HYDROSTATIC TEST REPORT **DATE: 9-27-11 EMS**

Couplings: 206 Hose Union: 4" 206 Hose Union, Male x Female
- Coupling/ferrule system rated to 500 psi. WP

Hose: Frac Blender Hose: 4" Goodyear Oilfield Fracturing Hose with ARC rated to 400 psi.

Attachment: Crimped: plated steel long ferrules

Goal: To exceed 1600 psi (hose WP of 400 psi. @ 4 to 1 Safety Factor)

Results: Hose exceeded 4 times WP. Hose burst at 1934 psi.

This test was conducted to ASTM D380 standards. See engineering details below.

HOSE: 4" GOODYEAR OILFIELD FRACTURING HOSE WITH ARC #543-710-123 400 PSI WP 36008 Made in Canada, initial length of 24-3/4

END CONNECTION #1: Assembled by Campbell, 206MHUD-16C, a 4" Campbell figure 206 male hammer union hose stem with a FPS400460L plated steel ferrule. A trace amount of lubrication was used and assembly was relatively easy, requiring little force and no pounding. The hose wall on this end measured between .402" and .420" with a .409" average. The latest crimp chart A, due to expire 4-30-12, was interpolated for a crimp of ϕ 4.901" using the specification for a 4" long crimpnology nipple. This end was crimped on a Custom Crimp cc-600 crimper using # 120 dies. This end was connected to our tester manifold using a 206NHUS-16, a 4" Campbell steel hammer union nut to connect to a 4" female FMC hammer union by 4" NPT. This was connected to a 4" x 2" NPT reducer bushing, a 2" x 3/4" NPT reducer bushing, and a GMS-3, 3/4" male spud to our usual 3/4" ground joint and attached to the tester via a length of previously used 1" steam hose with ground joints and ferrules. The tester nut was hand tight and the hammer union nut was mildly hammered tight. Teflon tape and pipe dope was used on the NPT threads. See first connection & first connection-1 photos.

END CONNECTION #2: Assembled by Campbell, 206FHUD-16C, a 4" Campbell figure 206 female hammer union hose stem using the same ferrule and methods as above with the following exceptions. The hose wall on this end measured between .403" and .421" with an average of .415". This end was interpolated for a crimp of ϕ 4.910" by using the current crimp chart for a long shank crimpnology nipple. This end was connected to our standard ground joint valve adapter with valve attached by using a 4" FMC hammer union nut to connect to a 4" male FMC hammer union by 4" NPT. This was connected to a 4" x 2" NPT reducer bushing, a 2" x 3/4" NPT reducer bushing, and a GMS-3, 3/4" male spud. The tester nut was hand tight and the hammer union nut was mildly hammered tight. Teflon tape and pipe dope was used on the NPT threads. See second connection & second connection-1 photos.

TEST: The assembly was filled with water and air was evacuated from the system by use of the valve at the free end. The coldest water available was flowed through the assembly for over an hour to stabilize temperature. Our final test temperature was 74° F, rather than the standard 70° F, because the municipal water system was unable to go any colder after over an hour of flow. The assembly was made up and crimped 24 hours before the test. See inlet temp and in tester photos.

Pressure was raised rapidly within ASTM D380 parameters and observed at various stages. The hose elongated during pressurization until the hose burst. See burst and close-up photos. **The highest pressure recorded was 1924 psi.** See peak photo. No movement occurred at either end of the hose assembly, See end 1 and end 2 photos.

Prepared by Eric M Schrack, Engineer