

## **Environmental Award Submission, Naval Station Great Lakes - 1 OCT 2010 through 30 SEP 2012**

### **Sustainability – Non-Industrial Installation**

#### **Introduction**

Naval Station Great Lakes (NSGL) serves as the “Quarterdeck of the Navy” transforming civilians into Sailors, and Sailors into highly qualified technicians since 1911. As the single site for recruit training, Naval Station Great Lakes’ mission is to develop men and women into highly skilled, disciplined and motivated Sailors for the fleet. NSGL is also home to Training Support Center Great Lakes, where most of the Navy’s surface warfare specialty training takes place. Total base population is over 20,000 military service members, family dependants, civilians, and contractor personnel. Annually, more than 37,000 men and women complete recruit training with over 175,000 visitors attending weekly Pass-in-Review graduation ceremonies. Additionally, over 25,000 Sailors attend initial and advanced training schools. Over 55 tenant commands and organizations reside at NSGL representing all branches of the Department of Defense, including: Navy Recruiting District Chicago; Marine Air Control Group 48; the U. S. Military Entrance Processing Command; Navy Drug Screening Lab; Naval Health Clinic Great Lakes; Naval Facilities Engineering Command Midwest; Navy Region Midwest Reserve Component Command; and many others. The installation also hosts two flag commands – Commander, Navy Region Midwest and Commander, Naval Service Training Command.

NSGL is located on 1,920 acres along the shore of Lake Michigan in northern Lake County, Illinois and is 30 miles north of the city of Chicago. The base is within the incorporated limits of the city of North Chicago and bounded by the Village of Lake Bluff and Chicago’s “Gold Coast” to the south. The natural environment include: lakefront beaches, rare dune ecosystems, coastal wetlands, inland ravine and hardwood forests. The surrounding built-community ranges from picturesque private golf course and residential subdivisions in rural settings to highly developed light industrial, chemical and pharmaceutical industry and lower socio-economic urban residential communities. A socially moderate political climate is predominant in Lake County, with strong support for environmental stewardship and sustainability. Lake County is one of the fastest growing counties in the United States, with over 40% growth over the past 20 years, and is expected to grow another 38% by 2050. The county has adopted a strategic goal of promoting a sustainable environment as outlined in their “Strategy for a Sustainable Lake County” that incorporates energy efficiency and conservation, water supply planning and conservation, solid waste recycling, pollutant reduction, and protecting and restoring ecosystems and open space.

NSGL resides within the Chicago Area Moderate Non-Attainment Area for Ozone and is also within highly regulated watersheds that flow to Lake Michigan. Lake Michigan and the Great Lakes contain 20% of the world’s freshwater resources and supply drinking water to over 33 million people in the U. S. and Canada. The installation has a nationally registered historic district and 45 historically significant contributing buildings.

**Background:**

Although NSGL is not an industrial installation, its large size, population, infrastructure, support services and industrial scale laundry facility combine to create complex environmental and sustainability challenges. Primary environmental aspects include air emissions and natural resource consumption in heating and cooling the over 9.6 million square feet of administrative and training buildings. A central heating plant with 1.2 Million MBTU capacity generates steam heat, hot water, as well as generates 20% of the bases electrical needs. Advanced trainers such as the gas turbine trainers and fire fighting trainers provide further air emission challenges regulated under a Title V Clean Air Act Permit. The large medical and dental clinics, drug testing laboratories, and treatment facilities also result in unique environmental challenges to manage hazardous wastes and wastewater discharges. An aggressive construction program and proximity within the Lake Michigan watershed area and an impaired waterway in Pettibone Creek result in challenging stormwater management, and permitting for construction and industrial sites. Large fuel storage near shorelines and Navy operations and recreational waterborne activity result in the installation being classified as a Substantial Harm Facility per the Oil Pollution Act of 1990, requiring an aggressive spill prevention and spill response capability. The Historic District and contributing facilities offer challenges in balancing cultural preservation with energy efficiency and modern mission requirements.

