

## BAE Systems Norfolk Ship Repair

### Employee education and engagement for environmental success.

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#### Overview

*BAE Systems Norfolk Ship Repair (BAE) is a 109-acre facility that provides commercial and military vessel maintenance and repair at the port of Norfolk. The facility offers support 24 hours a day, 365 days a year, primarily to the U.S. Navy. Environmental sustainability is part of the company's core culture and value.*

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#### How do environmental considerations affect BAE's workplace culture?

The safety and health of its workforce is BAE's core value. BAE strives to prevent and minimize adverse environmental impacts including waste, emissions and discharges from their operations. BAE is dedicated to protecting natural resources through conservation and preservation. Employees are empowered to stop work when they believe a condition exists that may be hazardous to the health and safety of themselves or those around them or may be a risk to the environment. BAE believes in a "Beyond Compliance" approach. BAE has committed to a culture of continuous improvement in the prevention of pollution and open communication to all stakeholders. The comprehensive list of compliance obligations, itemizes federal, local and other requirements is kept current through various means. BAE understands that successful companies in a globalized world must do social and environmental good on top of financial good. BAE's environmental management considers the energy the company consumes and the waste it discharges, the resources it needs, and the consequences for living beings as a result. Not least, carbon emissions and climate change.

#### What energy reduction efforts have been most effective?

On-site energy consumption decreased by 1.34 percent in 2019 from the previous year, saving over 1 million kWh. The facility's energy usage decreased regardless of a larger workforce and a greater number of labor hours in 2019. BAE enhanced energy management and continued to foster decreased energy usage. BAE also completed several energy sustainability projects that resulted in total energy savings for lighting upgrades and other energy improvements; a measured savings of 3,511,951 kWh or \$66,801. The company's energy savings equates to a reduction of 2,483 US Metric tons of CO<sub>2</sub> emissions. BAE has completed energy sustainability projects including:

- Procuring and installing VSD on 300HP Saltwater Pump for a savings of 1,932,885 kWh and \$33,825
- Converting steam propeller unit heaters to natural gas heat for a savings of 1,519,280 kWh and \$16,076
- Procuring and installing an economizer/heat recovery, roof curb, conduits, rooftop unit and test system for a savings of 59,786 kWh or \$16,900

Total savings from reduced energy use in 2019 was 1,003,475 kWh and \$68,236. The savings from energy sustainability projects was 3,511,951 kWh and \$66,801. The total savings from sustainable energy management was \$135,037.30.

#### What are some best practices for reducing water use?

Total facility water use was 14.92 percent lower in 2019 than the previous year, a total decrease of 17.5 million gallons. In conjunction with decreased water usage, expanded water conservation efforts were conducted throughout 2019. BAE treated 9,320,200 gallons of wastewater in 2019. BAE sought to achieve the maximum standard of sustainability through wastewater treatment processes. The onsite wastewater treatment plant can treat wastewater at a fraction of the cost of shipping this waste offsite. The facility saves at minimum \$1.5 million a year by virtue of wastewater treatment. Furthermore, BAE wastewater treatment aids in collection and consolidation of used oil. The facility's lifecycle approach focuses on reconditioning, reuse, and recycling of wastewater. BAE captured 757,926 gallons of steam condensate wastewater which is then reused within the facility. In 2019, the 757,926 gallons of condensate were captured and reused, avoiding the purchase of the same amount of city water. Savings from water reduction in 2019 equaled 17.5 million gallons and \$125,570.70. Savings from the use of condensate was 757,926 gallons and \$5,457.10. Savings from wastewater treatment was 9,320,200 gallons and \$1.5 million. The total savings from decreased water usage was \$131,027.80 and \$1,631,027.80 from sustainable water use and treatment.

#### What other ways have you reduced your environmental impact?

- Hazardous waste recycled was 35.58 percent greater in 2019 than in 2018, an increase of 20,000 pounds. The efficient consolidation, application, and substitution of paint generated a total cost avoidance of \$47,288 or 11,000 gallons in hazardous paint waste disposal for 2019; diminishing hazardous paint waste by nearly 70 percent.
- BAE facilitates a waste management program, consolidates waste and disposal, and promotes naval vessel infrastructure scrap metal recycling. BAE recycled 7,794 tons of waste, 14.76 percent greater in 2019 than in

2018. In conjunction with expanding the number of recyclable materials, BAE's prioritization product substitution for recyclable materials and minimization of non-recyclable materials enabled more waste to be recycled.

