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TEST AND EVALUATION OF FOUR FIRE RESISTANT BOOMS AT OHMSETT

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16. Abstract (MAXIMUM 200 WORDS)

During the period of August 22-October 12, 1998, seven commercial fire booms were involved in burn testing at the U.S. Coast Guard Fire and Safety Test Detachment in Mobile, Alabama, in accordance with the proposed protocol, American Society for Testing and Materials-F20. Four of the seven booms survived the test sequence and were shipped from Mobile, Alabama, to the Minerals Management Service's OHMSETT facility for additional tests including first loss, gross loss, tow speed, oil loss rate, and critical tow speed. The four booms showed the same trend in response to various wave conditions; the long sinusoidal waves improved containment performance and the short, choppy waves degraded performance. One of the four booms achieved slightly higher first and gross oil loss speeds in each test. Three of the four booms performed comparably during the oil loss rate tests. One boom demonstrated superior stability at high tow speeds.

The results of this test report are consistent with the evaluation of fire booms previously tested at OHMSETT, but also show a slight increase in performance. The tests indicate that the existing fire booms can contain oil in currents up to 1 knot and in various wave conditions after being exposed to multiple burns. This information will be used by the Coast Guard to develop policies and procedures for the In-Situ Burning (ISB) of oil during a spill.

17. Key Words		18. Distribution Statement
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tow speed	first loss tow speed	
critical tow speed	gross loss tow speed	

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EXECUTIVE SUMMARY

An alternate cleanup method during an oil spill is ignition and burning of the oil at sea. Use of in-situ burning (ISB) has the potential to increase the efficiency of spill responders, lower the cost of spill response and protect marine resources. In order to develop consistent approaches throughout the United States, standard policies and procedures are being investigated and developed by the Coast Guard Research and Development Center. The results of this project will provide information, specifications, guidelines and field manuals to make ISB an operational oil spill response technique.

One of the major concerns of spill planners and responders is the durability of fire booms. Fire booms must function as an oil containment boom so it must withstand the forces of being towed through the water to collect and contain oil. It must also withstand the high heat flux and flexing caused by the burning oil. A major operational concern has been whether fire booms can still be used to collect and contain oil after a burn. This report attempts to answer that question by performing towing tests on fire booms after they have been exposed to burning oil. These tests will determine whether oil escapes under the boom or over the top if the fire has damaged the boom above the waterline.

Seven commercial fire booms were tested to the proposed American Society for Testing and Materials (ASTM) – F20 Fire Boom test protocol in which they were subjected to three hours of burning diesel fuel and waves simultaneously. These tests occurred at the U.S. Coast Guard Fire and Safety Test Detachment (FSTD) in Mobile, Alabama, and were reported in "Second Phase Evaluation of a Protocol for Testing Fire Resistant Oil Spill Containment Booms," Report CG-D-15-99. Four booms that survived the burn test sequence were shipped to OHMSETT, the National Oil Spill Response Test Facility in Leonardo, New Jersey, for further evaluation.

The purpose of the OHMSETT testing was to measure the oil collection/containment performance, ease of handling, and the seakeeping ability of the selected fire booms when subjected to a variety of towing and wave conditions. The test booms were rigged in a catenary configuration with the gap equal to 33% of the length. Tests were conducted at tow speeds up to 1.5 knots in calm water and three wave conditions. The first loss tow speeds, defined as the lowest speed at which oil droplets pass continuously under the boom, ranged from 0.6 to 1.1 knots. Loss rates at first loss plus 0.1 knot ranged from 3 to 9 gpm. The loss rates at first loss plus 0.3 knots were also comparable, ranging from 23 gpm to 36 gpm. Critical Tow Speed of each boom was determined using calm surface conditions and ranged from 2.25-4.6 knots.

The results of this test report are consistent with the evaluation of fire booms that had been previously tested at OHMSETT and are documented in "Test and Evaluation of Six Fire Resistant Booms at OHMSETT", Report CG-D-12-98. These results show a slight increase in the boom's performance in containing oil due to improvements made by the manufacturers. The performance of these fire booms indicates that under the right conditions, they can be used for the burning of oil on the ocean. These results will provide the input needed to develop policies and procedures for the use of ISB.