



Maryland Green Registry MEMBER

The Maryland Green Registry promotes and recognizes sustainable practices at organizations of all types and sizes. Members agree to share at least five environmental practices and one measurable result while striving to continually improve their environmental performance.

Northrop Grumman, Mission Systems



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Global Security
Member since October 2014

Management and Leadership

Environmental Policy Statement

It is the policy of Northrop Grumman Electronic Systems to conduct its operations in an environmentally responsible manner and to protect the health and safety of employees, contractors, customers, visitors, and the public.

Environmental, Health, Safety & Fire Protection Policy Commitment

< Insert Campus Name >

The management of this campus is committed to conducting operations in a manner that protects the health and safety of our employees, customers, contractors, visitors, and the public and is environmentally responsible. Meeting this commitment is a management objective and the individual and collective responsibility of all employees. To that end, we commit to:

- **Comply** with all applicable environmental, health, safety & fire protection laws and regulations and other applicable requirements to which the company is subject.
- **Reduce** the environmental impact of our operations and products by preventing pollution, conserving natural resources, managing energy use, and addressing past environmental contamination, as reasonably practicable.
- **Motivate and prepare** employees to take personal accountability for protecting the environment and creating a safe and healthy workplace.
- **Continually improve** our environmental, health, safety and fire protection programs and performance, as necessary.

We will periodically review and, as necessary, modify this policy commitment and communicate it to our employees and make it available to the public as requested. For the complete policy and sector-level requirements, refer to ES Command Media Policy K01, *Environmental, Health, Safety, and Fire Protection*.



< insert name >

Name

< insert title >

Title

Signature

Date

- *An adherence to all applicable EHSFP laws and regulations and other applicable requirements to which the company is subject,*
- *A dedication to the prevention of pollution, injuries, and illnesses, and*
- *A commitment to continual improvement.*

The following Environmental, Health, Safety & Fire Protection (EHSFP) Policy Commitment is signed by the highest level site manager and prominently posted throughout each Maryland campus.

Northrop Grumman's environmental sustainability program is referred to as greeNG.

The mission of greeNG is to:

- *Promote environmental sustainability by minimizing our environmental impact*
- *Improve communications of our environmental sustainability efforts and accomplishments to internal and external stakeholders.*



Environmental Team

The greeNG Leadership Team was created in 2008 as a result of the implementation of the greeNG Program. The greeNG Leadership Team is comprised of a variety of individuals from different business areas within Northrop Grumman Electronic Systems. Although the greeNG Program is managed by the Environmental, Health, Safety & Fire Protection organization, individuals from business management, communications, engineering, facilities, human resources, manufacturing, maintenance, real estate, and shipping and receiving are all represented.

The greeNG Leadership Team meets on a bi-weekly basis to determine business specific goals, implement pollution prevention plans, and encourage innovation in the area of environmental sustainability. The team is central to determining baselines, analyzing data, and establishing goals for future sustainability-related metrics.

In addition to the greeNG Leadership Team, an employee based team was developed for those who share a common interest in safeguarding the environment. The greeNG Employee Team is a grassroots group that was formed to help reduce our environmental impacts, both as individuals and as a company. The 250 member team encourages employees to get involved with employee education seminars, community events, and the overall "greening" of Northrop Grumman Electronic Systems.



Annual Environmental Goals

The Northrop Grumman Corporation is committed to becoming a leader in environmental sustainability by setting goals designed to reduce the overall impact of company operations. In 2009, the company committed to a 25 percent reduction in greenhouse gas (GHG) emissions (normalized to sales and measured against a 2008 baseline) by the end of 2014. Announced in August 2013, the Northrop Grumman Corporation achieved the inaugural GHG reduction goal two years ahead of plan; realizing a 25.3 percent reduction in carbon intensity from the 2008 baseline, resulting in a 26.9 percent absolute reduction in GHG emissions. Subsequently, on Earth Day 2014, the Northrop Grumman Corporation renewed its commitment to reduce GHG emissions by 30 percent from 2010 levels before 2020.

In 2010, the company added solid waste reduction and water conservation goals to its portfolio. The performance of all buildings greater than or equal to 100,000 sq. ft. is measured by a list of best management practices (BMPs). This list of practices was designed in consultation with Conservation International and drives solid waste reduction and water conservation in the company's operations.

