



Part 2: Technical Considerations for Hydraulic Fracturing and Groundwater Protection

Introductory Description of Hydraulic Fracturing

Lloyd H. Hetrick PE, CSP
Newfield Exploration Company

A. Introduction and Overview

B. HF Base Fluids

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What we pump into the hydrocarbon formation to stimulate it



How we pump and then recover this stimulation treatment

Introduction and Overview

1. Hydraulic Fracturing or “HF” (but please) not “fracking”!

[http://en.wikipedia.org/wiki/Frak_\(expletive\)](http://en.wikipedia.org/wiki/Frak_(expletive))

2. What is HF?

<http://www.hydraulicfracturing.com/Process/Pages/information.aspx>

3. What is not HF?

<http://www.youtube.com/watch?v=hZ2jwqhNtCl>



HF Base Fluids

1. Water

<http://www.hydraulicfracturing.com/Water-Usage/Pages/Information.aspx>

2. Energized Fluids: N₂ and CO₂

<http://www.praxair.com/praxair.nsf/AllContent/9EA635B388F3638E85257402006C781C?OpenDocument>

3. Liquefied Petroleum Gas “LPG”

<http://www.gasfrac.com/>



HF Proppants

1. Sand

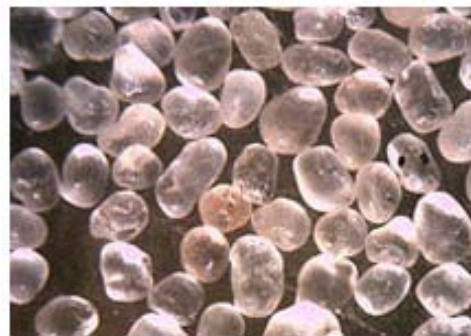
<http://flexfracsand.com/>

2. Resin Coated Sand "RCS"

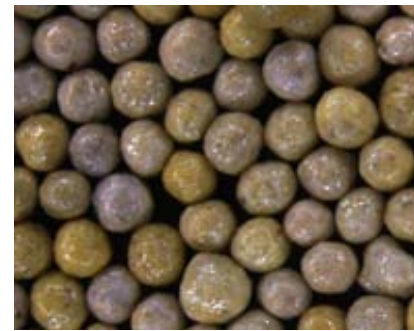
<http://www.atlasresinproppants.com/>

3. Ceramics

<http://www.carboceramics.com/>



20/40 Ottawa White Sand



HF Chemical Additives

1. Acids
2. Gels and Crosslinkers
3. Buffers
4. Gel Breakers
5. Friction Reducers
6. Surfactants
7. Iron Control
8. Corrosion Inhibitors
9. Biocides
10. Scale Inhibitors



<http://fracfocus.org/chemical-use/what-chemicals-are-used>

http://www.halliburton.com/public/projects/pubsdata/Hydraulic_Fracturing/fluids_disclosure.html

Green Chemistry ?

HF Pumping

1. Equipment Spread and Logistics
2. Testing and Monitoring Pressures
3. Stage by Stage Isolation and Pumping

http://www.hydraulicfracturing.com/Pages/information.aspx?utm_source=OPM&utm_medium=CPC&utm_campaign=Paid_Search&qclid=CLO7tvyw0q0CFUhgTAodKCivlw/Pages/information.aspx



HF Flowback

1. Plug drill-outs
2. Recovery of HF fluids
3. Initial hydrocarbon production
4. Hydrocarbons to sales



Exam

True / False: is this HF?



False



False



True

Q&As