

Original Paper

Pathways and Countermeasures for Prevention and Control of New Pollutants

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Abstract

In recent years, the harmfulness of new pollutants has attracted increasing attention from all sectors of society. In May 2022, the Ministry of Ecology and Environment issued the “Action Plan for the Control of New Pollutants”, which takes precise pollution control, scientific pollution control, and lawful pollution control as the working principles. By 2025, complete the screening of chemical substance environmental risk assessment, dynamically release the list of key controlled new pollutants, and gradually establish and improve the regulatory system and management mechanism for toxic and harmful chemical substance environmental risk management. However, in the existing legislative system for chemical management, China mainly focuses on safety production and control of conventional pollutants, while the management of emerging pollutants appears relatively weak, lacking sufficient attention and effective governance measures. This legislative situation to some extent limits the effective promotion of the treatment of new pollutants. This article aims to establish the legislative value of “new pollutant control” from a legal perspective, explore its underlying connotations, and explain the necessity of establishing a legal system for new pollutant control. Based on existing laws, administrative regulations, and local government rules, analyze the situation of “new pollutant treatment” and obtain the application of governance laws in different regions. Based on other countries and regions’ legal documents on “new pollutant control”, summarize the reasons for the current confusion in “new pollutant control”, and connect it with the reasons for environmental tort liability attribution in the Civil Code, in order to establish a complete legal system for “new pollutant control”.

Keywords

New pollutants, Environmental law, Local regulations

1. Introduction

With the continuous increase in the production and use of chemicals in China, the impact of new pollutants on the ecological environment and human health is becoming increasingly apparent. New pollutants refer to pollutants caused by human activities and discharged into the environment, with characteristics such as biological toxicity, environmental persistence, and bioaccumulation, which pose significant risks to the ecological environment or human health, but have not yet been included in management or existing management measures are insufficient to effectively prevent and control their risks. At present, the main new pollutants of concern internationally include environmental endocrine disruptors, persistent organic pollutants such as perfluorinated compounds (PFCs), antibiotics, and microplastics. There are various types of new pollutants. Compared with conventional pollutants, new pollutants have the characteristics of short production and use cycle, large quantity, diverse types, wide distribution range, difficult degradation, easy accumulation in organisms, and unknown harmful consequences. Therefore, they have not been fully regulated. The new pollutants correspond to the conventional pollutants known to the public. What is a pollutant? Pollutants are both chemical and legal concepts. In the concept of chemistry, pollutants are substances that cause environmental pollution, which are released from nature or generated through human social activities. After entering the environment, they interfere with the normal composition and properties of the environment, directly or indirectly affecting the environment and leading to the deterioration of environmental quality. Pollutants can be classified into various categories based on their sources, properties, composition, and the main objects of pollution. Due to the fact that most pollutants are originally useful substances in production, comprehensive utilization and turning waste into treasure have become active measures in environmental pollution control.

In legal terms, China has established a relatively complete governance system for conventional pollutants. In June 2003, the 10th National People's Congress passed the "Law of the People's Republic of China on the Prevention and Control of Radioactive Pollution", which implements the policy of prevention first, combination of prevention and control, strict management, and safety first for the prevention and control of radioactive pollution. And the country has established a monitoring system for radioactive pollution, clarifying legal responsibilities. In 2018, the People's Republic of China successively promulgated the Water Pollution Prevention and Control Law, Soil Pollution Prevention and Control Law, and Air Pollution Prevention and Control Law, aiming to protect and improve the environment, prevent water, soil, and air pollution, and promote the construction of ecological civilization. The 14th Five Year Plan period is a crucial period for China to achieve a phased victory in the battle against pollution prevention and control, improve the coordination mechanism in the field of ecological civilization, build an ecological civilization system, and promote the comprehensive green transformation of economic and social development. While promoting the treatment of conventional pollutants, efforts need to be made to prevent and control new pollutants.

