

Suntaya Mingmongkol 2012: Nitrous Oxide Emission Sampling Method for Wastewater Treatment Plant with Biological Nitrogen Removal. Master of Engineering (Environmental Engineering), Major Field: Environmental Engineering, Department of Environmental Engineering. Thesis Advisor: Assistant Professor Pongsak Noophan, Ph.D. 61 pages.

According to general method of nitrous oxide (N_2O) emission measurement for wastewater treatment plant (WWTP) with biological nitrogen removal (BNR) should follow U4R07 protocol: Characterization of Nitrogen Greenhouse Gas Emission from Wastewater Treatment BNR Operation. The protocol suggests using the chamber properly match with the isolating flux chamber to collect N_2O gas from WWTP. The commercial chamber could be ordered from <http://www.fivesenses.com>. However, this chamber is significantly expensive and has to import from abroad. For this reasons, the onsite emission gas collecting chamber (OSEGCC) for N_2O emission sampling method was developed. The results from this research revealed that there is truly nitrous oxide emission from full scale WWTP Thailand by delivery grab samples.

The OSEGCC was tested for leakage before it was used to collect sample in the field of WWTP with BNR. The leakage test of the OSEGCC was conducted by observation white smoke from aroma joss sticks for a half an hour.

To collect N_2O gas in the field, the OSEGCC was floated in an anoxic zone of BNR of activated sludge with BNR for 24 hours. The OSEGCC was tied by three concretes boxes to protect turn over in 7 meter deep BNR. The bottom rim of the OSEGCC would be with BNR about 4 inch or 7L. The headspace of the OSEGCC would be high 8 inch or 14L at atmospheric pressure. The amount of grab sample was collected to the 10 L tedlar bag. The samples were taken to analyze N_2O concentration at the Environmental Research and Training Center (ERTC), Thailand.

The N_2O concentration from WWTP with BNR in anoxic and aerobic zones was 25 ppm or 0.44% N_2O emission of the nitrogen load and 17 ppm or 0.35% N_2O emission of the nitrogen load, respectively. The N_2O result production from WWTP with BNR from this work could be used as a guideline for study N_2O production in the future.

Student's signature

Thesis Advisor's signature