In addition to the company-wide sustainability goals, Northrop Grumman Electronic Systems set a sector-specific goal for all employees and contractors to recycle at least 50 percent of their entire waste stream by the end of 2014. This goal is known as the "50/50 Recycling Challenge" and is a sector-wide, employee engagement campaign used to promote recycling practices throughout daily business.



Environmental Restoration or Community Environmental Projects

The Northrop Grumman Corporation recently sponsored a beautification event at MacArthur Middle School. Activities around the school included weeding, mulching, painting, and planting.

The Northrop Grumman Corporation is also a proud supporter of National Public Lands Day events throughout Maryland, an annual event focused on improving and enhancing the nation's public lands. Specifically, in 2012, the Northrop Grumman Corporation joined forces with the Aquarium Conservation Team to clean up the Fort McHenry National Monument and Historic Shrine in Baltimore. As part of this event for both National Public Lands Day and International Coastal Cleanup, twenty-one employees, along with friends and family, removed debris from the marsh and enhanced the area with beneficial native plant gardens. Employees from both Northrop Grumman's Electronic Systems and Information Systems sectors spent the day at water's edge in an area called Angie's Cove, where bagfuls of Styrofoam, plastic bottles and other trash were removed from the water and beach. At the end of the day, the

Northrop Grumman team was part of a larger effort that collected over 13,000 pieces of debris in 80 trash bags, totaling nearly 4.5 tons of debris removed from around Fort McHenry.

In addition, Northrop Grumman Electronic Systems hosts annual beach cleanup events at Sandy Point State Park and its Annapolis campus.

Waste

Solid Waste Reduction and Reuse

The Northrop Grumman Corporation established a list of facility and manufacturing-oriented BMPs geared towards reducing solid waste, not only in Maryland but throughout its campuses nation-wide. Goals have been set to reach a high level of compliance with this list and aim to reduce overall waste generation.

Specific examples of BMPs that were implemented include instituting a single stream recycling program for general purpose office materials (paper, bottles, etc.), implementing a program for reusing office furnishings, eliminating Polystyrene food containers, and implementing recycling programs for construction and demolition debris, electronic equipment, and batteries.

In 2013, the Northrop Grumman Electronic Systems Maryland campuses reached a 57.9 percent recycling rate; recycling 1,576.5 tons of material compared to 1,146.1 tons of disposed material.

Recycling

Recycling is not only a key component of the Northrop Grumman Corporation's solid waste reduction BMPs, but with the "50/50 Recycling Challenge," recycling rates have improved year-over-year since 2010. This campaign has created significant visibility for the commodities that are being recycled. Each Maryland campus follows single-stream recycling practices where aluminum cans, cardboard, glass, paper, and plastic bottles are all co-mingled for recycling. The campuses also recycle batteries (both rechargeable and non-rechargeable), construction and demolition debris, scrap electronics, precious metals, scrap metals, tires, and waste oil.

Included in the construction and demolition category, our waste hauler provides a detailed report of the items being recycled. Asphalt, carpet, ceiling tiles, concrete waste, masonry waste, metals, sheetrock, and wood are just a few commodities that are segregated and recycled by the vendor.

The Maryland campuses tracked a total of 1,576.5 tons of recyclable materials, achieving a 57.9 percent recycling rate in 2013. Contributing to this rate, the campuses recycled over 750 tons of single-stream commodities, nearly 700 tons of construction and demolition material, over 50 tons of scrap metal, almost 50 tons of electronics, approximately 5 tons of batteries and over 20 tons of miscellaneous materials.

Hazardous Waste/Toxic Use Reduction

Each Northrop Grumman Maryland campus is required to develop and implement an overall campus pollution prevention program that identifies the relevant environmental impacts of campus operations.

Environmental impacts include but are not limited to:

- *Generation of industrial waste and toxic pollutants*
- *Consumption of raw and other materials, energy, and water*
- *Emission of criteria pollutants, volatile organic compounds, toxic air pollutants, greenhouse gases, and ozone depleting substances*
- *Environmental degradation of land and water bodies*
- *Discharge of wastewater and storm water*

Minimization of environmental impacts is considered at all stages of campus activities including planning, product and process development, manufacturing, service and maintenance activities, supplier selection, process/facilities decommissioning, construction and demolition.