2. Legal Basis and Current Situation for the Prevention and Control of New Pollutants

Table 1

Number	Law Source Attribute	Legal Document Name	Relevant Provisions
1	law	Environmental Protection Law	All
		Clean Production Promotion Law of the People's Republic of China	Article 19, Article 22
		Solid Waste Pollution Prevention and Control Law of the People's Republic of China	Chapter 3 Industrial Solid Waste, Chapter 6 Hazardous Waste
		Air Pollution Prevention and Control Law of the People's Republic of China	Chapter 4, Section 2 Industrial Pollution Prevention and Control
		Soil Pollution Prevention and Control Law of the People's Republic of China	Article 16, Article 18, Article 28
		Water Pollution Prevention and Control Law of the People's Republic of China	Article 21, Article 25, Section 2 of Chapter 4: Prevention and Control of Industrial Water Pollution
2	Departmental regulations	Registration Measures for Environmental Management of New Chemical Substances	Article 4, Article 26, Article 38, Article 44
3	Policy documents of the State Council	Action Plan for New Pollutant Control	All
		List of Existing Chemical Substances in China	All

2.1 The National Level

In addition to the principle protection provisions for the discharge of pollutants in China under the Environmental Protection Law, the Clean Production Promotion Law of the People's Republic of China (hereinafter referred to as the "Clean Production Law") and the Solid Waste Pollution Prevention and Control Law of the People's Republic of China (hereinafter referred to as the "Solid Waste Prevention and Control Law") stipulate the connection between the treatment of new pollutants and

environmental protection from the perspective of production and discharge. The Air Pollution Prevention and Control Law of the People's Republic of China (hereinafter referred to as the "Air Pollution Prevention and Control Law"), the Soil Pollution Prevention and Control Law of the People's Republic of China (hereinafter referred to as the "Soil Pollution Prevention and Control Law"), and the Water Pollution Prevention and Control Law of the People's Republic of China (hereinafter referred to as the "Water Pollution Prevention and Control Law") respectively explain how to protect the environment and reduce pollution hazards from three aspects: soil, atmosphere, and water bodies. If new pollutants are included in the Key Control New Pollutant List (2023 Edition), environmental risk control measures such as prohibition, restriction, and emission limitation shall be taken in accordance with relevant national regulations, and dynamic adjustments shall be made according to actual situations.

2.1.1 Environmental Protection Law

The first article and articles 32 to 34 of the Environmental Protection Law provide summary provisions on the prevention and control of new pollutant pollution in China; Article 39 proposes the establishment and improvement of environmental and health monitoring, investigation, and risk assessment systems, providing a theoretical basis for the three-stage treatment of new pollutants through screening, evaluation, and control; Articles 42 to 46 provide regulations on pollutant emissions, monitoring, and total control indicators. Although the article does not specifically emphasize new pollutants, they belong to the category of industrial pollutants in China and are also subject to this law.

2.1.2 Clean Production Law

Article 2 of the Clean Production Law defines the concept of clean production, which refers to continuously adopting measures such as improving design, using clean energy and raw materials, adopting advanced technology and equipment, improving management, and comprehensive utilization to reduce pollution from the source. Article 6 expresses that China encourages the promotion of clean production technology. Article 19: Encourage enterprises to adopt clean production measures in the process of technological production, adopt processes and equipment with high resource utilization and low pollutant generation, and at the same time adopt pollution prevention and control technologies that can meet the national or local pollutant emission standards and total pollutant emission control indicators. Article 27 requires enterprises to monitor and conduct production audits on resource consumption and waste generation during production and service processes. Enterprises that do not meet the standards shall implement mandatory clean production audits.

Article 17 of the Clean Production Law stipulates that the people's governments of provinces, autonomous regions, municipalities directly under the Central Government and their working departments shall establish and publish a list of enterprises with key pollutant emission control indicators according to the needs of promoting clean production work. The government shall work together with multiple departments to comprehensively coordinate the enterprises on the list, focus on supervising the production and emission of pollutants, and accept public supervision. The above legal

provisions provide formal legal basis for local government agencies and other units to deal with the problem of new pollutant pollution, and also provide guiding ideas for the formulation of local regulations and policies. And strengthen public supervision to achieve the goal of controlling pollution and protecting the environment.

2.1.3 Solid Waste Prevention and Control Law

The third chapter of the Solid Waste Prevention and Control Law stipulates the measures for the treatment of industrial solid waste, which stipulate the powers and responsibilities of relevant departments of the State Council and local people's governments at or above the county level in the prevention and control of environmental pollution caused by industrial solid waste; Article 40 stipulates that units that generate industrial solid waste shall utilize the industrial solid waste or adopt harmless treatment to prevent pollutants from causing environmental pollution. Chapter 6 Measures for the Treatment of Hazardous Waste also stipulates that the people's governments of provinces, autonomous regions, and municipalities directly under the Central Government shall organize relevant departments to carry out centralized disposal of hazardous waste, and encourage regional cooperation between adjacent provinces, autonomous regions, and municipalities directly under the Central Government. Article 78 to Article 80 stipulate that units that generate hazardous waste and units engaged in the collection, storage, utilization, and disposal of hazardous waste shall obtain licenses in accordance with national regulations, develop hazardous waste management plans in accordance with relevant regulations, and adopt measures to prevent environmental pollution.

