

# Research on the Purpose and Significance of Regional Water Resources Assessment and Demonstration in Coal Mine

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## Abstract

The development and utilization of water resources in the mining area and the hydrogeological conditions of coal mines have an important impact on the determination of the level and scope of water resources demonstration, the rationality analysis of water abstraction, the reliability and feasibility of water abstraction sources, and the analysis of the impact of water abstraction and withdrawal. The results can be used as the technical basis for construction projects to apply for water abstraction licenses.

## Keywords

Coal Mine; Water Resources Demonstration; Water Withdrawal; Assessment.

## 1. Introduction

The Party Central Committee and the State Council attach great importance to the protection of cultivated land and the improvement of soil fertility, and unswervingly do a good job in the construction of high-standard farmland, and improve the construction standard and quality. General Secretary Xi Jinping pointed out: "It is necessary to build high-standard farmland to truly achieve drought and flood protection, high yield and stable yield." In 2018, the "Strategic Plan for Rural Revitalization (2018-2022)" proposed to promote the construction of high-standard farmland on a large scale to ensure that it will be completed by 2022. 1 billion mu of high-standard farmland, and the quality of cultivated land has been improved by more than 0.5 grades (different) on average; No.) pointed out that the construction of high-standard farmland is a key measure to consolidate and improve grain production capacity and ensure national food security. With increasing grain production capacity as the primary goal, we should focus on arable land protection, soil fertility improvement and efficient water-saving irrigation, and vigorously promote high Standard farmland construction, and the newly added cultivated land indicators for high-standard farmland construction are included in the supplementary farmland index library, which can be used for cross-regional farmland occupation and supplement balance adjustment when it meets the demand for the balance of farmland occupation and compensation in the region; "The plan and the outline of the long-term goals for 2035 propose that 1.075 billion mu of high-standard farmland will be built; the "National High-standard Farmland Construction Plan (2021-2030)" will build 1.2 billion mu of high-standard farmland by 2030, and new high-standard farmland will be built. The average production capacity per mu of farmland will be increased by about 100 kilograms; in 2021, the No. 1 document of the Central Committee proposes that 100 million mu of farmland will be built in 2021 to ensure high-yield, stable yield and high-standard farmland.

In order to better implement the decision-making and deployment of the Party Central Committee and the State Council on strengthening the construction of high-standard farmland, in 2020, the Shaanxi Provincial People's Government issued the "Notice on Printing and Distributing the Implementation Plan for Accelerating the Construction of High-standard Farmland", it is proposed to vigorously promote the construction of high-standard farmland to

lay a solid foundation for ensuring food security in the province. By 2022, the province will build 6 million mu of high-standard farmland with concentrated contiguous, drought-flood-guarantee, high-efficiency water-saving, stable and high-yield, and ecologically friendly; The Guiding Opinions on Strengthening the Construction of Newly-Added Cultivated Land and Increased Production Capacity of High-standard Farmland”, which takes the newly-added cultivated land and newly-added production capacity of high-standard farmland as the balance of occupation and compensation to supplement the cultivated land index adjustment. The proceeds are used for high-standard farmland construction, further improving the high-standard farmland construction standards, and forming a virtuous circle of high-standard farmland construction and economic and social development.

## 2. Project Overview

The mining area is located about 30Km west of Fugu County, with geographic coordinates of 110°39'35"~110°44'43" east longitude and 38°57'22"~39°02'42" north latitude. The transportation conditions in the mining area are convenient. Tower) A highway passes east-west in Huangyangcheng Valley in the north of the coal mine. The coal mine is about 6km away from Xinchengchuan Container Station of Shenshuo Railway, about 7km away from Xinmin Station of Fudian First-class Highway, and about 3km in straight distance. The coal mine is about 15km away from Shenmu County in the southwest, 85km away from Fugu County in the east, 75km away from Xinjie Town in Inner Mongolia in the northwest, and 150km away from Dongsheng City. The landform in the area is the loess Liangmao area dominated by erosion. The ravines are vertical and horizontal, the terrain is broken, the surface is mostly covered by loess and laterite, the mountain beams are mostly flat, and the valleys are eroded to form corresponding mountain valleys. The Yan'an Formation strata are exposed at the bottom of the gullies. The cross-sections of the small gullies are mostly "V"-shaped, while the larger ones are mostly "U"-shaped. A typical loess Liangmao area. The land use type in the mine field is mainly barren grassland, there is no basic farmland, and the land use agreement has been signed with the local competent authority.

