Study on the technical method of linking environmental impact assessment of park planning with emission permit based on total emission control of pollutants

Lihua Huang *

Appraisal Center for Environment and Engineering, Ministry of Ecology and Environment, Beijing 100012, China

*Corresponding author e-mail: huanglh@acee.org.cn

Abstract. This paper proposes that the park should be regarded as the key unit of total pollutant control and allocation in China. In order to improve the environmental quality of the park, the technical path of linking the environmental impact assessment of the park planning with the emission permit is studied. It includes target estimation of total pollutant control, total pollutant allocation technology, linkage of total pollutant control index, etc. Put forward suggestions for system optimization. It provides a useful reference and reference for the research and improvement of China's planning EIA system and emission permit system.

Keywords: Industrial Park planning EIA; Total emission control of pollutants; Environmental quality improvement.

1. Introduction

Industrial Park is the area with the most concentrated fixed pollution sources, the largest pollutant emission intensity and the most prominent environmental pollution problems in China. Planning EIA and pollutant discharge permit are important management systems for pollution prevention and control in the park, which are responsible for the prevention of pollution source and the control of terminal pollution respectively. Environmental impact assessment of park planning focuses on prevention in advance, which is the access permit for fixed pollution sources. Emission permit focuses on the post supervision of pollution sources, which is the ID card of pollutant emission and its information [1]. The two systems have played an important role in the prevention and control of pollutants in the park. However, there are some differences between the two systems in the object, intervention period, prevention and control methods, and the manifestation of pollution prevention and control effect, which has not yet formed a good connection. At present, total amount control is an important management system of pollution prevention and control in China, and also an important carrier of linkage between environmental impact assessment of park planning and emission permit system. The goal of total amount control is to control the total amount of pollutant emission, focusing on the "surface" control. It establishes emission bottom line for regions and industries through relatively unified emission reduction targets. Environmental impact assessment of park planning aims at improving environmental quality, and controlling pollutant emission of enterprises and institutions in the park is an important means to
realize environmental quality control of the park. The goal of emission permit is to control the emission of pollutants, focus on the control of "points" such as enterprises and institutions, and improve the pertinence of total pollutant control [2]. However, all enterprises and units in the park have reached the pollutant control emission, and the park may not be able to achieve the restrictive objectives of environmental quality control [3]. Therefore, it is necessary to take the capacity-based total amount control as the main line and the environmental quality improvement as the goal to study the undertaking relationship and connection path of the two systems of the industrial park planning EIA and the project EIA, so as to improve the efficiency of the environmental management system of the industrial park.

This paper aims to promote the linkage between total amount control and environmental quality. From the perspective of total amount control target, total amount allocation and total amount index linkage, the paper studies the connection path between environmental impact assessment and pollutant discharge permit. The total amount control index of regional pollutants is implemented from the macro level of the park to the point source level of the fixed pollution source, and the optimization suggestions of the environmental impact assessment of the park planning, the discharge permit of the fixed pollution source and the total amount control system are put forward, so as to play the role of collaborative pollution control and effectively slow down the environmental pollution of the park Perfect to provide useful reference and reference.

2. The necessity and feasibility of the linkage between environmental impact assessment and emission permit.

2.1. Promoting the demand of linking total amount target with environmental quality.
Since the implementation of the total amount control system with the target total amount control as the core, it has effectively curbed the rapid growth of pollutant emissions in China [2], and has played an important role in the prevention and control of pollution in the park. However, in the 13th Five Year Plan period, great changes have taken place in China's environmental situation. The pollution situation in the industrial park is more serious. The pollution situation of the industrial park is more serious. The current total amount control mode which is out of touch with the environmental quality leads to the problem that the total amount of pollutants discharged does not exceed the total control target in some places, but the environmental quality of the region or river basin continues to deteriorate. The total quantity control strategy with the target total control as the core can not meet the increasing demand of environmental quality improvement. In order to improve the efficiency of total amount control, it is necessary to change the total amount control mode to the capacity total amount control mode. In the current management of pollutant discharge permit, although the previous top-down allocation mode of total amount control has been cancelled, the total amount of discharge permit for regional fixed pollution sources is basically based on the total amount control target of administrative region, and the emission permit is issued accordingly. At present, the determination of emission permit limit is mainly based on industry emission standards and EIA approval requirements, which is based on technology, without considering the spatial and temporal differences of regional environmental capacity resources [4]. Under the framework of the current emission permit system, the total amount of pollution permits of fixed pollution sources in the park may exceed the environmental carrying capacity of the park, which will aggravate the problem of regional environmental pollution. The solution of the problem depends on the control and management of the total environmental capacity of the park. Based on the study of allowable emission of ecological carrying capacity, the spatial-temporal change response relationship of pollution source, pollutant emission, environmental quality and environmental capacity is established in the environmental impact assessment of the park, which provides scientific basis and technical support for the determination of the total amount control target based on the improvement of environmental quality.

