

GEOTHERMAL POWER



WELL HEAD SHUT OFF AND CONTROL



BACKGROUND: Geothermal energy has become a focal point in generation company portfolio's with the demand for renewable energy continuing to expand. Geothermal energy production is known for its reduction in greenhouse gas emissions as it can be extracted without burning any fossil fuels. Currently, geo-fields are producing about one-sixth of the carbon dioxide of a clean natural gas fueled plant, and unlike solar and wind power, geothermal energy is always available. Whether it is a dry steam, flash, or binary cycle plant design, it all starts at the well head. Often separated from the plant by significant distances, production wells include emergency shutoff valves (ESV) and flow control valves, that play a key role in the process. Therefore, they must be able to function dependably, so as not to interrupt the flow of steam or brine to the plant.

KEY TO SUCCESS: in maintaining well head steam or brine flow to flash tanks and separation systems, is to regularly and reliably cycle emergency shut off and flow control valves, regardless of ambient conditions and degree of internal scaling. Performing hot well head replacements more often than scheduled is a dangerous and expensive task. It is critical that these valves function as designed for proper operation of flash and separation processes that support plant efficiency and maximum turbine output.

PROBLEM: Reliable shutoff and flow control valve operation at production wells can be a major headache due to scaling and potential harsh environmental conditions. As geothermal fluids travel through the earth's crust towards the well head, they absorb a number of dissolved minerals and gases. Reservoir temperature and saturation levels will dictate the amount

ELECTRAULIC™ ACTUATION

of scaling at the well caused by these minerals. The most common scales found at geothermal installations are silica and calcite. Build up on valve internals starts immediately, and can reach catastrophic levels in a very short period of time. It's not unusual to find electromechanical valve actuators overheated and unable to move. The ability to "power through" corrosion with the force of hydraulics is extremely important in order to not render the well head valves inoperable.

In wells with two-phase flow or high flow rates, vibration can be a large problem. Substantial anchoring and piping support is normally installed to protect lines and equipment, but it is impossible to eliminate electric actuators with on-board electronics from shaking apart.

By nature of the location of geothermal fields, near fault lines and volcanic areas, ambient conditions can definitely play into the successful operation of production wells, with temperatures usually surpassing manufacturers ratings for electronics. The separation of these components from the mechanical assembly basically eliminates this problem. Also, corrosive gases may permeate many areas of the plant, rusting everything its path. Therefore, careful selection of materials and marine type paints can guarantee a longer life.

SOLUTION: REXA Electraulic™ Actuation offers a responsive and dependable solution for Geothermal Well Head Emergency Shutoff and Control Valve applications. Designed for continuous modulating service, the patented self-contained, closed loop, hydraulic circuit provides stiff, stable control in the harshest conditions (-40°F to +250°F). The closed loop hydraulic system does not require any filters or oil based maintenance. A dedicated microprocessor control enclosure operates the drive unit, and is usually located in a convenient area. Set-up and calibration is made simple through a membrane key pad on the enclosure cover. Performance is unmatched in the industry with adjustable dead-band to 0.05% of stroke, resolution of <0.1% and frequency response of 1.5 to 5.0 Hz. Standard product offerings are fail to position or fail in place, as well as rapid full stroke speeds (<2 seconds) with no hysteresis or overshoot. Importantly, power requirement options include 120VAC electronics, allowing the use of solar panels for a completely self-contained production well operation.



RESULT

A geothermal plant operator will notice improved reliability and control of fluid flow from the well almost immediately. Unscheduled down time due to burned out actuators from scaled-up valves becomes a thing of the past, allowing increased generation. Maintenance costs are greatly reduced, eliminating the need for expensive spare units. Robust NEMA 4X electronics separated from the process provide extended life for trouble free operation.

Since the REXA oil system is self-contained and hermetically sealed, no oil maintenance is required. When it comes to reliability, choose to Rely on REXA.

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