



Pictured here is a coal-fired power plant in Anhui province. The Chinese government has carried out a batch of policies to curb mercury pollution from such plants.

Ministry making moves to tackle mercury issue

In an effort to curb mercury pollution nationwide, an office under China's environmental watchdog has launched a series of research projects.

Because coal is used to meet much of the nation's power demands, coal-fired power plants are a major source of mercury pollution in the country, according to research being conducted by the Foreign Economic Cooperation Office of the Ministry of Environmental Protection of China, as Xu Xiao reports:

•Coal-fired power plants

Currently, the mercury emissions from the country's coal-fired power plants amount to about 100 tons annually, accounting for about 20 percent of mercury emissions.

The Chinese government has implemented a series of policies to reduce the emissions from coal.

Some strict requirements were set for waste gases containing mercury at coal-fired power plants in the 12th Five-year Plan (2011-15) for the Comprehensive Control of Heavy Metals Pollution issued in 2011.

They include but are not limited to increasing the proportion of raw coal washed and that of low-sulfur, low-ash coal, improving synergetic mercury removal with conventional pollution-control equipment, strengthening R&D, and applying activated carbon injection and other mercury removal technologies.

The Ministry of Environmental Protection also organized meetings for pilot projects for atmospheric mercury pollution control at coal-fired power plants in September 2010.

The ministry is requiring coal-fired plants to launch pilot programs for online monitoring. New emissions standards have been set as well.

The mercury emissions limit was set in the Emission Standard for the Air Pollutants at Coal Fired Power Plants (GB 13223-2011) using the relevant standards at coal-fired power plants in the United States, European Union and Germany for reference.

•Boilers for industrial use

More than 80 percent of boilers for industrial use in China are coal boilers. Now that the government and related departments have recognized this issue, they are suggesting two ways to solve this problem.

The first is to eliminate the use of small, inefficient coal boilers.

Boilers with capacity of 10 tons of steam per hour will be phased out from the urban area by the end of 2015. In addition, boilers with capacities less than 20 tons per hour are now forbidden for any new projects.

Developing large boilers is an urgent task for the industry, according to the ministry, since the markets will favor boilers with a capacity of 35 tons per hour or more, according to the research.

The second is to promote mercury-control technology in industrial boilers. Most of the coal used for industrial boilers in China is not washed. Unwashed coal decreases heat efficiency, wasting energy and increasing

transportation load.

Studies indicated that conventional coal washing, which is an economical and practical control measure, could remove up to 60 percent mercury content as well as 60 to 80 percent of ash and 30 to 40 percent of sulfur in coal.

The research also suggests using low-nitrogen-oxide combustion and circulating fluidized bed combustion technology as part of mercury pollution control.

The low temperature environment for nitrogen combustion would help to increase the content of oxidized mercury, and the circulated fluidized bed combustion can reduce mercury emissions from gas.

Other technologies include activated carbon adsorption, flue gas recirculation and mercury removal with adsorbent.

The smelting of zinc, lead and copper are the other major sources of mercury emissions.

China is one of the largest zinc producers worldwide. Its zinc mining production totaled 6.33 million tons in 2010, according to the latest statistics.

Thus, zinc mining has been listed among the 14 major industries targeted for a reduction in mercury pollution.

To solve this problem, researchers suggested that the country should work to eliminate outdated industrial infrastructure and use advanced technologies to update existing zinc mining enterprises.

•PVC industry

The PVC industry is another source of mercury.

Because it produces an important basic industrial material in China, the PVC industry consistently maintains an average growth rate of more than 10 percent annually.

Currently China is the world's largest PVC producer.

To solve mercury pollution problems in the PVC industry, the center suggested that the central government implement several policies to regulate related enterprises.

Industry insiders raised several pro-



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PVC products on sale.



Photo shows a PVC production enterprise in China.

posals to solve the problem, too.

The first way they suggest is to raise the industry entry threshold to ensure that PVC producers in the country are qualified and use environmentally friendly technologies.

The overall capacity of PVC with calcium carbide process should be appropriately adjusted and projects be strictly controlled.

The second method, they say, is to better position mercury-recycling enterprises.

Newly built manufacturers of mercury catalysts should be close to the origin of resources and energy, equipped with better conditions for environmental protection and transportation.

The distribution of waste catalysts recyclers should be connected to that of manufacturing enterprises for PVC with calcium carbide process. It is encouraged to build waste catalysts recycling facilities in the north or northwest of China, to shorten the transportation distance for waste containing mercury.

They also ask producers to strengthen procedure control during the manufacturing process.

Low mercury catalysts are advised to be used for newly built and renovated PVC production projects with calcium carbide process technologies, and the existing manufacturers must develop plans to substitute the high mercury catalysts with low ones. The researchers suggest that all the relevant enterprises use low catalysts by year 2015.

