permeability of 150md for the average reservoir section.

The in-place volume of the whole reservoir layer is calculated 2018 MMbbl, as P50. The recoverable reserve is 501MMbbl.

Then Static and Dynamic study of Sardar Jangal field (6.2 structure) have been done by WSI Company in 2015-2016.

Summary of Sardar Jangal Oil Field

General	Field Name	Sardar Jangal
	Basin	Caspian Sea
	Location	210 Km East of Astara and 193 Km North of Noshahr
	Areal Closure	97 Km^2 (23.8Km*5.8Km)
	Vertical Closure	~ 500 m
	Water depth	~ 700 m
	Reservoir depth	~ 2500 mss
	Field phase	Appraisal
	Number of drilled wells	2
Geology	Reservoir lithology	Sandstone
	Formations	Apsheronian-Agchagyl-Chelekan
	Age	Upper Pliocene
		Unconsolidated
	Thickness	~ 30-40 m
Petrophysics	porosity	27.5 %
	Water Saturation	38 %
	NTG	87 %
MDT	Reservoir pressure	~ 5060 psi
	Reservoir Temperature	40 C
PVT	Reservoir fluid	Oil-under saturated
	API	37
	Bubble Point	~ 3100 psi
	Rs	~ 900 scf/stb
	WAX Content	12 %
	WAT @ 2012 psi	24 F
	WAT @ 15 psi	28
	WDT @ 2230 psi	34F
	WDT @ 15 psi	35
	Bo @ 5057 psi	1.352 bbl/stb
	Bo @ Pb	1.379 bbl/stb
	Oil vis. @ 5057 psi	1.0728 cp
	Oil vis. @ Pb	0.9016 cp
Pressure Test	DST	On both well
	Flow Problem	Wax blockage
	Wax content from PVT analysis	12%
	Last read Down hole Pressure at DST#3	5002 psi
	Last read Down hole Pressure at DST#2	5012 psi
	Average Permeability	~ 150 md
	Max. oil rate at DS#3	4793 bbl/d



SC500 horizon depth map with closure 2940 m

Introduction

This block is located in southern part of the Caspian Sea, approximately 190 km North of Nowshahr and 246 km from Behshahr. This block area is approximately 192 sq. km which is confined by Structure 6.2. (Fig-1)

STRATIGRAPHY

The South Caspian region represents a great depression which is filled by 20-25 Km. of upper Upper Mesozoic to Quaternary deposit. (See fig…, Stratigraphic column).

Regarding the great thickness of Neogene - Quaternary sediments in the South Caspian Basin, the stratigraphy column defined here covers the Neogene Sediments that uncomfortably overlies the Lower deposits. The water depth is approximately estimated between 600 to1000 meters.

Middle Pliocene Sediments (Cheleken Fm.)

In Iranian deepwater section (SRJ-X2C and SRJ-X1f), the Cheleken Series is Consist of clean sandstone, shale , thick Succession of Evaporate Deposit (such as Anhydrite and Salt) ,brown clays, marls and sandstone. In Azerbaijan Sector (shahdeniz field) and Iranian shallow water wells (Meghdad , Meysam and Khazar) litholoshy of the Cheleken has similarity to Sardar Jangal structure. In lack of the sufficient outcrops of this stage in Iran, the stratigraphic nomenclature is adopted from Turkmenistan that is equal to Productive Series of Azerbaijan.

Upper Pliocene Sediments (Aghchagyl Fm.)

In type locality, the Aghchagyl consists limestone, marl, clay and sandstone. In Iran, the Aghchagyl Stage is represented by siltstone, clay stone, rubbly mudstone and conglomerates. Cardium dombra and Mactra subcaspia are common fossil contents.

Average thickness of Aghchagyl Stage in SCB (offshore wells) is about 120m. In Sardar Jangal Wells the lower part of this unit was a good reservoir with 49m thickness.

Quaternary Sediments

Apsheron Formation (Basal Quaternary): In the type locality (Apsheron Peninsula, Baku Archipelago), the Stage is represented by a thick section of sand, marl and shell beds containing following fossils:

"Cardiidae, Monodacna, Adacna, Dreissensia"

Bakuvian Stage: This Stage is used originally in marine terraces in the Baku region. It contains the following fossils:

" Didacna sp., Planorbis eichwaldi, Theodoxus pallasi, Cobicula fluminalis"

In Mazandaran and Gorgan drilled wells, this Stage is represented by a poor consolidated marine and brackish clay and sand deposits.

Khazarian Stage: The lower part of the Ancient Caspian deposits, originally is subdivided into upper section which is named as Khovalinskian Stage (in Iranian offshore and onshore, the same nomenclature is used), the lower part is named as Bakuvian

Khovalinskian Stage : In North Iran this name is used for the upper part of ancient Caspian deposits.

New Caspian (Novocaspian) : This Stage is named for the recent sediments.

TECTONIC

The South Caspian Basin is an oceanic back-arc basin, which has continued to subside since its formation in the Cretaceous, and has accumulated a sediment pile up to 20 km thick. The northern margin of the basin is the Apsheron Ridge, the western part of which is a subduction zone.
The South Caspian Basin is divided into six tectonic units, which are different in character:

- Apsheron Ridge
- Cheleken Peninsula, the Apsheron Ridge‟s geographical continuation now dominated by strike slip
- Amu Darya Province (eastern part of the basin).
- Volga and Kura Provinces (western part of the basin).
- Central Province
- Sefid Rud and Meysam Provinces (southern part of the basin).

HYDROCARBON SYSTEMS

- The Oligo – Miocene Shales (Maykop Series) are assumed as the source rock in south Caspian Basin.
- The Base of Aghchagyl Formation (Shale Bed) could act as the possible source beds for hydrocarbon potential of the upper sandstone layer..
- The Lower Productive Series & Lower Sandstone of Aghchagyl Formation are oil reservoir layers.
- Pliocene Evaporate of Surakhani (Upper Productive Series) could play as an effective seal beds for Lower productive Series.
- The fine clay of Upper Aghchagyl Formation could play as an effective seal beds for Aghchagyl sandstone reservoir.
- Productive series and Aghchagyl Formation are the most important reservoir layers, which are sealed by Upper fine clay or Evaporate beds and charged by Lower Shale layers from Maykop Series & base of Aghchagyl Formation in two Sardar Jangal wells.
- Aghchagyl Sandstone is oil/gas producing and acts as a reservoir target.
- Upper fine clay beds play as a seal beds over Aghchagyl reservoir.

