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Marine Design Center

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USACE MARINE DESIGN CENTER

Marine & Floating Plant Newsletter

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NAN & MDC Partner to Repair GELBERMAN

The New York District and the Marine Design Center partnered to repair the U.S. Drift Collection Boat GELBERMAN.

The major scope of work included drydocking the vessel, cleaning and painting the hull, interior compartments, decks and fittings. The scope also included various inspections and work items required to satisfy hull and machinery survey requirements of the American Bureau of Shipping and the U.S. Coast Guard.

The work was completed by May Ship in Staten Island, NY. New York District personnel and GELBERMAN crew members handled the day-to-day Quality Assurance in the shipyard with engineering and some additional QA support from MDC. Working closely with Philadelphia District Contracting, MDC was able to provide quick action on various changes to avoid delaying the work in the shipyard.

Over the years, MDC has performed similar work on several repair contracts for the New York District. This partnership has proven to be beneficial in providing the full range of services necessary for a successful shipyard repair job.

P.O.C for this project in the Marine Design Center is:

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Excess Barge Wanted by CEMVS

The St. Louis District is looking for a barge of approximately 195 x 35 feet to convert into a Spill Barge for use in creating environmentally beneficial habitat in conjunction with the Dredge POTTER.

Please contact Mr. Allen Epps of the Marine Design Center with any information regarding any excess equipment that meets the criteria above.

P.O.C for this project in the Marine Design Center is:

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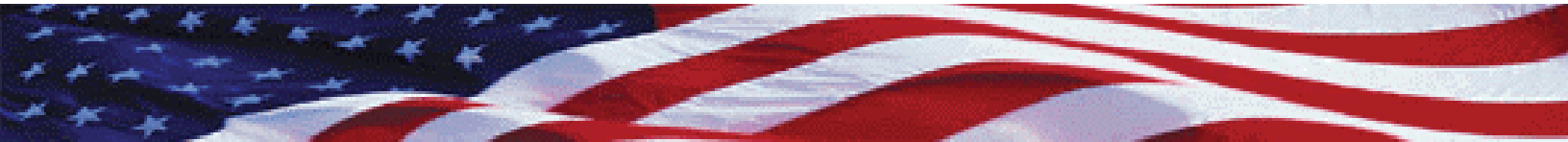
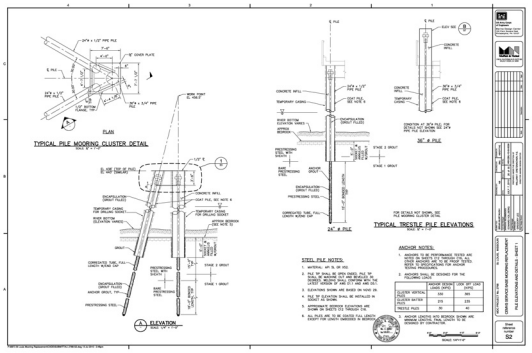


Marine Civil & Environmental IDIQ

"The Marine Design Center has awarded an Indefinite Delivery contract to Moffatt-Nichol of Walnut Creek, CA"

The Marine Design Center has awarded an Indefinite Delivery contract to Moffatt-Nichol of Walnut Creek, California for in-scope work consisting of:

- Environmental engineering related to marine activity, including activities related to floating plant impacts, vessel engine exhaust emissions, obtaining emission certifications, modeling of vessel missions and determining compliance with federal, state and local requirements.



- Design, repair and construction support for vessel docking and mooring facilities, fixed piers, pilings, bulkheads and upland dredge disposal sites.
- Engineering services for dredge material placement in upland disposal sites, with emphasis on environmental issues.

P.O.C for this Contract in the Marine Design Center is:
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EPA Vessel General Permit Update

"All owner/operators with vessels covered by the VGP are required to submit the "One-Time" report for each vessel"

All USACE vessels greater than 79 feet in length, or with more than 2,100 gallons of ballast water capacity should have submitted a Notice of Intent (NOI) to the Environmental Protection Agency (EPA) to receive coverage under the Vessel General Permit (VGP) for discharges incidental to normal vessel operations (there are 26 covered discharges). The NOI should have been submitted between June 19, 2009 and September 19, 2009.

