

# 2019 NAPS

NORTH AMERICA PERFORATING SYMPOSIUM

## AND SAFETY FORUM

DALLAS - FORT WORTH. AUGUST 5-6, 2019.

### A LOOK AT PERFORATING FOR MECHANICAL ISOLATION REFRACS: A New Challenge for Perforating Technologies

2019-NAPS-5.1

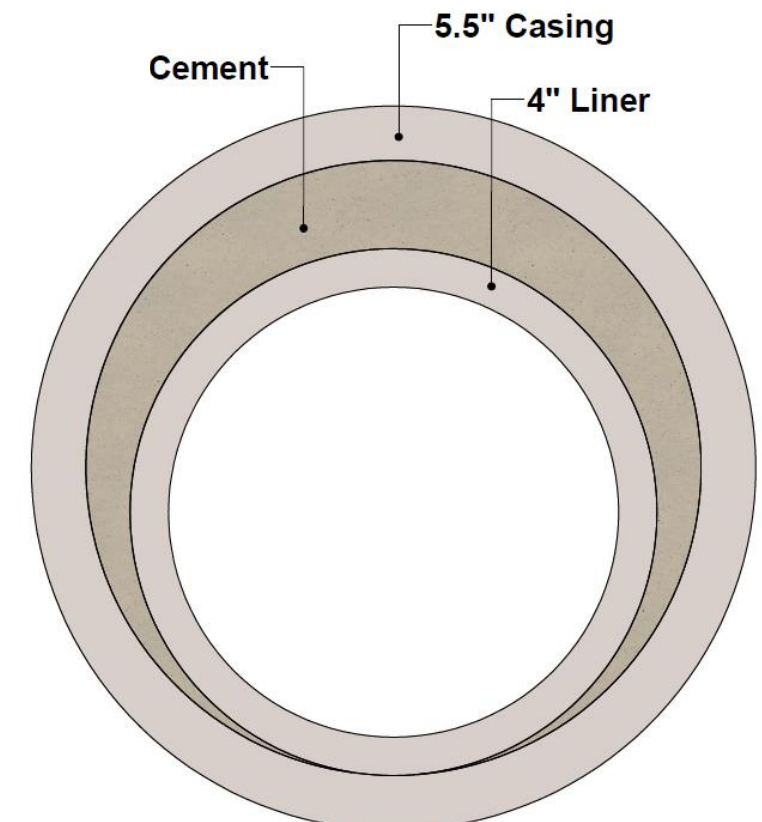
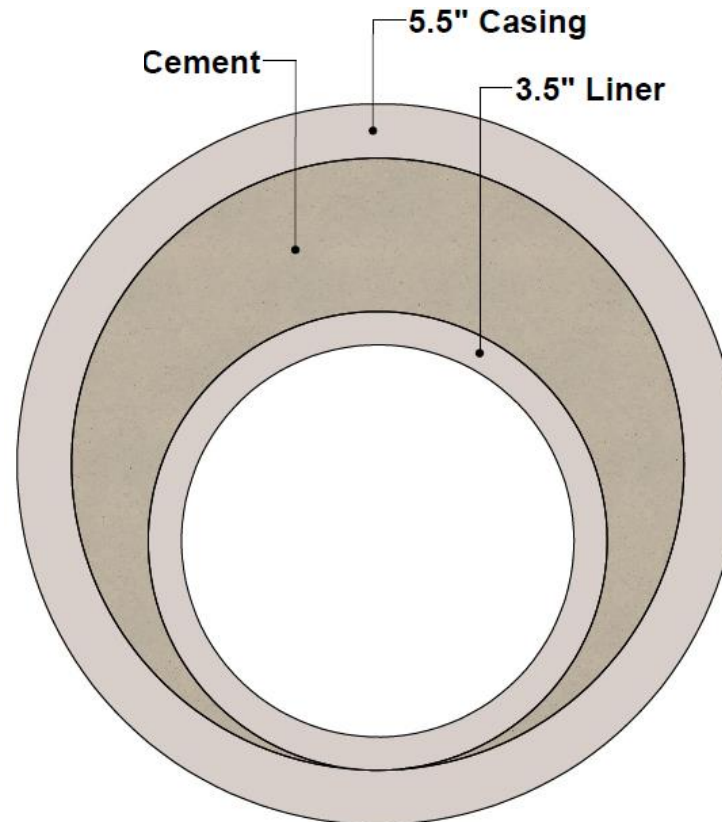
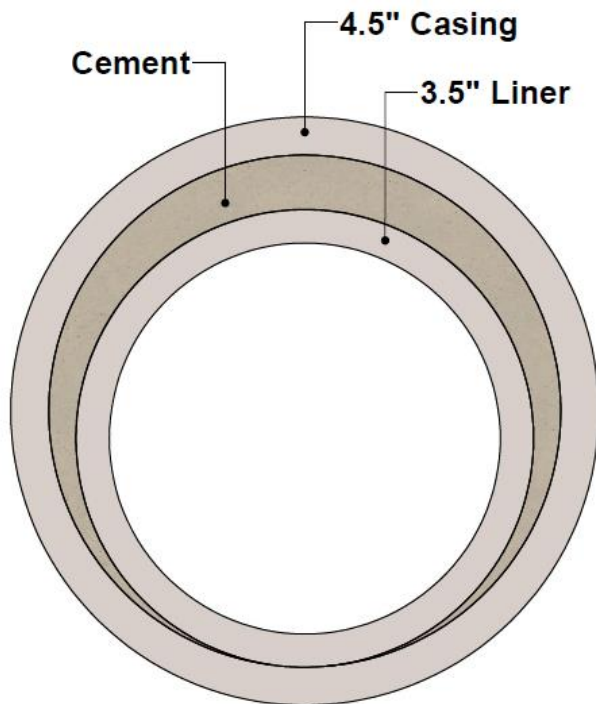
AUTHORS: Justin Coker, Cory Day - Core Lab.  
Anthony Nguyen - ConocoPhillips.

