

The Ohmsett Gazette

Leonardo, New Jersey

Testing · Training · Research

Fall/Winter 2010

The X-PRIZE is Looking Forward to Your Participation

The Wendy Schmidt Oil Cleanup X CHALLENGE is looking for a breakthrough in technologies for cleaning up our oceans. The X CHALLENGE is a \$1.4 Million competition designed to inspire a new generation of innovative solutions that will speed the pace of cleaning up seawater surface oil resulting from spills from ocean platforms, tankers, and other sources.

The X CHALLENGE, announced on July 29, 2010, is a one-year competition that began on August 1, 2010 and will culminate in the summer of 2011, with head-to-head competitive demonstrations taking place Ohmsett.

A \$1 Million Prize will be awarded to the team that demonstrates the ability to recover oil on the sea surface at the highest oil recovery rate (ORR) while maintaining a recovery efficiency rate (RE) of 70% or greater.

For competition details and registration, please visit www.iprizecleanoceans.org.



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Test Tank Renovation



Scheduled maintenance on the Ohmsett test basin took place during the summer. Repairs included replacing the wooden slats on the beach system and painting the tank.

At the end of May 2010, the Ohmsett test tank was drained for scheduled maintenance and repairs that were initiated in early January 2010. The repairs were a huge endeavor and accomplished within three months to have the tank filled and ready for scheduled training and testing at the end of August.

Ohmsett's main feature is the 2.6 million gallon test tank. It is 667 feet long, 65 feet wide and 11 feet deep. The concrete tank is supported by pilings and is made up of twelve sections with eleven continuous rubber seals to make the tank water-tight. It also features three movable bridges, a beach system, wave maker, and six viewing windows.

Before the tank could be drained, a certified laboratory tested the basin water to en-

sure the water quality met New Jersey Department of Environmental Protection (NJDEP) discharge standards. With the NJDEP approval, over two and a half million gallons of crystal-clear saltwater was discharged into the Sandy Hook Bay and the real work began.

To help maintain the water-tight integrity of the test basin, seven custom seals were replaced. These seals run the width of the tank and expand and contract with seasonal temperature changes.

Also affected by seasonal temperature changes, the six viewing windows along the side of the tank that provide for underwater observation, had started to lose their water-tight seals. "The original installation has always been a problem with seasonal leak-

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Test Tank Renovation

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ing," commented Dave DeVitis, test director at Ohmsett. "We designed and implemented a completely new approach to sealing the viewing windows within the basin side walls."

The two-inch thick polycarbonate windows were removed, and the concrete openings were restored using epoxy based mortar to provide a true flat surface for the integral seal. A low profile barbed seal was designed, custom die fabricated, and a run of seals made from silicone.

With the seals and windows in place, the newly fabricated outside frames were installed. "Previously, pressure exerted on the seals was provided only by the static water pressure which proved inadequate. The new frames provide four times the static water pressure and compress the seals to maintain water tightness. As a result, relative movement due to expansion and contraction will have negligible effects on the seal pressure and therefore, they will always remain under compression; an essential condition for seals," explained DeVitis.

An integral part of Ohmsett's test basin is its wave generating capabilities. The original wave flaps were from the 1970s and had degraded and rusted in areas, primarily above the waterline. During the maintenance, much of the structural steel had been



Technician Tom Schmidt prepares wave flaps for removal.

sectioned and replaced. To withstand the pressure of the improved wave maker hydraulic pistons, the wave flaps were reinforced to improve their strength. "Square tube trusses were fabricated along the top of each flap at the point where the hydraulic pistons push on the flap," said DeVitis.

The wave-damping beach system in the test basin attenuates the reflected waves so that they will not interfere with newly generated waves. The beach system is constructed of wooden slats which over time curls and bends. These wooden slats were replaced with white oak.

In the final steps of the repairs, the test basin, as well as the main and vacuum bridges, were pressure washed and re-



Test Director Dave DeVitis installs custom designed window frames.

Painted. By the end of August the repairs and cleaning were completed. With Ohmsett technicians working around the clock for three days, the basin was refilled with water from the Sandy Hook Bay. The brackish bay water was filtered over several weeks to bring it back to crystal clear visibility and bulk salt was added to increase the salinity to that of ocean water necessary for testing.

