ANSWER KEY TO STUDY QUESTIONS

Ecological Management of Human Wastes

1) In a wastewater treatment facility what is meant by ‘primary treatment’?

*Removal of solids by allowing them to settle out of suspension by gravity.*

2) What is meant by ‘secondary treatment’?

*Removal of dissolved and suspended solids by using aeration to encourage microbial consumption of organic matter.*

3) While the KSTD facility does not use it, what is meant by ‘tertiary treatment’?

*Removal of mineral nutrients, in particular nitrogen and phosphorus.*

4) What is the function of the chlorination chamber?

*To kill any pathogenic bacteria that may remain in the effluent.*

5) What is another name for sewage sludge?

*Biosolids*

6) The microbes involved in the ‘secondary treatment’ of sewage are known as saprophytes. What are saprophytes?

*Saprophytes are organisms that consume dead organic matter.*

7) What are the major microbial taxa represented in the saprophyte community of a sewage treatment plant?

*Bacteria and protistans, the latter of which include ciliates, flagellates, and rotifers.*

8) Approximately how many pounds of saprophytes are produced during each day of operation of the secondary treatment tanks at KSTD?

*8000 lbs*

9) How many cubic yards of sewage sludge does KSTD send to the Hawk Ridge composting facility per week? (How many dump truck loads does this represent?)

*240 cubic yards (168 tons) contained in a total of six truckloads.*
10) How much money does KSTD pay the Hawk Ridge composting facility per year to accept their sewage sludge?

$600,000

11) What are the advantages of aerobic composting to anaerobic composting?

Aerobic composting results in much faster decomposition than anaerobic composting.

12) What specific type of composting is used at the Hawk Ridge facility?

In-vessel (bioreactor) aerobic composting

13) What are the five essential factors that are important to control in the production of compost?

Microbes, aeration, temperature, moisture, carbon/nitrogen ratio.

14) At Hawk Ridge what ingredients are mixed with sewage sludge to produce compost?

The compost mixture includes 23% sludge, 50% kiln-dried sawdust, 17% short fiber paper dust, and 10% inoculum (compost containing microbes).

15) Breaking it down into steps, how much time is involved to complete the composting process at Hawk Ridge?

Initial phase in bioreactor: 7-8 days; curing phase: 21 days; maturing (windrow) phase: 90-120 days.

16) On an annual basis, how much sewage sludge does the Hawk Ridge facility process, and how much compost does it produce?

On an annual basis, 51,600 cubic yards of sludge are processed, and 80,000 cubic yards of compost are shipped.

17) In New England Organics’ business plan, what two roles are defined for the company with respect to Class B biosolids (sewage sludge)?

1) Convert Class B biosolids, an environmentally restricted material, to compost, an unrestricted material.

2) Process the compost to make products that are valuable for the horticulture and landscape industries.