

THE NAVY'S ENERGY & ENVIRONMENTAL MAGAZINE

Currents

summer 2013



CNO Recognizes Award Winners for
EXCEPTIONAL ENVIRONMENTAL
STEWARDSHIP

Fleet Launches Aircraft Energy-Saving Initiatives
Mitigating Noise from Open Detonations at China Lake
FRCSE Saves Time & Money Locating Potential Aircraft Fuel Leaks



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Currents

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The Fiscal Year 2012 Chief of Naval Operations Environmental Awards competition honored various Navy ships, installations, individuals, and teams for environmental excellence including the Cultural Resources Management Team at Naval Support Activity Monterey, California. This team renovated elements in the Hotel Del Monte Historic District, the Roman Plunge Pool, and adjacent Solarium to reflect the original 1918 aesthetic in consultation with the local historic society.

Victoria Taber

CNO Environmental Awards Recognize Exceptional Stewardship

Achievements Demonstrate the Navy's Commitment to Protecting the Environment

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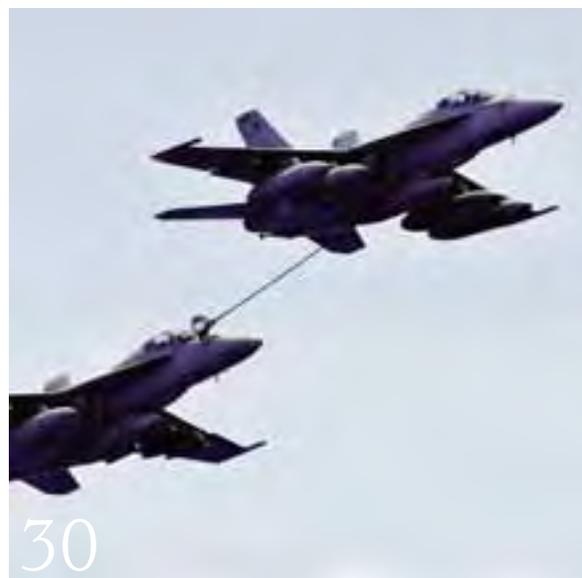
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Facing Furlough—With the Long View in Mind

WELCOME TO THE summer 2013 issue of *Currents*. Amid the heat and humidity here in Washington, DC, we're working through tough budgeting issues—as are other federal agencies—while continuing to press forward on matters of great concern for Navy readiness. Happily, I do have some progress to report, so I'll touch briefly on furlough impacts and then describe energy and environmental efforts that have been a focal point over the past few months.

There's no doubt that the civilian furlough has been a hurdle, as our organization depends on a highly skilled, largely civilian workforce. We're currently into our fourth furlough week, and while it has caused some challenges, I've frankly been very impressed with the professionalism of the team as we've worked to overcome those challenges. There have been times when having key members of the team out of the office has forced us to reprioritize meetings and adjust schedules to manage impacts. As difficult as furlough and related budget issues are for our people and programs in the short term, it's important to maintain a "long view" perspective.

With that in mind, we continue working hard to influence Navy-wide culture regarding energy consumption and the need for increased efficiency in our platforms, systems, and facilities. An example of the type of culture change that sets the bar for transforming behavior Navy-wide is safety. Over the past 30 years, safety has become a top priority for our Sailors and workforce, and is addressed in nearly all aspects of Navy training. We are working to incorporate this same level of Navy-wide awareness for energy. In the future, new recruits at boot camp and new officers at officer candidate school or officer indoctrination school should learn the basics of why energy should be a priority, and then later learn about energy conservation and efficiency topics more specific to their jobs. For example, a surface warfare officer would be exposed to smart voyage planning technology, energy-efficient plant operations, and other approaches that could conserve fuel when mission requirements make it feasible to do so.

We've begun energy education initiatives for senior Navy executives and flag officers. On July 14–19, the Naval Postgraduate School (NPS) hosted the first Secretary of the

Navy (SECNAV) Energy Executive Education seminar in Monterey, CA. The Deputy Chief of Naval Operations for Fleet Readiness and Logistics (N4), our Navy Energy Coordination Office, and the Office of the Deputy Assistant Secretary of the Navy for Energy worked



closely with NPS to develop the curriculum. The seminar's overarching purpose was to increase awareness of energy as both a capability and a vulnerability. We'll be interested in participants' feedback, and are planning a second offering in September.

This past June, the Defense Logistics Agency (DLA) hosted a tabletop exercise highlighting vulnerabilities we might face delivering fuel to the fleet in an operational environment. Participants included representatives from OPNAV N41 (Supply, Ordnance and Logistics), OPNAV N42 (Strategic Mobility and Combat Logistics), and my office. We will incorporate lessons learned from the DLA exercise into a logistics war game we're scheduling in the November timeframe. This exercise will center on the theme of "fighting hurt," a focus area for N4, and will explore vulnerabilities from fuel and other logistics supply chain items such as ordnance. It will challenge the assumption that these supplies will be delivered when and wherever needed, highlighting significant risks to our operations if those logistics chains are disrupted.

In our at-sea environmental planning, the Atlantic Fleet Training and Testing and Hawaii-Southern California Training and Testing efforts remain a top priority. We anticipate releasing final Environmental Impact Statements at the end of August and remain on track for new Marine Mammal Protection Act and Endangered Species Act authorizations to be issued by January 2014, ensuring continuation of vital training and testing activities in these areas.

Additionally, two scientific papers were released in July, summarizing preliminary results of Navy-funded studies in

which 17 blue whales and two beaked whales were tracked using passive listening systems and digital data tags (temporarily attached to the animals) to study reactions to simulated sonar and other sounds. The results varied, but suggested that some animals reacted to the sounds—and some didn’t—based on the types of activities they were engaged in during the exposures.

In the July 8–12 timeframe, a Navy-funded research team worked with the USS Dewey (DDG-105) to conduct the first-ever controlled exposure experiment using our real-time tactical mid-frequency active sonar as the sound source. A second controlled exposure experiment took place with USS Cape St. George (CG-71) from July 28–30. The team tagged six marine mammals (two blue whales, two Risso’s dolphins, a fin whale, and a Cuvier’s beaked whale) off Southern California and conducted a series of successful sound exposures. Data from these studies and other research will be considered as part of our ongoing adaptive management process with the National Marine Fisheries Service.

Annually since 1994, we have recognized winners of the Chief of Naval Operations (CNO) Environmental Awards in a ceremony in Washington, DC. This year due to fiscal challenges, we considered canceling the ceremony. However, Admiral Greenert wanted to ensure that the winners were recognized for their outstanding achievements, so we conducted the event via video teleconference on July 11. Winners dialed in from 15 locations around the U.S. and overseas for a “virtual” ceremony with CNO, Vice Admiral Cullom (N4), and myself. Participants at the Pentagon included John Conger (Acting Deputy Under Secretary of Defense for Installations and Environment); Roger Natsuhara (Principal Deputy Assistant Secretary of the Navy for Energy, Installations and Environment); Don Schregardus (Deputy Assistant Secretary of the Navy for Environment); Ralph Cantral, Director of the Coastal America Partnership and Senior Advisor to the National Oceanic and Atmospheric Administration; and Allison Schutes, Trash Free Seas Coordinator for the Ocean Conservancy. In addition to saving significant travel dollars, the event was still effective in enabling the CNO to personally thank each of the winning teams for their efforts. For more information about the awards, please see this issue’s cover story on page 6.

In the area of readiness sustainment and compatibility, we continue to work with the Department of Defense

(DoD) Siting Clearinghouse, SECNAV staff, the Fleets, and Chief of Naval Installations Command (CNIC) to review proposed renewable energy development projects to reduce the potential for interference with the Navy mission. One project under review is

a proposed wind farm offshore of Oahu, where we have a key training area. We’ve been meeting with the Bureau of Ocean Energy Management, DoD and Navy stakeholders to identify alternate areas around Oahu that could accommodate future wind energy development that would not interfere with critical Navy and Marine Corps training.

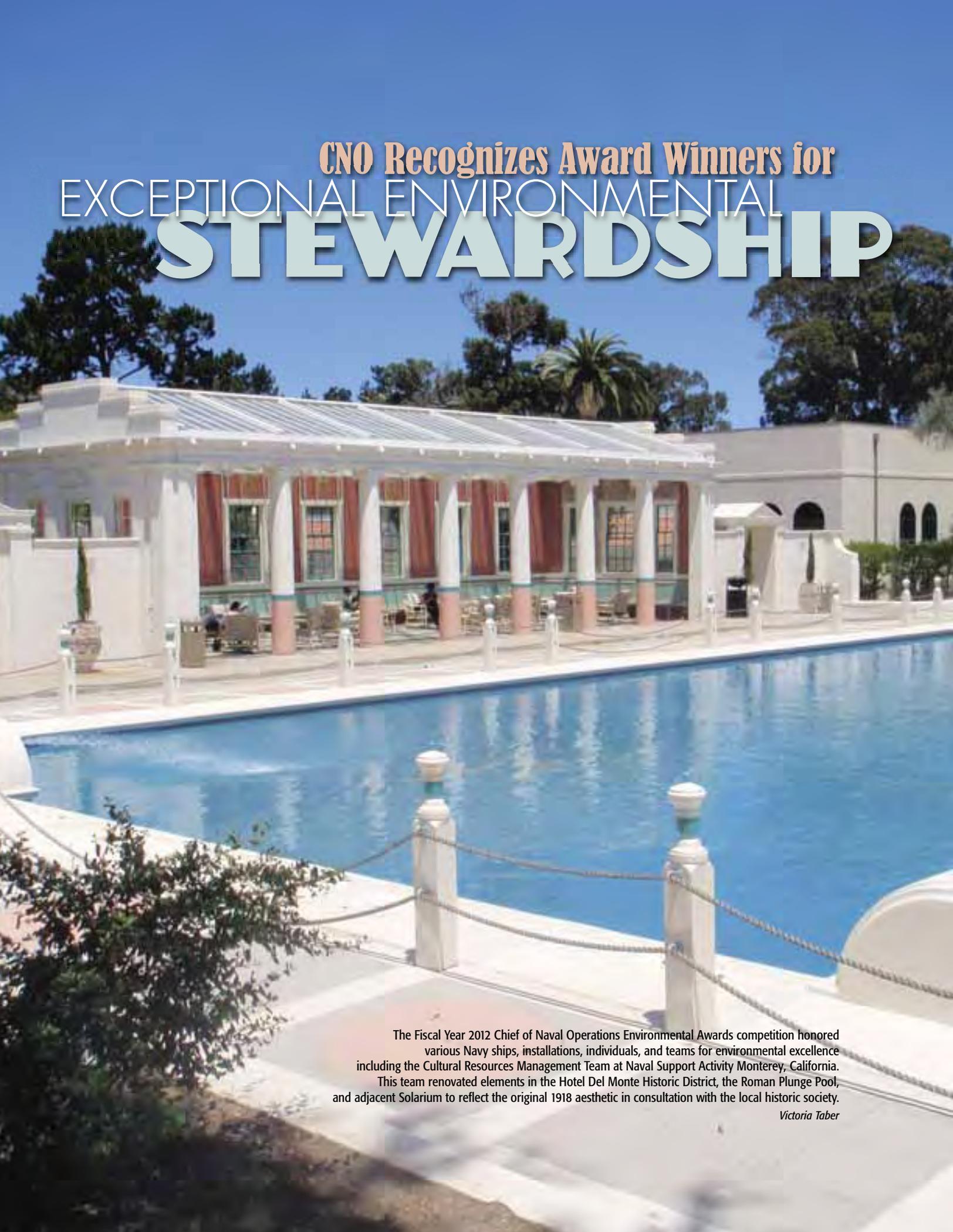
We are also in the process of revising the 2007 CNO encroachment management program instruction (11010.40) to reflect issues that have intensified over the six years since the instruction was released, including mission compatibility of buildings and other types of development; renewable energy impacts; foreign investment around our facilities and training areas; and other emerging encroachment issues. Because these will be major revisions, we’re incorporating additional opportunities for key stakeholders (CNIC, the Naval Facilities Engineering Command, and the Fleets) to provide input before finalizing.

Finally, we are taking steps to help communities, private industry, and government entities access information to assist them in making decisions about siting renewable energy projects. We have launched a new page at <http://greenfleet.dodlive.mil/rsc/>, where we’re posting maps that show compatible standoff distances from Navy facilities and related contact information. We’ll be adding new content to that page in the coming months, so check it periodically for updates.

I hope our Navy team, and the many federal and non-federal professionals with whom we interface and who are affected by the furlough, will maintain the positive mindset I’ve seen to date and continue to focus on the long view. Thank you for your interest in and continued support of the Navy’s energy and environmental initiatives. ⚓

Rear Admiral Kevin R. Slates
 Director, Chief of Naval Operations Energy and
 Environmental Readiness Division



A large, ornate swimming pool with a white building in the background. The building has a white facade with red and blue accents. The pool is surrounded by a white deck with a rope railing. The sky is blue and there are trees in the background.

CNO Recognizes Award Winners for EXCEPTIONAL ENVIRONMENTAL STEWARDSHIP

The Fiscal Year 2012 Chief of Naval Operations Environmental Awards competition honored various Navy ships, installations, individuals, and teams for environmental excellence including the Cultural Resources Management Team at Naval Support Activity Monterey, California. This team renovated elements in the Hotel Del Monte Historic District, the Roman Plunge Pool, and adjacent Solarium to reflect the original 1918 aesthetic in consultation with the local historic society.

Victoria Taber

ACHIEVEMENTS DEMONSTRATE THE NAVY'S COMMITMENT TO PROTECTING THE ENVIRONMENT WHILE CARRYING OUT NATIONAL DEFENSE MISSION

Thirty winners have been announced for the Fiscal Year (FY) 2012 Chief of Naval Operations (CNO) Environmental Awards competition. The annual program honors Navy ships, installations, individuals, and teams for environmental excellence.

This year's winners understand that environmental stewardship is INTEGRAL to the mission.

—Rear Admiral Kevin Slates

For the FY 2012 competition, Navy commands from around the globe submitted nominations for consideration in 11 award categories: natural resources conservation (large installation), cultural resources management, (installation and individual/team), environmental quality (industrial installation, overseas installation, and small ship),

sustainability (non-industrial installation and individual/team), environmental restoration (installation), environmental excellence in weapon system acquisition, small program (individual/team), and environmental planning (team).

Subject matter experts from the Navy and non-government organizations judged the nominations on accomplishments from 1 October 2010 through 30 September 2012.

“This year's winners understand that environmental stewardship is integral to the mission,” said Rear Admiral Kevin Slates, director of the Navy's Energy and Environmental Readiness division. “Their initiatives afloat and ashore supported Navy readiness by reducing operational constraints, strengthening community relationships, and helping sustain the resources we need to accomplish our mission—today and in the future.”

This article highlights the environmental accomplishments of the FY 2012 winners.

THE AWARDS PROCESS

The CNO Environmental Awards are the first step in a three-part competition within the Department of Defense (DoD). Winners at the CNO level become nominees, along with Marine Corps nominees, at the Secretary of the Navy (SECNAV) level of competition. With the exception of the small ship and environmental planning categories, which have no equivalent at the Secretary of Defense (SECDEF) level, winners at the SECNAV level become nominees at the SECDEF level of competition.

Congratulations to the Navy and Marine Corps winners of the 2013 SECDEF Environmental Awards competition:

- Naval Base Coronado, California (Natural Resources Conservation, Large Installation)
- Marine Corps Air Station Beaufort, South Carolina (Cultural Resources Management, Installation)
- Ms. June Noelani Cleghorn, Marine Corps Base, Hawaii (Cultural Resources Management, Individual/Team)
- Marine Corps Base Camp Smedley D. Butler, Japan (Environmental Quality, Overseas Installation)

Cattails were removed and the water supply line was replaced during Domonoske Pond restoration on the Dixie Valley Electronic Warfare Range. This pond contains bass and sunfish and the area is open to the public for fishing and camping.



NATURAL RESOURCES CONSERVATION

The Natural Resources Conservation awards recognize efforts to promote the conservation of natural resources, including the identification, protection, and restoration of biological resources and habitats; the sound management and use of the land and its resources; and the promotion of the conservation ethic.

mutually beneficial goals; implementing ecosystem enhancements and invasive species control efforts for several ponds at the Dixie Valley Training Range to enable sensitive species, such as the Dixie Valley tui chub (a unique fish species), to thrive with less threat of predation; installing bat-compatible gates to abandoned mines

LARGE INSTALLATION

Naval Air Station Fallon, Nevada

The primary objective of the natural resource management program at Naval Air Station (NAS) Fallon is integrated stewardship to ensure that the military mission is accomplished and resources are available for present and future generations.

NAS Fallon's environmental initiatives included establishing partnerships with stakeholders to accomplish

Custom-designed gates were installed on different types of mine openings, including on Training Range B-19. The metal gates were installed on abandoned mines to protect the bat habitat and keep people out of the unsafe mines. Bats use these mines as maternity roosts and for hibernating.



at Training Ranges 17 and 19 to protect military personnel and provide safe habitat for bats; and actively participating in public outreach events, such as Earth Day, National Recycling Day, guided tours, and tree plantings, to inform the community about NAS Fallon's conservation efforts.

Naval Base Coronado, California

Using an ecosystem management approach, Naval Base Coronado's (NBC), natural resources program successfully manages 31 federally listed species of plants, animals, and their habitats—one of the highest concentrations on DoD lands—in a manner that is compatible with military operations.

NBC's proactive management efforts achieved sustained increases in population numbers of multiple species, including six federally listed plants slated for down-listing; the San Clemente Island loggerhead shrike population, numbers for which are supportive of down- or de-listing; the island night lizard, which is being considered for delisting; and the San Clemente Island fox species, which has rebounded to the highest numbers ever recorded on the island. Other accomplishments include partnering with state government to help protect the nesting grounds of the endangered California Least Tern and Western Snowy Plover birds, and developing a successful San Clemente Island fox management and natural resource compliance and outreach program (including DVDs, signs and brochures).

Western Snowy Plover.
T.A. Blake, USFWS



The San Clemente Island fox was listed by the U.S. Fish and Wildlife Service (USFWS) on four of the eight Channel Islands, but it was not listed on San Clemente Island due to proactive management by the Navy. In 2012, NBC successfully transferred three injured/orphaned island foxes to California zoos to support education and research for this unique species.

M. Booker



Naval Base Coronado's natural resources program successfully manages 31 federally listed species of plants, animals, and their habitats—one of the **HIGHEST** concentrations on DoD lands.

Naval Base Ventura County, California

The natural resources conservation program at Naval Base Ventura County (NBVC) developed and implemented three Integrated Natural Resource Management

Giant coreopsis in bloom on San Nicolas Island. Through partnerships with universities and cooperating agencies, San Nicolas Island is the site of several long-term monitoring projects including the federally endangered black abalone.

Francesca Ferrara



Plans as the basis for managing the natural resources at NBVC's three operating facilities: Point Mugu, Port Hueneme, and San Nicolas Island. Point Mugu Lagoon provides a habitat for six federally listed species and San Nicolas Island is home to three federally listed threatened and endangered species.



