



The management of the electroplating industry in Lake Tai Basin needs to be strengthened



**SIP Lvse Jiangnan Public Environment Concerned
Centre**

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1. Background

1.1 The environmental condition of the Lake Tai Basin is worrying

Lake Tai basin is located in the middle of the Yangtze River Delta and Lake Tai is the third largest freshwater lake in China. It is located in a plain area, so the water level is relatively stable. The basin is home to many towns and firms, supporting a population of more than 30 million people and the most dynamic economic center in China. However, with the rapid economic development and urbanization, new problems have emerged in the water environment of Tai Basin : The increasing number of developing projects, the lack of effective control of pollutant discharges, and the water shortage and deterioration of water environment caused by water pollution. These result in that the problems in drinking water's safety are increasingly prominent, and the task of water pollution prevention and control is arduous.

In 2015, the average water quality of Lake Tai was IV. Among 20 national control monitoring points, III water quality points accounted for 20.0%, IV accounted for 75.0%, V category accounted for 5.0%. (The water quality below Class III is poor and cannot be used as a drinking water source). The main contamination index are chemical oxygen demand and phosphorus. The high nitrogen, phosphorus and organic matter cause the eutrophication of Lake Tai, which leads to cyanobacteria outbreak, resulting in fish death, peculiar smell and algae toxins, affect the water function of the lake and bring serious influence in to residents' normal life. In addition, heavy metal pollutants are not easily degraded. They will enter the lake sediment by cumulative adsorption and suspended sedimentation due to the change of water dynamic conditions. Due to the limited carrying capacity of the sediment and the changes of

other external factors, heavy metals will be re-released from the sediment as potential secondary pollutants, causing secondary pollution.

The sediment of Lake Tai is generally thin, only a few tens of centimeters, which is the carrier and home for many pollutants to migrate and transform in the water environment. Therefore, heavy metal pollution in Taihu basin cannot be ignored. The main heavy metal pollutants in the sediment of Taihu Basin are cadmium, mercury, copper and lead. According to relevant literature, the intensity of heavy metal pollution in the northern region of Lake Tai basin is generally higher than in the southern region. Especially in Wuxi, a relatively economically developed area in the northern part of Taihu basin, which is the key area where the polluted rivers are concentrated in the lake. During 2000-2005, the lead and copper content of the sediment of the lake in Wuxi was in light pollution stage and in the second level of soil environmental quality, and the trend is increasing year by year^[1]. Cadmium is in the third level of soil environmental quality^[2].

The heavy metal pollution in Taihu basin mainly comes from electroplating enterprises and dye factories' "three wastes". With the development of automobile, electronics, household appliances, aviation, aerospace industry, construction industry and corresponding decoration industry and the improvement of people's need of beautifying house and living things , the demand for electroplating products in China has increased significantly. The electroplating enterprises in the Lake Tai Basin of Jiangsu Province are highly concentrated, and the total amount of discharge per unit is among the highest in China. Therefore, the heavy metal pollution from electroplating enterprises in Lake Tai basin should become the focus of attention.

2.2 Environmental and health hazards of the electroplating industry

Electroplating is a widely used basic process in industries, and is an indispensable part of the manufacturing treatment of mechanical and electronic products, instrumentation, electronic communication devices, automobiles and so on. It has

unique applications such as decoration and protection. The most widely involved in the electroplating process industry in China are galvanizing and copper/nickel/chromium plating. Which accounts for 45-50% and 30% respectively. Alumina and anodized film accounting for 15%, and electronic products plating with lead, tin and gold accounts for about 5%. According to the Technical Specification of the Wastewater Management Project for Electroplating Industry and Best Practicable Technology Guide for the Pollution Prevention and Control of Electroplating Industry, the types, sources and pollution factors of wastewater in electroplating industry are shown in Table 1 below.

