

**Norfolk Naval Shipyard  
FY 2015 Chief of Naval Operations  
Environmental Award  
Sustainability, Industrial Installation**



An aerial view of Norfolk Naval Shipyard.  
Portsmouth, Virginia  
“Our mission is to safely repair US naval warships to technical standards, on time, and at cost.”-NNSY Command Philosophy

### **Introduction**

Established in 1767, Norfolk Naval Shipyard (NNSY) is America’s oldest shipyard and is currently dedicated to repairing, overhauling, modernizing, and providing logistic support for United States Navy warships. As the largest industrial facility within the US Navy, NNSY strives to integrate environmental compliance and stewardship into everyday activities. At NNSY, Naval Facilities Engineering Command Mid-Atlantic (NAVFAC MIDLANT) and Naval Sea Systems Command (NAVSEA) work in partnership to promote the highest achievable level of environmental sustainability. Excellence toward this goal is demonstrated in a variety of ways including:

- Hampton Roads Sanitation District Pollution Prevention Award winner for sustainability efforts
- River Star Award Winner from the Elizabeth River Project
- Green initiatives for the workforce
- Community involvement with local environmental groups

Located in the Tidewater Region of southeastern Virginia, the shipyard is composed of several noncontiguous areas totaling 1,275 acres, with a controlled industrial area of 498 acres. Two parcels of

land, the non-controlled industrial area and controlled industrial area, are identified as the main shipyard and are adjacent to the Elizabeth River (a tributary to the Chesapeake Bay). Other special use areas or annexes include: Scott Center Annex, South Gate Annex and St. Juliens Creek Annex.

NNSY has approximately 5,000 active duty military personnel and 10,300 civilian employees working with state-of-the-art technology to support Los Angeles and Ohio class submarines and Nimitz class aircraft carriers. As stated in our Environmental Policy: “Our mission is an honorable one that directly supports our nation’s security and the CNO’s three tenets: Warfighting First, Operate Forward, Be Ready. Encompassed within this philosophy is our responsibility to provide the voice for the environment as we execute our daily actions.” As such, we must establish a holistic environmental approach which minimizes the impact our actions have on our natural surroundings.

### **Background**

With such a multifaceted industrial area, the Occupational Health, Safety, and Environment (OSHE) Office works to support ship maintenance schedules while ensuring environmental compliance with local, state and federal regulations. To focus

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these efforts, 48 OSHE employees utilize the Environmental Management System (EMS) which integrates all aspects of environmental management and compliance. Some of the OSHE programs at NNSY include:

- Pollution Prevention (P2)
- Solid Waste Management
- Hazardous Waste/Material Management
- Storm Water Management
- Clean Air Compliance
- Source Reduction

Employees work together to maintain day-to-day sustainability while reducing the potential negative impacts our industrial work could have on the surrounding ecosystems. To ensure environment precepts are integrated into every project and process, NNSY employs dozens of Environmental Coordinators from multiple departments/commands to support these efforts.

### Accomplishments

#### ❖ Facilities Upgrades

The electroplating shop was replaced with a modern facility more closely sized to NNSY's current and future planned workloads. The facility began operations in 2014 and is taking advantage of technological advances to eliminate cyanide compounds from plating processes. This action significantly reduces hazardous waste generation, reduces hazards present to operational personnel, and helps eliminate spills to the environment. A recent performance test for the stack emissions from chrome plating showed the discharge levels were an order of magnitude lower than the prescribed regulatory limits.

The electrical system at NNSY's largest dry dock is being upgraded to accommodate the new Gerald R. Ford Class aircraft

carriers. The upgrade has resulted in the removal of over 4 million pounds of lead contaminated soil from an existing



USS Eisenhower leaving NNSY, Aug 2015, after a scheduled maintenance period

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) site in FY 2015. Soil from the project is being sent off yard for proper disposal and this action significantly reduces our long term environmental impact.

#### ❖ Air Quality Enhancements

A shipyard employee devised a modified can for storing brushes used to apply liquid neoprene for repairing electrical cables. The brushes are stored in toluene to prevent the neoprene from hardening between uses. A hole is drilled in the can's lid and the brush used to apply the liquid is permanently attached through the hole to the lid. The lid can be closed to reduce evaporation of the liquid and the brush can be used over and over until the can is empty. Before this idea, the shop was using an estimated four to six brushes and half a pint of toluene per day. The shop has reduced its waste and now uses only one to two brushes a month and less than one pint of toluene per week. The savings equates to more than \$7,000 per year. The reductions equate to 47 pounds of Volatile Organic Compounds (VOCs) per person per year and 300 pounds per person per year of solid waste (brushes).

