



# China Geology

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## News and Highlights

### 10910 m! China's first Ultra-Deep Well completed

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On February 20, 2025, China National Petroleum Corporation announced that China's first ultra-deep scientific exploration well—Shenditake 1 Well—successfully reached a depth of 10910 m underground (Fig. 1). Deep Earth Towerke 1 Well is located in the heart of the Taklamakan Desert in the Xinjiang Uyghur Autonomous Region, within the territory of Shaya County. It has become the deepest vertical well in Asia and the second deepest in the world. The well has successively set five major engineering records: The deepest global tailpipe cementing, the deepest global cable imaging logging, the fastest global onshore drilling to exceed 10000 m, the deepest direct well drilling in Asia, and the deepest

onshore coring in Asia. This marks another major breakthrough for China in the field of “Deep Earth” exploration, following its achievements in “Deep Space” and “Deep Sea.”

Shenditake 1 Well began drilling on May 30, 2023. This well has successfully retrieved China's first core sample from below 10000 m. It is also the first time in the world that hydrocarbon indications have been discovered in onshore drilling at depths exceeding 10000 m, enriching and perfecting the geological understanding of hydrocarbons in ultra-deep layers.

It took 279 days for Shenditake 1 Well to reach 10000 m



**Fig. 1.** Shenditake 1 Well.

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from the surface. Drilling the final nearly 1 km below 10000 m took more than 300 days. During the drilling process, the well overcame challenges such as excessive load, wellbore instability, tool failure, and formation wellbore leakage. Especially below 10000 m, the drill pipe became as flexible as a noodle, conventional drilling tools and sensors failed, the formation hardness was extremely high, and the downhole load reached up to 6650 t.

To tackle these world-class challenges and extreme difficulties, China National Petroleum Corporation, in collaboration with tens of thousands of personnel from enterprises, research institutions, and universities both within and outside the group, conducted intensive research and development. They developed ten major technological innovations, including the world's first 12000 m automated drilling rig and geotechnical engineering integrated design technology. These efforts have formed an independent and controllable core technology system for ultra-deep drilling, promoting the iterative upgrade of China's series of key equipment, tools, and materials for deep earth drilling.

With the support of these “National Heavyweights”, China National Petroleum Corporation successfully managed multiple complex downhole situations and continuously

drilled through 12 different lithological and pressure formations, eventually reaching rocks formed over  $500 \times 10^6$  years ago. This has established China's leading position in the field of ultra-deep earth engineering technology.

The successful drilling of the 10000 m deep well signifies that China's key core equipment and technology for ultra-deep wells have withstood the test of extreme conditions in ultra-deep environments. It not only enriches China's engineering technology series in the field of drilling but also provides a solid equipment guarantee for challenging deep earth limits and developing ultra-deep oil and gas resources.

Based on geological samples and data such as core, cuttings, and logging while drilling, Chinese petroleum researchers have drawn the first 10000 m geological cross-section map in Asia. This provides first-hand physical data for deep earth scientific exploration and oil and gas exploration, and will strongly support research on major fundamental scientific issues such as the deep structure and material composition of the Earth, Earth's evolution, and climate change.

Source: China Daily, February 20, 2025.

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