Table 1:Types, sources and pollution factors of electroplating wastewater

serial number	types of wastewater	processes that generate wastewater	pollution factor
1	wastewater without oil	degreasing and cleaning of plated parts	COD, petroleum
2	acid and alkali wastewater	acid cleaning of plated parts	COD
3	chromium-containing wastewater	passivation Cleaning	COD, Cr
4	nickel-containing wastewater	nickel plating cleaning, de-plating cleaning	COD, Ni
5	cyanide-containing wastewater	pre-plated copper cleaning; bronze plating / imitation gold cleaning	COD, CN, Cu
6	copper-containing wastewater	acid copper plating cleaning	COD、CN、Cu

Lake sediment is the main accumulation site for terrestrial pollutants such as heavy metals. Sediment can play a role in purifying water bodies under certain conditions, but may also become a potential source of endogenous pollution, increasing the pollution of the upper water body. There are two types of hazards of heavy metals to human, one is direct toxicity, and the other is long-term chronic toxicity through food chain enrichment. The acute manifestations of heavy metal poisoning are vomiting, weakness, drowsiness and even death. Chronic toxicity is

characterized by long-term immune deficiency, which can lead to the development of cancer. The main damage caused by heavy metals to human is shown in Table 2.

Table 2: The risks of heavy metals to the human body

types of heavy metals	the risks
lead(Pb)	damage to the central nervous system (especially in children), kidneys and immune system; potentially carcinogenic
mercury(Hg)	after entering the body and sinking into the liver in large quantities, it will damage the kidneys and can cause necrosis of renal tubular epithelial cells; cause damage to the brain and central nervous system; may cause cancer
chromium (Cr)	can cause lung cancer, nasal cancer; cause blood diseases, liver and kidney damage
arsenic (As)	can harm the central nervous system; cause cardiovascular dysfunction; cause gastrointestinal dysfunction
rationalization (Cd)	accelerate the loss of calcium from bones, causing fractures or deformities; cause damage to kidney tubules, leading to diabetes and eventually kidney failure; cause lung disease and even lung cancer; cause cardiovascular disease
antimony (Sb)	can cause lung cancer; radioactive damage to the skin
zinc (Zn)	weaken the immune function of the body, affect the role of iron, and can cause cholesterol metabolism disorders, and even induce cancer
nickel (Ni)	have an irritating effect on human skin mucous membrane and respiratory tract, which can cause dermatitis and bronchitis, and even pneumonia; Have accumulation effect in kidney, spleen and liver, and can induce nasopharyngeal and lung cancer
copper (Cu)	trigger anemia when it is in excess; extremely harmful to the liver, kidneys and gastrointestinal tract.

In addition, the electroplating industry produces a wide variety of industrial solid waste, and most of them are hazardous waste. According to the National Hazardous Waste List, the types of solid waste, generation processes and hazardous waste categories in electroplating industry are shown in the following table 3.

Table 3: Types of solid waste, generation processes and hazardous waste categories in electroplating industry

serial number	name of solid waste	generation process	hazardous waste category
1	plating tank slag, plating solution filtration slag	filtration of plating bath and cleaning of bath sludge	HW17
2	sludge of wastewater management	wastewater management	
3	oil pollution	de-oiling tank	
4	bags for chemical materials	package plating materials	HW49

Solid waste generated by the electroplating industry usually has the characteristics of high quantity, high water content, high content of toxic heavy metals such as copper, nickel, chromium and zinc and low calorific value, etc. If not stored or treated normally, it is very easy to cause secondary pollution, which is extremely harmful to the surrounding environment.

2. Bottlenecks in the development of electroplating enterprises in

Taihu Basin

2.1. The government's mandatory pollution control effectively promotes the orderly development of the industry

There are nearly 600 electroplating enterprises or enterprises which include electroplating process above the scale in Jiangsu Province, of which 376 directly emitting pollution. According to the relevant statistics, in 2013, the COD emissions of these enterprises were 1362 t, ammonia nitrogen emissions were 69 t, petroleum emissions were 51 t, cyanide emissions were 2919 t, total chromium emissions were 2863 t, and hexavalent chromium emissions were 1515 t.^[3]

In the face of the increasingly serious environmental situation, in order to further improve the level of pollution prevention and control of electroplating enterprises in the Taihu basin, and to effectively reduce heavy metal emissions, the Jiangsu Ministry

of Ecology and Environment issued the Environmental Protection Rectification of Electroplating enterprises in Taihu Basin in 2012. According to the requirements of the higher level, all cities combined with the actual situation, and made severe corrections to local electroplating enterprises. Small electroplating enterprises without licenses and permits were resolutely banned, and some enterprises with advanced equipment and larger scale were upgraded. The government planned the electroplating industrial park reasonably and enhances the pollution control level of electroplating enterprises through scientific and intensive management.