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Another NNSY employee exemplified environmental stewardship through an initiative with Hertz to replace older forklifts (that are not compliant under new emission standards) with newer forklifts prior to the end of their economic life. To date, 53 of the 150 forklifts at NNSY have been replaced. By removing older forklifts and replacing them with more sustainable models, NNSY is reducing air emissions while at the same time saving time and money due to increased reliability and lower equipment maintenance costs.

Additional vehicle emissions are reduced through the Travel Incentive Program (TIP). Employees are encouraged to join a bus or van pool to travel to work and NNSY pays for employees commuting costs. The program is intended to reduce NNSY employee's contribution to traffic congestion and air pollution. Employees also benefit by not having to worry about parking, paying for gas, or tolls on their daily commute. Currently 593 employees use 40 vans and other forms of public transportation to report to NNSY on a daily basis. Since the 2013, 1,033 employees have participated in TIPs. According to the EPA, nearly four grams of CO<sub>2</sub> is emitted per mile driven for an average passenger vehicle. If the average drive is 30 miles per day for an NNSY employee, one employee can save an estimated 65 pounds of CO<sub>2</sub> per year by utilizing this program.

### ❖ **Source Reduction**

Repairing, preserving, and modernizing Navy ships requires large amounts of hazardous materials. The Consolidated Hazardous Material Reutilization and Inventory Management Program (CHRIMP) is an important program for sustainability and source reduction efforts at NNSY. CHRIMP assists the shipyard in better tracking, managing and using hazardous

materials (HM). An Authorized Use List (AUL) is utilized as a material management tool. Each HM currently on the AUL has been carefully reviewed for environmental impact and compliance before it can be used. Source reduction aspects of CHRIMP include:

*-Monthly Inventory Reconciliation* decreases excess inventory. Additionally, should there be excess inventory it can be returned to the supply organization for re-issue.

*-Improved shelf life management* reduces amount of HM being disposed of as hazardous waste due to a past expiration date.

*-Material return* to Hazmat lockers results in reuse of the material at the shop and project levels, thereby minimizing amount of HM to be acquired.

*-Advanced review of requests* for new HM before purchase reduces the amount of HM received into NNSY. Additionally, materials can be selected that will increase minimization efforts and are less toxic to the environment.

Once per quarter NNSY has a "Clean the Shipyard Day". Production is stopped so military members and civilians can work together to clean up the shipyard. Projects include cleaning office spaces, collecting outside debris, and cleaning up project work sites. These actions have had a significant impact on the cleanliness of our waterfront and have been recognized by multiple regulatory agencies. Although not quantifiable, these events have also had a positive impact on our aquatic friends in the river.

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### • Pollution Prevention

NNSY combines its efforts with NAVFAC's Navy Regional Recycling Program. The recycling program is a Qualified Recycling Program (QRP) and



NNSY solid waste sustainability goals

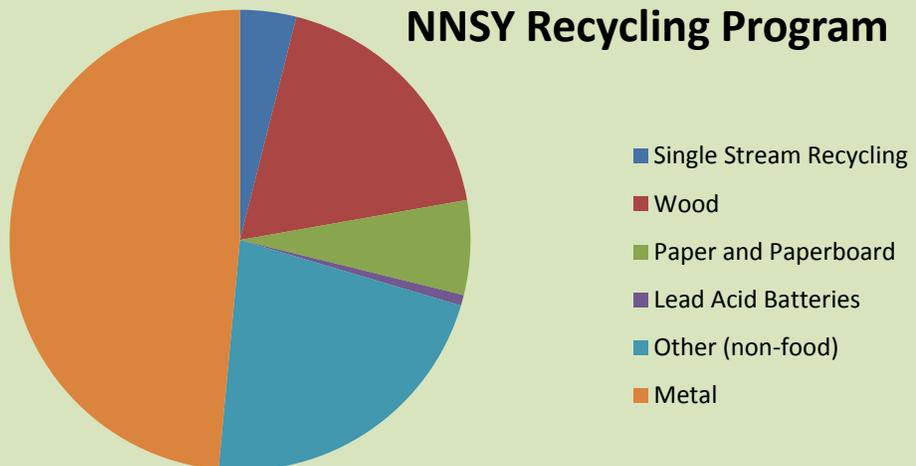
continues to grow and expand by utilizing the tipping facility at Building 1460 as a Material Recovery Facility (MRF). NAVFAC employees work diligently to segregate recyclables from shipyard dumpsters including scrap metal, cardboard, and wood. The OSHE solid waste program manager oversees the Permit-by-Rule for the MRF. In addition, NNSY has a single-stream recycling program in office areas that recycles all colors and grades of paper, aluminum cans, plastic bottles, toner cartridges, and small cardboard boxes.

