4G INTEGRATED EXPLORATION

4G , BEYOND SUCCESS RATE

ACCURATE, EFFICIENT, ECONOMIC, ENVIORNMENTAL-FRIENDLY

Trap Hydrocarbon Detection – Lithologic Trap, Junggar Basin, China

Survey Summary

- Lithologic Trap Exploration in Junggar Basin, China
- Total coverage of 131.5km²
- Sample spacing- 330 to 330 m regular grid
- Correctly predicted the drilling result of 3 wells drilled during survey
- One commercial oil well in a new oil bearing stratum drilled as result of 4G integrated survey

Introduction

- Located in a monocline close to the oil generating depression
- Primary reservoir is middle Jurassic Toutunhe Group channel sandstone
- Depth over 3,000 meters
- Two exploration wells (A2 and A5) gained commercial discoveries. In a distance less than 2 km, two appraisal wells (A021 and A051) produced water. It indicates complex oil-gas contact

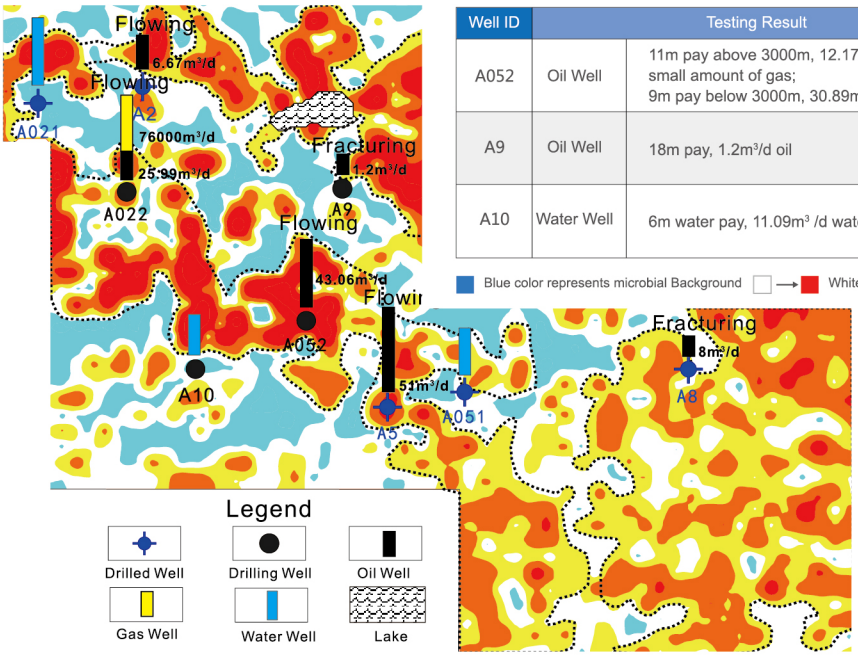
Survey Objectives

- Apply geomicrobial hydrocarbon detection method to identify hydrocarbon accumulation zones in targeted area. Analyze the hydrocarbon bearing potential and reservoir distribution of the lithologic traps in the study area
- Apply geochemical hydrocarbon detection method to analyze the reservoir geochemical property in the study area

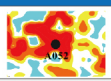
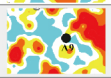
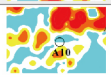
Survey Result

1 Microbial anomalies delineated the areal extent of the hydrocarbon accumulation zones, which matched well with drilling results.

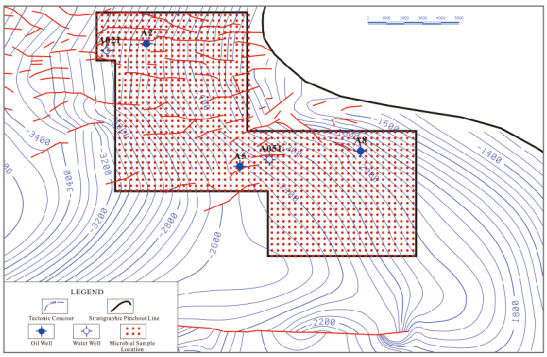
- Geomicrobial hydrocarbon detection result identified 3 hydrocarbon accumulation zones.
- Geomicrobial hydrocarbon detection result matched well with 5 known wells' drilling results (A5, A051, A2, A021, and A8).
- Accurately identified the drilling results of 3 wells drilled during survey (A052, A9, A10).