There are more than 90 electroplating enterprises in **Changzhou**. 74 electroplating enterprises have met the standard, and 4 have been shut down and 2 enterprises' sewage draining exits were blocked. There were 68 electroplating enterprises in **Danyang, Zhenjiang**, and 6 of them were temporarily retained and upgraded. 45 enterprises were divided into two batches into electroplating parks. The 17 electroplating enterprises (or electroplating workshops) that do not meet the industry development, have backward production capacity and many safety hazards, were closed down. Huangqiao Town in Suzhou will focus on the rectification of small electroplating workshops, with the goal of fundamental improvements. The government has a phased approach to the closure, transfer, transformation of enterprises, and will eliminate all the heavy polluting electroplating enterprises till the end of this year, the heavy pollution of electroplating enterprises All eliminated. Wuxi Metal Surface management Technology Industrial Park is the first one in the province established by the government to focus on the surface management and related industries. There are more than 140 electroplating workshops or enterprises in the park. The industrial park will take over the wastewater from each enterprises in the park to the park's wastewater management center. However, the problem of excessive nickel has not been effectively solved.

2.2. There are problems that need urgent breakthrough

At present, the problems of electroplating enterprises in Taihu Basin are as follows.

2.2.1. Electroplating enterprises have small scale and are scattered, and the operation level of their pollution control facilities is poor

The electroplating industry is a cross-sectoral supporting treating industry. Except for professional electroplating factories and electroplating workshops of a few large factories, many electroplating enterprises are small in scale and scattered, and there are also supporting electroplating workshops for some non-electroplating enterprises . The level of environmental management equipment is low. Employees are not professional enough and are not motivated to invest in pollution control. We can see these problems in Figure 1.

Although the technical level of electroplating enterprises in Taihu Basin has been further improved after the rectification in 2012, the scale and technical level of different enterprises are still uneven. There are still a lot of problems, such as mixed intermittent discharge, over-standard discharge or diluted discharge, unregulated outfalls, the lack of diversion of rainwater and sewage, idle or improperly used governance equipment, uncollected and untreated toxic and hazardous waste gas, excessive emissions of toxic and hazardous waste gases, plating credentials that have been used multiple times, plant within plant, production of electroplating not in the scope of business, unapproved construction project, operation exceeding the amount of environmental assessment approvals, messy sludge site management or illegal transfer of sludge site management.



Figure 1: Scene pictures of an electroplating enterprise

2.2.2. Emission standards for a few electroplated metals have not been established yet

At present, the electroplating industry in Taihu Basin is implementing standard in the Emission Standards for Electroplating Pollutants (GB21900-2008)(Table 3). The main metals used in electroplating are zinc, copper, nickel, chromium, gold, silver, tin, lead, cadmium, cobalt, manganese and mercury. But the monitoring points and emission standards for tin and cobalt have not been specified in the Emission Standards for Electroplating Pollutants. So the environmental supervision department cannot monitor and evaluate tin and cobalt.

2.2.3. The hazardous waste generated is difficult to effectively dispose in time

Most of the electroplating industrial parks only focus on the management of wastewater and ignore the disposal of sludge. As shown in Figure 2 ^[4], the amount of electroplating sludge generated in Jiangsu province is increasing year by year, and the distribution of the amount generated in each city in the province is shown in Fig. 3 ^[4]. Suzhou and Wuxi are the largest producers, with a total of nearly 70% of the total.

At present, there are fewer qualified units in Taihu Basin with the ability to dispose of

hazardous wastes such as electroplating sludge and packaging waste. Generally the local hazardous waste disposal capacity is limited, most of units give priority to the disposal of local hazardous waste, and will accept the waste form other cities only if there is spare capacity. If the waste needs to be transferred to other provinces for disposal, it will take longer time for cross-provincial transfer approval. Therefore, the phenomenon is common that most electroplating enterprises have a large amount of temporary storage of hazardous waste and the disposal is not timely. While the barrier of qualification and technical of hazardous waste management have caused the monopoly phenomenon of hazardous waste management market. All parties are driven by the interests, leading to the illegal transfer of hazardous waste and hazardous waste dumping violations occur from time to time.

