How many grams of $NaHCO_3$ would be required to keep the ANC levels in a lake above 50 µeq/L for 3 hydraulic residence times given an influent pH of 3.0 and a lake volume of 4 L, if the current lake ANC is 0 µeq/L?

$$ANC_0 = \left[ANC_{out} - ANC_{in}\left(1 - e^{-\frac{t}{\theta}}\right)\right] e^{\frac{t}{\theta}}$$

$$ANC_{out} = 0.000050$$

$$ANC_{in} = -0.001$$

$$\theta = 3, t = 3$$

$$ANC_0 = \left[0.000050 - (-0.001)\left(1 - e^{-\frac{3}{3}}\right)\right] e^{\frac{3}{3}} = 1.854 meq/L$$

$$[NaHCO_3]_0 = ANC_0 = \frac{1.854 mmol\ NaHCO_3}{liter} * \frac{84 mg\ NaHCO_3}{mmol\ NaHCO_3} * 4L = \mathbf{0.623g}$$