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Continuing Education Course #113  
Management of Desalination Plant Concentrate

1. What is Percentage of Desalination Plant Discharge is Concentrate?
  - a. 10 to 20%
  - b. 90 to 95 %
  - c. 25 to 35 %
  - d. 40 to 50 %
2. What two main factors determine the quantity of concentrate?
  - a. Desalination plant intake type and depth
  - b. Concentrate salinity and conductivity
  - c. Volume of permeate and quality of seawater
  - d. Plant size and permeate recovery rate
3. Permeate Recovery Rate is Function of Source Water Salinity - True or False?
  - a. True
  - b. False
4. What is the Daily Volume of Concentrate Generated by 1 MGD Plant Operating at 45 % Recovery?
  - a. 1.22 MGD
  - b. 2.00 MGD
  - c. 0.75 MGD
  - d. 1.50 MGD
5. Concentrate Volume Increases with Increase of Permeate Recovery Rate - True or False?
  - a. True
  - b. False
6. What is the TDS of Concentrate for Source Seawater Salinity of 35,000 mg/L, Permeate Recovery Rate of 50 % and Permeate Salinity of 200 mg/L?
  - a. 25,000 mg/L
  - b. 69,800 mg/L
  - c. 73,500 mg/L
  - d. 62,000 mg/L
7. Concentrate Factor Increases with Increase of Permeate Recovery?
  - a. True
  - b. False
8. What is the Typical Range of the Concentration Factor of Single-Pass Seawater Reverse Osmosis System?
  - a. 1.7 to 2.0
  - b. 2.5 to 8.5

- c. 1.1 to 1.4
- d. 2.9 to 6.7

9. Most Heavy Metals are Rejected by RO Membranes in Ratio Similar to the Rejection of Calcium and Magnesium?

- a. True
- b. False

10. What is the Typical BOD Level of Desalination Plant Concentrate?

- a. > 5 mg/L
- b. > 20 mg/L
- c. 30 to 50 mg/L
- d. < 5 mg/L

11. What is the Most Common Concentrate Management Practice in the US?

- a. Surface Water Discharge
- b. Evaporation Ponds
- c. Deep Well Injection
- d. Sewer Disposal

12. What Method of Concentrate Disposal is used for the 40 MGD Boca Raton Plant in Florida?

- a. Collocation with Power Plant
- b. Co-discharge with Wastewater Treatment Plant Effluent
- c. Land Application
- d. Zero-liquid Discharge

13. Blending of Desalination Plant and Power Plant Discharges Results in Accelerated Dissipation of Both Salinity and Thermal Discharges - True or False?

- a. True
- b. False

14. Collocation of Desalination and Power Plants Can Yield Significant Cost Savings - True or False?

- a. True
- b. False

15. What is the Most Common Material Used for Concentrate Outfalls Over the Past 10 Years?

- a. Steel
- b. Wood
- c. Plastic
- d. Cast Iron

16. What is the Typical Maximum Diameter of HDPE Pipe Outfalls?

- a. 100 inches
- b. 78 inches
- c. 50 inches
- d. 24 inches

17. What is the Typical Design Velocity of Concentrate Outfalls Expressed in Feet per Second (fps)?

- a. 2 fps
- b. 7 fps
- c. 1 fps
- d. 12 fps

18. What is the Recommended Concentrate Diffuser Exit Velocity Range Expressed in Feet per Second (fps)?
- a. 1 to 5 fps
  - b. 10 to 15 fps
  - c. 50 to 100 fps
  - d. 6 to 12 fps
19. Discharge of Concentrate to Sanitary Sewer is The Most Costly Concentrate Management Option - True or False?
- a. True
  - b. False
20. What is the Total Dissolved Solids Concentration Threshold in Wastewater Treatment Plant Influent above which the Biological Treatment Process is Inhibited?
- a. 500 mg/L
  - b. 20,000 mg/L
  - c. 3,000 mg/L
  - d. 67,000 mg/L
21. Deep Injection Wells are Not Used for Concentrate Disposal - True or False?
- a. True
  - b. False
22. The Natural Salinity of the Aquifer Selected for Concentrate Injection Should Be Lower than the Salinity of the Desalination Plant Concentrate - True or False?
- a. True
  - b. False
23. What is the Maximum Design Velocity for Concentrate Injection Wells in Florida (expressed in feet per second - fps)?
- a. 5 fps
  - b. 10 fps
  - c. 3 fps
  - d. 12 fps
24. What is the Maximum Slope of Sites Suitable for Land Application of Concentrate?
- a. 2 %
  - b. 1 %
  - c. 10 %
  - d. 20 %
25. Golf Course Grasses Are Affected by Irrigation with Concentrate of TDS Content Higher than 1,000 mg/L - True or False?
- a. True
  - b. False
26. The Minimum Number of Recommended Rapid Infiltration Basins for Concentrate Disposal is?
- a. 2
  - b. 6
  - c. 3
  - d. 10
27. Solar Ponds Have Higher Evaporation Rate than Conventional Concentrate Evaporation Ponds - True or False?

- a. True
- b. False

28. Southern Arizona is More Favorable Location for Construction of Concentrate Evaporation Ponds than Southern California - True or False?

- a. True
- b. False

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