OHMSETT Creates Better Waves
with Upgrades to the Wave Generator and Beach System

Leonardo, NJ - The Minerals Management Service (MMS) recently funded upgrades to the Ohmsett wave generator to improve the quality of waves so they more closely simulate ocean waves. While the old wave forms were adequate for testing oil spill response equipment, the waves were not close enough to ocean waves to satisfactorily evaluate alternative energy devices which are now being tested at Ohmsett.

The overall objective was to enhance the existing wave generator capabilities to produce wave spectra (frequency and amplitude) by varying stroke acceleration and speed instantaneously.

This effort included retrofitting the existing wave generator system with dual action hydraulic actuators to drive wave flaps, programming the computer to create wave spectra, and in the future, upgrading the existing beaches.

The wave flap frequency and amplitude can be varied on each stroke by following a computer generated, random wave spectra that more closely approximate waves in the ocean. The new system can produce waves as high as one meter, simulated harbor chop, FM Slides, JONSWAP, and Pierson-Moskowitz spectras with controlling parameters being wind, velocity and scale ratio.

At Ohmsett, reflected waves are controlled by using a system of “beaches” at the end of the test tank, opposite the wave flap. The beach system extends from the test tank floor, to the calm water line. When waves are generated at one end of the tank, a portion of the wave that impacts the beach is partially damped while the portion of the wave above the water line is not affected by the beach. This results in a reflective wave traveling back towards the wave flap. These reflective waves have the potential to cancel incoming waves or amplify them depending on the resonance of wave frequencies.

A new wave-damping beach system that will attenuate the reflected waves so that they will not interfere with newly generated waves is planned for the upcoming year.

Along with the recent wave flap improvements, a more effective beach system will be installed, which will allow Ohmsett to generate realistic waves that can be used by researchers testing the performance of hydrodynamic energy converting devices. This three-phase effort will include: quantifying reflected wave energy and effectiveness of the present beaches; designing and retrofitting improvements to the existing beaches; and designing, building, and installing a new beach. These improvements are scheduled to be completed by the end of 2010.

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