ABSTRACT

Sustainability for Water Quality Infrastructure: South Bethany Beach's Tidal Pump System

Christopher L. Overcash, P.E., BCEE [1], Timothy W. Wolfe, P.E., BCEE [2], Ralph G. Dorval [3]

[1] Associate, KCI Technologies, Inc., 10 North Park Drive, Hunt Valley, MD 21030; PH (410) 316-7826; email: covercash@kci.com

[2] Vice President, KCI Technologies, Inc., 10 North Park Drive, Hunt Valley, MD 21030; PH (410) 316-7849; email: twolfe@kci.com

[3] Program Manager, Marine Services, Oceaneering International, Inc., 700 Rosemont Avenue, Chesapeake, VA 23324; PH (413) 369-4691; email: rdorval@oceaneering.com

Tidal power represents a largely untapped and completely renewable, sustainable energy source for powering a variety of potential water quality and other associated systems. In the Town of South Bethany Beach, Delaware a project designed to do just that is underway. The Tidal Pump System is a revolutionary concept intended to utilize the existing tidal differential between the Atlantic Ocean and the canals of South Bethany to "pump" or circulate water via a network of underground pipes, up to 36-inches in diameter, connecting the two bodies of water. The circulation of the water will improve the water quality within the inland system of canals, which has become degraded since their construction in the 1950s.

The Tidal Pump concept was initiated in 2002 and is based upon harnessing the site available diametrically opposed tides of the Atlantic Ocean and Inland Bays to deliver the power necessary to circulate the water. In 2006 KCI Technologies, Inc. and Oceaneering International, Inc. teamed to provide preliminary engineering for the innovative system. For the study the engineering team performed a hydraulic analysis of the system using modeling software; provided an analysis of environmental factors which may affect the Tidal Pump system; provided an analysis of potential pipe materials, installation methods, valve types and locations; and Identified operations and maintenance issues.

Although the conventionally generated power savings of the system is modest, it represents what can be done to move towards sustainable, fully renewable, sources of energy wherever the opportunity exists. It will take incremental changes, to add up to and provide fully renewable power for the future, reduce the need for non-sustainable generated power, and reduce greenhouse gas emissions. In these respects, the Bethany Beach Tidal Pump System is a truly innovative and revolutionary model for sustainable systems within the water environment and elsewhere.