

Laws and Regulations and Research Status Wastes Disposition in Substation

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Abstract: Literature review and field survey had been done, and the domestic and foreign laws and regulations on the waste of substation are summarized, and the method or the way of the waste disposal in various substations are listed. By comparing with the advanced management experience of Japan, the United States, the European Union and other countries, it puts forward that "the substation waste recycling use management system" should be established, and the goal of substation waste "reduction, resources, harmless" will be achieved in the future.

Introduction

Transformer substation waste mainly includes waste transformer oil, waste lead-acid batteries, and waste composite insulators etc.. Waste containing organic substances, heavy metals and other harmful substances, if handled improperly, it will occupy and pollute the land, atmospheric environment and water environment, seriously it can have a fatal impact on human health. Therefore, the various countries strict rules for the management and disposal of the substation waste.

Foreign related laws and regulations and research status

Waste transformer oil

Generally, the need for recycling of waste lubricating oil is clearly defined through the legislation in all countries, and policies are developed to encourage it. In 1975, "the energy policy and conservation law" was approved in the United States, and later "the law of waste oil recycling" was formulated specially. In 1979, the U. S. Environmental Protection Agency proposed legislation, ruled the waste oil harmful toxins, and played a role in promoting the recovery and regeneration of the waste oil.

In 1986, the EU reaffirms its priority to the refining waste oil processing, and stressed the ecological and environmental factors of the process to collect and recycle the waste oil. In 1992, the regulations was implemented in Italy, and declared the priorities of waste oil refined in the comparison of different waste treatment, and the special legal Oil Association was established, which set a number of contractors or collecting companies of waste oil recycling and disposal, to regulate the market behavior. The general approach is: using their own trucks or collectors through

the home, contact the produced oil organization and storage the waste oil. Collected waste oil is transported to the legal association of oil warehouse storage, if the waste oil can be recycled, collect business will be expected to get paid based on the contract. If waste oil pollution can not be recycled, collectors will bear the cost of high temperature incineration of waste oil, and then charge the original holder of the oil. The Legal Oil Association will conduct the collected waste oil through physical and chemical analysis, and then classify it. This classification is helpful to determine the type of waste oil, and determine the optimal disposal[1].

Waste lead-acid battery

Developed countries attach great importance on recovering and recycling of waste lead-acid batteries. In the West and medium developed countries, waste lead-acid batteries are recovered mainly by three ways: first, through its retail network organization recovery by the battery manufacturers; second, by those who are approved in accordance with government regulations to collect waste lead-acid batteries and lead waste recycling companies, these waste materials from various possible ways to collect waste lead-acid batteries, miscellaneous lead and other lead waste, and then transferred to the renewable lead plant with the scale and operating license. Third, by the operation of establishment of a specific waste lead-acid battery recycling in the recycling of the company, the main methods to take are: with the old for new, the mortgage system, the provisions of special signs, environmental taxes, etc.. They returned to the regeneration of the lead factory after they were cleaned by the waste acid storage battery.

It's proved that, as long as the appropriate laws and regulations to ensure, these methods are effective. It had achieved satisfactory results in most developed countries, and now the recovery rate of waste lead-acid batteries basically reached 100% in developed countries[2].

In Germany, it has made great achievements in the construction of battery recycling system, power battery recycling technology demonstration and legal system construction. The Germany circular economy law is formulated mainly based on "the Waste Framework Directive (2008/98/EC)"; In early March 1991, the EU promulgated the "waste battery for hazardous materials on battery NO. 91/157 provisions of the mandatory document". Stipulated the mark of batteries containing more than 0.4% and the battery demolition method from the equipment, and the provisions of the public bringing the waste battery car, duty free electric vehicles to retailers or recycling station, which was bought for the battery deposit, if you do not return, then deductions deposit; part of the funds out of recycled lead factory must also be obtained from the production of waste batteries in the interests for investment and development of environmental protection equipment[3].

Waste composite insulator

Up to now, there are few reports on the recovery and regeneration of the composite insulators in the domestic and international, and there are no reports on the pretreatment technology of composite insulators, and the recycling of silicone rubber materials (including waste materials in the process of retirement and production) has not been reported, there is no relevant laws and regulations.

Waste electrical equipment PCBs

The production and use of PCBs have been stopped since 1968.

The chemical properties of PCBs are very stable, and it is difficult to decompose in nature. PCBs is a kind of persistent organic pollutants, used for power equipment, such as capacitors containing PCBs, voltage, etc.. Methods for handling the PCBs, which are summarized as follows:

Buried method: PCBs and PCBs contaminants sealed in the special design construction or together with the construction of deep underground. Also ready-made cave or air defense hole, after

impermeable treatment, are used for the disposal of the leakage of PCBs and pollutants (temporary storage).The method can not fundamentally solve the problem of pollution of PCBs, And due to the corrosion of the shell,leakage phenomenon will appear, and environmental protection is still in existence[4].

Microorganisms to Division: Japanese scholars cultivate the two kinds of yeasts from the soil: one is red yeast strains of the genus; another is the snake skin ringworm. Experiments show that the former can be decomposed to 40% of PCBs, the latter can be decomposed by 30% of PCBs. A large number of cultures can be used to treat industrial wastewater and soil in the PCBs.