Compared with the Clean Production Law, the Solid Waste Prevention and Control Law also mentions that units that generate solid waste should implement clean production audits in accordance with the law to reduce the harm of solid waste to the environment. However, from the perspective of waste discharge, the Solid Waste Prevention and Control Law proposes that relevant enterprises and production units should promote clean production. These legal provisions should serve as guidance to ensure that enterprises and related production units receive legal guidance in production and pollution control, provide legal principles for the treatment of new pollutants, and promote the sustainable development of the environment in China.

2.1.4 Air Pollution Prevention and Control Law, Soil Pollution Prevention and Control Law, Water Pollution Prevention and Control Law

China's Air Pollution Prevention and Control Law, Soil Pollution Prevention and Control Law, and Water Pollution Prevention and Control Law all emphasize the obligation of any individual to protect the air, soil, and water environment from three aspects: air, soil, and water, and stipulate the legal responsibilities that must be borne for environmental damage. The "List of Toxic and Harmful Air Pollutants", "List of Soil Toxic and Harmful Substances", and "List of Toxic and Harmful Water Pollutants" required to be formulated in the three laws respectively overlap with the substance scope of new pollutants. And these three laws, from the perspective of harmful consequences, stipulate the legal responsibilities that need to be borne after new pollutants and other hazards are caused. At the same

time, it was proposed that pollution control requires the joint efforts of multiple departments, cross regional comprehensive governance, and government and other departments to assume leadership responsibilities. However, several pollution prevention and control laws in our country mainly rely on post disaster relief and end of pipe treatment as control measures, which do not meet the risk regulation needs of new pollutants.

2.1.5 Measures for Environmental Management Registration of New Chemical Substances, Action Plan for New Pollutant Control, and List of Existing Chemical Substances in China

Based on the “Registration Measures for Environmental Management of New Chemical Substances” (hereinafter referred to as the “Registration Measures for New Chemical Substances”), China registers, screens, and assesses the risks of chemicals that have not yet entered the market through the environmental registration management system, in order to achieve understanding and source control of them.

The Measures for the Registration of New Chemical Substances stipulate the legal responsibilities for non registration and illegal registration of new chemical substances. At the same time, from the perspective of increased environmental risks, further understand and regulate the environmental pollution that new chemical substances may cause.

In October 2020 and April 2021, General Secretary Xi Jinping further emphasized the need to pay attention to the treatment of new pollutants during the Fifth Plenary Session of the 19th Central Committee of the Communist Party of China and the 29th collective study session of the Central Political Bureau. Premier Li Keqiang emphasized in his government work report at the 2022 National People’s Congress the need to strengthen the management of solid waste and new pollutants. In recent years, the Ministry of Ecology and Environment has made significant progress in strengthening the environmental risk management of toxic and harmful chemicals, in collaboration with multiple departments. The core of this effort lies in building and improving the relevant policy and standard system, issuing the “New Chemical Substance Registration Measures”, and comprehensively carrying out environmental risk assessment of chemical substances. At the same time, the department has also released a list of priority controlled chemicals, aimed at accurately identifying and prioritizing the handling of chemical substances that pose a significant threat to the environment.

In order to further complete the treatment of new pollutants, the Ministry of Ecology and Environment, together with 14 departments including the National Development and Reform Commission, the Ministry of Science and Technology, the Ministry of Industry and Information Technology, the Ministry of Finance, the Ministry of Housing and Urban Rural Development, the Ministry of Agriculture and Rural Affairs, the Ministry of Commerce, the National Health Commission, the General Administration of Customs, the State Administration of Taxation, the State Administration for Market Regulation, the China Banking and Insurance Regulatory Commission, and the State Administration for Market Regulation, jointly studied and formulated the Action Plan for the Treatment of New Pollutants. This action plan is based on the principles of precise pollution control, scientific

pollution control, and legal pollution control, and implements investigation and evaluation of new pollutants, classified treatment, and full process environmental risk management. Intended to strengthen institutional and technological support and ensure a sound system for the treatment of new pollutants.

