



# **Testing of Aquawrap<sup>®</sup> for use in Repairing Damaged Pipelines**

## **Burst Testing Pursuant to ASME PCC-2**

Prepared By  
Franz Worth, PE

March 31, 2008

Air Logistics Corporation  
F.A.C.S.<sup>TM</sup> Group  
925 North Todd Avenue  
Azusa, CA 91702 Phone  
626-633-0294 • Fax 626-633-0791

### 1.0 Summary:

This report summarized the pressure testing of a repaired pipe section pursuant to the “Short Term Spool Test” in appendix III of ASME PCC-2. After the repair was completed the pipe was transported to an outside lab for testing. The results of the test were quite successful in that the pipe withstood about 10% higher pressure than was required.

### 2.0 Test Requirements:

Appendix III of the PCC-2 requires that a pipe section with a specified machined defect be repaired pursuant equation III,2 of the standard with no safety factor and pressurized to the yield pressure of the pipe. The wall loss may be 80% or less depending on the repair system suppliers intent. The calculations are as follows.

Test pressure of the pipe  $P_f = 2*t*s_a/D$

The thickness of the repair  $t_{\text{repair}} = 1/e_c(P_f*D/2 - s_A*t_s)$

Where:

t = wall thickness of the pipe (in.)

s<sub>a</sub> = actual tensile strength of the pipe (psi)

D = diameter of the pipe (in)

e<sub>c</sub> = actual tensile strength of the repair system (psi)

t<sub>s</sub> = thickness of the steel in the defect area. (in.)

### 3.0 Test Details;

The pipe section selected for the test was 6” nominal diameter X42. The actual tensile strength of the steel was 48074 psi. The wall loss in the machined defect area was 80%. The defect was 6.625” long by 3.125” wide. The repair material used was tested separately and had a per ply strength of 706 pounds per inch of width. The test pressure was calculated at 6270 psi and the number of layers of wrap at 24.

### 3.0 Test Results:

The repaired pipe section was taken to Authorized Testing where the test was performed. The pipe section was placed in a pit and the testing commenced. The pipe was pressurized to 6900 psi and the pressure was released. There were no signs of wrap failure or leaks. This result is very good in as much as the pipe withstood about 10% greater pressure than required and did not fail.



Photo 1. Machined Pipe



Photo 2. Pipe with load transfer material installed



Photo 3. Pipe with adhesive



Photo 4. Pipe with wrap installed



Photo 5. Wrapped pipe in test pit.



Photo 6. Pipe section after successful test.