



Recertification Quiz

Prepared for WQA members by Tanya Lubner, Ph.D.

This quiz is based on *Dealing with 'Nearly Perfect' Water – Unintended Consequences of Arsenic Removal* by Fredrick W. Vance, Ph.D., published in this issue.

1. **How does oxidation of trivalent arsenic [As(III)] affect iron and magnesium cations present in the water supply?**
 - a. Causes fouling of the adsorptive bed with iron and manganese compounds
 - b. Helps iron and manganese compounds stay dissolved
 - c. Causes the positive charge on iron and manganese cations to decrease
 - d. Causes iron and manganese-containing bacteria to flourish
2. **What's the advantage, with respect to arsenic treatment, of treating iron and manganese with an oxidizing filter prior to arsenic treatment?**
 - a. Helps arsenic compounds remain dissolved for later treatment
 - b. Reduces arsenic from pentavalent As(V) to trivalent As(III)
 - c. Could remove enough As to make additional treatment unnecessary
 - d. Removes enough iron and manganese so that follow-up As treatment is more efficient
3. **Which pH conditions make As removal more economical?**
 - a. pH has no effect
 - b. highly alkaline pH
 - c. basic pH
 - d. acidic pH
4. **Which is an unintended and unwelcome consequence of pH adjustment prior to As treatment?**
 - a. Inhibition of bacterial growth
 - b. Oxidation of iron
 - c. Release of scale in pipes
 - d. Promotion of bacterial growth
5. **What should be done to make sure residual acid from an adsorptive media has been removed?**
 - a. Backwash the media prior to use to remove the acid
 - b. Air out the media prior to use to evaporate the acid
 - c. Run some base through the media
 - d. Follow the media with a calcite filter
6. **What is an advantage of using adsorptive media with more spherical and robust beads?**
 - a. Lower flow rate needed for backwashing
 - b. Fewer bed volumes needed for backwashing
 - c. Higher initial adsorption capacity
 - d. Better at removing iron and magnesium
7. **What is a good empirical method to determine when used adsorptive media should be backwashed?**
 - a. Watch for an increase in predetermined pressure drop across the media
 - b. Watch for formation of iron precipitate in the media
 - c. Watch for bacterial growth on the media bed
 - d. Watch for color changes in the media bed
8. **What is an advantage of adsorptive media beds over the coagulation/filtration approach?**
 - a. Less fouling
 - b. Less bacteria growth
 - c. Less frequent backwashing
 - d. Lower pressure drop



Water Quality Association Recertification Credit Quiz



Water Conditioning & Purification Magazine Answer Sheet

Quizzes can only be completed by a person holding current WQA certification. Answers can be submitted in one of two ways:

- 1) An original answer sheet (no photo copies) can be signed and returned to WQA per the procedures below, or
- 2) The quiz can be addressed online at www.wqa.org. Go to the WQA Store item under the Member area, scroll down to the FREE Certification Credit Quizzes, find this quiz, enter your information and submit.

Answers can be submitted up to six months after the WC&P issue in which it is printed.

Dealing with 'Nearly Perfect' Water – Unintended Consequences of Arsenic Removal by Fredrick W. Vance, Ph.D., January 2010.

Circle the best answer for each question.

- | | |
|------------|------------|
| 1. a b c d | 5. a b c d |
| 2. a b c d | 6. a b c d |
| 3. a b c d | 7. a b c d |
| 4. a b c d | 8. a b c d |

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I hereby certify that the answers to this quiz represent my own work and not that of anyone else. I understand that if this statement is found not to be true, all credit will be withdrawn and lapse of certification could result.

Signature (Must be legible for credit) _____ Date _____

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