Validating Dispersant Effectiveness

The use of chemical dispersants is an important oil spill response countermeasure. In the past seven years 15 major dispersant research projects funded by the Bureau of Ocean Energy Management, Regulation, and Enforcement (BOEM) were conducted at Ohmsett.

The most recent research project conducted during the week of November 1, 2010, was a BOEM funded series of dispersant experiments at the Ohmsett Facility to address several different operational issues from ongoing research projects. Scientists from SL Ross Environmental Research Ltd assisted the Ohmsett staff in conducting these experiments.

In the first set of the experiments, dispers-

ant effectiveness (DE) testing was conducted on two heavy crude oils obtained from platforms located offshore California. These two crude oils were not available during the April, 2010 DE testing program *Dispersant Effectiveness Testing on Heavy California Oils at Ohmsett*. The established Ohmsett DE test protocol and Corexit 9500 dispersant were used in these experiments. DCOR, LLC provided the crude oils to BOEM for testing. Results from these experiments will be used to determine the limiting viscosity for the effectiveness of chemical dispersants applied to viscous U.S. Outer Continental Shelf (OCS) crude oils from the Gulf of Mexico and Pacific.

The next set of tests conducted later that

week, addressed questions that had arisen during earlier test programs.

In past studies, laboratory-scale experiments were conducted at the SL Ross Environmental Research lab using the same dispersant and oil combinations that were tested at Ohmsett. These experiments were designed to determine if small-scale test results can be used to provide reasonable estimates of field performance. Results from the November, 2010 Ohmsett experiments will be used in an ongoing project to correlate the results of bench scale tests to one another. The mixed results suggest that few, if any, of the tests are representative of real-world situations.

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Valuable Dispersant Training Offered at Ohmsett

Spill response and emergency management personnel from the U.S. Coast Guard, government agencies and private industry gathered at Ohmsett November 9 & 10 to attend the Dispersant Training for the Oil Spill Responder course. This two-day training course emphasized experience in full-scale dispersant applications conducted at the Ohmsett facility using the Special Monitoring of Applied Response Technologies (SMART) Dispersant Monitoring Protocol and fluorometry methods. Instruction was provided by leading dispersant experts from SL Ross Environmental Research, Ltd., Ottawa, Canada. This was the second consecutive year the course was conducted at Ohmsett.

Classroom and hands-on training, led by Ken Trudel of SL Ross Environmental, focused primarily on practical experience dispersing oil slicks under near-at-sea conditions in the Ohmsett tank. Topics during the training included: interactions of oil, dispersants, seawater and waves; dispersant operations and coordination; SMART Protocol: principles, experience and advances; set-up and use of monitoring instruments; Ohmsett dispersant effectiveness protocol; effectiveness of skimmers after dispersant application; advances in dispersant knowledge; and experience in recent spills including lessons learned in the Deepwater Horizon spill.

Robert LeMay, an emergency management specialist for the National Energy Board in Calgary, Canada, when asked why he attended the course, replied "I wanted to gain more knowledge about dispersants as an oil countermeasure tool during oil spill response efforts." He went on to say "I had an understanding of oil properties which was definitely helpful to have for this high level course, however, I wanted to learn as much as possible about using dispersants as an oil countermeasure if and when we ever have a need to use them. The course manual is a great reference book that I am going over with a fine tooth comb."

On the tank, students observed instrumentation set-up and dispersant application runs using the SMART Protocol. The instrumentation used during training included the USCG Atlantic Strike Team's SMART instrumentation and software package, Turner C3 fluorometer, and the Ohmsett's laser-based



Spill response and emergency management personnel from around the U.S. and Canada attended the two-day Dispersant Training course that offered classroom instruction and hands-on tank training.

particle size analyzer.

"The tank exercises emphasized observing the visual signs of dispersant-oil interactions," said Trudel. "During the day and a half of tank work, we wanted to give the students a first-hand look at the dispersion of oil by breaking waves with and without dispersants."

Observing the application of dispersants

to oil on water was one of many reasons Brian Green, an offshore supervisor with Alaska Clean Seas, traveled to Ohmsett for this course. "The outside tank work was particularly informative. I wanted to see how well dispersants work with oil in water and witness environmental factors, including wind and waves, and their effect on dispersant efficiency," commented Green.