## Defining the Method

- Revitalize depleted wells with use of hydraulic fracturing
- Liner ran inside existing well casing
- Cement placed between liner and casing to:
  - Isolate previously completed zones
  - Provide mechanical connection between liner and casing
  - Provide confinement for treatment injection
- Well recompleted by perforating and treating through liner, cement, and casing

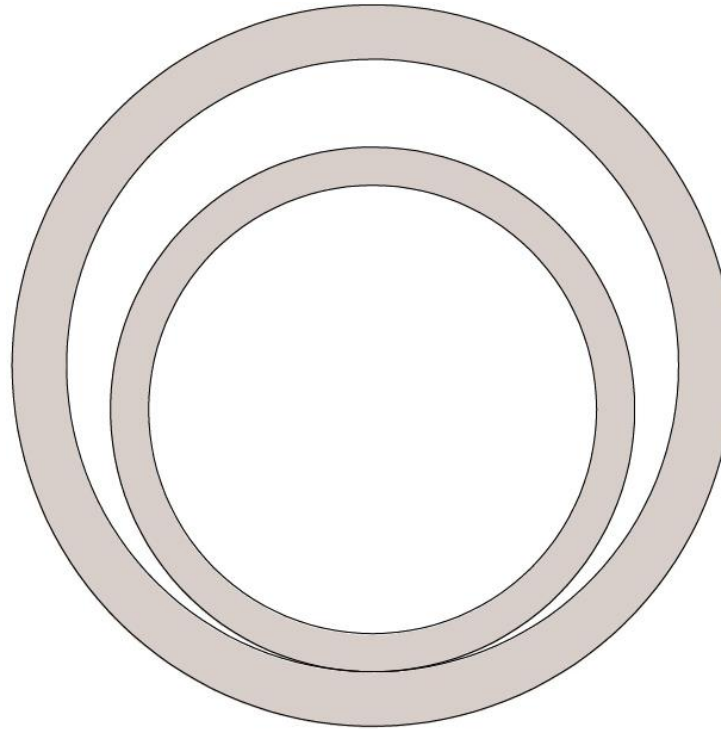
## Defining the Method

- Common wellbore layouts include
  - 3.5" liner inside 4.5" casing
  - 3.5" liner inside 5.5" casing
  - 4" liner inside 5.5" casing