A federally endangered adult California Least Tern incubating a nest at NBVC Point Mugu. A colonial nesting species, California Least Terns return to beaches on base each year during the breeding season. The colony at Point Mugu is one of the five largest in the state, making it an important element in the survival and recovery of the species.

Francesca Ferrara

NBVC coordinates with tenant commands to carry out several environmental initiatives, including a marine mammal program, endangered species monitoring and habitat restoration, long-term bird community surveys, climate change/sea level rise studies, bird aircraft strike hazard and raptor relocation programs, and renovations to the San Nicolas Island nursery compound—which has been developing native plant stock to be used for erosion control, restoration projects, and habitat for listed species.

Carrying the portable shrine (called a Mikoshi) is a traditional event in Japanese society. CFAY has participated in this annual ritual for 40 years. The Mikoshi shrine will be carried upon the shoulders of DoD military and civilian personnel from downtown Yokosuka onto the Yokosuka Naval Complex.

Paul Long



CULTURAL RESOURCES MANAGEMENT

The Cultural Resources Management awards recognize efforts to promote Navy stewardship of cultural resources, including archaeological sites, historic built environment, and cultural landscapes, through cultural resources management initiatives and partnerships with stakeholders.

INSTALLATION

Commander, Fleet Activities Yokosuka, Japan

Commander, Fleet Activities Yokosuka (CFAY) recognizes cultural resources management as an integral part of host nation relations and its ability to successfully perform its mission. During the awards period, CFAY promoted cultural resources management and cross-cultural communication through extensive networking with local officials, professionals, private citizens, and organizations to convey cultural sensitivities and inspire mutual respect among military personnel and their Japanese hosts.

CFAY's efforts to preserve cultural assets include discovering assets and preserving them in place or donating them to local museums; giving base historical tours; indexing and cataloging cultural and historical assets; and campaigning to create awareness through local media and volunteer programs. Additionally, CFAY has preserved numerous non-military historical shrines, tombs, and archeological sites dating back to the Paleolithic era.

Commander, Fleet Activities Yokosuka has preserved numerous non-military HISTORICAL shrines, tombs, and archeological sites dating back to the Paleolithic era.

Naval Air Station Fallon, Nevada

NAS Fallon is home to the Navy's TOPGUN program and is the only Navy installation that provides advanced carrier air wing strike training. NAS Fallon's cultural resource manager is responsible for all archaeological and historical resources on the main station and ranges. In 2011 and 2012, NAS Fallon inventoried over 11,000 acres for archaeological resources and identified 196 archaeological sites, increasing the total number of sites at the installation by almost 50 percent to 621.

Historic preservation efforts continued with the evaluation of four historic structures for the National Register of Historic Places and a historic district on NAS Fallon's training ranges. Other initiatives include public outreach by presenting research papers at seven professional confer-



Tours of archaeological sites have been an effective means of promoting preservation at NAS Fallon. Military personnel gain an appreciation for archaeology that can only be gained by seeing sites first hand. Here, personnel tour "Hill 16," a Paleoarchaic site estimated to be 9,000 years old.



The Range B-16 control tracker building was constructed in 1960. Designed by the architectural firm of DeLongchamps and O'Brien, it and the B-16 spotting towers may be the only examples of military architecture designed by this firm. The structure is currently undergoing evaluation for listing on the National Register of Historic Places. Additional research is now underway to determine the significance of the architects' contribution to military architecture.

ences and public meetings, and collaborating with state agencies to install custom safety gates at 10 historic mines to ensure the closures were both bat-compatible and sensitive to the mines' historic integrity.

INDIVIDUAL OR TEAM

Former Naval Weapons Station Concord, California (Cultural Resources Management Team)

Naval Weapons Station (NWS) Concord was identified for closure in 2005 and the Navy is now proposing transfer of approximately 5,000 acres of NWS Concord to local agencies for redevelopment. Between December 2011 and August 2012, the Naval Facilities Engineering Command (NAVFAC) Headquarters Base Realignment and Closure Program Management Office successfully completed Native American Graves Protection and Repatriation Act (NAGPRA) consultation with Native American tribes regarding the former NWS Concord.

By developing and implementing a consultation plan based upon interest-based negotiation, sensitivity to tribal



Archaeological fieldwork underway at the former NWS Concord. To support the Navy's implementation of the NAGPRA plan of action, a Navy archaeologist and cultural resources manager oversaw the fieldwork. Three Native American specialists assisted in the identification of NAGPRA cultural items and properties of religious or cultural significance.



Prehistoric beads, similar to those depicted in this photo, were discovered during the 2012 fieldwork at the former NWS Concord. Typically comprised of shell or animal bone, these beads were used for trade and in ceremonies. Analysis of beads like these will assist in dating and interpretation of the archaeological sites.

histories and cultures, and a commitment to Navy mission, the team forged lasting trust and consensus with tribal stakeholders, finished the archaeological fieldwork on time and within budget, and conducted proactive communication that resulted in a NAGPRA plan of action. The team's efforts expedited the mission-critical schedule, realized cost-savings, and led to new, collaborative partnerships with three Native American tribes.

Mr. Lon Bulgrin, Naval Base Guam, Marianas

Naval Base Guam's (NBG) cultural resources management program aims to safeguard and manage irreplaceable cultural and historic assets and properties spanning 4,000 years of human history, while supporting mission requirements. As NBG's cultural resources manager, Mr. Bulgrin has developed working relationships with government and private agencies to ensure the proper management of more than 2,000 historical properties. He also advises stakeholders on conducting exercises on National Historic Landmarks



The barrel of a Model 88, 75-mm gun was discovered during trenching for the NBG wastewater system project upgrade. This WWII Japanese weapon served a dual role as an anti-aircraft and coast-defense gun. Mr. Bulgrin implemented standard operating procedures for its inadvertent discovery, which allowed the completion of the wastewater system upgrade without any further delays or additional costs to the Navy.



Mr. Bulgrin provided intensive support for numerous military exercises conducted throughout Joint Region Marianas. The Japanese WWII Air Administration Building is a contributing element to the North Field National Historic Landmark on Tinian, and was temporarily modified and used to simulate a terrorist compound during the Tempest Wind exercise. This exercise involved a variety of Special Forces, including Navy SEALs, Army Rangers, Delta operators, and elements of the Australian Air Special Service.

Lon Bulgrin

and using buildings of historic significance. Mr. Bulgrin's accomplishments include successfully completing upgrades to the NBG archaeological and historical collections, implementing standard operating procedures for the inadvertent discovery of a Japanese World War II (WWII) artillery, and completing the Historical American Engineering Record for the Ma'anot Reservoir, which will allow demolition of the structure and construction of new and efficient infrastructure that will provide water to Guam.

Naval Support Activity Monterey, California (Cultural Resources Management Team)

Naval Support Activity (NSA) Monterey is home to 15 tenants, including the Naval Research Laboratory Monterey, Fleet Numerical Meteorological and Oceanographic Center, and the Naval Postgraduate School. NSA Monterey's cultural resources management team implemented an Integrated Cultural Resources Management Plan to provide a framework and to ensure compliance with preservation laws while supporting mission requirements.

NSA Monterey's accomplishments include restoring the Roman Plunge and Solarium Complex, finalizing the Historic Building Maintenance Plan for Herrmann Hall, reusing historic cottages for command functions, meeting sustainability goals, and installing interpretative signage to enhance cultural resources.

Elements in the Hotel Del Monte Historic District, the Roman Plunge Pool, and adjacent Solarium were renovated in FY11/FY12 in consultation with the local historic society. The project, designed to reflect the original 1918 aesthetic, earned NSA Monterey a 2012 California Preservation Foundation Award for Restoration. The Roman Plunge area, used for command functions and Morale, Welfare, and Recreation events, is a prime example of adaptive reuse.

Jim McCord

Naval Base Guam's cultural resources management program aims to safeguard and manage IRREPLACEABLE cultural and historic assets and properties spanning 4,000 years of human history.



Guests at the luxurious Hotel Del Monte enjoyed recreation at the Roman Plunge in this circa 1918 photo. This photograph served as the basis for restoration of the structure. The original murals lining the solarium are evident and were used as a key design element in the restoration.

Historic photo courtesy of Pebble Beach Company





Fish passage impediments were removed from Beaver Creek to allow for the free movement of spawning salmon. As part of the final phase of the Beaver Creek project, a new bridge was installed that ensures the continued use of the road for operational purposes and allows free movement of fish throughout Beaver Creek.

ENVIRONMENTAL QUALITY

The Environmental Quality awards recognize efforts to ensure mission accomplishment and protection of human health through sound environmental practices in the areas of environmental planning, waste management, and safe drinking water.

INDUSTRIAL INSTALLATION

Fleet Logistics Center Puget Sound, Washington (Manchester Fuel Department)

The Fleet Logistics Center (FLC) Puget Sound Manchester Fuel Department provides bulk fuel, lubricants, and waste oil removal services to fleet forces in the Pacific Northwest. The fuel department established a unique Environmental Management System (EMS) that incorporates the entire workforce and organizations (operations, maintenance, security, engineering, environmental, quality assurance, and administration) to meet environmental goals.

Under the EMS, the fuel department developed innovations in spill response operations and pollution prevention/treatment; restored a salmon-bearing stream through natural resource infrastructure improvements and innova-

tive partnerships with stakeholders; and has led efforts throughout the northwest to convert lighting to Light Emitting Diodes (LED), significantly saving disposal, maintenance, and energy costs.

Biofuels for the Great Green Fleet demonstration were transferred from trucks to segregated barges before being blended and issued. A total of 972,000 gallons of blended fuel was provided.



The fuel department also supported the Navy's Great Green Fleet Demonstration initiative in July 2012 by accumulating (from commercial sources) and providing 972,000 gallons of 50/50 biofuel/traditional hydrocarbon blended fuel to the Rim of the Pacific 2012 exercise.

NWS Seal Beach supported the **SAFE** movement of over 43,000 tons of munitions during FY12.

Naval Weapons Station Seal Beach, California

NWS Seal Beach is home to some of the last remaining coastal wetlands and the Seal Beach National Wildlife Refuge. NWS Seal Beach created a fully integrated environmental review process, which improved compliance, streamlined execution, and identified environmental opportunities. Accomplishments during the awards period include reducing electricity usage and water consumption, increasing renewable energy, reducing compliance deficiencies by 80 percent, dramatically improving hazardous waste management, improving environmental training, and exceeding Executive Order sustainability goals in the areas of energy, water, and solid waste.



Robert Schallmann, NWS Seal Beach conservation manager, teaches third graders about wildlife on the installation and the Navy's environmental programs.

Edgar Espinoza



USS Milius (DDG 69) and USS Curts (FFG 38) conduct simultaneous ordnance operations at the NWS Seal Beach wharf. The base supported the safe movement of over 43,000 tons of munitions during FY12.

Gregg Smith

U.S. Naval Ship Repair Facility and Japan Regional Maintenance Center, Yokosuka, Japan

The U.S. Naval Ship Repair Facility and Japan Regional Maintenance Center (SRF-JRMC), located at Yokosuka and Sasebo, Japan, executes a comprehensive environmental program based on its EMS to mitigate negative operations impacts on the mission or Japan's natural resources. During the award period, SRF-JRMC implemented an "Energy Conservation Passport" program as part of continuing energy conservation efforts, and proactively executed solid waste recycling events in coordination with the Yokosuka qualified recycling program Office. Efforts collected over 20,000 pounds in a two-year period and decreased



The 2012 SRF-JRMC solid waste collection event generated 13,000 pounds of recyclable material, which were processed through the qualified recycling program. Profits from recycling were returned to CFAY tenants.

Keiichi Adachi

frequency of improper solid waste disposal findings. SRF-JRMC improved in-house wastewater treatment capability by partnering with Navy personnel to share information and test water treatment systems and utilized cross-functional EMS teams to improve environmental programs.

OVERSEAS INSTALLATION

Commander, Fleet Activities Sasebo, Japan

CFAS serves as a logistic support center for forward deployed units and visiting operational forces of the U.S. Pacific Fleet and its tenant activities. During the awards period, CFAS expanded its robust EMS program, increased solid waste diversion rates, and dramatically cut non-compliance deficiencies. CFAS made significant contributions to the DoD's recycling revenues, accounting for 4.3 percent of the DoD's \$14 million in recyclable revenue in FY10. CFAS also increased recycling education to the public and implemented programs to capture and recycle used oils, oily waste water, and cooking oils.



CFAS conducts numerous off base clean-up events such as the one at Shirahama Beach in April 2012. Engaging in these interactive projects with various local and prefectural organizations strengthens the installation's relationships with communities and our host nation partners. Over 200 bags of refuse were collected during this outreach event.

Thomas Smith

Navy Region Center Singapore

Navy Region Center, Singapore's (NRCS) environmental program plays an important role in maintaining compliance with U. S. environmental policy and applicable local laws and regulations, as well as enhancing the quality of life of the facility's population. Through continued efforts, NRCS fully evaluated all major and minor aspects of processes and developed/established 19 work processes, eight standard operating



CFAS converted 17.9 tons of used paint cans and oil drums from hazardous waste to scrap metal. Compaction reduces space required during transportation from the disposal center to the recycling center, resulting in fewer trips. This reduces fuel consumption and costs. Cost avoidance totaled \$30,789 and sales generated over \$9,000 annually for the recycling program.

Thomas Smith



NRCS performed a mosquito trapping study in FY12 with scientists from the Naval Medical Research Unit in Singapore and the Duke/National University of Singapore. The 11.5-week study compared which type of trap worked best for the different kinds of mosquitoes in Singapore and collected a total of 33,669 mosquitoes.

procedures, and 17 management procedures under the program.

With all the checks and balances implemented, the system continued to find ways to reduce operational impacts. NRCS effectively implemented environmental compliance programs, which received no notice of violations from local regulators. NRCS achieved EMS data transition goals into EMSWeb, completed a triennial major claimant environmental quality assessment with minimal findings, implemented an effective solid waste qualified recycling program, and conducted numerous training sessions to enhance NRCS' spill response capability.

U.S. Naval Support Activity Naples, Italy

In FY12, NSA Naples implemented and sustained a comprehensive EMS, which reflected the command's commitment to improving environmental program management. NSA Naples's environmental team conducted an EMS and compliance audit, which verified positive impacts on environmental compliance. The audit set a high standard for the development and implementation of innovative approaches to improving environmental protection, increasing base-wide environmental awareness, and ensuring compliance with applicable regulatory drivers.

NSA Naples's initiatives included implementing base-wide training to improve EMS and pollution prevention awareness; partnering with the base community to host an Earth Day event that had participation from 21 tenant commands (each sponsoring a booth focusing on "Partnering for a Greener Future"), decreasing energy consumption by one percent in FY12, and implementing innovative hazardous waste efforts to recycle 66 percent of hazardous waste materials, which resulted in savings of \$118,000 in waste disposal costs.

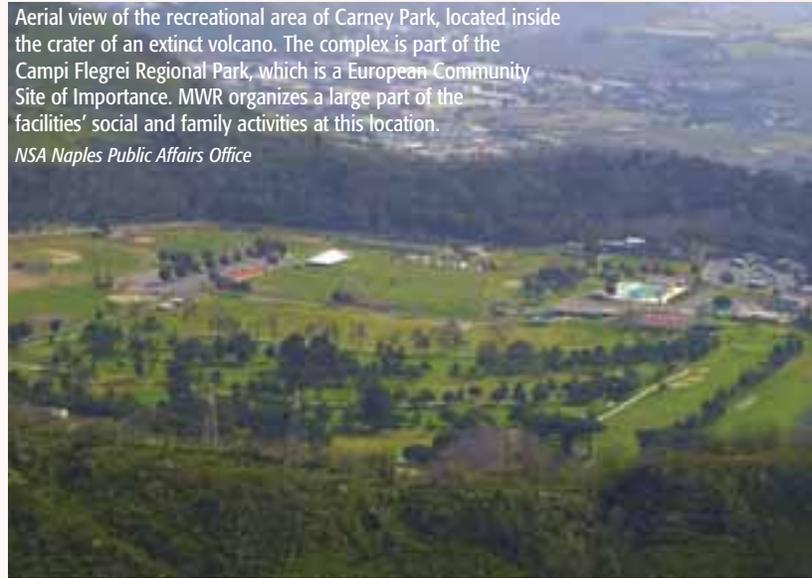
View of NSA Naples Capodichino with the Vesuvius volcano in the background. Capodichino is the operational facility where all base functions reside. It is adjacent to the Naples International Airport and has a dedicated area for its flight line.

NSA Naples Public Affairs Office

NSA Naples's initiatives included implementing **INNOVATIVE efforts to recycle 66 percent of hazardous waste materials, which resulted in savings of \$118,000 in waste disposal costs.**

Aerial view of the recreational area of Carney Park, located inside the crater of an extinct volcano. The complex is part of the Campi Flegrei Regional Park, which is a European Community Site of Importance. MWR organizes a large part of the facilities' social and family activities at this location.

NSA Naples Public Affairs Office



SMALL SHIP

USS Florida (SSGN 728)

Homeported at Naval Submarine Base Kings Bay, USS Florida (SSGN 728) is an Ohio-class guided missile submarine with a crew of about 160. Florida's hazardous material and atmosphere control programs have become a template for success in the Atlantic Fleet Submarine force after the programs scored above standards on its last three supply management inspections in FY12. The crew meticulously managed a 354 hazardous material/atmosphere contaminant control line item inventory to ensure 240 stock and work center inventories were properly executed and processed directly, resulting in a 50 percent decrease in expired and excess material. The crew also conducted over 24 environmental control program audits. Florida conducted over 1,100 hours of environmental awareness training for all crew members to maximize their attention and awareness.



A Sailor assigned to the Ohio-class guided-missile submarine USS Florida (SSGN 728) heaves a line ashore as the submarine arrives for a port visit on the island of Crete.

Paul Farley

USS Ford (FFG 54)

USS Ford (FFG 54) is a Pacific Northwest frigate with multifaceted mission capabilities and an environmental quality program that is a fundamental pillar of its operational mantra. All crew members are properly trained on protection and quality requirements to ensure the highest levels of environmental awareness and compliance. Ford's solid waste management program ensured all waste plastics,



Sailors assigned to the Ohio-class guided-missile submarine USS Florida (SSGN 728) conduct mooring operations as the submarine arrives for a port visit on the island of Crete.

Paul Farley



Gas Turbine System Technician Mechanical Fireman Recruit Podhradsky analyzes a sample of Ford's gas turbine engine oil to assure its quality during Ford's testing of the Naval Sea Systems Command (NAVSEA) HRF-76 biofuel.

glass, and metals, were processed and disposed of in accordance with current requirements. Also, the crew's dedication to minimizing environmental contamination was demonstrated when Ford's hazardous material program passed the stringent 2012 Supply Management Certification inspection standards. Other accomplishments include participating in the Navy's experimental biofuels program in March 2012, minimizing emission levels by maintaining equipment in peak operational condition, and employing continued use of the Protective Measures Assessment Protocol (PMAP) and Sonar Positional Reporting System to protect marine mammals and mitigate risks of endangering them.

