Determination Method of Screening Proportion of Key Pollutant Discharge Units

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Abstract: The list of key pollutant discharge units is an important means of pollution source supervision. At present, the coverage of key pollutant discharge units is insufficient, which greatly restricts the supervision of industrial pollution sources. This paper analyzes the feasibility of improving the screening proportion of pollutant discharge of key pollutant discharge units in Shandong Province from the aspects of pollutant discharge situation of key pollutant discharge units and the method of pollutant discharge screening proportion.

Keywords: Key pollutant discharge units; Proportion; Screen

1. Introduction

1.1. Environmental conditions

Shandong Province has a large amount of pollutant emissions. In 2019, the emissions of major pollutants in Shandong Province are all in the forefront of the country. Among them, chemical oxygen demand and ammonia nitrogen ranked seventh and fifth respectively in water environment; sulfur dioxide and nitrogen oxide ranked first in atmospheric environment, and smoke and dust ranked fifth.

After 17 years of continuous improvement of water environment quality and continuous improvement of atmospheric environment quality of Shandong Province, it has entered the bottleneck period of steady improvement from rapid decline period.

1.2. Information of key pollutant discharge units

In 2019, a total of 5022 enterprises in Shandong Province will be listed in the list of key pollutant discharge units. Among them, 1938 are water environment, 2006 are atmospheric environment, and 3944 are water and gas, accounting for 3.8% of the total number of industrial pollution source enterprises.

1.3. Coverage of industrial sources by key pollutant discharge units

According to the management requirements, the proportion of the total amount of pollutants discharged by the key pollutant discharging units should be greater than 65% of the total amount of industrial pollutants discharged in the region.

According to the analysis of the proportion of the total emissions of six major pollutants including chemical oxygen demand, ammonia nitrogen, sulfur dioxide, nitrogen oxides, smoke dust and volatile organic compounds from key pollutant discharge units in Shandong Province in 2019 and the emission of industrial sources in environmental statistics in 2019, the number of enterprises and the proportion of six pollutants in Shandong Province are 40.3%, 61.5%, 62.2%, 70.3%, 80.0%, 70.1% and 71.5%, respectively Ammonia nitrogen can not reach the bottom line of 65%, and there is a big difference in 17 cities.

With the increasing demand of the people for environmental quality improvement, the existing key pollutant discharge units can no longer meet the requirements of environmental supervision. In order to continuously improve the environmental quality and better serve the ecological environment management, it is necessary to strengthen the supervision of industrial sources and increase the number of key pollutant discharge units.

2. Screening Proportion Method of Pollutant Discharge Volume of Key Pollutant Discharge Units

2.1. The idea of screening proportion

Taking the general list of No.2 sewage as the total sample, comprehensively considering the key indicators such as industrial wastewater, waste gas, solid waste and hazardous waste, determine the screening proportion, verify the screening results, update and increase key pollutant discharge units scientifically and reasonably.

2.2. Screening proportion principle

The coverage shall be as large as possible. It has reached the required proportion at all levels of the province and the city. In particular, the pollution sources that meet the requirements of the key work of ecological environment management, such as the key management of pollutant

discharge permit, shall be included in the list of key pollutant discharge units.

Focus on the key points and focus on Dayuan. The screening conditions shall be set to ensure that all the major pollutant producing or discharging households at all levels of the province and the city are covered, to ensure that the major source does not leak, and to avoid "large leakage and small emission".

Considering regional balance and feasible operation. Considering the statistical capacity of ecological environment at all levels of cities and counties and the balance of workload among cities, it is feasible to investigate the selected key units one by one.

2.3. Determination of screening proportion

Taking the second national pollution source census database in 2017 as the total sample, we focused on the coverage of indicators and key sources, and assessed the balance of local work and statistical capacity to obtain the applicable screening proportion.

Analysis of emission cut-off point. According to the research on the emission cut-off point based on the conventional indicators of the first and the second pollution, the cumulative proportion distribution curve of the emission has no obvious change, and the emission cut-off points are mostly stable in the range of 75-85%. Taking the sulfur dioxide emission enterprises of Shandong Province as an example, the cumulative proportion data of enterprises is shown in Table 1.

Table 1. Cumulative proportion of sulfur dioxide emission enterprises in Shandong Province

Proportion of emissions	Cumulative number of enterprises	New enterprises	Change rate of new enterprises
0.65	275		
0.7	360	85	
0.75	481	117	30.9%
0.8	639	158	32.5%
0.85	858	219	32.8%
0.9	1194	555	153.4%
0.95	1829	635	14.4%

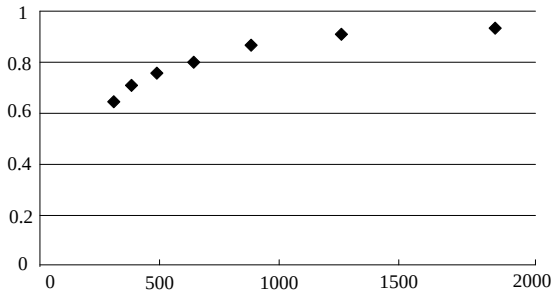

Figure 1. Shows the cumulative proportion of SO2 emission enterprises in Shandong Province.

With the increase of the cumulative proportion of emissions, the curve becomes more and more gentle, that is to say, for every 1 unit of increase in the percentage, more and more enterprises are added, and the tangent slope of each point on the curve is becoming smaller and smaller, approaching zero infinitely. In the 70% - 85% emission area, for every 5% increase, the number of new enterprises has increased by about 30% compared with the number of new enterprises at the previous boundary point, that is to say, the number of enterprises has increased by 100-200. It can be seen that the more suitable screening accounted for 75% - 85%.

Figure 1 distribution of cumulative proportion of SO2 emission enterprises in Shandong Province

Analysis of emission proportion. According to the proportion of 65% - 85% emissions in the whole province, it can be seen that the minimum value of enterprises selected by 80% emissions is 100 tons, which can ensure the full coverage of large sources with SO2 emissions of more than 100 tons. See Table 2.

Table 2. Sectional statistical results of accumulated sulfur dioxide emissions of exhaust gas in Shandong Province

SO2 emission (ton)	Number of enterprises	Proportion of cumulative amount	Total number of enterprises	Minimum average volume of accumulated enterprises (ton)
362951	102951	65%	275	232.1
		70%	360	184.3
		75%	481	135
		80%	639	100.7
		85%	858	68.5

3. Conclusion

Based on the analysis of SO_2 emission of key pollutant discharge units and typical indicators of industrial sources in Shandong Province, it can be seen that it is

reasonable and feasible to increase the screening proportion of key pollutant discharge units from 65% to 80%, that is to say, the main pollutant emission accounts for 80% of the total annual industrial source emission within the jurisdiction of each city.

References

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