Ocean Team Group of Companies

SERVICE DESCRIPTION:

Cleaning of Umbilicals and Control-lines Using Liquid & Supercritical CO_2

The Oil & Gas industry is dependent on continuous and efficient production, where the systems can be relied on not to fail. Fact is that 80% of all failures in fluid transfer systems are due to contaminations. In order to avoid failures and breakdowns, unwanted particles and deposits have to be removed from the systems.

Flushing is a well-known method to clean inside systems. For an effective cleaning, the flow has to be turbulent during the flushing process. Turbulent flow loosens deposits on the inside of the pipes leaving behind a totally clean system, whereas flushing with laminar flow only cleans the fluid while leaving behind all deposits.

Disadvantage of Using Conventional Flushing
Systems consisting of pipes with relatively small inner diameters (say below a ¼" to 1") and huge lengths (Let's say 3.000-20.000 meter) are problematic to clean using conventional flushing methods. For instance systems containing umbilical's and control lines for Subsea use.

The problem using conventional flushing fluid in these systems is, that keeping a turbulent flow all the way through the pipes will require a pressure drop larger than the pipe/tube is designed to handle (most pipes can handle 200-700bar). Compensating this kind of pressure drop exceeds the maximum operational pressure. Conventional flushing therefore, is not an option for cleaning these types of systems effectively.

The Solution Is: Supercritical CO_2
Ocean Team has developed a patented method, solving the above described problem. By using CO_2 in a liquid and supercritical state, it becomes possible to create turbulent flow with a pressure drop less than 2500 PSI along the pipes. Besides, the opportunity to create turbulence, the use of supercritical CO_2 also has the advantage of, not only removing, but also dissolving wax and grease from the inside of the pipes.

Four Programmed Steps

1. Add CO2 to the Unit
2. Bring the CO2 in to a supercritical / liquid state; to loosen impurities, wax and grease from inside of the pipes in order to carry them out.
3. Flush the pipes
4. When returned to the unit, bring the CO2 back to its gas state. The loosened impurities will hereby separate from the CO2 without a filter, leaving the pipelines cleaner than ever seen before.

The benefits by using supercritical CO2 to clean subsea installations are many:

1. **Environmental friendly method** - by using a natural gas like CO2 in the cleaning process we eliminate the risk of adding damaging flush fluid to the sea.
2. **Simple and flexible equipment** - because of the reduced level of pressure, there are no need for huge and expensive high-pressure pump equipment.
3. **Easy to operate** - the equipment can be operated by only one engineer.
4. **Higher cleanliness and greater operational reliability** - the method secures a much higher level of cleanliness and hereby gives your system a greater operational reliability compared to other cleaning methods. You hereby reduce your maintenance costs and risks of system failure significantly.

Ocean Team has successfully tested...

...13,000 m control-line with a 1/4" OD. The CO_2 cleaned it to a Nas1638/AS4059, Class 3 with a pressure loss of 150 bar and a Reynolds no. of 20,000. Impressively loosing and cleaning out particles and wax.