The action plan specifies the governance objectives, aiming to complete the environmental risk screening of high concern and high-yield chemical substances by 2025, and complete a batch of chemical substance environmental risk assessments; Dynamically release the list of key controlled new pollutants; Implement environmental risk control measures such as prohibition, restriction, and emission limitation for key controlled new pollutants; The regulatory system and management mechanism for environmental risk management of toxic and harmful chemicals are gradually established and improved, and the ability to control new pollutants is significantly enhanced.

According to the “Registration Measures for New Chemical Substances”, the Ministry of Environmental Protection has compiled the “List of Existing Chemical Substances in China”. This list is the basic information used to distinguish between existing chemical substances and new chemical substances. Furthermore, if it is not included in the “List of Existing Chemical Substances in China”, it is considered a new chemical substance and needs to be registered and supervised in accordance with the “Registration Measures for New Chemical Substances”.

3. Difficulties and Causes of New Pollutant Prevention and Control

3.1 Insufficient Understanding of the Importance of Preventing and Controlling New Pollutants

To discuss the current situation of insufficient understanding of new pollutant treatment in China, it is necessary to first compare it with the situation of new pollutant treatment in other countries, and objectively evaluate the current situation of new pollutant treatment in China. Environmental information disclosure is a relatively objective global ranking table and a favorable tool for evaluating environmental quality. Global Environmental Performance Index (EPI), in response to the Millennium Development Goal of improving the environment established by the United Nations in 2000. It is a systematic environmental analysis for various countries and regions, published in collaboration with the Yale University Center for Environmental Law and Policy, the Columbia University Center for International Earth Science Information Network, and the World Economic Forum. It aims to address the two fundamental aspects of ecosystem vitality and environmental health. Among them, Ecosystem Vitality, which is under pressure from industrialization and urbanization, can be compared with other countries in terms of new pollutant emissions and treatment through two projects: “pollution emissions” and “waste management”. In the main performance indicators of EPI, China is located in the middle and lower reaches (ranked 156th in 2024, with a total of 180 countries participating in the evaluation). EPI is a quantitative measure of environmental performance in national policies, and China ranks relatively low, which to some extent highlights the weakness of environmental management and the severity of implementing pollutant environmental governance in China. In addition, there is a

strong positive correlation between EPI scores and per capita GDP, indicating that countries cannot sacrifice environmental sustainability for economic prosperity. The indicators of good governance include sound legal provisions and fair enforcement of regulations, which are effective means of improving EPI scores. However, there is currently a lack of legislation for the treatment of new pollutants such as persistent pollutants, endocrine disruptors, antibiotics, and microplastics, as well as a lack of industry emission standards and comprehensive laws and regulations.

3.2 Disagreement on the Scope Definition of New Pollutants

The US Environmental Protection Agency (EPA) defines new chemicals that are not regulated as new pollutants. Japan has a more flexible definition of new pollutants, which is defined in the Chemical Substance Review and Regulation Act as: chemical substances that are not included in Japan's existing chemical substance list or registered new chemical substance public list or corresponding management list. The new chemical substances that can cause pollution are called new pollutants.

However, there is still room for discussion on the definition of new pollutants in China. Firstly, the name was determined relatively late. Before the proposal of the 14th Five Year Plan (2021), "new pollutants" were also known as "new pollutants" or "emerging pollutants" in the academic community in China. They were collectively referred to as "new pollutants" after the proposal of the 14th Five Year Plan. In terms of management, "new pollutants" are a concept corresponding to conventional pollutants, mainly referring to pollutants that have not yet been regulated by laws, regulations, and standards or have incomplete regulations.

Based on the opinions of experts and scholars, it can be seen that China has defined the characteristics of new pollutants. There are two characteristics included, one is that the production or discovery time is relatively "new", and its hazards have not been fully discovered; The second is to reflect "new" in legal provisions, which are currently not regulated by any laws or administrative regulations.

3.3 The Legislative Level for the Prevention and Control of New Pollutants Is Relatively Low

Legal hierarchy refers to the vertical classification of various legal sources within the legal system of a country within the same legal domain. At present, among the legal documents related to new pollutants, the legal source attribute of the "Registration Measures for Environmental Management of New Chemical Substances" is the departmental regulations of the Ministry of Ecology and Environment, and the "Action Plan for the Treatment of New Pollutants" and the "List of Existing Chemical Substances in China" are policy documents of the State Council. There are no specific laws or administrative regulations to regulate the environmental hazards caused by new pollutants. On the other hand, China's legal management system for four typical new pollutants is relatively scattered, making it difficult to form a systematic legal governance system for new pollutants. Taking antibiotics as an example, China's management of antibiotics is usually achieved through drug management. In 1984, the Drug Administration Law was promulgated, which stipulated antibiotics as a type of drug through Article 57, achieving the legalization of antibiotic management. The "Biosafety Law" promulgated in 2020 directly indicates the management of antibiotic use and residues by the state through Article 33.