USS Ford conducts a refueling-at-sea evolution in the Southern California Operations Area following the testing of the NAVSEA HRF-76 biofuel.



Engineman First Class Gabriel Mejia records observations of the 200-ton air conditioning plant. Careful observation of refrigeration systems parameters allows Momsen to take prompt action to protect the equipment and environment.

substance or oil spills; and conducted monthly inspections to ensure proper equipment was onboard and easily accessible in case of a spill. Finally, by operating in the most efficient configurations possible, Momsen minimized emissions, ensured maximum fuel efficiency, and reduced fuel consumption by as much as 10 percent per day.

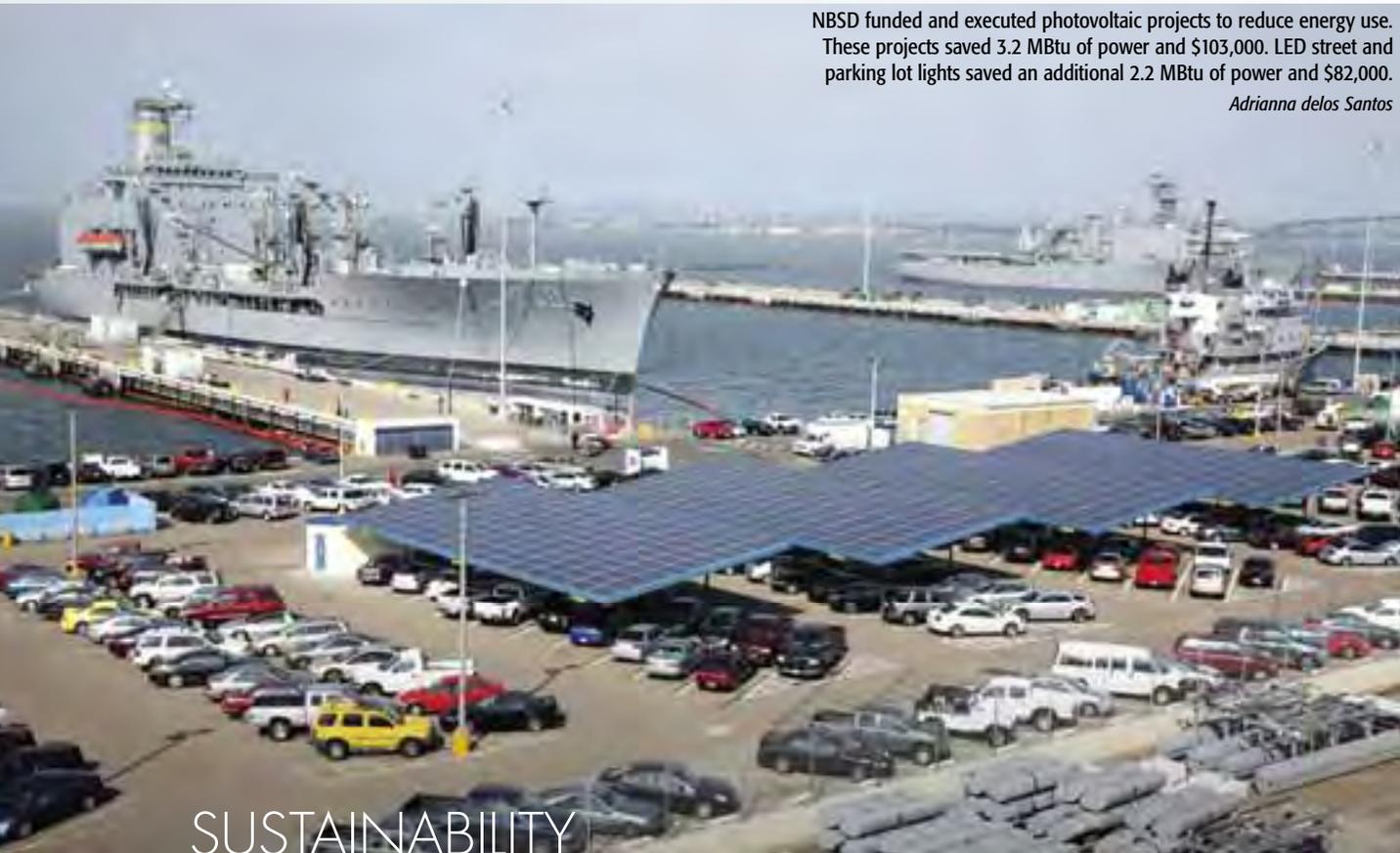
By operating in the most EFFICIENT configurations possible, Momsen reduced fuel consumption by as much as 10 percent per day.

USS Momsen (DDG 92)

Homeported in Everett, Washington, USS Momsen is a proactive steward of the environment. During the awards period, Momsen conducted crew training on environmental protection and spill response and monthly training on eco-friendly procedures for work and home. Momsen's crew implemented active recycling and refuse sorting techniques; maintained the oil/water separator in full operation to ensure liquid discharges were scrubbed of pollutants; employed pollution prevention measures to prevent hazardous

Gas Turbine Systems Technician Mechanical Third Class Jessica Isaza maintains the Oily Waste Separator. The Oily Waste Separator, a critical component of Momsen's environmental protection program, cleans water of hazardous oils before it is discharged. The crew's maintenance of the separator flow totalizer prevents environmental pollution from oily waste.





NBSD funded and executed photovoltaic projects to reduce energy use. These projects saved 3.2 MBtu of power and \$103,000. LED street and parking lot lights saved an additional 2.2 MBtu of power and \$82,000.

Adrianna delos Santos

SUSTAINABILITY

The Sustainability awards recognize efforts to prevent or eliminate pollution at the source through efficient and sustainable use of energy, water, raw materials, and other resources.

NON-INDUSTRIAL INSTALLATION

Naval Base San Diego, California

Naval Base San Diego (NBSD) is comprised of the wet and dry side naval base, Broadway Complex, Naval Medical Center San Diego, and Mission Gorge (Admiral Baker) Recreation Area. NBSD actively promotes an energy conservation culture on the installation and in the surrounding communities, and executes energy conservation and environmental compliance programs. In cooperation with stakeholders, NBSD hosts electronics recycling events to collect recyclable electronics and divert materials from hazardous waste landfills. During the awards period, NBSD's accomplishments include certifying an EMS program compliance with International Organization for Standardization (ISO) 14000 guidelines via external inspec-

tion team, which saved 3.2 Million British thermal units (MBtu) of power and \$103,000; diverting 44,879 tons of solid waste from landfill disposal, which represents a 71.4 percent overall diversion rate, and a disposal cost avoidance of \$942,000.

Naval Station Great Lakes, Illinois

As the single location for recruit training, Naval Station (NAVSTA) Great Lakes' mission is to develop men and women into highly skilled, disciplined and motivated Sailors for the fleet. NAVSTA Great Lakes accomplishments include reducing energy consumption by 29 percent, minimizing solid waste generation by increasing recycling by 114 percent in 2012 compared to 2011, and initiating an electronic collection and recycling event that resulted in the collection of over 8,000 pounds diverted from local landfills. NAVSTA Great Lakes also implemented progressive pollution prevention practices, which reduced regulated air emissions by 17,407 in 2011, a 21 percent reduction as a result of fuel substitutions, power plant process changes, and green construction. Finally, material substitutions have continued to reduce hazardous waste generation by 60



The green parts washer at NAVSTA Great Lakes' steam plant uses a biological solution to break down oils; therefore, these parts washers do not generate hazardous waste.

Cora Mata

percent from 2008 levels; and toxic wastewater concentration were reduced by 99 percent through incorporation of industry-leading dental wastewater treatment systems and use of best management practices.

Naval Base San Diego hosts electronics recycling events to collect **RECYCLABLE** electronics and divert materials from hazardous waste landfills.

Naval Support Activity Monterey, California

Despite being one of the smaller installations within the Navy, NSA Monterey is a leader in sustainable practices and conservation. The command has an energy working group that reviews and plans water and energy conservation projects. Working group members include the installation energy manager, utility and energy manager, and subject matter experts from the public works department. NSA Monterey's sustainability accomplishments during the awards period include decreasing potable water consumption by 35 percent, maintaining a 74 percent solid waste diversion rate with a construction and demolition waste diversion rate of over 95 percent, decreasing pesticides use by 60 percent compared to FY10, and reclaiming stormwater to provide 98 percent, or 8 million gallons, of irrigation for the main base.



Funding from DoD/National Public Lands Day provided the installation the opportunity to construct a pollination garden. With assistance from installation and community volunteers, 80 native plants and bushes were planted. Plants were selected based on input from the California Native Plant Society in hopes of attracting nocturnal moths.

Toni Wills

During the awards period, NAVSTA Great Lakes completed a project rerouting a section of the Skokie River to improve drainage performance upstream.

Craig Harley



INDIVIDUAL OR TEAM

Mr. Matthew Schreck, Fleet Readiness Center Southwest, California

Fleet Readiness Center Southwest (FRCSW) provides aviation maintenance, repair, and overhaul support to the U.S. and allied warfighters. To support this effort, FRCSW operates a multitude of industrial processes, including electro-



The C-2 and E-2 aircraft are maintained at FRCSW.

plating, painting, chemical cleaning and stripping, and jet engine testing, which utilize hazardous materials and generate hazardous wastes and emissions. Mr. Schreck, FRCSW's energy and water conservation manager, exemplifies the command's commitment to reduction of energy and water. He directly contributes to the mission by ensuring energy resources continue to be available by directly managing over \$10 million of investment funds. In total, Mr. Schreck saved over 17,820 MBtu of energy and over 120,000 gallons of water annually. Mr. Schreck's other accomplishments include increasing organizational energy security, successfully completing two dozen energy projects spanning a multitude of technologies and process types, and participating in public outreach programs.

Navy Region Center Singapore (Environmental Sustainment Team)

NRCS's environmental sustainment team uses checks and balances to continuously find ways to reduce operational impacts. The team's efforts continue to contribute to the command's strategic plan and improved command readiness. Significant accomplishments during the award period include effectively implementing environmental compli-

ance programs that received no Notice of Violations (NOV) from local regulators, achieving EMS data transition goals into EMSWeb, implementing an effective solid waste qualified recycling program, installing over 1,700 backflow preventer devices to ensure protection of water supply, conducting numerous training sessions and drills to enhanced spill response capability, and implementing an outreach program to local communities.



NRCS participated as one of 125 community partners to celebration Singapore World Water Day on 24 March 2012. More than 25,000 people participated at 15 locations island-wide.

The event was officiated by Singapore President Tony Tan Keng Yam and Dr. Vivian Balakrishnan from the Ministry of the Environmental and Water Resources, and others to raise awareness on the importance of caring for water and water sustainability.

Rear Admiral Thomas Carney and Captain Paul Foster were guests of honor and received a certificate of appreciation for NRCS' efforts and contribution to the event.

Latt Aung Zaw



NRCS and the base operating support contractor performed annual spill drill exercises to maintain response capability including a simulated spill in one of the warehouses on base. The responders are rated based on their job description (primary/cross-train), skills in containment, cleanup, and decontamination, response time, personal protective equipment selection, and their decision making process.

E-2 is the first carrier-based aircraft to test **NON-CHROMATE** primer on the entire aircraft exterior.

PMA-231 Environment, Safety, and Occupational Health Team, Maryland

Hawkeye, Advanced Hawkeye, and Greyhound Program Office (PMA-231) Environment, Safety, and Occupational Health (ESOH) Team has employed innovative, highly effective strategies resulting in the dramatic reduction of the environmental footprint of the E-2 platform. The team ensures effective ESOH integration into the development, manufacture, use, maintenance, and disposal of PMA-231 aircraft systems. E-2 is the first carrier-based aircraft to test non-chromate primer on the entire aircraft exterior.

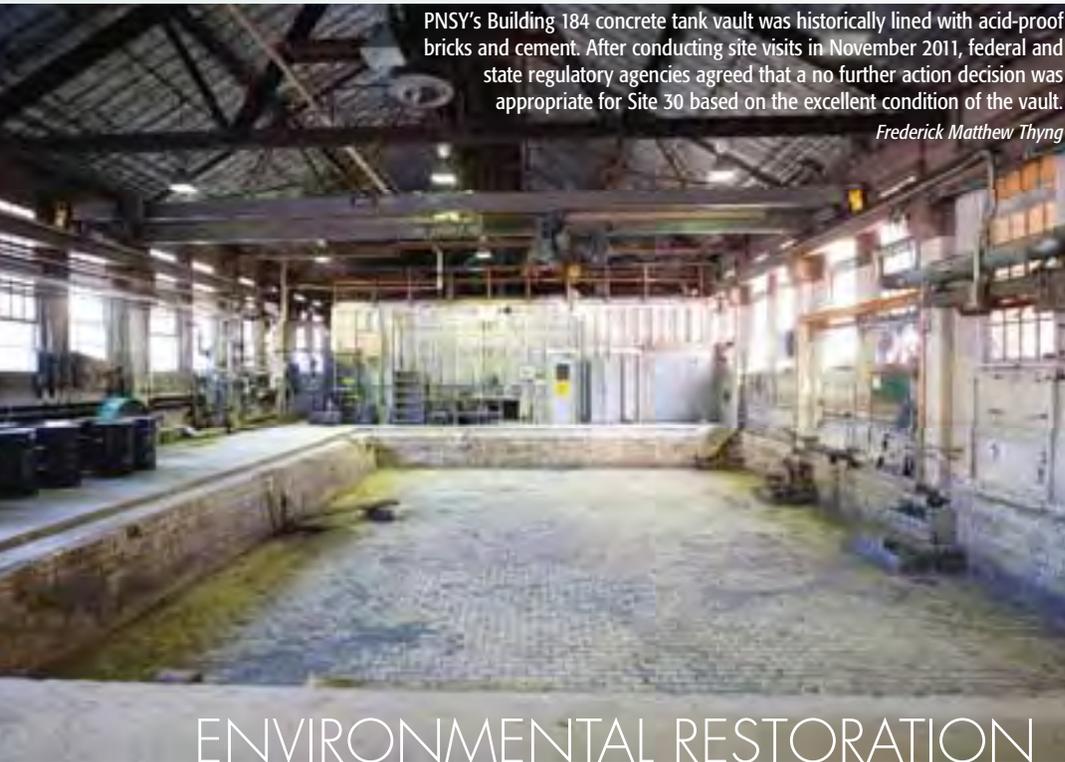
Several non-chromate primer E-2Cs successfully completed carrier deployments; post-cruise inspections concluded robust primer performance and confirmed “drop-in” maintainability. Pending continued demonstration success, non-chromate primer will be implemented on E-2/C-2 Fleet and E-2D production aircraft, avoiding lifetime use of over 20,000 pounds of chro-

mate primer. Other accomplishments include reducing energy consumption by 35 percent compared to the 2006 baseline through expansion of lighting management and building automation systems programs and reducing water usage by 185,000 gallons per year through the Saint Agnes Medical Center water conservation and quality program.



A plane director aboard Nimitz-class aircraft carrier USS Dwight D. Eisenhower (CVN 69) gives signals to the pilot of an E-2C Hawkeye to position the aircraft on the catapult. The current version of the Hawkeye, the E-2C, became operational in 1973, and surpassed one million flight hours in 2004. The aircraft has undergone several upgrades to its active and passive sensors, engines, and propellers.

MC2 Miguel Angel Contreras



PNSY's Building 184 concrete tank vault was historically lined with acid-proof bricks and cement. After conducting site visits in November 2011, federal and state regulatory agencies agreed that a no further action decision was appropriate for Site 30 based on the excellent condition of the vault.

Frederick Matthew Thyng

ENVIRONMENTAL RESTORATION

The Environmental Restoration awards recognize efforts to protect human health and the environment by cleaning up contamination from past activities at Navy sites in a timely, cost-efficient, and responsive manner.

INSTALLATION

Portsmouth Naval Shipyard, Maine

The Portsmouth Naval Shipyard (PNSY) has been challenged to accelerate the installation restoration (IR) program to achieve the goal of having all remedies in place by FY14. The PNSY IR program completed a removal action for a site located within a historic building, which will facilitate an energy and renovation project that will ultimately enable long-term adaptive reuse of the historic building. PNSY moved rapidly from project work plan development to remedial action completion for manual removal of 3,650 square feet of lead-contaminated soil located beneath a tidally-influenced building crawl space in a mission critical area. PNSY also partnered with academic researchers to provide sediments from offshore areas in the PNSY IR in support of two DoD Strategic Environmental Research and Development Program projects. Additionally, PNSY enhanced public outreach through quarterly Restoration Advisory Board (RAB) meetings, a community involvement plan update, and annual site management plan updates.

Naval Base Point Loma, California

The mission of Naval Base Point Loma (NBPL) is to enable and sustain readiness through reliable shore support while preserving the critical resources necessary to secure the future of our forces. NBPL has an active RAB that is in its third year. The RAB has ten active members, as well as Navy and regulatory agencies, and meets bi-monthly. NBPL is responsible for 1,869.5 acres of federal property, to include 37 IR program sites, 20 of which are open, and the remaining 17 sites are closed.

NBPL's accomplishments include phase two remedial investigation sampling and pilot

studies for ground water enhanced anaerobic bioremediation and soil vapor remediation (IR program sites 10 and 11); regulatory site closure with no further action for submarine base; continued long-term maintenance and



Anaerobic water, vegetable oil, and dehalococoides bacteria have been mixed and injected into the groundwater to remediate groundwater contamination. This is part of a pilot study using Enhanced Anaerobic Bioremediation at IRP sites 9 and 23. After injection is completed, the area is opened back up to traffic flow and parking, minimizing remediation impacts to the surrounding tenants.

Steve Blanchard

monitoring of native plant site restoration on three sites; and final focused feasibility study and proposed plan for Old Town campus IR sites 1 and 9. The combined efforts of NBPL personnel, local agencies, and citizens have produced significant environmental restoration achievements during this period and established a firm foundation for further achievements in the years to come.

Naval Base Point Loma's accomplishments include phase two remedial investigation sampling and pilot studies for ground water enhanced **ANAEROBIC** bioremediation and soil vapor remediation.



A Soil Vapor Extraction (SVE) system for remediation of contaminated soil vapors is tested at NBPL Old Town campus. SVE rapidly reduced contamination levels and demonstrated the effectiveness of an innovative technology at IR Sites 10 and 11.

Steve Blanchard

St. Juliens Creek Annex, Virginia

St. Juliens Creek Annex's (SJCA) environmental restoration program addresses both IR and munitions response program sites. Out of 59 potentially contaminated sites, only four IR sites and one munitions restoration site remain active in the SJCA environmental restoration program, two of which have their final remedies in place and only require land use controls and monitoring. SJCA's accomplishments include applying green remediation concepts that focus on material reuse and offsite disposal minimization; completing a removal action that ultimately returned 23 acres of land to the facility with unrestricted use; increasing RAB interest and meeting attendance; and completing the remedial action-construction phase with results indicating contaminants are now below the cleanup goal at 21 of the 30 monitoring wells.



Site restoration was performed at SJCA following completion of the excavation and backfilling components of the non-time-critical removal action conducted at IR Site 5. Site restoration included the replacement of the driveway to a building that is located adjacent to the site and repairing the asphalt along the portion of a road that was damaged from the haul truck traffic.



