

Sensaphone® System Provides Off-Site Management for Hydroelectric Plant

Growing up around hydroelectricity sparked Kevin Duncan's dream of one day building his own plant. Duncan's father, Charles Winne, worked in hydroelectric power for many years before his eventual retirement. Following in those footsteps, Duncan has an electrical and mechanical background and works full-time as electrical manager for the Snohomish County Public Utilities District in Everett, Washington. His wife, Vicki, is a journeyman electric meter electrician for the same company. Fueled by their own backgrounds and Kevin's lifelong dream, the pair decided to design, construct and operate their own hydroelectric plant.

In late 1985, the Snohomish County Utilities District sent Duncan into a remote area of the foothills of the Cascade Mountains on a service call in Lynnwood, Washington. There he spotted a steep hill with a 1,700-foot cliff, which looked like a perfect location for a hydro plant. With the exception of a substantial water source, the location, called Ebey Hill, provided all the necessary elements.

Then Duncan discovered that the base of a dam rested approximately 1,500 feet back from the cliff on Ebey Hill. Farmers had built the dam in 1962 to provide an agricultural irrigation pond. Before the year was up, the Duncans had purchased the dam from a California-based religious organization that now owned it and had secured the necessary permits to begin construction of the Ebey Hill hydroelectric plant.

They avoided financing the project by saving funds and buying materials as it progressed. Apart from some welding and a licensed survey, the Duncans

constructed the plant entirely by themselves. They even carried in every piece of equipment and all materials. The project includes a concrete and wood powerhouse and a 3,000-foot penstock made of polyvinyl chloride (PVC) pipe and steel. They modernized the dam and headworks with motor-operated valves and electronic sensing equipment.

The Challenge

The plant began operation in 1991 and currently produces about 614,000 kilowatt-hours of electricity annually. However, the Duncan's journey had some mishaps. Fifteen minutes after the plant began operating, the Duncans experienced their very first setback: The plant's generator exploded.

"Apparently some mice chewed on the windings while we had it stored," Duncan admitted. The incident prompted him to begin collecting information on remote monitoring systems. Kevin Duncan looked for flexibility and easy programming as well as something he could afford. He spent more than a year researching and comparing capabilities before deciding on a Sensaphone system for remote monitoring.

The Solution

The Duncans have come to depend on the Sensaphone system to watch over every aspect of their plant. The Sensaphone Express II allows the plant, now only manned once a week, to run without constant on-site supervision. Many components of the plant require attention, even when unattended — kilowatts, kvars, volts and amps, reservoir level, waterflow, turbine vibration and penstock pressure — all of which the Sensaphone system monitors.

The Benefits

One of the most beneficial features of the Sensaphone unit is that it provides for real-voice communication for automatic shutdown, leaving Duncan confident that he is capable of preventing potentially crippling damages. The Sensaphone also allows manual remote-command operation.

“The unit takes real-time data and converts it to engineering units for me,” Duncan said. “It saves me time and headaches.” The Sensaphone Express II also keeps an eye on cabin security conditions such as intrusion, fire alarms, air pressure alarm, and station battery voltage.

Sensaphone’s Enhanced Capabilities

Additionally, the Duncans need to address environmental concerns with the hydroelectric project. A section of the penstock rests above ground, so if a rupture from catastrophic failure or vandalism should occur, the surrounding area would suffer severe consequences.

“With site locations 45 minutes apart and a good 45 minutes from home or work, we need dependable remote monitoring,” Duncan said. “The Sensaphone system brings a set of hands, eyes and ears to each location.” Duncan chose the Sensaphone system over other products for multiple reasons. One feature that strongly influenced his choice was the system’s I/O expandability. Flexibility in accessing the system also persuaded him.

“I [can] access the Sensaphone unit from any telephone. It’s very convenient that there’s no special computer necessary.”

When Duncan attended a conference in Boston, thousands of miles away from his plant, the added security of the remote monitoring system allowed him to enjoy the seminars and historical attractions of the city with complete peace of mind.

Duncan even called the Sensaphone system during his flight. “I was able to check on the operations at the plant any time of day or night. It allows me the freedom to attend to other important business,” he said.

The Sensaphone system boasts such intelligent capabilities that it can call Duncan, alerting him to any emergency or inconsistency in the operation of the plant. The convenience and ease of the real-voice feature also impressed Duncan. The fact that the Sensaphone system speaks to him in his own voice comforts him. Communication without the need for a modem, personal computer or special training; custom-recorded messages in his own voice; and flexible I/O expandability made it easy for Duncan to choose the Sensaphone.

The Duncans presently maintain one paying customer with their hydroelectric plant: The Snohomish County Public Utilities District buys electricity from the Ebey Hill plant. Future plans include building a home on the site and converting some of the electricity for personal use. If time and energy allow, the Duncans might even build another hydroelectric plant.

Sensaphone designs and builds active remote monitoring and early detection products for a wide range of markets that quickly and effectively provide alerts to problems at remote locations. Over 400,000 Sensaphone systems are in use today around the world with superior customer satisfaction.

Contact Sensaphone for the right solution and for pricing:
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