3.4 Lack of Accountability and Accountability Mechanisms for the Prevention and Control of New Pollutants

According to existing laws and the Civil Code, no fault liability is adopted for environmental pollution liability. The so-called “no fault liability” refers to Article 7 of the Tort Liability Law, which stipulates that if a person damages the civil rights and interests of others, regardless of whether the person is at fault or not, the law stipulates that they should bear tort liability. The essence of whether the principle of no fault liability should be applied to environmental infringement is the relationship between regulatory law and tort liability, because the “fault” standard in environmental infringement generally reflects whether it exceeds the corresponding mandatory standard. However, in the actual application of the law, there are practical problems. One is the difficulty of accountability. Due to the inherent characteristics of new pollutants, such as their relatively new discovery time, their characteristics and the pollution they cause have not been clearly recognized. Although China’s “Registration Measures for Environmental Management of New Chemical Substances” stipulate a secondary registration system for new pollutants, the understanding of the hazards they can cause is still far from sufficient. Secondly, there is a lack of accountability mechanisms. The public welfare nature of environmental pollution issues determines a wide range of accountability, and governments, enterprises, and individuals can all be called the main subjects of environmental accountability. In the basic laws of environmental protection in our country, the Environmental Protection Law has made relevant provisions on environmental responsibility in Chapter 5 “Legal Responsibility”. But its focus is on detailing the administrative, civil, and criminal responsibilities that enterprises and institutions bear for violating the Environmental Protection Law. The environmental responsibility of the government is only summarized in one article, Article 45, which provides administrative sanctions and criminal penalties for the dereliction of duty of government officials. In terms of pollution control caused by new pollutants, China’s laws and administrative regulations still need to further clarify the accountability mechanism.

4. Legislative Methods and Logical Thinking for the Prevention and Control of New Pollutants

Foreign scholars started their research on new pollutants earlier. In the 1960s, they gradually began to study various new pollutants such as toxic and harmful chemicals, persistent organic pollutants, antibiotics, and environmental endocrine disruptors. Since the 1990s, with the advancement of detection technology and environmental science, emerging pollutants that exist in trace amounts in the environment but can also cause environmental and health risks have been continuously discovered. A large number of scholars have studied the environmental occurrence, treatment, and ecological impact of new pollutants.

Many countries and regions, such as the European Union, the United States, and Japan, have already incorporated existing and new chemical substances into a unified risk assessment system.

4.1 Foreign Legislative Experience

In order to control the hazards caused by the production and use of chemicals, since the 1970s, countries have successively established relevant laws and regulations for chemicals generated in industrial production results and production processes. Subsequently, the world gradually carried out regional coordination and cooperation, and jointly signed conventions related to chemical pollution. In 2001, under the advocacy of the United Nations, countries signed the Stockholm Convention on Persistent Organic Pollutants (hereinafter referred to as the “Convention”). Since the formal implementation of the Convention in May 2004, 186 signatory countries (or regions), including China, have conducted comprehensive investigations on chemical risks related to persistent organic pollutants (POPs), a type of new pollutant. However, due to differences in economic development and industrial production levels among countries and regions, their approaches to treating new pollutants and legislative models vary.

4.1.1 The European Union

Internationally, “emerging pollutants” is commonly used to refer to new pollutants. As early as the 1960s, the European Union issued the Directive on the Classification, Packaging and Labelling of Hazardous Substances (67/548/EEC), which regulates chemical substances and has been continuously improved and developed since then. Currently, the European Union Regulation Concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals, under the leadership of REACH, the regulation of new pollutants is implemented. This regulation provides transparent, independent, and high-quality scientific opinions and decisions through chemical safety work, serving as the basis for drafting and adopting EU measures. Collaborate with EU institutions, member state authorities, as well as third countries and international organizations. Ensure the provision of relevant, reliable, and objective information to the public and stakeholders. In 2007, REACH imposes greater responsibility on manufacturers to better and earlier assess the hazards and risks of the compounds they produce, and to identify and implement measures to protect humans and the environment. Therefore, REACH provides a legislative basis for studying the toxic properties of compounds before they are applied or released into the environment, rather than after they appear as pollutants.

