Integrated Tidal Current Demonstration Project at Race Rocks, British Columbia, Canada

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European Commission Coordinated Action on Ocean Energy (CA-OE)

Workshop on

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Location of the Project

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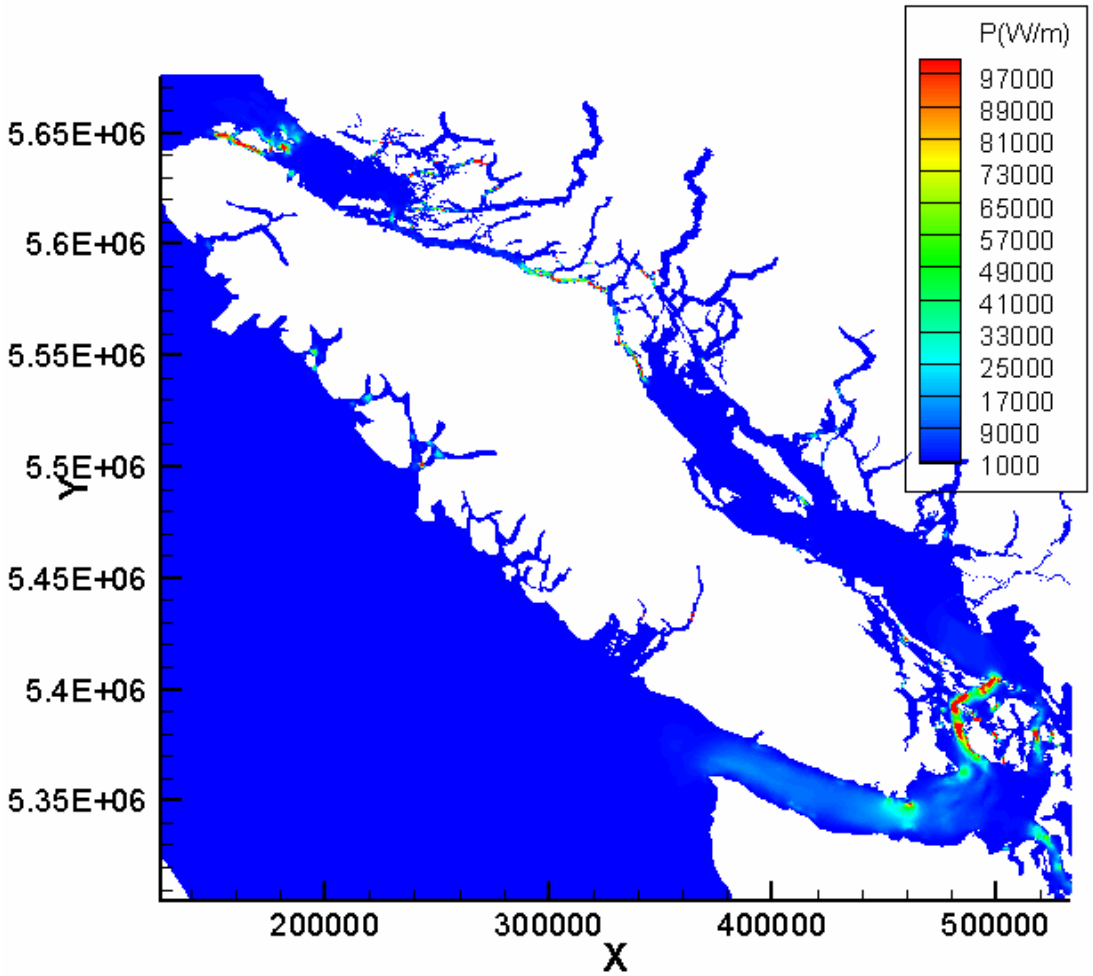
Tidal Stream Power Density Near the Project Site *Ref: CHC/Triton-TR-2006*



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Host of the Project

- Lester B Pearson College (www.pearsoncollege.ca)
- One of the United World Colleges
- Offers International Baccalaureate Program in Language, Sciences, Mathematics and Fine Art
- 200 Students from 88 Countries with Full Scholarships