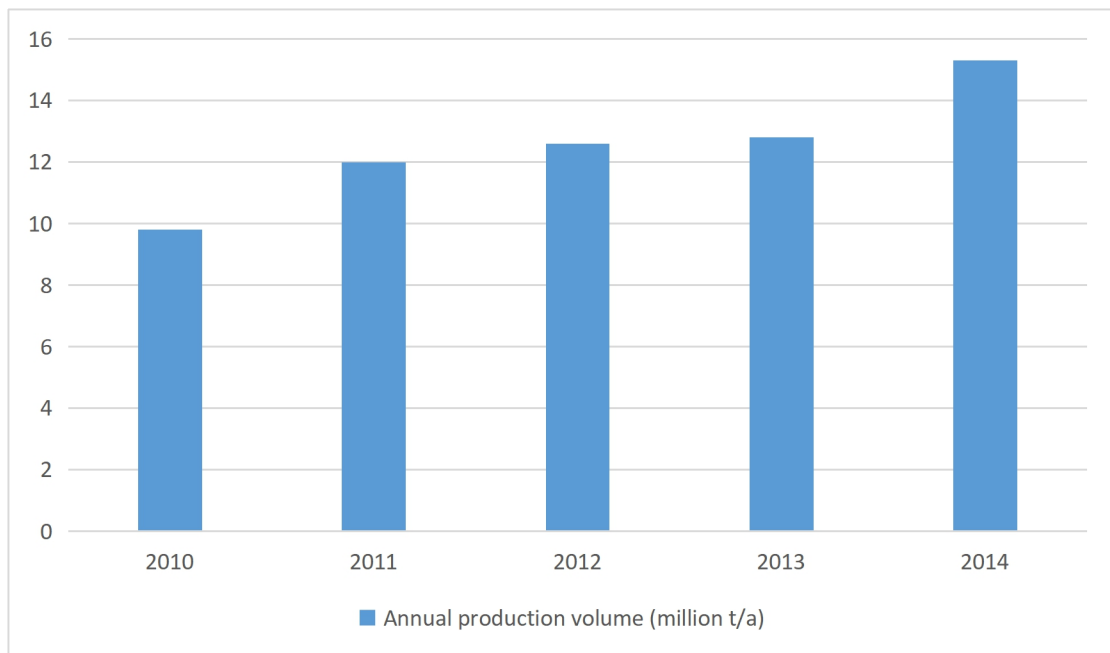


Figure 2: Electroplating sludge (HW17) generation in Jiangsu Province

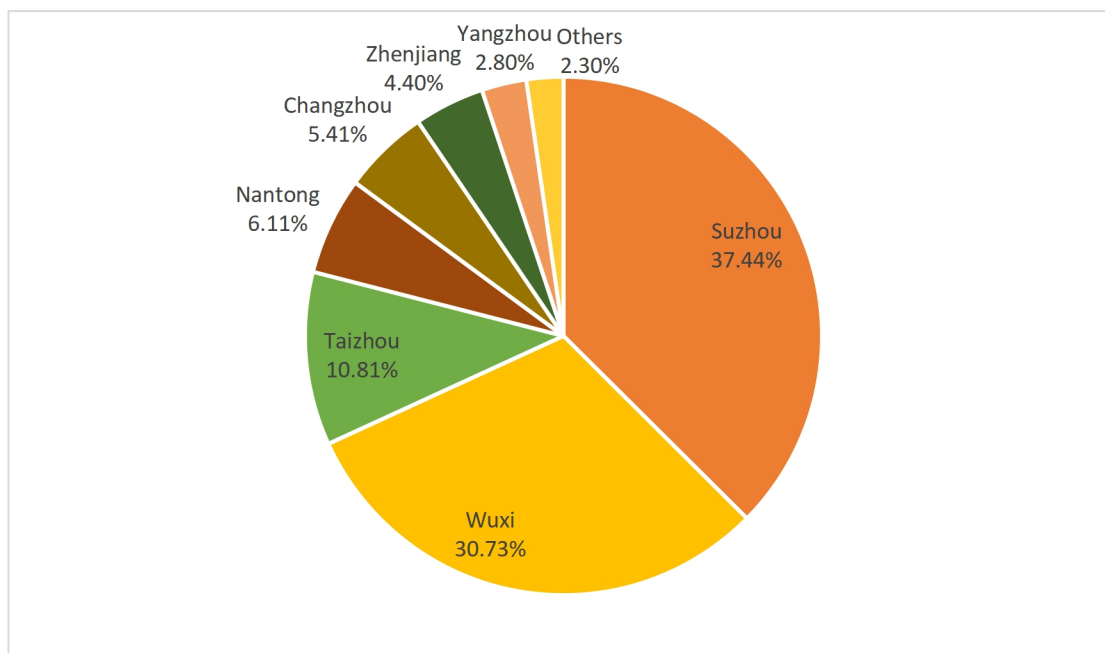


Figure 3: Regional Distribution of Electroplating Sludge Generating Enterprises in Jiangsu Province in 2014

