

# WWTP Discharge Control

## Czech Republic

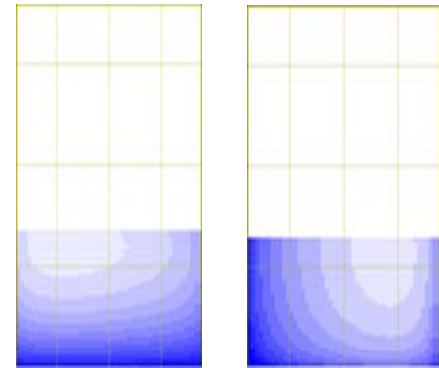
### Case Study

### Expertise in Flow

#### ADFM Pro20 Benefits:

- 2% flow rate measurement accuracy
- Accurate velocity measurement in difficult hydraulic conditions
  - Turbulence
  - Near zero/ zero velocity
  - Peak velocity shifting from side to side in channel
- Large flow measuring span (0.2 - 6 m level)
- 4 Piezoelectric ceramics measuring velocity in multiple points (bins) and pointing in different directions of the flow
- Measures velocity even if 1 or 2 sensors are covered
- Generates a true flow profile
- Calibration-free technology with zero drift of ultrasonic level

*The ADFM Pro20 Pulse Doppler flow logging system from Teledyne Isco, Inc. provides accurate and reliable data under varying and difficult hydraulic conditions at a WWTP outlet in Olomouc, Czech Republic.*



Measuring site (left) and ADFM Pro20 true flow profiles derived from the same location at two different times (above). Lighter blue colors indicate higher velocities, and the height represents the water level.

#### ADFM Pro20 Sensor



Ultrasonic level sensing ceramic pointing straight up, and four velocity sensing ceramics pointing in different directions

#### Project Background

Olomouc WWTP is responsible for treating the waste water from around 130.000 inhabitants. The treatment plant is operated and managed by Moravska Vodarenska a.s., which is a part of Veolia Voda, in Czech Republic. The treated water from the Olomouc WWTP is discharged into the Morava river, which runs through the city.

It is crucial for the plant to control and monitor the volume of water that it is discharging in order to comply with local regulations. It is important to deliver accurate readings during high level conditions, such as those present during rainfall events.

#### Challenging Site Conditions

The outlet is a 1.8 meter rectangular channel. Maximum level is >1.7 meter and minimum level in dry periods is ~0.2 meter. Two channels merge into one larger channel, forming a Y shape (see photo above). Both channels have a level drop at the merging point, causing the formation of air bubbles trapped in the water. This effect allows velocity measurements despite a low particle concentration (5 mg/l). However, the channel shape creates turbulences and peak velocities shifting from side to side, making it difficult to measure velocity accurately with only one velocity sensor.



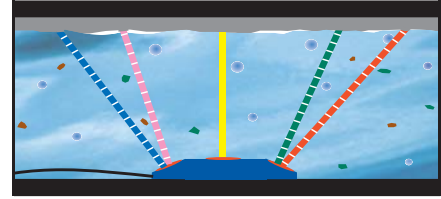
ADFM Pro20 Installation

**System Options:**

- Stationary or portable
- Communication:
  - Data logging
  - Analog (4-20mA)
  - Digital (MODBUS/Ethernet)
- Relay Alarms
- GSM/GPRS
- CDMA/1xRTT
- Flowlink 5.1 software:
  - Data Analysis
  - Diagnostics
  - Graphs/Tables
  - Editing
  - Reports

**ADFM Pro20 Solution**

TECHNOAQUA, the Teledyne Isco distributor in Czech Republic, recommended using the Isco ADFM Pro20 flow system at the site. The ADFM Pro20 system measures flow rate to within 2% of actual value, in depths up to 6 meters. Four (4) pulsed acoustic beams pointing in different directions in the flow measure velocity at multiple level points, called bins (see figure to the right).

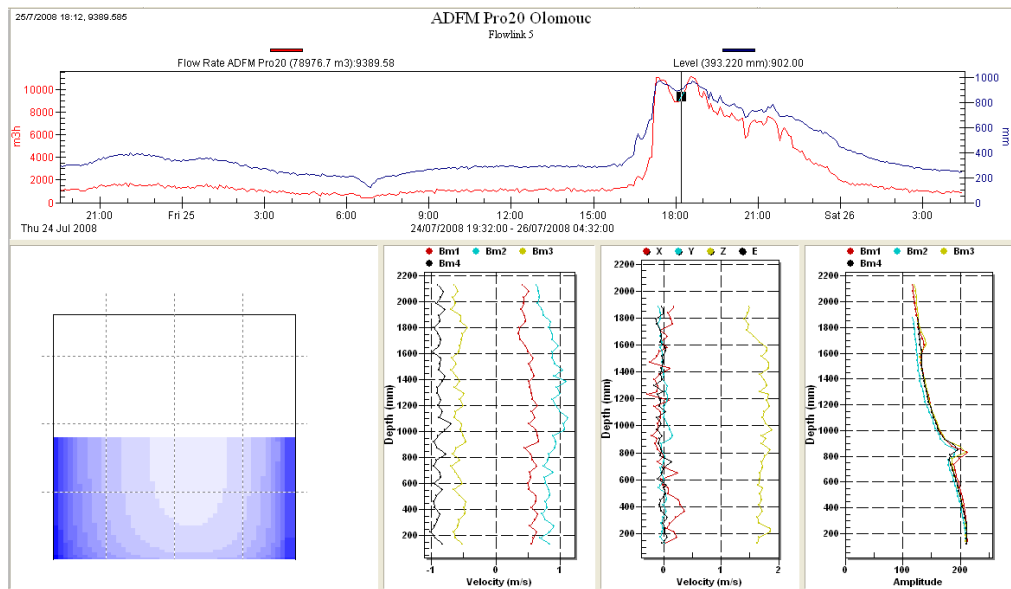


Advanced algorithms automatically adapt to changing flow characteristics, removing the need for in-situ calibration and ensuring accurate flow rate measurement even in difficult hydraulic conditions. Due to the recurring fouling problems, it was important for the customer to have a redundant flow measurement system with more than one velocity beam to ensure accurate and reliable velocity readings. The ADFM Pro20 met and surpassed this expectation. With four independent velocity beams, the system will measure velocity even if one or two ceramics are completely covered.

**Feedback from Olomouc WWTP**

Ing. Petr Schinneck and Ing. Jan Abrahánek of Olomouc WWTP were satisfied and impressed with the easy installation of the ADFM Pro20 sensor and the accurate flow measurement under all conditions, including both low (30 - 40cm) and high (70 -110cm) levels.

*“The measurement by ADFM Pro20 has met all our requirements and wishes. We also found the Flowlink 5.1 software to be very useful in evaluating the data, with the graphic display of measured data, velocity diagnostics and true flow profiles.”*



Flowlink 5.1 graphic display of ADFM Pro20 measurement data, true flow profile, and velocity signal diagnostics.

**Teledyne Isco, Inc.**

P.O. Box 82531, Lincoln, Nebraska, 68501 USA  
 USA & Canada: (800) 228-4373 • Phone: (402) 464-0231 • Fax: (402) 465-3091  
 Web site: www.isco.com • E-mail: IscoInfo@teledyne.com