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Race Rocks Island, BC, Canada

A Marine Protected and Ecological Reserve Area

Pearson College took over the operation of Race Rocks in 1997

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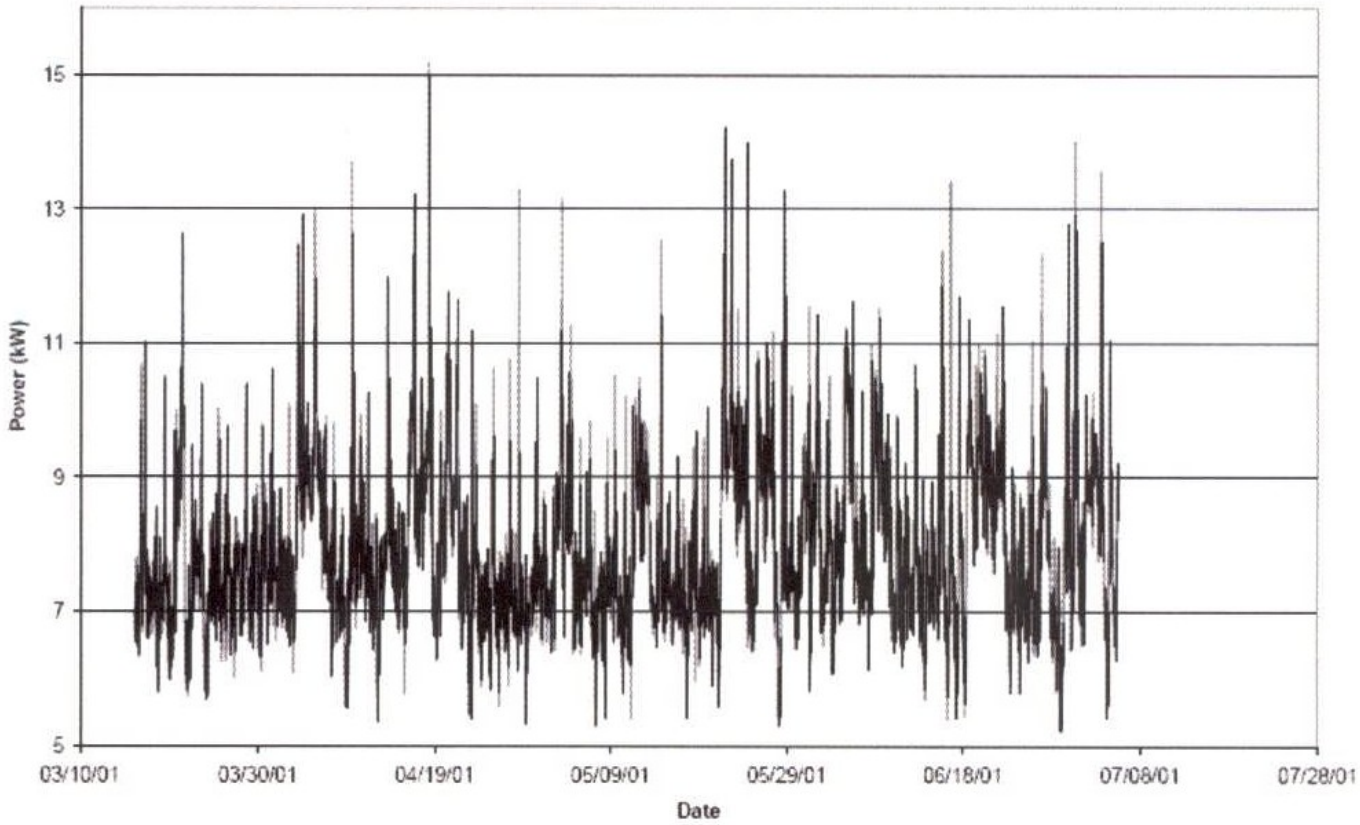
Hourly Load Profiles for Race Rocks Island



