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China Oil and Gas Exploration & Development Current Situation and Trend

In recent years, China's oil and gas exploration and production stepped into fast development track. Since the second half of 2014, the international oil prices plummet, oil and gas industry enters into the trough of booming cycle, China's economy faces downward pressure, and upstream investment reduced sharply, but the inertia of reserves growth peakkeepsthe oil and gas exploration both remain growing. In the past two years, nearly 80 important oil and gas discoveries and exploration breakthroughs were obtained. Unconventional oil and gas exploration progress was compelling. The proven reserves of shale oil and tight oil had reached hundreds of millions tons, and the proven geological reserves of shale gas was more than 500 billion cubic meters. Oil and gas production maintained a stable growth, while natural gas production growth slowed significantly. Shale gas production accumulated to more than 6 billion cubic meters. In the next few years, if oil and gas prices continue to slump, China's oil and gas exploration and production will be severely affected.

1. China oil and gas exploration status

(1) The change of the oil and gas reserves

In recent years, China's oil and gas reserves maintained a well-performed growth momentum. By the end of 2014, the number of proven oil and gas fields reached 955. 14 new oilfields were found in 2014, and new proven technical recoverable oil reserves were 188 million tons with crude oil replacement rate of 89%. In 2014, new proven natural gas geological reserves were 940 billion cubic meters, 53% up on the year earlier. In 2015, China oil and gas exploration kept develop stably, with continuous new oil and gas discoveries. Proven new oil and gas geological reserves are estimated to keep the levels of 1 billion tons and nearly one trillion cubic meters respectively (including shale gas).

(2) The key findings of oil and gas exploration

In the past two years, China's oil and gas exploration kept growing rapidly, and has made a number of important oil and gas findings. Hong Tai structure low saturated hydrocarbon reservoirs, the San Tang Lake volcanic rock reservoirs, the bedrock reservoirs of Altyn piedmont depression, and metamorphic reservoirs in Gaoyou sag all made breakthrough. Kuqa deep natural gas, Gaoshiti - Moxi structure's Sinian - Cambrian reservoirs, Leikoupo formations of the Triassic and Permian in Middle Sichuan Basin and the northwestern margin of Junggar basin

exploration also obtained a number of important findings. With the offshore exploration technology and theory increasingly matured, the new findings were obtained in offshore exploration. Lingshui 17-2 was the first big discovery in China deep-water self-exploration, and Pearl River Mouth basin also achieved a medium oil finding. Ordos, Tarim, Sichuan basin, Bohai Bay, and the south China sea become the key area of oil and gas reserves increase in the future.

(3) The characteristics of China oil and gas exploration

Oil and gas exploration difficulty is increasing.With the advancement in China oil and gas exploration and production, secluded and complex oil and gas reservoirs became the main objects of exploration, and areas with complex surface and geological conditions became the key prospecting target zone. The remaining conventional oil and gas resources possess poorer quality, with the proportion of low quality resources such as low permeability, large buried depth, deep water oil and gas, heavy oil, and high sulfur gas etc. increased year by year.

Get new breakthroughs in deep water.With onshore oil and gas exploration difficulty increasing, the deepwater oil and gas exploration and development became the new direction. China's deepwater oilfield is still in the early exploration stage.

Unconventional oil and gas resources became an important reserves increasing basis.Tight oil exploration has won a number of important discoveries, and is ready to form reserves with scale and be developed effectively. Petrochina discovered the first hundreds of million tons tight oil field— Xin Anbian large field in Shanbei Jiyuan.

Important breakthroughs were made in shale gas exploration. In recent two years, China's shale gas proven geological reserves increased rapidly, and has already accumulated to more than 500 billion cubic meters by far. Four shale gas production areas, Fuling, Changning, Weiyuan and Yanchang have been formed, with total annual production capacity exceeding 6 billion cubic meters.

Reexploration the old oil well has become an important way to tap the potential and reduce cost. In 2015, many production areas began to reexplore old wells and renew old data. This can not only save the cost effectively, but also gain new discoveries in old marginal constantly.

