



**US Army Corps  
of Engineers®**  
Marine Design Center

Issue # 15

MARCH 2012

## USACE MARINE DESIGN CENTER

# Marine & Floating Plant Newsletter

## 2011 Floating Plant Highlights

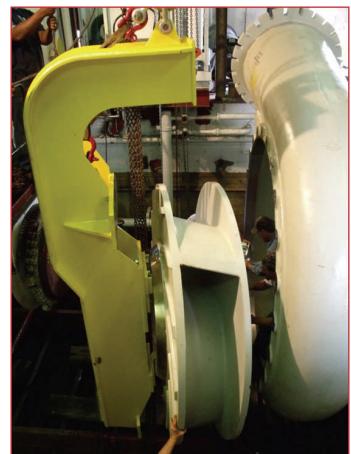
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The following projects were completed or major milestones achieved during 2011. Brief project summaries are given for potential applicability in other Districts:

- All aluminum 65' surveyboat for SAJ awarded to All American Marine of Bellingham, WA.
- USCG/USACE agreement (see article P.5)
- World Wide Power –MDC is helping purchase microgrid power for Afghanistan saving fuel and lives.
- MVS Stringout — A new barge dock, steel piles, and access ramp.
- MVK JADWIN New Pump including new DC Drives, pilothouse, nav and dredge consoles, and electronics.

- MVN WHEELER Repower awarded to Signal shipyard Mobile, AL to install GFE Cat C280 engines and support systems & repair.
- NWP YAQUINA Repower—Year 4 Dredge engines and new pumps
- MVP LEONARD—procure and install new pedestal crane on existing barge.
- SAW MURDEN—New 500 cu yd shallow draft splithull dredge about to be delivered.
- MVM HURLEY Ladder Mounted Dredge Pump procurement awarded to SPI Mobile Pulley
- MVS POTTER Texas Deck, Pilothouse, and new dredge pump replacement.
- MVR towboats Rock Island and Clinton delivered .



JADWIN New Impeller

## Ensley Engineer Yard Memphis

The Memphis District owns the best kept secret in the Corps—Ensley Engineer Yard (EEY). For USACE plant located on the inland rivers, EEY is an excellent resource for boat repair and small to medium size marine renovations. EEY has excellent fab shops and machining facilities and a couple different sized drydocks.

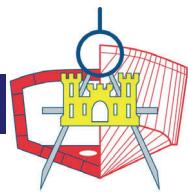
When supplemented with naval architecture, marine engineering,

and heavy lift capability, EEY is a very effective alternative to repair/rehab your boats.

MDC has successfully partnered with MVM's EEY on several projects including: MVM Dredge HURLEY Ladder lengthening; MVK Dredge JADWIN Propulsion Mods, new Pilothouse, and new Dredge Pump Foundation; and new Seatrax Crane on the MVP Crane Barge Leonard.



Ensley Engineer Yard Memphis



*The SEEMP applies to existing ships and is intended to address how the ship is operated to increase energy efficiency*

## Satellite Communications Installations

The Office of Secretary of Defense (OSD) has a policy that states we must go through Defense Information Systems Agency (DISA) and their contracting arm, DITCO, for ANY long haul communications services (voice, data, satellite, etc).

In other words, you cannot procure communications services through your local

contracting offices or put requests for bids out on the street. Sites cannot provision communications services from any source unless they have a registered DAR.

Please be advised and aware of the new requirements.

POC for this is:

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(412) 841-7501 (mobile)  
[john.cicone@us.army.mil](mailto:john.cicone@us.army.mil)



## Environmental Update

MDC recently attended the 2011 Marine Log Global Green Ship Conference and Expo. Conference topics included updates to the IMO Emission Control Area (ECA) regulations, advanced technology being utilized for compliance with IMO Tier III emissions regulations, ballast water treatment systems, CFD optimized vessel design, and discussions on various

hybrid vessels under construction or recently completed. Use of Liquefied Natural Gas (LNG) was also discussed at great length. Of particular interest, were the EEDI (Energy Efficiency Design Index) and SEEMP (Ship Energy Efficiency Management Plan) requirements under the IMO ECA requirements. The EEDI applies to new construction above 400 gross tons.

