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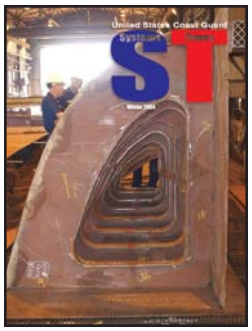
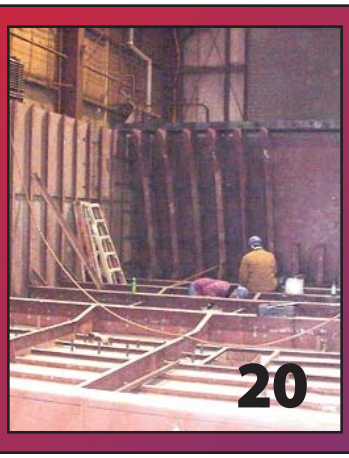
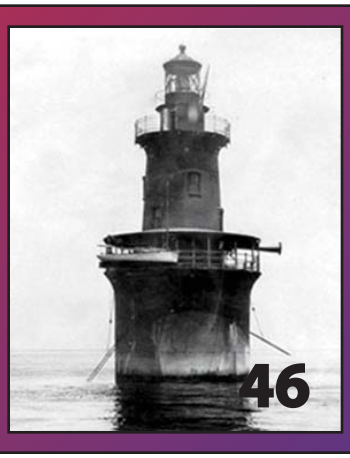


Bilge Radius structure for the GLIB (Great lakes Icebreaker) under construction at the Marinette Ship Yard. See story on page 20.





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Back cover: WASHINGTON, DC. -- A Boatforce DC rigid-hull inflatable small boat, better known as a Safeboat, patrols the waters of the Washington, D.C. area as part of homeland security. USCG photo by Telfair H. Brown

From the Chief Engineer

Greetings,

and a warm welcome to the Winter 2004 edition of *Systems Times*. Last issue I spoke about intellect, information and infrastructure. This issue appropriately focuses on intellect. I believe our most precious resource is our people and that we must continually take the time and make the effort to invest in their intellectual growth. I ask each of you personally to maximize every opportunity to develop the intellectual, technical and leadership skills of every active duty member, every civilian, every reservist and all our auxiliarists. I ask you, your chiefs, senior civilians and auxiliarists to become personally engaged in helping those under you grow, develop and advance.

I am proud of the many challenges and successes highlighted in this edition, and the countless daily contributions of all of our people to our Service's operational success everyday. Included in this edition are many great articles and I am compelled to comment on at least one. The high risk Design-Build solution for the Neah Bay Waterfront Improvements (page 42) was a departure from our usual low risk design-bid-build approach. However, with a sound risk mitigation strategy that was flawlessly executed, the project

was accomplished on time and on budget. Of course, this is only one of many approaches to project management. What this project (and others in the Engineer's Digest section of this edition) demonstrates is truly innovative thinking and well thought out risk mitigation. I believe that's where our future focus should be … that's what investment in intellect will produce. I encourage each of you to embark on a relentless pursuit of excellence to solve the problems of today … be people of possibilities. Our Coast Guard is truly blessed with extraordinary people doing extraordinary things … everyday. Thanks, I genuinely appreciate your tireless efforts to make our Service better.

Two major events occurred over the past three months that I want to briefly comment on. The first is the standing up of CG-6, which is a combination of the former G-CIT (Information and Technology Directorate) and G-SC (Command, Control, Communications and Computers (C4) Directorate). The new CG-6 Directorate is named C4IT (Command, Control, Communications, Computers and Information Technology). This reorganization centralizes all information technology related responsibilities, making management and delivery of those services more effective and efficient. The Systems Directorate and CG-6 remain closely connected and committed to providing the absolute best support to all of our customers.

The second event is the Systems Directorate off-site meeting that was held in October, 2003. Senior level personnel from the engineering, logistics and information technology communities were in attendance, including MLCs, AR&SC, ELC, Yard, C4IT and Systems Directorates. Our effort was to review our overarching documents, in an effort to more clearly define and quantify our measures of effectiveness. I expect our revised plan should be available in early 2004.

Again, keep up the valiant efforts. Strive for perfection, but settle for nothing less than excellence. And thank you for your service to our Coast Guard and to our nation. Semper Paratus!