During the non-time critical removal action at SJCA IR Site 5, excavated soil and sediment were loaded from the materials handling area into a dump truck for offsite disposal after quality control and quality assurance activities confirmed that materials greater than 1-inch in diameter had been removed. A total of 32,960 tons of soil and sediment were transported and disposed of offsite.

Nathaniel Price

The T-45 Virtual Mission Training System program implemented polyurethane gaskets in the airborne upper and lower antenna hardware, which improved bonding between the aircraft and antenna, reduced corrosion, and eliminated the polysulfide sealant that contained hexavalent chromium.



ENVIRONMENTAL EXCELLENCE IN WEAPON SYSTEM ACQUISITION—SMALL PROGRAM

The Environmental Excellence in Weapon System Acquisition, Small Program awards recognize efforts to incorporate ESOH requirements into the weapon system acquisition program's system engineering, contracting, and decision-making processes.

INDIVIDUAL OR TEAM

NAVAIR 1.6 Programmatic Environment, Safety, and Occupational Health Evaluation Document Authoring Tool Team, Maryland

The mission of the Naval Air Systems Command (NAVAIR) Environmental Programs Department (AIR-1.0 Team) is to create environmental excellence by applying smartly designed processes and tools to help acquisition programs deliver systems that meet fleet operational needs with reduced ESOH constraints. The AIR-1.0 Team assists acquisition programs with cost-effective ESOH efforts using the Programmatic ESOH Evaluation (PESHE) Document Authoring Tool (DAT). The tool was deployed in 2007 to facilitate integration of ESOH requirements and risk management into systems engi-

neering and program decision-making. The web-based tool standardizes NAVAIR's ESOH risk-assessment process and development of PESHE documents. Modules provide the capability to manage program milestone events, develop ESOH risk mitigation plans, track identified hazards, and execute National Environmental Policy Act (NEPA) requirements.

Metric reporting features allow the AIR-1.0 Team to determine which hazards have the highest likelihood and consequence, analyze commonalities in environmental impacts across acquisition programs, plan for upcoming program milestones, and ensure proposed NEPA actions are completed on time.

A document archival feature allows users to upload their signed PESHE and NEPA documents into PESHE DAT. This is now NAVAIR's formal library of key ESOH documents. Automated and effective collaboration among program personnel and ESOH subject matter experts is achieved via the use of PESHE DAT, which facilitates document reviews and compliance to minimize ESOH risks to the users of NAVAIR acquisition systems.

An EA-6B Prowler stationed at NAS Whidbey Island prepares to land aboard the Nimitz-class aircraft carrier USS Abraham Lincoln (CVN 72).

Mass Communication Specialist Seaman Joshua E. Walters



ENVIRONMENTAL PLANNING

The Environmental Planning awards recognize outstanding environmental planning efforts that benefit the Navy, the environment, and the public at large.

TEAM

Northwest Training Range Complex, Washington (Environmental Impact Statement Team)

The Northwest Training Range Complex (NWTRC) EIS team completed a three-year EIS/OEIS project with the primary goal of sustaining critical Navy training and testing activities in the Pacific Northwest. The EIS/OEIS included extensive analysis of potential impacts to marine mammals. With deficiencies in existing data, it was necessary for the EIS team to proactively develop regional marine mammal density information to support the analysis effort. As part of an extensive outreach effort, the team participated in numerous meetings with the public, federally recognized tribes, and representatives from governmental agencies.

The team's openness and responsiveness created a more trusting climate between the Navy and the public and

improved public understanding of the Navy's mission and its strong focus on environmental stewardship. Navy environmental planners now have a better understanding of the public's issues and concerns in this area. The team's efforts ensured compliance with environmental laws and regulations, including NEPA, the Marine Mammal Protection Act, the Endangered Species Act (ESA), and the Coastal Zone Management Act, for current and future naval readiness activities in the NWTRC.

Aviation Ordnance men load sonobuoys before flight activities on a P-3C Orion stationed at NAS Whidbey Island.

MC2 Julian R. Moorefield



Atlantic Fleet Training and Testing Environmental Planning Team, Virginia

The U.S. Fleet Forces (USFF) Atlantic Fleet Training and Testing (AFTT) environmental planning team was assembled to develop an Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) to cover at-sea Navy activities off the east coast and Gulf of Mexico as part of Phase II of the Navy's Tactical Training Theater Assessment and Planning (TAP) program. Although many EIS/OEISs were developed for at-sea training activities as part of the first phase of the TAP program, AFTT presented new complexities.

The team's accomplishments include adding system command (SYSCOM) research, development, testing, and evaluation activities within the study area to the proposed action; including a suite of activities—previously covered in seven separate EISs—in a single EIS/OEIS; including ten times the number of acoustic sources covered previously; improving connectivity with the acquisition community to validate SYSCOM activities; and creating greater flexibility in permits to support ongoing, evolving mission requirements. USFF approached these challenges with a multifaceted strategy, building on lessons learned from TAP Phase I.

The AFTT team developed and successfully pioneered new processes and methodologies including an effective method of accounting for mitigation effectiveness in post-modeling analyses, significantly reducing overly conservative estimates of marine mammal takes; an innovative methodology of grouping sources, providing greater capacity to cover new and changing requirements while ensuring potential environmental impacts have

been thoroughly considered; and new PMAP requirements allowing for the AFTT-required mitigation measures to be implemented appropriately by both the fleets and SYSCOMs once promulgated.



Peter Hulton and Josh Fredrickerson (Naval Undersea Warfare Center), explain the Navy's Acoustics Effects Model at a public meeting for the AFTT EIS/OEIS in Providence, Rhode Island.

Silver Strand Training Complex, California (Environmental Impact Statement Project Team)

The SSTC is critical to Navy west coast naval amphibious, special warfare, and mine countermeasure training due to its proximity to military families.



California least tern eggs nesting on a SSTC beach area. The least tern is listed as endangered by both USFWS and under the California Endangered Species Act. More than half of the U.S. least tern breeding population is located within San Diego County.
Jenny Marshall



SEAL teams conduct Naval Special Warfare Training for clandestine over-the-beach assaults. This activity is an example of training conducted on both the oceanside boat lanes and bayside training areas to develop specialized, individual mission skills and physical fitness training. The SSTC EIS team's efforts ensured that the Navy can continue to fulfill its Title 10 requirements to train and equip a combat ready force while minimizing environmental impacts to SSTC's sensitive ecosystem.

Eric Logsdon

The SSTC EIS team ensured early and **MEANINGFUL** involvement with the public and regulators.

The objective of the project team's overall objective was to ensure fleet readiness and success of the military mission while minimizing effects on the environment.

In addition to preparing a comprehensive EIS in compliance with NEPA and successfully negotiating a Biological Opinion and Incidental Harassment Authorization in compliance with the ESA, the team completed an Essential Fish Habitat Assessment, Coastal Consistency Determination, and informal consultation for the green sea

turtle. Final approval of the SSTC EIS ensured that Sailors and Special Forces have continued access to quality training opportunities at such a vital training area. The team also ensured early and meaningful involvement with the public and regulators. The SSTC EIS team initiated focused interviews with local city officials and regulatory agencies and helped the diverse public understand the issues in a reader-friendly format through printed fact sheets and online. [📄](#)

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Fleet Launches Aircraft Energy-Saving Initiatives

Air ENCON Program Targets Refueling Practices for Savings

NAVAL AVIATORS ARE evaluating energy-saving refueling practices as part of a program aimed at standardizing fleet-driven energy best practices that do not adversely impact mission or safety.

The Naval Aviation Energy Conservation (Air ENCON) program is driving the fleet-wide implementation of these practices across the entire operational spectrum, from training and ground operations to maintenance and flight operations.

As part of the beta launch running through December 2013, the program distributes quarterly squadron “energy report cards” and solicits fleet feedback and additional energy saving ideas, said Michael Olszewski, NAVAIR Propulsion and Power, Air ENCON deputy program lead.

Air ENCON directly supports the Chief of Naval Operations’ goal to increase efficiency and reduce fuel consumption afloat by 15 percent by 2020. Naval aviation operates more

and Super Hornets,” said Quinn, an F/A-18F Weapons Systems officer. Other participating aircraft platforms include the H-60 Seahawk, E-2 Hawkeye, C-2 Greyhound, EA-6B Prowler and P-3C Orion.

“While several energy conservation practices have been used by carrier air wings and squadrons, they are not practiced consistently across the fleet,” Quinn said.

“This prompted the Navy Task Force Energy, Aviation Working Group to

The Air ENCON program distributes quarterly squadron “energy report cards” and solicits fleet feedback and additional energy saving ideas.

—Michael Olszewski

“Our goal is to enable the Navy to fly more efficiently by providing options to fleet commanders who manage flight hours,” said Lt. Cmdr. Daniel Quinn, Air ENCON program lead, with Commander, Naval Air Force, U.S. Pacific Fleet (CNAP), Force Readiness. The team also includes Commander, Naval Air Force Atlantic (CNAL) and Naval Air Systems Command (NAVAIR).

than 3,700 aircraft that consume more than 600 million gallons of petroleum-based fuels each year. Resource constraints and mission requirements demand increased operational capability be extracted from each gallon of fuel.

“Air ENCON is focusing first on the largest consumers, F/A-18 Hornets

develop the Air ENCON program,” Olszewski said. In 2011, the Naval Aviation Enterprise (NAE) established the team to identify, validate and institutionalize energy-conservation best practices across the naval aviation community.

“A panel of aviators, engineers and analysts evaluates operational energy conservation initiatives from across

the fleet, industry and academia,” Olszewski said.

“Once validated, the practices are standardized and incorporated into pre-deployment training,” Quinn said. Fleet feedback and additional ideas fuel the cycle.

“As the ‘technical conscience’ of the fleet, NAVAIR ensures that changes in operational behavior do not negatively impact system safety, performance or readiness,” Olszewski said. “Our technical responsibilities include engineering support, data analysis and risk management.”

To date, Air ENCON has validated several energy conservation practices, including Short-cycle Mission and Recovery Tanking (SMART) in-flight refueling, and expanded use of mobile refueling trucks in place of “hot pit” refueling stations.

Refueling Carrier-based Aircraft

“In 2009, Carrier Air Wing (CVW) 7 pioneered the SMART practice, saving about 1.7 million gallons of fuel during 120 fly days,” Quinn said.

“The traditional tanking practice began in 2002, when the Super Hornet took over the S-3 Viking role as in-flight refueling tanker with a ‘5-wet configuration,’” Quinn said.

In a standard tanking configuration, the Super Hornet carries one centerline refueling tank and four auxiliary tanks, totaling about 28,000 pounds or 4,118 gallons of fuel. Excessive weight and drag cause the tanker to consume more fuel than usual, leaving only

about 5,000 pounds or 735 gallons of fuel to refuel other aircraft.

“Once launched, the Hornet tanker remains airborne for the complete mission, or sortie, cycle of about 1.5 hours—burning fuel the entire time,” Quinn explained. In addition, fuel that is not transferred in flight must be consumed or jettisoned for the tanker to achieve a safe landing weight.

In comparison, a Super Hornet in a SMART configuration carries only the centerline refueling pod and 14,000 pounds or 2,059 gallons of fuel.

The tanker launches to refuel the aircraft returning from their mission then lands within about 20 minutes. “Referred to as “Yo-yo Tanking” in the fleet, this method can still deliver up to 5,000 pounds of fuel per tanker without incurring undue drag, weight or efficiency penalties,” Quinn said.



F/A-18F Super Hornets perform the SMART refueling practice that saves energy by configuring a Super Hornet tanker with only the centerline refueling tank. The tanker launches to refuel the aircraft returning from their mission then lands within about 20 minutes. Referred to as “Yo-yo Tanking” in the fleet, this method delivers up to 5,000 pounds of fuel per tanker without incurring undue drag, weight or efficiency penalties.

MC Specialist Seaman Zachary A. Anderson

Refueling Aircraft Ashore

The truck refueling process was documented at Naval Air Station (NAS) Lemoore, California, where 85 percent of mission refueling is delivered by truck instead of by hot pit refueling.

“Hot pit refueling occurs when an aircraft lands, taxis to a hot pit refueling area and waits in line to refuel with engines running,” Quinn said.

“As much as 70 gallons of fuel is consumed or wasted while the aircraft waits to take on 2,000 gallons,” Quinn said. “That adds up to millions of gallons a year.”

With truck refueling, the aircraft shuts down, and a truck brings the fuel to the aircraft. However, once the engine is shut down, a turnaround inspection, which may take up to an hour, must be conducted. “While timing may be an issue that necessi-



An EA-6B Prowler and an F/A-18E Super Hornet perform a refueling exercise during an air power demonstration aboard the aircraft carrier USS John C. Stennis (CVN 74).

MC Specialist Seaman Jose L. Hernandez

Air ENCON emphasizes the strategic importance of conserving energy.

—Lt. Cmdr. Daniel Quinn

tates hot pit refueling, a flight schedule can be built around truck refueling,” said Quinn.

Air ENCON’s goal is to encourage other naval air stations, such as NAS Oceana, Virginia, to use truck refueling 85 to 88 percent of the time.

“It’s an easy sell,” Quinn said. “Without infrastructure, capital or manpower investment, about 240,000 gallons per year can be saved at NAS Oceana alone. Other facilities would achieve additional savings.”

Culture Change

“Thanks to Air ENCON, the word is getting out and the culture is changing. The Fleet Readiness Training Plan (FRTTP) now requires one day of SMART training as part of a squadron’s pre-deployment training,” said Quinn.

The Secretary of the Navy (SECNAV) has said energy management will be a mandatory Commanding Officer

Fitness Report and Counseling Record (FITREP) element.

“Air ENCON emphasizes the strategic importance of conserving energy,” Quinn said. “While we have been accustomed to having plenty of fuel available, it may not always be the case.”

Saving fuel also gives warfighters more tactical options, such as more time loitering, more time to stay on post to support a convoy on the ground, or more time on the training range.

Air ENCON plans to implement the program fleetwide in January 2014 for active-duty Navy squadrons. The U.S. Marine Corps has also expressed interest in future collaboration.

To submit an energy conservation idea or for more information on



Air ENCON, visit <http://airencon.dodlive.mil>. 

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So if you have a story that you'd like us to promote in our winter 2014 issue, you'll need to submit your text and images by Friday, 18 October 2013. Any submissions received after this date will be considered for our spring 2014 issue.

You can get a copy of the *Currents* article template by sending an email to Bruce McCaffrey, our Managing Editor, at brucemccaffrey@sbcglobal.net. This template has proven to be a tremendous asset in helping us edit and track your article submissions. And your chances of being published in *Currents* are dramatically increased if you use this template and submit all of your images as separate documents. And don't worry. If writing isn't your cup of tea, we'll handle all of the editing necessary to get your submission into publishable form.

Bruce is also available at 773-376-6200 if you have any questions or would like to discuss your story ideas.

As a reminder, your Public Affairs Officer must approve your article before we can consider it for inclusion in the magazine.

Don't forget to "like" us on Facebook at www.facebook.com/navycurrents. *Currents'* Facebook page helps expand the reach of the magazine and spread the news about all the great work you're doing as the Navy's energy and environmental stewards. Your experiences take on new meaning when you share them with the *Currents* readership and on Facebook.

Currents Deadlines

Winter 2014 Issue: Friday, 18 October 2013

Spring 2014 Issue: Friday, 17 January 2014

Summer 2014 Issue: Friday, 18 April 2014

Fall 2014 Issue: Friday, 18 July 2014

You can also refer to your *Currents* calendar for reminders about these deadlines.

Mitigating Noise from Open Detonations at China Lake

Seasonal & Monthly Analyses Lead to Plan that Minimizes Impacts to Local Communities

ROBUST SEASONAL AND monthly analysis of sound propagation levels have enabled personnel from Naval Air Weapons Station (NAWS) China Lake, California to develop and execute a solid plan that minimizes impacts to the surrounding communities of the sound generated during open detonation events.

NAWS China Lake is the Navy's largest Research, Development, Acquisition, Test, and Evaluation facility for weapons development and testing. As a result of its mission activities, China Lake generates a

diverse and explosive wastestream—most of which is destroyed via open detonation (OD).

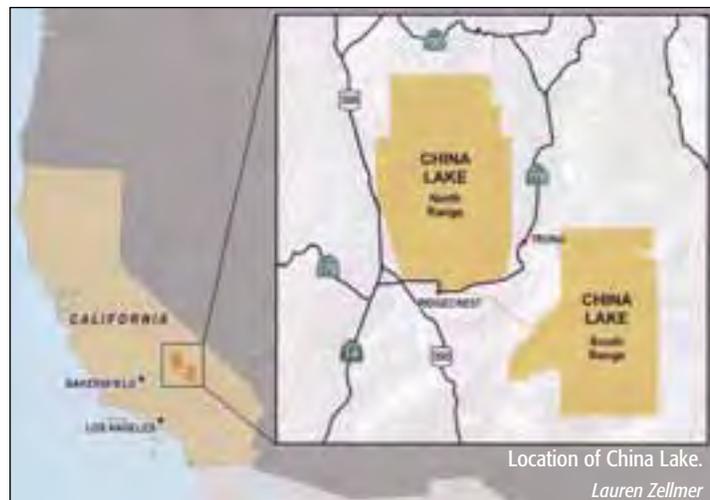
In order to comply with environmental and safety regulations, the California Environmental Protection Agency required China Lake to apply for a Part B permit—a modification of the base's existing hazardous waste facility permit. The Part B permit application developed by NAWS personnel addressed mitigation of potential human health risks and environmental impacts of OD events, including noise. The Part B permit

was granted in 2008, and the noise analysis was begun as a condition of that permit.

Sources of noise at China Lake include airfield operations, aircraft flights (both subsonic and supersonic), sonic booms, and ordnance detonation at test and target sites. These activities can create high noise levels which may impact surrounding areas. An Air Installation Compatible Use Zones (AICUZ) program plan is used to achieve compatibility between the NAWS China Lake and surrounding communities by

The Basics About China Lake

NAWS CHINA LAKE is the principal Navy research, development, test, and evaluation center for air warfare systems (except antisubmarine warfare systems) and missile weapons systems. The NAWS manages and conducts the complete weapon development process, from concept formulation through the entire lifetime of a weapon system, including fleet and production support. Nearly every significant Navy and Marine Corps airborne weapon system in the past five decades was developed and/or tested at China Lake.



The Basics About Open Detonation

BECAUSE A LARGE percentage of energetic hazardous waste (EHW) generated at China Lake is either hazardous, incompletely classified, or altered by research and development activities, Federal and Navy regulations prohibit the transport of most of this EHW via public roadways. As a result, most of this EHW must be treated onboard China Lake.

Currently, OD is the primary and preferred method of treating EHW at China Lake. Open burning can also be conducted; however, hazard analyses have determined that OD is the preferable method for treating sensitive research compounds and damaged ordnance items. China Lake operates one site to conduct all of its OD events. This single site is environmentally desirable because the base itself covers a huge landmass, and much of the surrounding land is either owned or controlled by the United States government. The arid landscape and deep groundwater level—more than 400 feet below surface—minimizes the risk of soil and groundwater contamination, and the nearest surface water is four miles away, on base property. Additionally, the site is located in rocky terrain outside of the known habitat of the desert tortoise.

