COMPANY SPOTLIGHT

Company Finds Cure for Downhole Leaks without Expensive Workover Operations

Background

Barry Ellis, founder and managing director of Seal-Tite International, worked as a problem-well specialist for one of the world's major oil companies. During his fieldwork in Libya, Malaysia and the Gulf of Mexico, Ellis saw a need for a method of curing downhole leaks without having to perform expensive workover operations. His entrepreneurial spirit led to the founding of Seal-Tite International in 1995 and the development of a line of unique pressure-activated sealants.

Product Development

The sealants are unique in that a sustained pressure drop through a leak site causes the sealant fluid to polymerize into a flexible solid seal. The sealant remains fluid until exposed to a pressure differential. Only at the point of differential pressure, through the leak site, will the sealant reaction occur. The monomers and polymers in the formula are crosslinked by the polymerizing chemicals. As the reaction proceeds, the polymerized sealant plates out on the edges of the leak site and simultaneously links across the leak site to seal the leak. The resulting seal is a flexible bond across the leak. The remainder of the sealant remains fluid and will not plug or damage any of the well components.

Liquid Sealant Polymerized Sealant

Because the sealant does not harden except in the presence of sufficient differential pressure to start the polymerization process, concerns about the time to deliver the sealant, the temperature of the well (below 500°F / 260°C), and the ambient

pressure in the well have been eliminated. Sealant repair operations have been successfully performed to hold differential pressure in excess of 17,000 psi.

Case-Study

Recently, after extensive testing on an actual riser stack assembly to a MAWP of 15,000 psi, Seal-Tite was contacted to diagnose and repair a leaking drilling riser choke line in 5,795 feet water depth in the Gulf of Mexico. Using dye and ROV inspection, the leak was identified as a connection at 4,275'. The leak rate was 8.5 gallons per minute at 2,000 psi injection pressure. The high leak rate was further aggravated by loop currents exceeding 2.6 knots.

A 2.5 bbl sealant pill was displaced to the leaking connection with seawater by circulating down the choke line and taking returns on the kill line. Once in position the BOP crossover valve was closed and sealant was squeezed into the leaking seals. Over the next 12 hours the sealant injection pressure was steadily increased until an 8,000 psi seal was achieved. This pressure was held for 8 hours to allow the sealant to cure, during which no pressure bleedoff was observed. The sealant was then flushed from the system and the choke line tested to 7,500 psi, allowing normal drilling operations to resume.

The leak was repaired and the client was able to complete drilling operations over the next 30 days with no further riser-related downtime. The choke line riser was successfully tested to 7,500 psi every three days for the duration of the drilling operation with no leaks observed.

Once the well had been suspended, the riser was pulled to the leaking choke line connection and the damaged seals removed for inspection.

Company Growth

Seal-Tite's technology was originally developed to seal leaks in the hydraulic systems of control lines and SCSSVs. Over the last 10 years, Seal-Tite's technology has earned worldwide acceptance and has expanded to cure leaks in over 1300 operations, including:

Dynamic Seal Leaks
- o Seal Units
- o Safety Valves
- o Sliding Sleeves

Static Seal Leaks
- o Packers
- o Hangers
- o Wellheads

Connection Leaks
- o Riser
- o Tubing and Casing
- o Control Lines
- o Umbilical Lines

Pipeline Leaks
- o Pinholes
- o Weld Defects
- o Internal Corrosion
- o Gate and Ball Valves

Microannulus Leaks
- o Compaction
- o Cement Composition
- o Stress-Thermal/Hydraulic

In 2001, Seal-Tite moved into a new 18,000 square foot facility near New Orleans, Louisiana, where research, mixing, engineering, field operations, training and administration were consolidated. In February of this year, Seal-Tite completed work on an 8,000 square foot extension to accommodate its growing needs. With offices in Argentina, Australia, Brazil, Brunei, Canada, China, Houston, India, Indonesia, Italy, Malaysia, Mexico, Middle East, Norway, United Kingdom and West Africa, Seal-Tite has the capability to quickly mobilize for leak repairs throughout the world.