▲ Microbial Anomaly Distribution Map

Well ID	Testing Result		Characteristics of MV Distribution	The Degree of Agreement
A052	Oil Well	11m pay above 3000m, 12.17m³/d oil and small amount of gas; 9m pay below 3000m, 30.89m³/d oil		High
A9	Oil Well	18m pay, 1.2m³/d oil		Fair
A10	Water Well	6m water pay, 11.09m³ /d water		High

Blue color represents microbial Background → White to red color represent low, medium, high to super high microbial anomaly



▲ Survey Design Map

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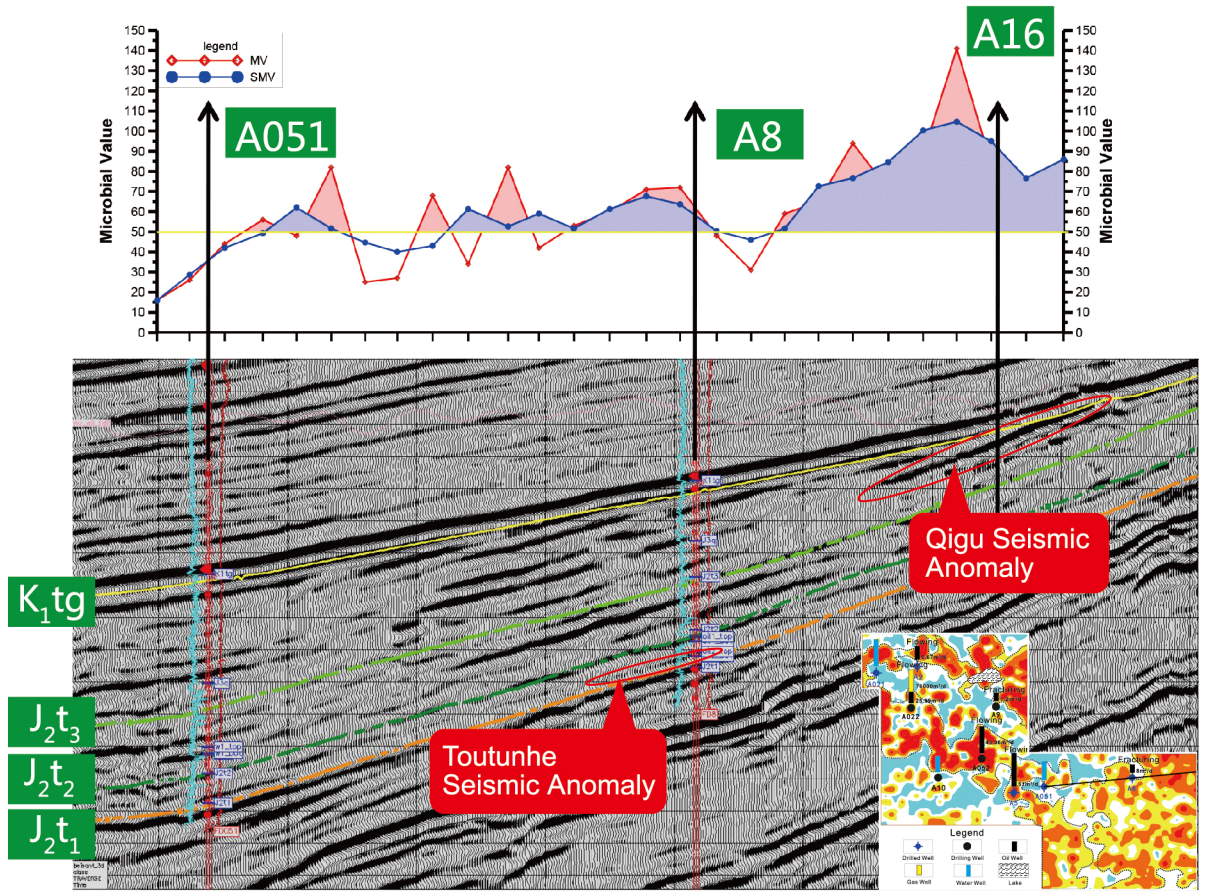
Survey Result

2 4G integrated research identified new hydrocarbon bearing stratum

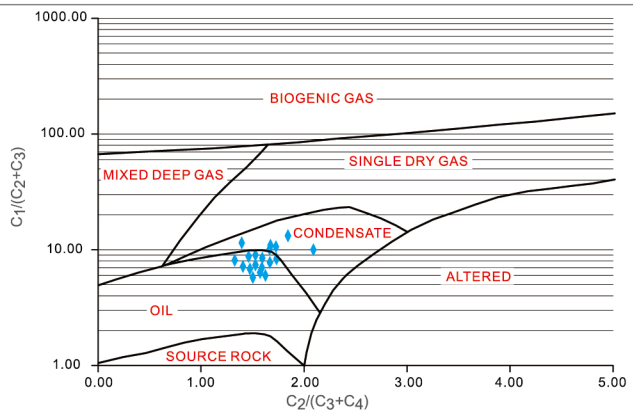
- New hydrocarbon bearing trap was identified in Qigu formation outside of the main targeted strata based on geomicrobial hydrocarbon detection and seismic data analysis. Well A16 was suggested to be drilled to Qigu formation.
- Well A16 discovered 17 oil pay at Qigu formation, and produced oil of 20m³/d with 3.5mm nozzle.



▲ Overlaying map of microbial anomaly line plot and seismic section

3 Geochemical hydrocarbon detection method accurately predicted reservoir property

- Geochemical hydrocarbon detection result indicated the reservoir in the study area is primarily of oil with some condensate. This understanding was later proved to be correct by drilling result.



▲ Hydrocarbon composite analysis and reservoir property evaluation plot