On the other hand, since the 1990s, the pollution of drinking water by new pollutants has been recognized. New pollutants from the environment can disrupt the hormonal (endocrine) system of exposed organisms by mimicking or blocking the action of hormones. In order to ensure the safety of public water supply, eliminate the impact of new pollutants, and be regulated by international and national legislation. In Europe, legislation formulated by the European Commission is becoming increasingly important. Nowadays, several European laws are of concern regarding the harm of emerging substances to water resources. The Drinking Water Act 98/83/EEC describes the minimum quality requirements applicable to drinking water. Many substances have specific requirements. However, the shortcoming is that the bill hardly mentions any newly emerging pollutants regarding the substances mentioned earlier. The Water Framework Directive 2000/60/EC aims to protect the quality

of surface and groundwater in Europe. Its general principle is that the standards of compounds should be related to their ecological (toxicological) logical effects. Article 7 of the directive explicitly links the improvement of water quality with the goal of drinking water. The protection level of surface water and groundwater should enable reliable drinking water to be sustainably prepared, and aim to reduce the required purification treatment level in a timely manner. Many priority compounds have been named. In addition to legislation, cooperation and discussion initiatives such as the International Commission for the Protection of the Rhine (ICPR) and the International Meuse Commission (ICM) also aim to protect the sustainable use of surface water. They provide a platform for discussing and resolving disputes between upstream polluters and downstream users of rivers.

In the process of managing new pollutants through the development of relevant laws, the European Union adopts a combination of legislation and specialized committees, guided by REACH, and collaborates with new pollutant manufacturers to tackle the challenges of new pollutant management through multi-party joint governance. On the one hand, this is a positive and effective means of governance, as new pollutants cross national borders and multiple countries should work together to control them. Therefore, measures should be taken to regulate them. On the other hand, international legislation implies a time-consuming process and the handling of compromises. At the same time, the list of regulated compounds cannot fully represent the new pollutants currently faced by China, and the understanding of new pollutants is limited by the current technological development.

4.1.2 United States

The United States adopts a parallel approach to the treatment of new pollutants in the early stages through legal amendments and monitoring system institutions. The Toxic Substances Control Act (TSCA) introduced by the United States in 1976 is a typical example of its chemical management legislation and specialized legislation on toxic and harmful substances. It has established a relatively complete legislative framework for chemical management and formed a legislative system that covers the entire life cycle of chemicals with the concept of risk prevention. In 1996, following the Paris Convention for the Protection of the Environment of the Northeast Atlantic, the United States was the first to pass an amendment to the Federal Food, Drug, and Cosmetic Act and establish an advisory committee for EED screening and monitoring.

Among persistent organic pollutants (POPs), the United States has developed a national strategic plan for perfluorinated compounds (PFOS) based on a deeper understanding of them. In terms of food packaging management, since the beginning of the 21st century, the United States has strictly regulated the use of fluorinated compounds (PFCs) in food contact materials through federal codes; In 2002, two important new use rules were issued for 88 perfluorooctane sulfonate compounds (PFOS) and related chemical substances, and in 2007, the rule was increased to 183 substances; In 2018, the United States revised the Toxic Substances in Packaging Act to prohibit the use of perfluorinated and polyfluoroalkyl substances (PFAS) in food packaging.

On the one hand, the United States has issued new uses for fluorinated chemicals from a positive perspective. On the other hand, after recognizing the teratogenic and carcinogenic persistent hazards of perfluorinated compounds to the human body, the United States has comprehensively restricted and regulated their abuse on packaging, starting from the food industry that can directly enter the human body.

4.1.3 Japan

The legislation of chemical substances in Japan started early, and the Chemical Substance Review and Production Control Law (CSCL) promulgated in 1973 was the world's first regulation to control the risks of chemical substances. After years of legislative improvement, six laws on general industrial chemicals, about 30 laws on specific use chemical substances, laws on restricting the discharge and disposal of chemical substances, laws on protecting consumer safety and preventing air pollution, as well as nearly a hundred government and provincial orders have been implemented to supplement them. It has the characteristic of comprehensively managing the entire process of new pollutants from production, discharge to environmental governance based on laws and decrees (referring to orders made by the Japanese Cabinet in accordance with Article 73, Paragraph 6 of the Japanese Constitution, which have the highest priority effect among orders issued by administrative agencies).

