

Geothermal Steam Pressure Monitoring

Industry: Power Generation
Products: EJX110B (Differential Pressure Transmitter)
YTA510 (Temperature Transmitter)
YFGW710 (Field Wireless Integrated Gateway)



Introduction

Geothermal power plants create electricity from geothermal energy. These power plants are similar to other steam turbine stations; however their heat source is that of the earth's core. The created steam is used to turn the turbine for the production of electricity. Technologies include Dry steam, Flash steam and Binary cycle power stations with Binary cycle being the most common geothermal plant in current production.

In the process of geothermal power generation the facility needs to monitor various processes, as in this case steam line pressure sits in remote from control room's location.



Benefits

- Reduced installation cost (CAPEX), high gain antennas allow remote monitoring up to 5km
- Improved future flexibility & scalability with ISA100 Wireless open and scalable network design
- Minimized infrastructure with long battery life (10 years with 30sec updates), reduced maintenance cost and effort based on flexible device functionality
- Reduced patrol rounds by monitoring steam pressure measurements located 2km away from control room

Requirements

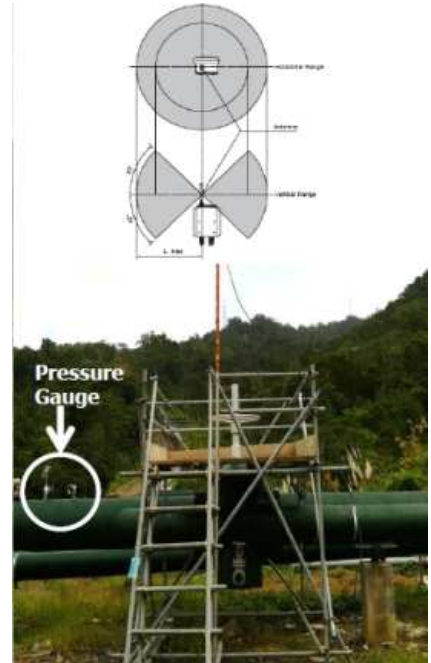
To replace existing pressure gauges on production wells with wireless pressure transmitters for online monitoring back at the local control room which can be relayed to operations. Measurement points are located in dense forest where the terrain slope is 1:20 which increased the difficulty of wireless communication.

Challenges

- Long Communication Range in dense forest
- Antenna propagation angle

Solution

The YFGW710 was installed near the control room, fitted with a 6dBi antenna to enable the long communication hop to the steam extraction points. The YTA510 wireless temperature transmitter also was fitted with a remote high gain antenna to act as a repeater in order to extend the coverage of the measurement points. The EJX110B wireless pressure transmitters were directly mounted at the required measurement points. Remote antenna cables were used for Sky Mesh approach to avoid forest obstacles with angled antennas for sloping signal propagation to match the grade of the environment.



Conclusion

- High gain antenna provided exceptional performance where only one repeater could achieve reliable communication with gateway covering the required distance.
- Field patrol interval was extended from daily monitoring to monthly in order to verify the site status and security.
- The wireless network enabled easy expansion of additional wireless measurement points.

Yokogawa has a proven track record of delivering reliable, scalable and open technologies for a century. ISA100 wireless solutions address the specific challenges of the industrial automation industry while lowering cost of ownership for our end users and maximizing their return on investment.



VigilantPlant is Yokogawa's automation concept for safe, reliable, and profitable plant operations. VigilantPlant aims to enable an ongoing state of Operational Excellence where plant personnel are watchful and attentive, well-informed, and ready to take actions that optimize plant and business performance.

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