

Reducing Environmental Pollution from Coal Mining

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Abstract. As the earth's environmental pollution problems are becoming more and more serious, the development of the world's countries relies on resources to a higher degree, resource extraction of the environment has also brought a lot of pollution problems, this paper is an in-depth study of coal mining on the environmental pollution of the various issues analyzed, to obtain effective and safe solutions to cope with the problem of pollution, the intention is to study the green and low-pollution mining and mining of the environment after the work of restoration and so on. This paper provides a comprehensive deployment plan for coal mining and the prevention and control technology to solve environmental pollution, summarizes the national policy, and pushes to reduce the pollution problem of coal mining to solve the problem. This paper systematically analyzes the impact of coal mining on the environment and proposes practical solutions. It has important theoretical value and practical significance and contributes wisdom and experience to achieving sustainable development goals.

Keywords: Coal; Pollution; Environment.

1. Introduction

Coal, as one of the major global energy sources, has long occupied a key position in industrial production and energy supply. However, the pollution and damage to the environment caused by its mining activities have increasingly aroused widespread concern. From the perspective of land resources, the coal gangue produced during the mining process piles up, not only encroaching on a large amount of land, which contains heavy metals and hazardous substances will also quietly seep into the soil, resulting in a sharp decline in soil fertility, hindering the growth of vegetation, and the land ecosystem suffered a serious injury [1].

In terms of water resources, mine drainage is like a “toxic stream”, carrying a large number of suspended solids, mercury, cadmium, lead and other heavy metals and acidic substances. If it is discharged without proper treatment, surface water, soil and groundwater will be spared, and the water ecosystem will be imbalanced, and the vitality of rivers and lakes will be gradually lost. Atmospheric pollution is also not to be underestimated [2]. The release of gas allows large amounts of methane, a potent greenhouse gas, to escape into the atmosphere, exacerbating the greenhouse effect. In addition, coal dust generated from all aspects of mining operations spreads unchecked, causing a sharp decline in air quality, which is not only hazardous to human health but also reduces the visibility of the atmosphere, affecting transportation and daily life.

It has become an important issue in the field of energy and environment to investigate the environmental pollution caused by coal mining and to find effective strategies to deal with it. In this study, a comprehensive and in-depth analysis will be carried out in order to provide a theoretical basis and practical reference for the sustainable development of the coal mining industry.

Many related scholars have carried out a lot of work on the environmental pollution of coal mining. Such as monitoring and assessment, pollution control technology research and development, scholars actively provide professional advice to policymakers and participate in the development of strict environmental standards and norms for coal mining.

This paper aims to solve this problem of environmental pollution from coal mining by analyzing the data mining technology, this paper to mine the specific pollution situation to analyze, and put forward the solution of the corresponding program recommendations and measures.

2. Current status

Minerals are natural resources of economic value extracted from the earth's crust and are usually categorized into metallic and non-metallic ores. Metallic minerals mainly include iron ore, copper ore, and bauxite, which are mainly used in industrial manufacturing and construction; while non-metallic minerals include coal, gypsum, and salt, which are widely used in energy, chemical and construction industries. Coal is an important fossil fuel, formed by plants through geological processes, and is mainly used for power generation and industrial production. According to the purpose of use, coal can usually be categorized into power coal and coking coal, of which power coal is used for power generation and heating, with high calorific value, and is the main fuel for the power industry; coking coal is used for smelting iron and steel and is heated to form coke, which has special physical and chemical properties [3].

In terms of the current status of coal mining globally and regionally, China is the world's largest coal producer and consumer, with an annual output of more than 3.5 billion tons; the United States has an annual output of about 700 million tons, mainly dominated by power coal; and Australia is a major exporter, with an annual output of about 400 million tons, mainly exported to China and India. In September, the raw coal output of the regulated industry amounted to 410 million tons, representing a year-on-year growth of 4.4%

In January-September, the raw coal output of the industry on a regular basis was 3.48 billion tons, up 0.6% year-on-year. Overall, the rigidity of coal production capacity has gradually become a consensus, and the subsequent increase in production mostly originated from the commissioning of new mines, which is expected to have limited space. Long-term, high-intensity production safety inspections are expected to continue, which will also affect the further release of incremental coal production capacity, the growth rate of raw coal production is expected to slow down significantly, and the production capacity ceiling may have already appeared.

The government asked to increase coal mining efforts to ensure the security of the energy supply. The State Council's State-owned Assets Supervision and Administration Commission held a meeting to urge centralized enterprises to increase coal mining and electric coal, natural gas purchasing efforts, to do a good job of the newly installed capacity and grid, and actively guide the user to cut peaks and fill valleys, to ensure that the peak of the winter to ensure the security of supply [4].

As the global demand for coal increases, the problem of over-exploitation is becoming more and more serious, which leads to a series of problems such as resource depletion and ecological degradation. Therefore, how to realize sustainable coal mining and utilization has become a key issue that needs to be solved urgently, and countries need to find a balance between securing energy supply protecting the ecological environment, and promoting the development of green energy in order to reduce the dependence on coal.

3. Environmental impacts of coal mining

Coal mining will penetrate nearly 1,000 meters into the ground, and in the process of mining, it will destroy the structure of the ground and cause deformation of the ground surface, resulting in the soil elevation and slope being affected. In addition, in the flat area, the soil ecological environment will be damaged due to the collapse of the ground which is easily caused by the hollowing out of the strata. Secondly, in part of the hollow area is very easy to subsidence zone, such as cracks, and deformation, triggered by the soil surface loosening, resulting in a substantial reduction in soil stability, under the influence of rainfall, which will cause soil erosion intensified, triggering geologic disasters.