Electrical Annual Load – 70,000 kWh

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Present Diesel Generating Units in the Island

- 15 and 25 kW Generators
- Diesel fuel supplied to the island 2-3 times a year
- Diesel generator noise is an on-going concern
- Fuel storage-double hulled 9,000 litre tanks

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Objectives of the Integrated Project

- to demonstrate reliability of the Clean Current's tidal current turbine generator technology
- to provide electricity to the island and to replace existing diesel generators, thus reducing green house gas emission
- to demonstrate reliability of power supply through battery storage and power conditioning capability
- to study behaviour of sea mammals and fish in relation to operation of the tidal turbine
- to demonstrate integration of the tidal current project with other renewable, such as, PV
- to demonstrate maintenance process for tidal current generator
- to contribute to the educational experience of Pearson College students

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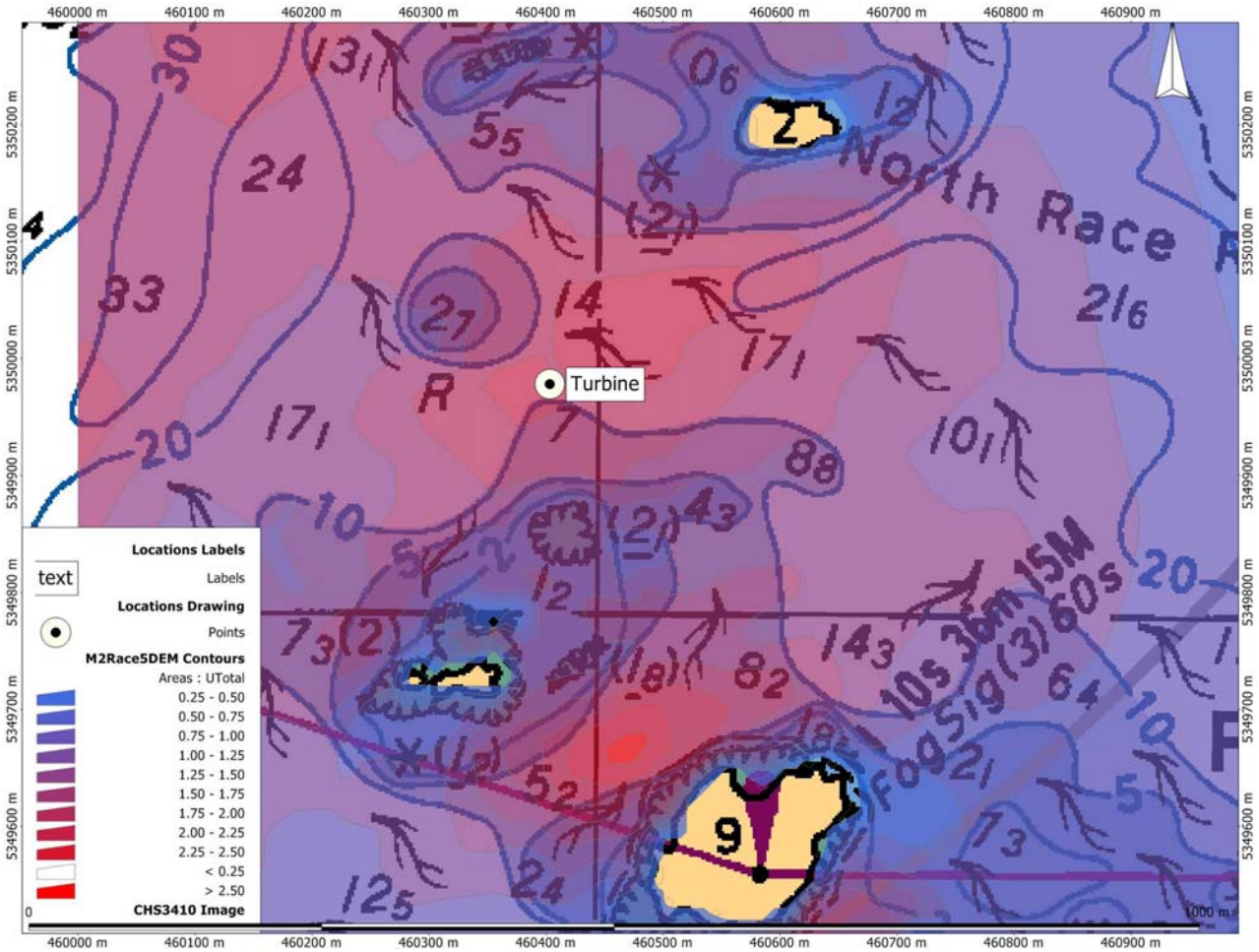
Modelled Current Velocities in the Vicinity of the Turbine Site



