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Dong Shuning

Study on the Optimal
Allocation of Water
Resources Systems
and the Comprehensive
Utilization of Water
Resources in Arid-Semiarid
Multiple Mining Areas

Doctoral Thesis accepted by
the Chang'an University, Xi'an, China

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Supervisor's Foreword

Arid-semiarid regions have suffered from sharp conflicts among water resource utilization, mining, and the environmental protection. Sustainable development in these regions requires a rational water resources allocation to meet the needs for economy, society, and the environment. Based on systematic hydrogeological investigations, laboratory and in situ tests, and application of innovative methodologies including theoretical analysis modeling and prediction to study water resource distribution (including surface water, groundwater, mine water, and coal mine domestic water) in mining areas, this dissertation provides detailed analysis of the current situation and trend of water uses in domestic supply, agriculture, and industry. This dissertation was supported by the project “*Basic Research on the Occurrence Regularities of Deep Coal Resources, Mining Ground Pressure Conditions and Fine Detection (2006CB202200)*”—a project of “973” Program of the state’s key basic research development, and the key scientific and technological research project of The Ministry of Education—*Transformation Mechanism of Precipitation (Evaporation)—Water in Aeration Zone—Groundwater and Its Ecological Effect in Maowusu Sandy Land (308021)*.

This thesis evaluates the status development and utilization, evolution trend, exploitation and utilization potential of water resources in Shen-Dong Coal Mine area. The study area is one of China’s extra-large coal bases and situated at the Loess Plateau (Northern Shaanxi Province) and northeast Ordos Desert fringe. Incorporated with the long- and intermediate-term development strategies of this area, the dissertation lays out a scientific allocation scheme of water resources in different hydrological years and proposes a planning mode of water resources development and utilization and a technical scheme for comprehensive water resources utilization to provide technical supports for the optimal allocation, rational exploitation, comprehensive utilization, and scientific management of water resources. Shuning Dong’s research demonstrates that optimal allocation of the complex water resources can be achieved by multiobjective programming models. His research results, as presented in this thesis, have provided the state-of-the art

methodologies that balance mineral mining and water resource conservation in arid-semiarid regions.

I congratulate Shuning to this excellent work. His dissertation is one of the best in Chang'an University because of the volume of reliable data, defensible scientific analysis, and world significance of the research results.

Xi'an, China
February 2016

Dr. Wenke Wang

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