- BAE wastewater treatment aids in collection and consolidation of used oil, which is sold for reuse. BAE's wastewater treatment recovered 72,414 gallons of oil. The recovered oil generated total revenue of \$13,035.

### **What has BAE done locally to improve the environment?**

BAE, located on the Elizabeth River, has made great strides to clean the river to maintain the ecological balance of the waterway. 2019 was Norfolk Ship Repair's 13th year participating in the Chesapeake Bay Foundation's oyster gardening initiative. Collaborating with the Elizabeth River Project, BAE grows oyster spat in over 20 cages, sheltering upward of 20,000 oysters. The oyster larvae are fixed on shells, producing natural oyster clusters that mimic reefs and protect spat from predation. When adulthood is reached the quarter-sized oyster spat are transferred to BAE's man-made porous concrete onsite oyster reef. BAE embarked on a new project to revitalize the Elizabeth River, constructing a robust oyster reef. Initially, 160 oyster bergs were utilized to construct the oyster reef. The 35-pound oyster bergs were installed at low tide and positioned to receive optimal flux of nutrients. To further increase the oyster population, BAE installed "oyster castles" using 180 recycled concrete blocks; constructing a reef amounting to 17 total structures. The porous concrete provides additional flat surfaces for oysters to attach and grow. The castles also provide habitat for over 300 other marine species. One adult oyster can filter up to 50 gallons of water a day; together they filter water on a massive scale to improve water quality in the Chesapeake Bay. The projects were awarded distinguished performance by the Hampton Roads Business Journal and awarded BAE Systems Norfolk Ship Repair inaugural River Star Business Hall of Fame.

BAE Systems Norfolk Ship Repair's Expanded Environmental Efforts earned global recognition, receiving the 2019 Chairman's Gold Award in the Embracing Responsible Behavior category, an honor granted by BAE Systems Plc.'s Chairman Sir Roger Carr. BAE Systems announced over 2,000 Chairman's award nominations from around the world. In the face of stark competition and several rounds of rigorous judging, Norfolk Ship Repair's Expanded Environmental Efforts team was selected as the company's most outstanding representatives of innovation, bold thinking and trustworthy behavior. The award acknowledges excellent stewardship of the environment beyond what is required and partnerships and vision needed for exceptional success. Norfolk Ship Repair's Environmental Dept. enacted several major programs that give back to the community while upholding the company's commitment to corporate responsibility: forging an on-site oyster reef; supporting RIVERFest, an annual festival promoting the well-being of the Elizabeth River; and adopting a section of Berkley Ave. in partnership with Keep Norfolk Beautiful to clean up. The Gold Award is the highest company merit bestowed by BAE Systems Plc., particularly considering the company employs over 90,000 people globally.



Environmental Manager Steve Bulleigh (rear right), Environmental Specialist II Connor Albrecht (far right), Chemical & Hazardous Waste Handler IV Steve Guajardo (near right), Environmental Technician III Dave Jancy (rear center) pose with Elizabeth River Project and Chesapeake Bay Foundation co-collaborators alongside the shipyard's robust oyster reef.

### **What are some of BAE's best practices?**

BAE emphasizes transparent communication of environmental best practices to all employees. BAE's environmental department routinely orchestrates Environmental Health & Safety meetings (SREC) with other site leads, who operate facilities spanning the U.S. within the broader organization, sharing best management practices and environmental issues. In similar manner, BAE conducts Executive Safety, Health and Environmental (STAT) meetings each week, attended by the General Manager, department managers, and staff to review corrective actions, audit results, environmental objectives and KPIs. In 2019, a new environmental orientation packet was created and implemented for new employees and hourly-subcontractors working in the shipyard. All BAE employees complete mandatory annual environmental trainings. To enhance communication of environmental best practices the site conducts regular "Town Hall Meetings" with its' subcontractors to review environmental issues, conduct training, review corrective actions, and assess performance. BAE's informative processes produces knowledgeable employees and a culture of compliance.