Claims

What is claimed is:

1. A wellhead system at a surface of a wellbore comprising:

a power source positionable at the surface of the wellbore;

an electric line; and

an annular safety valve positionable in an annulus outlet of the wellhead system, the annular safety valve comprising:

an inductive coupler, the electric line coupling the inductive coupler to the power source for providing power to the annular safety valve;

an actuator assembly communicatively coupled to the inductive coupler; and

a valve assembly, the actuator assembly being retrievably coupled to the valve assembly such that the actuator assembly is de-coupleable from the valve assembly, the valve assembly configured to remain downhole while the actuator assembly is decoupled from the valve assembly, wherein a valve of the valve assembly is configured to be positionable in a closed position to prevent flow of gas from flowing through the annular safety valve in response to the actuator assembly being decoupled from the valve assembly.

2. The wellhead system of claim 1, wherein the annular safety valve is positionable at least partially within a spool of the wellhead system.

3. The wellhead system of claim 2, wherein a first inductive coupler component of the inductive coupler is positionable on the spool, wherein a second inductive coupler component of the inductive coupler is positionable on the actuator assembly, and wherein

the first inductive coupler component receives power from the power source via the electric line and inductively transmits the power to the second inductive coupler component.

4. The wellhead system of claim 3, wherein the actuator assembly comprises an actuator housing, a linear actuator positionable within the actuator housing and configurable to receive power from the inductive coupler, and an actuator arm positionable within the actuator housing and configurable to be actuated by the linear actuator.

5. The wellhead system of claim 4, wherein the valve assembly comprises a valve flow tube for compressing a spring in response to the actuator arm contacting the valve flow tube for actuating the valve between the closed position and an open position.

6. The wellhead system of claim 5, further comprising a valve housing for housing the valve flow tube, spring, and valve.

7. The wellhead system of claim 2, wherein the annular safety valve further comprises at least one sensor.

8. The wellhead system of claim 7, wherein the at least one sensor is positioned within a flow path of the annular safety valve for monitoring conditions in the annulus outlet.

9. The wellhead system of claim 1, wherein the valve assembly includes a plurality of openings for controlling an amount of a gas that may pass through the annular safety valve.

10. The wellhead system of claim 1, further comprising:

a lubricator system coupleable to the annulus outlet and configured to de-couple the actuator assembly from the valve assembly.

11. An annular safety valve positionable on a surface of a well system in an annulus outlet, the annular safety valve comprising:

an actuator assembly communicatively coupled to an inductive coupler configurable to receive electrical power from a power source, the actuator assembly comprising:

an actuator housing;

a linear actuator positioned within the actuator housing for receiving electrical power from the inductive coupler;

an actuator arm positioned within the actuator housing for actuating in response to the linear actuator; and

a valve assembly, wherein the actuator assembly is retrievably coupled to the valve assembly such that the actuator assembly is de-coupleable from the valve assembly and the valve assembly is configured to remain downhole while the actuator assembly is decoupled from the valve assembly, the valve assembly comprising:

a valve positionable in a closed position to prevent, or in an open position to allow, flow of gas from flowing through the annular safety valve; and

a valve flow tube including a tube body and a projection, wherein the projection is positionable between a first end of a spring and the actuator arm and configured to move in a first direction in response to the actuation of the actuator arm; and

a spring for actuating the valve between the open position and the closed position in response to the valve flow tube moving in the first direction,

wherein the valve assembly is configured to cause the spring to actuate the valve to the closed position in response to the actuator assembly being decoupled from the valve assembly.

12. The annular safety valve of claim 11, wherein the annular safety valve is positionable within a spool or annulus line of the well system.

13. The annular safety valve of claim 12, further comprising a locking system for securing the annular safety valve onto the spool.

14. The annular safety valve of claim 13, wherein the locking system comprises a mechanical locking assembly.

15. The annular safety valve of claim 13, wherein the locking system comprises an electromagnetic lock assembly comprising a magnet with a magnetic flux positionable on one of the spool or the annular safety valve for securing the annular safety valve to the spool.

16. The annular safety valve of claim 15, wherein the locking system further comprises an opposed magnet positionable on the other of the spool or the annular safety valve for increasing a strength of a magnetic force securing the annular safety valve to the spool.

17. The annular safety valve of claim 15 wherein the electromagnetic lock assembly is coupled to the inductive coupler via a power line for powering the electromagnetic lock assembly.

18. The annular safety valve of claim 11, further comprising at least one sensor electronically coupled to the inductive coupler.

19. The annular safety valve of claim 11, wherein the actuator assembly is configured to be de-coupleable from the valve assembly via a lubricator system that is coupleable to the annulus outlet.

20. A method of controlling a flow of gas through an annular safety valve positioned at a surface of a well system, the method comprising:

providing an annular safety valve comprising:

an inductive coupler coupled to an electric power source at a surface of the well system via an electric line;

a valve assembly coupled to an annulus outlet in the well system;

an actuator assembly retrievably coupled to the valve assembly;

a linear actuator coupled to the inductive coupler;

transmitting power from the electric power source to the annular safety valve;

actuating the annular safety valve from a closed position in which gas may not pass through the annular safety valve to an open position in which a first amount of gas may pass through the annular safety valve;

decoupling the actuator assembly from the valve assembly, wherein the valve assembly remains coupled to the annulus outlet while the actuator assembly is de-coupled from the valve assembly; and

in response to decoupling the actuator assembly from the valve assembly, actuating a valve of the valve assembly to a closed position to prevent flow of gas from flowing through the annular safety valve.