Nationwide, many OD treatment facilities bury waste items to mitigate blast effects and noise. However, this method prevents the complete conversion of toxic compounds to nontoxic compounds. To ensure that toxic compounds are completely neutralized, a larger amount of

donor explosive and exposure to air are needed. This is possible at China Lake because the base is so large, and its OD facility is seven miles from the base's fence line.



Location of the OD site in China Lake's north range.

Lauren Zellmer

managing noise. (See our sidebar entitled, “The Basics About Air Installation Compatible Use Zones.”) However, this plan applies to aircraft and training-related noise only—hence the need for a separate sound analysis.

Conducting the Noise Analysis

The noise analysis mandated by the permit B application was a collaborative effort among personnel from China Lake and Wyle Laboratories. Wyle used Noise Model Simulation (NMSim) and ground elevation data for the area, as well as the Noise Assessment Prediction Capability (NAPS) developed by the U.S. Army. This software

provides an estimate of the surface peak noise intensity in all directions surrounding a blast source while accounting for meteorological and topographical variations.

The effort began by dividing single-blast effects into “annoyance” and “structural damage” categories. A threshold for annoyance events, also known as “knick-knack shakers,” has been established by the American National Standards Institute at 120 decibels (dB). This is roughly the noise level of a jet engine. The lowest documented threshold for structural damage is 128 dB. Though NAWS China Lake's permit only required an analysis of blasts with the potential for structural

The Basics About Air Installation Compatible Use Zones

IN THE EARLY days of aviation, military airfields were situated in remote areas, far from civilian populations. However, in the post-World War II baby boom, communities began to encroach upon military bases. This type of encroachment increased the safety risk and level of annoyance experienced by civilian populations. Navy experience over the years has demonstrated that the presence of these factors invariably results in restrictions being imposed on the conduct of military operations, thereby adversely impacting the ability of an installation to fulfill its mission. In the early 1970s, the Department of Defense (DoD) initiated the AICUZ program to address this problem. Each base with an operational airfield is required by DoD instruction 4165.57 to develop an AICUZ study.

In an AICUZ study, noise exposure zones and accident potential zones are generated from computer models and historical operational data. These zones are used as planning tools for installation and local government agencies in an effort to prevent development or land uses that could endanger aircraft or the public in the vicinity of the airfield.

The China Lake AICUZ study, for example, addressed the following considerations when issuing land use recommendations:

- Land uses that would attract birds, especially waterfowl
- Electromagnetic interference with aircraft communications, navigation, or other electrical systems
- Lighting (direct or reflected) that would impair pilot vision
- Towers, tall structures, and vegetation that penetrate navigable airspace or are to be constructed near the airfield
- Land uses that would generate smoke, steam, or dust

Once noise exposure zones and accident potential zones (APZ) are determined in an AICUZ study, command personnel turn to Chief of Naval Operations Instruction 11010.36C, "Air Installations Compatibility Use Zones Program," for land-use compatibility recommendations. For example, manufacturing may be allowed in zones where residential development is discouraged.

The China Lake AICUZ has a detailed land-use plan, based on three different noise zones and two APZs.

damage, both thresholds were used in the noise analysis for the OD facility.

How Noise Travels

Noise from OD consists of vibrations from blasts traveling from the source to the receiver through the ground and air. Since the OD facility is approximately ten miles from the nearest towns (Trona and Ridgecrest), ground-borne vibration from OD events is unlikely to be sufficient to cause structural damage. Therefore, the noise analysis focused on airborne vibrations.

To determine the conditions under which airborne vibrations were likely to travel farthest, historical meteorological data were collected and organized into the four seasons of the year.

Utilizing the maximum allowable OD blast of 22,500 pounds Net Explosive Weight (NEW), the analysis determined that peak sound levels exceed the 128 dB threshold off-China Lake only during the winter season. (NEW refers

to the actual weight of explosive. 22,500 pounds NEW is the TNT-equivalent of 15,000 pounds.)

Atmospheric conditions can have a strong effect on sound propagation, particularly over long distances. While humidity and temperature have a substantial effect on sound propagation, temperature inversions and positive wind gradients have a greater effect.

A temperature inversion means that temperatures are cooler at ground level and warmer at higher altitudes. Sound can refract or bend downward during temperature inversion conditions and/or when the propagation is downwind.



View of the OD blast site from a distance of one mile.
Lauren Zellmer



A positive wind speed gradient is a condition when wind speed increases with increasing altitude. This condition also causes sound waves to refract, pushing them greater distances.

Assessing the Data

Several years of meteorological data were collected and examined. The seasonal data were first examined to determine when a temperature inversion was present. Temperature inversion was not found to be present in any average seasonal data, including winter.

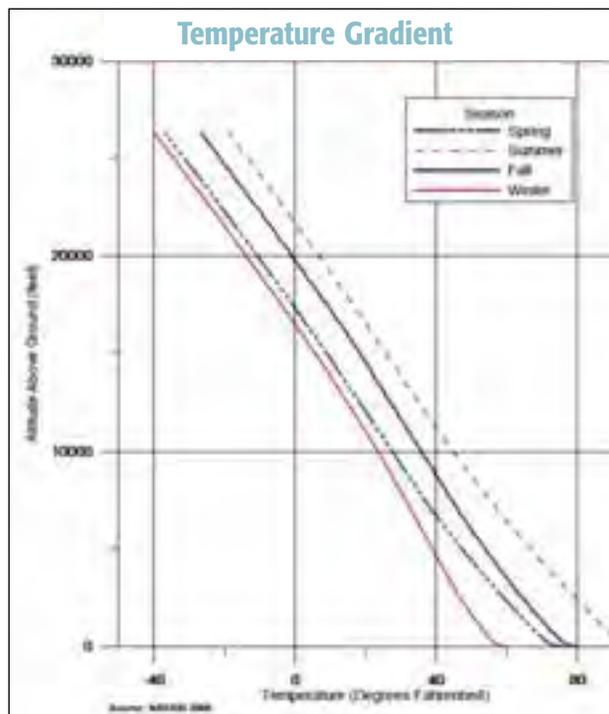
The temperature gradient plotted on the chart at right describes a condition called temperature lapse, which is the opposite of temperature inversion.

The seasonal meteorological data was next examined to determine when a positive wind gradient was present. All seasons indicated a positive wind gradient.

The rate of increase during the spring, summer, and fall seasons is not significant to produce downward refraction. The rate of increase is, however, significant during the winter season, increasing sound propagation along the ground. This positive wind speed gradient during the winter season is the primary contributing meteorological condition to off-China Lake noise levels.



It was found that sound traveled furthest in winter, exceeding peak threshold sound levels of 128 dB in an area off-China Lake. (Bold lines represent 128dB; gold lines represent base boundaries.)



In this condition, the temperature increases closer to the ground. Temperature lapse favors sound refraction up and away from the ground, reducing the ability of sound to travel.



Next, monthly meteorological data were examined to calculate peak sound levels during each winter month (December, January, and February). All three winter months show positive wind gradients. While no significant temperature inversions are indicated, it is important to note that strong temperature inversions may be present during certain times of a particular day (most typically mornings). Strong inversions produce significant downward refraction of sound waves, and longer distance sound propagation.

It was found that a positive wind gradient is likely to cause downward refraction of sound waves and longer distance sound propagation during all the winter months for a normal 22,500-pound event.

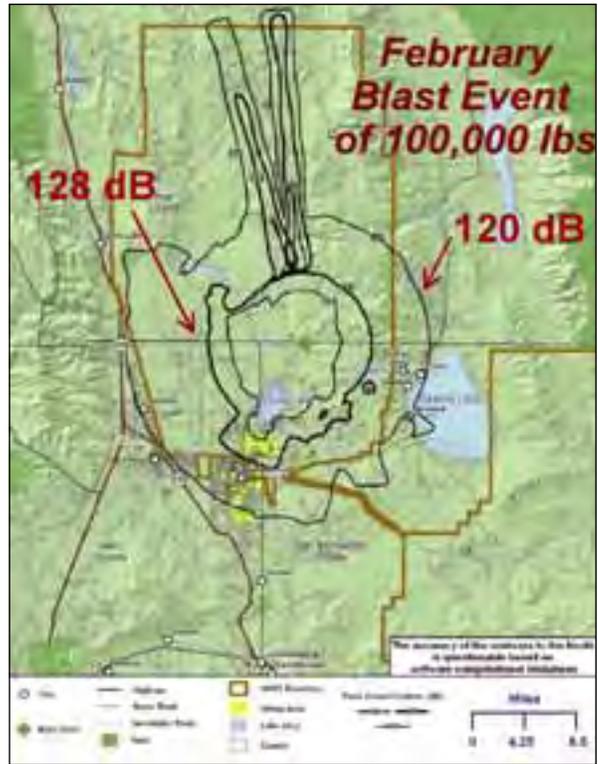
Increasing the size of the blast did not appear to increase sound propagation significantly. Although blast events are limited to 22,500 NEW at China Lake, larger blasts of 100,000 and 250,000 pounds NEW were modeled on an experimental basis. The results show a similarity of contours.

The Findings

After collecting and analyzing more than three years' worth of meteorological data, it was determined that the



These maps demonstrate how peak sound levels in December, January and February occasionally reached 128 dB in surrounding communities (see bold lines). Note that the contours for February are quite different than those for December and January. This difference is probably due to a smaller set of meteorological data for February as compared to the data set for December and January.



Though blast events are limited to 22,500 NEW at China Lake, larger blasts were demonstrated. Surprisingly, the annoyance and structural damage zones did not differ significantly with these more powerful blasts.

Temperature inversion is typically not a factor between 10:00 am and sundown.

potential for unacceptable off-China Lake noise exposure for single-event detonations is driven by two adverse weather conditions:

1. Temperature inversion
2. Positive wind gradient (winds 15 miles per hour (mph) or greater directed toward a populated area)

Temperature inversion is typically not a factor between 10:00 am and sundown. Because almost all OD events occur after 10:00 am, temperature inversion is not considered in OD event planning.

The Mitigation Plan

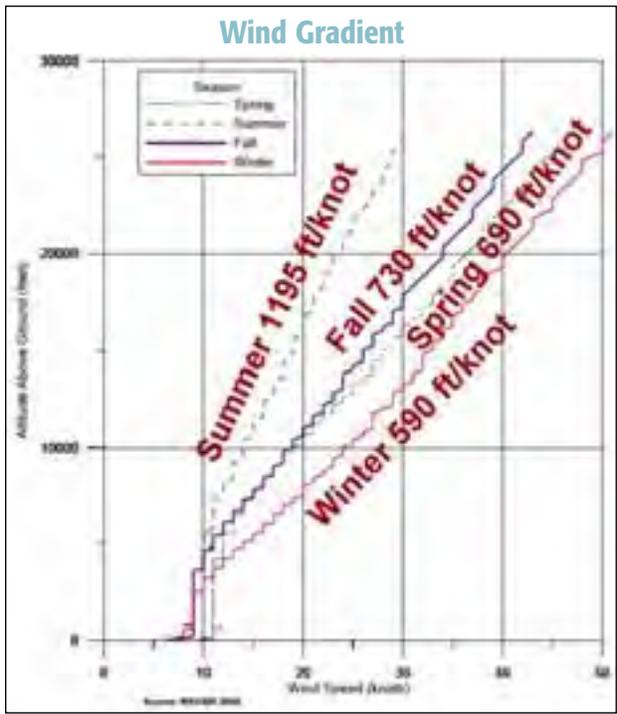
To assure acceptance of their noise mitigation plan, officials at China Lake worked closely with the local regulator from the State of California

Department of Toxic Substances Control, utilizing Wyle as a facilitator. The plan stipulates that the following conditions be studied before an OD event is conducted:

- Wind speed and direction

From March through November, a favorable wind direction at the surface is towards the West to East/Northeast (90 through 247.5 degrees). This range is favorable with any wind speed, since wind gradient during this time period is not generally an issue.

During the months of December through February, if wind speeds are 15 mph or less, the same wind direction range (90 through 247.5 degrees) is used. If wind speed is between 15 and 30 mph during December and January, then the more restricted wind direction of



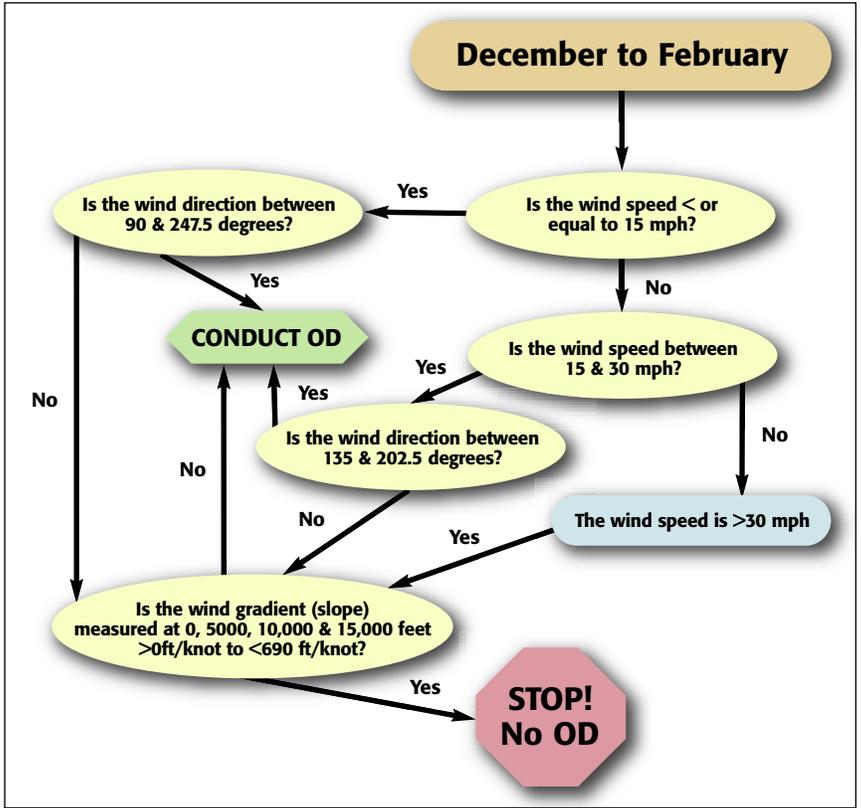
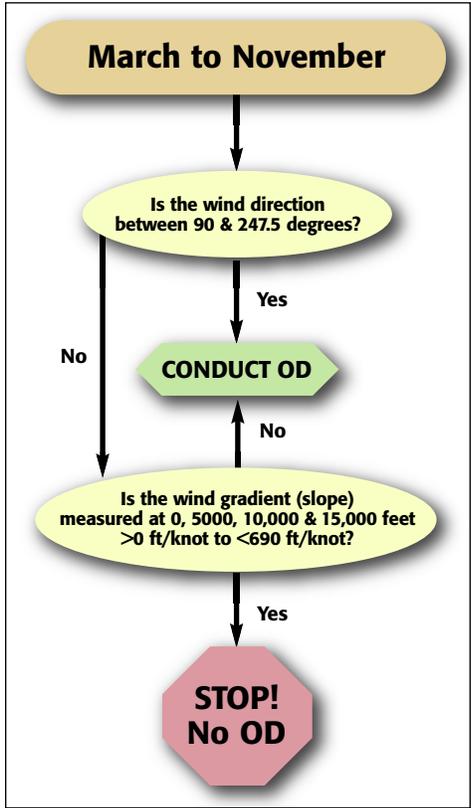
This chart shows a positive wind gradient for each of the four seasons (wind speed on x-axis versus altitude on y-axis).

Northwest to North/Northeast (135 through 202.5 degrees) is used.

If the wind direction (along with wind speed) is unfavorable, then the second condition of wind gradient must be considered. (Note: If wind speed in any direction is over 30 knots in December through February, then wind gradient must always be considered.)

- Wind gradient
As stated earlier, a positive wind gradient increases the refraction of noise. Wind gradient is a measurement of wind speed in knots (x-axis) to altitude in feet (y-axis). As a positive wind gradient means that wind speeds are stronger at higher altitudes and slower at lower altitudes.

In a positive wind gradient, the wind speed increases at elevation, displaying as a decreased slope. The line for the spring season has a slope of 690 feet per knot (ft/knot) and is considered favorable. Any line with a shallower slope (or lower number) than the spring season is considered unfavorable. Therefore, any positive



LEFT: Flowchart for determining noise impacts for spring, summer, and fall months. RIGHT: Flowchart for determining noise impacts for winter months.



An OD event at China Lake.
China Lake Technical Information Department

slope (greater than zero ft/knot) less than 690 ft/knot is considered unfavorable.

If wind speeds do not consistently increase with increase in altitude, a negative wind gradient slope may occur. A negative slope indicates a decrease in wind speed with elevation. This scenario is actually a favorable wind gradient, decreasing the probability that any noise will propagate off-China Lake.

Putting the Plan into Action

As a result of this analysis, China Lake has developed a noise mitigation plan that is executed as part of the base's OD event planning activities. This plan specifies that personnel from the base's environmental office must contact the base Geophysics Operations Division no later than noon of the day before a planned OD event. The office provides wind speed information at various altitudes and wind direction data. This data is input into a simple

More About Wind Speed

A **KNOT** IS a unit of speed equal to one nautical mile (1.15 land miles). In meteorology, wind speed is always measured in knots. Traditionally, aircraft and ship speeds are also expressed in knots. However, in order to facilitate understanding by the general public, knots are often converted to miles per hour (or kilometers per hour, depending on the local standard). To convert:

- 1 knot equals 1.15 mph
- 1 mph equals 0.868 knots

Excel™ flow chart. This model plots points and calculates slope. If unfavorable conditions are detected, the OD event will be postponed.

Lessons Learned

While it is intuitive to think that the amount of explosives in an OD event is the driving factor for off-station sound propagation, the China Lake noise analysis proved that atmospheric conditions are actually the main driver. Temperature inversion (the same condition that entraps smog into a valley or causes a cold day at low altitudes while warmer at higher altitudes) makes perfect sense as one of the drivers. However, positive wind gradients were not expected as a second driver.

Except for the occasional temperature inversion that lingers into the late morning, China Lake's noise mitigation plan has successfully prevented noise from OD events from reaching surrounding communities. And while meteorological conditions differ widely in other parts of the country, some of the basic findings could prove useful if other facilities are tasked with the challenge of mitigating noise from their own operations. ⚓

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SUBASE New London Wetlands Undergo Remediation, Restoration

Contaminated Soil Removed, Invasive Species Tackled

NAVAL SUBMARINE BASE (SUBASE) New London environmental specialists and Public Works Department leadership have deemed the remediation efforts undertaken to restore and revitalize a base wetland area a success.

During a six-month project that completed at the end of December 2012, the wetland area in the northeast corner of SUBASE underwent remediation to remove ecologically harmful chemicals, and restoration to control the population of invasive plant species.

“We couldn’t be more pleased with the result,” said Mike Brown, SUBASE environmental director.

