

Case study – Coal Mine Methane Extraction Technology for Connection of Multi-lateral Horizontal Well and Underground Boreholes

Initial condition:

The 24307 working face of Shaqu Coal Mine of Huajin Coking Coal Co., Ltd. is planned to be excavated in 2015, with the length of 1500m and the width of 220m. The average thickness of coal seam is 4m, the gas content in coal seam is 11.5m³/t, the permeability of coal seam is 1.78-3.78m²/MPa².d, the attenuation coefficient of gas flow quantity from boreholes is 0.024-0.028 d⁻¹, the firmness coefficient of coal is 0.5, and the coal is soft coal. The burial depth of target coal seam is 330m, and the dip angle is 3-7°.

Gas treatment:

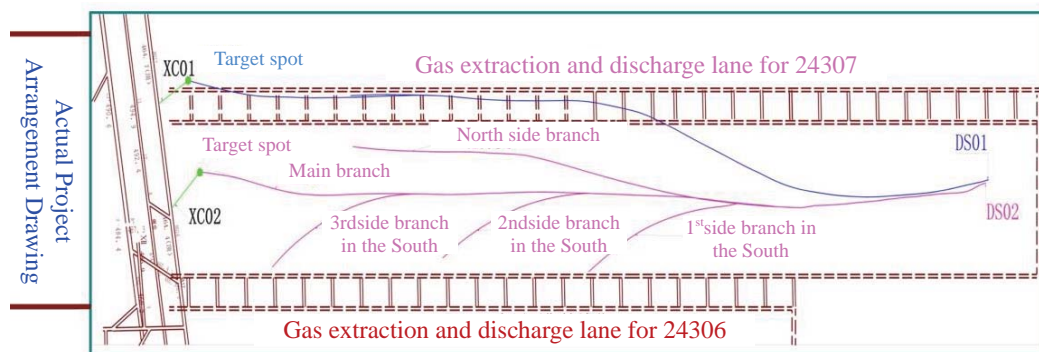
The permeability of coal seam is weak, the extraction of gas is quite difficult, which makes it hard to realize the target gas extraction quantity and pre-drainage in advance, the connection of working faces in the mine is tight, the gas concentration would be prone to exceed the limit during the coal extraction procedure, and consequently bring huge security risks in the course of production.

Solution:

Considering the construction of underground roadway in Shaqu Coal Mine has not been completed, the conditions for underground extraction were not satisfied, it is proposed a surface extraction method which connects the horizontal well and vertical well based on coalbed methane extraction technology. All actions for this method shall be completed on the ground, horizontal well and vertical well will be constructed in the planned working face based on the working face arrangement plan to realize the pre-drainage of gas in the working face.

The project consists of projects on the ground and underground. There are 2 main

branch wells DS01 and DS02 and 4 side branch wells constructed in multi-lateral horizontal well. Main branch well DS01 locates between the gas extraction lane and roadway, the length of horizontal section is 1027m. Main branch well DS02 locates in the central axis of working face, the length of horizontal part in the coal seam is 1056m, The four side branch wells are distributed in the two sides of DS02, the lengths of which are 272m, 272m, 273m, 797m separately, the lengths of two gas drill holes XC01, CX02 constructed under the wells and connecting with the horizontal main well on the ground are 53m, 54m separately.



The extraction of horizontal well in 24307 working face has lasted for 672 days as of Oct. 19th, 2014, the accumulated extraction quantity is 10,130,000m³, the daily average gas output is 15069m³, the gas concentration is above 90%, the gas output is desirable, and this horizontal well has become the major gas supply for gas power station on Shaqu Coal Mine.

