

CLAIMS

What is claimed is:

1. A variable flow resistance system for use with a subterranean well, the system comprising:
 - a first flow path configured to receive a fluid;
 - a sensor configured to measure a property of the fluid received into the first flow path; and
 - an actuator configured to control an inflow rate of the fluid received into the first flow path based upon the property of the fluid measured by the sensor.
2. The variable flow resistance system of claim 1, wherein the property of the fluid to be measured by the sensor comprises at least one of a resistivity of the fluid, a flow rate of the fluid, a pressure of the fluid, a density of the fluid, and a viscosity of the fluid.
3. The variable flow resistance system of claim 1, wherein the sensor comprises at least one of a resistivity sensor, a conductivity sensor, a capacitive sensor, an inductive sensor, a nuclear sensor, a temperature sensor, a flow sensor, and an acoustic sensor.
4. The variable flow resistance system of claim 1, further comprising a controller configured to control the actuator based upon the property of the fluid measured by the sensor.
5. The variable flow resistance system of claim 1, further comprising a power generator configured to generate power for the variable flow resistance system.
6. The variable flow resistance system of claim 5, wherein the power generator comprises a turbine configured to generate power solely from fluid received into the first flow path.

7. The variable flow resistance system of claim 5, further comprising a power storage device configured to store power generated by the power generator.
8. The variable flow resistance system of claim 1, further comprising a communications unit configured to at least one of receive a communications signal and send a communications signal.
9. The variable flow resistance system of claim 8, wherein the actuator is configured to control the inflow rate of fluid received into the first flow path based upon the communications signal received by the communications unit.
10. The variable flow resistance system of claim 1, further comprising a tool body and a second flow path configured to send the fluid into an interior of the tool body.
11. The variable flow resistance system of claim 1, further comprising a production tubing string, wherein the first flow path comprises a production orifice for the production tubing string.
12. The variable flow resistance system of claim 1, wherein the actuator comprises at least one of a screw assembly, a piezoelectric actuator, a hydraulic cylinder, an electric motor, and a hydraulic pump.
13. A method of variably controlling flow resistance in a well, the method comprising:
 - receiving a fluid into a first flow path;
 - measuring a property of the fluid received into the first flow path; and
 - adjusting an inflow rate of the fluid received into the first flow path based upon the measured property of the fluid.

14. The method of claim 13, wherein the adjusting the inflow rate comprises:
comparing the measured property of the fluid with a predetermined value; and
adjusting the inflow rate of the fluid received into the first flow path based upon the comparison of the measured property of the fluid with the predetermined value.

15. The method of claim 13, wherein the measuring the property of the fluid comprises measuring at least one of resistivity, flow rate, pressure, density, and viscosity of the fluid.

16. The method of claim 13, wherein the measuring the property of the fluid comprises measuring a resistivity of the fluid, and wherein the adjusting the inflow rate comprises:
comparing the measured resistivity of the fluid with a predetermined value for the resistivity of the fluid;
increasing the inflow rate of the fluid received into the first flow path if the measured resistivity of the fluid is above the predetermined value for the resistivity of the fluid; and
decreasing the inflow rate of the fluid received into the first flow path if the measured resistivity of the fluid is below the predetermined value for the resistivity of the fluid.

17. The method of claim 13, further comprising generating power from the fluid received into the first flow path.

18. The method of claim 13, wherein the first flow path comprises a production orifice for a production tubing string.

19. The method of claim 13, further comprising:

receiving a communication signal from a remote location; and
adjusting the inflow rate of the fluid received into the first flow path
based upon the received communication signal.

20. A method of variably controlling flow resistance in a well, the method comprising:

receiving a fluid into a first flow path;
receiving a communication signal from a remote location; and
adjusting an inflow rate of the fluid received into the first flow path
based upon the received communication signal.