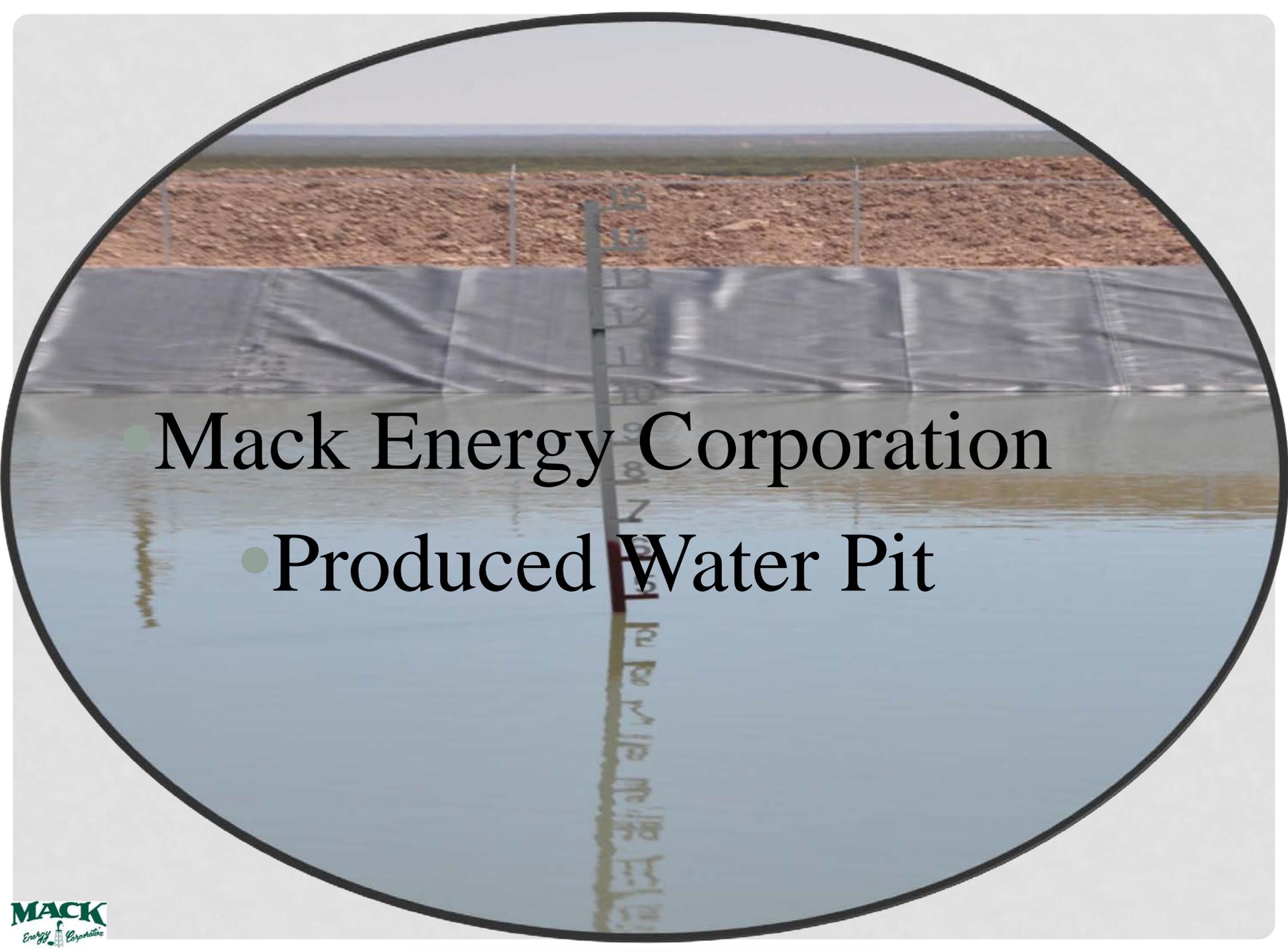


- 
- Mack Energy Corporation
    - Produced Water Pit

# PRODUCED WATER

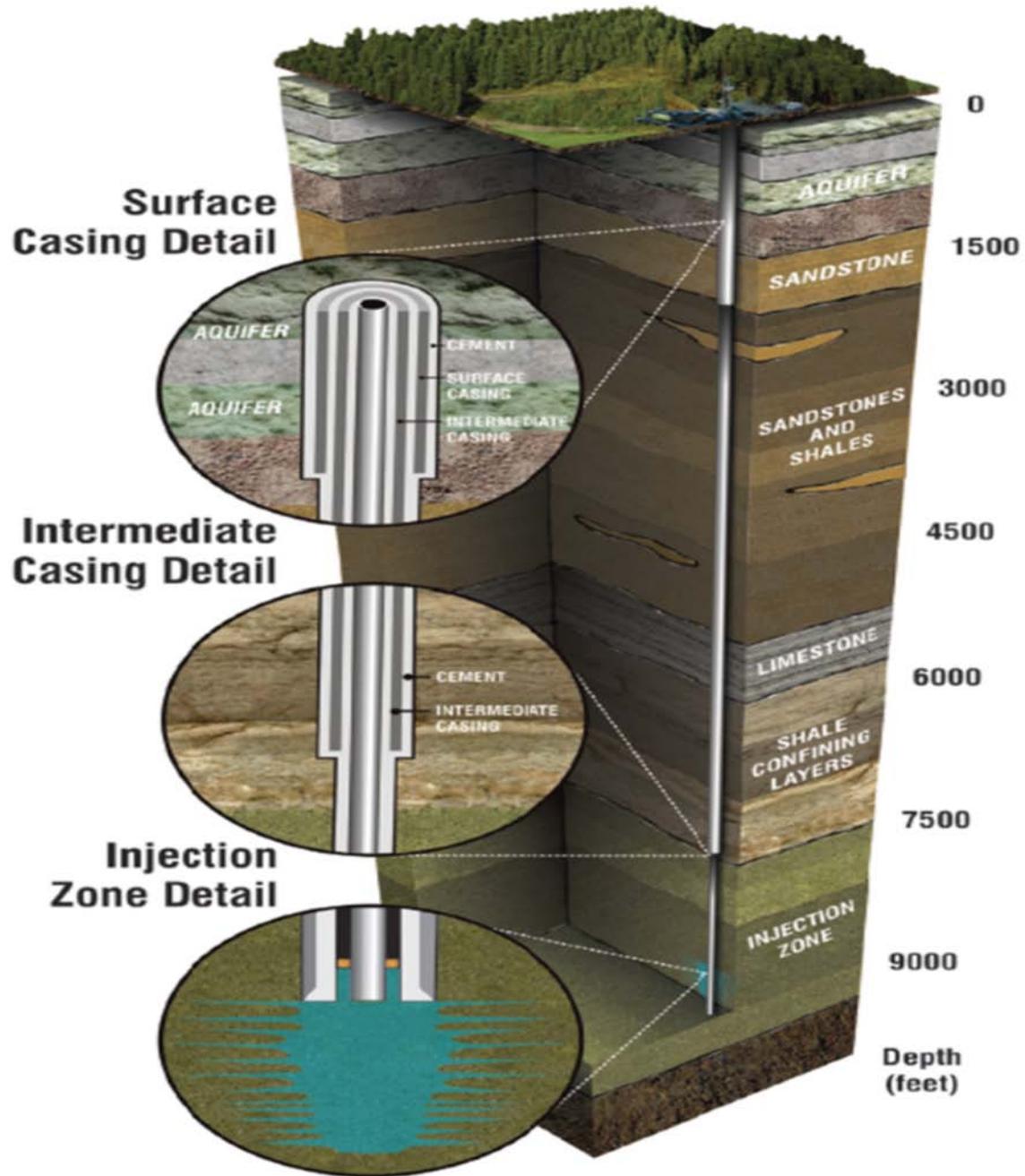
- What is it?



# PRODUCED WATER

- What does the industry currently do with it?
- Pipelines
- Trucks
- Secondary Recovery
- Salt Water Disposals (SWD)

# TYPICAL CLASS II INJECTION WELL



# PRODUCED WATER

- Future of Produced Water?



# PIT DESIGN



# SETBACK REQUIREMENTS



- Groundwater depth  $> 50$ ft
- $>300$  feet to surface water
- $>500$  feet to
  - a wetland
  - water supply well
- $> 1000$  ft to residence
- Not in 100-year floodplain
- Not on unstable ground