Water depth:

19 m to 22 m

Max Current speed at the Turbine Level:

3 m/s

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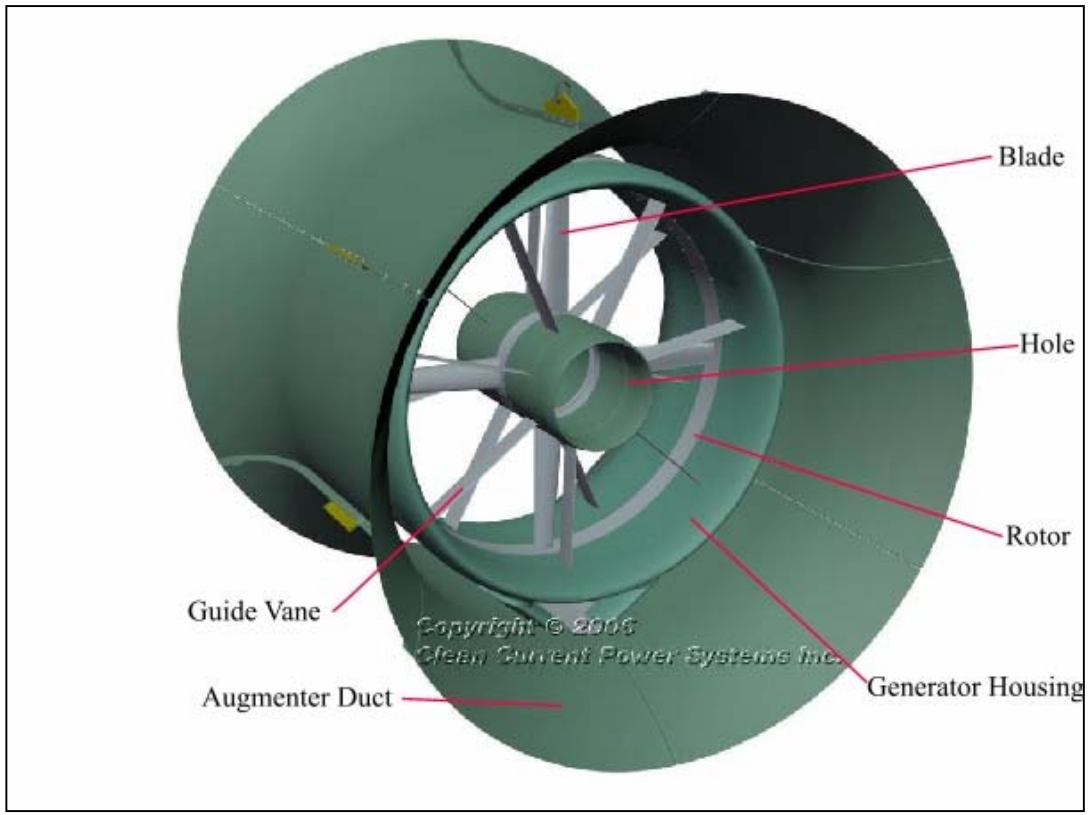
Clean Current Power Systems

Tidal Current Turbine Generator Technology



Bi-directional ducted horizontal axis turbine with a direct drive variable speed permanent magnet generator