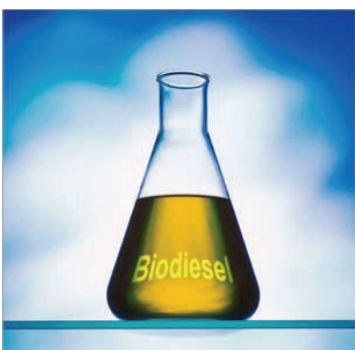
The SEEMP applies to existing ships and is intended to address how the ship is operated to increase energy efficiency (ex. use of autopilot, slow steaming, constant versus variable engine speed, etc.). The EEDI and SEEMP mostly apply to fuel reduction/efficiency which directly relates to a reduction of CO<sub>2</sub>.  
(cont'd on page 4)

## Biodiesel Pilot Program

In FY11 USACE successfully tested the operational feasibility of biodiesel use on 4 pieces of floating plant equipment located in San Francisco, Cleveland, St. Louis, and Washington, DC. The testing and conversion protocol was based on the methodology developed by NOAA at their Lake Michigan Field Station over the previous several years of

marine biodiesel use. In FY12 funding has been obtained from the USACE Sustainability Initiative to pursue continued efforts in this direction, with the aim this fiscal year to 1) establish the feasibility of nationwide biodiesel use on USACE floating plant, 2) determine emissions results of marine use of biodiesel fuels in accordance with EPA and CARB testing standards, and 3) determine

the feasibility of second-generation biodiesel use in USACE floating plant. In FY11 USACE used roughly 20,000 gallons of B100 and 315,000 gallons of B5; in FY12 the primary goal is to convert 1,000,000 gallons of diesel use to biodiesel. It is expected that after the completion of these FY12 actions enough information and experience will have been  
(cont'd on p. 4)





## USCG Subchapter M—Inspection of Towing Vessels

In August 2011, the U.S. Coast Guard issued their Notice of Proposed Rulemaking (NPRM) in the Federal Register for the Inspection of Towing Vessels. Up until this NPRM, only towing vessels over 300 GRT that operated on specific routes were required to be inspected vessels. This new section, 46 CFR Subchapter M (Parts 136-144) will be applicable to US Flagged Towing Vessels greater than 29-

feet (also less than 29-feet if towing hazardous or dangerous cargo).

The specific requirements for the vessels are contained in Parts 140 (Operations), 141 (Lifesaving), 142 (Fire Protection), 143 (Machinery and Electrical Systems & Equipment) and 144 (Construction and Arrangement). Some of the requirement highlights are:

- Emergency battery power for 3

-hrs for vital equipment and systems.

- Fixed fire extinguishing system and fire detection systems.
- Pilothouse alerter system.
- Life jackets, buoyant apparatuses, and signaling equipment.
- Training, plan development and record keeping.

It is anticipated that every vessel will need to make modifications (either in operations/record

(cont'd on p.5)

*46 CFR Subchapter M  
(Parts 136-144) will  
be applicable to US  
Flagged Towing  
Vessels*



## Marine Arc Flash Update

On CESO webpage <https://hqintra1.hq.ds.usace.army.mil/soh-internal/index.htm> there is a draft Corps Arc Flash Program (ER 385-1-100) and Implementation Letter (EP 385-1-100). Floating Plant are included in the scope. NWP has implemented this ER and required their existing floating plant to retrofit to meet it. MDC is in the process of suggesting changes to the ER based on the marine regulatory

bodies' guidance. As background, EM 385-1-1 included the Arc Flash rules in Section 11 (Electrical) but not in Section 19 (Floating Plant). Section 19 is silent as to whether Section 11 is applicable to floating plant or not.