2.2.4. The ecological restoration of sites for electroplating enterprises is difficult

The contaminated site is a serious threat to human health and ecological environment, and there is a greater environmental risk in the process of its redevelopment and utilization. The soil of sites for electroplating enterprise is generally polluted to different degrees. The collection of wastewater from electroplating workshops is incomplete. Leakage in the pipes carrying wastewater is very serious. The evasion of wastewater is common. The soil where the wastewater management facilities, sludge filtering and temporary storage sites are located is more seriously polluted. The heavy metal contaminated soil left behind after the closure of electroplating enterprises poses a serious threat to the environment. Although the Action Plan for Soil Environmental Protection and Pollution Control has been issued, it is still a major problem for the remediation of such a complex contaminated sites left over from the electroplating industry

2.2.5. The management of electroplating industrial park is not perfect

The management level of some electroplating industrial parks is backward, and the management system of the parks needs to be improved. Besides, the management system of each electroplating enterprises is not sound. The wastewater of electroplating workshop is not collected and treated separately, resulting in inefficiencies. The centralized management unit of electroplating wastewater has simple technology and aging equipment, and the results can't meet the standard under normal operation. The centralized management becomes the centralized discharge, and becomes a "haven" for illegal discharge of enterprises.

2.3. Cases

The total number of heavy metal state-controlled enterprises in the Taihu Basin of Jiangsu Province is 35, of which 30 are in Wuxi. Among them, 26 heavy metal enterprises in Huishan District are located in Wuxi Metal Surface Treatment Technology Industrial Park in Huishan District. From May 2015, Lvse Jiangnan conducted a year-long study of this park.

After a desk research Lvse Jiangnan found that more than 80% of the enterprises in the electroplating park have more than one bad record of environmental violations before 2015. Jiangsu Jinlin Environmental Technology Co. and Wuxi Yongda Wastewater Treatment Plant who treat wastewater discharged by all enterprises have multiple bad records of environmental violations each year, and even its environmental credit rating is rated black.

Researches show that whether in unpolluted or heavily polluted water bodies, the content of heavy metals in the sediment is much higher than the content of heavy metals in water. In April 2016 Lvse Jiangnan carry out sediment sampling and testing respectively on the upstream and downstream of the river on the north side of Jiangsu Jinlin Environmental Technology Co.. The test results of third-party testing

organizations are compared with domestic and international standards, as shown in Table 4.

Table 4: Test results of heavy metal content in river sediment

name	soil samples 1	soil samples 2	soil samples 3	NOAA Sediment Quality Standard ERM value (mg/kg)
lead	88	27	45	218
nickel	190	173	217	51.6
copper	2860	727	672	270
zinc	4770	1530	1750	410
chromium	3660	4510	2850	370

The test results showed that the content of heavy metals in the three soil samples taken, except for lead, exceeded the standard to different degrees, especially copper, zinc and chromium, which are alarmingly high! The heavy metals in the sediment will be transferred to the aqueous phase when the hydraulic conditions change. Among them, hexavalent chromium is the most toxic, mildly causing dermatitis and ulcers, heavily causing respiratory and gastrointestinal diseases, even directly leading to lung cancer disease, and can also cause central nervous system poisoning in infants. Trivalent chromium is relatively less toxic, but more toxic to aquatic organisms than hexavalent chromium. Zinc content in water higher than 0.1 mg / l will have an impact on aquatic life such as fish and shrimp, higher than 2mg / l will lead to loss of enzyme activity and reduced microbial action in the soil, resulting in reduction of crops. The copper content in the water body over 0.01 mg/l will be harmful to aquatic organisms. Nickel is a heavy metal that people often exposed to, but hydroxy nickel is identified as a strong carcinogen.