Base environmental specialists and representatives from project contractor Shaw Environmental and Infrastructure (Shaw E&I), conducted a final walk through of the site near the base’s weapons compound and seasonal swimming lake on 9 January 2013.

“It really looks very different. We not only restored five Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) areas but also mowed quite a bit of phragmites outside of the restoration areas to provide more ecological lift to the entire area,” said Tracey McKenzie, SUBASE natural resource manager.

In the 1950s, the 19.3-acre area was a dump site for dredge spoils from the Thames River. In the 1960s, dichlorodiphenyltrichloroethane (DDT) pesticide bricks were utilized there to control the mosquito population.

Site investigations on SUBASE following the CERCLA-established process, commonly referred to as Superfund, identified the wetland area as one of 25 sites for the base to focus on to mitigate the potential for any hazardous substance releases that may endanger public health, welfare, or the environment.

As greater priority areas on the base were tackled, additional site investigations at the wetlands through 2011, uncovered local, low concentrations of aromatic hydrocarbons, DDT, and polychlorinated biphenyls (PCB). Other chemicals of concern included polynuclear aromatic hydrocarbons (e.g., asphalt, waste oils, burning of fossil fuels),



Typical phragmite (invasive vegetation) coverage on SUBASE New London prior to remediation.

pesticides and metals posing unacceptable risk to plants and wildlife.

After comprehensive study, coordination with federal and state environmental agencies, and public input, the Installation Restoration program at SUBASE decided to pursue a two-pronged approach to the wetland's remediation and restoration:

1. Remove contaminated sediments
2. Curtail the growth of invasive plant species, such as phragmites

Some 6,800 cubic feet of sediment, from five separate areas totaling three acres, was excavated and removed.



A temporary road was created into the excavation area to minimize environmental impact.

To allow vehicle and machinery access to the site, contractors created a temporary road with a system of interconnecting composite mats, specially designed to minimize environmental impact.

Additionally, several wetland acres were mowed in the winter of 2012 to manage the invasive common reed *phragmites communis* (also known as *phragmites australis*) which threatens native wetland vegetation.

Denise Page, the lead wetland biologist with Shaw E&I describes *phragmites communis*: "The reeds can grow up to 15 feet tall. They came via ships from Europe to the ports; they were used as packing material and spread from there." The reed is now found in every one of the lower 48 states, but is most prevalent on the Atlantic coast and Northeast.

As remediation and restoration was completed, the wetlands became an even more attractive home to wildlife. Based on sightings or observations of tracks, a long list of animals now make themselves at home in the wetland, including white-tailed deer, amphibians, mallard ducks, coyote, snakes, raccoons, opossum, frogs, turtles, salamanders, and a variety of birds. Many species of trees, including swamp white oak, red and silver maple, black willow and river birch have been planted in the excavated areas.

The Basics About SUBASE New London

NAVAL SUBMARINE BASE New London, Connecticut is the Navy's first submarine base. Its mission is to deploy combat-ready submarines and to train professional submariners. Almost every submariner in today's Navy will be stationed at SUBASE New London for training.

The base began as a naval yard and storage depot on 11 April 1868. By 1898, its main use was as a coaling station. In 1912, as oil replaced coal in the Fleet, the base was scheduled for closure. Instead, due to the efforts of a local congressman, New London became the Navy's first submarine base in 1915.

Today, Naval Submarine Base New London stretches along the east side of the Thames River, straddling the communities of Groton and Ledyard. It occupies approximately 687 acres, and has ten submarine piers and 15 SSN (nuclear) submarines. The base also is home to more than 70 tenant commands and employs more than 9,500 active duty, reserve and civilian personnel.





Access into the site was provided by interconnecting mats, which formed a temporary road.



Newly planted shrubs and trees are protected by deer fencing.



Contaminated sediment is removed from the wetland area.



New topsoil is being placed after the contaminated sediment was removed.

In the spring of 2013, a wetland seed mix will be hydroseeded in the excavated areas.

The wetlands will be monitored annually for three years to ensure the establishment of healthy vegetation. The invasive reeds will be controlled with an herbicide that targets phragmites without harming other plant life. Otherwise, the area will be left alone to return to its natural state.

“The effective coordination between the base, the Public Works’ Facilities Engineering and Acquisition Division, the U.S. Environmental Protection Agency (EPA), and the contractors was instrumental in the success of this project,” stated Brown.

Remediation and restoration of the wetlands brings SUBASE one step closer to being removed from the federal Superfund list of the nation’s most polluted sites, where it has been since 1990. If the current schedule holds and restoration remedies continue to move ahead on two other sites at SUBASE, the base could be taken off the list in 2014. ⚓

Photos by Shaw E&I.

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NAVMAG Indian Island Treats Wastewater Without Chemicals

Northwest Navy Base Utilizes Ultraviolet Technology as Greener Alternative



BALANCING THE COMMAND'S mission with environmental preservation has always been a priority for Navy personnel at Naval Magazine (NAVMAG) Indian Island. The weapons station recently became the first Navy installation in Washington to utilize eco-friendly ultraviolet (UV) technology at a Navy-owned wastewater treatment facility.

The pristine waters of Puget Sound and Port Townsend Bay support an abundance of marine life and offer a variety of outdoor recreation opportu-

nities. To help preserve this important habitat, and at the same time improve cost-effectiveness of the water treatment process, the Navy decided to install a zero-chemical treatment system at NAVMAG Indian Island in December 2012.

Shaleen Kessler, NAVMAG Indian Island Environmental Department's Water Quality Program site coordinator, said the treatment system demonstrates the Navy's commitment to conservation and habitat preservation. "The whole point of

having a wastewater treatment center is to treat that water to make sure it's safe for reuse," said Kessler. "So, it was in the Navy's best interest to find a system that will result in the purest discharge with the lowest amount of environment effects, and the UV guarantees that."

The UV treatment system replaced the chlorine disinfection system, which was originally constructed in 1979. It was built to treat the collection, holding, and transfer (CHT) waste from visiting ships at the ammunition wharf. The ships discharged their CHT waste through the installation's treatment system, where wastewater produced in base facilities was also being treated before being discharged into Port Townsend Bay.

Kessler said that the old system produced a chlorine byproduct, which can be harmful to wildlife if it entered the surrounding aquatic environment in high concentrations. Though there were never any known incidents of adverse effects on wildlife, the environmental depart-

Sand filter beds provide secondary treatment of wastewater biosolids prior to entering the UV disinfection chamber at NAVMAG Indian Island. The UV treatment system then disinfects the water before it is discharged into Port Townsend Bay at the end of the installation's wastewater treatment process.

MC2 (SW/AW) Scott A. McCall



After passing through the sand filter, wastewater enters the UV disinfection chamber through large pipes for the final phase of the installation's wastewater treatment process. Computerized industrial controls are used to operate and monitor the UV disinfection system.

MC2 (SW/AW) Scott A. McCall



Port Townsend Bay

THE TIDAL WATERS of Puget Sound are known historically to Native Americans as the Salish Sea. Admiralty Inlet flows into Port Townsend Bay on the northeastern edge of the Quimper Peninsula in Western Washington. The marine waters and shorelines of Port Townsend Bay serve as a prime habitat area supporting an abundance of marine life, including salmon, oysters, river otters, harbor seals and orcas. These pristine waters and shorelines also offer a variety of outdoor recreation opportunities such as fishing, beach walks, kayaking and bird watching.

The marine waters of Port Townsend Bay support an abundance of marine life, as well as a variety of outdoor recreation opportunities.

MC2s (SW/AW) Scott A. McCall



ment felt that an extra step needed to be taken to eliminate the chlorine byproduct from discharge waters.

“What UV radiation does is kill the pathogens, the bacteria and viruses, so they don’t reproduce,” said Kessler. “Plus, it eliminates the use of chemicals, so when the water comes out of the wastewater treatment center, it doesn’t have any byproducts or harmful residue.”

Not only is the UV system safer, it is also more mechanically reliable. Bill Kalina, NAVMAG Indian Island environmental site manager, added that the old chlorine system had the potential for mechanical error as well as operator error and safety issues for the workers at the treatment facility. “UV eliminates all of that variability and that potential for human error and mechanical error,” said Kalina. “This UV system has industrial controls for monitoring, so it has a computerized system that will alert us if there is a problem.”

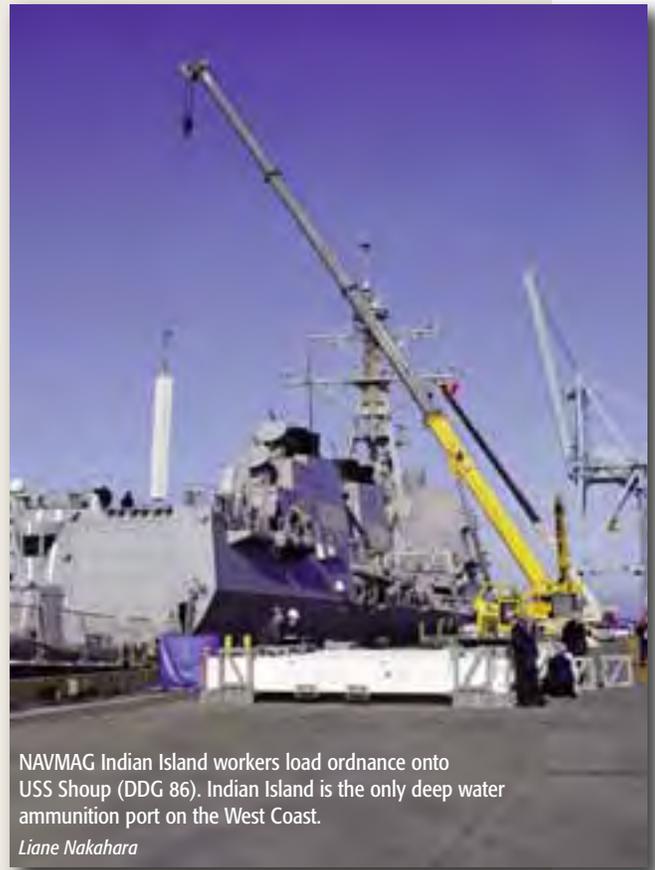
According to Kalina, the wastewater treatment system upgrade ranked as the number one utility issue on the installation. The initial cost of the UV system was more than \$640,000. The long-term cost savings will be substantial due to reduction in labor hours to monitor and maintain the new system and the elimination of material costs associated with the chlorine-based system.

Additionally, being proactive with environmental projects like the UV system helps NAVMAG Indian Island establish credibility with regulatory agencies like the U.S. Environmental Protection Agency and Washington State Department of Ecology, as well as with local tribes and members of the surrounding community.

Naval Magazine Indian Island

NAVMAG INDIAN ISLAND is the only deep water ammunition port on the West Coast. It is responsible for the joint transfer shipment of ammunition among the five branches of the military services. The base is also a critical site for joint training exercises, including waterborne security and logistics mobilization drills. Not only do NAVMAG Indian Island employees provide an invaluable service to the fleet, they also go out of their way to be good stewards of the environment by improving and protecting tidal salt marshes, building a shoreline protection system, removing creosote logs from the beaches, and remediating contaminated sites from historic World War II operations. These projects resulted in the removal of NAVMAG Indian Island from the National Priorities List by the U.S. Environmental Protection Agency in 2005. This achievement makes NAVMAG Indian Island the only Navy installation on the West Coast, and the third base in the Navy's history, to be removed from this list. In the past several years, NAVMAG Indian Island has won multiple Secretary of the Navy Energy and Water Management Awards as well as the 2012 small shore command award in the Navy Community Service Program for Environmental Stewardship. NAVMAG Indian Island takes its name from the famous British Explorer Captain George Vancouver who dubbed this land mass "Indian Island" after observing a seasonal village site of the Chemakum tribe on Walan Point during his exploration of Puget Sound in 1792. The Walan Point area is the present day location of the Navy's ammunition wharf.

For more information on NAVMAG Indian Island, visit www.cnmc.navy.mil/Indian_Island/index.htm.



NAVMAG Indian Island workers load ordnance onto USS Shoup (DDG 86). Indian Island is the only deep water ammunition port on the West Coast.

Liane Nakahara



An aerator in the sewage lagoon is used to mix the water to facilitate microbial breakdown of the sludge as part of the primary phase of the wastewater treatment process.

MC2 (SW/AW) Scott A. McCall

"Our mission is integrated with our environmental stewardship," said Kalina. "We want to be good stewards of the environment, but it is also important to us operationally to have public trust and credibility."

Kalina added that the Navy's initiative to 'go green' has both installation and fleet personnel throughout Navy Region Northwest, not just at NAVMAG Indian Island, thinking 'greener' every day.

For more news from Commander, Navy Region Northwest, visit www.navy.mil/local/cnrnw. 

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NAS Jacksonville Implements Sustainable Sewage Sludge Treatment

New System Consumes Significantly Less Energy

THE NAVY HAS established aggressive targets for reducing energy consumption and increasing renewable energy production. To help achieve the goals laid out in the Navy's energy program, personnel from the Naval Air Station (NAS) Jacksonville, Florida recently installed an innovative (first-of-its kind for the Department of Defense) sludge treatment solution at its wastewater treatment plant to reduce energy consumption, lower costs, and recycle waste.

This newly-installed sludge treatment system relies on simple, safe and repeatable chemistry to achieve disinfection of sewage sludge and organic waste. Traditional sludge treatment systems rely on energy intensive and difficult to control biological or thermal systems. The system uses two separate chemicals to safely generate chlorine dioxide (common disinfectant) onsite for disinfection and odor elimination of the sewage sludge. The process is completely automated and computer controlled to ensure consistent operation.

During the treatment process, sludge generated at NAS Jacksonville's waste-

water treatment plant is pumped to the new system's chemistry injection system where the chlorine dioxide is generated and added to the sludge stream. The sludge flows through the process control system where it is disinfected and odor-causing compounds are destroyed. Sludge treatment that previously took four to six weeks now takes 10 minutes with the new system. Following treatment, the disinfected, odor-free product is

dewatered using the existing belt press and then collected and transported to a permitted land application site where the nutrient content is recycled.

The new sludge treatment system consumes significantly less energy than the aerobic digesters previously used for sludge treatment at NAS Jacksonville. Traditional treatment via aerobic digestion required substantial energy to power the motors that



Casey Cochran, utilities supervisor for Richard Brady and Associates, left, points out some of the unique functions of the solenoid valve for the Clean B Solution to Jay Caddy, commodity manager for NAS Jacksonville Public Works Utilities and Energy Management. The valves filter the water for after it is disinfected either into the Chemical Sludge Treatment System or back to the wastewater treatment plant to be retreated.



Kevin Savela, general maintenance worker with Richard Brady and Associates, works on the air system of the belt filter press at the Wastewater Treatment Plant.

were needed to continuously mix and aerate sludge. Converting to the new system has reduced sludge treatment energy consumption from close to one million kilowatt hours (kWh) per year to an estimated 500 kWh per year. This substantial energy reduction will result in savings to NAS Jacksonville of around \$75,000 in 2013. Based on projected increases in energy costs, the base will save an average of \$107,000 per year of energy over the next 20 years. One additional benefit will be the reduction in operation and maintenance costs and recapitalization of aging infrastructure due to the elimination of a primary clarifier, sludge thickener and two aerobic digesters at this facility.

The Navy's shore energy policy is more than environmental stewardship and lowering energy bills. Energy is a strategic resource, and developing efficient operations that rely on resilient energy sources is a matter of national security.



The Chemical Sludge Treatment System, tanks and components treat an average of 40 gallons per minute of waste sludge from the NAS Jacksonville Wastewater Treatment Plant.



Sludge is sent by conveyer belt to a dumpster after going through the separation treatment process. The sludge is picked by a recycler to be used for non-public access pasture lands.

Naval forces depend on constant support from shore operations, and energy security is essential for powering our critical shore installations now and in the future. Therefore, the savings being realized by the new system, coupled with the energy savings, result in a simple payback of 6.3 years for the \$700,000 investment in the system.

This \$707,000 energy project was awarded to Aerostar Environmental Services in April 2012. BCR Environmental designed, built and installed the system and completed the project in October 2012. ⚓

Photos by Kaylee LaRocque.

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Manmade Wetland at MCRD San Diego Recycles Wastewater

Water Conservation Possible with the Living Machine

LIKE MANY CITIES in the western part of the U.S., San Diego has increasingly been subject to water restrictions due to an ongoing shortage of water. This is becoming a serious issue in many parts of the world; one that could adversely affect the Navy's mission.

One promising new method for conserving water is currently being demonstrated at Marine Corps Recruit Depot (MCRD) San Diego. A manmade mini wetland system for the recycle and reuse of domestic (sewage) wastewater has been installed by personnel from the Naval Facilities Engineering Command (NAVFAC) Engineering and Expeditionary Warfare Center (EXWC) with sponsorship from the Environmental Security Technology Certification Program (ESTCP), and support from MCRD, San Diego and the Navy Environmental Sustainability Development to Integration (NESDI) program.

The wetland cells alternately fill and drain to replicate and accelerate the tidal action in an estuary but in a much smaller footprint. In comparison to conventional wastewater treatment technologies, this system offers reduced energy use and significant savings in both capital and lifecycle cost while achieving reuse water quality standards.

This ecosystem-based wastewater treatment system centers around a set of wetland modules which look like planter boxes, enhancing aesthetic amenity. Each cell module contains native plants with a bed of engineered gravel. The gravel supports a biofilm of beneficial bacteria and other microorganisms that use the waste as their food source, leaving only clean water for reuse. The water is contained beneath the gravel surface—all the casual observer sees are lush, vibrant plantings.

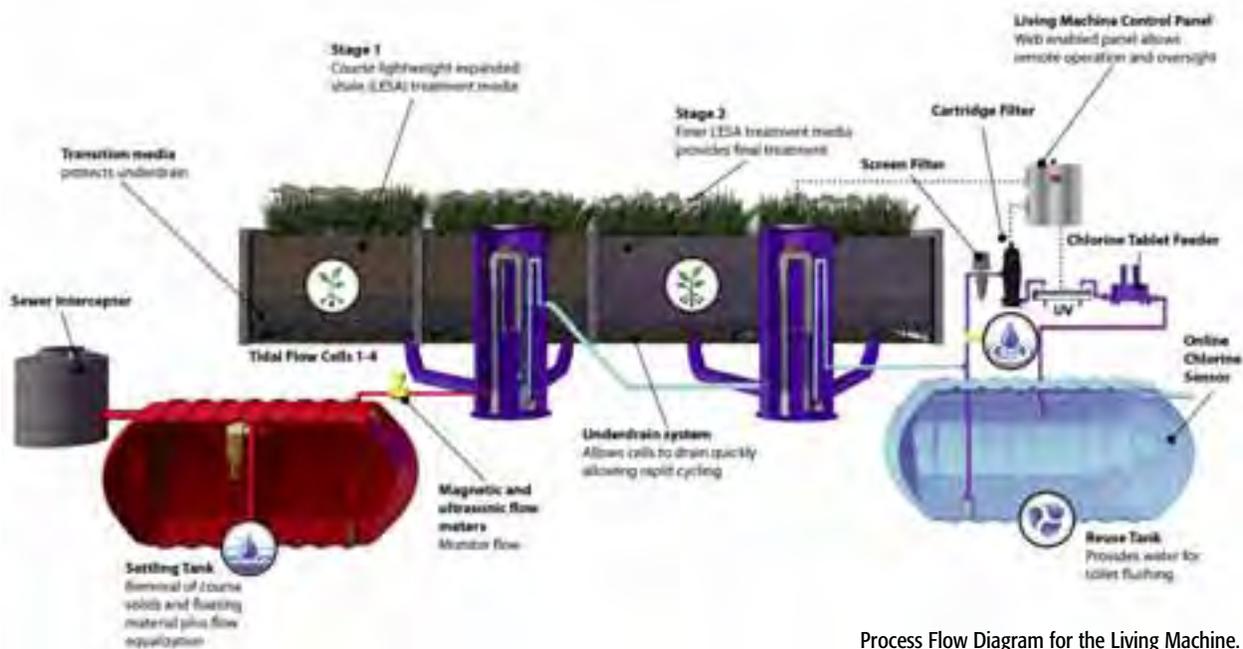
The system will allow MCRD San Diego to realize a reduction in water consumption mandates, and will reduce costs associated with the purchase of fresh water and the disposal of used water.