OBJECTIVES

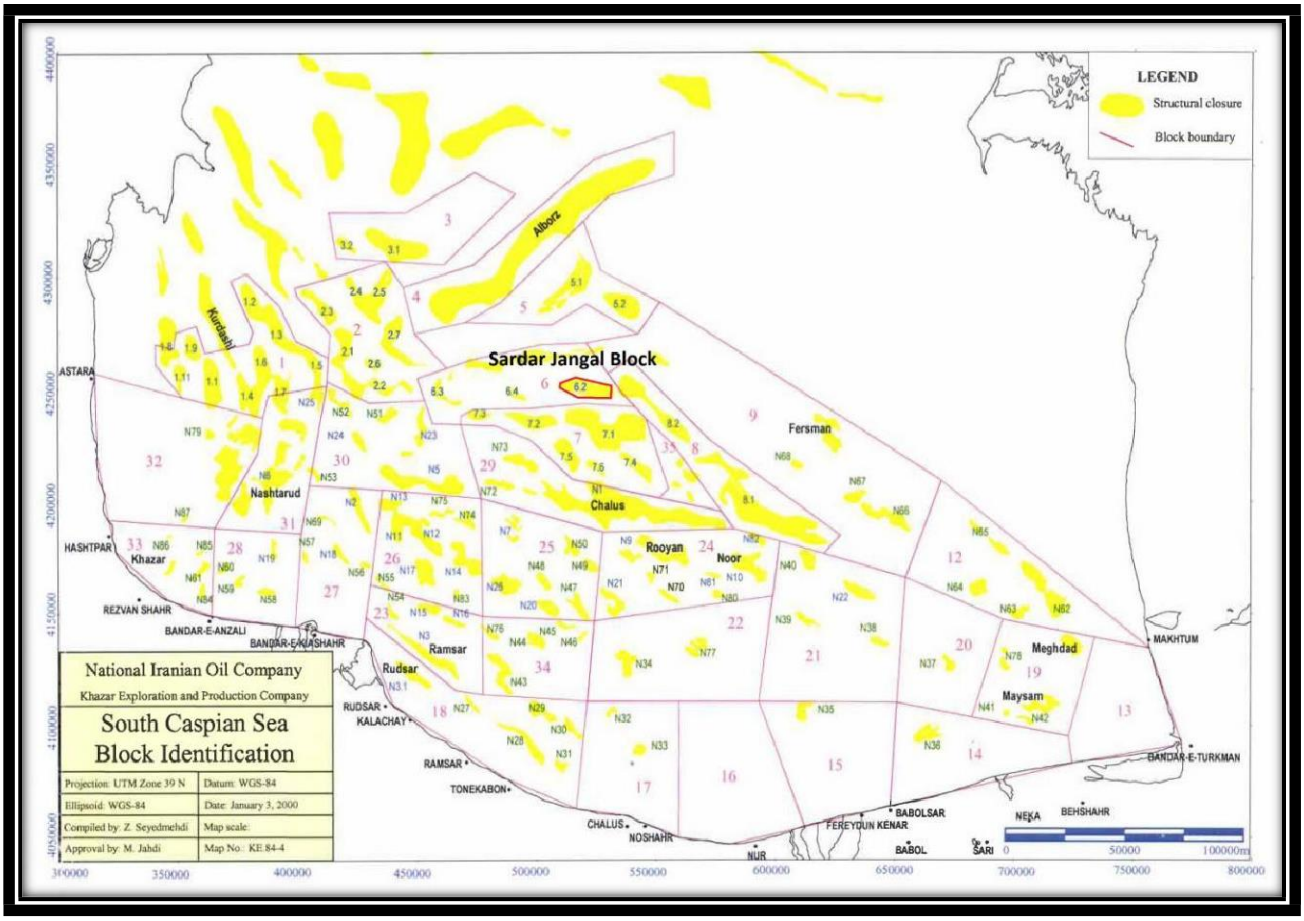
The main targets through this block area could be regarded as follow :

- Aghchagyl sandstone are the main objectives through this block.
- Lower Productive Series sandstone (Balakhany equivalent) are the secondary objectives through this block.

PREVIOUS WORK

Two wells have been drilled in this block area, that are SRJ-X1 & SRJ-X2
Totally 120 km^2 3D seismic data has already been acquired.

