Errata posted 12/01/2023

Revisions are shown in red.

Exam Specifications, p. 4:
- The exam uses both the International System of units (SI) and the US Customary System (USCS).

Question 66, p. 46:
The primary clarifier of a trickling filter plant receives 1,000 lb of solids daily. The clarifier has a solids capture rate of 90% and produces an underflow sludge concentration of 9% (SG = 1.05). The volume of primary sludge (ft³/day) is most nearly:

- A. 2
- B. 80
- C. 150
- D. 210

Question 76, p. 50:
The illustration should read as follows:
**Question 79, p. 52:**
The illustration should read as follows:

<table>
<thead>
<tr>
<th>Carbon dioxide 50</th>
<th>Calcium 150</th>
<th>Other cations 125</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bicarbonate 120</td>
<td>Other anions 155</td>
<td></td>
</tr>
</tbody>
</table>

Length of bars not to scale. All concentrations are mg/L as CaCO₃.

**Solution 53, p. 75:**
Lines 2 and 6 should read as follows:

\[
F_1 = \frac{V_1}{\sqrt{gy_1}} = \frac{50 \text{ ft/sec}}{\sqrt{(32.2 \text{ ft/sec}^2)(3.8 \text{ ft})}} = 4.52
\]

\[
F_2 = \frac{V_2}{\sqrt{gy_2}} = \frac{8.46 \text{ ft/sec}}{\sqrt{(32.2 \text{ ft/sec}^2)(22.46 \text{ ft})}} = 0.31
\]
Solution 66, p. 81:
Refer to the Sludge Production section in the PE Civil Reference Handbook.

Using equation \( V_S = \frac{M}{P_S S_S g_w} \)

Use SG of sludge = 1.05
\( M = 1,000 \text{ lb/day} \times (0.9) = 900 \text{ lb/day} \)
\( P_S = 0.09 \)
\( S_S = 1.05 \)
\( g_w = 62.4 \text{ lb/ft}^3 \)
\( V_S = \frac{900 \text{ lb/day}}{(0.09)(1.05)(62.4 \text{ lb/ft}^3)} = 152.6 \text{ lb/ft}^3 \)
\( V_S = 153 \text{ lb/ft}^3 \)
Round to tens digits = 150 lb/ft\(^3\)

Solution 76, p. 85:
The illustration should read as follows:

![Diagram of tank design parameters]

- Maximum elevation
- Airport flight path
- Pump total discharge head (TDH)
- Minimum elevation
- Service pressure
- Volume
- Fire-flow duration
- Chlorine residual