Programmatic management is accomplished through leadership commitment and a strong culture of teamwork across commands and tenants. NSGL has driven successes across the full spectrum of environmental sustainability. The installation leads the Navy in sustainable vehicle fleet and alternative fuels use, sustainable laundry services, sustainable construction, and energy conservation. With the smallest environmental staff and leanest budget of any large CONUS installation, the NSGL team has leveraged support from higher echelons, forged partnerships with external agencies, industry, academia, and environmental groups and has engaged the local community to sustain effective environmental stewardship programs. An Environmental Management System (EMS)-centric approach is used to focus on significant aspects and alignment with the 2010-2011 DoD Strategic Sustainability Performance Plan (SSPP). As part of the EMS program, an active aggressive Cross-functional Team (CFT) comprised of representatives from all tenant commands in addition to NSGL Public Works Department Shops, FEAD, Transportation Asset Management and Utilities facilitate the environmental communications, support and education of goals and objectives throughout the entire installation. The team has aggressively pursued targets and objectives, which has resulted in substantial pollution reductions, energy and natural resource conservation, and a pursuit of clean energy initiatives to meet fleet and facility needs. NSGL leadership includes Environmental reports and updates in the weekly Public Works Department staff meetings and the CO's regular Integration meetings with all tenants.

The NSGL EMS in 2011 and 2012 included key objectives to reduce energy use, reduce greenhouse gas emissions, reduce mercury in wastewater discharge, and improve stormwater pollution prevention during construction activities. These objectives receive Commanding Officer and leadership commitment and have driven operational planning for all commands and tenants through the EMS Management Cross Functional Team, Solid Waste Committee and the Pollution Prevention (P2) Committee and Base Energy Advisory Board. The installation has actively engaged with outside partners to share technology and to benefit from technology

advances in industry and academia. Partnerships include the Region 5 Sustainability Network with USEPA (USEPA Federal Green Challenge Team) and six states, pollution prevention partnership with the Illinois EPA, Illinois Sustainability Technology Center (University of Illinois), ex-officio membership in the Solid Waste Agency of Lake County, Illinois Department of Natural Resources and Lake County Storm Water Management Commission, conservation partnerships with the Illinois Audubon Society, Lake County Openlands, Lawrence Berkley National Laboratory, participation on the Lake County Emergency Planning Committee, North Chicago Community High School, Goodwill Industries, and Forest City Military Communities, LLC, housing, among others.

The installation has an active program to promote green procurement and includes a local specification in all contracts to require preferable products, where economically feasible. Several of our service providers including (Clarke Pest Management and Fluorecycle, Inc.) have earned the 2012 Governor of Illinois Sustainability Award. All office paper and supplies include recycled content above federal goals. The environmental staff and EMS-CFT regularly train purchasers and credit card holders on green procurement expectations. To further illustrate the installation's commitment to environmental protection, their oil spill team annually participates in local and regional spill preparedness and events and was the first external Navy Region team to respond to the Deepwater Horizon oil spill in June 2010.

### **Summary of Accomplishments**

From 1 OCT 2010 through 30 SEP 2012, the NSGL Sustainability Program made a major and lasting impact to the Navy and our nation through incorporation of environmental and mission sustainment into facility and operational planning. The installation has an excellent compliance record and trust-based relationships with state and federal regulators. NSGL established objectives to reduce impacts to the installation budget, while protecting the environment and sustaining the training mission. Sustainable development, construction and energy are incorporated into the station master plan, regional shore infrastructure plan, and in the energy advisory board and EMS cross functional team efforts. These efforts have resulted in a continued 29% energy intensity reduction -- nearly double the federal goal, to date. Total Green House Gases (GHG) regulated air emissions have been slashed from 81,300 tons in 2010 to 63,893 tons in 2011, a 21% reduction as a result of fuel substitutions, power plant process changes and green construction. The installation increased recycling by 114% in 2012 compared to 2011. Material substitutions have continued to reduce hazardous waste generation by 60% from 2008 levels, driving the installation to near small quantity generator status. Toxic wastewater concentrations have also been reduced by 99% through incorporation of industry-leading dental wastewater treatment systems and use of best management practices. These initiatives have reduced energy costs by over \$11 million per year, reduced environmental compliance costs, reduced impacts to the environment and correspondingly improved public perception and support for the Navy mission.