The specific AF standards referenced in the ER and EP; NFPA 70, NFPA 70E, and OSHA are not applicable to ships with a few minor exceptions. In fact,

NFPA 70E states specifically that ships are not covered by this standard. OSHA does not generally apply to workers on ships. Workers on USACE vessels are regulated, licensed, and certified by the USCG (CFR Title 46). CFR 46 requires NFPA 70 (NEC) in specific areas such as transformer protection. OSHA is specifically applied by CFR 46 for marine casualty reporting, tankerman certification, procedures for (cont'd on p.5)

## USCG/USACE Agreement

This project was initiated from General Van Antwerp and USCG Admiral Papp's initiative to promote USACE and USCG collaborative efforts. Currently, the USCG's inland fleet of river buoy tenders (WLR/WLI) and inland construction tenders (WLIC) is beyond its economic service life and is in need of wholesale recapitali-

zation. In late 2010, the USCG and USACE-MDC developed and signed an Individual Support Agreement (ISA), tasking MDC to develop conceptual design alternatives to replace the existing USCG inland fleet. The tasking also included evaluation of newer technologies such as Z-Drive propulsion and Hybrid Diesel Electric

Powering. The conceptual design process has involved multiple design iterations incorporating USCG requirements and feedback. Final deliverables will include initial design drawings, powering and equipment recommendations, and weight and construction cost estimates.



**USCG WLR River Buoy Tender—  
Towboat with ATON (Aids To  
Nav) Barge**



## Environmental Update (cont'd from p. 2)



LNG Fuel will require a culture shift in marine operations

To reduce SO<sub>x</sub> and NO<sub>x</sub> to comply with the ECA requirements, shipping companies are applying various emissions reduction technology. This includes changing the type of fuel used (LNG, ULSF, etc.), installing engine exhaust aftertreatment equipment (SCR's, scrubbers, etc.), and utilizing dual fuel (ex. ULSF while inside ECA and HFO while outside ECA). Each of the tactics requires the company to ad-

dress other issues associated with availability of the secondary fuel, personnel training to operate and maintain engine aftertreatment equipment, etc.

Additionally, IMO Tier II requirements for marine diesel engines are the prevailing requirements for 2011 to 2015, however in 2016 marine diesel engines operating within the IMO North American ECA will be required to be Tier III compliant.

For additional information, please contact Jeremy Coatsworth at (215) 656-6850 or [Jeremy.D.Coatsworth@usace.army.mil](mailto:Jeremy.D.Coatsworth@usace.army.mil)



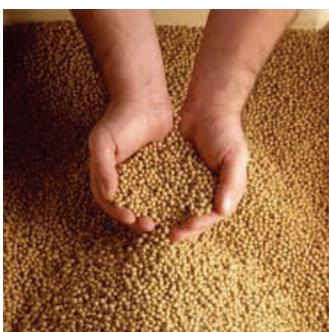
Buying marine equipment without planning for some degree of electronics interface has become a thing of the past.

The need to protect the electronics is an essential part of maintaining reliable operation. Shipboard bonding/grounding is not intuitively understood by most shipyards and marine electrical contractors. Based on recent projects, MDC has learned that the bonding/grounding sys-

tem on a vessel is as important as the fuel or fire protection systems and must be engineered, fabricated, and installed with the same degree of diligence.

We have experienced failures of diesel engine Electronic Control Units (ECU), monitoring and alarm system PLCs, even propulsion controls that have been attributed in some part to poorly designed or installed bonding/grounding systems.

Stay tuned for future updates on this topic. For additional information, please contact Vint Bossert at (215)656-6162 or [vinton.c.bossert@usace.army.mil](mailto:vinton.c.bossert@usace.army.mil)



collected to issue clear recommendations to USACE floating plant owners and operators to facilitate continued conversions and education as feasibility warrants. Ideally this will result in decreased fuel costs as well as greenhouse gas reductions in

accordance with the USACE Sustainability Plan mandates. For additional information, please contact: Bob Leitch at (202) 761-5904 or [Robert.b.leitch@usace.army.mil](mailto:Robert.b.leitch@usace.army.mil)





## USCG Subchapter M—Towing Vessels (cont'd from p.3)

keeping or the vessel's systems) to comply with Subchapter M requirements. Recent towboats that were designed and delivered through the MDC comply with the majority of the requirements. Only minor modifications may be necessary to comply with the newly proposed requirements.