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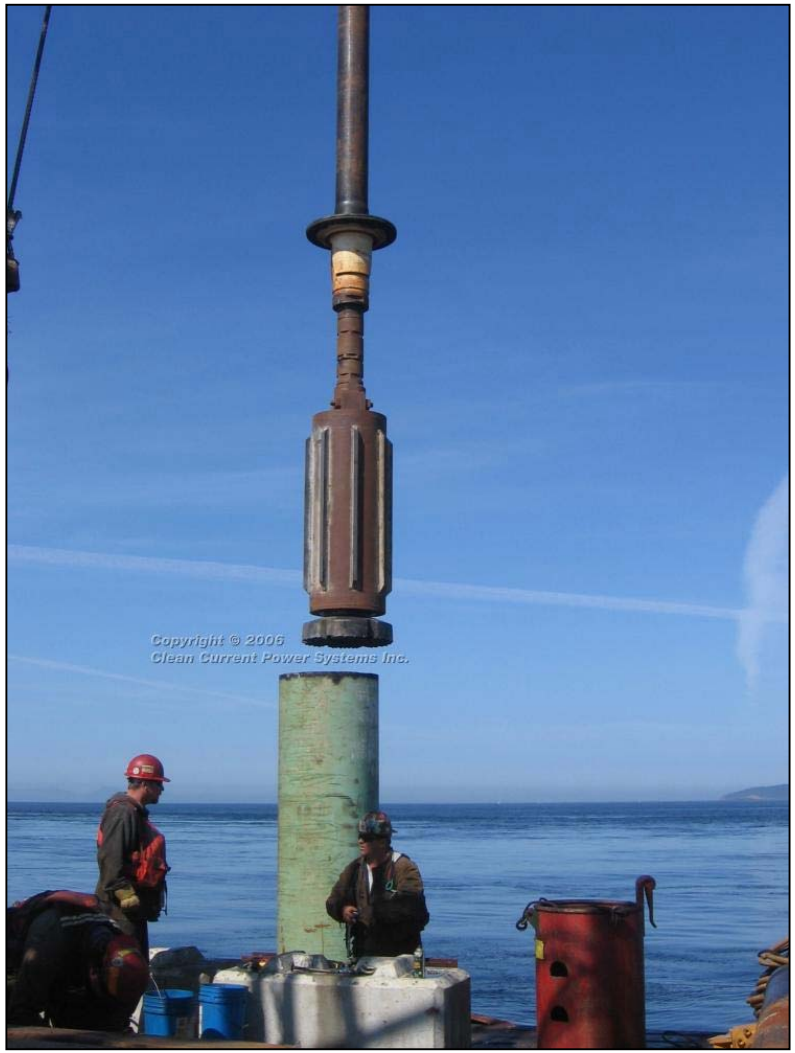
Final Assembly of the CCPS Tidal Turbine Generator for the Race Rocks

- 1:5 Scale Model
- 65 KW Generator
- 3.5 m Blade Diameter

Drilling & Post Installation at the Site



Piling is drilled and grouted approx 10.8 m into the bedrock

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Submarine Cable Route from the Generator to the Island

Length of submarine cable: 600 m

Type of Submarine Cable: single conductor, 3/0 str. Copper, 15 KV aluminum wire armoured submarine cable

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Deployment of the Generator at the Site

