API RP19B Update

Presented by
Mark S Brinsden
Shell
Chair API RP 19B Committee
Briefing on recent meeting of API RP19B and API RP67 Committees

Update on development and testing of cement based Synthetic Target

Discussion with SPE on the Perforating Section of the new SPE Wiki and incorporation into an industry handbook or manual

Update on IPS in 2012 and looking forward to 2013, including Website Perforators.org and LinkedIn Group
Section 1: Evaluation under surface conditions in concrete targets
Section 2: Evaluation under stress conditions in rock targets
Section 3: Evaluation under elevated temperatures
Section 4: Evaluation of flow performance under simulated downhole conditions
Section 5: Debris Evaluation
Section 6 (new): Standard for measurement of gun swell
API Witness Instructions & Report

1. CHARGE SELECTION
   • Witness must include the date with signature on sealed boxes of shaped charges

3. GUN FIRING / DATA COLLECTION
   • Witness must verify that the casing used in the construction of the target meets the reported grade and weight.

5-8. (Optional activities to witness)
   • If witnessed it is mandatory to record information from documentation
# API RP19B Section 1

## Registered Data Sheet Perforating System Evaluation, API RP 19B Section 1

<table>
<thead>
<tr>
<th>Service Company</th>
<th>Conforms to All requirements of Section 1</th>
<th>Special test – See Remarks/Exceptions below</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gun OD &amp; Trade Name</td>
<td></td>
<td>Explosive weight: gm</td>
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<tr>
<td>Charge Name</td>
<td></td>
<td>Primer</td>
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<tr>
<td>Manufacturer/Charge Part.</td>
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<td>Case Material</td>
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<tr>
<td>Gun Type</td>
<td></td>
<td>Shot Density Tested</td>
</tr>
<tr>
<td>Phasing Test: degrees, Firing Order: Top down</td>
<td></td>
<td>Shot Density Tested</td>
</tr>
<tr>
<td>Available Firing Mod</td>
<td></td>
<td>Recommended Minimum ID for Running</td>
</tr>
<tr>
<td>Debris Description</td>
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</tbody>
</table>

| Remarks/Exceptions per Section 1 11 |  | |

| Casing Data |  | |
| Casing OD, Weight |  | |
| Target Data |  | |
| Target Casing OD |  | |
| Amount of Cement |  | |
| Amount of Sand |  | |
| Amount of Water |  | |
| Date of Compressive Strength Test |  | |
| Biogas Compressive Strength |  | |
| Age of Target |  | |

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| Remarks |  |  |  |  |  |  |  |  |  |  |  |

**WITNESSING INFORMATION**

Witnessed by:

Optionally Witnessed Activities: Target Firing, Biaxial Preparation, Biaxial Testing, Burr Height Measurements

I certify that these tests were made according to the procedures as outlined in API RP 19B Recommended Practices for Evaluation of Well Perforators, Second Edition, September 2009. All of the equipment used in these tests, such as the guns, shaped charges, detonating cord, etc., was standard equipment for our company for the use in the gun being tested and was not changed in any manner for the test. Furthermore, the equipment was chosen at random from stock and therefore it is substantially the same as the equipment, which would be furnished to perform a well for any operator.

API neither endorses these test results nor recommends the use of the perforator system described.

Penetration data recorded in API RP 19B Section I may not directly correlate to penetration downhole.

CERTIFIED BY

(Company Officer) (Title) (Company) (Address)

Name of test as it should appear on website:

Name of test as it should appear on application and application date:
API RP19B  Section 2

- Some issues with getting progress on Sect 2
- Need to get broad input into this important standard – requested that we have 1 Operator and at least 3 other members
- Trying to set up longer meetings to get job done as a team over 1-2 days, to avoid distractions
Again some issues with getting progress on Sect 3

2 Operators have now joined this committee - important to have a suitable method of identifying performance at temperature

Safety issues raised with various methods of heating charges.
Section 4 has been sent to API legal for final review.

It has also been sent to the technical authors for final formatting etc.

Should be released shortly.
API RP19B Section 5

Section 5 Testing Summary

• Pre-weigh assembly
• Shoot target casing (vertical)
• Preserve gun with internal debris and dry
• Weigh spent gun assembly
  – Total debris lost at detonation
• Roll carrier and capture/sieve/weigh add
  – Total debris rolled from gun
• Present final results in various formats

Recommendations for Review

• Post roll debris weight: current
  – Currently weigh all debris gathered from roll test
  – Sieve debris and weigh debris by size
  – Adjust precision of final debris results

• Recommended
  – Use only sum of sieved weights for total (consistency)
Section 6 (new): Standard for measurement of gun swell

• Currently no standard for gun swell. Increased use of high performance small diameter carrier guns in Thru-Tubing operations has resulted in the requirement for a standard fit-for-purpose method of measuring swell.

