

CARBONRT®

 Non-Radioactive Traceable proppant

FEATURES

- Identifies the proppant coverage (stimulated interval) as well as propped frac height
- Safe and environmentally friendly – no special equipment, handling, permits or licenses required
- Uniform distribution through each grain of proppant – not a coating
- No shelf-life or half-life issues – logging can be performed anytime throughout the life of the well
- Available with any ceramic proppant in CARBO's full product line
- Employs standard neutron logging tools run at standard speeds

An innovative, environmentally responsible, technological breakthrough in proppant placement

CARBONRT is the industry's most effective detectable proppant due to its combination of safety and conductivity.

Safe and simple

Non-radioactive CARBONRT eliminates the dangers and difficulties inherent in other traceable products. It saves time and money because no special equipment, handling, training, permits or certifications are required. There is no mixing involved. Chemically inert CARBONRT is environmentally responsible and doesn't require any special disposal of unused or flowed back proppant.

Uniform distribution, accurate measurement

The proprietary tracer used in CARBONRT is uniformly distributed throughout each grain of proppant during the manufacturing process. This assures consistent distribution of the traceable marker throughout the near-well-bore fracture zone, enabling more accurate measurement of proppant coverage and propped frac height.

CARBONRT also eliminates the need to add specialized coatings.

Conduct logging anytime, with standard tools

With field-proven, non-radioactive CARBONRT, there is no half-life deterioration of the detectable properties. Since the proppant is permanently identifiable, an operator has the flexibility of conducting post-frac logging months or years after fracturing to quickly identify intervals for restimulation.

CARBONRT can reduce costs by using standard neutron logging tools run at standard speeds.

CARBO's renowned conductivity – for use in any well, anywhere

The detectable taggant of CARBONRT can be added to any proppant in the extensive CARBO line without altering proppant performance characteristics.

- CARBOHYDROPROP®
- CARBOCONOPROP®
- CARBOHSP®
- CARBOLITE®

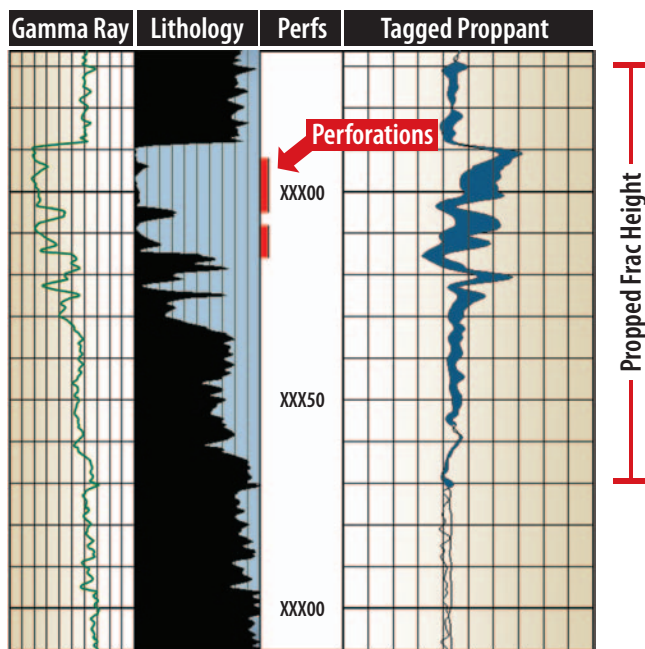


CARBONRT provides information that can increase recovery and decrease the total cost of completion

Measuring actual fracture height

Frac height is used to calibrate the stresses above and below the formation, and, when used in conjunction with a frac model, can give an indication of hydraulic fracture geometry. This is particularly important when there is concern with vertical penetration into an unwanted zone, such as water (in any hydrocarbon well) or gas (in an oil well). When the actual frac height is known, frac models can be calibrated with more certainty so that future designs can be modified to provide the optimal drainage and recovery from the frac.

Actual Plot of Frac Height



CARBONRT helps an operator detect proppant coverage. In this example, **CARBONRT** indicates approximately 100 feet of propped frac height.

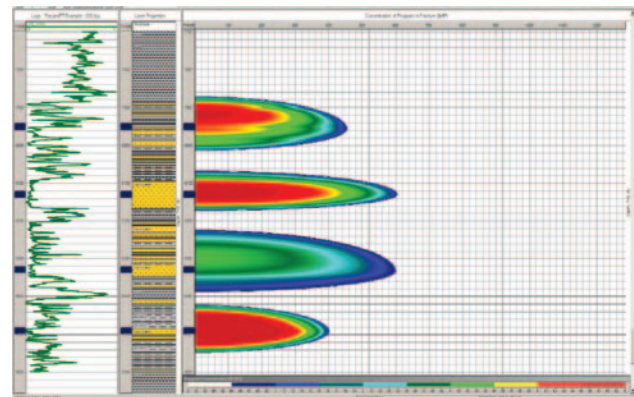
CARBONRT – Traceable conductivity from the world's leading supplier of ceramic proppants

CARBO Ceramics
 Energy Center II
 575 N. Dairy Ashford, Suite 300
 Houston, Texas 77079 USA
 T: +1-281-921-6400
 F: +1-281-921-6401
 CarboCeramics.com/NRT

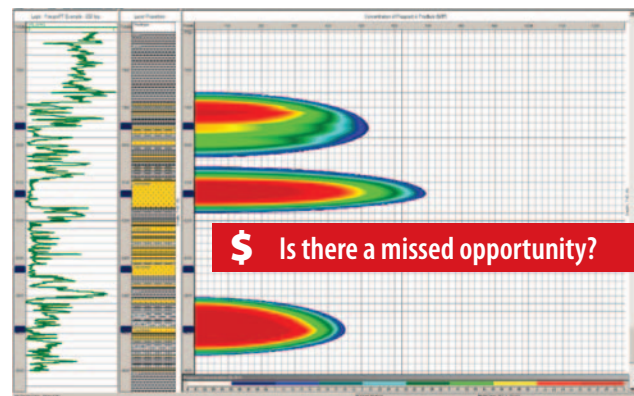
Determining proppant placement

Engineers design fracs, perf placement and frac staging based on the assumption that all zones will be treated. However, after the frac it is critical to determine whether all zones have been successfully stimulated. If a particular zone is not producing, it is important to understand whether it is due to a poor reservoir or poor stimulation. **CARBONRT** can show whether all zones received proppant during the stimulation. If it is found that proppant was not placed in a zone, then a re-stimulation or other remedial operation can be evaluated that would provide increased recovery from the well.

The Importance of Measuring Proppant Location



An optimal fracture will stimulate all zones.



CARBONRT will show which zones were actually propped. If any zone was not properly stimulated, remedial strategies can be developed to improve recovery.