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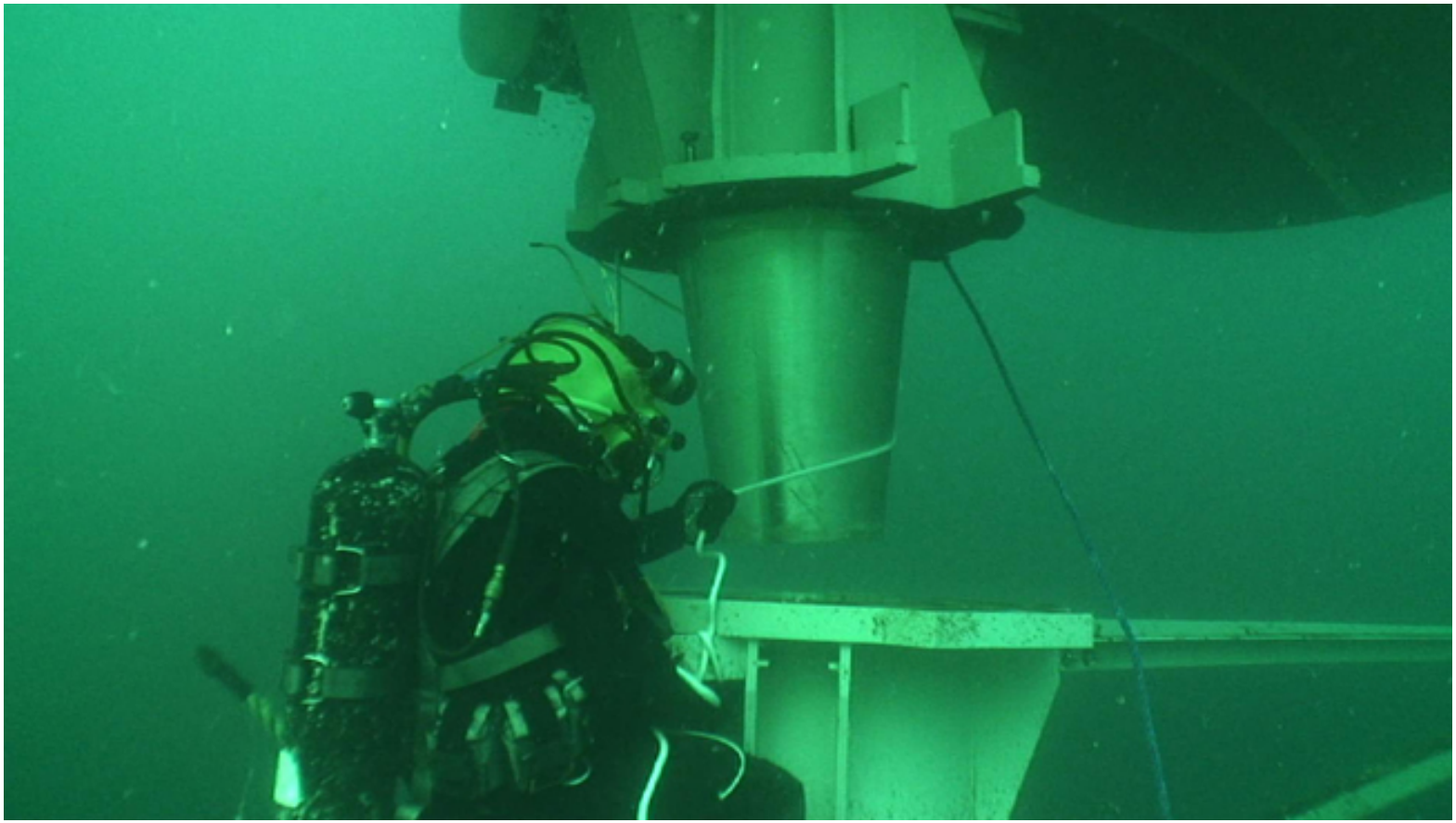
Installation of the Generator on the Support Post



