Participation Exercise for JETCC Operator Class

May 2017

You currently land apply 180,000 gallons of a co-thickened liquid sludge (combined primary and waste activated) per year which averages 1.3% solids. By adding a rotary drum thickener prior to application it is estimated that you can increase the solids content to 4.5%

1. How many gallons will need to be hauled and land applied if you add the rotary drum thickener?

First determine how many gallons ae solids and how many are water:

Gallons of solids = 180,000 X 1.3/100 >>> 180,000X0.013 = 2,340 gallons are solids (177,660 are water)

Convert back to a slurry at 4.5% 2,340 gallons of solids / 0.045 <u>= 52,000 gallons of sludge</u>

2. If your transportation and land application costs are $4.00 per gallon, How much can you save by adding a rotary drum thickener?

Savings = 180,000 – 52,000 = 128,000 gallon you will not have to haul @ $4 per gallon That is <u>$512,000.</u>

3. If polymer costs $2.25 per pound and a dosage rate of 10 lbs per dry ton of solids is needed to achieve the thicker solids specified above, what is your projected annual polymer cost (assume the wet weight of solids have a specific gravity of water, or each gallon weighs 8.34 pounds) ?

In #1 we determined that we had 2,340 gallons of solids at 8.34 lb/gallon this is 19,515 pounds of solids, or 19,515 lb /2000 lb/ton = 9.76 dry tons of solids round up to 10 tons x $2.25 = <u>$22.50</u>

4. Your treatment plant produces 9,400 cubic yards of sludge per year having a solids content of 20%.
a. Assuming your sludge has a unit weight of 1750 lbs/ cubic yard, and all sludge is landfilled how many tons are you landfilling?

9,400 yd X 1750 lb/yd = 16,450,000 pounds /2000 lb per ton = <u>8,225 tons</u>

b. If disposal costs $82.50 per ton, what is your annual cost?

8,225 tons X 82.50 = $678,562   (If the tipping fee goes up to $110 per ton due to PFAS, how much does this "hit" your facility?) The added cost is 8,225 X (110-82.5) = $226,160)

c. By adding Anaerobic Digestion you can cut the <u>dry</u> solids output by 45% How many dry tons will you produce?

First determine how many dry tons you are currently producing: 8,225 wet tons X 0.20 = 1,645 dry tons. If you reduce this by 45% (0.45) you still have left 1.0 - 0.45 = 0.55 (55% remains) Thus,

1,645 X 0.55 = <u>905 dry tons</u>

d. But your percent solids will drop to 18%, How many wet tons do you need to dispose of?

905 dry tons / 0.18 = <u>5,028 wet tons</u>

e. How much will you save in disposal costs (using the original landfill price of $82.50 per ton)?

 (8,225 – 5,028) X $82.50 = <u>$263,752</u>

If the going price is $110 per ton, then the savings is $351,670.