It can be seen that Wuxi Metal Surface Treatment Technology Industrial Park has caused such a large amount of heavy metal pollution in the surrounding river sediment. Since the area is a Type II protected area of Lake Tai, such a phenomenon has seriously affected the safety of the water resources of Lake Tai and the production

and life of the surrounding environment and people. This shows that there are major problems in the management of this electroplating park, which needs to be strengthened and improved in many aspects in order to reduce or stop the adverse effects and make the electroplating park really play the role of unified management and unified governance of electroplating enterprises.

In this case, the sewage treatment plant, which should centralize the treatment of sewage, is reduced to a source of pollution. Although centralized governance can save environmental investment and improve the efficiency of treatment, if it is not well supervised, there will be concentrated pollution and the responsibility for pre-treatment is difficult to clarify, and the risk is difficult to assess.. We can not let sewage treatment plant which is the last line of defense of pollution prevention and control become a major source of pollution emissions, affecting the urban environment and the life of residents.

3. The management of electroplating enterprises in Taihu Basin needs urgent breakthrough and strengthening

For the above problems of electroplating enterprises in the Taihu basin, in order to accelerate the change of the industry status, improve the level of industry, promote energy saving and emission reduction, control heavy metal pollution, and achieve sustainable development, Lvse Jiangnan now makes the following recommendations.

3.1. Plan scientifically, make the threshold reasonable

The Industrial Transformation and Upgrading Plan proposes to "insist on improving the development level of industrial parks and industrial bases as an important grasp of transformation and upgrading". The establishment of electroplating industrial park is the most fundamental means of governing the electroplating industry, changing the disorganized and small-scale production and decentralized management of pollutant

emissions into centralized production and centralized management. Managing electroplating enterprises by establishing an electroplating park is not only conducive to the unified management of environmental protection departments, but also conducive to attract investment.

At present, China's electroplating park construction is booming. How to do a good job in the park's environmental protection, plan reasonable, manage scientifically, and avoid the lack of supervision and centralized pollution, has become a problem of industrial pollution prevention with Chinese characteristics. It is recommended to focus on the objective conditions and intrinsic laws of the plating industry, allocate high-quality resources and centralize the layout based on the upstream and downstream industrial chain in the preliminary planning of plating park.

In the "Standards for Electroplating Industry", which came into effect on November 1, 2015, the scale, process and equipment of electroplating enterprises are stipulated. It is recommended that the electroplating parks take the followings as the basis for new electroplating enterprises. (1) They should formulate a reasonable and scientific access threshold, guide the healthy development of the electroplating industry, prevent the blind expansion of the industry, and inhibit low-level repetitive construction in accordance with the principles of energy saving, emission reduction, structural adjustment and industrial upgrading. (2) should one by one find out the basic situation of electroplating enterprises that have been built and formulate a plan for categorization and improvement in a scientific way. For enterprises with certain scale and technical advantages and complete environmental protection procedures, electroplating park should improve and upgrade them according to certain standards, so that they can become benchmark enterprises in the park. For technical equipment backward, environmental protection procedures are incomplete, no hope of rectification of low, small and scattered enterprises to be shut down and eliminated by law, to curb high energy consumption, high pollution, low efficiency production, accelerate the promotion of enterprise upgrading, and promote the sustainable and

healthy development of the electroplating industry.

3.2. Establish and improve the supporting legal and regulatory system

From the perspective of electroplating pollution prevention and management, China's has 191 related environmental standards related to environmental standards, basically can become a system. These environmental standards generally play a regulatory role in the environmental management and technical guidance of the electroplating industry. However, the overall coordination of the system still needs to be improved, and the classification of standards still needs to be adjusted.

According to the relevant literature ^[5], a clearer and more complete system is proposed (Figure 5), which is divided into the following three categories.

(i)the standards of electroplating pollution prevention and control for electroplating pollutant generation, emission, treatment and comprehensive utilization, etc. (ii) standards for new source management, existing source management, regional environmental management and post-decommissioning management for electroplating enterprises or parks (iii) standards for environmental monitoring of electroplating. The system is clearer and more practical as it provides a full range of standards for the daily work of enterprises and environmental management departments. This classification will help enterprises to know and implement these standards more accurately and completely.

