Additional information on technologies on the control of mercury releases

Government of Japan

As a follow-up of the previous submission on the national regulations and industrial practices related to the control of mercury releases, Japan conducted a questionnaire survey on measures to control mercury releases. The survey was conducted for domestic enterprises which own technologies or implement practices to control mercury releases. The followings are the summary of the results.

1. Information provided by business operators possessing mercury releases control technologies

Types of technology	Chelating resin
Overview of technology	This chelating resin is a phenol-formaldehyde based one, dedicated to mercury, which can capture mercury ions in the aqueous solution phase with thiocarbamide groups.
Mercury removal process and/or removal performance	This resin works effectively even at low concentration of mercury. It has high selectivity of mercury ions and is less susceptible to other foreign heavy metals.
Condition for the application or precautions for use	Mercury must be ionized; metallic mercury cannot be adsorbed. This resin can be basically applied if there is an adsorption column. The size of the resin can be adapted to the volume of wastewater to be treated.
Cross-media effects	Saturated chelating resins contain high concentrations of mercury and thus must be treated as mercury wastes.
Cost including initial costs, and operation and maintenance costs	-
Others	It is also highly selective for precious metals (gold, platinum, palladium) and is used for their collection.
Types of facility in which introduced before.	Industrial waste treatment facilities, final disposal sites, metal refining facilities, soda chemical industrial facilities and precious metal recycling facilities

Types of technology	Adsorption tower using activated carbon
Overview of technology	Removal of mercury in gas and liquid
Mercury removal process and/or removal performance	A device in which the column is filled with a mercury remover using activated carbon. Substances other than mercury cannot be basically adsorbed.
Condition for the application or	Mercury can be removed at temperature and normal pressure.

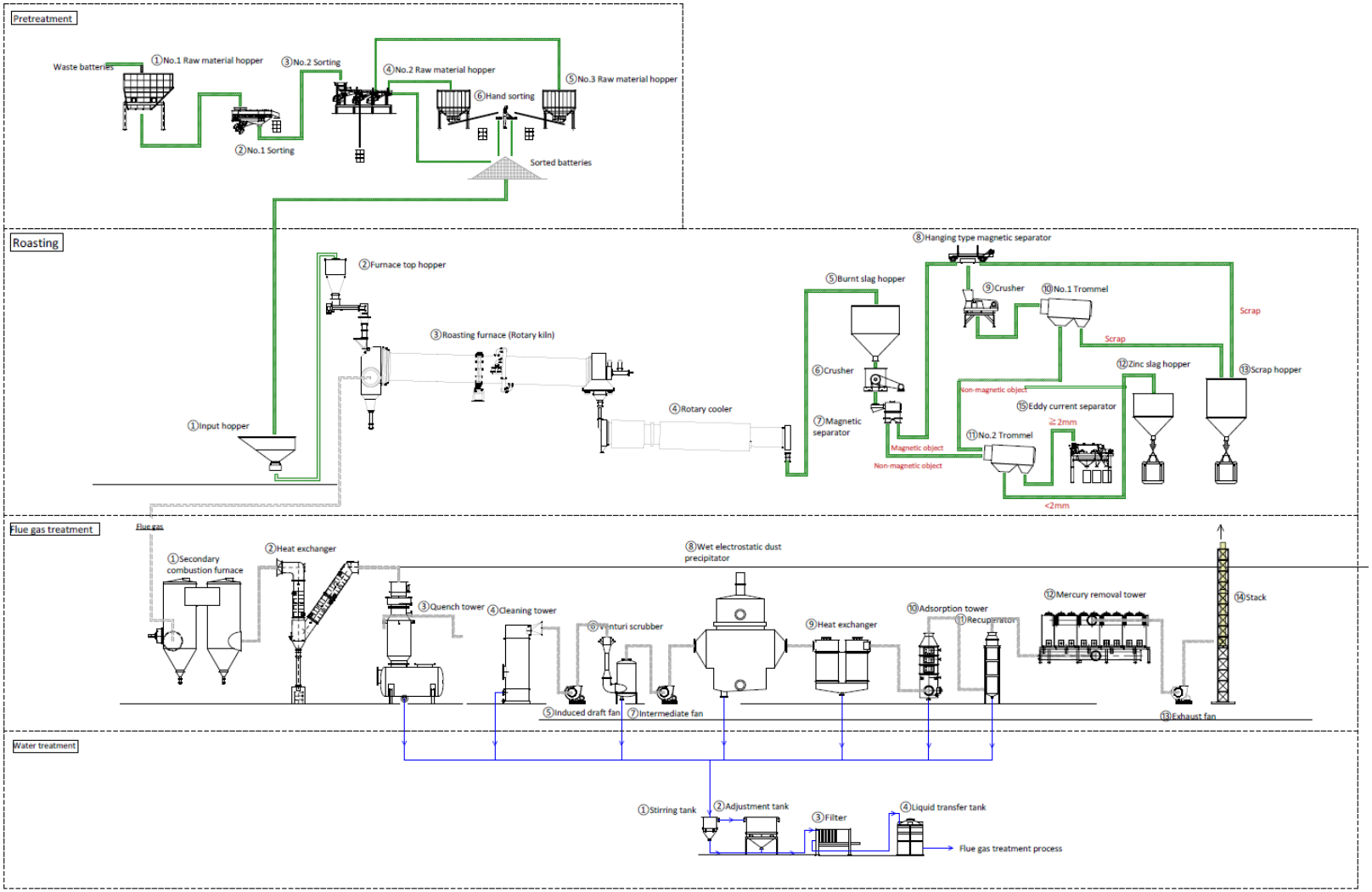
precautions for use	
Cross-media effects	Saturated mercury removers contain mercury and should be disposed of as industrial waste.
Cost including initial costs, and operation and maintenance cost	The cost of the equipment is about 100 million yen and the mercury remover is about 10 million yen
Others	-
Types of facility in which introduced before.	Installed in all oil refinery facilities in Japan.

2. Information provided by business operators implementing measures to control mercury releases

Types of facility	Natural gas processing plant
Facilities where mercury-containing wastewater is treated and processes for generating wastewater	A trace amount of mercury is contained in the water generated in the process of separating the production fluid extracted from natural gas wells into gas, oil and water.
Overview of technology	Removal of heavy metals with chelating agent and removal of biochemical oxygen demand and chemical oxygen demand by catalytic oxidation process
Mercury removal process and/or removal performance	The mercury in the mine wastewater is removed by adding a chelating agent. Heavy metals such as lead can be removed at the same time.
Condition for the application or precautions for use	-
Cross-media effects	The treated sludge should be properly treated as an industrial waste after the analysis, since it contains a trace amount of mercury.
Cost including initial costs, and operation and maintenance cost	-
Others	▪ A state of sludge coagulation is periodically checked and chemicals that require manual dosing are prepared by plant operators. ▪ The equipment and measuring instruments are periodically inspected and renewed if there is an age-related deterioration

Types of facility	Mercury wastes treatment facilities
Facilities where mercury-	Treatment of wastewater generated in the flue gas treatment

containing wastewater is treated and processes for generating wastewater	process at a roasting furnace to treat mercury wastes.
Overview of technology	Water used is circulated in the system and thus no wastewater is generated (closed system).
Mercury removal process and/or removal performance	Process flow to treat waste of dry cell batteries using rotary kiln is presented in the next page. The flow of wastewater in the process is indicated in blue arrows.
Condition for the application or precautions for use	-
Cross-media effects	-
Cost including initial costs, and operation and maintenance cost	-
Others	Closed system reduces the risk of pollution from wastewater.



Facility to treat waste of dry cell batteries