The first endocrine disruptor strategic plan in Japan (SPEED98) included observation and risk assessment of environmental hormones (EEDs). Environmental hormones (EEDs) cause biological effects on individuals or populations by disrupting endocrine function, and have characteristics such as toxicity and persistence. If released in large quantities into the environment, it will affect the balance of natural hormones in organisms and accumulate and amplify them through the food chain.

In the first SPEED (1998), Japan conducted extensive observations on regional EED environmental exposure levels and wildlife hazards, and proposed 28 highly prioritized chemicals with endocrine disrupting effects for hazard assessment. Excellent progress has also been made in risk assessment and management, information sharing, and international cooperation. Subsequently, based on the relevant reactions and information of chemical substances in environmental monitoring, the hazard assessment of chemical substances will continue. Japan has increased the number of chemical substance monitoring in the third SPEED and has completed in vitro screening for 113 of them. Adopting a grading principle for first level screening and second level testing of EEDs, and establishing an evaluation framework for toxicity effects. At present, the United States, the European Union, and Japan have all included multiple EEDs in their priority pollutant control lists.

Japan supplemented the drinking water quality standards by revising relevant standards in 2015, adding five endocrine disruptors to the water quality indicators and making stricter limit regulations.

4.2 Domestic Prevention and Control Logic

4.2.1 Constructing a New Pollutant Treatment Method Based On the "Ecological Restoration Theory"

Lv Zhongmei and Dou Haiyang (2020) proposed that "the environmental infringement system has shifted from a single environmental pollution to a dual recognition of environmental pollution and

ecological damage in behavior recognition, and from a single private interest to a dual protection of private interest and public welfare in the relief object.” With the gradual improvement of relief methods, a distinctive “ecological restoration theory” has been formed. The so-called “ecological restoration theory” is a fundamental specialized environmental liability system that provides a theoretical basis for establishing remedies for “damage to the environment”. With the core of ensuring the integrity of the ecosystem, we advocate for the coordinated consideration of environmental factors and the ecosystem and its service functions. In terms of damage relief, we prioritize restoration, including the restoration of the ecological environment and the prevention and control of human health risks. It can protect the environment, compensate the injured party or eliminate obstacles to restore the original state; It can also punish and admonish those who damage the environment. To achieve the effect of ecological restoration, it is necessary to focus on the enterprises and producers that cause environmental hazards from new pollutants. On the one hand, criminal and civil responsibilities should be pursued to achieve the “guiding” role of the law; On the other hand, the government should adhere to the governance core of “restoring the environment” and build a “green China” of ecological civilization.

4.2.2 Improve the Entire Process of New Pollutants through Three Stages of Screening, Evaluation, and Control

Screening “refers to” listing control lists for new pollutants, “evaluation” refers to incorporating new pollutants into the risk assessment system, and “control” refers to taking control measures for new pollutants with high environmental hazards. The first step is to screen for new pollutants and accurately select chemical substances with characteristics such as biological toxicity, environmental persistence, and bioaccumulation from tens of thousands of chemical substances produced and used in China each year, and include them in the control list. The second step is to do a good job in the evaluation work, conduct environmental risk assessment on the chemical substances, and accurately identify the chemicals that should be prioritized for control. Evaluation criteria and procedures for controlling chemicals and the list of key controlled new pollutants. The third step is to conduct environmental risk assessments on priority chemicals and accurately identify the chemicals that should be prioritized for control.

5. Improvement Approach for Prevention and Control of New Pollutants

The treatment of new pollutants is a typical risk society issue, with a focus on the source and a core focus on chemical substance risk control and prevention. German sociologist Ulrich Beck first proposed the concept of “risk society” in his book “The Risk Society” published in 1986. Baker explains in the book that although the term risk has existed since the origin of human civilization, with the development of modern society, modern risk has characteristics such as imperceptibility and uncertainty... It is precisely because of these characteristics that it has entered a completely new risk society. The environmental risk of new pollutants is a typical scientific uncertainty problem, that is, based on the current level of human technology and existing information, it is difficult to make

accurate judgments on the specific environmental and health risks of new pollutants. This uncertainty mainly includes the uncertainty of the source, development process, and harmful results. This “uncertainty” is consistent with the definition of a “risk society”, and at the same time, the environmental risks caused by new pollutants are a typical type of risk in a risk society. Environmental risk is a new pollutant risk prevention and control system built by society based on the concept of “risk” throughout the entire life cycle management and optimized grading, which has good reference significance for the improvement of China’s new pollutant governance.

