A Report on Expert Visits of China PPM Case Study

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Topics for Expert Visit

1. Play and prospect resources assessment and economic evaluation on tight gas sandstone.
2. Methods on natural fracture prediction and geologic risk analysis on (fractured) tight gas reservoirs.
3. Prediction of subtle traps and resources assessment on subtle traps, including deep basin gas, lithologic trap, different composite traps.
4. Production techniques on multi-pay zone gas accumulations, such as the technique that one well produces gas from several pay zones separately at the same time.

5. Artificial fracturing techniques on very tight gas sandstone. (porosity 3-8%, permeability <0.01md).
Dr. BEN E. LAW

He is 65 years old. More than twenty-five years of research on unconventional gas systems has led to national and international recognition as an expert in basin-centered gas and coalbed methane systems.

EDUCATION
San Diego State University, San Diego, California
B.Sc., Geology, 1967
San Diego State University, San Diego, California
M.Sc., Geology, 1969
All Russian Petroleum Research Exploration Institute (VNIGRI), St. Petersburg, Russia,
Honorary Doctor of Science Degree, 1997

EXPERTISE
- Basin-centered gas system analyses
- Coalbed methane system analyses
- Prospect generation
- Regional/local thermal maturity evaluation
- Reservoir pressure analyses
- Gas resource assessments of basin-centered and coalbed methane accumulations
- Classes on basin-centered gas systems
- Geologic field work
Mr. CYRUS ESPAHANIAN

He has over 13 years experience identifying underdeveloped gas fields in the Rocky Mountain region that can profitably be acquired and developed. As both an engineer and manager, he was a key leader in Snyder Oil’s successful acquisition and development programs at Jonah and Wamsutter. His key strengths are fracture stimulation and completion optimization, pay identification, property acquisitions, and leadership of multi-discipline technical teams.

The 1st Expert Visit

- March 15-19th, 2004
- Mr. CYRUS ESPAHANIAN
- Stimulation and completion
- Participants: 16, most are engineers
March 15th, 2004: field trip to Xinchang Gas Field

- Visited well CL562 in Luojiang prospect; observed the cores of Xu2,4 Formation, lower Triassic; mud logs of this drilling well
- Visited CX 134 station— the biggest gas gathering and distribution station of Southwest Petroleum Company, SINOPEC.
- Observed the cores of Penglaizhen (upper Jurassic) and Shaximiao Formation (middle Jurassic) in the core depot of Xinchang gas field
Mr. Lin Hui, the deputy chief engineer of Downhole Operation Branch, introduced the current situation of exploration and development on Xujiahe Formation.

1. **Summary of exploration and development**
2. **Geological features of gas reservoir engineering**
3. **Current situation of drilling and completion technology**
4. **Current situation of reservoir stimulation**

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Mr. Esphahanian’s presentation topics

- Resource assessment on Jonah gas field
- Case study on shear fault in Wyoming, USA
- Reservoir stimulation in Dfit area
- The effect of proppant on the conductivity of proppant supported fractures
- Evaluation of fracturing from the operation design, restoring testing and production analysis
- Details of fracturing operation on multiple pay zone gas well
7. The property and distribution of permeability, capillary force and relative permeability are very important to the evaluation, harm analysis and reservoir stimulation of tight gas reservoir.

8. Operation curve analysis for multiple tight sands of Mamm Creek gas field in Piceance basin, Colorado.

9. The current situation and development trend for tight sand gas reservoir.

10. Production evaluation after reservoir stimulation in Jonah gas field

Discussion topics

(1) The current status of well completion techniques in high temperature and high pressure gas wells
(2) Development obstacles in sour gas reservoir
(3) The main concerns of the fracturing design in natural fractured gas reservoir
(4) How to control the fracture height on the condition of weak barrier
(5) How to decrease the pressure during fracturing operation
(6) How to optimize perforation procedures in tight gas reservoir
(7) The main concerns of fracturing operation in gas-bearing horizon
(8) The major problems of reservoir stimulation in horizontal wells.

The 2st Expert Visit

- April 19-23th, 2004, last day in Beijing
- Dr. Ben E. Law
- Basin-centered gas system
- Participants: 19, most are geologists