Problem of the Day
2014.Nov.05

Discussion

The Water Environment Federation is the trade organization for water professionals, including wastewater treatment operations professionals (http://wefcom.wef.org/home). Individual states, or groups of states, sponsor local chapters. On October 29, 2014, I gave a 6-hour Math for Operators Workshop at the annual conference of the Pacific Northwest Clean Water Association (PNCWA). PNCWA represents Idaho, Oregon and Washington (http://www.pncwa.org/). All operators should seriously consider joining their local association. In California it is the California Water Environment Association (http://www.cwea.org/).

Long story short: I randomly covered a series of math problems in the PNCWA workshop, and I have been requested by several attendees to send them the problems. Instead, I am going to post them here. They are good practice for all visitors to WWTT's Problem of the Day.

For those of you who may be new to WWTT's Problem of the Day, we insert a page break after the problem statement so you can print it without looking at the solution: see what you can do to solve the problem **before** looking at the solution.

Problem

Today's problem, like yesterday's, is a pounds-per-day calculation.

Problem of the Day: Given the following information, calculate the pounds of TSS per day in the primary sludge.

- Influent flow = 5.2 MGD
- Primary influent TSS = 310 mg TSS/L
- Primary effluent TSS = 80 mg TSS/L
- **Calculate: lb TSS/d** in the primary sludge.

Solution

Problem of the Day: Given the following information, calculate the pounds of TSS per day in the primary sludge.

- Influent flow = 5.2 MGD
- Primary influent TSS = 310 mg TSS/L
- Primary effluent TSS = 80 mg TSS/L
- ★ TSS concentration to primary sludge = (310 − 80)mg TSS/L = 230 mg TSS/L
- **Calculate: lb TSS/d** in the primary sludge.

lb TSS		230 ~~mg~~ **TSS**	~~L~~	5.2 ~~Mgal~~	8.34 **lb**
d	=	~~L~~	~~Mmg~~	**d**	~~gal~~

All the units have canceled except those needed in the answer, **lb TSS/d**. The arithmetic gives the answer:

230 x 5.2 x 8.34 = **9,975 lb TSS/d**.

Obviously, the "trick" to this question is understanding that if 310 mg TSS/L are coming into the primary clarifier and 80 mg TSS/L are going out, then the difference, 230 mg TSS/L, is going into the sludge. Once this is understood, the problem is very straightforward.

Happy calculating!