

January 2009

Middle East Offshore Pipeline Rehab

Background:

An eight inch high pressure flexible steel pipe used to transport sour gas from one platform to a second for re-injection into a well had generated a leak and the customer wanted the most cost effective and rapid solution to repair or replace the line to get it back into service. The line operates at 1,200PSI and was approximately 6,000ft in length.

The operator selected 3.5" Thermoflex® tubing with a Fortron (PPS) liner to resist the corrosion due to the H₂S. The pipe was then pulled through the existing flexible steel pipe. Canline of Breton Alberta performed the installation

Installation:

The existing high pressure steel pipe was pigged to assure that there were no restrictions along the line. A braided rope wound on a winch was then attached to a pig and pulled through the existing pipeline. The rope was rated for 38,000lbs See figure one.



Figure 1: Pulling Rope and Winch

Once the roped is pigged through the existing pipeline, the spools of pipe (see figure 2) were set into position, a termination coupling was installed on the end of the pipe and a pulling cone screwed on to the termination coupling for pulling (See figure 3)



Figure 3: Pulling Cone



Figure 2: Spools Staged for Installation

The pulling cone was attached to the rope and the winch pulled the pipe off an A-frame at a rate of 10 to 20 feet per minute (3 to 6 meters per minute) The maximum length of tubing that could fit on a 10ft spool is 1,800ft. When one spool was complete, the pulling was stopped a splice coupling installed to connect the next spool. (See figure 4) There was radio contact between platforms to make sure the winch operator knew when to stop and start the pulling and to make sure the load does not exceed 9,000lbs of pull strength. Thermoflex tubing can be designed with various pull strength requirements depending upon the pull length and bends in the line. Please consult Polyflow to review the project to determine the correct pull force requirements.

Once the entire tubing length was pulled through the existing pipe, a flange termination was coupled on the tubing and the line was pressure tested at 1,700PSI with water. The line was then pigged of water and put into service. The entire project took three and a half days.



Figure 4: Splicing Tubing Together



Figure 5: Tubing coming through the riser



Figure 6: Flange Termination



Figure 7: View from One Platform to Other

Result:

The customer had his line up in five days including the installation, pressure testing and connections to turn it in line. The solution saved the operator 90% versus installing a new flexible steel line.