



WHAT IS THIS CLASS ABOUT?

This four hour online course will introduce equipment and processes used to clean oilfield produced and frac water. Cleaning water for injection in disposal wells and for recycling for different purposes will be discussed. Limitations imposed by salinity, regulations, economics, and need to dispose of waste products will be considered.

The class ties together information that is usually presented as bits and pieces. The instructor is neither an oilfield “booster” nor does she demonize the oilfield: the class is intended for people who have a non-theoretical need to evaluate water disposal and recycling options.

LEARNING GOALS

Goals for the participants include:

- Recognize the function of equipment and processes used in oilfield water processing
- List the order of removal of contaminants from water, and recognize the effect on the water quality discharged from a given processing train
- State the main idea of Stoke’s law with regard to size and density of particles
- Distinguish between the two federal regulations UIC and NPDES
- Recognize that discharge specifications vary for different water bodies
- Recognize micron sizes of particles and oil droplets and know where to look for information regarding particle removal
- Recognize limitations imposed by salinity and by waste product disposal
- Relate end uses for recycled water, such as drilling mud, to the required water quality, in terms of particulates and chemistry required
- Discuss differences between produced and frac flowback water
- Recognize the cause of earthquakes related to water injection
- Evaluate water quality needed for irrigation of different crops

WHO SHOULD ATTEND?

- Managers looking for options for water management
- Employees who need training about water processes and injection wells
- Industrial water plant operators seeking to understand oilfield operations
- Regulators seeking to understand field operations
- Academics researching practices and processes
- People working in municipal water and wastewater who are adding to their skill set
- Equipment and chemical suppliers seeking to understand the oilfield market

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INSTRUCTIONAL METHODS

The class consists of self-paced modules, featuring examples with actual data. Each module is narrated, and the student is able to move between slides at their own pace, using navigating arrows.

Each module features two or three short quizzes. Some contain humorous choices for answers, but all are intended to reinforce material just learned.

A set of curated resources is provided for additional study, for example:

- Papers detailing the water quality achieved by specific recycling plants
- Examples of permit requirements for NPDES discharges to streams and rivers
- Irrigation water quality requirements that customers might require
- Videos showing facilities such as injection wells
- A list of chemicals added in a water plant
- Charts showing micron sizes of contaminants, and the equipment used to remove the contaminants

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CERTIFICATE

Upon completion of all modules, the student has the option to print a certificate of completion.

COURSE INTERFACE

When the student logs in, they will see a screen similar to the one below. To begin a module, the student clicks a green arrow button, and the module will start. A free backgrounder on frac flowback water is available as a sample.

The screenshot shows a user interface for 'My Training'. At the top, there is a navigation bar with links: Home, My Training, Transcript, Catalog, Resources, Profile, Help, and a role dropdown set to 'Learner'. Below the navigation bar, the 'My Training' section is displayed. It includes a sub-header 'My Training' and a brief description: 'Below is the list of courses that you are enrolled in. For more details about a lesson, click the Details icon. To launch a lesson, click the Launch icon.' A 'Sort By: Due Date' dropdown is visible. The main content area lists two courses:

- Free Backgrounder - Frac Flowback Water** (Status: Incomplete)
 - F1 FRAC FLOWBACK BACKGROUNDER (Incomplete)
 - Documents
- Oilfield Water Processing and Recycling Processes** (Status: Not Attempted)
 - A INTRODUCTION (Not Attempted)
 - B BIG PICTURE ISSUES (Not Attempted)
 - C STRATEGIES - CONTAMINANT SIZE AND EQUIPMENT (Not Attempted)
 - D_SALINITY (Not Attempted)
 - E PRODUCED WATER - EQUIPMENT & PROCESSES (Not Attempted)
 - F FRAC FLOWBACK & SALT REMOVAL (Not Attempted)
 - H INJECTION WELLS - SURFACE DISCHARGE (Not Attempted)

INSTRUCTOR

Lisa Denke is a consultant currently working in the DJ Basin. Her work has been for both operators and consulting firms, and she has done academic research as well. She has worked in plants and done well work, and also seeks out information from Subject Matter Experts to get a perspective from different areas around the US and Canada. She holds a Bachelor's in Electrical Engineering, and is licensed in Mechanical Engineering in Wyoming and Colorado.

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