Pulsonix® TFA Service
Innovative Process for Optimizing Matrix Treatment Effectiveness

The Pulsonix® TFA service incorporates Halliburton’s coiled tubing and hydraulic workover expertise with proven fluidic oscillator technology. The newest innovation of this process, Tuned Frequency Amplitude (TFA), enables better control when matching fluid rates to the most desirable frequency and amplitude of the pressure pulses based on the requirements of the application.

- Fluid rates from 0.50 bbl/min to 40 bbl/min.
- Wide range of rates enables matching the bottomhole assembly and maximizing the benefits of flow capacity of a wide range of coiled tubing and jointed pipe sizes.
- Unprecedented mass flow rates provide stronger pulse amplitude providing enhanced near wellbore action.
- Side and bottom ports enable direct impingement on perforations.
- Functions at low flow rates.

Pulsonix® TFA Service Applications
The Pulsonix TFA service is excellent for a wide variety of vertical and horizontal wells, both openhole and cased hole, including oil, gas, injection, geothermal, CO2, water disposal, monitoring, and solution mining. The Pulsonix TFA service provides proven performance for the following operations:

- Removing deposits from the near wellbore area, perforations, and screens.
  - Mud and filter cake buildup
  - Cement damage
  - Perforation damage
  - Formation fines
  - Paraffin’s, asphaltene’s, and scales
- Removing gel, emulsions, crosslinkers, and other fluid damage.
  - Penetrate deep into fractures to clean up gel or emulsions
  - Penetrate into formation matrix to release emulsions
- Enhancing the placement and effectiveness of treatment fluids.
  - Stimulating high permeability formations.
- Treating perforation and wellbore with gravel packing and fracpacking.
  - Place fines consolidation chemicals
  - Gravel pack repair to remove chemical and fines plugging
  - Conductivity enhancement
- Removing fill from open hole or casing.
- Optimizing injection profiles.
Fluidic Oscillation Provides Important Advantages

The Pulsonix® TFA tool is based on proven fluidic oscillator technology which causes alternating bursts of fluid. These bursts of fluid create pulsating pressure waves within the wellbore and formation fluids providing several benefits:

- Pressure waves propagate radially from the tool and can break up many types of near-wellbore damage through cyclic loading.
- Enhances penetration of chemical treatments into the formation matrix.
- Enhances penetration of chemical treatments into existing fractures.
- Eliminates the standoff requirements of jetting nozzles.
- Can be run in conjunction with other tools.
- Can be installed anywhere in a jointed pipe string.
- Metal to Metal seals with no moving parts to fail.

Case History

Western USA – Production from a water drive field was declining due to fines migration and deposits in the injection wells reducing the obtainable injection rate. Previous acid treatments with a rotating jetting tool were unsuccessful in increasing the injection rates indicating the problem was not due to perforation plugging but was likely in the near wellbore area. Acid treatments were performed with a stacked Pulsonix TFA Fan and Side Exit jet assembly, which resulted in a total injection rate increase of 1000 BWIPD in treated wells.

Bakken Field – Production from a newly completed well had almost completely stopped due to chemical compatible issues creating an emulsion and foam in the fractures. A Pulsonix TFA tool was ran on the end of jointed pipe to the first stage of the well. A specifically designed chemical mixture was pumped into the well at each Frac Stage. The well was brought back on production and the well produced as expected in the 320 bpd of oil range.

Ecuador - Operations have reported success in stimulating 10 wells using Side Jet 1.69-in. Pulsonix TFA tool to perform low volume acid stimulation treatments over the perforation intervals. The average for these 10 wells required 38 bbls of acid to increase production 245% from 198 bpd to 684 bpd.

For more information please contact your local Halliburton representative or e-mail production-solutions@halliburton.com.