Dispersant Effectiveness

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In April, 2010 Heavy Oil Dispersion experiments were conducted using two dispersion application processes to examine the viscosity mechanisms that limit the effectiveness of dispersants. One process was to test the ability of applied dispersant to penetrate into the viscous oil in sufficient quantity to be effective before it is washed away in the dominant water phase. The other process was to test the internal visco-elasticity of the oil that may prevent the oil from being broken into small droplets. Results from these experiments confirmed that dispersant effectiveness is controlled by oil viscosity preventing the penetration of dispers-

ant into the oil where it could work. A second set of experiments conducted in November, 2010 was to confirm the methodology and results from the April, 2010 experiments. "We wanted to investigate two levels of the process; how to get the dispersant through the oil and how the internal elasticity of the oil prevents it from being broken into smaller droplets," said Joe Mullin, program manager, BOEM Oil Spill Response Research.

The information gained from these experiments, when applied to the use of chemical dispersants, will significantly enhance the effectiveness of oil spill response countermeasures.

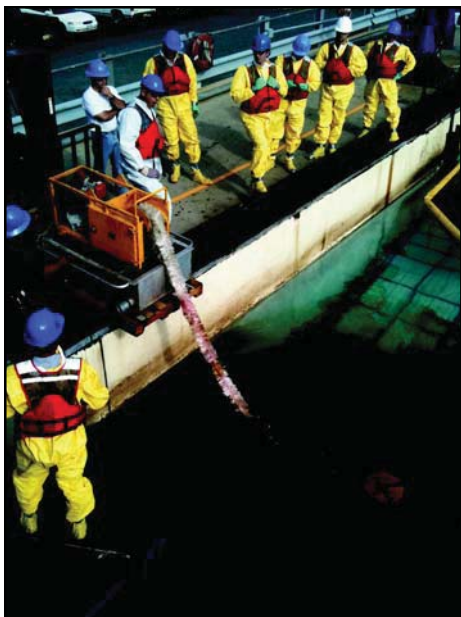
Training the Oil Spill Responder

Ohmsett provides a training venue for private companies to train their personnel

Light Oil Spill Response Course Introduces Current

Ocean Blue, LLC provided a three day training opportunity specific to the mining industry in September 2010 at Ohmsett. In attendance were response personnel and management from The Pebble Limited Partnership, Hunter Dickinson Services Inc., and Niblack Project.

Training was geared toward providing new responders with intensive hands on deployment of various skimming devices and sorbents in light oils (diesel fuel and lube oil) in wave and river current conditions.



Training provided hands-on deployment of various skimming devices. Here students deploy a rope-mop skimmer.

The course began with a review of Ohmsett safety requirements and the requirements at a live oil spill incident. Also reviewed, were tactical objectives, Incident Command System (ICS) field organization and field government agency relations; all essential to a successful, safe initial response.

After the classroom instruction, task forces were assigned and Ohmsett tank exercises began. Students were required to

train as if at a real oil spill incident by conducting gas vapor monitoring and wearing the protection mandated for use during on-water oil spill response.

Training in the Ohmsett tank with light oil was designed to have students assemble, deploy, disassemble and decontaminate sorbents and skimmers in a variety of conditions, including calm water, various water heights and fast water with light oils.

"The sorbent training not only offered an opportunity to test the absorbent properties of sorbent materials, but also instruction on selecting the appropriate sorbent for the water condition," said Earl Rose, the instructor from OceanBlue LLC. Various sorbents used during the training included: Sorbent Boom, Sorbent Pads, Sorbent Sweep and Sorbent Roll.

The skimmer training allowed students to become proficient in the use of the rope-mop skimmer, Elastec smooth and grooved drum skimmers, and Crucial coated drum skimmer. On the final day of training students were required to assemble and deploy skimmers without instruction to ensure effectiveness of the training.

"Although Ohmsett is well known for its wave generating and advancing bridge capabilities, this training raised the bar by adding flowing current and cascade booming to more closely simulate river conditions," remarked Mr. Rose. "One reason Ohmsett is regarded as a highly successful training location, is the eagerness of the staff to support clients with new ideas and scientific expertise to constantly expand the capabilities of this unique facility."

