DATA SHEET

Perforating

HALLIBURTON

FEATURES

- Can be run with a variety of gun system sizes: 2 to 7 in.
- Powerful predictive software validated by field matching high-speed downhole gauge data
- Can be deployed with perforating guns to provide DUB cleanup for new perforations
- Can be deployed separately to provide DUB cleanup for existing perforations

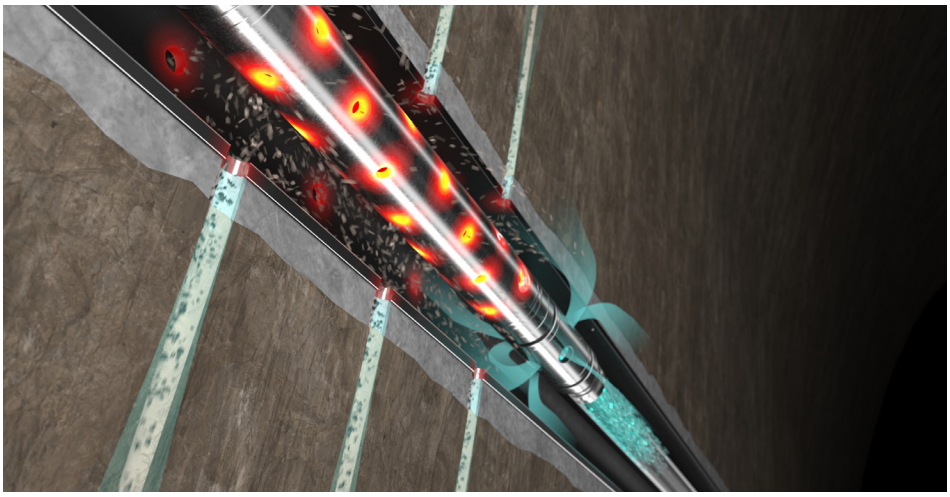
BENEFITS

- No requirement to reduce shot density
- System can be optimized: dynamic underbalance results are engineered/ optimized for each run using modeling software to determine number/ position of vents, volume of atmospheric chambers, tc.
- Can be deployed on wireline, TCP, CT, and slickline, in deviated/ non-deviated wells, in overbalanced/underbalanced conditions

APPLICATIONS

- Treatment for new perforations
- Treatment for existing perforations

SurgePro™ dynamic underbalance design services

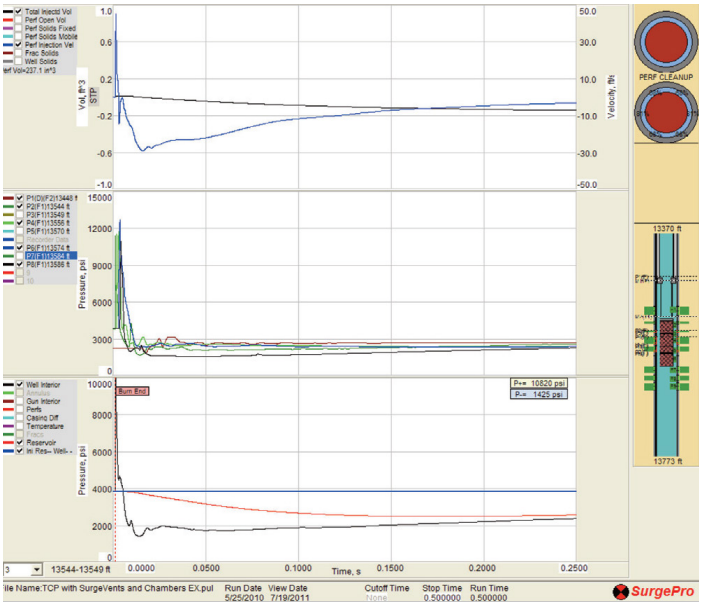


Overview

SurgePro™ dynamic underbalance design services is Halliburton's dynamic underbalance solution. It incorporates the industry's most powerful dynamic modeling software with simple and robust hardware systems to establish a controlled dynamic underbalance to create a desired differential across the perforation.

The SurgePro services vent and chamber assembly can be placed above and/or below standard guns in a perforating string or run separately without loaded perforating guns to treat existing perforations. The vent opens upon detonation of the perforating string. This action allows wellbore fluid to flow into the connected SurgePro services chamber at atmospheric pressure. This fluid displacement creates a region of lower pressure across the sand face and induces differential pressure (in a short time frame), which results in an inflow of formation fluid into the wellbore. The action of this inflow breaks down and removes the damaged material around the newly formed perforation tunnels, reduces skin, and improves productivity/injectivity.

The simple vent tool contains a disk of oxidizing material, which becomes a high-pressure gas when the detonating cord burns through it (as the gun detonation train passes through the vent and adjacent chamber when the guns are fired). This gas is directed through a vent to act on a shear-pinned sliding sleeve, forces this sleeve down, and exposes the flow ports in the tool housing. Wellbore fluid is now free to enter the vent through the ports and large bore gun connector and into the large atmospheric chamber of the SurgePro services chamber. This thereby creates the dynamic underbalance effect in the wellbore.



» **FIGURE 1 -** A typical screen capture from SurgePro software stimulation: understanding and prediction of dynamic pressure behavior becomes paramount when conventional underbalance techniques are not an option.

Figure 1

Tool hardware specifications

ASSOCIATED GUN SIZE (IN.)	MAX OD (IN.)	MAKEUP LENGTH (IN.)	NO. OF PORTS (IN.)	PORT ID (IN.)	MAX OPERATING PRESSURE (PSI.)	FLOW AREA (IN.^{2})	TENSILE STRENGTH (LB)	WEIGHT (LB)	REDRESSABLE
2	2.13	1.4	3	0.75	13,000	1.15	57,300	13	
2 1/2	2.5	1.46	3	0.75	13,000	1.15	57,300	17	
2 3/8	2.38	1.4	3	0.75	13,000	1.15	57,300	16	
2 3/4	2.75	1.7	4	0.875	20,000	1.27	108,500	36	
2 7/8	2.88	1.93	4	0.875	20,000	1.27	108,500	36	yes
3 3/8	3.375	1.89	5	1	13,000	2.4	143,500	39	
4 1/2	4.63	1.79	7	1	13,000	4.9	291,500	62	
4 5/8	4.63	1.79	7	1	13,000	4.9	291,500	63	
7	7	2.22	8	1.44	13,000	13.02	643,900	180	

For more information, contact your local Halliburton representative or visit us on the web at www.halliburton.com