Study on How to Improve Surface Water Quality Monitoring

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Abstract: Under the guidance of the Party Central Committee and the State Council, China's environmental protection initiatives have made remarkable achievements, both in terms of system optimization and in terms of solving problems left by history. The masses also put forward suggestions and opinions on the achievements of China's environmental protection departments, and the public awareness of environmental protection has been constantly enhanced. In this context, more and more enterprises and individuals begin to pay attention to the changes in environmental quality. Surface water quality monitoring, as an important task to clarify the environmental quality of surface water, provides a wealth of information for the relevant technical personnel to clarify the change of environmental quality. Therefore, in the process of design and production, our environmental protection personnel and other industry engineers will put forward the requirements for quality monitoring of surface water where the project is located, and different industries have different requirements for their testing accuracy. It can be seen that improving surface water quality monitoring has become an urgent task for environmental protection engineers.

1. Introduction

Viewed through the lens of environmental protection or enterprise production, surface water is an important natural resource. Quality of water resources reflects the changes in the natural environment and affects water supply and water pollution treatment. Therefore, in the social production and life, the surface water quality monitoring reflects the irreplaceable significance. Moreover, with the continuous development of chemical analysis technology, the accuracy of surface water quality monitoring has been effectively improved, and the testing process has also been effectively optimized. The testing personnel can also better understand the factors affecting the quality of surface water quality monitoring. However, various problems are also found in the surface water quality monitoring work in our country. The existence of these problems directly affects the improvement of the quality of surface water quality monitoring in our country, and also restricts the development of related technologies. Therefore, this paper discusses the existing problems of surface water quality monitoring in China, and puts forward corresponding solutions, in order to provide new ideas for improving the quality of surface water quality monitoring.

2. Development status of surface water quality monitoring in China

2.1 Monitoring quality fails to meet the actual demand

For environmental monitoring, surface water quality testing technology is the main technology. At present, as the biological monitoring technology and automatic monitoring technology of surface water quality are still in the initial stage, there is still a big gap between China and developed countries in surface water monitoring technology level[1]. Although the monitoring effect of surface water in China is relatively ideal, there are still some problems in the monitoring methods. For example, the current
physical and chemical monitoring methods can meet the needs of early warning, and can effectively monitor the potential threat of surface water pollutants, as well as provide relevant departments and individuals with real-time changes in pollutants. However, the cost of this technology is relatively high, and it has high technical requirements, so it needs to invest a lot of human and material resources to build a large-scale real-time monitoring network [2].

At present, although the Chinese government can provide the surface water quality monitoring report of China, the relevant data in the report is mainly completed by the national laboratory test system of China, and China has not built a complete surface water monitoring database, so the existing surface water monitoring data is difficult to be fully utilized. In this case, it is difficult to realize the deep utilization of data, which will affect the authority of data. Nowadays, the monitoring data of surface water quality in many areas of our country are difficult to report in time, and there is no guarantee of real-time information in many areas, which are closely related to the limitation of technical conditions [3].

Although China's surface water quality monitoring technology has been developed significantly, it has not reached the world's leading level, and many social actual needs have not been effectively met, so as a whole, China's environmental protection system still needs further development and optimization [4].

2.2 Monitoring network needs further improvement

More than 200 surface water quality monitoring centers have been built in various regions of China. These monitoring centers can cover the surface water bodies of various large and medium-sized cities in China, together constituting the surface water quality monitoring network of China, which includes more than 3000 surface water quality monitoring stations [5]. China's surface water quality standards and quality monitoring function division standards are the specific basis of monitoring network operation. The system includes 80% of municipal stations and 10% of county-level stations. At the same time, the core work of surface water pollution control is surface optimization. The provincial distributed monitoring mode is the main working mode of the provincial monitoring center, which can effectively control the data quality of the monitoring stations at all levels, thus ensuring the scientificity and rationality of the data. At the end of the 20th century, the environmental protection department of our country carried out rating assessment for the surface water quality monitoring agencies at that time, and the authority of the data has been improved to a certain extent. In China's environmental protection testing, the full-automatic monitoring technology has played a very important role, and standardized monitoring methods have been widely used in the actual project development process. Although some projects lack relevant standards, there are equivalent methods to complete the assessment work [6].

