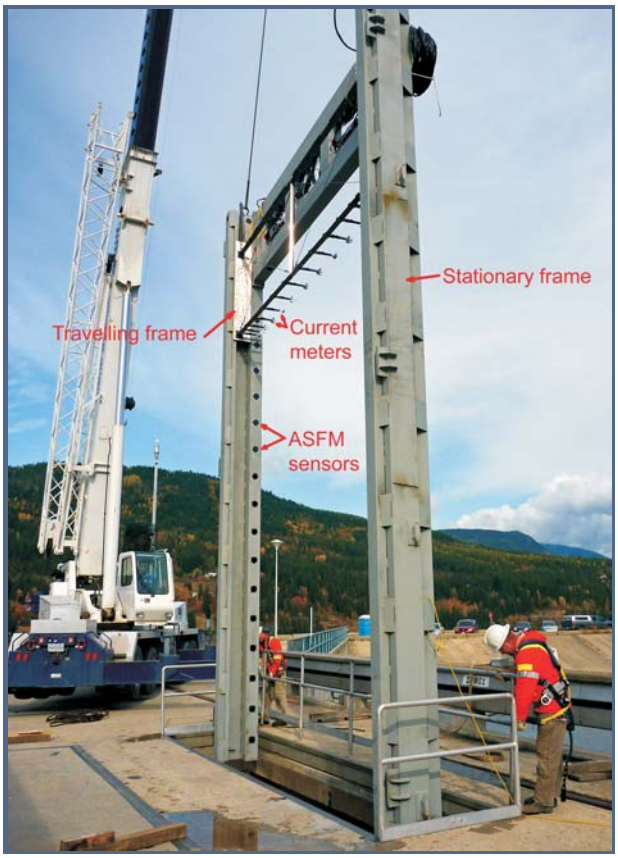
ASL AQFlow inc.

NEWSLETTER

Vol. 9 No. 1 *Innovative solutions to your flow measurement challenges* July 2010

Home of the Acoustic Scintillation Flow Meter

Acoustic Scintillation Flow Meter Successful in Flow Comparison Test at Kootenay Canal Power Plant Intake



As part of an ongoing effort to advance the state-of-the-art of turbine flow measurement, CEATI (the Centre for Energy Advancement through Technological Innovation, Canada) sponsored comparison flow measurements at the intake of Unit #1 at B.C. Hydro's Kootenay Canal power plant, British Columbia, Canada, in October 2009. The measurements, supervised by the PTC-18 Committee of the ASME, were run as a blind test, with none of the test participants having knowledge of the reference discharges until after the final results were submitted. The Acoustic Scintillation Flow Meter (ASFM) was one of the three intake flow measurement instruments tested. The other two methods deployed in the intake were current meters (Hydro Quebec) and acoustic time-of-flight (Accusonics). The reference measurement was provided by the acoustic time-of-flight method (Rittmeyer) deployed in a code approved location in a straight run of a penstock. The 3rd Workshop on Turbine Flow Measurement, which will be held as part of Hydro 2010 in Lisbon, Portugal, will offer presentations on all aspects of this CEATI/ASME PTC-18 activity.

Each unit at Kootenay Canal has a single intake, 7.44 m high and 4.88 m wide. As the intakes are fed from a canal, they strongly resemble intakes typical for low head plants, even though Kootenay Canal is a medium head plant. The preferred method to install the ASFM sensors is on a fixed frame deployed in a slot. As the maintenance gate slot was the only one available, the current meters and the Acoustic Scintillation Flow Meter (ASFM) were both deployed there. Fortuitously, the slot was wide enough that a combined stationary/travelling frame could be used, allowing both methods to operate simultaneously. The ASFM sensors were mounted in pairs on opposite vertical sides of a large stationary part of the frame, forming sixteen sampling paths. The current meters were mounted on the cross-member of a travelling frame, which moved up and down within the stationary frame. An auxiliary pair of ASFM sensors was also mounted on the current meter travelling frame to test an alternative implementation, where the single path is moved in sequence to a set of fixed elevations spanning the intake height, or is moved slowly and continuously over the height of the intake. Each ASFM discharge measurement required approximately 8 minutes and thus three measurements could be made at each condition while the current meter sampling was under way. The mean of the three individual discharges was reported as the result for each of the 46 flow conditions measured.