The system, known as The Living Machine®, will allow MCRD San Diego to realize a reduction in water consumption mandates, and will reduce costs associated with the purchase of fresh water and the disposal of used water.

How It Works

The Living Machine is based on tidal wetland technology consisting of treatment cells where plants are

The Living Machine uses tidal action to maintain an aerobic environment for the biofilm. Through the use of uniquely designed valves and pumps, gravity flow is maximized and energy consumption is minimized. The water level is raised and lowered about 12 times per day to create multiple tidal cycles. As the water level is lowered, air replaces the water and oxygenates the biofilm.



Process Flow Diagram for the Living Machine.

The primary contaminants removed by the wetland modules are suspended solids and dissolved nutrients like phosphorous and nitrogen. The wastewater first goes through a settling tank where the bulk of the solids are removed. Then it goes through treatment cells where most of the treatment occurs. It is then disinfected by ultraviolet light and again by chlorine in a two-stage disinfection step. Thus, the effluent from the treatment subsystem will have been treated to a tertiary level. The end product is colorless and odorless.

Though this is the first installation of a Living Machine on Department of Defense property, the system is being employed at several institutions around the country, including schools, government and municipal buildings, retail shopping centers, and even private housing developments. The U.S. General Services Administration is currently installing a highly-landscaped Living Machine at its Otay Mesa border crossing station. The range of uses for the treated water includes toilet flushing, cooling towers, and subsurface irrigation, as is the case at MCRD San Diego. While MCRD San Diego will eventually recycle 10,000 gallons of wastewater per day through its Living Machine, other users have recycled up to hundreds of thousands of gallons per day.

The Permitting Process

Once the Living Machine was successfully demonstrated, MCRD San Diego sought permitting to continue to provide

The Basics About the NESDI Program

THE NESDI PROGRAM seeks to provide solutions by demonstrating, validating and integrating innovative technologies, processes, materials, and filling knowledge gaps to minimize operational environmental risks, constraints and costs while ensuring Fleet readiness. The program accomplishes this mission through the evaluation of cost-effective technologies, processes, materials and knowledge that enhance environmental readiness of naval shore activities and ensure they can be integrated into weapons system acquisition programs.

The NESDI program is the Navy's environmental shoreside 6.4 Research, Development, Test and Evaluation program. Sponsored by the Chief of Naval Operations Energy and Environmental Readiness Division and managed by NAVFAC, the program is the Navy's complement to the Department of Defense's ESTCP which conducts demonstration and validation of technologies important to the tri-Services, U.S. Environmental Protection Agency and Department of Energy.

For more information, visit the NESDI program web site at www.nesdi.navy.mil or contact Leslie Karr, the NESDI Program Manager at 805-982-1618, DSN: 551-1618 or leslie.karr@navy.mil.





Living Machine subsurface treatment cells/tanks installation.

subsurface irrigation at the base. For past installations of the Living Machine at other locations, it has been the duty of the local Water Quality Control Board and the local Board of Health to review such a system. The system is designed to meet potable water reuse (toilet flushing, laundry, etc.) and equipped with ultraviolet and chlorination disinfection to meet this strict requirements. However, since the treated wastewater for this application will be used for sub-terrain irrigation only, a “discharge to land” permit will be applicable. This type of permit is easier and

cheaper for MCRD San Diego to obtain and requires less wastewater monitoring.

NAVFAC EXWC is working with the base to prepare a Report of Waste Discharge (ROWD). The ROWD contains a complete technical description of the Living Machine’s operation, with the following sections:

- Wastewater Characterization (including flow rate, constituents and concentrations)
- Treatment System (including the process by which the wastewater is treated and the capacity of that system)
- Best Management Practices (This section is not applicable to the Living Machine since the system itself is a BMP.)
- Disposal Site (including a description of how and where the wastewater will be disposed)
- Groundwater (including a description of how the wastewater will interact with the groundwater and demonstration that the system will be in compliance with water quality criteria)

In turn, the San Diego Regional Water Quality Control Board will assess any impacts to the groundwater caused by the operation of the Living Machine. Then, the Board will impose Waste Discharge Requirements (WDR) on the operation, along with an annual fee. WDRs apply to discharges to land, as opposed to discharges to surface water. The purpose of WDRs is to protect the groundwater from contamination. Past WDRs for Living Machine installations in California have included waste discharge specifications, general prohibitions, additional system design and

The Living Machine ribbon cutting ceremony at MCRD San Diego with Brigadier General Daniel D. Yoo.





The Living Machine wastewater treatment system at MCRD San Diego.

operations specifications, and monitoring requirements.

An Environmental Protection Specialist at an installation may also expect to coordinate with their local Board of Health to ensure that people do not come into contact with unhealthful water.

Currently, MCRD San Diego's Living Machine is operating at about 7,000 gallons per day. Eventually, the system will be ramped up to 10,000 gallons per day. Long-term performance data is still being collected by the system's computer (including pH, oxygen, flow rates, and power consumption). The

treated water will be tested for total suspended solids, total dissolved solids, and eight other criteria, in line with California reuse requirements.

Cost Avoidance

Through the use of the Living Machine, MCRD will avoid the cost of obtaining potable water (\$5,022 per million gallons) and the cost of disposing of used water (\$5,347 per million gallons). The savings will be about \$39,000 per year.

The cost for a basic system similar in size to the one installed at MCRD is about \$250,000, resulting in a simple

payback period of 7.1 years. MCRD San Diego's cost includes an additional \$200,000 that ensured complete integration of the system with their landscape

Future work includes documenting the true water and cost savings of the Living Machine system at MCRD San Diego and disseminating the results. NAVFAC EXWC is also exploring a funding and contracting arrangement where an activity would receive a Living Machine system and then pay for it over time using the savings generated by the system. Currently, some energy conservation projects are funded this way.

The Living Machine system, along with the subsurface irrigation system are working together to help MCRD San Diego conserve water, save money, and enhance mission readiness. ⚓

Photos by Sonny Maga.



The lawn at MCRD San Diego will be irrigated by water from the Living Machine.

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FRCSE Saves Time & Money Locating Potential Aircraft Fuel Leaks

New Detection Capability Established for P-3 Orion

THE QUEST FOR an environmentally safe, cost-effective way to identify leaks in aircraft fuel cells has come to a close at the Fleet Readiness Center Southeast (FRCSE) in Jacksonville, Florida—at least where the P-3 Orion is concerned. FRCSE has implemented a new fuel leak detection capability for the P-3 Orion aircraft that has already reduced Turn-Around-Time (TAT) by 15 percent with a cost avoidance of nearly \$20,000 per aircraft.

The Search for a CFC-113 Replacement

Since the use of chlorofluorocarbon (CFC) 113, a priority I ozone depleting substance, was banned in 1996, alternative methods of fuel leak detection have not proven adequate to identify all potential fuel leaks nor ensure the integrity of fuel systems. The result is frequent, unnecessary rework and retest of fuel tanks.

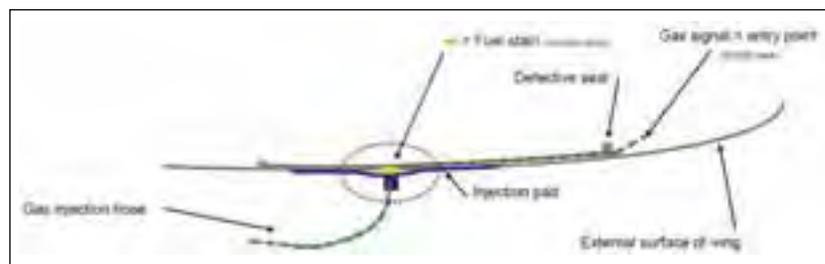
supported FRCSE in their investigation of alternative fuel leak detection technologies to replace the capabilities lost with the ban of CFC-113. In recent years, commercial leak detection technologies have advanced and a variety of potential alternatives are available, including ultrasonic and infrared thermography, and several trace gas leak detection technologies.

Leaks and leak paths which are frequently masked by seam sealers and paints can be readily identified and leaks repaired.

Leak identification and repair in aviation fuel systems are significant concerns that regularly impact maintenance and repair schedules, and increase cost. But more importantly, this maintenance issue can reduce the availability of critical Navy assets and negatively impact mission readiness. In addition, rework due to fuel leaks increases personnel exposure to fuel and hazardous materials, as well as harm to the environment if leaks go undetected or are not properly contained during fueling operations.

Since 2007, the Navy Environmental Sustainability Development to Integration (NESDI) program has

Of these, industry development and growth of helium and hydrogen trace gas leak detection technologies have



By applying the tracer gas on the outside of the tank and using the hydrogen leak detector on the inside, leaks and leak paths can be readily identified and leaks repaired.

Courtesy of INFICON, Inc.



A WP-3D aircraft operated by the National Oceanic and Atmospheric Administration's Aircraft Operations Center sits on the airfield at FRCSE as maintainers perform a visual inspection. The aircraft is one of two hurricane hunters used for long-range atmospheric research. They are civilian versions of the U.S. Navy's P-3 four-engine maritime reconnaissance aircraft and are maintained and repaired at FRCSE on Naval Air Station Jacksonville, Florida.



Sheet Metal Mechanic Bryan Swafford inspects a P-3 Orion wing tank for potential fuel leaks using hydrogen leak detection technology at FRCSE. This new capability has reduced the TAT of aircraft wet check by 15 percent.

been substantial. Currently, both technologies are widely used in the automotive, as well as air conditioning and refrigeration industries, and have expanded into aviation use.

Based on market research and in collaboration with the U.S. Air Force, FRCSE contacted several commercial vendors to perform technology demonstrations at the military depot. From the P-3 fuel wing tank demonstrations, FRCSE determined that the hydrogen tracer gas

technology was more user-friendly, accurate, reliable, and easier to maintain than the helium leak detector. Further, hydrogen leak detection provided a lower operational cost, as helium is a limited resource and very expensive.

How It Works

Hydrogen trace gas leak detection technology uses a 95 percent nitrogen/5 percent hydrogen mixture that is both inexpensive and inert (non-flammable). With the extreme sensitivity of the detector and ready dispersion in air, the low-level, hydrogen concentration gas works well for leak detection and is inherently safe.

The hydrogen trace gas is injected into the empty (closed) fuel tank, and the exterior of the tank is probed with a portable detector to find and locate leaks. When the probe detects hydrogen, the unit provides a visual LED light and audible alarm.

The hydrogen leak detector can detect extremely small leaks at leak rates (as low as 5×10^{-7} cubic centimeters per second) or it can be adjusted to sense leaks at greater levels as required.

Based on P-3 demonstrations, FRCSE engineering established a threshold level at which the

smallest of actual fuel leaks would be detected. To validate this threshold, the team performed several tests on multiple aircraft using the hydrogen leak detector and verified that no fuel leaks were observed during initial fueling operations.

An added advantage of the tracer gas technology is the capability to apply the 'backflow leak detection' method to find the actual source of wing tank fuel leaks for the

FRCSE Continues to Improve F/A-18 Green Hornet Fuel Leak Testing

FRCSE PERSONNEL, WITH support from the NESDI program, also collaborated with the U.S. Air Force to improve aircraft fuel leak testing on the F/A-18 (A-D) Green Hornet Strike Fighter. The team performed vendor-supported, hydrogen leak demonstrations on uninstalled and installed F/A-18 (A-D) fuel cells.

The hydrogen leak detector was very effective in pinpointing leaks on uninstalled F-18 fuel cells in the shop, but it proved challenging on installed fuel cells due to the inability to seal the structural cavity vents. For this reason, the project team was unable to create sufficient pressure to pinpoint leaks.

Still, another type of leak testing, pressure decay testing, was formally implemented as a result of hydrogen leak testing. In pressure decay testing, pressure in the fuel tank is raised to a target level. A pressure gauge is used to measure the pressure drop or pressure decay over a specified period of time. The acceptance criterion is typically zero drop corrected for temperature change. FRCSE developed test kits and performed pressure decay testing for F/A-18 (A-D) fuel cells #1 through #4.

Since January 2010, pressure decay testing has been required prior to the installation of internal fuel cell components including valves, pumps and tubing. Testing not only proves the integrity of the fuel cell but also verifies that the O-rings installed at all joints between the fuel cell and the cavity are not damaged.

To date, the pressure decay test has been performed on more than 26 aircraft. This has resulted in at least ten fuel cells, including six of the more complex (#4) fuel cells, being replaced prior to installing internal components and performing a final wet check. (Note: During a "wet check" artisans fill the fuel tank with a liquid (oil) then check the exterior for liquid leaks. The weight of the liquid can cause the wing tank to flex and a leak to be found.) Thus, a significant amount of rework has been avoided, TAT has been reduced by eight to ten days per aircraft, and no less than 200 man-hours per aircraft have been avoided by capturing the discrepancies prior to final wet check.

Currently, Naval Air Systems Command, Naval Air Warfare Center Lakehurst, Boeing and Northrop Grumman are in the process of fielding a combination test kit and universal plug kit to enable fleet maintainers to perform a pressure test of fuel cells on all F/A-18 aircraft including the Super Hornet and the EA-18G Growler aircraft.

The universal plug kit will provide a means to seal off all the fuel cell fittings and perform the pressure decay test. The kit will also seal off the problematic vent ports located in the cavity structure to create sufficient pressure across the fuel cell.

When the combination pressure test set and the universal plug kit are fielded to FRCSE, the team will resume efforts to further enhance the facility's capability to isolate fuel cell leaks with the very promising hydrogen leak detector.



Aircraft Mechanic Patrick Dodrill (from left), Mechanical Systems Engineer Patrick Papay, and Darvin Etienne monitor a pressure decay test to detect the presence of a fuel leak on an F/A-18 Green Hornet Strike Fighter aircraft at FRCSE.

P-3. Frequently, the fuel leak found on the outside of the tank does not provide any indication of the origin inside the tank. By applying the tracer gas through an injection pad on the outside of the tank and using the hydrogen leak detector on the inside, leaks and leak paths which

are frequently masked by seam sealers and paints can be readily identified and leaks repaired. Currently, FRCSE is working to gain approval of the backflow method to provide yet one more tool in the toolbox for fuel leak detection.



FROM LEFT: Aerospace Engineer Dan Marlow, Environmental Logistics Engineer/Pollution Prevention Manager Tom Cowherd, Chemist Kellie Carney, P-3 Production Line General Foreman Greg Wallace, and Production Support Specialist Rodney Boone pose in front of a P-3C Orion Maritime Patrol and Reconnaissance aircraft at FRCSE. They were part of the team to implement the new hydrogen fuel leak detection process.

To implement this new process for the P-3 aircraft, FRCSE applied “lean” methodologies and released a Local Process Specification to eliminate more than half of the leak detection process steps to reduce TAT to the Fleet. (Note: Lean, a management philosophy derived mostly from the Toyota Production System, is centered on preserving value with less work.)

Environmental benefits of this process are:

1. A viable replacement to CFC-113 has finally been implemented.
2. Potential hazardous waste streams associated with active aviation fuel

tank repair and leak testing have been substantially reduced.

3. The Hazardous Air Pollutants/Volatile Organic Compounds associated with fueling, defueling, de-puddle and gas-free testing due to rework have been reduced.
4. The risk associated with potential water runoff contamination due to leaking aircraft fuel tanks has been reduced.

For more information about this project, see the fact sheet on the NESDI program’s website at www.nesdi.navy.mil/ProjectsCurrent_FS.aspx?ProjID=333. ⚓

Photos by Victor Pitts.

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Naval Hospital Bremerton Diverts Biomedical Waste from Its Waste Stream

Operating Room's Initiative Reduces Landfill Biohazard Waste, Proves Cost-Efficient

WHEN IS A ton not a ton? When approximately 2,000 pounds of biomedical waste gets diverted from a landfill due to efforts of personnel at Naval Hospital Bremerton (NHB).

April 22, 2013 marked one year of success for Naval Hospital Bremerton's Main Operating Room (OR) sustainable practice of recycling and reprocessing single-use instruments.

fiberoptic instrument, passed through a small incision in the abdominal wall, which examines the abdominal cavity or performs minor surgery.) Much is disposable and not reusable. But the instrumentation once used is recyclable. Plastic parts can be grinded and/or melted down; metal components of copper and steel can be separated, recovered and reused.

The Main OR used to throw away three, 30-gallon bags of garbage per total joint surgery case. Now they recycle three, 30-gallon bags of plastic and have just one 15-gallon bag to throw away.

"It's a significant reduction in the waste sent to a landfill. It's really an incremental amount of waste product, and we're staying on top of the

The OR's environmental initiative has not only reduced landfill biohazard waste, but also proved cost-efficient.

The OR's environmental initiative has not only reduced landfill biohazard waste, but also proved cost-efficient by saving \$2,300 from enacting biomedical waste disposal processes, as well as enhanced their recycling efforts by receiving brand new sterile items from instruments turned in.

A prime example of the OR's sustainability plan concerns medical supplies involved in laparoscopic usage during a procedure. (Note: A laparoscopic procedure involves the use of a flexible

"Due to our case load, we might use a dozen specific devices a day and each is recycled instead of sending them to a landfill," said Kevin Stevenson, Main OR Nurse and prime coordinator of the OR efforts along with Cmdr. Fran Slonski, Quality Management Department Head, and previous Main OR Department Head. Stevenson and Slonski received the inaugural NHB Sustainability Award certificate last year on behalf of the OR for this endeavor.

process because it's easy to take for granted. We even recycle the instrument wrappings to use again," Stevenson said.

"This program is becoming more main-stream because of its obvious benefits. It is also supporting our environmental sustainability. Environmental management is focused on waste diversion, reduction, and minimization," said Ramon Calantas, NHB Facilities Management environmental technician.

“We have a lot of great nurses, both military and civilian, working on this project,” said Slonski.