2.3 No perfect and clear indicator system has been established

At present, toxic pollution and organic pollution are still the main water pollutants. The current water quality monitoring work in China is mainly carried out from two aspects: drinking water quality monitoring and surface water section water quality monitoring. The drinking water quality monitoring mainly completes the detection of dissolved oxygen, ammonia nitrogen, temperature and other indicators, while the surface water section water quality monitoring mainly completes the monitoring of heavy metal content, BOD, COD and other indicators. It can be seen that for specific production water supply, the current surface water quality monitoring indicator system is difficult to reflect the actual needs of different industries, so the indicator system is not targeted, perfect and clear enough, which has a negative impact on the improvement of the quality of water quality monitoring [7].

2.4 Regional division is unclear

The management mode of water quality monitoring in China still adopts watershed division system, and different departments are responsible for water quality monitoring in different basins, which can make the job content clear and improve the quality of work. However, due to the long river basins or large lake areas, the efficiency of pollution source investigation will be affected. And many water bodies have
the characteristic of crossing administrative areas, so the investigation of pollution sources often involves multiple administrative units and water quality monitoring departments. In the actual work process, the consumption of all kinds of resources is very high, and the problem of information communication is also very obvious. Many information is difficult to reach the relevant departments and staff in time, and there is a problem of inaccurate information [8].

2.5 The technical equipment is not perfect, and the technical level needs to be improved
Many district and county-level surface water monitoring units do not have perfect technical equipment. The lack of water sample storage equipment, drug storage equipment and experimental equipment has affected the accuracy of the test results, and brought unnecessary errors to the surface water quality analysis, thus affecting the authority and scientificity of the monitoring data [9]. In addition, because the experimenters of surface water monitoring units in many areas are not graduates of environmental engineering and environmental monitoring, they lack sufficient knowledge of relevant theories and technical methods of environmental quality control, so in the process of water sample collection, there are often problems such as nonstandard operation. What’s more, with the development of testing technology, many traditional monitoring technologies fail to meet the actual needs of the modern world. If the technicians do not master the advanced testing technology and still use the traditional ones, the accuracy of the surface water quality test results will also be affected [10].

3. Measures to improve the quality of surface water quality monitoring

3.1 Study the surface water quality monitoring technology in depth
The improvement of technical level can fundamentally improve the accuracy of surface water quality monitoring results. Therefore, environmental monitoring technicians in China need to study the surface water quality monitoring technology in depth, improve the accuracy of monitoring technology from water sample collection, water sample transportation, water sample preservation, experimental operation, data processing and other aspects, clarify the influencing factors of test results, and propose effective measures to control these factors, so as to improve the stability of monitoring technology. In the process of research, technical personnel should also clarify the actual needs of different industries for water resources, as well as the impact and mechanism of different pollution sources on surface water quality, so as to enable environmental protection technicians to complete the analysis and investigation of pollution sources through surface water quality monitoring indicators, reduce the workload of pollutant investigation and improve the efficiency of environment quality control [11].

3.2 Improve the system of surface water quality monitoring
The perfect working system can improve the quality control level of surface water environment in China, and play a role in simplifying the working process and improving the working efficiency. Therefore, it is suggested that the environmental protection department of our country should sort out and re-plan the functions of the current surface water environmental monitoring units, clarify the job content and responsibility scope of each unit, do a good job in the division of monitoring areas, and create good conditions for communication between units at all levels and between each functional unit. And it is necessary to evaluate and audit the work of each unit properly to ensure that its work quality can meet the relevant requirements of national environmental protection work and give full play to the functions of surface water environmental monitoring unit. In addition, the third-party monitoring unit should be integrated into the system, so that it can also contribute to the surface water quality monitoring work in China. However, it is also necessary to strictly review the relevant capabilities and qualifications of the third-party monitoring units to ensure the authority and accuracy of the monitoring results [12].

