Challenges
Stimulate an openhole horizontal lateral with high water cut. Increase oil production without increasing the water cut.

Solutions
Used coiled tubing (CT) and a JetBLASTER® jetting tool to pump OilMAX* diversion and conformance fluid and OCA* LT low-temperature organic clay acid to remove the damage and stabilize fines.

Results
Increased production tenfold, from 12 to a stabilized 140 bbl/d of oil. Reduced water cut.

The OilMAX/OCA LT treatment increased oil production from 12 to 200 bbl/d and decreased water cut from 95 to 94%. Oil production stabilized at 140 bbl/d.

Stimulating oil intervals and diverting from water zone
An operator in Ecuador wanted to stimulate a horizontal well with declining oil production and 95% water cut. The well, in the Napo "U" formation, is at 7,000 ft TVD and has 75 ft of open hole completed with wire-wrapped screens. Permeability ranges from 300 to 500 mD. Production had been decreasing in the well because of

- fines migration caused by high kaolinite concentration in the formation
- the rapid onset of formation water.

Fines migration is a common problem in Ecuador. In addition, the intervals of the openhole where water had broken through were not known.

An engineered solution
A treatment was needed to increase oil production, which had declined to 12 bbl/d, without increasing the water cut. Because it was not known where the water had broken through in the horizontal section, the treatment-design with OilMAX diverting agent helped to selectively divert the subsequent OCA LT organic clay acid treatment away from the high water cut intervals to avoid stimulating them.

The treatment was pumped through CT, as the well was completed with an ESP and a Y-tool, using a JetBLASTER jetting tool. The CT was cycled up and down the openhole section during each stage.
Schlumberger proposed using
1. solvent to remove residual organic deposits and crude
2. OilMAX treatment to enter and divert away from the higher permeability watered-out sections of the openhole
3. acetic acid preflush and OCA LT organic clay acid to remove the fines migration damage and stabilize remaining fines
4. repeating steps 2 and 3 to ensure coverage of the openhole section.

Achieving sustained production increase without increasing the water cut
As the OilMAX treatment was injected into the formation, the pressure increased. This indicated that the treatment was successfully diverting the subsequent stages to the intervals where water had not broken through and were not yet stimulated. The pressure decreased each time the OCA LT stages were injected into the formation, indicating that it was removing the damage caused by fines migration.

After the treatment, oil production increased from 12 to 200 bbl/d, finally stabilizing at 140 bbl/d. Post-job production has remained stable for more than 3 months after the treatment. The indicates that the OCA LT organic clay acid was successful in removing the formation damage caused by fines migration and stabilizing remaining fines to prevent future migration. The OilMAX treatment successfully diverted the OCA LT fluid away from the high water cut sections, allowing it to successfully stimulate the oil-producing intervals.