1. **Canal and turbine dimensions**

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| Data name | Canal and turbine specifications |
| Data description | The hydrokinetic energy site is a 180 meter straight section of Roza Canal, Yakima, WA. The channel geometry at this location is trapezoidal and uniform. The turbine is located at approximately 145 m span of the straight section. The channel starts to widen at 35 m downstream of the turbine. |
| Longitudinal slope (So) | 0.0004 |
| Width of channel bottom (Bbot) | 4.27 m |
| Side wall slope (Swall) | 1:1.25 (vertical : horizontal) |
| Distance from base to top of lining (Hchannel) | 3.96 m |
| Turbine type | Vertical axis hydrokinetic turbine |
| Turbine diameter (Dturbine) | 3 m |
| Turbine height (Hturbine) | 1.5 m |
| Turbine position | 1.4 – 2.9 m above the channel bed |
| Maximum flow depth (canal design) | 3.4 m |
| Technology developer and project developer | Instream Energy Systems |



1. **ADCP wake velocity at hub-centerline**

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| Data name | Wake velocity at hub centerline |
| Data description | Hub-centerline streamwise velocities obtained from interpolating ADCP moving-vessel measurements.  |
| Reported variables | * Measurement location as distance from turbine, normalized by rotor diameter (x/D)
* Velocity (interpolated), normalized by mean inflow velocity (UINT/U∞)
 |
| Date | August 15, 2014 |
| Measurement start time | 13:46:57 MST |
| Measurement end time | 14:05:09 MST |
| Flow discharge | 54.96 m3/s  |
| Typical water depth | 3.3 m |
| Mean canal flow speed (Canal bulk velocity) | 1.890 m/s |
| Technology developer and project developer | Instream Energy Systems |

1. **ADCP cross-section velocity contour at 10, and 20 meters downstream of turbine**

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| Data name | Streamwise velocities at a cross-section 10 m downstream of the turbine (T8) |
| Data description | Spatio-temporally averaged streamwise velocities at a cross-section 10 m downstream of the turbine. Velocities were measured using an acoustic Doppler current profiler. |
| Reported variables | y (m), z (m), spatio-temporally averaged streamwise velocity (USTA), channel bottom elevation (h). The variable y represents the distance across the channel from a datum. The values of y increase from the left bank to the right bank of the channel (when looking downstream). The variable z represents the vertical distance, measured from water surface.  |
| Date | August 14, 2014 |
| Measurement start time | 19:24:13 MST |
| Measurement end time | 19:58:09 MST |
| Flow discharge | 55.44 m3/s  |
| Typical Water depth | 3.4 m |
| Mean canal flow speed | 1.900 m/s |
| ADCP discharge calculation method | Discharge was calculated according to RD Instruments (2013) and Mueller and Wagner (2009) |
| Spatio-temporal averaging method | Inverse Distance Weighting method, as outlined in Gunawan et al., (2010), was used to average the ADCP data. |
| Technology developer and project developer | Instream Energy Systems |

|  |  |
| --- | --- |
| Data name | Streamwise velocities at a cross-section 20 m downstream of the turbine (T9) |
| Data description | Spatio-temporally averaged streamwise velocities at a cross-section 20 m downstream of the turbine.  |
| Reported variables | y (m), z (m), spatio-temporally averaged streamwise velocity (USTA), channel bottom elevation (h). The variable y represents the distance across the channel from a datum. The values of y increase from the left bank to the right bank of the channel (when looking downstream). The variable z represents the vertical distance, measured from water surface.  |
| Date | August 14, 2014 |
| Measurement start time | 18:32:35 MST |
| Measurement end time | 19:11:38 MST |
| Flow discharge | 55.44 m3/s  |
| Typical Water depth | 3.4 m |
| Mean canal flow speed | 1.921 m/s |
| ADCP discharge calculation method | Discharge was calculated according to RD Instruments (2013) and Mueller and Wagner (2009) |
| Spatio-temporal averaging method | Inverse Distance Weighting method, as outlined in Gunawan et al., (2010), was used to average the ADCP data. |
| Technology developer and project developer | Instream Energy Systems |

1. **ADV turbulence**

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| --- | --- |
| Data name | Inflow turbulence |
| Data description | Velocity and turbulence measurements at 50 m upstream of the turbine. Velocities were measured using a Nortek Vector acoustic Doppler velocimeter at approximately the turbine hub height level. Measurement periods were at least 5 minutes.  |
| Reported variables | Rotor RPM, mean streamwise velocity (U), mean lateral velocity (V), mean vertical velocity (W), RMS of streamwise velocities (URMS) ), RMS of lateral velocities (VRMS) ), RMS of vertical velocities (WRMS), and turbulence intensity (TI) |
| Date | June 11, 2014 |
| Measurement start time | 16:14:00 MST |
| Measurement end time | 17:54:00 MST |
| Sampling frequency | 64 Hz |
| Technology developer and project developer | Instream Energy Systems |

**References**

Instruments, T. R. (2013). "Workhorse Rio Grande, Versatile discharge measurement system." Brochure.

Mueller, D. S., and Wagner, C. R. (2009). "Measuring Discharge with Acoustic Doppler Current Profilers from a Moving-Boat."

Gunawan, B., Sterling, M. and Knight, D.W. (2010) Using an Acoustic Doppler Current Profiler in a small river. Water and Environment Journal, Vol. 24 no. 2.