NNSY is committed to diverting the maximum amount of solid waste possible from landfills. Disposal options with more environmentally friendly fates such as recycling and reuse are preferred. Another sustainable alternative is using NNSY Abrasive Blast Material (ABM) as alternative daily cover. As a policy to divert trash from the landfill NNSY sends burnable refuse to a waste-to-energy recovery facility. In 2014 and 2015, over 11,000 tons of trash were sent to be burned for energy conversion. During the same timeframe, the shipyard continued to improve its already robust recycling program with diversion rates of 86% and 94%, respectively.

The following were recycled by NNSY in FY 14 and FY 15:

- 278 tons single stream items
- 469 tons paper and cardboard
- 34 tons tires
- 1,291 tons wood
- 3 tons florescent bulbs
- 1,548 other (non-food)
- 52 tons lead acid batteries recycled
- 1,440 tons spent ABM, which was reused as a daily pre-cover for local

### NNSY Recycling Program



NNSY QRP recycling efforts for FY 14 and FY 15. Values are in tons.

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landfill to reduce the amount of fill dirt needed

- 3,428 tons scrap metal
- 322,212 tons Construction & Demolition (C & D) Debris was also recycled.

Overall, the economic benefit of solid waste diversion for FY 14 and FY 15 totaled \$20,774,830. NNSY continues to promote sustainability through the solid waste program, and continuously looks for more innovative ways to reduce, reuse, and recycle.

In addition to solid waste recovery, reuse, and recycling, NNSY treats industrial generated wastewater at either the Industrial Wastewater Treatment Plant (IWTP) or the Centralized Pier-side Pretreatment Unit (CPPU). Water is received from multiple processes related to the ship repair and is treated to meet the requisite water quality standards prior to discharging into the southern branch of the Elizabeth River. In 2014 the IWTP treated 2.8 million gallons of industrial wastewater and the CPPU treated an additional 26 million gallons of industrial wastewater.

### ❖ Sewer System Rehabilitation

The NNSY environmental staff has worked closely with NAVFAC MIDLANT to determine the most appropriate manner to manage NNSY's aging sewer system infrastructure. Starting in FY 2014, projects totaling \$175,000 were completed to upgrade the system. Some projects included sewer pipe and manholes repairs, sewer line replacements and lift station upgrades. Other projects to rehabilitate the sewer system include:

- Sewer Lift Stations 507 and 508 Upgrades – Updated the level controls to a transducer type and replaced the alarm systems

- Sewer Lift Station M-22 – Updated the level control to transducer type
  - Manhole Repairs – Replaced the frames and covers to 6 manholes
  - Purchased a new, more efficient bypass pump to be utilized at NNSY for backup
- These projects will increase the integrity of the sewer system and reduce infiltration from storm water. These actions are part of ongoing renovations at NNSY to minimize inflow and infiltration into the sewer system which in turn reduces NNSY's impact on the environment.



NNSY Employees picking up litter on Clean the Shipyard Day

### ❖ Energy Savings and LEED Certification

NNSY and NAVFAC continue to incorporate "green" designs into facilities throughout the shipyard. The benchmark for identifying and implementing green building design is the United States Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) certification. LEED certification provides verification that a building was designed and built using strategies aimed at achieving high performance in five key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality. NNSY is continuously working to achieve LEED certification in multiple areas.

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Solar panels have been installed to supply power to the new controlled industrial facility (CIF) and include one vehicle charging station. The panels will provide approximately 32,500 kWh of electricity, saving an equivalent of about 25 tons of greenhouse gases per year. The CIF has been designed with daylighting and when completed the CIF will meet LEED Silver certification.

Currently three buildings are planned for renovations to meet LEED certifications. All new buildings and facility renovations are installing energy efficient lighting. Motion activated lighting is also being installed to reduce NNSY's electricity usage and increase energy sustainability.