5.1 Clearly Define the Scope

There are two characteristics of new pollutants: one is that their production or discovery time is relatively new, and their hazards have not been fully discovered; The second is to reflect “new” in legal provisions and determine the boundary between new pollutants and traditional pollutants.

At the cognitive level of discovery, new pollutants usually refer to chemical substances that have been produced, used, or newly emerged in the natural environment in recent decades. Due to their relatively short appearance time, the scientific community’s understanding of their toxicity, ecological impact, and human health risks may be incomplete or blank. Traditional pollutants are often substances that have existed for a long time in history and have been widely studied, and their harmfulness and mechanism of action are already relatively clear. At the legal regulatory level, the “novelty” of new pollutants in law may be reflected in the fact that they have not yet been explicitly included in the regulatory scope of existing environmental laws and regulations, or although they have been included, the specific emission standards, restriction measures, etc. are not yet perfect. Traditional pollutants usually have clear legal definitions, emission standards, and control measures.

For the conceptual division of new pollutants, combining the cognitive level of discovery and the level of legal supervision, the two parts define new pollutants to ensure comprehensive regulatory measures for the target in actual production management.

5.2 Clearly Define Specialized Laws

In the process of promoting the codification of environmental laws, the improvement of legislation for new pollutants is not only a key part of building a logically rigorous and comprehensive environmental law system, but also a direct response and necessary measure to address the current problem of low legislative level and limited implementation effect in the field of chemical management. The aim is to ensure that the treatment of new pollutants enters the environmental legal system by elevating the legislative level and enhancing the legal status, thereby safeguarding the sustainable health of the ecological environment and the sustainable development of society. In the legislative process, the principle of “screening, evaluation, and control” should be adhered to in the treatment of new pollutants: a control list should be compiled for new pollutants, new pollutants should be included in the risk assessment system, and control measures should be taken for new pollutants with high environmental hazards, so as to achieve full lifecycle management of new pollutants as the goal of new pollutant treatment laws starting from chemical production. At the same time, we will integrate the

existing specialized laws and regulations in China for four major categories: environmental endocrine disruptors, persistent organic pollutants such as perfluorinated compounds (PFCs), antibiotics, and microplastics, and establish a comprehensive chemical legal management system for new pollutants.

5.3 Clarify Legal Responsibilities

Clarifying legal responsibilities is the key to ensuring social order and justice, and resolving disputes over infringement caused by the hazards of new pollutants. Applying “attribution” to clarify legal responsibility, “basis of responsibility” and “attribution” solve the problem of the value ontology and objective value evaluation of legal responsibility.

In order to address the current situation of the lack of a “baton” in the treatment of new pollutants. The government should take the leading responsibility, formulate and improve relevant laws and policies, and promote the prevention and control of new pollutants. Integrating ecological security into national security and arranging it together with people’s well-being requires the establishment of a system and mechanism for smooth communication and coordinated operation of power, and strengthening power constraints. In terms of social governance, we will build a policy system that integrates the rule of law, administration, and market, and strengthen the full chain traceability of the responsibility of enterprise entities for “prohibiting emissions, reducing emissions, and comprehensive governance”. Secondly, as the main emitters of pollutants, enterprises should bear the main responsibility for emission reduction and governance. For enterprises that violate relevant laws and policies and discharge pollutants beyond the standard, their legal responsibilities should be pursued in accordance with the law, including fines, production suspension and rectification measures. At the same time, the public should actively participate in the prevention and control of new pollutants, and jointly maintain the ecological environment and human health through reporting, supervision, and other means.

5.4 Establish A Cross Departmental Collaboration Mechanism

The cross departmental collaboration mechanism mainly focuses on the collaboration between administrative agencies and public institutions within the government system on emergency management matters. Due to its environmental persistence, bioaccumulation, and other characteristics, new pollutants are difficult for a single government administrative agency to effectively control. In cross departmental collaboration, it is not only necessary to communicate and collaborate among departments, but also to have clear and specific leadership departments and division of responsibilities. Conduct information disclosure in cross departmental collaboration to facilitate the work of each department in their respective professional fields.

It is also necessary to establish a mechanism for sharing characteristic pollution information, as information sharing is a prerequisite for achieving cross departmental collaboration. At the same time, another practical significance is that in the increasingly complex socio-economic system, it is difficult for a single department to independently capture and conduct comprehensive analysis of the chain information of new pollutants. Only in the context of collaborative efforts among multiple departments, can the obtained information resources be dismantled, analyzed, and re integrated to produce

information that is practically meaningful for the treatment of new pollutants.

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