Fig-1: location of Sardar Jangal Block



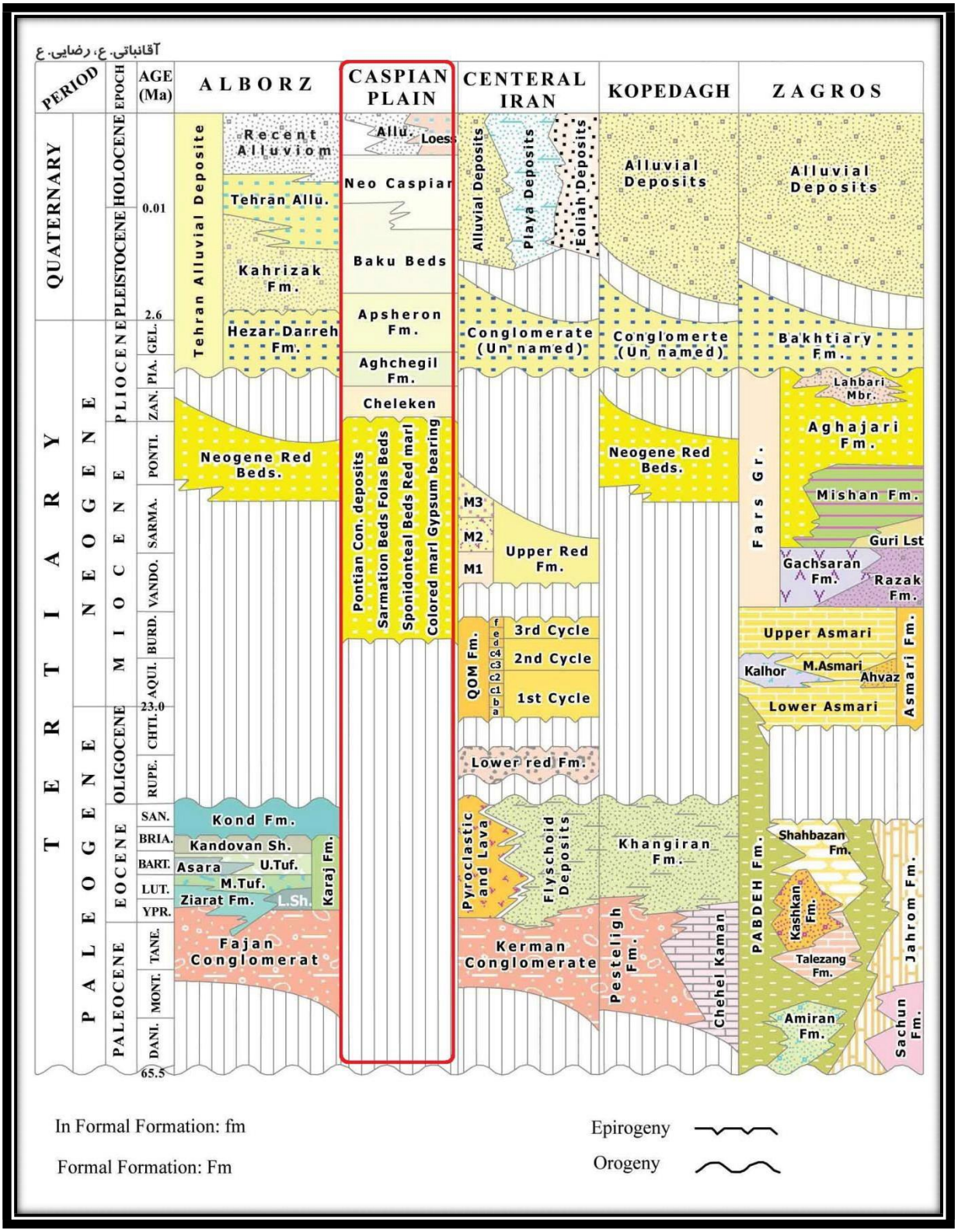


Fig-2 Stratigraphy Column of South Caspian Sea

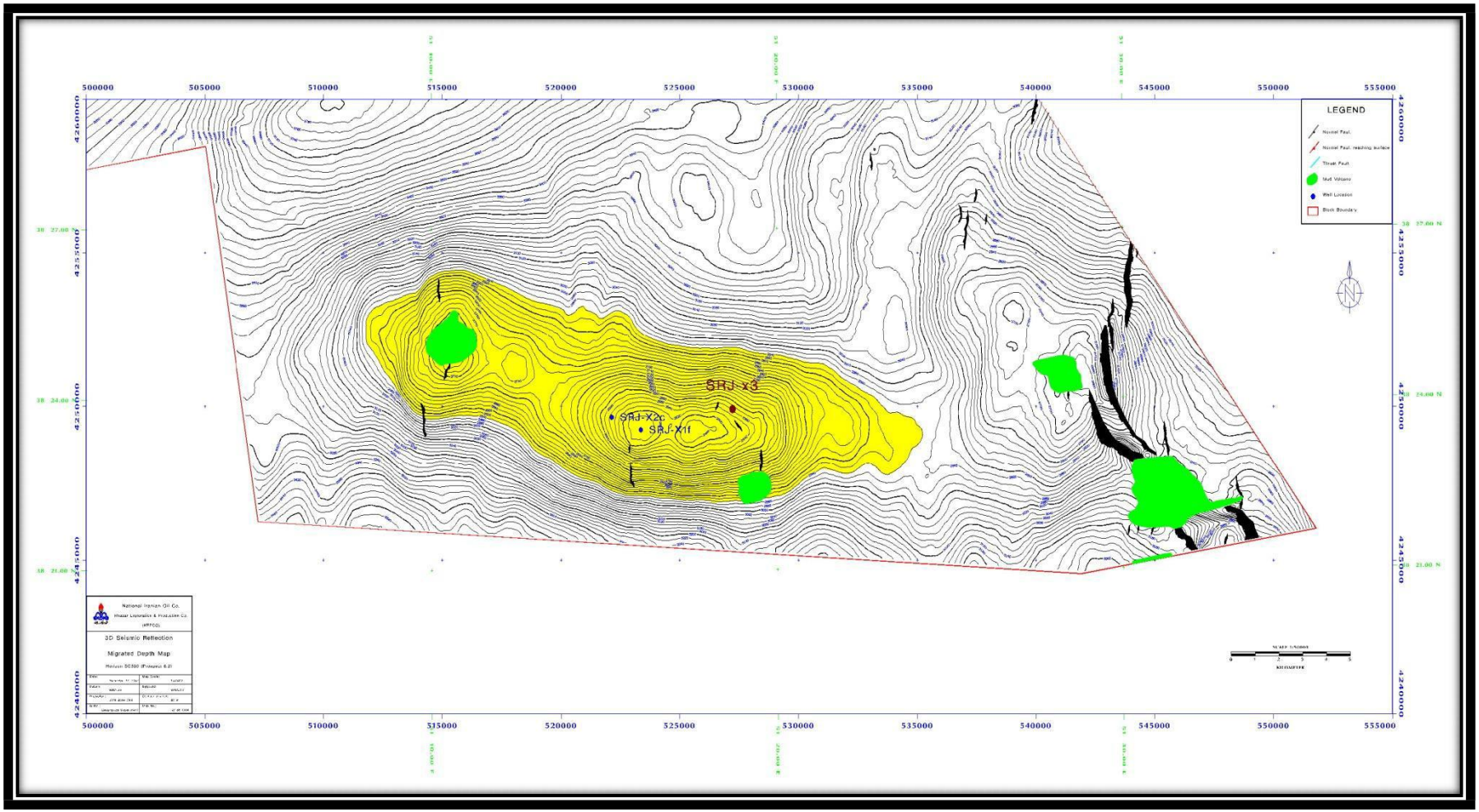


Fig-3 Depth Map of SC-500 (Near Top of Cheleken Series) Seismic Horizon

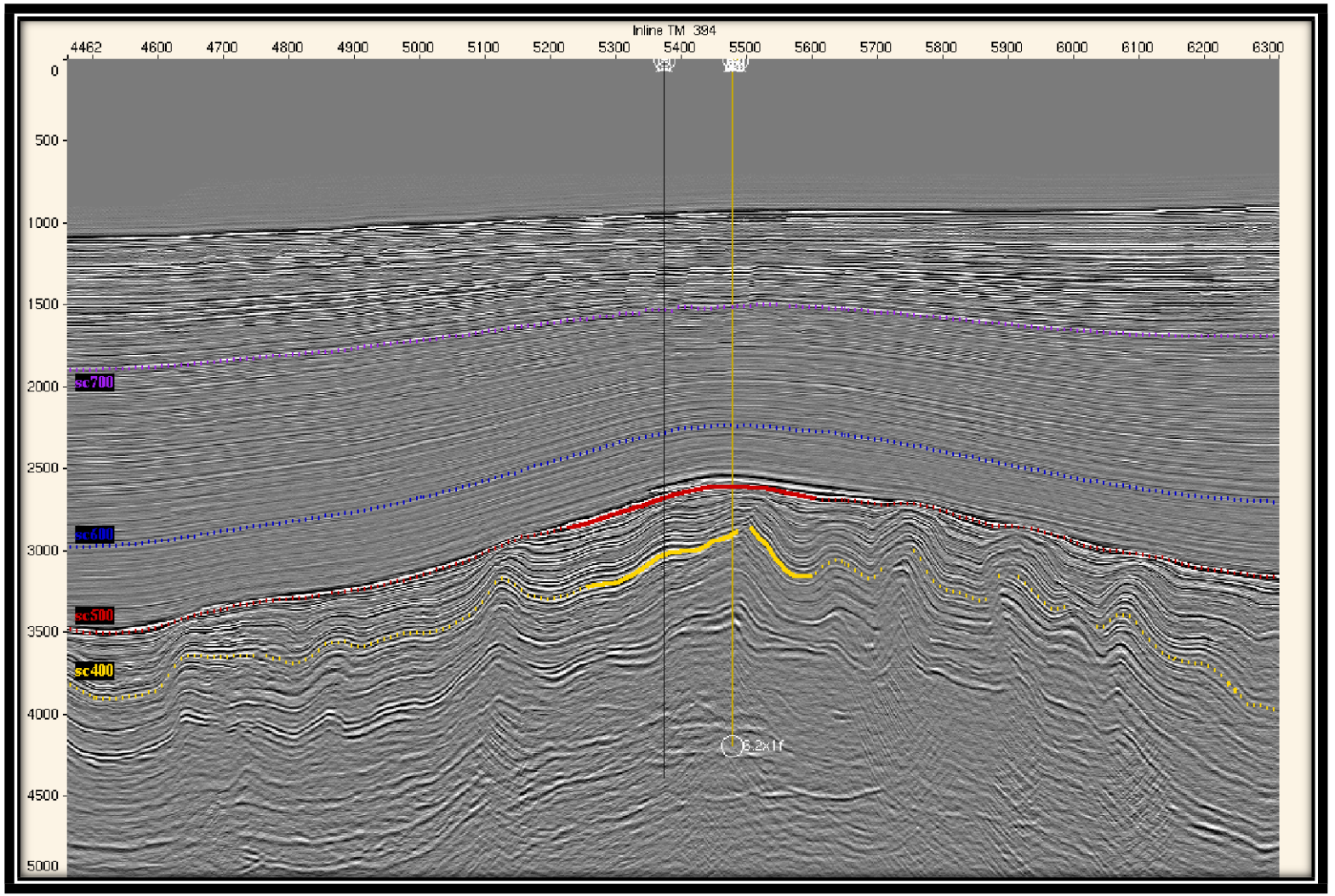


Fig-4: 2D Seismic line of Sardar Jangal Block

