REGISTERED DATA SHEET PERFORATING SYSTEM EVALUATION, API RP 19B SECTION 1

Service Company: AVAILABLE TO ALL

Explosive Weight: 3.7 gm, HMX powder, Case Material: STEEL

Gun OD & Trade Name: 1-9/16" 6 SPF 60 DEG PH

Max. Temp.: °F 400 h, 3 hr, 24 hr, 100 hr, 200 hr

Charge Name: 1-9/16" MILLENNIUM

Maximum Pressure Rating: 20,000 psi, Carrier Material: STEEL

Manufacturer Charge Part No.: 100157028 Date of Manufacture: 11/13/2002

Shot Density Tested: 6 Shots/ft

Gun Type: SCALLOPED

Recommended Minimum ID for Running: in.

Phasing Tested: 60 degrees, Firing Order: X Top Down, Bottom Up

Available Firing Mode: Selective, Simultaneous

Debris Description: VERY SMALL STEEL FRAGMENTS

Debris Weight: gm/charge, Debris: in³/charge

Remarks:

SECTION 1 - CONCRETE TARGET

Casing Data: 2-7/8" OD, Weight: 6.4 lb/ft, L-80 API Grade,

Date of Section 1 Test: DECEMBER 19, 2002


Date of Compressive Strength Test: 12/6/02, Briquette Compressive Strength: 6,949 psi, Age of Target: 34 days

Shot No. | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7 | No. 8 | No. 9 | No. 10 | No. 11
--- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | ---
Clearance, in.: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0
Casing Hole Diameter, Short Axis, in.: | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22
Average Casing Hole Diameter, in.: | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24
Total Depth, in.: | 10.2 | 10.1 | 10.6 | 10.4 | 9.8 | 9.7 | 8.4 | 10.1 | 10.1 | 10.1 | 10.1
Burr Height, in.: | 0.02 | 0.04 | 0.03 | 0.07 | 0.03 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02

Shot No. | No. 12 | No. 13 | No. 14 | No. 15 | No. 16 | No. 17 | No. 18 | No. 19 | No. 20 | No. 21 | No. 22 | Average
--- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | ---
Clearance, in.: | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40
Casing Hole Diameter, Short Axis, in.: | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21
Average Casing Hole Diameter, in.: | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22
Total Depth, in.: | 8.8 | 9.2 | 8.2 | 9.7 | 6.1 | 8.1 | 7.1 | 8.1 | 8.1 | 8.1 | 8.1 | 8.1
Burr Height, in.: | 0.03 | 0.04 | 0.02 | 0.01 | 0.04 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02

Date of Notice of Intent to Test: DECEMBER 6, 2002

Witnessed by: ED LANGFORD

Other Activities Witnessed: Target Pouring, Briquette: Preparation, Testing, Burr Height Measurements, Samples Taken: Concrete X Casing X

WITNESSING INFORMATION

I certify that these tests were made according to the procedures as outlined in API RP 19B: Recommended Practices for Evaluation of Well Perforators, First Edition, November 2000. All of the equipment used in these tests, such as the guns, jet charges, detonator cord, etc., was standard equipment with 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 will be substantially the same as the equipment, which would be furnished to perforate a well for any operator. The American Petroleum Institute neither endorses these test results nor recommends the use of the perforator system described.

CERTIFICATION

X CERTIFIED BY [Signature] RESEARCH & ENGINEERING MANAGER 1/15/03 JET RESEARCH CENTER 8432 S. IH35W, ALVARADO, TX 76009

(Company Official) (Title) (Date) (Company) (Address)

API Form 19R-A