2019 Operations Challenge – Laboratory Event – Solids Inventory Calculations

Thank you to Sidney Innerebner and Indigo Water Group for the use of the above graphic.

Using the Above Diagram and attached Design and Daily Process Data Complete Questions and Solve Problems related to the following topics (There will be 10 questions / calculations):

- Solids Loadings Calculations
- Total Solids Calculations
- Solids Removal Calculations
- Volatile Solids Calculations
- Solids Retention Time
- Process Unit Efficiency
- Sludge Age
2019 Operations Challenge – Laboratory Event – Solids Inventory Calculations

Solids Loading Rate to Clarifier (lbs/day/sq ft) = \( \text{MLSS (mg/l)} \times \text{Flow (MGD)} \times 8.34 \text{lbs/gal} \times (0.785)(D^2) \)

Solids Loading to Tank or Stream (lbs/day) = Concentration of TSS (mg/l) \times \text{Flow (MGD)} \times 8.34 \text{lbs/gal}

Sludge Age (Days) = \( \frac{\text{MLSS (mg/l)} \times \text{Aeration Volume (MG)}}{\text{TSS (mg/l)} \times \text{Flow (MGD)} \times 8.34 \text{lbs/gal}} \)

Solids Retention Time (SRT in Days) = \( \frac{(\text{MLSS mg/l}) \times (\text{Volume in Aeration and Clarifier, MG}) \times (8.34 \text{lbs/gal})}{(\text{WAS SS mg/l}) \times (\text{WAS Flow, MGD}) \times (8.34 \text{lbs/gal}) + (\text{Eff. SS mg/l}) \times (\text{Plant Flow, MGD}) \times (8.34 \text{lbs/day})} \)

Percent Removal = \( \frac{\text{Influent} - \text{Effluent}}{\text{Influent}} \times 100 \)

% Total Solids = \( \frac{\text{Weight of Total Solids (after drying), g}}{\text{Weight of wet sample, g}} \times 100 \)

% Volatile Solids = \( \frac{\text{Weight of solids lost in burning, g}}{\text{Weight of Total Solids, g}} \times 100 \)