

Proven Sustainability Approaches Advance Mission at Navy Installations

Efforts Include Energy & Water Conservation, Green Building Management Practices

THE SUMMER 2013 issue of *Currents* highlighted the activities of eight Navy installations as examples of proven approaches for cost-effectively improving operations, benefiting the environment while advancing the mission. This article brings the total number of highlighted installations to a dozen, showcasing four more examples of approaches worthy of imitation throughout the Navy.

Using Facility Energy & Potable Water More Efficiently

A Resource Efficiency Manager for Continuous Commissioning

Naval Base Kitsap and the Puget Sound Naval Shipyard and Intermediate Maintenance Facility in Bremerton, WA achieved significant energy and cost savings by procuring the services of a resource efficiency manager (REM) to conduct continuous commissioning on its buildings. Continuous commissioning is the process of optimizing the heating, ventilation and air conditioning (HVAC) system—along with the systems that supply the HVAC system—for the building’s current operating requirements. Regular commissioning ensures that the building functions as it was originally designed, while continuous commissioning optimizes the building systems to meet the current needs of the facility.

The energy and associated cost savings generated by the REM in the last three years are shown in the table below. Most of the savings were realized by shifting from continuous operation of HVAC equipment, such as air handling units, exhaust fans, and heating coils, to single shift or daytime operation. The performance expectation for any improvement is a 200 percent return on investment, such that every dollar the facility invests in improvements returns two dollars in savings (not including the costs to contract the REM). As of spring 2013, the REM is still conducting continuous commissioning of facilities both at Naval Base Kitsap and the Puget Sound Naval Shipyard and Intermediate Maintenance Facility.

In addition to continuous commissioning, the facility implemented a systematic program to detect and repair leaks in the steam, water, and air systems. The repairs reduced the



Continuous commissioning optimizes a building’s systems for current needs.
Ryan MacPherson

SAVINGS FROM CONTINUOUS COMMISSIONING

	FY 2010	FY 2011	FY 2012
Cost Savings	\$227,101	\$132,012	\$195,128
Energy Savings (million Btu)	20,898	12,105	12,183

NAS Jacksonville expects to be reclaiming 100 percent of its wastewater in late 2014 or early 2015.

facility's Fiscal Year (FY) 2010 water consumption by 11.5 million gallons compared to FY 2009. The facility also acquired over 9,600 megawatt hours of wind-generated electricity at no cost by using credits available under the Bonneville Power Administration's Conservation Rate Credit program. Naval Facilities Engineering Command Northwest was honored with a 2011 Federal Energy and Water Management Award for its efficiency work.

Low Water Aircraft Cleaning

The Fleet Readiness Center Southwest in San Diego, CA made significant efficiency improvements in its use of industrial and irrigation water. At its manufacturing and painting facilities, the installation installed a waterless steam cleaning system and low-water steam assist rinse, and retrofitted the aircraft washing hoses to be low volume. The switch is not only saving about 119,000 gallons of water every year, it is saving the facility an estimated \$150,000 per year, mostly by avoiding costs to treat and dispose of industrial wastewater. The installation also installed a highly efficient subsurface irrigation system that is yielding annual savings in outdoor water use of 120,000 gallons, a reduction of about one-third. The time for the combined projects to pay for themselves was less than one year.

Reclaiming Water from Wastewater

Naval Air Station (NAS) Jacksonville in Florida has long been using a minimal amount of potable water to irrigate its

golf course, because it gets much of the water needed to irrigate the course by capturing stormwater in a nearby retention pond. During dry periods, the base augmented the stormwater by pumping water from a formerly potable well located next to the pond. However, the neighboring private golf course (Timuquana Country Club) had been using a deep potable well to irrigate their golf course, drawing from the Florida aquifer that supplies fresh water to the area. Given local concerns over the long-term sustainability of the aquifer, combined with the fact that the station was discharging highly treated domestic wastewater into the St. John's River, NAS Jacksonville installed a water reuse system in 1998 to provide reclaimed wastewater to the country club as well as the station's own golf course. The country club paid all costs for the design, permitting and construction of the reuse pipeline and retention pond, in exchange for receiving the water at no cost. The \$1.9 million project prevents 18,000 pounds of nutrients per year from being discharged into the river, and it provides the country club with between 150,000 and 200,000 gallons of water per day, which otherwise would have been pulled from the Florida aquifer.

The country club uses only a portion of the wastewater treatment effluent, so the station continued to discharge the remainder of its treated wastewater into the St.