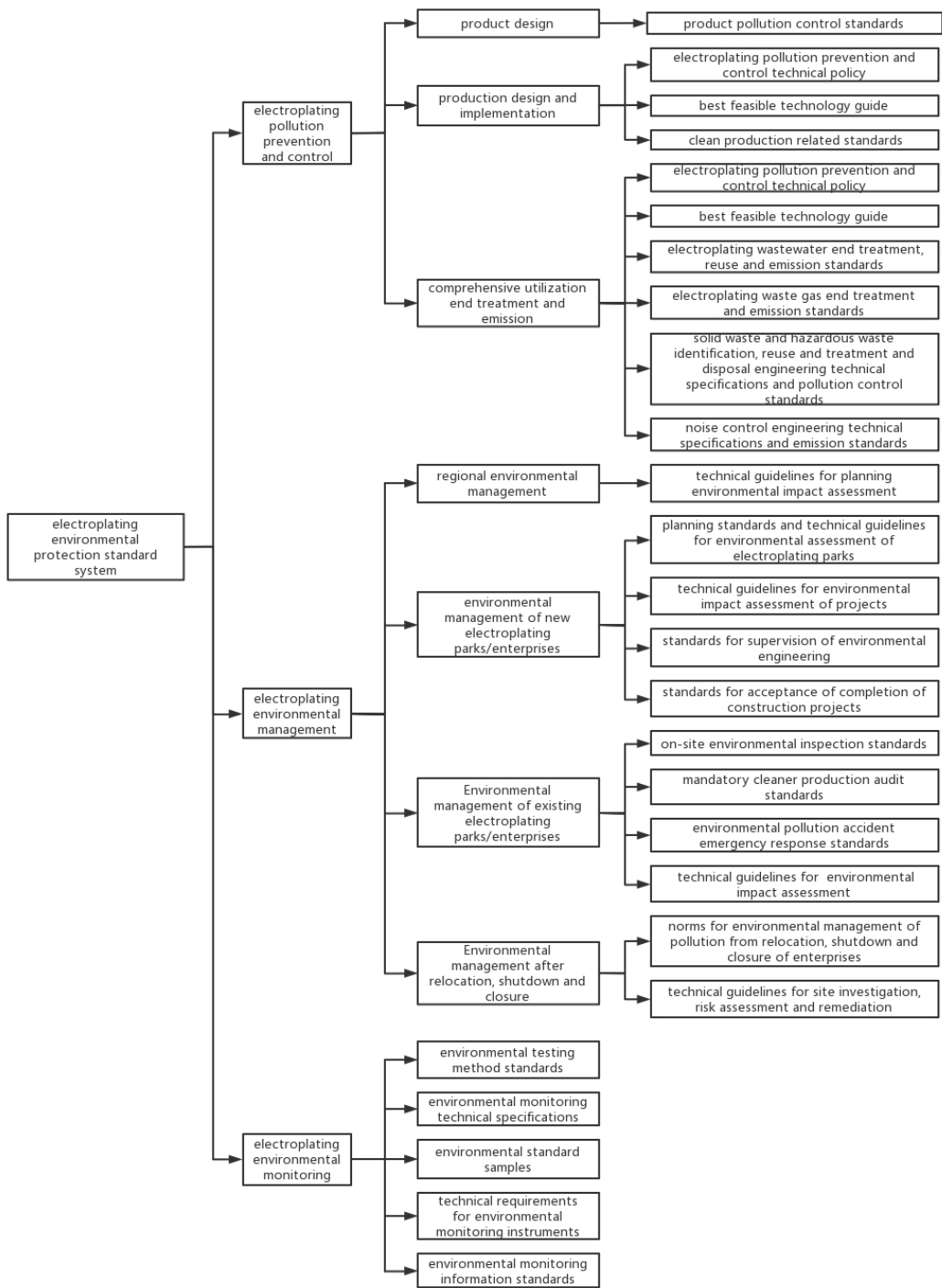


Figure 4: Electroplating environmental standards system framework

Some scholars have studied the benchmark of heavy metal content of lake sediments in China, but no complete and systematic benchmark data has been formed. A scientific standard of heavy metals in lake sediment must be supported by benchmark

data. We propose to conduct systematic research on the benchmark content of heavy metals in the sediment of Taihu basin, and use it as a benchmark for the development of heavy metal standards in Taihu basin. It is suggested that a systematic study of the benchmark sediment heavy metal content in Taihu basin should be conducted as an effective support for the formulation of the standard of sediment heavy metal content in Lake Tai.

