

GEOHERMAL POWER



GEOHERMAL INJECTION WELL CONTROL



BACKGROUND: Within the last few decades, injection wells have become a necessity for maximum geothermal power generation and reservoir management. Fluid injection is one of the most important parts of this process, eliminating any environmental impact of surface disposal and providing pressure support to the well. More of a strategy now than in the past, injection encompasses many variables such as the number of required wells, locations, depths and any potential long-term effects on production. To ensure reservoir replenishment and the highest production well output, injection sites are carefully selected based on exploration, testing, conceptual modeling and proper well design. Plants thoroughly examine any adverse effects on production well fluid, such as cooling and chemistry change.



KEY TO SUCCESS: Maintaining injection well longevity requires monitoring and control of the fluid being injected back into the reservoir. Reliable flow control keeps fluid velocities high enough to prevent the settling of suspended solids and allows multiple units to feed a reduced number of injection wells. In flash plants, injection well flow control valves (often called Level Control Valves) are critical components that must accurately maintain back pressure and level in the separator.

PROBLEM: Controlling fluid flow to an injection well while maintaining system backpressure is a difficult task in itself, all while trying to prevent a multitude of other problems known to occur at these sites. Potential major issues, such as gradual plugging of the well or pipeline due to silica scaling, increase injection pressure. Heat-depleted brine is a known cause. Cooling of the fluid at production wells or declining enthalpy can happen if there is “short-circuiting”

ELECTRAULIC™ ACTUATION

of the injected fluid through a fault or fracture zone during high pressure conditions. An unusually high brine flow rate can lead to ground heaving near the injection site, and loss of productivity for dry steam production wells. When injection pressure reaches excessive levels, seismic activity can occur in the area.

Often found several kilometers from the plant, motor-operated valves (MOVs) installed at injection wells are known to cause trouble for operators. Once actuators are overheated and stalled due to high ambient temperature or conductive heat, technicians must venture out to attempt resetting them. Meanwhile, flow is diverted to other injection wells as needed to maintain proper system backpressure. High frequency vibration found in the injection piping has also proven to be very detrimental to electro-mechanical or pneumatic actuator longevity. Internal electronic components and external linkages come apart rendering an actuator inoperable. The separation of electronics from a simple robust mechanical assembly eliminates this problem.

SOLUTION: With more than 20 years of experience in the Geothermal Power market, REXA Electraulic™ Actuators are the right solution for efficient Injection Well control. REXA actuators are engineered for use in critical applications requiring continuous modulating duty cycle with accurate and repeatable positioning. The self-contained, closed-loop hydraulic circuit provides stiff and stable control independent of load variation. The sealed, positive pressure hydraulic system does not require filters or oil-based maintenance. A dedicated microprocessor control enclosure, with a user-friendly control interface, operates the actuator. Power requirement options include 115 VAC electronics, allowing the use of lower voltage wiring and components in remote locations.



RESULT

Upon installation, a geothermal plant operator will immediately notice improved reliability and control of fluid flow to the well. Unscheduled downtime due to overheated actuators tripped offline from high ambient temperatures and scaled-up valves becomes a thing of the past, allowing accurate control of injection well flow and backpressure. Maintenance costs are greatly reduced, eliminating the need for expensive spare units. Robust NEMA 4X electronics separated from the process provide extended product life for continuous, efficient and safe operation.

When it matters most, Rely on REXA!

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