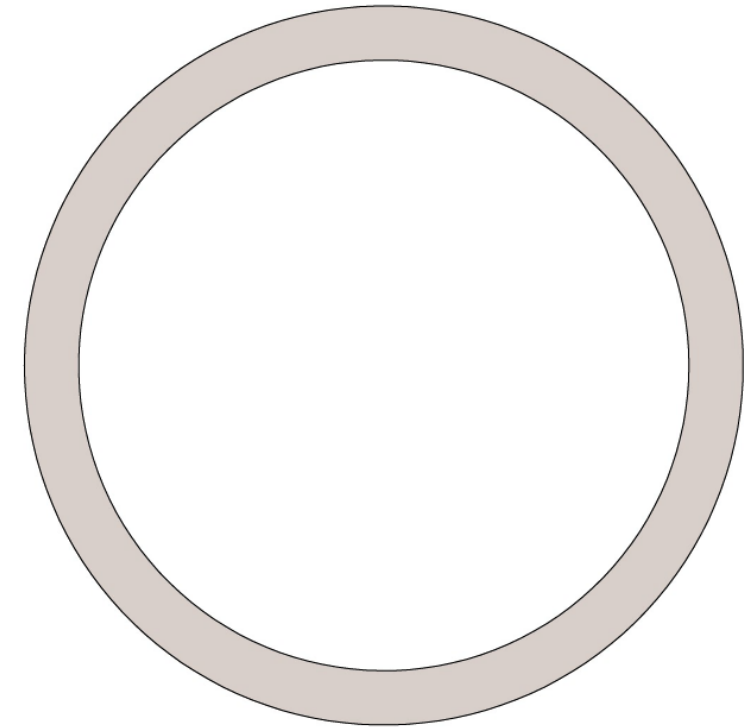


## Challenges for Perforating

- Perforate through two strings
- Liner likely fully eccentric



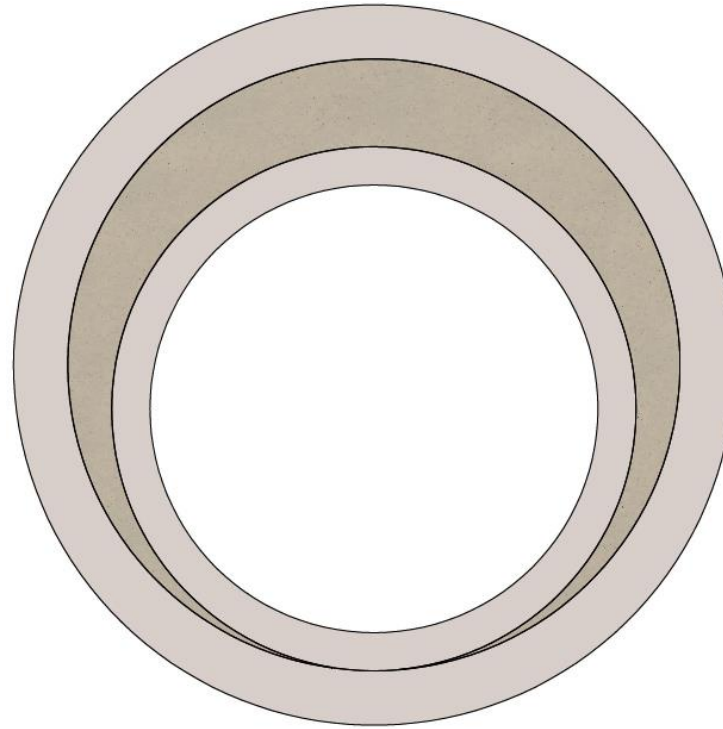
**Refrac**



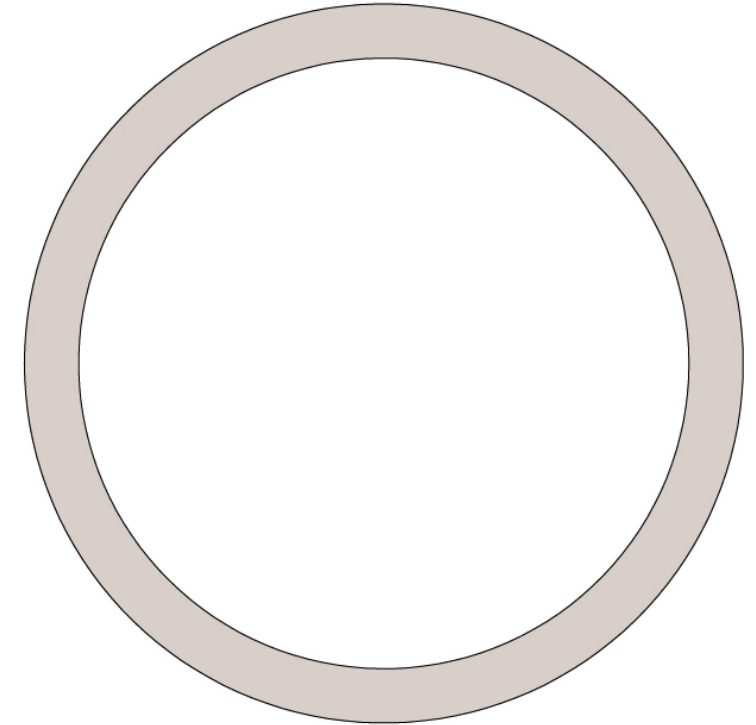
**New Completion**

## Challenges for Perforating

- Perforate through two strings
- Liner likely fully eccentric
- Cement between strings