Working together, NNSY, NAVFAC MIDLANT and Portsmouth Naval Shipyard have created a pilot program to replace and improve industrial equipment and processes. The program utilizes an Energy Savings Performance Contract (ESPC) which is a form of third party financing that can be used to augment shipyard recapitalization. The goals of the program include:

- To acquire state of the art energy efficient technology and processes
- Guaranteed system and equipment performance savings
- Improve industrial equipment with an initial capital investment or use of appropriated funds

Some of the targets of industrial infrastructure and equipment include: forges, freeze protection, lathes, blasting and paint processes, motors, and fire protection systems. An ESPC installation wide audit on these targets was conducted during September 2015 and the final report is expected to be completed in January 2016.

To help meet the sustainability goal set forth by SECNAV of having 50% of DON

installation attains a net zero electrical energy status by 2020, NNSY uses energy from a waste-to-energy (WTE) facility. Wheelabrator Technologies Inc., located on NNSY property operates the refuse-derived-fuel facility and the WTE facility which provides 500k MBTU/year of steam. The WTE facility also provides 150-200K Mwh/year to the local electrical grid. This is achieved by up to 2000 tons of municipal solid waste (MSW) from the surrounding area being turned into steam and electricity.



Solar Panels in the parking lot of NNSY were constructed as a LEED component to the CIF.

The steam plant at St. Juliens Creek Annex utilizes a 32,000 lb/hr biodiesel boiler. It provides comfort heat for the buildings on the installation. 2016 will be the third year of using B20 fuel.

### Community Outreach and Recognition

Outreach and education for employees are vital to the continued environmental success at NNSY. For environmental programs and sustainability efforts to achieve longevity, employees must have a vested interest and understanding in them. Outreach is accomplished through a variety of events and media avenues.

In September 2015, a safety and environmental fair was held aboard the aircraft carrier the George H. W. Bush (CVN 77) where OSHE employees worked with Ships Force to raise awareness about

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safety and environmental programs for shipyard workers. Information included ways to reduce impacts on the environment on a daily basis both in and outside of work. This also promoted dialog between waterfront workers and OSHE program managers about sustainability in the shipyard.

Public awareness articles are often published in NNSY's newspaper "Service to the Fleet" and address a variety of topics including:

- Benefits of incorporating pollution prevention into everyday work at the shipyard
- The importance of preventing storm water pollution and actions individuals could take at work and at home to reduce pollution
- The importance of recycling

Monthly OSHE grams, an electronic newsletter, are utilized to incorporate pollution prevention methods into daily shop work and educate employees on environmental updates.

Electronic information displays are yet another way to keep employees informed about sustainability accomplishments at NNSY. The displays are located throughout NNSY.

During new employee training an introduction to NNSY's environmental stewardship, sustainability, and management systems is provided to these workers. Over 1,000 new employees have been trained in the last year and new employees will continue to be trained in the coming years.

OSHE employees are working with the Audio-Visual Department to create multiple training videos. These videos will focus on the environmental impacts that waterfront work could have on the river and how we can minimize these impacts by following

approved environmental processes. By properly training employees, waterfront compliance will be sustainable. In addition to using the videos for training purposes, they will be posted on "Yard-Tube".

### ❖ Hampton Roads Sanitation District (HRSD)

NNSY was awarded the Pollution Prevention and Perfect Compliance awards for 2014 by HRSD. The award is based on pollution prevention initiatives such as reducing the amount and toxicity of pollutants which would normally enter the waste stream. Reduction can occur by a variety of methods such as at the source, in-process recycling, and raw material substitution. Perfect compliance is awarded to a HRSD permitted user, who has demonstrated outstanding compliance for that year. NNSY received the award while servicing the installation by discharging 1.1 million gallons of industrial wastewater per day into HRSD's system. By receiving this award, NNSY is proven to be a dedicated steward for environmental sustainability and a leader for supporting its workforce and the Hampton Roads community.

### ❖ Elizabeth River Project (ERP)

ERP is an independent, non-profit organization, whose sole mission is to restore the Elizabeth River to the highest practical level of environmental quality through government, business and community partnerships. NNSY has supported the ERP's River Star program since its inception. On January 22, 2015, the Elizabeth River Project (ERP) awarded the Sustained Distinguished Performance River Star to NNSY for its continued efforts concerning restoration of the Elizabeth River. This award represents the highest level of recognition bestowed upon an organization by the ERP.