3.3. Strengthen technical support to ensure effective compliance

In order to cope with the increasingly stringent environmental protection requirements and promote the technological progress of the industry, it is necessary to strengthen the development of technical support for the difficult points of pollution prevention and control in the electroplating industry. Such as electroplating wastewater treatment methods, electroplating sewage sludge and slag treatment and disposal methods. It is necessary to promote advanced technologies and alternative processes such as low hexavalent chromium and low COD degreasing agents, to eliminate outdated production processes, to eliminate electroplating processes containing toxic and harmful cyanide and manual plating processes, and to encourage the use of automated plating process control devices and automated testing, inspection and high stability, automated and digital plating production lines with multi-stage counter-current cleaning systems.

If the wastewater from each process of electroplating is concentrated to the final treatment, the components such as complexes and heavy metals in it may react with each other and affect the treatment effect. Therefore, it is suggested that the wastewater should be treated separately, which is not only conducive to the stable achievement of standards, but also can reduce the cost.

3.4. Improve information disclosure and promote public participation

It is recommended to establish and improve the "government-enterprise-public"

trinity environmental monitoring model as soon as possible to strengthen public participation and ensure the effective implementation of standards. It is recommended that Jiangsu pollution source census data, such as the "home base" of various pollution conditions, be made available to the public in a timely manner. Emission markings should be set up not only to facilitate monitoring and sampling by environmental protection departments, but also to facilitate public identification and participation in supervision. It is recommended that the enterprise production process, production products, pollutant discharge types, sludge and hazardous waste disposal methods and other information to the public to be disclosed to facilitate public supervision.

3.5. Sound management system, strengthen environmental awareness

Only the establishment and strict implementation of a sound system can guarantee the stable operation of the enterprise. It is recommended to speed up the elimination of backward processes, carry out pollution prevention and control projects according to the pollutant monitoring plan, strengthen the enterprise environmental pollution accident emergency response system and safety mechanism, improve accident emergency treatment facilities, and enhance the ability to prevent and handle unexpected environmental incidents

It is recommended to organize regular study of national environmental protection laws and regulations for enterprise leaders. Enterprises should consider environmental protection work as an important part of production management, for which there are environmental protection officers. The environmental protection officers are responsible for supervising and inspecting the enterprise's "three wastes" management, educating and promoting environmental protection laws and regulations to employees, and raising their awareness of environmental protection.

3.6. Strengthen the monitoring and treatment of characteristic pollution factors

The Twelfth Five-Year Plan for National Environmental Protection, in strengthening environmental monitoring, emphasizes "enhancing the monitoring capacity of regional characteristic pollutants, carrying out monitoring of pollution factor emission sources of typical environmental problems, and encouraging the inclusion of characteristic pollutant monitoring in the scope of daily local monitoring." It is recommended to strengthen the monitoring capacity and level of heavy metals in surface water, groundwater and soil around electroplating enterprises, and install automatic monitoring devices in all of them to implement real-time monitoring and dynamic management. While controlling exogenous pollution, relevant departments should carry out an appropriate amount of environmental dredging of Lake Tai to remove bottom sediment pollution.

3.7. Mandatory implementation of cleaner production-related standards

As a heavy polluting industry, electroplating industry has high pressure of end treatment and high treatment cost. The best way to reduce the pressure of end management is to implement clean production. It is suggested that according to the Clean Production Evaluation Index System for Electroplating Industry, the electroplating industry should replace with the clean production process, vigorously promote the clean production process with no cyanide, no fluorine, no phosphorus, low toxicity, low concentration, low energy consumption and less complexing agent, reduce the plating solution with out, implement the heavy metal tank side recycling technology, and strengthen the fine management, etc. Electroplating enterprises should be implemented in accordance with the two-year round of mandatory clean production audit, and gradually eliminate the clean production level in the three levels and below, and improve the proportion of clean production level two and above.

4. Conclusion

By formulating a strict access system, the government will promote new electroplating projects to enter the designated electroplating industrial park, and gradually move the existing scattered electroplating enterprises into the park after treatment and rectification, and implement unified centralized treatment of wastewater separation and classification in the park. To implement the sustainable development of the electroplating industry, we must accelerate the elimination of high-pollution processes, backward production capacity, promote the upgrading of industrial structure, reduce the risk of pollution, improve information disclosure, promote public participation, and promote the electroplating industry changing from "scattered, small, coarse, black, polluting" to "centralized, recycling, high technology, energy saving, environmentally friendly" .

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