2.2. It is necessary to improve the scientificity of total allocation.
There are great differences in resources and environment endowment among parks in China, and the spatial and temporal variation characteristics of meteorological conditions, hydrological conditions and
pollutants in different regions are significant. For example, the heating period in northern China is a period of high PM2.5 pollution, and the self-purification capacity of pollutants in different water periods is different. However, China's total amount control strategy, which takes administrative districts as the unit, takes the year as the time scale, and the average allocation of each season and month, has been unable to meet the current environmental management requirements of precise control of pollutants. Although the emission reduction requirements of fixed pollution sources in some areas have been considered during the peak period, the response relationship between the emission reduction of fixed pollution sources and environmental quality has not been established. It is impossible to judge the contribution of fixed pollution source emission reduction to the improvement of regional environmental quality, nor to determine the total amount of fixed pollution source emission reduction meeting the environmental quality improvement objectives. Therefore, it is necessary to reform the mode of total park allocation. With the help of environmental simulation of environmental impact assessment of park planning, linear programming method and other technical methods, the corresponding relationship between pollutant emissions and allowable emissions, emission reduction and environmental quality improvement in different seasons and periods of pollution sources is established, and a differentiated total amount control target system on regional and temporal and spatial scales is constructed. We should give full play to the role of total amount control in promoting regional environmental quality improvement and high-quality economic development.

2.3. The need to strengthen the matching between total amount control index and pollution precise control.

First, it is necessary to strengthen the total amount control of characteristic pollutants. As an industrial cluster area, the park has various types of industrial industries, large amount of pollutant emissions, many types of pollutants and complex components, especially the characteristics of emissions. The types of pollutants are complex and the environmental hazards are serious. The high-intensity centralized emission of pollutants has a serious impact on people's health. For example, the characteristic pollutants produced by the steel industry park include hydrogen sulfide, mercury and other heavy metals, dioxins and other organic pollutants. Among them, dioxin has strong carcinogenicity, and its concentrated emission will cause serious harm to human health. At the same time, the synergistic reaction of NOx and VOC from steel park will produce ozone, which will aggravate the pollution of fine particles. Due to the complexity of environmental pollution mechanism, the lag of pollutant treatment technology and the severity of harmful consequences, the control of characteristic pollutants has become the bottleneck of environmental quality improvement in the park. Therefore, it is urgent to strictly control the total amount of characteristic pollutants. Since the 13th five year plan, China's total emission control index has only added three regional pollution indicators (volatile organic compounds in key areas and industries, total nitrogen and total phosphorus in key areas) in addition to the original four pollutants [5, 6]. The update speed of total amount control index is far behind the demand of characteristic pollutant control and management in industrial park. Although the pollution discharge permits of fixed pollution sources in the park also put forward clear requirements on the concentration and emission of characteristic pollutants, they are all aimed at a single fixed pollution source and lack of overall control requirements at the park level. Therefore, it is urgent to improve the total amount control index at the park level through the study on the environmental impact assessment of the park, and make up for the weak points of environmental pollution control and management and the short board of regional environmental quality improvement.