Incineration method: this method is considered to be the best method of treatment, but it can not easily burn, and must be in a special incinerator which can completely decompose PCBs with the high efficiency.

Chemical method: the method of chemical treatment of PCBs has reached more than 10 kinds of methods, such as chlorine, hydrogen chloride, Sunohio method, wet catalytic oxidation method, metal sodium, Goodyear method, sodium polyethylene glycol method, ozone method etc.

Physical method: at present, there are microwave plasma method, activated carbon adsorption method, radiation exposure method, etc..in foreign countries.

Plant root repair method: this is a new field, and the interaction between plants and the rhizosphere microorganisms is used to degrade PCBs, and the effect is obvious[5].

Domestic laws and regulations and research status

Waste transformer oil

According to the “National Hazardous Waste List”, the waste mineral oil is a hazardous waste in the production and operation process of motor vehicle maintenance, industrial and mining enterprises.It is number HW08. According to the list, waste mineral oil is a toxic substance, which contains the sulfide, petroleum substances, and nutrient rich.Water and soil pollution is particularly serious.

Waste transformer oil contains a variety of toxic substances, and experiments show that it will lead to the loss of normal function of various cells, if these toxic substances through the human and animal skin penetration into the blood, and in vivo accumulation. It is recognized as carcinogenic and mutagenic compounds. Random dumping and illegal transfer, reselling waste oil, will affect human health, also bring secondary pollution in black to the survival environment, cause serious pollution to water and soil, which is harmful to animals and plant growth and the human survival environment.

Waste lead-acid battery

In 2010, the "waste acid storage battery treatment pollution control technology standards" includes the provisions of the waste acid storage battery collection, storage, transportation and recycling of resources in the process of pollution prevention and control of lead recycling business operation and management requirements.

Ministry of industry and information technology, Ministry of environmental protection, Ministry of Commerce, development and Reform Commission and the Ministry of Finance and other five departments jointly issued “Opinions on promoting the development of standardized development of lead acid storage battery and lead industry”, Overall requirements: thoroughly implement the scientific development concept, according to the principle of strict access, strengthen supervision and specimen and treatment, increase industrial restructuring efforts, strengthen environmental protection verification, industry access and production license management, increase environmental law enforcement, improve policies and regulations and standards, and effectively

control lead emissions, and realize the standard production, orderly recycling, reasonable recycling of lead-acid battery.

In 2008, the national standard GB/T22425 "Recycling of lithium ion batteries for communication" was proposed by the people's Republic of China Ministry of industry and information technology, the recovery and disposal requirements of lithium ion batteries for waste communication are provided, Including the transportation and storage of waste lithium ion battery, the separation and extraction of the material, the processing of the electrode material, the treatment of the residual material etc.

Waste composite insulator

There are no relevant reports or laws about the recovery and regeneration of waste composite insulators in the domestic and international.

However, the umbrella piece of waste insulator and other materials used in automobile tires belong to polymer materials. Waste polymer materials resources had been used as a priority area and key tasks in the "waste resources and technology project" "Twelfth Five Year" special plan ".

Waste electrical equipment PCBs

It had stopped the production and import of PCBs as the medium of electrical equipment in the late 70's of China, and began to centralize storage management of waste electrical power equipment PCBs and PCBs pollution of the material. In June 25, 2004, the "Stockholm Convention on persistent organic pollutants" was adopted in China, which will officially take the responsibility and obligation to eliminate and reduce the persistence of organic matter.

The "Pollution control standard of waste containing PCBs" (GB13015-91) provided the standard value of waste pollution control and the disposal method of the waste containing PCBs, and provides for the collection, storage, transportation, recycling, processing and disposal of PCBs.

In October 2013, the State Environmental Protection Department issued the "Technical specification for waste incineration and disposal of PCBs" (HJ2037-2013), which provides the technical requirements for the design, construction, acceptance, operation management and other technical requirements of waste incineration disposal of PCBs.

Conclusion

With the advanced management experience of Japan, the United States, the European Union and other countries, it's found that foreign waste management first from the legislative constraints, so as to clear from the production and consumption of recycling and recycling of continuous management mode, from the source to reduce pollution, promote recycling use of waste, form a renewable materials and recycled products related industrial chain, and the government-business-citizens closely linked, form a balance and mutual constraints.

Our country has made the control, resource, harmless of solid waste pollution prevention and the "3C principle" as solid waste management technology policy, established the whole process management principle of the solid waste from production, collection, transportation, utilization, storage, processing and disposal; and hazardous five continuous or discontinuous link control of waste from the production to the disposal: reduce or avoid the generation of solid waste, system recycling, system recycling, harmless/stable treatment, disposal/management. But the management mode is still not clear for substation waste such as waste transformer oil, waste composite insulators, retired lead-acid battery etc. especially the echelon use has not been paid attention, the lack of scientific and effective management system. Therefore, the establishment of a sound system of waste management model has become the primary condition of strengthening the waste recycling and harmless treatment.

Substation waste management pattern can consider to follow "recycling, echelon utilization and harmless treatment" principle, to establish "substation wastes recycling using management system, adopt a "decentralized recovery, unified detection, centralized treatment and circulating utilization" management mode, clearly related responsibilities, strengthen the whole life cycle management of substation waste, achieve the substation waste ultimate goal of "reduction, resources, harmless".

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