

Study of Countermeasures to Reduce Greenhouse Gas Emissions from Sewage Sludge Incinerators

Whole term

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(Purpose)

The government's Outline for Promotion of Efforts to Prevent Global Warming (March 2002) clarifies the general image of countermeasures for achieving the greenhouse gas (GHG) emission target specified in the Kyoto Protocol in Japan and presents a package of policies for this purpose. These specifically mention measures to reduce emissions of dinitrogen monoxide (N₂O) by application of advanced combustion technology in sewage sludge incineration facilities.

Anticipating a review of the Outline, which is expected at some time in the future, the Ministry of Land, Infrastructure and Transport (MLIT) has been engaged in deliberations on global warming measures related to the creation of social infrastructure in the Environmental Subcommittee of the Infrastructure Construction Council and issued an Interim Report in June 2004. With regard to high temperature combustion for sewage sludge incineration facilities, the Report notes that it is necessary to strengthen policies to ensure adoption of high temperature combustion by standardizing high temperature combustion under the existing design guidelines.

Against this background, the present work was carried out for the purposes of studying standardization of high temperature incineration of sewage sludge, review of emission factors related to high temperature incineration of sewage sludge, etc. and preparing countermeasures for GHG emissions from sewage sludge incinerators.

(Content of study)

The content of this study consists broadly of the following 3 items.

1. Study of the appropriateness and necessity of standardization of high temperature incineration of sewage sludge
2. Study for review of emission factors related to high temperature incineration of sewage sludge
3. Study of other measures for reduction of GHG emissions in the sewerage field

Interviews on existing incinerators and plans for new incinerators, including questionnaires to local governments, were also conducted.

(Results)

- Target value for incinerator setting temperature

To achieve an N₂O reduction effect, a target value for the incinerator setting temperature of around 850°C is appropriate, considering also increased CO₂ emissions.

- Objects of incinerator temperature setting

In aiming at an amount equivalent to 1.4 million tons, which is the CO₂ reduction target under the Outline, improvement of existing incinerators as well as new incinerators is essential. Structurally, the possible range for this is an increase of several tens of °C.

- Effectiveness of other countermeasures in the sewerage field

Considering the percentage of GHG emissions, reduction of electric power consumption is the most effective means of reducing CO₂. However, to achieve the reduction specified in the Outline, unit power consumption must be reduced by approximately one-half. This would be difficult under the present conditions.

Types of fuels were also reviewed, and trial calculations were made for the emission reduction effect of effective use of sewerage resources, use of digestion gas, use of recycled water, etc. However, the effects were not as large as the reduction by introducing high temperature incineration.

The above confirmed that reducing N₂O by introducing high temperature incineration is an important warming countermeasure.

In the future, further clarification of the incineration equipment which is to be the object of improvement, considering actual cost effectiveness, together with standardization of high temperature combustion and reflection in policy will be necessary.

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key words

Global warming countermeasures, High temperature incineration, Greenhouse gas, Dinitrogen monoxide, N₂O