CleanWave℠ Water Treatment Service
CHALLENGE: Reduce Water Costs / Improve Water Quality

What is the Real Cost?

- Acquire
- Transport
- Site Storage
- Disposal
- Flow Back
- Treatment
- Condition for Use
SOLUTION: Treatment and Recycling

A service custom-tailored to your needs
Service Benefits

- Improves safety
- Lowers operating costs
- Minimizes fresh water use
- Helps meet water supply needs
- Reduces disposal challenges
- Creates community goodwill
- Improves reservoir performance
CHALLENGE: Clean-up and Re-use of Fracture Flow Back and Produced Water

- Non-potable water source treatment

- Preparing water for:
  - Fracturing fluids
  - Drilling muds

- Water intensive operations, i.e., shale gas

- Limited water supply

- Limited disposal options
SOLUTION: CleanWave℠ Water Treatment Service

- Workhorse of the flow back treatment process
- Electrical charge coagulates suspended matter
- Containerized unit with 100 kVA generator
- Scalable - can handle total flow in real time
- Handles wide variety of source waters (Total Dissolved Solids range = 100 to 300,000 mg/l)
- Established technology; New application
Outcome

Clear brine for your next:

- Fracturing program
- Drilling program
- Reinjection or disposal
CleanWaveSM Service Benefits

ENERGY INPUT

- Suspended Materials
- Bacteria
- Heavy Metals
- Total Petroleum Hydrocarbons

COSTS

FLOW RATE

TREATS up to 20 BPM

REMOVES up to 99% of TOTAL SUSPENDED SOLIDS
CleanWave℠ Service Advantages

Reduces volume of sludge
Additional CleanWave℠ Service Benefits

- Coagulates particles down to < 1 micron
- Conserves water via onsite treatment of:
  - Frac flow back
  - Produced water
  - Surface runoff
  - Other sources
- Automated

- Reduces
  - Bacteria
  - Turbidity
  - H₂S
  - Scaling, corrosion
  - Chemicals used
  - Disposal, handling, transportation costs
  - Sludge
Case Study: CleanWave℠ Service

**CHALLENGE**
- Remote location in Utah
- Significant delays in production schedule
- Single truck road – 40 miles each way
- Massive snow buildup in the winter
- High total dissolved solids (TDS) water > 50,000 ppm

**SOLUTION**
- CleanWave℠ water treatment service
- Halliburton slick water frac

**RESULTS**
- Successful seven month operation
- 55,000 barrels treated in under four days
- 1,000 truck loads, 5,000 hours of drive time eliminated
- Significant reduction in water management cost
- On location treatment eliminated frac schedule delays
- Successful frac
Why Halliburton Water Treatment Services?

Halliburton has **unique expertise** and technologies to help you recycle water for any designated task with minimal use of chemicals.

- Thorough understanding of oilfield and fluids/chemistry
- On location QA/QC
- HSE performance second to none

>> **Reduce** water costs while **improving** water quality