

CRYOGENIC CONTROL CENTER AND SAFE HAVEN FOR LOX/LH2 BARGES

First LEED-Designed Building Completed | By Margie Church

The aftermath of Hurricane Katrina continues reverberating through commercial construction projects across the South. Effected owners and government agencies are still upgrading their existing facilities and constructing new storm-proof buildings to meet the latest building codes. The McDonnell Group recently completed significant upgrades to NASA's cryogenic safe haven and constructed a new control center at the John C. Stennis Space Center near Pearl River, Mississippi. Stennis is America's largest rocket engine test complex. It's where a majority of space shuttle main engines are tested and proven flight worthy, and where future engines will be tested.

The new, single story, 3500 square-foot control center was built adjacent to the

existing propellant storage yard. NASA's hurricane-resistant design consisted of 8-inch solid precast concrete wall panels and a double tee pre-cast concrete roof substructure. To ensure the design the double tee pre-cast planks were topped with a 2-inch, poured-in-place concrete slab. The building also included standing seam metal roofing, fixed aluminum windows, and the associated mechanical/electrical/plumbing systems.

The safe haven project included expansion of the existing liquid hydrogen truck unloading area, furnishing and installing specialty valves, modifying the existing vacuum jacketed cryogenic piping, and adding two barge docks. Liquid hydrogen, gaseous hydrogen, liquid oxygen, and gaseous nitrogen are transferred by the use of a complex integrated piping system. One of the piping systems installed was vacuum

jacketed piping, this highly specialized piping, allows the propellant, liquid hydrogen, to be safely transferred at -400 degrees Fahrenheit.

Meeting the Challenges of LEED

The Cryogenics Control Building was The McDonnell Group's first project constructed under the LEED building standards. LEED requirements are established by the U.S. Green Building Council (USGBC), and sets standards to promote and encourage the global adoption of a sustainable green building, which is now a standard for all new construction at federal buildings.

Through the course of construction, The McDonnell Group was diligent in ensuring the LEED project requirements were adhered to, and that all information was thoroughly documented. According to Project Engineer Jeffrey



Stennis Cryogenic Control Center

%% Continued on page 12



Purge Panel



LH2 Yard

Proctor, The McDonnell Group, the prescribed requirements were logged and monitored carefully to satisfy the tremendous amount of paperwork due at the project's completion.

In order to meet the proposed LEED requirements, all construction material needed to have a total recycled content of 10 percent and all construction materials must contain a local/regional content of 10 percent. In addition to the above, 50 percent of the construction generated debris needed to be diverted from landfills. Despite producing low levels of construction debris, separate dumpsters were placed onsite, so that wood, metal, and concrete could be

recycled. Thanks to the extraordinary efforts of Project Superintendent Todd Pierce, The McDonnell Group, over 90 percent of the construction debris was diverted from landfills, thereby allowing the project to qualify for more points. Proctor said, "Sorting took time but not sending all that waste into a landfill was well worth the effort."

Another LEED project requirement The McDonnell Group faced during construction was establishing and implementing an indoor air quality plan. This required The McDonnell Group to investigate ways to minimize construction dust and debris. The Indoor Air Quality plan also required all HVAC

ductwork remain fully sealed and air filters with a high-rated MERV (Minimum Efficiency Reporting Value) be used. As required by LEED, prior to turning the completed building over to the owner, the entire building was flushed out with 14,000 cubic feet of fresh, outdoor air.

Other LEED project requirements included using a low VOC content on all paint, flooring, and adhesives to reduce fumes; use of high solar reflex index metal roof panels insulated with multiple layers of fiberglass to control the heat load; white pigmented concrete used outside to reduce the heat island effect on the site; water-efficient native grasses which reduces/eliminates the need for an irrigation system thus reducing water consumption; waterless urinals to reduce water consumption; waste discharge and exterior solar lighting to illuminate the driveway and parking lots to reduce and maximize energy efficiency.

"I think LEED-certified projects are important. They implement good design practices which lead to a more pleasing environment to work in and they lower operating costs," Proctor said.

Lessons Learned

Project Manager, Andrew Silva, said "The Stennis project confirmed that The McDonnell Group is definitely a contractor that can work within federal government standards and provide a quality project." This project was unique to TMG due to the highly specialized mechanical piping and valves that were installed. Overall, TMG was able to meet NASA's performance specifications and obtain a potential LEED Silver rating, with no reportable safety incidents. We're ready to take on the next project."

By linking the construction efforts of The McDonnell Group with the efficient design of the building, the project is on course to meet the required credits to achieve LEED Silver Certification.