3.3 Construct scientific and perfect indicator system
As an important basis to guide the technical work, the scientific and perfect technical indicators determine the quality and level of technical work. Moreover, the water quality monitoring technology
is in the process of rapid development, so the technical personnel of surface water quality monitoring in China also need to develop a practical and reliable indicator control system according to the current technical development situation, and make clear the water quality indicators related to social life and production according to the industry development situation, so that the surface water monitoring indicators can fully reflect their technical value.

3.4 Develop effective quality management system for all kinds of laboratories
We have developed the corresponding quality management system for the third-party monitoring agencies and government testing agencies, and regularly assess and review the qualification and monitoring capacity of these agencies. However, the quality management system of all kinds of laboratories in China still needs to be improved effectively. In addition, it is necessary to focus on the inspection of the relevant regulations of the laboratory, the technical level of personnel, the calibration of equipment and instruments, and the implementation of testing projects. These contents reflect the real monitoring level of a laboratory. Relevant units in China also need to carry out surprise inspection on various laboratories, so as to make clear the real working state of relevant laboratories, find out existing problems of laboratories, urge the laboratories with slight problems to rectify, and take punishment measures such as suspension of business for rectification or disqualification for the laboratories with serious problems, so as to purify the testing industry.

3.5 Provide support for technical optimization of testing unit
In many remote areas of our country, the surface water monitoring units are often lack funds to update the equipment. Therefore, the relevant units in our country should actively give some financial support to the monitoring units with relatively tight financial situation, so as to provide strong support for them to improve the level of technical equipment and ensure that the equipment level of the surface water monitoring units in these areas can reach the national average level. In addition, relevant units also need to organize technical personnel to learn advanced monitoring technology, and analyze and discuss the existing problems in the current testing work, so as to achieve the purpose of correcting technical operation problems. At the same time, through the necessary training, the professional level of technical personnel can also be effectively improved.

Based on this, the surface water quality monitoring units in various regions of China should promote the normalization and standardization of training work and provide systematic skills training for technical personnel. In addition, the training content also needs to be adjusted and optimized according to technical development, so that the technical personnel can master the effective monitoring technology and also clarify the relationship between the testing work and other industries at the same time, then further clarify the occurrence mechanism of water pollution and the impact of different pollutants on the environment, so that the surface water quality monitoring work can really play an important role in supporting the development of other industries.

3.6 Build an automatic surface water monitoring system
The rapid development of science and technology has brought a new opportunity for surface water monitoring. With the development of intelligence and automation, science and technology can be applied to the surface water monitoring in environmental monitoring. The construction of automatic surface water monitoring system and the implementation of continuous and real-time remote monitoring and control of water quality will greatly improve the monitoring efficiency. Monitoring the surface water situation of key river basins and sections, and carrying out real-time prediction and early warning can effectively deal with the cross-regional water pollution disputes, and urge each region to implement the discharge in strict accordance with the standards. The automatic surface water monitoring system needs to consider the characteristics and functions of water body in this area. The velocity, volume and depth of water body will affect the monitoring results, and the external environmental factors should also be fully considered. It is necessary to assign specially trained personnel for monitoring and management to deal with emergencies timely and rapidly.
4. Conclusion
As a very important natural resource, water is closely related to people's life and social development. We must pay more attention to it, strengthen our efforts to continuously improve surface water monitoring, enhance monitoring management, introduce and develop advanced equipment and facilities, and select appropriate monitoring means and methods according to the actual situation, so as to continuously improve the effect of surface water monitoring, lay a foundation for the protection of water resources and promote the sustainable development of society.

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