The mean difference between the ASFM discharges and the reference was less than 0.5%. No bias was indicated through the full range of velocities (1.0 to 3.0 m/s), even with modifications in the operation of neighbouring units. As the mean difference between the other two discharge methods and the reference was also within acceptable limits (approximately 1.0% for current meters and 0.2 % for acoustic time-of-flight), these CEATI/ASME PTC-18 measurements confirm that acceptably accurate turbine flow measurements can be performed in intakes, as long as these intakes have suitable characteristics. And because both the current meters and the ASFM can be mounted on frames, transported between intakes fully instrumented and deployed without intake dewatering, the cost of measurements is considerably lower than with methods employing dedicated instruments installed in individual penstocks.

A view of the 30-path ASFM frame being lifted into the slot.

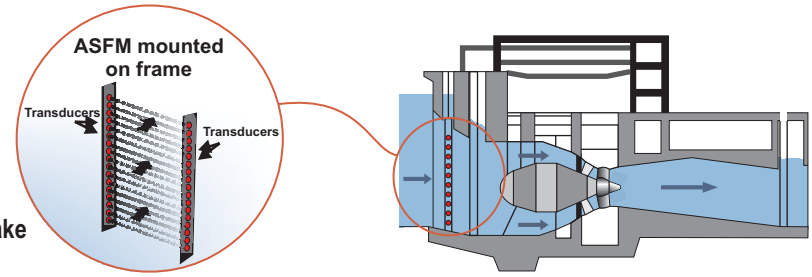
News From France

Compagnie Nationale du Rhône (CNR) contracted ASL AQFlow to perform flow measurement services with the Acoustic Scintillation Flow Meter at unit G5 at the Châteauneuf du Rhône-Montélimar- Henri Poincaré hydroelectric plant on the Rhône River in France. The project was carried out in October 2009. Overall the measurements were successful. On-cam and off-cam flow were obtained for efficiency and performance optimization. The CNR's hydraulics and materials testing laboratory team received training in the mounting and operation of the ASFM system.

Latest news:

CNR is now going ahead with the purchase of a 30-path ASFM system for conducting measurements of Kaplan units and eventually measurements of bulb turbines at 12 of their plants along the Rhône River.

Powerhouse of the Châteauneuf du Rhône-Montélimar- Henri Poincaré hydroelectric plant



An ASFM in a bulb turbine intake

Upcoming Conferences and Exhibitions

HydroVision 2010 Charlotte, North Carolina

Visit AQFlow's Jan Buermans, Sales Manager, and Josef Lampa, Hydroelectric Consultant.

Ask us about the results of the comparison measurements for the PTC 18 at Kootenay Canal.

Visit AQFlow in Booth #666

Hydro 2010 Lisbon, Portugal

David Lemon of AQFlow, will be presenting a technical paper in:

Session 21 – Flow Measurement
Tuesday September 28 Afternoon
3rd Workshop on Turbine Flow Measurement

Visit AQFlow in Booth #532

IGHEM 2010 – Roorkee, India

The 8 International Conference on Hydraulic Efficiency Measurements

David Lemon is presenting a paper titled: " Improvements to the accuracy of discharge measurements by acoustic scintillation resulting from revisions to data processing procedures"

Other Hydro Solutions

Our parent company, ASL Environmental Sciences, offers a range of related services and products for other hydro applications, such as **flow surveys** and **numerical simulations** in forebays and tailraces and **remote sensing** including mapping and monitoring of watershed land use/cover, aquatic vegetation, and water quality and temperature.

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