In order to comply with Subchapter M, owners/operators will have the option to either submit to an annual U.S. Coast Guard inspection and survey, or create and comply with a Towing Safety Management System (TSMS) and use a 3<sup>rd</sup> Party to verify compliance. With the TSMS option, the Coast Guard

will only conduct an inspection/survey to issue the Certificate of Inspection (COI) and to renew the COI after five years. Regardless of the compliance option selected, the vessel needs to be dry docked around the mid-point of the COI term (2-3 years).

There are many new requirements and nuisances contained in the NPRM for Subchapter M. MDC recommends that each district/operator become familiar with the new Subchapter and to begin planning/programming for the issuance of the final rule and the start of compliance for towing vessels. MDC has consider-

able knowledge of the NPRM and can assist districts/operator with evaluating existing vessels and developing plans for compliance. As a side note, all new towboats designed and constructed through MDC will incorporate all of the necessary vessel features and systems required to comply with Subchapter M. If you have any questions, or would like more information, please contact Mr. Timothy Keyser, (215) 656-6171. [timothy.j.keyser@usace.army.mil](mailto:timothy.j.keyser@usace.army.mil) <http://www.regulations.gov/#/documentDetail;D=USCG-2006-24412-0001>



CERL Towboat JC THOMAS

## Marine Arc Flash (cont'd from p. 3)

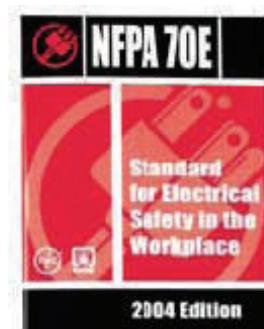
benzene monitoring.

The possibility exists where an arc flash hazard conflicts with circuit breaker coordination (required for all ship electrical systems by CFR 46). In certain circumstances to mitigate the arc flash danger, a breaker's time/current characteristics must be changed, which may un-coordinate the circuit breakers (an upstream breaker may trip before the breaker that is closest to the fault). If that upstream

breaker is the generator breaker, thereby causing the loss of the entire electrical plant (dead ship), and this occurs in a restricted channel, a marine casualty could result with potential loss of life and damage to the environment.

The Marine Arc Flash topic is currently coming to the forefront. MDC with CESO are quickly coming up the curve on this subject and developing a thought-through approach and

implementation of Arc Flash protection on Floating Plant. USACE should tread a little slower on this topic, since the marine regulatory bodies, USCG and the American Bureau of Shipping (ABS) do not currently have any rules addressing the issue, though they have asked us to participate in the development of proposed rulemaking. For additional information, please contact Vint Bossert at (215) 656-6162 or [yinton.c.bossert@usace.army.mil](mailto:yinton.c.bossert@usace.army.mil)



### ! WARNING

<b>Arc Flash and Shock Hazard Appropriate PPE Required</b>	
19 inch	Flash Hazard Boundary
1.29	cal/cm <sup>2</sup> Flash Hazard at 18 inches
Class 0	Untreated Cotton
480 VAC	Shock Hazard when cover is removed
42 inch	Limited Approach
12 inch	Restricted Approach
1 inch	Prohibited Approach
Bus Name: MDP, Prot Device: MA 800A	

## Follow MDC on TWITTER

The Marine Design Center is now on Twitter. Follow us at @USACE\_MDC. We have been using Twitter to communicate the latest

information and photographs of new, ongoing and completed projects, new solicitations and to more broadly disseminate our newsletters.

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## US Army Corps of Engineers Marine Design Center

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- Drydock and Blocking
- Hull Thickness Surveys (In-water and on drydock)
- Model Testing
- Dredging Systems
- Design & Construction of Floating Plant