Part 4.4.4 of the VGP requires a "One-Time" report for each vessel between 30 and 36 months after obtaining permit coverage. All owner/operators with vessels covered by the VGP are required to submit the "One-Time" report for each vessel (regardless of whether or not a NOI was submitted). Assuming you had an existing vessel when the original coverage began in December 2008, your **"One-Time" report is due between June 2011 and December 2011.** If you have received a new vessel that requires coverage under the VGP, the "One-Time" report will be due 30 to 36 months after you receive initial coverage.

The purpose of this report is to ensure compliance with the permit, but also to learn how the permit is being implemented and to gain a better understanding of the impacts from the permit. The EPA strongly encourages everyone to complete the "One-Time" report form electronically to save time. The form and related information can be found at www.epa.gov/npdes/vessels/eNOI.

MDC has been working closely with the EPA, industry groups and USACE operators on com-

plying with the provisions in the VGP. If you have any questions or concerns regarding the VGP, or other discharge/environmental related issues, we can provide you with advice, perform assessments, and assist you with compliance. MDC can also provide you with sample inspection/compliance forms and a VGP Operator's Manual that was developed for USACE operations. Please contact Timothy Keyser (Timothy.J.Keyser@usace.army.mil, 215-656-6171) for more information.

One final note, the current VGP is set to expire on December 19, 2013. The EPA is currently working on the next VGP and MDC is monitoring the progress. As more information on the next VGP becomes available, MDC will post on Twitter @USACE_MDC and in our newsletters.

Ocean City, MD gets new Mooring Dolphins

Working with Baltimore and Wilmington Districts, the Marine Design Center adapted an existing 19-pile dolphin design for use in Ocean City, MD to dock the USACE Dredge CURRITUCK.

The design consisted of 2-19-pile dolphins. Piles on the mooring face of the dolphin were installed vertically to prevent the radius of moored vessels from battering the piles due to wind and wave action. Piles were driven to refusal or to a maximum depth of -35 MLLW. Clusters extended to +10 MLLW excepting that the center pile (king pile) extended to +12 MLLW. Once completed and wrapped with steel wire, the piles were faced with UHMW Polyethylene fendering for protection purposes.

All materials were procured and the dolphins were installed by the crew of Wilmington District's SNELL.

P.O.C for this project in the Marine Design Center is:
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19-pile timber dolphin faced with UHMW Polyethylene fendering in Ocean City, MD.

Dredge POTTER Gets a Facelift & New Heart

Original deckhouse being lifted off Dredge Potter

In 1931 and 32, during the height of the depression, the Corps of Engineers built four steam driven dustpan dredges: POTTER, JADWIN, BURGESS and OCKERSON . The POTTER and the JADWIN still maintain the rivers of the central United States as they have for the past 80 years.

The two vessels have undergone numerous and significant changes over the intervening years; new hull plating, ladder changes and steam to diesel conversion just to name a few. The most recent change was to the Dredge POTTER; the upper three decks were replaced forward of the stack and a new dredge pump installed.

The St. Louis District (MVS) in conjunction with the Marine Design Center (MDC) began brainstorming the changes about 5 years ago. Crew input was solicited and a basic description of the new house began to emerge. Investigation into new systems took place to ensure up-to-date equipment was part of the change. MDC contracted with JENSEN Maritime to create a design package for the new house and associated systems including electronics, structure and HVAC. The electrical distribution system for the new deckhouse was designed by MDC. The design package was used to solicit proposals in early 2010. A new dredge pump and associated systems was also contracted with Vosta, Inc. More on the pump changeout in the next Newsletter issue.

New Dredge Pump

Gulf Island Marine Fabrication, Inc. (GI) of Houma Louisiana was awarded the contract to modify the POTTER and work began immediately. GI chose C&J offshore of Anacortas, Wa. To upgrade the electronics suite and winch controls. GI used local subcontractors for the electrical and HVAC work (Work Boat Electric and Juneau Marine respectively). GI opted to build the new house as a single piece while the dredge continued to operate for the 2010 season.