A specific example of hazardous waste reduction is the implementation of a solvent recycler for the reclamation and recycling of spent isopropanol at the Northrop Grumman Sykesville campus. Since installation in 2010, all spent isopropanol has been diverted for recycling and the purchase of virgin isopropanol has been reduced by greater than 90 percent.

Energy

Energy Efficiency

Throughout its Maryland campuses, Northrop Grumman Electronic Systems is committed to energy conservation and energy efficiency by installing innovative energy efficiency solutions. A Lutron Lighting Eco System was installed throughout the BWI campus in Linthicum, Maryland. The energy efficiency solution is a smart lighting system that uses electronic dimmable ballasts, occupancy sensors, and daylight compensating sensors to control light levels and the on/off functions of lighting fixtures. The initial system installation impacted

108,000 sq. ft. of office space and is projected to save 1.6 million kWh and nearly \$180,000 per year in electrical costs. This project alone resulted in a reduction of 814 metric tons carbon dioxide equivalent (MTCO_{2e}). Since the initial installation, Lutron Lighting Eco Systems were installed throughout much of the BWI campus and expanded into our Advanced Technology Laboratories campus and surrounding office buildings.

In addition to the Lutron Lighting Eco System, LED lighting is also a common energy efficiency solution to facility lighting enhancements. The Northrop Grumman Sykesville campus converted all interior office space and warehouse space to LED. Exterior lighting, including parking lot and security lighting, was also converted to LED solutions.

Outside of lighting enhancements, facility mechanical systems such as HVAC air handler units, air compressors, boilers, chillers, cooling towers, and motors are being replaced with more energy efficient technologies.

Furthermore, innovative projects, such as escalator replacement, also incorporate energy efficiency into their design. The BWI campus replaced four of its twenty-plus year old Schindler escalators with new Otis NCE environmentally-friendly escalators. The new escalators are equipped with the Otis Eta Plus Power Monitoring System, an electronic power monitoring system that controls energy consumption by monitoring the number of passengers and applying appropriate torque levels. Whenever the escalator is carrying less than its rated load, the system applies less torque resulting in an overall reduction in energy. This feature is credited with a 9 percent reduction in energy compared to the baseline design.

Transportation



Employee Commute

At Northrop Grumman Electronic Systems, there are a variety of well-established "Alternative Work Arrangements." Each agreement is designed to help employees maintain the flexibility of work and life needs, but also contributes to reducing the sector's carbon footprint. Electronic Systems offers a "9/80 Program", which allows employees to work 80 hours in nine days rather than ten. A "Compressed Work-Week" is also available and allows employees to work four 10-hour days. Often times, an employee can work with his or her manager to implement a telecommuting or hoteling schedule. Telecommuting or hoteling allows an employee to work at a location closer to their home without requiring the employee to be at his or her designated work location. While many "Alternative Work Arrangements" are geared toward enhancing employee work and life needs, there is also an environmental benefit associated with the

arrangement. Approximately 70 percent of Electronic Systems employees take advantage of “Alternative Work Arrangements,” ultimately reducing the company’s Scope 3 carbon footprint.

Efficient Business Travel

Northrop Grumman Electronic Systems is a supporter of efficient business travel. One example is through the ability to teleconference. Many employees utilize this technology on a daily basis to meet with coworkers across not only Maryland, but the nation. Microsoft Lync allows all employees to share material from their computer with their coworkers, regardless of their location. This technology both improves business efficiency and is beneficial to the environment.

Additionally, employees often travel between campuses together. While there is no policy that enforces this practice, a variety of awareness bulletins are posted on the company intranet.

Water

Water Conservation

In addition to solid waste reduction, Northrop Grumman Corporation has also established a list of BMPs aimed at conserving water. These BMPs include the installation of low-flow fixtures and closed-loop systems and the establishment of practices to conserve water such as repairing leaks, creating a leakage hotline, and preventing the use of water for outdoor surface cleaning.

