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Progress and achievements of shale gas development in CNPC

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Over the past 5 years, CNPC has made great strides in shale testing and development in the Sichuan Basin. The Sichuan Basin is a major target for shale gas exploration currently in China because of its rich gas stored on many dark sides with a large series of bed sheets. The Sishuan Basin sets the record for the first discovery of natural gas and the discovery of shale gas in China. To date, the process of shale gas exploration and development at Wufeng-Longmaxi on the basis has been divided into three phases, e.g. Testing and selection, playing the display and testing of the product, and exploitation at the professional level. Shale Gas in China has seen significant progressive progress due to the progress of the marine resource development approach, becoming the largest coal-fired gas producer in the USA. Benefits from the continuation of the forward-looking approach, a comprehensive series of shale resource development projects of less than 3500 m have been developed for road and field research studies, including five key approaches to biodiversity analysis, oil and speed installation, hydraulic multistage leakage, , and the efficiency of the development sectors. At present, shale resources in China have never been fully exploited without marine resources (<3500 m). It could be a future development practice to promote the full restoration of shale air (<3500 m). In addition, two-thirds of the undisclosed resources are retained in construction (> 3500 m). With the additional process of initiating a marine shale development approach, shale gas is expected to reach a single type of gas field that offers the highest annual production rate in the near future.

Both certified warehouses and production levels have grown rapidly. This is further achieved through the development of technology and management. a) Technology of Geology and geophysics ensures the reliability of resource testing and production purpose. It is characterized by the acquisition, processing and interpretation of geophysical data to find the correlation of stratigraphy, the distribution of fine spots, the key to geology & geomechanics factor. b) Excavation and completion technology provides early repayment. CNPC has looked at the best practice of integrated technology (including fast food piercing, volume detection treatment), getting the first production rate (over 6.4 × 104 m3 / d well on the Changing and Weiyuan line).

c) Reservoir technology ensures long-lasting production. Proper gas separation is established to make integrated management of multiple production resources; production performance tests are produced to measure OGIP and EUR (standard OGIP per source is 1 × 108m3, EUR is 7.6 × 107m3 / d); and efficiency of paracturing optimization is enhanced to maximize productivity and benefits. By conducting this driving research since 2012, CNPC has developed a comprehensive plan for the development of buried metals under the 3500m, and gained great confidence in achieving a product from shale. While CNPC made significant strides in commercial

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production, low fuel prices and high investment are expected to be growing challenges in the future of shale gas. CNPC will see less expensive production at lower fuel prices with continued development and innovation.

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