



APPLICATION SPOTLIGHT

Wireless Monitoring of Hydroelectric Dam Levels



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This picture of the dam shows the natural stream of water next to the pipe. The flow varies during seasons and is controlled to maintain sufficient water levels in the reservoir to generate electric power.

APPLICATION:

Hydroelectric dams and their reservoirs store a significant amount of energy, which can be fed into the grid very quickly, when necessary. In determining the amount of available energy, the water level height at the reservoir must be monitored accurately by a reliable monitoring system.

PRODUCT SUPPLIED:

- SignalFire Remote Sensing System™ (SRFSS)

CHALLENGE:

Previously, the hydrostatic water level sensing system at the dam connected to the power station via a hard-wired cable. Besides being aged and frequently damaged by falling trees, the wired system had problems with ground faults, and the cable was prone to lightning strikes. Installing another wired measurement signal from the dam to the powerhouse would be both physically challenging and costly. Providing for redundancy, a second hard-wired system would double costs.

SOLUTION:

As a wireless system, the Signal Fire Remote Sensing System does not require cabling, eliminating the risk of failure due to lightning strikes and ground faults. Consisting of a gateway and remote nodes that integrate with sensors, the wireless sensing system provides the power station staff with valuable field data to determine the available energy in the dam. A parallel

repeater station provides a secure, robust and redundant communication path for the data signal.

This adaptive radio networking system seamlessly integrates with the hydrostatic level transmitters, which are suspended into the dam in a stilling tube and transmit the level data to a remote programmable logic controller located at the power station.

With a range of up to approximately three miles, the network with redundant communications link is both self-installing and self-configuring, so it immediately starts once the settings, address and parameters for the individual components are entered. Wireless nodes install themselves automatically into the network.

The diagram below illustrates the configuration of the high-reliable and redundant monitoring and control system designed for this application. Powered by battery and solar energy, the wireless system ensures reliability under all conditions as the dam and repeater station have no power. The Backup Repeater provides a level of redundancy to ensure that the signals /data have the highest degree of reliability. The stringent requirements of the application required that the telemetry system is failsafe, performs in extreme high and low temperatures (-50°C to 60°C) and operates on battery and solar power only.