The installation has been recognized with environmental and energy excellence awards from NAVFAC and has received Blue and Gold Department of Navy Energy and Water Management Level of Achievements from ASN (I&E). In addition, NSGL received the Governor of Illinois 2012 Environmental Sustainability Award and received Important Bird Area (IBA) status from the National Audubon Society and the Illinois Department of Natural Resources. NAVSTA Great Lakes has also received recognition from the USEPA for the USEPA Green Challenge Program for successful completion our Green Challenge FY 2012 Goals.

**Green Fleet** – NSGL is the Navy’s leader in implementing sustainable practices in operated vehicle fleets. Our visionary transportation leaders have planned and implemented a holistic approach to a sustainable fleet, with tremendous successes to date and further enhancements are planned. Over the past several years, NSGL has aggressively recapitalized their fleet with alternative-fueled vehicles, developed fueling stations for compressed natural gas, E-85 Ethanol, and BD-20 Bio-Diesel, and implemented innovative fuel management systems to increase alternative fuel use.

NSGL has a project in place to increase electric vehicles in future acquisitions and the installation of ten electrical charging stations at key locations across the installation is scheduled for completion in FY2013. Another key component to their successful program is an automated chip key refueling system that is programmed to allow only the use of alternative fuel in vehicles that are flex fuel capable. This feature combined with new installed BMPs for vehicle operations and the addition of low-consumption and electric type vehicles has resulted in an increased miles per gallon metric from 5 MPG to 7.25 MPG, a 32% increase.

AFV Type	Increase
CNG/E-85	29%
Electric	25%
MPG	32%

The NSGL transportation team has also been very effective in reducing vehicle usage and resulting air emissions and fuel consumption through implementation of shuttle bus service, vehicle usage surveys, vehicle pool consolidations, and ride-sharing programs. The installation entered a partnership with Goodwill Industries, Inc. to provide base-wide shuttle services for Sailors and contract workers. Rigid monitoring of vehicle use resulted in the reduction of 20% of vehicles base-wide and increased ride-sharing which facilitated the elimination of over 110 older vehicles with poor emissions and fuel mileage as compared to NSGL’s newer inventory.

**Public Outreach & Education** – The installation has shared its successes and enhanced awareness of alternative fueled vehicles with our surrounding community and region-wide through off-site demonstrations and vehicle displays held in conjunction with Earth Day and Navy Day events at the North Chicago Community High School, Edgebrook Grade School, McHenry, Illinois and Lake County Forest Preserve District, North Chicago, Electronics Collection and Education Event, North Chicago Navy Pier in Chicago, IL and in environmental and energy fairs hosted at the installation.

**Pollution Prevention/ Waste Reduction** – As part of the Pollution Prevention and Solid Waste Management Committee activities, a new program was introduced during FY 2012 to divert the green landscaping waste from the solid waste stream. A separate dumpster was provided and all green type wastes are collected separately for offsite composting. It is projected that 10-15 tons/year of green waste will be diverted from the solid waste stream with this new program. Again, as part of the P2 Committees efforts, an innovative food waste pulper-extractor system was introduced in 2011. The pulper-extractor system reduces galley waste by 70%. The remaining galley food waste is collected and utilized by a local compost facility resulting in the diversion of 340 tons/year from the solid waste stream. The P2 Team also in cooperation with the PWD-Utilities and Moral Welfare and Recreation (MWR) has installed a new parts washer system that is 100% solvent free and utilizes microbial technology (BioCircle). The BioCircle system is in a pilot study process for all of the MWR and Utilities maintenance departments and has resulted in a reduction of over 600 pounds of solvent waste per year. As part of pollution prevention and public outreach, the P2 Team also initiated an annual electronic collection event in celebration of Earth Day. The collection area was located off-station to allow public access and resulted in the dissemination of environmental information along with the collection of 8,319 pounds of electronic equipment.

