

# **Performing a State Point Analysis**

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- Secondary clarifiers are evaluated based on two key categories consisting of the following parameters:
  1. **Hydraulic capacity** (detention time, surface overflow rate [SOR], and weir overflow rate [WOR])
  2. **Solids loading** capacity or solids loading rate (SLR)
- One of these categories, or one of these parameters, will be a constraint that ultimately limits clarifier performance.
- State point analysis can be used to model and evaluate secondary clarifier performance.

State point analysis is a (simplified) mathematical model that predicts secondary clarifier performance using actual operating data consisting of:

1. Influent flow rate
2. Return activated sludge (RAS) flow rate
3. Mixed liquor suspended solids (MLSS) concentration
4. Clarifier surface area
5. Number of clarifiers in service
6. Sludge volume index (SVI)

- The “state point” or the “operating point” is the point where the solids in the clarifier underflow rate line and the surface overflow rate line intersect.
- For stable operation of secondary clarifiers, loosely defined here as maintaining the sludge blanket at  $\leq 3$  feet, the state point must be located well below the settling flux curve.
- As the state point moves closer to the boundary line represented by the flux curve, it can be expected that the sludge blanket in the clarifier is increasing. This will be further indicated by the solids underflow line moving closer, or becoming tangent to, the settling flux curve.
- When the state point has moved outside, or above, the settling flux curve, loss of solids in the clarifier will likely be observed.

Step-by-Step Explanation

# **State Point Analysis**