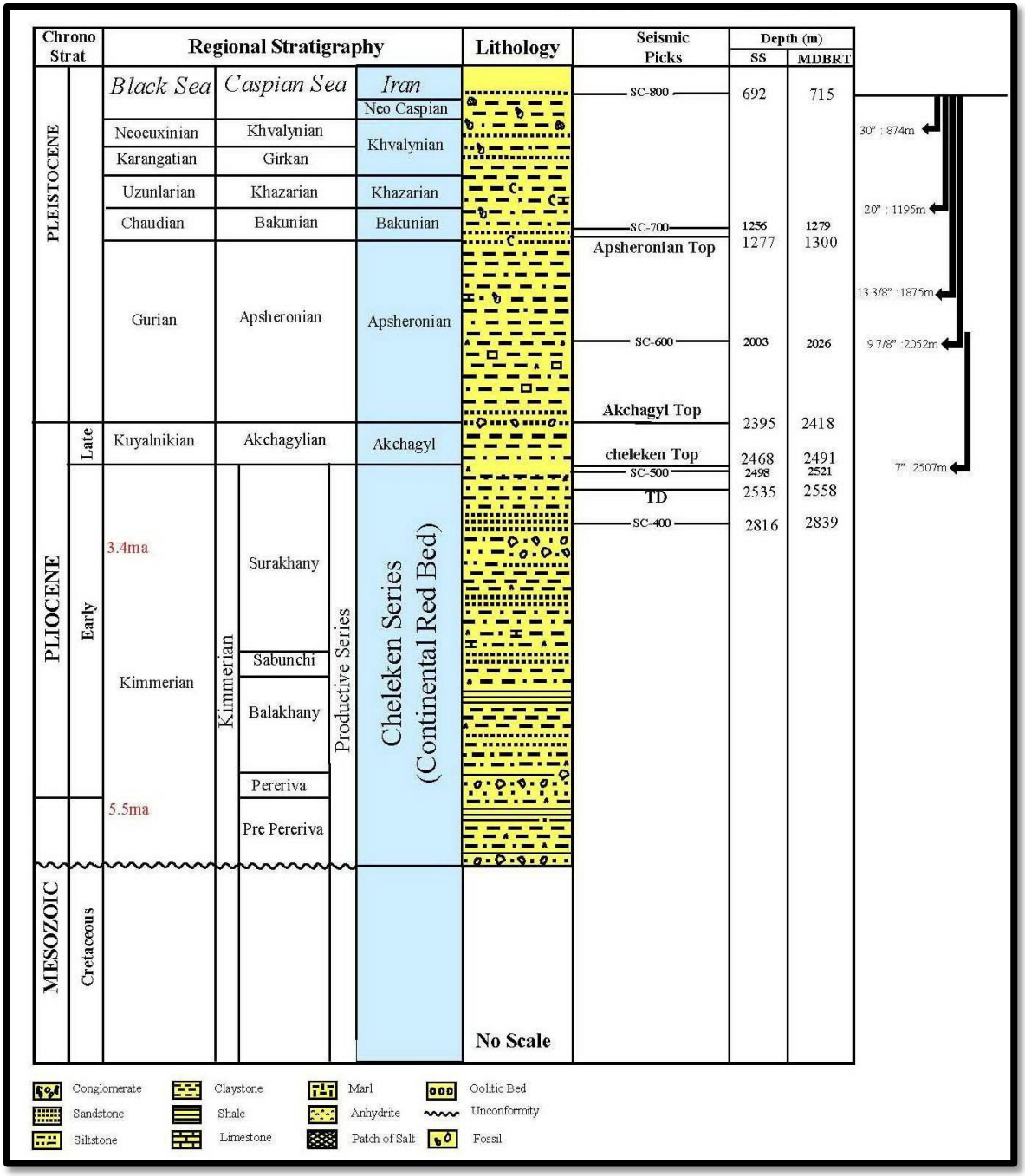


Fig-5 : Stratigraphic Column of SRJ-x1

Petroleum Engineering

Well SRJ-X1

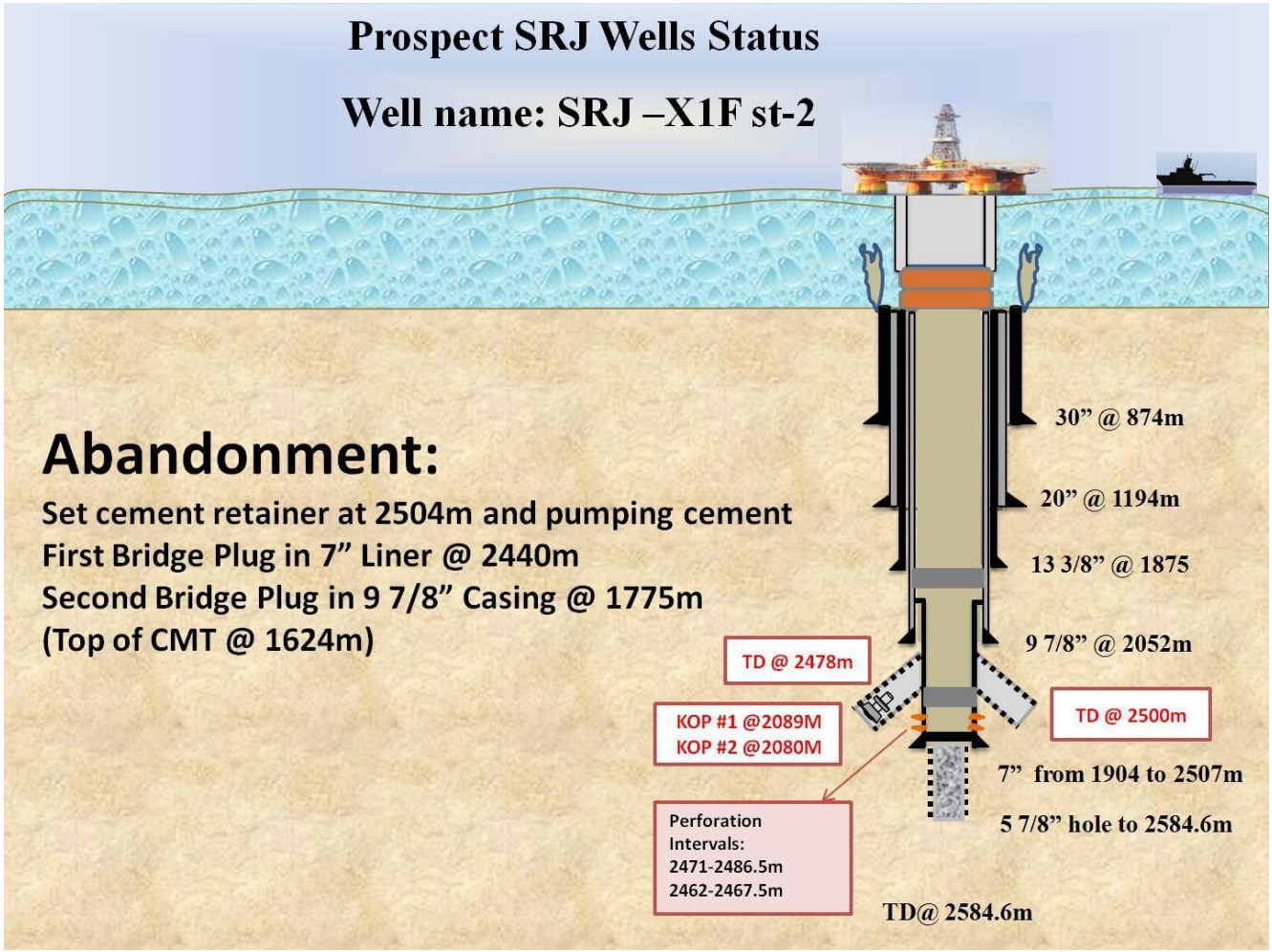


Fig 6: Schematic of well SRJ-X2 and well test interval

Wire Line logging

HOLE	Type of Logging Tool	Bit Size for Logged Hole (in)	Logging Interval (m)	Logging Method
Vertical Hole	BHC/GR (Sonic Measurements)	12 ¼" * 14 ¾"	1875-2052	WireLine
Vertical Hole	VSP/GR (Vertical Seismic Profile)	12 ¼" * 14 ¾"	713-2039	WireLine
SideTrack_2	FULLSET (PEX/HRLA/MSIP/NGT)	8 ½"	2052-2507 OpenHole (Sidetrack_2)	MSIP(WireLine) Other Logs(TLC)
SideTrack_2	VSP/GR (Vertical Seismic Profile)	8 ½"	1905-2507	WireLine
SideTrack_2	Perforation/CCL	8 ½"	2462-2492 (21 m -Two run)	WireLine