Beyond the BMPs, opportunities for reducing the water associated with manufacturing operations are evaluated. One example is the development of a new wastewater treatment and process water production system designed to treat 187 gallons per minute of combined wastewater at the BWI campus. Using microfiltration and reverse osmosis, the system can recycle/reuse 80 percent of the wastewater for manufacturing, with the remaining 20 percent wastewater treated to water quality discharge standards.

Stormwater Management and Site Design

Throughout Maryland campuses, Northrop Grumman Corporation has implemented stormwater BMPs to minimize exposure of industrial activities to stormwater and contaminants from parking lot runoff. Examples of BMPs include re-routing industrial discharges to the sanitary sewer system, installing oil booms

for parking lot runoff, and constructing stormwater management ponds to reduce sediment, nutrient, and contaminant entry into the local waterways.

The employee parking lot at the BWI campus was selected for the implementation of stormwater quality improvements through a Department of Natural Resources grant awarded to the Low Impact Development Center. The site design planning, permitting, and procurement will take place in 2014, with the installation of improvements occurring in 2015. The project includes conversion of conventional pavement to porous pavement and concrete pavers as well as the installation of bio-retention cells, bio-swales, and rain garden areas to treat stormwater. 45 percent of the current impervious surface will be treated through this retrofit effort, contributing a removal of 75 pounds of total nitrogen, 9 pounds of total phosphorus, and 2.6 tons of solids per year. The project will serve as a model for other private landowners to demonstrate how large-scale office complexes and manufacturing facilities such as Northrop Grumman Electronic Systems can be retrofit to meet the new stormwater requirements and promote future similar projects.

Electronic Systems is also investigating other opportunities to retain and infiltrate stormwater so that we further reduce the impact of our operations on receiving water bodies.

Green Building

LEED Silver

Northrop Grumman Electronic Systems was awarded LEED Silver Core and Shell for the recently constructed West Quest C office building. The office located in Linthicum, Maryland was the first LEED Certified building in the Electronic Systems sector.

Environmental Certification Programs, Awards and Other Activities

Environmental Achievements

In August 2013, the Northrop Grumman Sykesville campus joined the Carroll County Green Business Network. The Carroll County Green Business Network encourages small businesses to incorporate sustainability into daily business operations.

Environmental Awards

In 2009, the Carroll County Board of Commissioners and the Carroll County Environmental Advisory Council awarded the Northrop Grumman Sykesville campus the Environmental Awareness Honorable Mention award for its efforts to reduce energy consumption, decrease carbon footprint and solid waste, and increase water conservation efforts.

In 2011, the collective actions and programs at Northrop Grumman Electronic Systems Maryland campuses earned the 2011 Outstanding Corporate Leadership Award from the Maryland Recycling Network for success in recycling and waste reduction efforts.

In 2012, the Northrop Grumman Sykesville campus was selected as the winner for the 2012 Carroll County Environmental Awareness Award - Business category. The Carroll County Commissioners presented the award to the campus for its efforts in promoting environmental awareness and in recognition of its valuable contributions to conserving and protecting environmental resources.

Scope 1 Greenhouse Gas Reduction Program Highlights

In 2012, through innovations spurred by the need and opportunity to make material substitutions and process improvements, our engineering teams generated ideas to streamline processes and reduce environmental impacts. The following examples highlight improvement our engineers made to processes and systems:

Sulfur Hexafluoride Abatement System:

Sulfur hexafluoride (SF₆) is a greenhouse gas with significant global warming potential: one pound of SF₆ equates to 23,900 pounds of carbon dioxide. The SF₆ gas used in our laser saw systems for silicon wafer production cannot be replaced by an alternative gas. In 2012 we installed an abatement system that destroys SF₆ emissions at a rate of 95 percent, achieving an estimated reduction of 4,800 MTCO₂e per year.

Aerosol Impact Mitigation (AIM):

The AIM program was developed to reduce greenhouse gas emissions associated with commonly used aerosol products. Products containing high global warming potential aerosols/propellants are being evaluated and substitutes with lower global warming potential are being identified.



Help build a greener, more sustainable Maryland through voluntary practices that reduce environmental impacts and save money.

Learn more at green.maryland.gov