Second, the demand for accurate control of pollution in the park. At present, some of the total amount control indicators or total amount index characterization indicators in China are limited by the environmental monitoring and analysis methods, and the indicators can not fully represent the key pollutants that restrict the environmental improvement. It is difficult to meet the requirements of accurate pollution control and management of current problems. (1) The total amount control index COD of water pollutants is inconsistent with CODcr (unable to represent the organic process of aquatic organisms consuming oxygen in natural water) and water quality monitoring index CODMn. The
discharge permit of fixed industrial pollution sources in the park meets the requirements of total amount index, and CODcr is also used as the control index. The oxidation condition of CODCr is (1 + 1) acid medium at 146 °C for 2 h. The volatile compounds, pyridine or polycyclic aromatic hydrocarbons (PAHs) and other organic compounds emitted from industrial pollution sources in the park can not be completely oxidized, so they can not be characterized by CODcr [7]. As a result, some organic pollutants in industrial wastewater can not be included in the scope of total COD control. At the same time, the dislocation of COD total amount control and water quality index also increases the technical difficulty and deviation of total amount accounting, which can not provide strong technical support for the precise control and management of water pollutants. (2) The total amount of air pollutants and the emission permit control index VOCs of fixed pollution sources are characterized by NMHC, so it is difficult to measure the total amount of VOCs in fixed pollution sources comprehensively and accurately. His is because NMHC is limited by the principle of FID detection, and the results are generally low when analyzing oxygenated volatile organic compounds (OVOCs). Especially when measuring VOCs emission from chemical enterprises, the concentration of VOCs in exhaust gas may be underestimated [5]. As a result, there is a deviation between the permitted amount of fixed pollution source accounting and the actual VOC emission, which can not support the need of comprehensive control of volatile organic pollutants in the park. Therefore, based on the study of the regional environmental quality and the characteristics of the main pollutants discharged by the park, the park planning EIA should optimize the total amount control factor and the pollutant discharge permit control factor of the fixed pollution source, so as to provide support for the fine total amount control management of the park.

3. Connection between environmental impact assessment and pollutant discharge permit based on total capacity control.

3.1. Objective optimization of total amount control linked with environmental quality.

The park is regarded as the key unit to decompose the total amount index, and the total amount control target is determined with a definite aim. The total allowable emission based on environmental capacity (environmental quality baseline) is taken as the total pollutant control target of the park. The total allowable emission is calculated according to the regional "three lines and one single" or the park planning EIA according to the environmental quality improvement objectives of the region or basin. And as the total control target of pollutants in the park, and then determine the total emission permit of fixed pollution sources in the park, as the basis for the emission permit. The total amount target should be put forward according to the environmental quality status and objectives of the region or park, its upstream and downstream, downwind and other surrounding areas, considering the meteorological conditions, hydrological conditions and other related factors, according to the most unfavorable conditions, and reserving a certain amount of safety margin. It has realized the transformation of the mode of pollutant discharge permit approval from the total discharge up to standard to the approved total emission linked with environmental quality, and makes full use of the regional and park environmental capacity resources.

3.2. Optimize the allocation mode of total control index.

Firstly, the total amount of park control in different periods should be allocated reasonably. The environmental impact assessment of the park should be based on the spatial and temporal variation characteristics of pollutants on average month by month for many years, study and determine the high pollution period and heavy pollution season of the park, and calculate the environmental capacity and allowable emissions in different periods. And then distribute it to each quarter and month within the year. For example, the total amount of different allowable emissions in heating period and non heating period, and the allowable discharge amount of water pollutants in various water environment functional areas in wet season, normal water period and dry season, etc. Based on the pollution contribution rate of fixed pollution sources, the total allowable discharge amount of the park in different seasons and
water periods is decomposed into the fixed pollution sources of the park and loaded into the discharge permit.

Secondly, the total amount of control of different pollution industries in the park should be allocated reasonably. For petrochemical, iron and steel, electroplating and other special industrial parks, the park planning environmental impact assessment should be based on the principle of short board effect to determine the main polluting industries. According to the industrial layout and the response relationship between the main pollutants and the environmental quality of the major polluting industries, the total allowable discharge amount of the main pollutants in the major polluting industries is determined and allocated to the corresponding fixed pollution sources.

Thirdly, the total allowable emissions of existing and new sources should be reasonably allocated. On the premise of meeting the goal of environmental quality improvement, the park planning EIA should calculate the total allowable emissions of existing and new sources, and allocate the total amount of active emissions to each fixed pollution source. According to the implementation path of double reduction or equivalent substitution, the total emission reduction amount of active pollutants should be proposed based on the regional environmental quality improvement plan and the enhanced emission reduction plan of the park, combined with the analysis of pollutant emission reduction potential, and the total emission reduction of active pollutants should be implemented to the existing fixed pollution sources.