“This is a result of staff members such as Cmdr. Slonski and Kevin Stevenson providing insight on how we can minimize our impact of the environment. It’s process improvement at its best,” Calantas said.

has staff members diligently placing single-use devices into Sharps Containers (a container used to place medical needles and other sharp medical instruments after use) for biomedical waste. Single-use devices include bipolar cutting forceps, laparoscopic dissectors, graspers, scissors, suture passers, ultrasonic scalpels, and any sharp-pointed surgical instruments.

and without needles are also disposed in the Sharps Containers.

According to Robert Mitchell, NHB Environmental Manager and Sustainability Program Manager, sustainability is to the ability to meet present needs without compromising the ability of future generations to meet their own needs.

The OR has reduced the amount of biomedical waste disposed, reduced the cost of disposing of medical waste, and saved money by buying back at half the price of a brand new device.

Calantas added that the OR recycling/reprocessing efforts are a prime example of keeping the command more environmentally sustainable. A prime example of the OR reprocessing single-use instruments

The primarily red-white colored Sharps Containers in the OR are also used to dispose of all sharps instruments such as needles, blades, scalpels, razors, pins, clips, staples, and puncture-creating items. Empty syringes with

“Stevenson has been the driving force of the Main OR team. He has helped to coordinate overall environmental awareness that has reduced the amount of solid waste leaving the Main OR, increased



All lined up and ready to go. Kevin Stevenson, NHB Operating Room Nurse, ensures that the department’s recycling efforts are prepped to accommodate the upcoming day’s case load.



“A place for everything and everything in its place” is the daily norm of NHB’s OR when it comes to recycling products from regular waste to biohazard waste to pharmaceutical waste.

recycling outflow and advocated product substitution as a sound economic practice,” said Mitchell.

“We work closely with our Environmental Department and brought in a contractor, Stryker Sustainability Solutions, to coordinate and accommodate the ambitious

sustainability plans we implemented. Without them, this would not have happened. We wouldn’t be handling paper, plastic and any medical devices as properly as we do now,” said Stevenson.

Stevenson notes that prior to partnering with Stryker, the OR devices were just disposed of into large Sharps Containers. Now, Stryker can sell devices back to NHB with up to 50 percent of cost reduction after each device is broken down to bare components, cleaned, sharpened, reassembled, packaged, and sterilized. The OR has reduced the amount of biomedical waste disposed, reduced the cost of disposing of medical waste, and saved money by buying back at half the price of a brand new device.

“Re-processing is really all about changing habits. It is keeping people from falling back into former ways of handling waste product. Kevin is a champion of the cause because he has shared his awareness and discipline with those with whom he works. As former military, we know that service members tend to pick up on new instructions quickly and follow through.

The Basics About Naval Hospital Bremerton

NHB IS A community-based acute care and obstetrical hospital, offering expert primary care, emergency care and a broad range of medical and surgical specialties, with 40 inpatient beds (with expansion capacity to 72). The hospital is conveniently located between Naval Base Kitsap (NBK) Bremerton and Puget Sound Naval Shipyard and NBK Bangor. NHB is parent command for three Naval Branch Health Clinics and the Puget Sound Family Medicine Residency Program. The three clinics are located at Puget Sound Naval Shipyard, NBK Bangor and Naval Station Everett.

NHB has a three-fold primary mission to support warfighters, past and present, and their families:

- Providing exceptional care anytime, anywhere.
- Shaping military medicine through training, research, and graduate medical education
- Preparing forces for deployment.

NHB and its clinic’s staff consist of approximately 1,400 dedicated military, civilian, contract and American Red Cross volunteer personnel.

For more information about NHB, visit www.med.navy.mil/sites/nhbrem.



The efforts here at NHB are really great,” stated Jayson Ayers, Stryker Sustainability Solutions representative.

“We are seeing a nearly 40 percent reduction in supply costs related to the purchasing of the reprocessed items. The first item we started buying as a reprocessed unit is saving us \$240 per box of five from purchasing them brand new. Creative business practices such as these will allow us to make better use of the government funding, reduce our environmental footprint, and prove our dedication to being responsible stewards for the government,” explained Lt. Cmdr. Richard B. Lawrence, Main OR Department Head. “Even with the custom set-up packs used in surgeries, the provider has been accommodating to the OR needs and concerns to achieve additional reductions in our waste stream,” he continued. Additionally, items such as sterile trays for equipment (to be placed on) are also being recycled to help meet environmental concerns.

“We are always interested in evaluating our partnerships with current and prospective vendors who can help our department and the Command reduce our environmental impact. All of these efforts are a huge team approach from the department, the vendors, and the other parties in the Command who help us along the way from Materials Management to the Environmental team. Without their support and dedication, we would have never been able to accomplish this goal,” Lawrence said.

Along with the Sharps Containers, NHB has a variety of color-coded medical waste disposal devices located at specific departments, clinics and offices throughout the command, such as:

- Clear bags for regular waste (trash/wrappers, dressings, diapers, gloves, empty drainage bags, disposable patient items and sanitary napkins)
- The black box for Pharmaceutical Waste including residual medication, intravenous (IV) bags and tubing with residual added medications (no blood)
- Vials, tablets, capsules, powders, liquids, creams/lotions, eye drops, suppositories, inhalers, unused nicotine gum or patches, nitroglycerine tablets
- Residual medications expelled from medication-filled syringes
- Partially used/residual prescription or over-the-counter medications



Just an arm's length away. Sharps Containers in the OR are used to dispose of all sharps instruments such as needles, blades, scalpels, razors, pins, clips, staples, puncture-creating items. Empty syringes with and without needles are also disposed of in the Sharps Containers.

The Biohazardous Waste red bags are used for:

- Blood and all potentially infectious material
- Bloody tubing, hemo/pleurovac chest drainage systems
- Soaked/dripping bloody dressing/intact glass or plastic bottles containing bloody fluids
- All disposable items soaked or dripping with blood or other potentially infectious material
- Maternity absorbent pads from obstetrical patients

The Trace Chemo Waste in yellow boxes are reserved for all supplies used to make and administer chemo medication, such as tubing, empty bags/bottles/vials, syringes, gloves, pads, masks, gowns and wipes. Pathological Waste such as human tissue and organs, placentas and similar tissues from surgery, delivery or autopsy procedures is disposed of in gray tubs. The color-coded medical waste disposal containers also have specific handling instructions that include maximum weight allowances. [↕](#)

Photos by Douglas Stutz.

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Sustainability Approaches Proven Successful at Naval Installations

Efforts Range from Using Facility Energy More Efficiently to Diverting Construction & Demolition Debris

EVERYONE IN THE Navy wants to see their installation run like a well-oiled machine—smarter, more efficiently, with less waste—to better accomplish the mission, and at lower cost—to do the right thing by the environment, not just now but for future generations. Sustainability brings together both of these concepts as successfully demonstrated by a number of naval installations.

1. The Continued Availability of Resources Critical to the DoD Mission is Ensured
2. DoD Readiness Maintained in the Face of Climate Change
3. The Ongoing Performance of DoD Assets Ensured by Minimizing Waste and Pollution
4. Continuous Improvement in the DoD Mission Achieved through

ties Criteria. But making a sustainable Navy a reality doesn't happen at the top, it happens on the ground, on Navy installations. This article compiles examples of eight installations that have demonstrated effective approaches for improving the sustainability of their operations. Their stories provide tangible examples of ways to do things better, while often saving money in the process.

DoD defines sustainability as the ability to operate into the future without decline—either in the mission or in the natural and man-made systems that support it.

Conducting the Navy's day-to-day business sustainably makes sense, and it's Department of Defense (DoD) policy. Every June, the Under Secretary of Defense for Acquisition, Technology and Logistics submits the DoD Strategic Sustainability Performance Plan, which is built around four mission-oriented sustainability objectives:

Management and Practices Built on Sustainability and Community

Complementing this framework are policies such as the Secretary of the Navy goal for half of Navy installations to be net zero energy consumers by 2020, and a suite of DoD and Naval Facilities Engineering Command (NAVFAC) guidance documents and standards such as the Unified Facili-

Using Facility Energy & Potable Water More Efficiently

Performance Contracting: Paying for Projects with Savings

Naval Air Station (NAS) Whiting Field in Florida awarded a \$3.6 million Utility Energy Service Contract performance contract in April 2012 to reduce fossil fuel and water consumption by 12 facilities on the installation.



Just as large expanses of otherwise underutilized DoD land are ideal for solar projects, so are rooftops. Also, the protection provided by the panels can lengthen the lifespan of the roof.

In a performance contract, the service provider is paid from the savings in energy—and often water—generated by the improvements the provider implements under the contract. NAS Whiting Field had a broad range of work conducted under the contract for renewable energy and energy and water efficiency. The utility, Gulf Power, installed advanced building energy monitors and made upgrades to heating, ventilation and air conditioning

(HVAC) systems, including installing direct digital controls for HVAC equipment. It upgraded infrared heaters, chiller compressors, and lighting to more energy efficient models. Personnel were trained on how to optimally operate energy-intensive equipment, including scheduling its use to reduce peak demand for energy. For water efficiency, the contract included installing high efficiency plumbing fixtures. Finally, more than 8,000 square feet of solar window film was installed in the two bachelor quarters, and 1,200 solar photovoltaic panels were installed on the rooftops of two squadron training buildings. As a result of the work, the base is reaping annual saving of 14,850 million British thermal units in energy—a drop of 10 percent—and 1.3 million gallons of water, a dramatic reduction of 74 percent. This translates into avoided costs by the installation of more than \$300,000 every year.



Air duct inspection at Naval Station Rota in Spain. Many energy efficiency improvements are low cost and generate ongoing revenue from the resulting savings.

Partnering with Local Authorities for Reclaimed Water

In February 2012, NAS Corpus Christi and local council members entered into an agreement to bring reclaimed water from the city's wastewater plant—treated but not potable—to the installation golf course. The City of Corpus Christi Water Department arranged and paid for the infrastructure (purple pipe and associated pumps, valves and controls) to take the water from the wastewater treatment plant to the fence line of the base, a little under one mile away, through a \$1.0 million contract. The base Department of Morale, Welfare and Recreation handled the infrastructure on the base, at a cost of \$1.2 million. The cost to the base will be repaid quickly, however. With the new system, the base is using 96,000 gallons of reclaimed

water per year, which the City provides at no cost. This represents annual savings for the installation of \$384,000 over using potable water for a payback period of just three years and two months.

Increasing Renewable Energy

In January 2012, construction began at Naval Air Weapons Station China Lake on what will be the Navy's largest solar installation—a 13.8 megawatt photovoltaic array consisting of 31,680 panels. Under a 20-year power purchase agreement (PPA), a financier (an affiliate of MetLife, Inc.) purchased the solar system. It was designed and built by a private solar company (SunPower Corp.), which will also operate and maintain the system. The role of the installation is to provide the land for the project and purchase electricity from it, at a rate locked in below the current retail utility rate for 20 years. The 20-year term for the PPA—the first one of this duration with the

federal government—gives the Navy a significantly better rate than 10-year PPAs. The Navy incurs no upfront costs. The array is projected to meet approximately 30 percent of the installation's annual energy needs and reduce its energy costs by about \$13 million over the 20-year life of the contract. The components of the solar energy system are shipped in pre-assembled power block kits to facilitate rapid installation on the site.

Decreasing Vehicle Petroleum Use

In Fiscal Year (FY) 2009, Naval Station (NS) Everett began working with the NAVFAC Northwest Navy Operational Support Center to convert their non-tactical vehicle fleet to run on 100 percent alternative fuel. By February 2013 the transition was complete, creating a fleet of 200 light and medium duty vehicles. All vehicles in the fleet are either low speed electric vehicles, hybrid electric vehicles, or compatible with biodiesel or E85 (a

blend of 85 percent denatured ethanol fuel and 15 percent gasoline). This makes Naval Station Everett the first installation in the Department of Navy to have a vehicle fleet powered almost entirely by alternative fuels. (The fleet still uses some gasoline in E85 flex fuel vehicles because the fleet managers found that using gasoline for one out of every five tanks help keeps the engine running smoothly.) The installation accomplished this through a three-prong approach of:

- Installing a biodiesel and E85 filling station on-site
- Exchanging 46 full size vehicles for low speed electric vehicles
- Aggressively making use of the General Services Administration (GSA) schedule for acquiring, replacing and exchanging vehicles

Looking ahead, NS Everett is committed to expanding its electric vehicle charging infrastructure to support not only the current low speed electric vehicles, but future full-size electric vehicles and plug-in hybrids. As part of this effort, the installation is negotiating with GSA to run a pilot program for compact and mid-size electric vehicles.

Managing Stormwater Runoff

The construction contract for \$6.3 million in improvements at Naval Weapons Station Earle in New Jersey included the Navy's low impact development requirements as



Low-speed electric vehicles like this cargo van are well suited for vehicles confined to the installation grounds.

well as those of the State of New Jersey. Compared to pre-developed conditions, the state requires annual groundwater recharge to be maintained, and runoff rate, runoff volume, and total suspended solids to be reduced. The project's stormwater management measures included two underground precast concrete infiltration basins to accommodate the runoff from most of the impervious areas within the project site. The basins provide groundwater recharge for 100 percent of the site's annual preconstruction groundwater recharge volume, and completely infil-

more efficient, and improved the identification of opportunities for solid waste diversion, as well as other sustainability goals. Specific components of the Sustainable Solid Waste Program are as follows:

- The installation requires C&D debris contractors to submit a C&D Debris Monthly Diversion Report which summarizes their waste diversion efforts. The installation also provides these contractors with a list of local C&D recyclers at pre-construction meetings.

Naval Station Everett is the first installation in the Department of Navy to have a vehicle fleet powered almost entirely by alternative fuels.

trate runoff from a two-year storm. The project included the construction of a new building, and a rainwater collection and reuse system was installed to collect and store rainwater from the roof. The system not only reduces stormwater runoff, but the installation uses the harvested water to flush toilets. As a result of the measures, the annual runoff flowing from the site contains 80 percent less total suspended solids on average, and the peak runoff rates for 2-, 10-, and 100-year design storms are less than they were prior to the project.

Reducing Waste

Putting Construction and Demolition Debris to Work

The Sustainable Solid Waste Program at Naval Weapons Station, Seal Beach in California diverted almost 99 percent of its construction and demolition (C&D) debris away from disposal in FY 2012, avoiding over \$141,000 in disposal costs. The installation achieved this remarkable success by making clear demands of contractors and providing them with guidance, including information on avenues for reusing and recycling construction debris. The installation has an on-site manager for the Sustainable Solid Waste program who works collaboratively with the installation's Environmental Aspects and Requirements Review process. The process had been merged into the business processes of the base's Public Works Department for the planning, design and construction of all Facility Engineering and Acquisition Department projects. The partnership has improved the effectiveness of project reviews, improved compliance, made project execution

- Contract oversight of Facility Engineering and Acquisition Department projects now includes continuous monitoring of municipal waste dumpsters and construction sites.
- Contractors for projects that cost more than \$100,000 and generate more than one ton of C&D debris must submit a Solid Waste Management Plan. The Plan must be approved by the program's on-site manager, and must describe actions to be taken to reduce solid waste generation and approaches to be used in recycling and reuse. It must also estimate the types and quantities of waste to be generated, and include a target diversion percentage rate (at least 50 percent of the total generated) and a list of specific waste materials that will be either recycled or salvaged for resale or reuse.

To ensure that organic waste is recycled or composted, program management provides direction and assistance on scope of work specifications for projects that produce organic waste through vegetation trimming, clearing and grubbing.

Reclaiming Used Fuel

The Naval Supply Systems Command Fleet Logistics Center Pearl Harbor provides logistics support to the Pacific Fleet. At its Fuel Oil Reclamation Facility, the Center reclaimed 237,000 gallons of fuel in FY 2010 and FY 2011 that could not be used (was "not ready for issue") until it was reconditioned. Previously, the fuel would have been disposed of as



Hosting events at NBSD to turn in unwanted electronics ensures their environmentally sound disposition and frees up storage space.

oily waste, but its reclamation enabled the Center to sell the fuel to a local refinery instead, generating a net savings of \$3.9 million. The installation made the reclamation possible by changing the procedures used for offloading used fuel onto barges at Joint Base Pearl Harbor Hickam. The new procedures chemically test the material placed onto each barge to

ensure that all material loaded onto barges intended for reclamation can be recovered as Fuel Oil Reclaimed, and is not contaminated with other material. This allows the entire load on such barges to be discharged to the Fuel Oil Reclamation Facility, rather than disposing of it as oily waste.

Electronic Stewardship

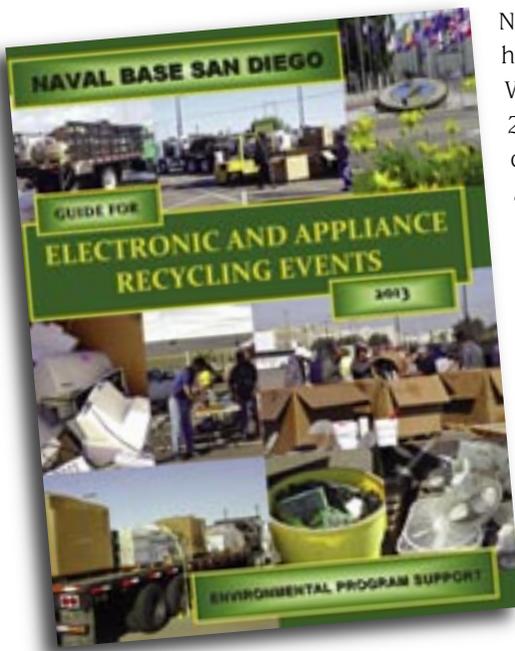
Naval Base San Diego (NBSD) hosted its seventh Electronic Waste Recycling Event in March 2012, enabling 35 Navy commands to get rid of old appliances and electronic waste, while knowing the material would be recycled or otherwise properly processed for disposition through the Defense Logistics Agency's Disposition Services. This year Commands turned in four and half tons of appliances and 14 tons of electronic waste, valued at more than \$200,000, which was properly recycled or resold. "E-Waste" Recycling Events are a proven

approach for the base. It has hosted seven in the past three years, and so far the events have pulled in more than 87 tons of electronics and 30 tons of appliances for recycling and resale, saving over \$1 million in disposal costs. The event accepts a wide range of government-owned materials: computers, laptops, electronics of all sorts, refrigerators, microwaves, televisions, cell phones, video cassette recorders, copiers, printers, tape players, modems, compact disc players, radios, typewriters, scanners, telephones, washers, dryers, freezers, trash compactors, space heaters, water heaters, air conditioners, ovens, stoves, and dishwashers. The events are held in the base's "wet side" parking lot, open to active duty, reserves and civilian Navy personnel. NBSD has developed a guide on how to conduct the event, available at: www.cnic.navy.mil/navycni/groups/public/documents/document/cnicp_a300509.pdf.

This set of success stories illustrates the breadth of sustainability, and provides concrete examples that other naval installations can use in formulating their own paths to operations that are both smarter and more sustainable. A future issue of *Currents* will focus on sustainability successes with facility energy, water and buildings. If you would like to highlight in that issue a successful approach your installation has taken to improve sustainability, on these topics or any other, please submit your story directly to Judith Barry. [📧](#)

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