Gas Lift Valve Actuated by Downhole Sensor  
Technology #15757

Applications

- Gas-lifted oil wells

Problem Addressed

In a gas-lifted well, it is possible for product to pass from the tubing into the annulus if two conditions are simultaneously met: (1) the reverse-flow check valve has a leak and the tubing pressure exceeds the gas pressure, (2) a combination of high tubing pressure and low gas pressure allows the bellows valve to open. If both the check valve and the bellows valve leak, then backflow can occur any time tubing pressure exceeds annulus pressure.

Technology

The invention is an apparatus within a gas lift valve that senses the presence of oil. This sensor is a conductivity sensor. Oil has a different conductivity than injection gas and when the sensor detects an increase in conductivity, it causes an electronic circuit to heat a shape-memory-alloy wire, which contracts to close a safety valve.

Advantages

- Prevents oil backflow through a gas lift valve
- Improved response time of valve
- Drastically reduced false actuations

Categories For This Invention:

Energy
Hydrocarbons
Oil Exploration
Sensors (Energy)

Intellectual Property:

Gas-lift safety valve actuated by a sensor
Issued US Patent
9,284,825

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**Publications:**

*A Thermally-Actuated Gas Lift Safety Valve*
SPE Production and Operations
November 1, 2013

*Sharp Phase Change in Shape Memory Alloy Thermal Actuators for Subsea Flow Control*

*Gas Lift Valve Failure Mode Analysis and the Design of a Thermally-Actuated Positive-Locking Safety Valve*
Masters Thesis, Massachusetts Institute of Technology. 2010

**External Links:**

Oceans@MIT
http://oceans.mit.edu/

**Image Gallery:**

![Image of a gas lift valve](image-url)