## 3. Overview of Mining History and Current Situation of Mining Deposits

### 3.1. Well Field Range

The coal mine is located in the southeastern edge of the Xinmin census area in the Shenfu Xinmin mining area of the Jurassic coalfield in northern Shaanxi. The west is bordered by the Feimaliang coal mine integration area, the Xintian coal mine integration area and the Xichagou coal mine integration area; the north is respectively connected with coal mine integration area, Wanda coal mine integration area, Da Gaoliang coal mine and Zhongda coal mine border; the northeast borders the Z38 integration area; the south and southeast belong to the Xinmin census area. There are currently two mining rights settings in the coal mine, namely "Fuyu Coal Mine (Redrawn Scope) Integration Zone, Xinmin Town, Fugu County" and "Z38 Integration Zone". The Z38 integration zone is delineated by five inflection points. It is an irregular polygon, with a width of about 2.70 km from east to west, a length of about 5.60 km from north to south, and an area of 13.2821km<sup>2</sup>. The integration area of Fuyu Coal Mine (redrawn range) in Xinmin Town, Fugu County is delineated by 18 inflection points, with a registered area of 37.0458Km<sup>2</sup>.

### 3.2. Industrial Site

The mine industrial site is located on the terrace of Zhangshipan Valley, adjacent to Liu Yayao Village. The land use type is wasteland. The general layout of the mine industrial site can be divided into main production area, auxiliary production area and administrative welfare area.

Use the roads in the site to organically connect the various sub-zones and main facilities, and meet the fire protection requirements.

Main production area: It is arranged on the east side of the industrial site, mainly including the main inclined shaft, driving machine room, raw coal bunker, product bunker, coal sample room and other structures. The raw coal comes out of the main inclined shaft through the raw coal transport trestle and enters the raw coal bunker, then is screened and crushed for classification, and finally loaded into the product bunker, weighed by the weighbridge, and then shipped out. The coal sample room is arranged next to the weighbridge room.

### 3.3. Mineable Coal Seam

There are five mineable coal seams in the mine field, which are 3<sup>-1</sup>, 4<sup>-3</sup>, 4<sup>-4</sup>, 5<sup>-1</sup> and 5<sup>-2</sup> coal seams from top to bottom. Most of the 3-1 coal seam has spontaneously ignited, and it is only distributed in the northwest part. The thickness of the coal seam is between 4.72 and 5.81m, and the average thickness is 5.24m; Part 4<sup>-3</sup> can be mined in the whole area, the thickness of the coal seam is 0.80~1.04m, the average is 0.94m, and the distance with the underlying No. 4<sup>-4</sup> coal seam is 9.20~20.65m, the average is 16m; the No. 4<sup>-4</sup> coal seam is only in the northwest of the integration area. And the northeastern part is mineable, the mineable thickness of the coal seam is 0.98-1.45m, the average thickness is 1.22m, and the distance between the underlying No. 5<sup>-1</sup> coal seam is 9.93~15.27m, and the average is 12m; 5<sup>-1</sup> is the main mineable coal seam in this area. The thickness of the coal seam is 1.37~4.19m, the general thickness is 2.70m, and the distance between the coal seam and the 5<sup>-2</sup> coal seam below is 11.01~19.28m, with an average of 14.47m; the 5<sup>-2</sup> coal seam is partially recoverable in the whole area, and the thickness of the coal seam is 0.95~1.48m, with an average of 1.19m.

## 4. Development and Utilization of Mineral Deposits

### 4.1. Determination of Wellbore Plan

The coal seam in the mine field is shallow, and the 5<sup>-1</sup> coal seam of the industrial site is buried at a depth of about 20m. The hydrogeological conditions are simple, so the design adopts the inclined well development method. A belt conveyor is laid in the shaft of the main inclined shaft, which is responsible for the coal lifting task of the whole mine; the auxiliary inclined shaft adopts the trackless rubber-tyred vehicle to undertake the auxiliary transportation task of the whole mine; the return air inclined shaft is responsible for the whole mine return air task.

