EVE 290 Introduction to Environmental Engineering

HW #1

1.7

A long, rectangular settling basin is used for removing suspended solids during water treatment. The basin's length-to-width ratio is 4:1 and its width-to-depth ratio is 1:1. Determine the basin's volume in cubic feet if its depth is 25 feet. Ans: $V = 62,500 \text{ ft}^3$

1.8

A 25-meter-diameter circular tank 10 meters deep is used for storing liquid sodium hydroxide (NaOH) solution at a wastewater treatment plant. Determine the tanks cross-sectional area in square meters and its circumference in meters. Ans: $A = 490.9 \text{ m}^2$, C = 78.5 m

1.9

Bituminous coal containing 5% sulfur (weight basis) is burned at a power plant to provide energy for generating electricity. Assume the combustion of coal is complete and the following equation can be used for modeling the oxidation of sulfur to sulfur dioxide:

S + O₂ ---> SO₂

Determine the kilograms of sulfur dioxide produced daily if 20,000 kilograms of coal are combusted each day. Ans = 2000 kg SO₂ per day

1.10

Chlorine is the most widely used disinfectant for killing pathogens during water treatment. Determine the kilograms of chlorine used daily at a water treatment plant handling 10,000 cubic meters per day of flow at a chlorine dosage of 10 mg/L. [*Hint*: Multiply the flow rate by the chlorine dosage and make appropriate conversions.] **Ans = 100 kg Cl per day**