Nalinee Suna 2014: The Removal of Various Phosphorus Forms by Treatment Ponds of Stabilization System. Master of Science (Environmental Science), Major Field: Environmental Science, Department of Environmental Science. Thesis Advisor: Associate Professor Kanita Tungkananuruk, M.Sc. 92 pages.

The objective of this research is to study the treatment of various phosphorus forms and the effecting factors such as water depth level (0.3,0.6 and 0.8 m) and season (summer and rainy season) the five ponds of the stabilization pond treatment system of The King's Royally Initiated Laem Phak Bia Environmental Research and Development Project. The four forms of phosphorus i.e. orthophosphate, polyphosphates, organic phosphorus and total phosphorus were determined. The results showed that the depth levels of water had no effect on the concentration of four forms of phosphorus. The concentration of orthophosphate and polyphosphate in wastewater from five ponds were closely in the range 1.69 - 1.86 mg/L and 4.61-9.03 mg/L respectively in rainy season and in the range 0.87 - 1.84 mg/L and 7.22 - 13.83 mg/L respectively in summer season. The tendency of organic phosphorus and total phosphorus concentration decreased from the 1<sup>st</sup> (8.68 and 16.27 mg/L respectively in rainy season and 15.94 and 28.33 mg/L respectively in summer season) to the 5<sup>th</sup> (2.28 and 8.60 mg/L respectively in rainy season and 6.23 – 14.37 mg/L respectively in summer season) due to the increasing of the mineralization of organic phosphorus by microorganism. The season factor effected on the higher concentration of orthophosphate, polyphosphates, organic phosphorus and total phosphorus in summer season than in rainy season due to the dilution of rainy water. The removal efficiency of organic phosphorus was 73.77% in rainy season and 60.64% in summer season that was higher than other phosphorus forms. However the concentration of orthophosphate and total phosphorus in all of 5 ponds exceeded the water quality standard ( $\leq 0.1 \text{ mg/L}$  and 2 mg/L respectively). In addition, the concentrations of orthophosphate in sediment soil of 5 ponds were determined. The results revealed that in both seasons the concentration of orthophosphate were in range 101.00 - 193.81 mg/L and 264.70 -402.99 mg/L respectively. Therefore, the utilization of stabilization pond to treat domestic waste water could be risk occurring eutrophication.

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Thesis Advisor's signature

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