

# Clamp-on flowmeters from Siemens help to regulate outflow from a dam

## Process Instrumentation and Analytics



Penstocks running over a 150-foot deep gorge

### Challenge

A utility in the Pacific Northwest United States needs to regulate the outflow of a large dam built in the 1930s. The outflow of the dam feeds a river into which the state government wanted to reintroduce a salmon run. Because of this, the utility would need to comply with some very tight limits on how quickly they could change the level of the river. This would require them to account for all water coming downhill from the dam.

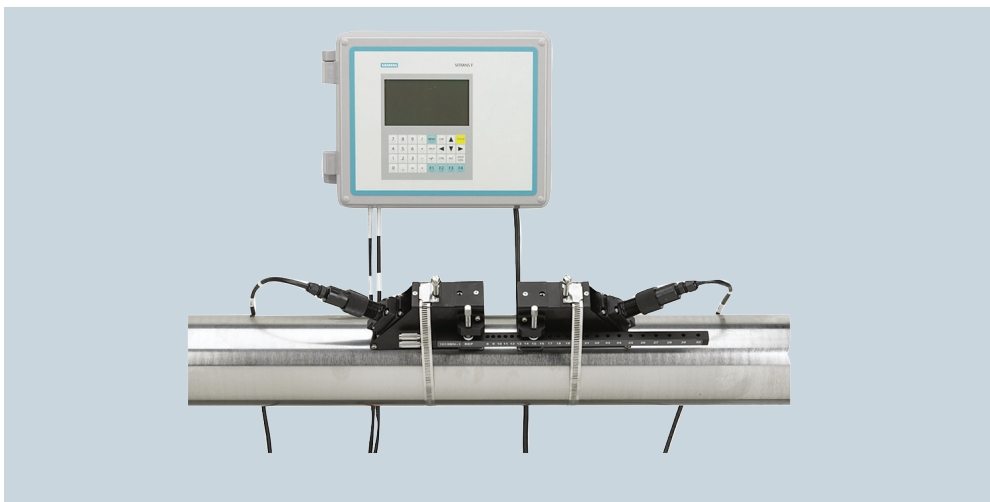
They already had the capability to calculate the outflow from the dam, using

measurements from two 6-foot diameter penstocks (large pipes) that were based on the efficiency of the turbines. However, those measurements did not take into account any leaks that could occur in the penstocks. Leaks in the pipes would add volume to the amount of water flowing into the river from the dam, and could also lead to a catastrophic break in the pipes.

In addition, the utility company also had a need to measure the flow from the dam relief gate, which they open seasonally to reduce the water level of the lake behind the dam.



Custom covers protect the transducers



SITRANS FUS1010 Series Ultrasonic Clamp-on Flowmeter

### Solution

The local Siemens representative installed two clamp-on ultrasonic flowmeters on each penstock; one at the dam site and the other near the powerhouse. The flow rates are compared to watch for breaks/leaks in the pipes.

Because the penstocks were running over a 150-foot deep gorge, traditional flow transducer (sensor) installation was an additional challenge. A special mounting bracket was designed and installed by the local Siemens representative in order to attach the transducers to the penstock. Often deer and even bear had been known to use the pipes as scratching posts, so a custom cover was also fabricated to protect the transducers from weather, accidental impact, or a "persistent itch" from the occasional wildlife.

Another Siemens clamp-on ultrasonic flowmeter was installed on the outflow pipe at the base of the dam to measure the flow when the relief gate was opened.

### Conclusion

The utility is now in compliance with the state regulations on the river-level ramp rate. By using the Siemens flowmeters, they are now aware of any leaks that occur in the penstocks, and they can measure the true amount of outflow from the dam relief gate. In addition, the Siemens flowmeters are a more accurate measure of the flow in the penstocks than the previous method of calculating the flow based on turbine efficiency. The state has now successfully re-introduced a salmon run into the river.

### About the SITRANS FUS1010 flowmeter

The SITRANS FUS1010 instrument is the most versatile clamp-on ultrasonic flowmeter available. Because it can operate in either WideBeam transit time or Doppler mode, there is no need to change the meter when operating conditions change. This makes it suitable for virtually any liquid, even those with high aeration or suspended solids.

The SITRANS FUS1010 flowmeter is available in single, dual, and optional four channel/path configurations. There are three enclosures to choose from: wall-mount, wall-mount explosion-proof, and compact explosion-proof.

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