Swift Water Spill Response

CHS Inc., a cooperative refiner located in Laurel, Montana, first came to Ohmsett last year to conduct Swift Water Spill Response training for their spill responders. In September 2010, members of the cooperative returned for another demanding training course that challenged the responders on the strategic deployment and placement of booms in order to capture the maximum amount of spilled oil.

The class was designed to provide students the opportunity for hands on oil recovery in the Ohmsett tank where different currents, eddies and velocities were created to simulate swift water conditions. "We get plenty of practice putting boom in the water but we never practice the oil recovery portion," said Brad Kimble, emergency response coordinator for CHS Laurel Refinery.

The course was led by Len Brown, president of Envirotech Nisku Inc. located in Alberta, Canada. Mr. Brown was able to bring his vast spill response experience and incorporate case studies into the training.

Highlights of the training included: river booming techniques, objectives, and strategies; skimmer design and operation; boom designs, deployment, anchoring and optimization; actual oil recovery in simulated open water conditions (calm and choppy water) and in simulated moving water conditions; oil behavior around boom and in currents; and oil herding with a boom.

"During the tank exercises, the emphasis was running the skimmers and recovering oil. The students were able to get their hands on the equipment and practice recovering oil," commented Kimble. "They were able to see how oil behaves and learn how to channel the oil to a calm spot for recovery.

"By the end of the week, it was clear to me that there is much to be learned in a class like this," said Kimble.



During the Swift Water Spill Response course, students practiced deploying a drum skimmer.

Corporate Oil Spill School

ConocoPhillips conducted their fourth Annual Corporate Oil Spill School training at Ohmsett September 27-29, 2010. This course consisted of classroom training and discussion, with hands-on training exercises and demonstrations in the Ohmsett tank.

During the training program students learned oil spill equipment set-up, operation, demobilization, and decontamination. The classroom portion of the course was conducted by ConocoPhillips, Clean Harbors Cooperative (CHC) and Marine Spill Response Corporation (MSRC) instructors and included topics such as booming and oil recovery strategies, shoreline cleanup, dispersants, oiled wildlife, spill response/incident management, and others.

In the Ohmsett tank, students participated in hands-on exercises using real oil with full-scale equipment provided by CHC and Ohmsett. This gave the students an opportunity to put to use the skimming and booming strategies they learned during the classroom portion of the training. "The ability to operate skimmers in the tank with and without waves really provides students with a greater appreciation for what it takes to recover oil in even small wave conditions," said Marty Cramer, emergency response coordinator for ConocoPhillips.

In conjunction with the three days of training at Ohmsett, students traveled to Linden, New Jersey to participate in two days of field activities at the ConocoPhillips Bayway Refinery and CHC facilities.

Advanced Oil Spill Response Training

In October 2010 Alaska Clean Seas (ACS) held two one-week advanced training sessions for experienced oil spill responders at Ohmsett, and assisted in field exercises with the Marine Spill Response Corporation (MSRC) New Jersey Responder which is home ported in Perth Amboy, NJ. ACS has been conducting training at Ohmsett for more than seven years.

"Our students at this class were members of the North Slope Spill Response Team, along with two field responders from the Alaska Department of Environmental Conservation (ADEC). Both ACS and MSRC are members of the Global Response Network and responded in support of the Mississippi Canyon 252 (Deep Water Horizon) oil spill in the Gulf of Mexico this spring and summer," said Chris Hall, training specialist for ACS. The Global Response Network is a collaboration of seven major oil industry funded spill response organizations which maximizes the effectiveness of oil spill response services world wide.

Each week students participated in classroom sessions and three days of skimmer exercises in the Ohmsett test tank. During the classroom portion of the program, students focused on all areas of spill response including fast-water inland spills, delta, offshore, river and land spills. The hands-on portion emphasized the students' participation in tank exercises, with oil, to reinforce what they learned in the classroom.

This year, in addition to the equipment they brought with them from the North Slope, ACS also used equipment from three vendors: Lamor, Elastec and Crucial, Inc. Each manufacturer's equipment exists in the ACS inventories at the North Slope. Students had an opportunity to assemble and operate these skimmers during on-tank exercises to collect oil in calm and harbor chop wave conditions.

After four days of Ohmsett training, the students traveled to MSRC in Perth Amboy, NJ to participate in an open water response equipment deployment exercise on board the New Jersey Responder.



