FLINT HILLS 41 DOCK 5 - LIQUID BULK TERMINAL
Flint Hills Resources | Ingleside, Texas

Key Features
- Conversion of a small craft pier to a liquid bulk terminal
- Structural repairs of pier, jetty platform, mooring and breasting structures
- Involved in all engineering phases of the project

Flint Hills Resources is an independent refining and chemicals company that operates refineries in Alaska (North Pole), Minnesota (Rosemount) and Texas (Corpus Christi) and has a combined crude oil processing capacity of more than 800,000 barrels of crude oil per day.

To capitalize market share of the 2008 Eagle Ford Shale crude play, Flint Hills purchased a portion of Naval Station Ingleside from the Port of Corpus Christi. Improvements required preparation of the marine portion of the terminal for handling Eagle Ford Shale crude at a cost of approximately $40 million. HDR was involved with all engineering phases of the marine facilities — from conception (budgeting, planning, etc.) to completion (design, bidding, construction, etc.) and start-up of the facilities (equipment procurement, installation, initial operation, etc.).

The project involved converting a lightly loaded small craft pier into a liquid bulk terminal to serve deep-draft oceangoing and shallow-draft intracoastal barges. Improvements included structural repairs of the small craft pier, a concrete pile-supported 40-foot x 60-foot jetty platform with a 25-foot x 25-foot x 55-foot steel hose tower, monopile mooring and breasting structures, pipe catwalks, dredging and cathodic protection systems.
Gulf Marine Fabricators (GMF) was awarded the fabrication of the ATP MinDOC for the Mirage Field. The MinDOC is a cross between a tension leg platform and a spar, has a total length of 500 feet and an expected weight of greater than 18,500 ST. HDR assisted GMF in its assessment of various fabrication options, and, by the end of 2006, GMF decided to construct a graving dock at its South Yard in Ingleside, TX, adjacent to the Gulf Intracoastal Waterway (GIWW), to facilitate fabrication of the MinDOC.

The MinDOC dimensions dictated the size of the graving dock, which is 250 feet wide and 600 feet long, with a basin floor at El. -30.0 feet. The Phase I scope included design for anchored sheet pile basin walls (40 feet high), driven steel pipe and pre-cast concrete piling for a concrete relieving platform, a 50-foot x 250-foot cofferdam that allowed for construction of the south wall bracing system, a 2- to 3-foot-thick basin floor structure to support the weight of the MinDOC, and associated wall and floor drainage systems.

The basin wall and relieving platform system comprises nearly 111,000 square feet of steel sheet pile, 68,000 square feet of reinforced concrete relieving platform, 654 precast concrete piles, 416 steel pipe piles, and 430 post-tensioned anchor rods. The basin floor structure comprises nearly 12,250 cubic yards of concrete and approximately 1,900 tons of reinforcing steel.

Phase II scope included the basin wall extensions to the GIWW. The south end of the basin was ultimately fitted with a floating gate structure to allow faster flooding/dewatering of the basin and quicker discharge times for fabricated structures. Phase II is complete.

The Graving Dock project received a 2009 Texas CEC Engineering Excellence Gold Award and was a National CEC finalist.
The Freeport LNG site is on the eastern end of Quintana Island adjacent to the intersection of the 45-foot deep Freeport Ship Channel and the Gulf Intracoastal Waterway.

Navigation safety and potential impacts on other traffic were major considerations for this location. Extensive analysis and vessel maneuvering simulation studies were conducted to determine the optimal arrangement for the berthing area. Maneuvering and casualty scenario studies were used to demonstrate the ability to accommodate LNG carriers up to the proposed 260,000-cubic meter Q-MAX class and to verify the number and sizes of tugs necessary to safely berth the vessels.

HDR assisted in the site selection, project planning, environmental impact evaluations, marine terminal design, and regulatory phases. Services included coordination with the U.S. Army Corps of Engineers, the U.S. Coast Guard, port officials and harbor pilots, and participation in the Federal Energy Regulatory Commission (FERC) licensing process. Related work included assistance with the Waterway Suitability Assessments hazard zone classifications, emergency response and safety plans, and the Facility Security Plan.

HDR prepared the Front End Engineering Documents (FEED) for the marine facilities including the jetty platform, breasting/mooring structures, shoreline protection, docks for tugs and line handling vessels, and ancillary facilities. Related services included dredging project design, dredged material placement for beneficial use and navigation aids design.

HDR evaluated the engineering, environmental, and financial issues associated with widening the Freeport Ship Channel from 400 feet to 600 feet. This was a direct result of simulation studies that showed widening is necessary to accommodate the Q-MAX LNG vessels. Ongoing work includes work with the USACE to facilitate non-Federal widening of the channel, the first such project of its kind.
REPAIRS TO PIER 4, PHILADELPHIA NAVAL BUSINESS CENTER (PNBC)
NAVFac Midlant | Philadelphia, Pennsylvania

Key Features
- Design-build delivery
- Provide critical docking facility needs of current inactive ship's mission including servicing CV and CVN class aircraft carriers
- Replacement of various sections of the pier to provide vehicle and crane access to inactive ships
- New steel sheet pile bulkhead installed along the face of the existing wharf
- Historic structure

HDR has a long history of port and maritime projects with the Federal Government and specifically the U.S. Navy. This project will provide critical docking facility needs associated with current inactive ship's mission. In particular the final facility will support CV-67 and other similar aircraft carriers. Replacement of various sections of the pier to provide vehicle and crane access to inactive ships berthed at the facility is also part of this design-build project. Two operational platforms will be designed for unrestricted operation of a 240 ton capacity mobile crane and an additional three platforms will be designed for unrestricted operation of a 90 ton capacity mobile crane. The crane travel path will be designed to resist crane travel with their full complement of counterweights. The outboard, high level deck along Wharf 4A will be demolished from the pier and a new steel sheet pile bulkhead will be installed along the face of the existing wharf.

The pier platforms will be required to provide resistance to 2,000 kip mooring and berthing loads. In addition, all of the existing pier's mooring fixtures will be upgraded including modification of their foundations to accommodate the proposed use of the structure.

Acting as the designers of record and permitting, HDR will provide the following services for this design-build project: Structural Engineering, Geotechnical Engineering, Mechanical Engineering, Electrical Engineering, and Civil Engineering, and Permitting.

Currently we are in the design and construction observation phases.