RAPID RESPONSE PERFORATING TESTING PROVIDES SOLUTIONS FOR CHALLENGING MULTI STRING APPLICATIONS
INTRODUCTION

Powerful Problems require Powerful Solutions:

Perforating Technology Providers and Technical Service Providers combine for Success in Challenging Applications

- The Problem
- The Options
- The Work
- The Result
THE PROBLEM: MULTI STRING P&A APPLICATION

2-7/8” Guns Preferred
3-3/8” Guns if Necessary

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THE PROBLEM: MULTI STRING P&A APPLICATION

18 hours!!

2-7/8” Guns Preferred
3-3/8” Guns if Necessary
In Country Tools

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THE OPTIONS

- Perforation Simulation Software
  - Simulation can provide a quick indication of performance

- Technical Experience

- Lab Tests in Coupons
  - For a more confident result and to validate a higher risk solution

- In Country Tools
SIMULATIONS IN MULTI STRING

3-3/8” Quad String Simulation

2-7/8” Quad String Simulation
SIMULATIONS IN MULTI STRING

Results: Communication is doubtful

3-3/8” Quad String Simulation

2-7/8” Quad String Simulation
SIMULATIONS AND MULTI STRING APPLICATIONS

- Hole Size and Penetration results are typically extrapolations from a single data point from an API 19B style test
- Other methods are being applied:
  - Incorporation of new Section 2 type base data
  - Incorporation of Porosity based penetration models
  - Incorporation of Parametric Water Gap base Data
  - Incorporation of predictive curve fit from API 19B Section 1 Data

- NONE OF THESE ADEQUATELY INCORPORATE THE EFFECT OF CHARGE DESIGN IN THE MANY POSSIBLE MULTI STRING SCENARIOS.

- EXPERIENCE MUST BE APPLIED, AND THE BEST SIMULATION MODELS WILL BE CONSERVATIVE – IE PREDICT FAILURE WHEN THERE IS DOUBT
25G CHARGE IN 3-3/8” GUN TEST RESULTS

MINIMUM HOLE 0.17”

PENETRATION 12+”

16 HOURS REMIAN
FEEDBACK FROM CLIENT

- THERE IS CURRENTLY AN OBSTRUCTION IN THE WELL, AND A LOWER DIAMETER SOLUTION IS NEEDED!

- ADDITIONAL TESTS WITH 23G CHARGE (LOWER SWELL) AND 2-7/8” GUN SYSTEM ARE PLACED IN THE TESTING QUEUE
23G CHARGE IN 3-3/8” GUN TEST RESULTS

MINIMUM HOLE 0.17”

PENETRATION 6+”

13 HOURS REMAIN
15G CHARGE IN 2-7/8” GUN TEST RESULTS

MINIMUM HOLE 0.12”  PENETRATION 2.5+”  13 HOURS REMAIN
## SUMMARY OF GUN TEST RESULTS

8 HOURS REMAIN

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THE RESULT

- SOLUTIONS WERE DEPLOYED TO FIELD
- WELL RESULT WAS POSITIVE
- DATA WAS GENERATED FOR SUBSEQUENT WELLS
- FAST RESPONSE ENSURED CORRECT SOLUTION WAS DEPLOYED WITHOUT ADDITIONAL EXPENSE
- TEAMWORK BETWEEN TESTING AND SERVICE COMPANIES ENABLED SUCCESS
- SIMULATION RESULTS USED IN CONJUNCTION WITH RAPID LABORATORY TESTING IS A POWERFUL TOOL FOR SUCCESS
QUESTIONS?
THANK YOU!

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