Actually, mercury itself is a scarcely recycled and important metal.

•Mercury mines

The long-term and disordered development of mercury mines in the country has caused pollution in several regions, posing a great threat to the environment and residents alike.

To reduce mercury pollutions, the first priority of officials is to strengthen the control and management of mercury waste, reducing the exposure of locals to such materials, according to

some research projects by the center.

Comprehensive control measures should be adopted, for example, to build dams to block the tail mines, set up an anti-seepage system, build a sewage sedimentation tank, conduct environmental monitoring and afforestation, and give a full assessment of the environment effects of demonstration projects. Proactive control measures should be adopted for the waste residue of mercury-melting mines and other uncontrolled pollution sources.

Another important thing is to monitor water.

Mercury control at rivers passing through tail mines should be strengthened in order to reduce the impact of mercury pollution.

Terraced sedimentation tank should be built at the upper stream of polluted rivers to treat the mercury-contaminated sewage, and then electrochemical induction and other technologies should be adopted to reduce the mercury content to meet the requirements set for the surface water.

Meanwhile, the clean-up work should be conducted for sedimentation tanks and river courses to remove sludge, the cement in the river courses should be solidified to form the runoff channel to control and prevent secondary pollution caused by the entrance of sediment containing mercury into the river during flood season.

Furthermore, experts suggest restoring land polluted by mercury, but the process should be guided by a strict regulatory and planning process.

Also, it is important to ensure the safety of crops in mercury mining regions, experts said.

In addition, experts say it is necessary to complete policies, regulations and standards to provide law and technology bases for addressing the problem.

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World unified in fight to curb levels of toxic metal

By HAO NAN

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Unlike some harmful materials that can be metabolized by the body, mercury continues to accumulate, causing a huge impact on human health and the ecosystem, experts say.

Because of its nature as a pollutant, the United Nations Environmental Program reached an agreement through tough negotiations on the text of an international mercury convention during its latest session held in Geneva in January.

In 2009, the United Nations Environment Program's 25th council moved to formally begin a global effort in mercury pollution control, stipulating that the UNEP would host five meetings with various governments between 2010 and 2013 to formulate a global legal convention on a range of efforts to control the toxic metal.

Responding to the call, China's Ministry of Environmental Protection established a team that works exclusively on mercury-related issues and provides technological support for the mercury convention.

Different from some harmful materials that can be metabolized in the human body, mercury continues to accumulate.

Since UNEP first initiated negotiations in 2010, the international organization has officially listed mercury as one of its global environmental protection priorities.

Five sessions of intergovernmental talks have been organized in the past three years with the aim of drafting a global convention on the control of the toxic metal.

A working group was established in March 2010 by Foreign Economic Cooperation Office under the Ministry of Environmental Protection of China that provides technical support, which is used in negotiations and implementation of any future treaty.

The group is also responsible for policy studies related to mercury control and international cooperation, which improves the central government's capacity to manage mercury-related technologies and the environmental effects of the pollutant.

At the end of 2010, the group became part of the national core mechanism to deal with mercury issues, and it drafted clear working procedures to be used when cooperating with other related domestic government agencies.

The group has given its full support to the negotiations on the global convention, participating in a series of conferences and discussions.

It has carried out investigations on different industries and sought technical aid for the ministry in an effort to lay a solid foundation for the future implementation of the treaty.

In addition, the working group also developed partnerships with other countries.

As for the policy study, the working group has since compiled 12 mercury research reports, including two on policies and regulations, and three on international mercury cooperation achievements.

It moreover has finished the layout of an exhibition hall highlighting the threat posed by mercury, especially to pregnant women and babies. The group also finished the design of several related websites and published magazines.

Partners overseas

Since its establishment, the working group has actively promoted multiple projects with foreign partnerships.

Together with foreign organizations and the local department for chemicals administration, the group has been carrying out a mercury-control and elimination project since the start of this year with an investment of over \$700,000.

To oversee the details of implementing projects, the group is coordinating with Chinese universities, research institutes, hospitals and companies, including Tsinghua University and Chinese Academy of Environmental Sciences.

It aims to compile a baseline report on China's non-ferrous metal emissions and propose mercury-control policies.

It will also study foreign countries' efforts to phase out products containing mercury and develop ways to recycle it for use in medical devices.

The group has also cooperated with the International Institute for Water Research since 2010 to research mercury control in coal-fired plants and zinc-smelting operations.

It is the second phase of the project, with an investment of around \$3.24 million.

Together with the United Nations Development Program, the group has also worked to formulate a standard for the mercury content of fluorescent lamps in three years since 2010.

To educate the public about efforts to curb mercury pollution in China, the center has set up a bilingual website - www.mercury.org.cn - that highlights a series of ongoing projects in the campaign.



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