Xinjiang released upstream pilot. The Ministry of Land and Resources opened tender for six oil and gas exploration blocks in Xinjiang. This is the first step of changing the application progress from "apply first" to "competitive transfer".The tender has made three breakthroughs, First it broke the boundaries of conventional and unconventional resources for the first time. Second it broke the limits of enterprise qualification. Third it broke the limit of bidding only in the stage of exploration. This tender will bring far-reaching influence to domestic oil and gas exploration.

2.China oil and gas development and production

(1)The oil and gas production continues to grow, while natural gas production growth slows down

China oil and gas production keeps a small growth in 2015, in which crude oil output is 214 million tons, up 2% from a year earlier; gas output is 131.8 billion cubic meters, up 3.5% from a year earlier. Gas production growth slowed down significantly.

(2) China's oil and gas development characteristics

Oil prices and cost pressures become significant challenges. The drop of International oil prices lowered the gas price at the same time, which seriously weakened the profitability of oil and gas exploitation enterprises, and severely impacted the high cost unconventional and offshore oil production. Some companies started to report loss.

Old oilfield stable yield gets harder. A group of Domestic old oilfields now are facing with production bottlenecks. Some old oilfields stable yield has been more and more difficult due to the reducing resources and increasing exploitation difficulty. The traditional development mode of old oilfields which rely on workload and investment is unsustainable. It now calls for adoption of new ideas and technology to further improve oil recovery and consolidate the foundation of stable yield.

Technology progress supports newoilfields production and special reservoir development.

Polymer flooding of heavy oil technique improves the reserves producing ability. The innovation and application of development technologies such as reservoir prediction, seam body three-dimensional sculpture and comprehensive evaluation driven new oil fields production increasing.

Unconventional oil and gas development gets breakthrough, having the ability of large-scale development for commercial. China has abundant unconventional oil and gas resources. Tight oil and gas has become the focus of unconventional oil and gas development. And tight oil already has the ability for large-scale development, shale gas and coal-bed methane has stepped into mass production stage.

Domestic three major oil companies reduced upstream investment, and exploration workload declined.

At the lower oil prices, oil companies generally cut investment in response to the upstream investment risk, and maintain necessary level of return on investment. In 2015, China's three major oil companies' exploration and development investment has plunged over 30% than 2014. The number of exploration wells and development wells, and the total drilling

footage all declined dramatically, but exploration well success rates till kept a relatively high level of 45%.

3. China's oil and gas exploration and development outlook

(1) The giant basins have high pressure in reserves and production increasing

With the deepening of the oil and gas exploration and development in China, the proportion of poor quality and hard-to-develop resources in the remaining oil and gas resources is increasing. In general, the exploration difficulty increased gradually, secluded and complex reservoirs have become the main objects of exploration and areas with complex surface and geological conditions became the key prospecting target zone. The domestic major oil companies reserves replacement rate shows the trend of decline.

(2) Sea area reveals huge potential.

The Ministry of Land and Resources released the latest evaluation results of national oil and gas resources developments, and shows that sea area is the most significant oil and gas resources growth areas. In the future, China offshore oil and gas reserves and production will keep high growth rate, deep water will become an important growth point in exploration and development. Some technology adapting to offshore exploration and development will continue to make great progress. The South China Sea resources potential is tremendous, and will become the key exploration and development field in the future.

(3) Unconventional oil and gas become an important replacement resource for increasing reserves and production in the future.

China has abundant unconventional oil and gas resources, including tight oil and gas, shale oil and gas, coal-bed methane, oil shale, heavy oil, gas hydrate etc., with the recoverable resources about three times of conventional oil and gas. The tight oil and gas, shale gas, and coal-bed methane stepped into the stage of large-scale exploration and industrial production.

(4) The stripper wells management and efficiency-raising may become the new growth point

At present, China newly increased oil and gas reserves are mostly “low grade resources” , while the old oil fields are in “high recovery degree, high water cut” stage. These will lead to the growth rate of stripper wells maintaining in a relatively high level. Stabilizing and improving single well production calls for more effective measures such as reducing development costs, improving development efficiency and the effective of reserves producing, as well as drive technology and management innovation.

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