Fueling Upgrades Bring Efficiencies for the Pacific Fleet

Renovations to the U.S. Navy's fueling hubs at Point Loma in San Diego and Naval Base Kitsap on Puget Sound will create major efficiencies for operations in the Eastern Pacific.

By Glenn Schmitt, P.E., and Robert Kulash, P.E., M.SAME

Even the most powerful naval fleet in the history of the world is dependent on efficient fueling logistics to fulfill its mission. On the heels of a successful redesign and rebuild of the Naval Base Point Loma Fueling Facility in San Diego, the U.S. Navy, with Defense Logistics Agency funding, has secured approval to move forward with a similar modernization program for the fueling depot at Fleet Logistics Center Puget Sound-Manchester at Naval Base Kitsap, Wash.

The two massive fueling facilities are critical elements in creating a new, more efficient and environmentally friendly fueling logistics backbone for naval operations in the Eastern Pacific. The full-scale redesign and rebuild of these Defense Fuel Support Points, all while remaining fully operational, is a firstever event for the Navy and its network of contractors.

Burns & McDonnell served as lead engineer and designer of record on the Point Loma Fueling Facility and will provide a similar range of services on the Manchester Fuel Depot that is just now getting underway.

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The Point Loma project was a massive undertaking, the largestever fuel facility construction effort by the Defense Logistics Agency. Since the early 1920s, Point Loma has provided petroleum, oil and lubricants support to ships and shore units of the Navy, U.S. Coast Guard, U.S. Marine Corps, other military users, and allied navies of the United States. By 2004, however, the Navy had concluded that the fueling infrastructure was in critical need of a complete overhaul as 30 underground and an additional 15 above-ground

storage tanks were in deteriorated condition. The $194 million project began in 2005 and all renovations were completed in May 2013.

THE PROJECT BEGINS

In 2017, the Navy began moving forward with plans to replace World War II-era underground fuel storage tanks at the Manchester Fuel Depot, which is located on a point extending into Puget Sound. The approved final environmental assessment confirmed the project will not have any significant impact on water, geological, or cultural resources on or near the installation. The engineering design was recently cleared to commence.

Currently, the Manchester Fuel Depot is configured with five above-ground bulk storage tanks and 34 underground tanks, for a total fuel capacity of approximately 79-million-gal. The redesign/ rebuild project calls for three phases in which existing tanks and related equipment will be progressively decommissioned and dismantled as new steel, above-ground tanks are completed. A pair of new, larger-capacity tanks will be completed in each phase, with each phase scheduled to take approximately two years from start to completion. As each phase is completed and commissioned, the JP-5 and F-76 fuel contained in existing tanks will be transferred into the new tanks. The new tanks will have the capacity to hold 5-million-gal of fuel, for a combined fuel storage capacity totaling more than 30-million-gal upon estimated project completion in 2026.

As with Point Loma, the Manchester project will be carefully staged and sequenced so there is no interruption in fueling operations. The new tank configurations will enable the Navy to meet fuel storage and distribution requirements in a more costeffective manner. Savings also will be achieved due to efficiencies and improvements in recurring maintenance requirements.

Each 64-ft vertical, cylindrical storage tank will be surrounded by a secondary containment dike for spill containment. The tanks will be field-erected in strict compliance with API STD 650 standards for Welded Steel Tanks for Oil Storage. The new tanks will be compliant with military standards while incorporating additional means to remove fuel to a nearly “drain dry” condition.

Receipt and issue pipelines at the Manchester Fuel Depot are located in blast proof tunnel systems. U.S. NAVY PHOTO BY CORINNA O'DONNELL

Additionally, new above-ground pipelines will be constructed to connect to the existing piping system at the historic pump house building. The piping system ties into the Manchester Fuel Depot's loading pier. Fuel primarily will be received from maritime tanker vessels offloading fuel from the pier, then distributed by way of oilers, barges and tanker trucks.

Similar to the Point Loma facility, each bulk storage tank can store either F-76 diesel fuel or JP-5 jet fuel. The tank product piping will be configured to allow a change of product in the storage tanks with the rotation of a set of spectacle blinds and pipe and tank cleaning as necessary.

SETTING THE STANDARD

With its completion in 2013, the newly reconstituted Point Loma Fueling Facility now serves as the model for the effort underway at the Naval Base Kitsap-Manchester Fuel Depot. When the Point Loma project began, most of the existing above-ground and underground tanks had been in service for more than 70 years and were posing safety and environmental hazards. Numerous environmental site assessments and computer models estimated that over the years of operation, possibly more than 1-million-gal of fuel had leaked from tanks, pipes and other equipment and likely was floating on top of the water table.

A military presence at Point Loma dates to 1908, when the base was established as a coaling station for steam-powered vessels. From the 1920s through the 1930s, several riveted-steel, above-ground storage tanks were built. In 1940, cut and cover underground storage tanks were built. Following the 1941 Japanese attack on Pearl Harbor, those tanks were surrounded with reinforced concrete walls for protection. In the decades after the war, another round of underground tanks was added, with the last tank completed in 1957.

The primary objective of the Point Loma renovation was to remove or close the 54 old tanks and replace that capacity with eight new above-ground tanks, each with a capacity to hold 5.25-million-gal of fuel. These tanks are outfitted with new equipment and systems that will greatly reduce the possibility of future accidental fuel releases.

The project featured particularly complex phasing requirements, in part because it was vital that the facility remain fully operational during construction. The first critical step was the installation of a temporary fuel pipe and valve system to the underground tanks. The work also required approvals of 31 permits and plans to confirm

environmental compliance and keep governmental authorities and the general public apprised of the ongoing project stages.

In addition to demolition of the fuel storage tanks, demolition or modification was required for three pump houses and a fuel oil recovery facility comprised of six above-ground and two underground storage tanks. An innovative plan to fill the empty storage tanks with soil that had been excavated and cleaned onsite saved $10 million (this was mainly due to eliminating the need to demolish the underground tanks and remove the demolished material and contaminated soils offsite).

INSPIRATION TO FOLLOW

The award-winning Point Loma project qualified for LEED Silver status due to environmentally responsible practices during construction as well as an extensive erosion and sediment control plan that was implemented.

The Manchester undertaking also will require meeting the challenge of designing and building a more efficient fueling operation on a smaller footprint, in an environmentally sensitive area, near a seismic zone, with new state-of-the-art equipment in order to provide maximum efficiency, operational cost savings and greater safety and managed risk for personnel and the environment. With the experience gained at Point Loma, the team is looking forward to meeting the challenge.

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