POTTER was delivered into GI's hands in January of 2011 and work commenced in earnest. The old house was stripped of any equipment to be reused (not much of that), cabling pulled back, and then the structure was cutoff and removed in a single lift. A large hole was cut in the top of the pump room and the dredge pump and reduction gear were replaced. The entire house was the installed again in a single lift.

The new house being in place, it now had to be fully integrated into the existing ship, structurally, mechanically, and electrically. The age and prior modifications proved to be a significant issue here – no reliable drawings of the electronic systems existed. The crew, in tandem with C&J, worked through this problem admirably, and the quality and functionality of the new systems stand as a testament to their efforts.

The dredge was drydocked during this period to allow for hull maintenance and to perform a comprehensive hull thickness survey as a baseline study. Several thin spots were

cropped out and replaced and the hull was pressure washed.

A fresh coat of paint was applied above the waterline and a test and trial period was completed successfully in early August. On 10 August 2011, the Dredge POTTER departed Cajun Country bound for home.

Significant changes to the "New" POTTER include:

-Increased crew comfort
- Larger Staterooms
- Private or semi-private heads
- New furniture

-Larger pilothouse, approximately triple the size of the old.

- New Navigation and Dredging Control Consoles
- Fully modernized propulsion and vessel monitoring systems including four reconfigurable monitors for the pilot and dredge operator.
- Infrared cameras forward and aft for safer night operations or other times of reduced visibility.
- A new, more efficient dredge pump system including:
  - A single piece casing, 3-vane impeller, state of the art dredge pump with new thrust bearing
  - A 38" suction sluice gate valve
  - A 16" vacuum relief valve near the dustpan head

The changes to the POTTER have made it safer, more habitable, more efficient and have ensured many more useful years from this most reliable of workhorses.

Rolling Prefabricated Deckhouse

New Navigation Console

"New" POTTER

Dredge McFARLAND Electrical Upgrades

The Marine Design Center (MDC) in partnership with the Philadelphia District has completed a major overhaul of the dredging and ship's service electrical systems aboard the Dredge McFarland.

The McFarland is a 300' trailing suction hopper dredge with the capability to bottom dump, pump ashore, and also function as a side-caster. In 2010 the McFarland entered the ready reserve. When a corps' dredge is placed in ready reserve status it receives a reduced work load during the dredging season, but is expected to be ready to mobilize at any time with as little as 24 hours notice.

New Dragarm Winch Motor VFD

In 2009 MDC, working with architect-engineer Jensen Maritime Consultants, conducted a survey of the McFarland to determine the areas that posed the greatest threat to reliability and readiness. The survey found three vulnerable areas, all related to the vessel's electrical system: the main switchboard, the dredge pump control system, and the dragarm controls. All three of these systems were original from when the vessel was built in 1967 and all were in very poor shape.

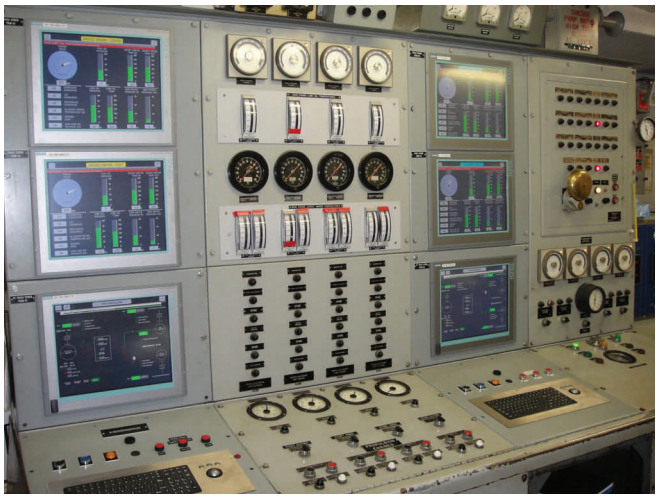
To help design a reliable and modern electronics package for the McFarland, Jensen hired Ockerman Automation Consultants of Anacortes, WA to develop a detailed design of the required equipment. The biggest challenge that Ockerman and MDC faced was deciding where to draw the line. Though it would be best technically to replace every piece of electronics on the ship, the costs would have been unreasonable. Conversely, some equipment was so antiquated that engineering a way to tie it in to a modern system would have cost more than replacing the equipment itself. The final solution involved significant amounts of new equipment, refurbishment of old equipment, and substantial field modifications.