# PIT DESIGN

- Rule Requirements

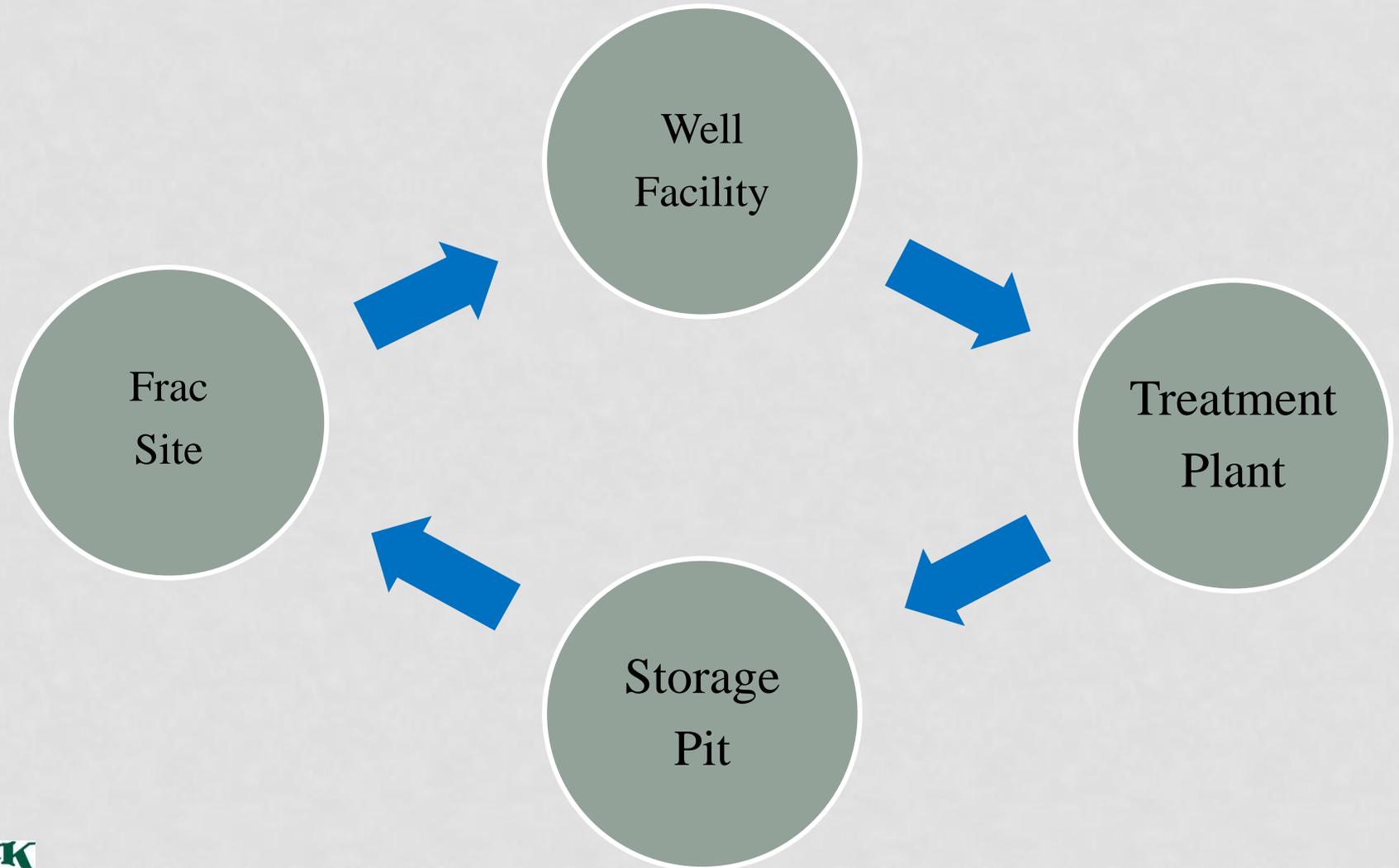
- Double lined
- Leak Detection System
- Measures to protect wildlife

- MEC Protocols

- 3H:1V slopes with fluid level below grade
- Use caliche to build future locations



# WATER TREATMENT CYCLE



# WATER TREATMENT

- **Goals**
- Removal of H<sub>2</sub>S
- Removal of Iron Sulfide
- Removal of Total Suspended Solids (TSS)

# WATER TREATMENT

- Treatment used to reach our goals
- Multi-Chem AcroClear Sulfide Controller



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# WATER TREATMENT

- Final Product



# WILDLIFE & ENVIRONMENTAL PROTECTION

- Implement an Avian and Wildlife Protection Program
- Program is overseen by the Center of Excellence for Hazardous Materials Management (CEHMM)
- Daily inspections of pit and leak detection system
- Fenced and Gated
- No Hydrocarbons on pit

# CEHMM

- Mission Statement
- Works in conjunction with US Fish and Wildlife Service and the New Mexico Game and Fish
- Developed a three phase system to ensure birds and wildlife are being properly protected
- Will monitor the pit to ensure wildlife safety

# PRODUCED WATER PIT BENEFITS

- Reduce use of fresh water
- Reduce truck traffic
- Use 100% Produced Water for fracking

# FRESH WATER SAVINGS

- Currently use 950,000 gallons of fresh water per frac
- In comparison
  - Ethanol uses 10 gallons of water for every 1 gallon of Ethanol produced
  - Oil uses 1 gallon of water for every 5 gallons of oil produced
- Going forward we will use 100% Produced Water in this area
- This will reduce our fresh water usage by almost 4,000,000 gallons a month

# REDUCE TRUCK TRAFFIC

- One frac requires water trucks to drive the equivalent of 7,000 miles to deliver fresh water
- By using Produced Water we will cut our traffic by 95%
- Saves wear and tear on Federal, State, and County Roads
- In the course of a year this could reduce truck traffic on New Mexico roads by 336,000 miles for just this one pit

# QUESTIONS