### 4.2. Wellfield Development Plan

The main, auxiliary and return air shafts are located in the east-west direction on the west side of Zhangshipangou. Coal gates of about 450m are arranged after the wellbore falls to the bottom. A group of three central alleys are arranged on both sides of the coal gates along the 5<sup>-1</sup> coal seam for development. In the later period, another inlet and return air shafts were set up near Shaqu Village to form a partitioned ventilation system, and the return air shaft was no longer responsible for the ventilation task, but only served as a safety exit.

According to the occurrence conditions of the coal seam in this mine field, the whole mine field is single-level mining, the horizontal roadway is set in the 5<sup>-1</sup> coal seam, and the 5<sup>-1</sup> coal and 5<sup>-2</sup> coal are intensively mined. Set up a group of panel lanes in the 4<sup>-3</sup> coal seam to mine 3<sup>-1</sup> coal, 4<sup>-3</sup>, and 4<sup>-4</sup> coal, pass through the panel coal hole, auxiliary transportation inclined lane and panel return air coal door and 5<sup>-1</sup> The main level of the coal seam is linked.

The whole mine field is divided into 5 panels, and the specific development plan is shown in Figure 1<sup>-4</sup>.

### 4.3. Horizontal Division

According to the coal seam spacing, thickness and reserves, the design divides the whole well field into a main level and an auxiliary level, the main level is set at 5<sup>-1</sup> coal, and the horizontal elevation is +1191.90m. The belt conveyor main road, the auxiliary transportation road and the return air road are arranged along the 5<sup>-1</sup> coal seam, and the 5<sup>-1</sup> coal and 5<sup>-2</sup> coal are mined in a concentrated manner. The auxiliary level is set at 4<sup>-3</sup> coal, and the horizontal elevation is +1193.00 m, 404 panel belt conveying roadway, auxiliary transportation roadway and return air roadway are arranged in 4<sup>-3</sup> coal seam, concentrated mining of 3<sup>-1</sup>, 4<sup>-3</sup>, 4<sup>-4</sup> coal in the north of the mine field. The 4<sup>-3</sup> coal seam panel roadway is connected with the 5<sup>-1</sup> coal seam main level through the panel slip coal hole, the auxiliary transportation inclined road and the panel return air coal door.

### 4.4. Mainly Develop the Layout of the Avenues

After the wellbore falls to the bottom, the coal gate of the belt conveyor, the auxiliary transport coal gate and the air return coal gate are arranged. A group of three main alleys are arranged along the 5<sup>-1</sup> coal seam on both sides of the coal gate parallel to the west boundary of the mine field, namely: the central belt conveyor is large. Alleys, auxiliary transportation alleys, and return air alleys. 5<sup>-1</sup> The lithology of the roof of the coal seam is dominated by medium-grained sandstone, followed by siltstone, and the floor is dominated by siltstone, with local fine-grained sandstone. 4<sup>-3</sup> The lithology of the coal seam roof is mainly siltstone, followed by silty mudstone and fine sandstone; the bottom floor is mainly mudstone, silty mudstone, siltstone and fine sandstone. Generally more stable, no kick drum, deformation phenomenon.

## 5. Purpose of Water Resources Demonstration

In order to implement the national water resources development and utilization policy, promote the optimal allocation and sustainable utilization of water resources, and ensure the reasonable water demand of construction projects, it is necessary to meet relevant national policies, comprehensive national and regional water resources planning, and water function zone management requirements. On this basis, the rationality, reliability and feasibility of the project's water intake, and the impact of water intake and withdrawal on the surrounding water resources and other water users are demonstrated. And from the perspective of sustainable utilization of water resources, balance of water supply and demand, environmental protection, engineering feasibility, etc., give scientific, objective and fair conclusions on the water intake of the project, so as to achieve rational development, economical use and effective protection of water resources. The purpose is to finally provide a technical basis for the application and approval of the water intake permit for the coal mine construction project in Fugu County, Shaanxi Province.

## References

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