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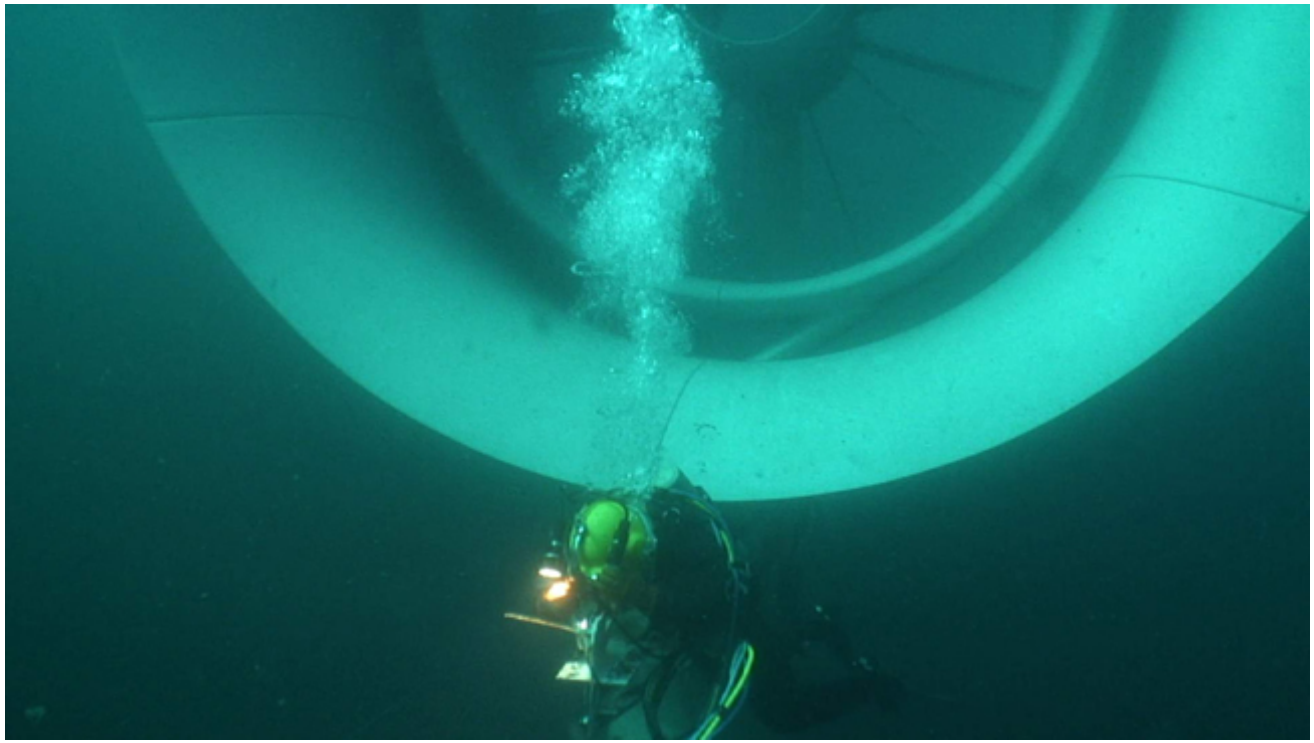
Completion of the Installation of the Turbine Under Water



Minimum Clearance of 5 m as per the Coast Guard Requirement

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Xantrex Power Converter for the Generator

- A rack of 12 X 6 kW Power Converters
- 200-500 VAC, 0-100 Hz to 0-60 VDC
- To Rectify and Control up to 65 kW
- Regulates the Battery Charge Current and Voltage

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Xantrex 3 Hybrid Generator Inverter Units

Rated at 42 – 60 VDC input

Provides 15 kW of well regulated uninterrupted power to the Island

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Battery Storage

Lead Acid Battery

Total Storage Capacity: 420 kWh

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Integration of the Carmanah PV to the System

6.5 kW

Sharp NE170U1
170W ea

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Potential Use of Excess Energy from the Integrated Project

- Determination of excess energy profile through a planned longer-term performance monitoring, including the energy management, of the Integrated Project
- Based on the results from the excess, carry out a feasibility assessment for producing hydrogen using the excess energy for providing fuel for the boat used by Pearson College for the Island.

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Environmental Impact & Monitoring

- Archipelago Marine Research Ltd/, Victoria, BC
- Report including Pre-construction monitoring (baseline), during the construction, and post construction, including Future monitoring recommendations, is complete
- All the relevant Environmental Impact Assessment and Monitoring reports are available at www.racerock.com

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Location for the Canadian EcoEnergy Policy Announcement (Jan. 19, 2007)

- Renewable production incentive of 1 cent per kWh

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Thank You

For more information on the project, please visit

www.racerocks.com

www.cleancurrent.com