Following classroom instruction, students gathered on the tank for hands-on training where they practiced recovering oil using full-scale equipment under conditions that simulate an actual oil spill.

Removal of Dielectric Fluids from the Marine Environment

During the week of April 12, 2010, M. Scott Miles, a researcher from Louisiana State University's (LSU) Department of Environmental Science (DES) came to Ohmsett to determine if conventional response tools (skimmers and dispersants) could be used for the removal of dielectric fluids from the marine environment. The dielectric fluids, which are used in wind turbine generators and on centralized electrical service platforms, are typically a mineral oil

but can also be vegetable based oils.

The LSU research at Ohmsett, funded by the Bureau of Ocean Energy Management, Regulation, and Enforcement (BOEM), determined the dispersibility of dielectric insulating fluid using COREXIT® 9500 and the capabilities and limitations of conventional response tools, namely oleophilic skimmers.

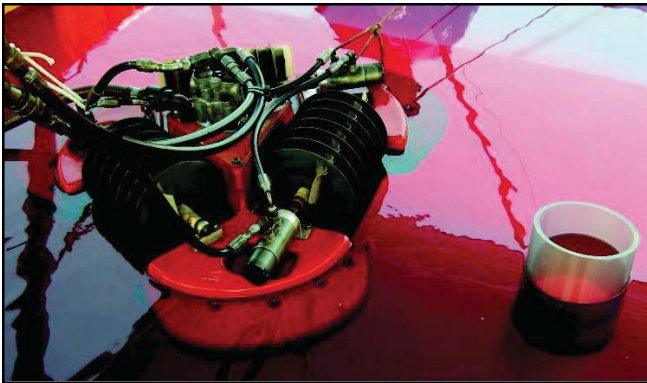
Full scale dispersant testing was conducted in Ohmsett's test tank, while mechanical recovery testing was conducted on the deck of the main tank using three types of oleophilic skimmers: drum, disc, and rope-mop. The mechanical recovery tests were conducted using Midel 7131 dielectric fluid (which was dyed red for visibility) and two comparison oils, Hydrocal (a medium viscosity lube stock) and diesel.

Using the American Society for Testing and Materials (ASTM) F 2709-08 - Standard Test Method for

Determining Nameplate Recovery Rate of Stationary Oil Skimmer Systems protocol, Oil Recovery Rate (ORR) and Recovery Efficiency (RE) were quantified for each of the three test oils using each of the three skimmers.

The second phase included two dispersant tests. COREXIT® 9500 dispersant was sprayed on the dielectric oil slick as waves began breaking in the tank. Dispersion was rapid throughout the slick. After dispersant was applied to the entire slick, the main bridge was brought to a stop, then run back in the direction of the slick so a LISST 100 particle size analyzer could record data on oil drop size and in-water oil concentrations. These measurements were made to confirm the presence of oil in the water column, to characterize the oil drop size distribution, and to determine the dispersibility of the Midel dielectric fluid.

The results from this project will aid in the development of spill response policies and decision-making of federal and state agencies when dealing with accidental releases of dielectric insulating fluids in the marine environment.



Dielectric fluid was dyed red for visibility during the mechanical recovery portion of the test.

Intern Visits Ohmsett for Research Project

Each year, outstanding engineering students are selected by industry and non-governmental organizations to participate in the Washington Internships for Students of Engineering (WISE) program, in Washington, D.C. During the nine week program, interns meet with leaders in the Congress and the Administration, industry, and organizations to research the public policy process, including how government officials make decisions on complex technological issues and how engineers can contribute to legislative and regulatory public policy decisions. At the end of the program, the students present their findings and provide their recommendations.

As part of this research process, WISE intern Hattie Larson and members of her sponsor organization, ASTM International, came to Ohmsett on July 16, 2010 to tour the facility and learn about the innovative oil



ASTM sponsored intern, Hattie Larson visited the on-site oil/water lab during the facility tour.

spill technology testing, training and research conducted at the facility. Accompanying Larson were members from ASTM International: James Olshefsky, director of External Relations and Academic Outreach; Jeff Adkins, manager of Committee F20 on Hazardous Substances and Oil Spill Response; and Anthony Quinn, director, Public Policy and International Trade.