John's River under its National Pollutant Discharge Elimination System permit. Recently, however, NAS Jacksonville decided to reclaim 100 percent of its effluent due to a tighter restriction on the total maximum daily load of nitrogen that can be discharged into the river, imposed by both the U.S. Environmental Protection Agency and the State of Florida. Faced with the difficulty of meeting the new requirement, the station decided that the



The NAS Jacksonville golf course.
Miller Design



The NAS Jacksonville golf course is irrigated with a combination of captured stormwater and water reclaimed from the installation's wastewater treatment plant. The reclaimed water is delivered to the course through purple pipe color-coded for this purpose.

Clark Pierce

better route would be to expand its reclamation system to achieve zero discharge. In 2010, the station obtained the permits needed to expand the infrastructure to deliver an additional 300,000 gallons per day of reclaimed water to its own golf course and ball fields. The station also separated the stormwater retention pond at the NAS Jacksonville golf course into two reservoirs, one for stormwater and one for treated wastewater. Meanwhile, the station is designing an effluent spray field irrigation system to use the remainder of the reclaimed wastewater, which will entirely eliminate effluent discharge to the river. The permitting process was completed around the end of FY 2013, with six months of construction to follow. The station expects to be reclaiming 100 percent of its wastewater in late 2014 or early 2015.



Rear Adm. Scott Sanders, reserve deputy director for Joint and Coalition Warfighting, J7, Joint Staff, speaks during the dedication and ribbon cutting ceremony for the new NOSC Phoenix building at Luke Air Force Base.

Senior Chief Mass Communication Specialist Gary Ward

Improving Building Performance

The Naval Operational Support Center at Luke Air Force Base (NOSC Luke) in Glendale, AZ is a newly constructed design-build project completed in December 2011. It was certified at the Platinum level in March 2012 by the Leadership in Energy and Environmental Design (LEED) rating system

of the U.S. Green Building Council. The project was funded for only a LEED Silver certification, a considerably less difficult rating than Platinum, but the team was able to achieve Platinum using an efficient, integrated approach to project implementation.

Highlights of the sustainability features of the facility are as follows:

- A 67 kilowatt (kW) photovoltaic solar array, which generates an estimated 100,000 kWh per year of renewable electricity
- Advanced metering of energy and water consumption
- Building materials with high recycled content, sourced from local vendors
- Water-efficient plumbing fixtures
- Reflective roofing material
- Interior furnishings consisting of materials that emit little or no volatile organic compounds
- Demand-control ventilation that senses the number of occupants in the building and adjusts the ventilation accordingly
- Daylighting in 70 percent of rooms

More Energy-related Initiatives in the Pacific Northwest

FOR A SUMMARY of energy-related initiatives at other Navy installations in the Pacific Northwest, read our article entitled “A Look at a Long-Term Energy Strategy in the Pacific Northwest: A Strong Tradition of Success in Resource Efficiency Management” in the spring 2013 issue of *Currents*.





An F/A-18C Hornet assigned to Fleet Readiness Center Southwest flies over NAS North Island and the aircraft carrier USS John C. Stennis to commemorate the 30th anniversary of the first McDonnell Douglas/Boeing F/A-18 flight. This Hornet and other aircraft assigned to Fleet Readiness Center Southwest are kept clean with a waterless cleaning system.

Lt. Alex Allwein

- A high-efficiency chiller
- High performance insulation for the building envelope
- Variable frequency drives in the mechanical system
- Landscaping with native and other low-water species.

The facility uses 47 percent less water than a typical building, and 39 percent less energy than a building constructed according to the American Society of Heating, Refrigerating

and Air-Conditioning Engineers standard 90.1 (2004), “Energy Standard for Buildings except Low-Rise Residential Buildings.” During the construction process, 88 percent of construction and demolition debris was diverted from disposal. The \$11.2 million facility was designed to house 750 Navy Reservists. It is 32,055 square feet in area, occupying one-story on 1.85 acres.

The successful approaches described here—continuous commissioning of building systems, low-water aircraft cleaning, irrigating with reclaimed wastewater, and constructing high performance buildings—are proven strategies suitable for widespread adoption across the Navy. ⚓

For More Insights

FOR MORE INSIGHTS into the Navy’s sustainability efforts, read our article entitled “Sustainability Approaches Proven Successful at Naval Installations: Efforts Range from Using Facility Energy More Efficiently to Diverting Construction & Demolition Debris” in the summer 2013 issue of *Currents*. To subscribe to the magazine or browse the *Currents* archives, visit the Department of the Navy’s Energy, Environment and Climate Change web site at <http://greenfleet.dodlive.mil/currents-magazine>.



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