

Open Hole Perforating

I've done open hole perforating several times to by-pass suspected mud damage and to improve low matrix permeability in the near wellbore instead of doing an acid job - several times vertically and twice in horizontals. With open hole perforating, I can focus a permeability improvement process directly on a zone of interest without having detrimental effects on other zones. The success is mixed, depending on whether the formation was really damaged or just very low permeability.

I'd use the largest gun I could get into the well (1.5" smaller diameter than the smallest restriction to allow fishing with an overshot in the 0.5 to 1% of the time we need to fish a gun). The largest and best designed DP charges available will create the longest tunnel with the least damage to the structure of the formation. Don't use big hole charges because of near wellbore structure damage to the rock. Capsule charges should be excluded for the same reason. I also would not suggest downhole deployable guns (Swing-jet or Pivot-gun) since they will leave a great deal of debris behind.

If you have a preferential direction to fire (up or down), swivels and rollers can help you align the guns, but you will have to work the guns back and forth in the interval several times to remove the stored torque from running.

In short - very good near well stimulation process with capability to reach out 12 to 20 inches in a 4000 to 6000 psi compressive strength (UCS) formation.

For modeling - about 1/2 of all perforations actually are open when you do underbalance perforating and about 30% open after overbalanced perforating. Look for crush zones 1/2" thick around the working perfs with crush zone permeability of 50% of initial. Perf volume varies with charge and perforation cleanup method.