Soil sanding is a common ecological environment problem in coal mining operations, coal mining will lead to groundwater backflow, resulting in changes in groundwater structure and water level, for example, in the coal mining process, the use of a large amount of groundwater for coal washing, which will make the original stratum of groundwater storage conditions, the storage structure of the fundamental change, resulting in the loss of water on the soil surface, and a large number of vegetation

and crops are unable to absorb deep water, and cannot grow normally, resulting in the loss of vegetation, and crops cannot absorb deep water, and cannot grow normally, so that the soil will not absorb water.

A large number of vegetation and crops are unable to absorb the deep-seated water and cannot grow normally, thus greatly weakening the ability of the vegetation to prevent wind and fix sand, resulting in infertile soil, which will also lead to soil desertification in the long run. Coal mining is accompanied by the emission of a large amount of solid and liquid waste and the generation of a large amount of toxic and harmful gases, such as carbon monoxide and gas during the mining process [5].

During the transportation of coal, it causes dust and generates a large amount of solid pollutants, leading to the destruction of the air environment. Part of the mining area involves the combustion of coal, which will produce a large amount of carbon dioxide, leading to increased warming, and part of the coal contains a large number of sulfides after combustion will lead to acid rain, destroying the atmosphere as well as the structure of the ozone layer, jeopardizing.

Mine water is common under the construction of wastewater, it has a certain pollution effect on the ground of the river and the sea rivers, the national coal mine drainage is as high as a dozen tons of weight per year, and individual mines even more drainage is relatively more, the scope of the pollution also spread, mine water mainly from the coal mining period of some of the wastewater or the underground dirty water as well as the mine road in the water of the large toxic substances, mine water due to the mining process and the combination of other pollutants, so it has a very large amount of water, and it has a very large amount of water.

Mine water due to the mining process and other pollutants combined, so it has a strong corrosive acidity, if into the rivers and mountains, the serious consequences on its ecological environment will have a certain impact, so the uncontrolled discharge of mine water, not only hinder the progress of human society, but also the spontaneous combustion of the environment of water has a serious nature of pollution.

4. Measures

After the closure/abandonment of mines, a large amount of land resources will be left behind, such as industrial plaza land, coal mining subsidence areas, and open pits and discharge sites. For example, coal mining in Shanxi Province, Shaanxi Province, Inner Mongolia Autonomous Region and other places are more seriously affected, and the environmental pollution problem needs to be improved.

First, the research and development of new coal mining technology should focus on realizing a greener, pollution-free mining process. For example, a coal mine has successfully realized the coordinated development of coal resources development and environmental protection after adopting green mining technology.

In the mining process, the introduction of modern equipment and technology improves the mining efficiency and reduces the impact on the surrounding environment. Adopting the method of exhausting gas in small quantities many times, most of the toxic gases are purified from the gas by passing through the air shafts (water injection into coal seams, high-pressure spraying, acoustic atomization, dust fans, etc.), and at the same time avoiding the explosive reaction of the harmful gases with the coal dust, especially the use of purifiers has a large-scale purification of toxic gases.

In addition, after the mining is finished, the mine realizes ecological restoration and environmental management, and the mine area is changed again into good fields and Forest land. Improving resource recovery and reducing waste generation are also important directions for new mining technologies.

For example, after adopting a new resource recovery technology, a coal mine was able to recycle and reuse materials that were originally regarded as waste, which not only saves resources but also reduces environmental pollution.

Finally, new coal mining technology should strengthen environmental monitoring and assessment. Through the establishment of a perfect environmental monitoring system, real-time monitoring, and assessment of environmental pollution that may be generated in the mining process In order to cope

with the new situation in coal mining, green mining technology should be vigorously promoted. Green mining technology is a mining system that advocates improving the utilization rate of coal resources and minimizing the impact of mining on the environment. Currently, the commonly used green mining technologies include coal and gas co-mining technology, coal pillar mining technology, filling mining technology and coal underground gasification technology.

The innovative combination of ecological restoration of mining areas and forest and grass carbon sinks, through the design of vegetation restoration programs with high carbon sequestration and sinking capacity and ecological restoration effect for the demonstration of carbon sink forests, and the greenhouse gas emission reduction measurements and monitoring of the existing vegetation system of ecological restoration projects can effectively quantify and improve the ecological restoration of mining areas, as well as to improve the ecological restoration of mining areas. Effectively quantify and enhance the carbon sink potential and carbon neutral capacity of the vegetation system of the ecological restoration project in the mining area, increase the coverage of forest and grass vegetation in the mining area as well as the carbon stock in the vegetation, and realize the positive recovery of the ecosystem function in the mining area while improving the ecological environment.

China actively implements the “Dual Carbon Initiative”. Strengthening ecological environmental protection: China adheres to the concept of green development, intensifies its efforts to combat environmental pollution, and strengthens the protection and restoration of ecosystems. A series of measures have been taken, such as combating air, water and soil pollution, promoting energy conservation and emission reduction, increasing forest coverage and protecting biodiversity.

5. Conclusion

This paper lists several coal mining pollution to the environment, integrates the study of the solution, and puts forward ideas to solve the coal mining pollution the environment, such as optimizing the environment of abandoned mines, new coal mining technology, enhancing the rate of green vegetation planting and so on from all aspects to reduce the harm of coal mining. The paper hopes that this article will help various industries and society to help solve the problem of coal mining pollution to the environment and contribute to green mining and environmental construction.

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