Logging While Drilling

WELL	HOLE	Type of Logging Tool	Bit Size for Logged Hole (in)	Logging Interval (m)	
X1-Pilot	X1b-Pilot	arcVISION675(APWD) SonicVISION675 geoVISION675 TeleScope675	8.5	718	1445
X1b	X1b	arcVISION825 TeleScope825	12 1/4	712.5	1074.1
X1c	X1c	arcVISION825 TeleScope826	12 1/4Slide 11	709	791.5
X1d	X1d	arcVISION825 TeleScope827	12 1/4	699.8	1220.8
SRJ_1(X1f)	Vertical hole	PowerPuls(GR)	12 ¼ * 14 ¾ “	1896	2057
SRJ_1(X1f)	Vertical hole	PowerPulse GeoVision(GVR-Res/GR)	8.5	2048	2504
SRJ_1(X1f)	SideTrack_1	PowerPulse PeriScope	8.5	2070	2465
SRJ_1(X1f)	SideTrack_2	PowerPulse GeoVision(GVR-Res/GR)	8.5	2401	2502
SRJ_1(X1f)	SideTrack_2	Impulse	5 7/8 “	2501.4	2534.72

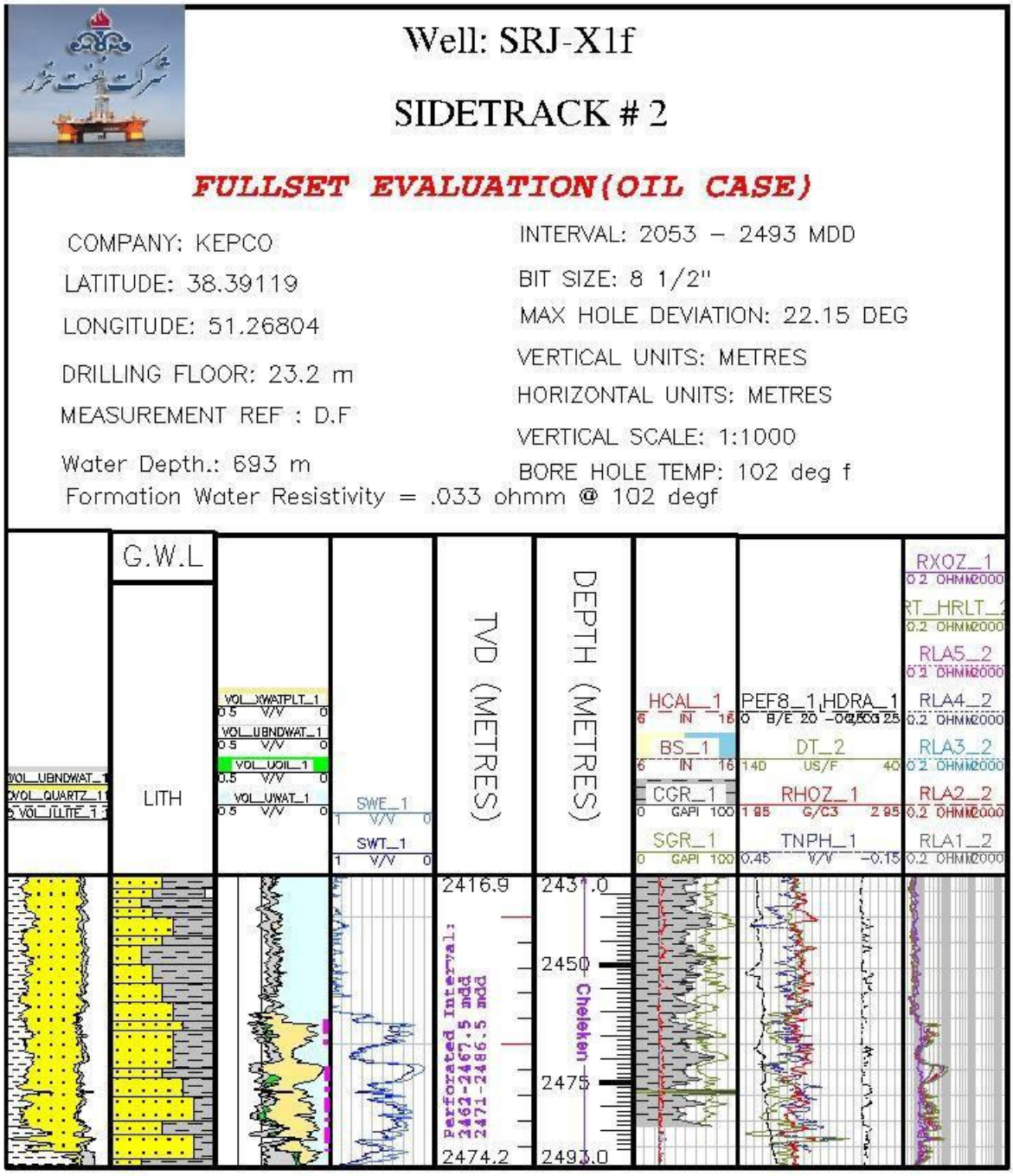


Fig 7: Petophysical results (Pore Volume & lithology Plot)