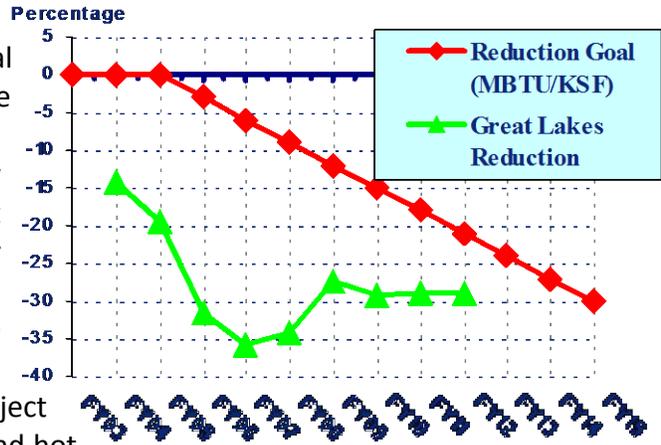
**Green Construction** - NSGL is a leader in sustainable construction. Since FY 2000 when a bachelor enlisted quarters project earned a pioneer certification under the U.S. Green Building Council LEED v.1 the installation has incorporated green building design elements in 17 construction projects.

With construction completed in FY 10/11, the “P-744 Special Programs Barracks,” has similar sustainable design aspects that meet ASHRAE 90.1-2004 and ASHRAE 55 standards. Unique window treatments adjust automatically for optimal thermal comfort while supporting natural daylighting and views. Energy conservation measures include use of occupancy sensors, low lighting load, DDC controls, four pipe heating/cooling, and zoned air handling systems. The site was designed to maintain 60% open space and reduce stormwater runoff by 35% as compared to pre-developmental conditions, and 81% of pollutant loads are removed from storm runoff. Use of native buffalo grass for landscaping reduces irrigation water use and grounds maintenance. This building is expected to meet LEED v.2.2 Silver, as a minimum.

**Energy Conservation** – NSGL leads the Navy in energy intensity reduction. The installation has achieved a 29% reduction in energy consumption and is 14% ahead of the established reduction goal established in EO 13423. The energy management team has a sustained history of identifying innovative ways to improve energy performance.

The installation formalized an improved energy program with a base-wide instruction and establishment of an Energy Management Team, an Installation energy advisory board, a full-time energy manager and a contracted resource efficiency manager (REM), and designating building energy managers for all facilities on the installation. This tiered energy management team has greatly increased energy awareness across the installation through clear Command Leadership commitment, frequent communication using several media, hosting energy fairs, and through face-to-face training. Energy outreach events included Earth day, July 4<sup>th</sup>, and Housing Community Forum.

In FY 2012, Phase I of the Energy Savings Performance Contract (ESPC) was completed for 54 buildings across the installation. The project significantly enhanced direct digital control systems and further improved lighting, performed HVAC system retro commissioning, installed variable frequency drive chiller systems, upgraded plumbing fixtures, and upgraded steam and boiler systems. This project affects 3.7 million SF (36% of the installation's total building space), is estimated to reduce these buildings energy intensity by a further 13%, and will save \$2.1 million per year in energy costs (4% base-wide reduction). NS Great Lakes is also in the early stages of a major utility upgrade project; P-816 "NSGL Steam Plant Decentralization". P-816 is one of the Navy's first major energy related construction projects. This \$91 million project will improve the efficiency of facility heat and hot water systems and is expected to result in \$9.2million per year savings in energy costs and up to a potential 15% reduction in total energy intensity.



Installation Comparison	Energy Reduction (since FY 03 Baseline)
NS Great Lakes	-29.0%
EO 13423 Goal	-15.0%

Renewable energy sources are a major part of EO 13423. Installation of a 100 kW wind turbine is currently underway for the Marine Air Control Group. The installation is also working a partnership with the Illinois Institute of Technology to further wind energy technology through on-and-off station demonstration projects.

NSGL has been a leader in supporting EO 13514 in partnering with industry and academia in hosting Environmental Security Technology Certification Program (ESTCP) demonstration projects. A "continuous automated commissioning" project is underway in collaboration with United Technologies, and the Lawrence Berkley National Laboratory. This project developed a high-end energy model for three buildings and monitors actual building system performance with predicted expectations to highlight under-performing components that are then scheduled for maintenance. Other demonstration projects proposed with this national laboratory and awaiting grant funding include: 1) "solar redirecting window film" with 3M Corporation to improve thermal performance and daylighting, and 2) "chiller control optimization" also with United Technologies. NSGL has also been selected by the Naval Facilities Engineering Service Center as a test site under their TECHVAL Program to implement a "direct replacement LED lighting" demonstration project.