

Operator Quiz Summer 2019 – Process Troubleshooting

The following questions are designed for trainees as they prepare to take the ABC wastewater operator test. It is also designed for existing operators to test their knowledge. Each issue of *Clear Waters* will have more questions from a different section of wastewater treatment. Good luck!

1. A trickling filter plant is experiencing an increase in secondary clarifier effluent suspended solids. It is noticed that there is excessive sloughing from the trickling filter most likely due to changes in wastewater characteristics. Which of the following would not be a corrective action to resolve this issue?
 - a. Check wastewater for toxic materials, pH, temperature and BOD.
 - b. Increase clarifier sludge withdrawal rate.
 - c. Clean off trickling filter with a low dose mixture of sodium hypochlorite.
 - d. Identify and eliminate the source of wastewater causing the upset.
2. An operator is told to do the following: Increase the hydraulic loading to the trickling filter, unplug the spray orifices, and adjust orifice opening at the end of the distributor arm to spray trickling filter walls. The most appropriate reason to do these actions is:
 - a. To help remove *Psychoda* (filter flies).
 - b. To increase microbiology population.
 - c. To increase BOD removal rate.
 - d. To decrease the amount of TSS in the trickling filter effluent.
3. A primary clarifier has damaged scrapers and is experiencing excessive sludge accumulating in the tank due to a plugged withdrawal line. What scenario is the operator most likely to see due to these conditions?
 - a. Floating sludge.
 - b. Clear effluent.
 - c. Decreased scum production.
 - d. Increased TSS removal.
4. A treatment plant has been implementing the following solutions to an ongoing problem in their primary clarifier: Using available tank capacity to shave peak flows; increased and consistent pumping as well as minimizing short circuiting of the tank. The most likely reason to implement these solutions is:
 - a. To aid in poor settleable solids removal.
 - b. To aid in poor fecal coliform removal.
 - c. To aid in poor pH neutralization.
 - d. To increase the amount of flow to secondary treatment.
5. An aeration tank is showing signs of stiff, white, billowing foam. Of the following statements, which is the most accurate?
 - a. This foam is characteristic of old sludge and chlorine should be added to kill any unwanted organisms.
 - b. This foam is characteristic of old sludge and the RAS rate should be increased to help minimize the foam.
 - c. This foam is characteristic of young sludge and more air should be added to increase the DO.
 - d. This foam is characteristic of young sludge and the WAS rate should be adjusted to increase tank MLSS.
6. An aeration system has just experienced an upset with the nitrification process. After identifying the problem, which of the following is not necessary to maintain the health of the nitrifying organisms?
 - a. Monitor the influent and effluent pH, nitrate, nitrite and ammonia levels.
 - b. Decrease the pH in the aeration basin to a more acidic level.
 - c. Reduce wasting to increase the SRT to develop the nitrifying organisms.
 - d. Maintain the DO in the aeration basin at an acceptable level, usually between 2 and 3 mg/L.
7. A centrifugal pump is experiencing rapidly wearing bearings. What would be the most likely cause and solution to this problem?
 - a. There is a misalignment of the pump; resolve this by greasing the bearings.
 - b. The shaft of the pump is bent; resolve this by tightening the packing.
 - c. There is a lack of lubrication in the bearings; resolve this by properly lubricating bearings.
 - d. There is dirt in the bearings; resolve this by adding more grease to the bearings.
8. When inspecting a newly built progressive cavity pump the operator noticed there is no discharge coming from the pump. This can be caused by an unprimed pump, loose belts, closed discharge line or which of the following?
 - a. Improper rotation direction.
 - b. Open check valve.
 - c. Open seal water line.
 - d. Low discharge pressure.
9. While doing rounds the operator noticed the grit system was not recovering any grit. After further inspection it was found that the grit pump was free of clogs and the pump seals and shaft were not worn. What is the most reasonable explanation for the decrease in grit removal?
 - a. Flow through the chamber is too fast or turbulent.
 - b. Flow through the chamber is too slow.
 - c. Grit was removed by the coarse bar screens.
 - d. Grit was removed by the primary clarifier.
10. An anaerobic digester is experiencing increased foaming. After doing an investigation it is confirmed that there was an organic overload to this digester. Which of the following scenarios would be the most likely cause of the digester upset?
 - a. Consistent feeding of co-thickened raw and waste sludge.
 - b. An increase of VFAs.
 - c. Limited grease and scum inputs in digester feed.
 - d. Low mixing time schedule.

Answers: 1C, 2A, 3A, 4A, 5D, 6B, 7C, 8A, 9A, 10B

For those who have questions concerning operator certification requirements and scheduling, please contact Tanya May Jennings at 315-422-7811 ext. 4, tmj@nywea.org, or visit www.nywea.org.

Correction: In the Spring 2019 Operator Quiz (Basic Conversion Factors, Digester Gas), there was a typographic error for the correct answer in question number 6. The question was "1 horsepower equals _____ kilowatts." The correct answer is (a), which should have read "0.746" rather than "746." Thanks to Angela Heintz for picking up on this error.