The general philosophy followed was to retain the large generators, motors, cables, and rectifiers. Though original equipment, these components are fairly robust and still serviceable - less opportunity for improvement here. The control systems, on the other hand, have grown by leaps and bounds. For example, the original controls for the dragarms required an 8 foot tall cabinet full of relays to run all the lights, buttons, safeties, and interlocks. Now all this information is processed by a programmable logic controller (PLC) that is about the size of a laptop computer. To optimize the limited funds available to the project, these control systems were replaced with new, and the large power components were inspected, cleaned, refurbished, and reused.

Another obstacle that had to be overcome was how to fit all the equipment in the available space. There were areas where new equipment had to be installed behind old equipment, tie into old equipment, and in some cases, installed inside old equipment. MDC partnered with GKS Services Corporation who specializes in 3-D laser scanning. This technology uses a specialized camera to take thousands of laser measurements inside an area. By taking these "pictures" from several locations, GKS can generate a 3-D model of a space; accurate to within a 16^{th} of an inch. This technology can be used to model a space as large as an engine room or as small as the inside of an electrical cabinet. Engineers can then insert models of the new equipment into the 3-D spaces to determine where they will fit, what interfer-

New Dredge Pump Switchboard

ences need to be moved, how big certain components can be, and precise interface dimensions where two pieces of equipment must tie together.



Control Room—Engine Monitoring

Once the design was complete, MDC put the job out for bid and awarded to two experienced marine contractors.

Industrial Power Systems (IPS) of Jacksonville, FL provided the main switchboard and AVID Controls of Cypress, TX provided the dredging electrical systems upgrades.

The new switchboard provides many improvements over the old, completely manual, design. The new system can automatically bring generators online and load share, maintain the rated voltage and frequency with great precision, automatically shed non-critical loads if the power requirements begin to exceed the capacity of the generators, and constantly adjust the generators as the operational requirements of the vessel change.

The dragarm controls, provided by AVID, utilize a Siemens Variable Frequency Drive (VFD) to control a new 200HP A/C induction motor, port and starboard. This motor was coupled to the lay shaft of the existing winches, which are used to hoist and lower the dragarm. From the new control console the operator uses a joystick to precisely control the speed of the dragarm. Unlike the old system that was basically "all or nothing", the operators can make constant speed adjustment and slow the winches down to as few as 5 RPM.

The dredge pump controls have 3 control stations to allow for operation in the engine room, pump out room, or from the same console that the dragarm is operated from. Like the rest of the new equipment, the dredge pump system is modular and provides self diagnostics. Nearly all the parts are mounted on a DIN rail and can be snapped off and replaced with a spare in a matter of minutes. If a component fails, the engineer will hear an alarm in the control room and can read what the problem is. Inside the equipment, a red light will indicate which component has faulted.

The equipment was installed by Colonna's Shipyard in Norfolk, VA over the course of 6 months.

Dragarm and Pump Control Console (Before)

Dragarm and Pump Control Console (After)

Follow MDC on TWITTER

The Marine Design Center is now on Twitter. Follow us at @USACE_MDC.
We plan to use Twitter to communicate the latest information and photographs of new, ongoing and completed projects, new solicitations and to more broadly disseminate our newsletters.

Please pass this information along to others in your organization.

"We plan to use Twitter to communicate the latest information…"

US Army Corps of Engineers Marine Design Center

The Marine Design Center is the Corps of Engineers center of expertise and experience for the development and application of innovative strategies and technologies for naval architecture and marine engineering. We provide total project management including planning, engineering, and shipbuilding contract management in support of Corps, Army, and national water resource projects in peacetime, and augments the military construction capacity in time of national emergency or mobilization.

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