## Survey and Discussion on Measures for Prevention of Global Warming in Sewerage Facilities in Fukuoka City

| Whole term | 2000.8 - 2001.3 | |
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(Purpose)

In the 3rd session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP3) which was held in December 1997, it was determined that Japan reduce emission rate of greenhouse gases in 2010 by 6% compared to in 1990 . In June 1998, the measures for global warming which should be urgently promoted by governments were summarized as the Outline for Promotion Effects to Prevent Global Warming. Moreover, the Law Concerning the Promotion of the Measures to Cope with Global Warming (hereinafter called the Promotion Law) was issued in October 2000 and enforced on 8th August 2001. Furthermore, based on the Promotion Law, in order to promote measures for global warming comprehensively and systematically, the Basic Policy on Global Warming was endorsed by the Cabinet on 9th August 2001.

In sewage treatment plants, carbon dioxide is generated by consumption of fossil fuels, in addition, methane and dinitrogen monoxide are generated by sewage treatment process and sludge incineration process. Therefore, in the future, the control of greenhouse gases emissions with initiatives by application of new technologies and implementation of measures for saving of resources and energy in sewerage initiatives is required.

Beside this background in this survey, actual condition survey of greenhouse gases generated from sewerage initiatives in Fukuoka City was performed. Moreover, current emission rate was analyzed, the emission rate of greenhouse gases in the future was estimated and the reduction measures of greenhouse gases were discussed. It is an objective of this study to contribute to the discussion of the measures for global warming in the sewerage facilities in Fukuoka City.

(Results)

1. Actual condition survey of greenhouse gases generated from treatment system
   Actual condition survey was performed in sewage treatment facilities and sludge treatment facilities in Fukuoka City and current emission rate of greenhouse gases was analyzed. The candidate treatment facilities for survey and survey period are shown as fellows.
   ① Western water treatment center: water treatment system, sludge treatment system, deodorizing facilities; summer, autumn, winter
   ② Saitozaki water treatment center: water treatment system; autumn, winter
   ③ Compost plant: deodorizing facilities; summer, winter
2. Estimation of emission rate of greenhouse gases (current)
   Emission rates of greenhouse gases from each following emission source were estimated
   ① Exhaust from each treatment system along with operation of facilities: ($CH_4$, $N_2O$)
   ② Exhaust by energy consumption such as electric power and fuels (oil, gas): ($CO_2$, $CH_4$, $N_2O$)
   ③ Exhaust by consumption of tap water, industrial water and chemicals: ($CO_2$)
   ④ Reduction of emission rate by effective utilization of sewerage resources: ($CO_2$)
3. Estimation in future in case of not performing measures for global warming
   Based on the Data about Sewerage Plan in Fukuoka City in March 1996, emission rate of greenhouse gases was estimated.
4. Discussion of reduction by measures for global warming
   As a reduction measure which could be expected reduction effect and quantify, effective utilization of sewerage resources, renewal of diffuser, effective utilization of digester gases, measures for unknown water quality, adoption of energy-saving incineration facilities and utilization of unused energy were selected as the topics for discussion. In addition, these reduction measures were quantified.
5. Formulation of action program to solve global warming (proposal)
   In sewerage facilities in Fukuoka City, it was determined to promote prevention of global warming with adopting operable measures as needed. Moreover, an action program to solve global warming (proposal) was formulated for setting the goal of controlling consumption rate of energy per unit treatment quantity and emission rate of greenhouse gases which are exhausted by sewage treatment and sewage sludge incineration per unit treatment quantity under the rates in the base year.

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| Key words | Global warming |
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