News and Highlights

Two Super-Large Gold Deposits Have Been Discovered in Jiaodong Peninsula of China

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During 2015, gold prospecting in Laizhou City of Shandong Peninsula in China has achieved a major breakthrough. Deposits containing 470 and 389 tons of gold metal were discovered in the northern sea area of Sanshandao and the Shaling area, respectively. As a result, the gold prospective resources in the entire Jiaodong Peninsula have now exceeded 4000 tons, fully indicative of the super-large prospecting potential of the Jiaojia-type deposits.

**Gold deposit in the northern sea area of Sanshandao**

Gold ores in the Sanshandao metallogenic belt (Fig. 1) are of an altered rock type, which occur in fractured zones and are mainly hosted in the Mesozoic Linglong granites and Guojialing granites. The rock masses have undergone strong beresitization, phyllic alteration and potassic alteration, and the wall rock alteration shows obvious zonation on both sides of the orebodies. The ore minerals are dominated by pyrite (90%), with small amounts of galena, sphalerite and chalcopyrite; the gangue is composed mainly of quartz, sericite, calcite and feldspar. The ores mainly display disseminated and brecciated structures and veinlets. Four stages of mineralization are involved: (1) potassium alteration–pyritization stage; (2) gold–quartz–pyrite–arsenopyrite stage; (3) gold–quartz–polymetallic sulfide stage; and (4) quartz–carbonate stage.

It is generally considered that the gold ore-forming materials are mainly derived from a deep source. A large number of gold deposits, including the Cangshang, Xinli and Sanshandao deposits, have been discovered on land in succession, but no major prospecting breakthrough has been achieved in the extended sea area.

Since 2012, the Third Institute of Geology and Mineral Exploration in Shandong has conducted exploration in the sea area 26 km north of Laizhou City, with an exploration area of 17.91 km², and has completed a total of 76341.98 m of offshore drilling (66 drill holes), with a maximum

Fig. 1. Offshore construction scene of gold deposits in the northern sea area of Sanshandao (after the Third Institute of Geology and Mineral Exploration in Shandong, 2015).

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single-well drilling depth of 1973.46 m. It is now better understood that the gold orebodies of this region show segmented enrichment along structural belts, with an approximately equidistant distribution and a planar and vertical symmetric distribution, and show significant enrichment and expansion along the NE-pitching position, turning parts and gentle structural position. Known gold metal deposits amount to 470470 kg, with an average grade of 4.30 g/t. Observed intrinsically economic gold resources (332 class) amount to 220896 kg, at an average grade of 5.09 g/t; inferred intrinsically economic gold resources (333 class) total 249574 kg, at an average grade of 3.78 g/t. Low-grade gold metal totals 2543 kg, at an average grade of 1.57 g/t. In addition, there are 663258 kg of associated silver gold amounts at an average grade of 6.5 g/t, 23676 tons of lead metal amounts with an average grade of 0.450%, and 2377367 tons of available sulfur amounts at an average grade of 3.17%. This super-large gold deposit has a potential economic value of 120 billion yuan, and fills gaps of gold prospecting in sea areas of China.

**Shaling gold deposit**

The Shaling gold deposit (Fig. 2) occurs in the Jiaojia gold ore belt. Geographically, the Sanshandao gold ore belt, Jiaojia gold ore belt and Zhaoping gold ore belt comprise a large-scale NE-SW-trending and nearly equidistant S-type ore belt from west to east. In this vast ore belt, a great number of large and medium gold deposits are densely distributed, such as the Xincheng, Hedong, Hexi, Wangershan, Hongbu, Dongji and Matang deposits, and have proven gold reserves exceeding thousands of tons. In recent years, the Sixth Institute of Geology and Mineral Exploration in Shandong has discovered the Sizhan, Jiaojia and Zhuguolijia gold deposits in the deep area of the Jiaojia ore belt, suggesting a broad metallogenic prospect in the deep area of Jiaojia ore belt.

The Shaling gold deposit is controlled significantly by the Jiaojia faults, and shares a generally similar metallogenic setting, ore-forming conditions and mineralization types with the Sanshandao gold deposit. The most significant difference is that a “second-layer mineralization zone” exists in the deep area of the Jiaojia ore belt, with ladder-like, deeply extending orebodies. This detailed survey has a single-hole depth of 1105.79–2117.70 m, with dip angles of 77°–90° and an average drill hole depth of 1563.40 m. A total of 389 tons of gold metal amounts were discovered. Among these, (332+333) class gold ore amounts of industrial ores total 328677 kg, with an average grade of 3.41 g/t; (332+333) class gold ore amounts of low-grade ores total 60598 kg, with an average grade of 1.44 g/t; associated 333 class silver amount to 264394 kg, and associated 333 class sulfur amounts are 46982 t. This super-large deposit has a potential value of nearly 100 billion yuan, which confirms the existence of the “second-layer mineralization zone” in the lower part of the shallow Jiaojia gold belt and greatly broadens the range of gold ore prospecting.

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Fig. 2. Construction scene of the Shaling gold deposit (after the Sixth Institute of Geology and Mineral Exploration in Shandong, 2015).