Well SRJ-X2

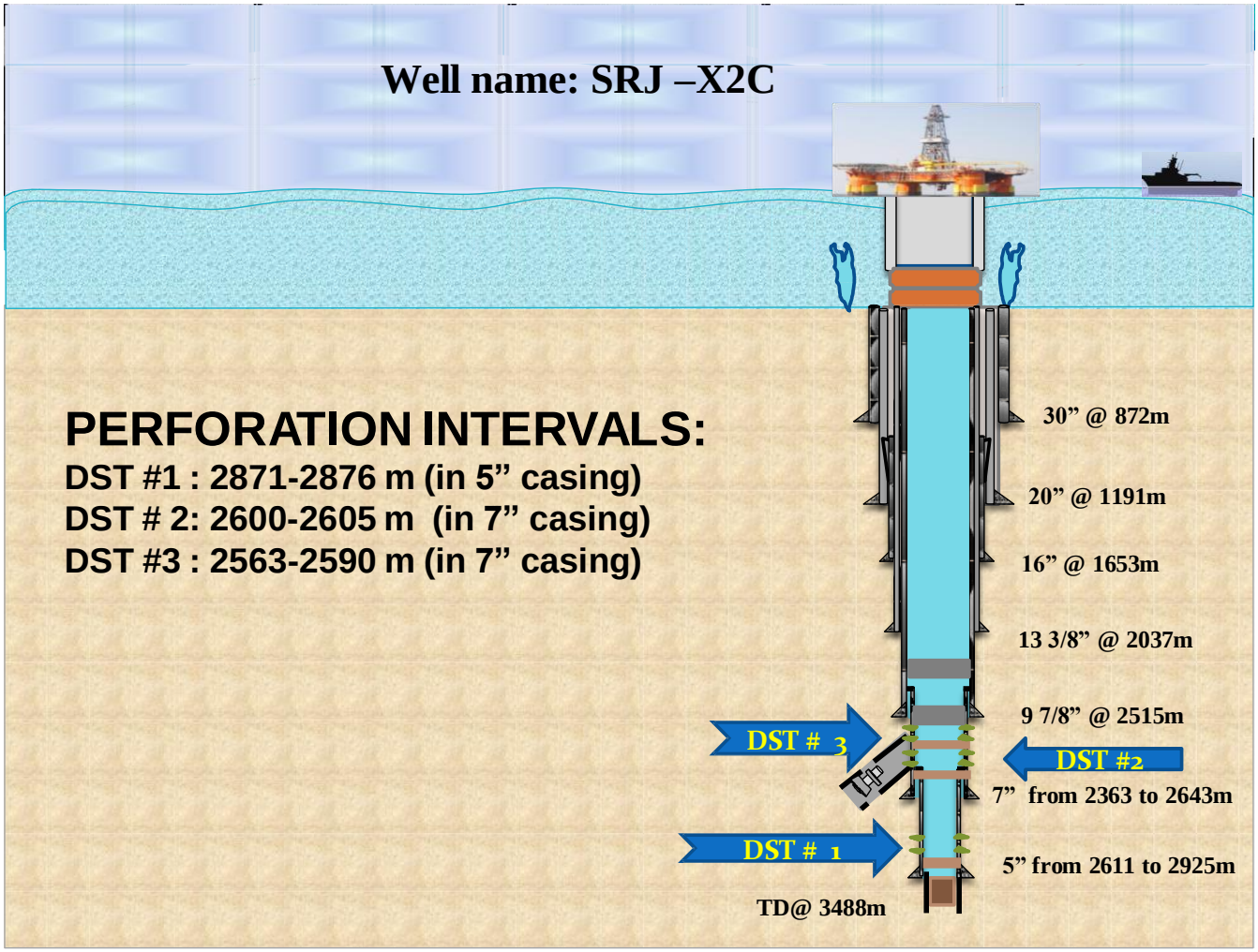


Fig 8: Schematic of well SRJ-X2 and well test intervals

Wire line logging Operation of SRJ-X2

HOLE	Type of Logging Tool	Bit Size for Logged Hole (in)	Casing or Liner Ran (in)	Logging Interval (m)	Logging Method	Date of logging	Remark
Vertical Hole	BHC/GR	14 3/4	O.H	1652.6-1810.7	WireLine	1.Feb.2014	Logged By NIDC
Vertical Hole	BHC/CBL/VDL/CCL/GR With 2 PPC for Centerlizer and Caliper	17.5	(CSG-13 3/8") (CBL/VDL)	1550-2039.5	WireLine	3.Mar.2014	Logged By WSI
		12 1/4	O.H (BHC-CALI)	2039.5-2438			
ST1	FullSet Run 1) SP/GPIT/HRLA/GR Run 2)Pex/NGT Run 3)BHC/GR	8 1/2	O.H	2487-2629	WireLine	22,23.Apr.2014	Logged By WSI
ST1	MDT	8 1/2	O.H	2487-2629 * 10 points pretest * 6 Bottle Samples(450CC) * 1 Sample Chamber 2.7Gallon	WireLine (TLC)	25,26.Apr.2014	Logged By WSI
ST1	GR/BHC/HRLA	5 7/8	O.H	2646-2746.5	WireLine	28.May.2014	Logged By WSI
ST1	SLDT/SCNT/GR	5 7/8	Liner 5"	2515-2922	WireLine	10.Jul.2014	Logged By WSI
ST1	VSP	5 7/8	Liner 5"	760-2880	WireLine	10.Jul.2014	Logged By WSI
ST1	SAIT/STGC(GR)	4 1/8	O.H	2925-3051	WireLine(TLC)	11.Aug.2014	Logged By WSI
ST1	Perforation by 4 1/2" HSD(5SPF,72 deg phasing, Ultra Jet HMX) as Three 9m Runs	8 1/2	Liner 7"	2581-2590 2572-2581 2563-2572	WireLine	8.Nov.2014	Logged By WSI