With the recent spill in the Gulf of Mexico, Larson came with questions about the oil spill technology currently being tested and used in spill recovery operations. Her public policy topic and paper covers oil spill response technologies; specifically, dispersant use during oil spill response operations, and how they affect policy and regulation changes in Washington.

Ohmsett Mechanical Engineer Paul Meyer gave a presentation on the recent testing

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News Briefs

PARI Representatives Tour Ohmsett

On Friday, July 16, 2010 Dr. Tetsuya Shiraishi, and Dr. Ismau Fujita, from Japan's Port and Airport Research Institute (PARI) arrived at Ohmsett to tour the facility and learn about the innovative spill technology testing and research being conducted here. Dr. Shiraishi is the Director of the Construction and Control System Department at PARI and Dr. Fujita is the head of the Oil



Ohmsett engineer Paul Meyer and the PARI representatives Tetsuya Shiraishi and Ismau Fujita tour the Ohmsett tank.

Spill Response & Multiphase Flow Dynamic for the PARI Oil Spill Response Group.

PARI is an independent administrative research institution. One of PARI's areas of research include the Simulation Tank for Oil Recovery in Marine Situations (STORMS), an indoor salt-water test tank designed for the research and development of oil spill science and response engineering. It is the only one of its kind in Japan.

Ohmsett Mechanical Engineer Paul Meyer gave a presentation on the recent testing and research conducted at the facility.

After the presentation, Meyer provided Dr. Shiraishi and Dr. Fujita a tour of the facility which included the on-site oil/water lab. There, Ohmsett Senior Test Engineer, Alan Guarino talked about the oils and dispersants used during research experiments conducted at Ohmsett.

"It was a very productive visit," Dr. Shiraishi commented. "The guided tour in Ohmsett was really informative and helpful for our studies."

Clean Gulf Conference 20th Anniversary

On October 19 and 20, 2010 Ohmsett staff attended the Clean Gulf Conference and Exhibition in Tampa, FL where more than 2,700 oil spill professionals participated in various workshops, keynotes and general sessions covering topics such as emergency response, prevention and response technologies. This year Clean Gulf celebrated 20 years as North America's largest oil spill response event for operators, responders and regulators.

The keynote address was presented by RADM Mary Landry from the U.S. Coast Guard, Deputy Director Walter D. Cruickshank, PhD. from the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEM), and Michael J. Utsler, chief operating officer of BP Gulf Coast Restoration Organization. The focus was on the Deepwater Horizon incident and response efforts.

The keynote was followed by a session moderated by Phil Wieczynski, chief of the Bureau of Emergency Response, Florida Department of Environmental Protection. The session covered the lessons learned so far on the Deepwater Horizon incident.

During the exhibition, companies displayed their products and services. Ohmsett had a booth on the exhibit floor where delegates could familiarize themselves with the latest spill response testing and research. The X-PRIZE Foundation team was there as well to talk about the Wendy Schmidt Oil Spill Cleanup X CHALLENGE; which caught the attention of many manufacturers and inventors who are interested in entering the competition.

The Deepwater Horizon incident spurred many ideas from around the world; many of which were used during the response efforts. The Clean Gulf Conference provided the spill industry a forum to share the lessons learned and presented the delegates with an opportunity to exchange ideas and information.

Intern Visits Ohmsett

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and research conducted at the facility. Of particular interest to the group, was the series of skimmer tests conducted at Ohmsett using the new ASTM Standard Test Method for Determining Nameplate Recovery Rate of Stationary Oil Skimmer Systems, as well as the recent chemical herding agent and dispersant research.

After the presentation, Meyer conducted a tour of the facility which included the on-site oil/water lab. There, Ohmsett Senior Test Engineer Alan Guarino talked about the oils and dispersants used during research experiments conducted at Ohmsett.

"I am extremely appreciative for all the questions and information that you all were able to give me," Larson said. "It will definitely be an asset to my paper." The public

policy paper was presented to society members as well as people she interacted with throughout her research on August 4, 2010 at the Capital Visitor Center in Washington, D.C.

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*Editor & Graphics Jane Delgado
Technical Editors Dave DeVitis,
..... Alan Guarino, Paul Meyer,
..... Susan Cunneff*

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Ohmsett Facility
MAR, Incorporated
PO Box 473
Atlantic Highlands, NJ 07716
(732) 866-7183