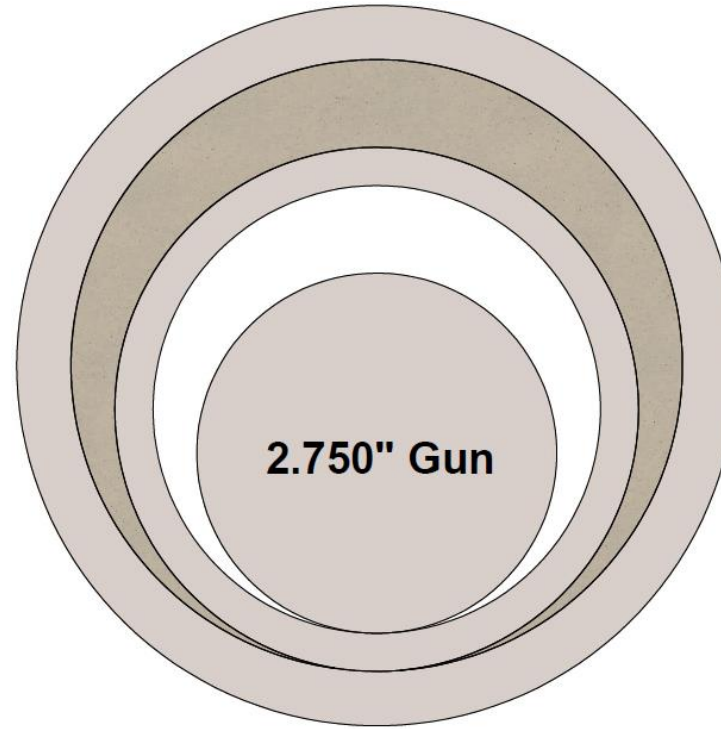
Refrac



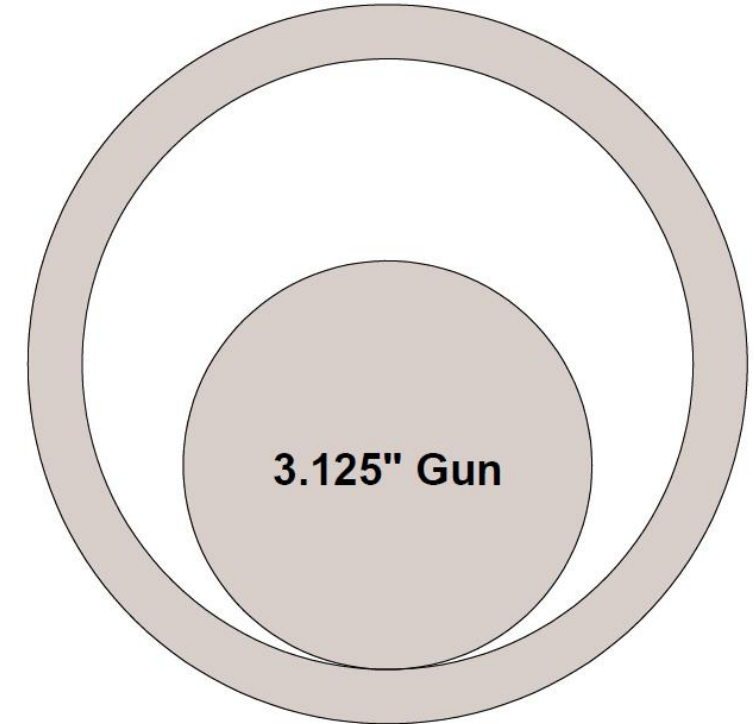
New Completion

## Challenges for Perforating

- Perforate through two strings
- Liner likely fully eccentric
- Cement between strings
- Gun likely fully eccentric
- Reduced perforating gun diameter









Refrac



New Completion







# Perforating for Mechanical Isolation Refracs

Performance Examples\_2.5" Gun in 3.5" x 4.5"

	Conventional GH	Conventional SDP
Average Hole Size (in.)	 0.24	 0.18
Minimum Hole Size (in.)	 0.20	 0.15
Maximum Hole Size (in.)	 0.29	 0.21
%STDEV	14.6%	11.2%

# Perforating for Mechanical Isolation Refracs







Performance Examples\_2.5" Gun in 3.5" x 5.5"

	Conventional GH	Conventional SDP
Average Hole Size (in.)	 0.21	 0.17
Minimum Hole Size (in.)	 0.18	 0.14
Maximum Hole Size (in.)	 0.27	 0.22
%STDEV	13.5%	17.2%



# Perforating for Mechanical Isolation Refracs

Performance Examples\_2.75" Gun in 4" x 5.5"

	Conventional BH	0.42" Conventional CH
Average Hole Size (in.)	 0.44	 0.30
Minimum Hole Size (in.)	 0.24	 0.24
Maximum Hole Size (in.)	 0.65	 0.38
%STDEV	39.3%	17.9%

## Introduction of a New Perforating Technology

- New shaped charge technology was needed to:
  - Produce optimal and consistent hole sizes:
    - Through both strings of casing
    - For all phasings of the gun system
    - Regardless of gun position
- This engineered solution provided operators with:
  - Better control of perforation friction
  - Higher cluster efficiency
  - Faster treating times
  - Predictable performance throughout entire well

## Field Observations from an Operator's Perspective

QUESTIONS?  
THANK YOU

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