• Full draft of Sect 6 has been completed – to be submitted for committee review before next meeting
API RP 67 Task Group

Steering Committee

10 Task Groups formed to address specialized subject matter

One Task Group for personnel training and API auditing is presently under Steering Committee remit

Company representation
Owen Shell
HAL Hunting Titan
SLB DynaEnergetics
Ecosse Cased Hole Solutions
Baker Expro
BP Shell PDO
SPEX

Teleconferences since OTC
- May 21
- Jun 26
- Aug 16
- Sep 24
API RP 67 Task Groups

1. Detonators, Delays, Surface Firing Panels
   - Ongoing
   - Multiple meetings

2. Interrupts
   - Starting
   - Chair to call meeting

3. Tractors
   - Ongoing
   - Multiple meetings

4. Temperature Mgmt
   - Ongoing
   - Multiple meetings

5. Firing Heads on Bottom of Guns
   - Starting
   - Oct meeting set

6. Coil Tubing Jobs
   - Starting
   - Chair to call meeting

7. Security / Regulatory
   - Ongoing
   - One pre-meeting

8. Pipe Recovery
   - Starting
   - Chair to call meeting

9. Pressure Control
   - Starting
   - Chair to call meeting

10. Special Categories of Explosive Devices
    - Starting
    - Chair to call meeting
• Goal is to complete re-write by Feb 2013
  – Maintain monthly SC teleconferences
  – Encourage TG chairs to start/continue their meetings

• Timely subject matter since questions regarding field issues continue to be received
  1. Detonators and electronic systems, including select fire (what’s safe and what’s not?)
  2. Safety protocol/multi-point failure analysis for tractors
  3. HPHT guidelines (especially when problems arise, how to handle those situations)

• Working with API to avoid anti-trust issues during our meetings.
Cement Target Development – Phase II

Continued development and testing of cement and sand based target

Previous trials had errors in the mixes which resulted in very weak & porous targets, but useful data

October trials – tested various sands for porosity and bulk density

Mixed 10 sets of 3 x 6in dia. x 2ft target samples with briquettes to obtain a broad field of data to work from for phase 3

All targets exhibited porosity – but not tested yet

Briquettes to be tested after 15 & 30 days and then targets shot with 2in charge, unconfined – Perm. Porosity and UCS to be measured

Initial 15 day briquette tests as follows:-
# Cement Target Development – Phase II

<table>
<thead>
<tr>
<th>Batch</th>
<th>Sand Type</th>
<th>Sand</th>
<th>Cement</th>
<th>Water</th>
<th>Compressive Str 15 day (psi)</th>
<th>Density 15 day (g/cc)</th>
<th>Compressive Str 30 day (psi)</th>
<th>Density 30 day (g/cc)</th>
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Cement Target Development – Phase II

Much appreciation to the JRC Alvaredo team who have worked with enthusiasm an ‘understanding’ with me on the ‘Brinstone’ project
SPE WiKi Discussion

- Previously in IPS 2012 Houston – delegates agreed that we should have an industry created and endorsed manual or handbook – no clarity on how though!

- Discussion with SPE at ATCE San Antonio - various ways to publish – SPE Monograms, PEH etc.

- SPE now have WiKi as well, only existing material is on the WiKi

- We can set up a cross industry editorial group to ensure the WiKi is effectively populated and controlled – canvas delegates

The PetroWiki pilot, launched 1 October, is based on the drilling and completions volume of the Petroleum Engineering Handbook (PEH). Published in 2007, many new technologies are missing from PEH. The wiki format will allow SPE members to keep PEH evergreen, updating and extending it to new technologies. By October 2013, the site will contain the complete handbook, and it will grow with contributions from SPE’s global membership base. All content in PetroWiki is vetted by moderators with subject matter expertise. “This is a game-changer for SPE. PetroWiki will be an important technical resource for our industry, with rich links to other content, including papers in OnePetro” said Mark Rubin, Executive Director of SPE. “The opportunity for members to share their knowledge with others, and for younger members to learn from these experiences will be invaluable.” SPE
IPS in 2012 and 2013

Successful year for IPS in Houston and the new EWAPS in Amsterdam – Well done EWAPS Committee!

Busy year in 2013 – too busy??


SLAP 2013 Bogota Colombia – 28-30 May

MENAPS 2013 Muscat Oman – Q3 2013 – Committee and location not yet finalised

IPS/IPF is still an informal group run by the active committees around the world
IPF/IPS on Perforators.org and LinkedIn

Website fulfils basic needs but with greater activity requires major improvement

To be discussed with current sponsor Guardian, to upgrade the facility or to look at transfer to another sponsor

LinkedIn – fairly active – key location for announcing meetings and for Perforation discussion – all group members vetted not an open group. Around 900 members.
Thank you all for continuing to so enthusiastically support the International Perforating Forum around the world

Firstly – All the volunteer members of all the committees who put in their valuable time to run these conferences so well!

Secondly - All the many many sponsors who kindly come up every time with the money to enable these Symposiums to be free to the industry - I see we have a record 19 sponsors this time!

Thirdly – To all the presenters for making these Symposiums really worth coming to

Finally – To all the delegates who take time out to make these Symposiums buzz with enthusiasm!