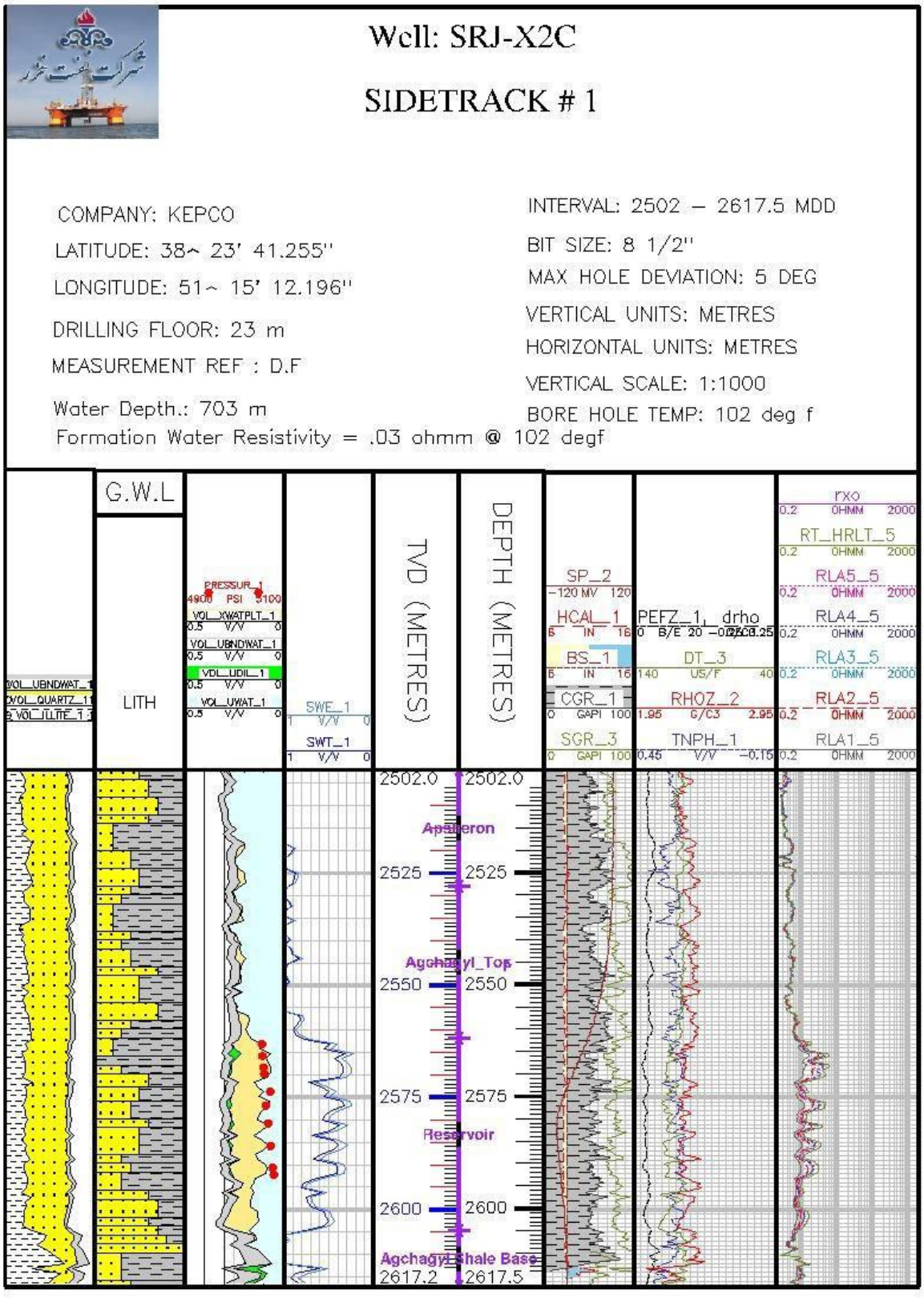


Fig 9: Petophysical results (Pore Volume & lithology Plot)

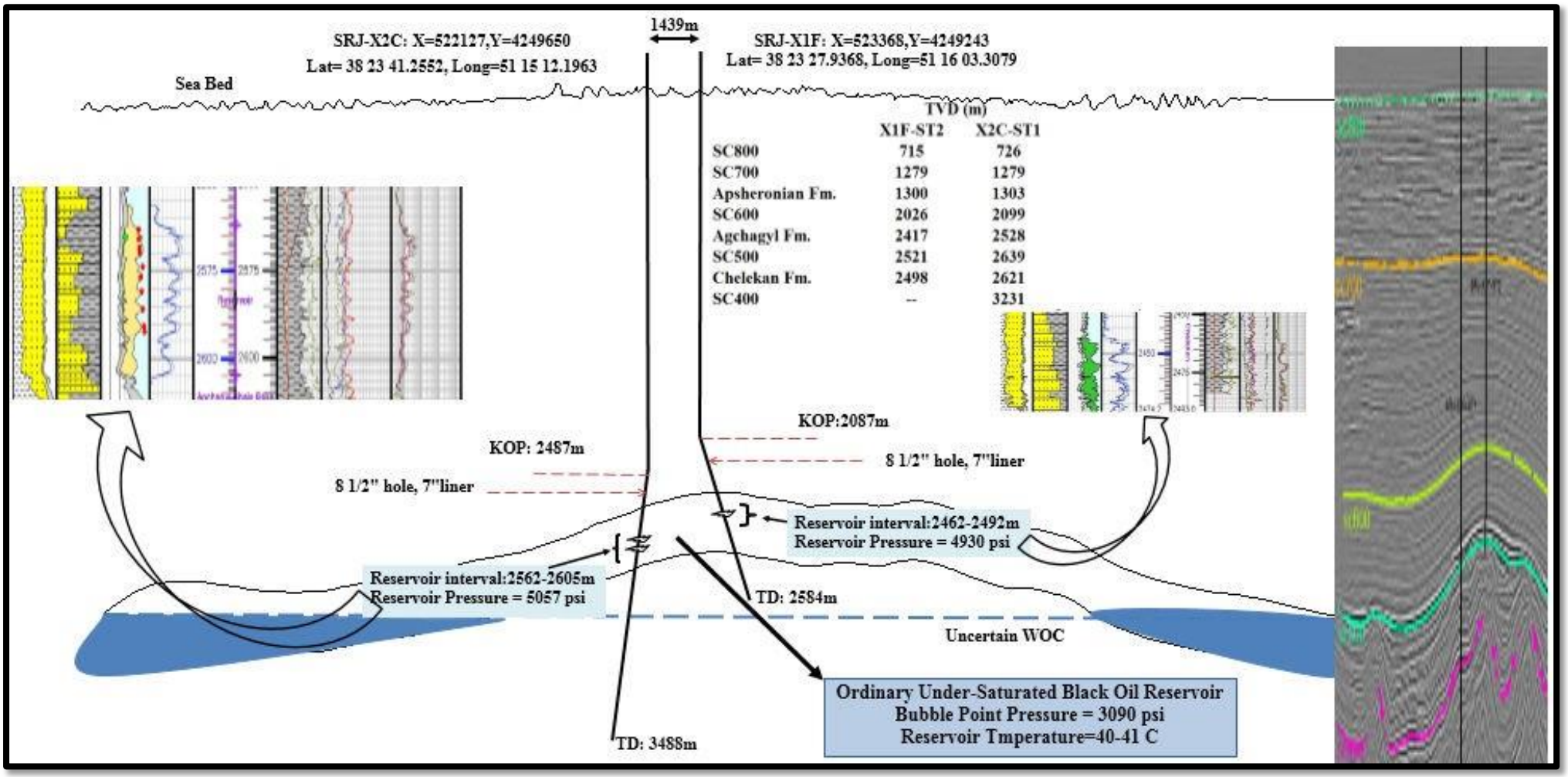


Fig 10: Schematic of reservoir model

Minimum Scope of Work

1- G & G Studies if necessary
2- Drilling at least one delineation well

For any further queries please contact us:
Email: ceo@casetra.com