Fourthly, reasonable allocation of the pollutant discharge permits for fixed pollution sources. (1) Suggestions on the allocation of permitted amount of water pollutants from fixed pollution sources. In view of the fact that the fixed pollution sources in the park have basically realized centralized sewage collection and treatment, it is suggested to calculate the allowable discharge (or reduction) at the discharge outlet of the sewage treatment plant in the park on the premise of meeting the requirements of the water environment functional zone of the tail water receiving body of the sewage treatment plant in the park or reaching the goal of environmental quality improvement. It is regarded as the total allowable discharge amount of fixed pollution sources in the park and allocated to the sewage outlets of fixed pollution sources within the service scope of the sewage treatment plant. In addition, in order to facilitate the management of sewage outlets, it is suggested that the discharge permit of fixed pollution sources should not only specify the discharge amount and type of pollutants, but also indicate the discharge direction of sewage. For the fixed pollution sources in the park that have not been managed, the control requirements for the issuance of discharge permit shall be put forward according to different situations. If it is unable to discharge the pollutants due to the enterprise's reasons, the enterprise shall postpone the issuance of discharge permit for fixed pollution sources before taking relevant measures to ensure the discharge of sewage. (2) Suggestions on the allocation of air pollutant allowance for fixed pollution sources. The environmental impact assessment of the Park aims to improve the environmental quality, and establishes the response relationship between the pollutant discharge from the fixed pollution source outlet and the environmental quality. Using linear programming method and other methods, the total allowable emission of existing sources is allocated to the outlets of existing fixed pollution sources as the allowable amount.

3.3. Improve the total amount control index.

First, we should appropriately expand the scope of total amount control indicators. The environmental impact assessment of park planning should combine with the environmental pollution characteristics of leading industries to determine the main characteristic pollutants. Considering the synergistic reaction of various characteristic pollutants and the transformation of primary and secondary pollutants, the characteristic pollution factors which may produce significant adverse environmental impact or major environmental risk are added to the total amount control factor of the park. Then, the allowable emission is calculated, allocated to each fixed pollution source and loaded into the emission permit.

Second, optimize the total amount control index. (1) It is suggested that COD should be adjusted to TOC (comprehensive indicator of total organic matter in water). Because TOC is mostly determined by combustion oxidation non dispersive infrared method, the oxidation of organic matter is relatively
complete, and the oxidation rate can reach more than 98% in most cases. It can be used to characterize benzene, pyridine and other aromatic toxic and harmful substances in water. Therefore, TOC can more accurately reflect the degree of organic pollution of water [4], making up for the lack of limited characterization range of COD. (2) THC can be used instead of NMHC to characterize VOCs emission source. THC characterization can effectively solve the problem that the efficiency of NMHC separation of non methane organic compounds by chromatographic column method or catalytic method is affected by the types of organic compounds, and VOCs can be characterized relatively accurately. For example, in Taiwan, China, the characterization of VOCs has been gradually adjusted to the characterization and monitoring system with THC as the core [8].

3.4. Construction of work connection mechanism.
First, we should improve the regional total control management system. Based on the research results of regional "three lines and one single project" and the environmental capacity and allowable emission of the park planning environmental impact assessment, the refined total amount control management framework of Administrative Region Park fixed pollution source is established. To realize the implementation of the total amount index based on capacity control from macro to micro scale. To promote the realization of regional environmental quality improvement objectives with efficient total amount control management.

Second, strengthen the main responsibility of the park management organization. It is emphasized that it is responsible for the environmental quality improvement and total amount control of the park, and strengthens the assessment of the total amount control index of the park management committee. The park management committee should implement the environmental access of construction projects proposed in the environmental impact assessment of the park, force the high pollution and high energy consumption industries to withdraw, and strictly control the total allowable amount of pollutants from fixed pollution sources. At the same time, the park management committee should also implement the park planning EIA tracking monitoring management requirements, according to the change trend of the park's environmental quality, timely adjust the total emission reduction index of the park in accordance with the change of the regional environmental quality improvement objectives, and take it as the total allowable amount of the fixed pollution sources in the park, so as to effectively play the role of total amount control in continuously improving the environmental quality of the park.

Third, implement the responsibility of self certification and law-abiding. Enterprises are required to consciously declare the discharge concentration and discharge amount of pollutants from fixed pollution sources according to the relevant management requirements of pollutant discharge permit and the amount of pollutant discharge allocated by the park, and conduct self-regulation of pollutant discharge behavior. In addition, the allowable emission amount determined by the emission permit is taken as the basis for Emission Trading (the principle is that trading can be conducted only when the total amount is below the red line).

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