

**Process Scenario #4: Odor Control**

Use the scenario information for all questions and circle the correct answer for each.

**You must show your work to receive full credit even if the answer is correct.**

The Scott Elston WRF is a conventional secondary treatment facility. Two scrubbers serve the facility. An activated carbon scrubber serves the primary clarifiers and a three phase scrubber serves the Solids Handling Building. During the last few months the facility has experienced a rise in odor complaints as evidenced in the September Log.

On an average 0.0185 lbs of hydrogen sulfide are generated each hour from the primary clarifiers. How often would the impregnated carbon in the odor control system need to be replaced?

<b>A</b>	100 years
<b>B</b>	0.5 years
<b>C</b>	1 year
<b>D</b>	2 years

$$0.0185 \text{ lbs/hr} \times 24 = 0.444 \text{ lbs/day}$$

$$\frac{0.44}{2.2} = 0.20 \text{ kg/day}$$

$$0.14 \text{ g/cc} \times 1,000,000 \text{ cc} = 140,000 \text{ g}$$

$$\frac{140,000 \text{ g}}{1,000} = 140 \text{ kg}$$

$$\frac{140}{0.2} = 700 \text{ days} = 1.9 \text{ years}$$

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Points (60/120)

Proper answer

\_\_\_\_\_ D \_\_\_\_\_

# Process Scenario #4: Odor Control

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You must show your work to receive full credit even if the answer is correct.

What percentage of the odor complaints are attributed to each odor control unit type:

13 total complaints

for i =  $\frac{4 \text{ with sulfur}}{13} = 31\%$

work (no clear)  $\frac{1}{13} = 7.7\%$

remainder  $\frac{8}{13} = 61.5\%$

<input checked="" type="checkbox"/> A	Primary Trmt = 31% Solids Handling = 62% Unknown = 7%
B	Primary Trmt = 50% Secondary Trmt = 25% Gravity Thickener = 25%
C	Primary Trmt = 75% MBRs = 5% Digesters = 20%
D	Primary Trmt = 10% Solids Handling = 80% Unknown = 10%

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Points (60/120)	Proper answer

\_\_\_\_\_   A  

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Which odor control unit are most of the odor complaints attributable to AND what is the problem. (Must get both answer correct to receive credit). **No work is required - just reasoning.**

*Previous question, solids handling*

*A = pH of 2 is OK*

*C = Yes*

*D = pH OK, pumps OK*

<b>A</b>	Solids Handling Building Scrubber - Acid feed rate is too high.
<b>B</b>	Primary Treatment Activated Carbon Cannister needs to have the carbon regenerated or replaced.
<b>C</b>	Solids Handling Building Scrubber - Recirculation Pump was turned off.
<b>D</b>	Solids Handling Building Scrubber - Caustic Feed Pumps are Out of Service.

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Points (60/120)	Proper answer

\_\_\_\_\_ C \_\_\_\_\_

# Process Scenario #4: Odor Control

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Identify three changes that should be made to the Odor Complaint Log to make it more useful.

Reduce # --- No  
 Suggest .. OK  
 Wind speed --- OK  
 Odor intensity --- OK  
 Temperature --- OK  
 Anonymize --- No  
 Actions taken --- OK  
 hydro hydrometers? No

<p><b>A</b></p> <ol style="list-style-type: none"> <li>1. Reduce the number of questions.</li> <li>2. Suggest types of odors one might smell - burnt, smokey, ammonia like</li> <li>3. Add wind speed.</li> </ol>
<p><b>B</b></p> <ol style="list-style-type: none"> <li>1. Add odor intensity on a scale from 1 to 5</li> <li>2. Add atmospheric temperature</li> <li>3. Anonymize the complaints to maintain complainant privacy.</li> </ol>
<p><b>C</b></p> <ol style="list-style-type: none"> <li>1. What actions were taken at the plant</li> <li>2. Take hydrometer readings in the area of the complaint</li> <li>3. Add wind direction</li> </ol>
<p><b>D</b></p> <ol style="list-style-type: none"> <li>1. What actions were taken at the plant</li> <li>2. Add odor intensity on a scale from 1 to 5</li> <li>3. Add wind speed.</li> </ol>

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Points (60/120)	Proper answer

\_\_\_\_\_ D \_\_\_\_\_