Erroll M. Brown RADM, USCG
Assistant Commandant for Systems
"Chief Engineer"

WHEC Main Gas Turbine Fuel Control Replacement Project

The Fuel Control Replacement Project for the High Endurance Cutter (WHEC) FT4As continues to move forward, and the Engineering Logistics Center Gas Turbine Team, working closely with the Coast Guard Yard/Maintenance and Logistics Commands (MLCs), has successfully completed installations on 11 cutters. U.S. Coast Guard Cutter (USCGC) GALLATIN was the latest unit to receive the upgrade, accomplished in early September 2003. This project was established to replace the obsolescent and unsupportable Hamilton Standard, hydro-mechanical fuel control installed on each FT4A-2/6 gas generator, with a state of the art digital fuel control system consisting of a Woodward LQ25 liquid fuel valve (engine) controlled/monitored by a processor assembly communicating with an Operator Interface Panel (OIP) in main control. Like all new systems, there have been growing pains as installers struggle with issues associated with successfully tying into a 40 year old console and operators familiarize themselves with the new OIP and its wide ranging capabilities from monitoring to troubleshooting gas generator operation(s). Nonetheless, we have been extremely pleased with the progress and results of this ambitious project and feedback from the fleet continues to be positive. As we look to the future, it is anticipated that the last cutter will be upgraded sometime in Fiscal Year 2004 (FY04) and the project will finally be closed. However, the Engineering Logistics Center (ELC) working in concert with the Original Equipment Manufacturer (OEM), will continue to monitor micronet system performance for the remainder of the HEC service life and be proactive in identifying and correcting problems that impact Main Gas Turbine plant reliability.

Short Range Aids to Navigation (C2CEN)

An Aid Control and Monitor System (ACMS) replacement project was awarded to Tideland Signal Corporation for replacement of the ACMS system software and all Remote Units (RU), Transfer Units (TU) and Low Energy Remote Units (LERU) with generic RU units. Baseline testing and Beta testing at Group Hampton Roads ACMS System is ongoing. Field units will be notified in first quarter Fiscal Year 2004 (FY04) when installations of equipment will be accomplished.

VM100 Fog Detectors had a firmware field change accomplished by USCG Command and Control Engineering Center (C2CEN) engineers and technicians in the Puget Sound, Great Lakes and regions of the 1st District. While in the field the procedures for installation, correct wiring and setup of the VM100 were presented to the local Aids to Navigation teams. Remaining field changes to the firmware will be accomplished as units are exchanged at the ELC Lab 02L. The firmware change lowers the receiver failure threshold and has a count down program that will not allow a failure until five successive receiver failure analog to digital counts. C2CEN also conducted a data call on all VM100s in the USCG. Current statistics show that 90% of VM100s installed are fully operational.

National Oceanic and Atmospheric Administration (NOAA) and C2CEN have agreed to share resources and testing facilities for the next generation

of visibility detector. This project is particularly important because the VM100 is 10 years into its life cycle and the U.S. Standard National Weather Service device, the Belfort 6230B forward scatter visibility detector, is no longer manufactured.

The Beta Range Light Controller (RLC) System is installed on the C2CEN baseline and will undergo Final Acceptance testing first quarter FY04. Installation of the Beta system at the Elk River Range will occur during the second quarter FY04. C2CEN SRAN Point of Contact is Michael Zemaitis at (757) 686-2153 or mzemaitis@c2cen.uscg.mil.

Nationwide Control Station (C2CEN)

The Nationwide Control Station (NCS) provides monitor and control functions for the U.S. Coast Guard's Nationwide/ Differential Global Positioning System (N/DGPS) network. NCS is installed at the two operational sites, USCG Navigation Center in Alexandria, Virginia and Petaluma, California, each capable of controlling the entire N/DGPS network. In addition, USCG Command and Control Engineering Center (C2CEN) maintains a support suite capable of performing monitor and control functions when necessary. An NCS suite is built on top of dual PowerEdge 6450 Servers running Windows NT 4.0 and Oracle RDBMS. Monitor, control and reporting are provided through a series of custom software applications developed at C2CEN in Portsmouth, Virginia.

Efforts are currently underway to provide additional automation and functionality for the control station operators. The Oracle Database Management System will be upgraded including implementing replication between control stations. This will provide seamless transition of monitor and control responsibilities from one navigation center to the complement without loss of data. Numerous Commercial-Off-The-Shelf (COTS) products will be upgraded in preparation for transition to Windows 2003 Enterprise Server.

Improving system performance and capacity will be the goal for the NCS development team over the next year. Design plans are to separate the system along functional lines and leverage under utilized resources to improve performance for both DGPS operations and management. This separation will result in double the available processor time and storage space to execute monitor, control and reporting functions without incurring additional costs or compromising system availability.

Future design plans are focused on developing a Data Warehouse capable of allowing long-term data analysis and storage. The vision for the Data Warehouse includes a one-stop source for generating reports on system performance, casualty trends, statistical analysis and site data sheets. C2CEN NCS Point of Contact is Ronald Pridgen at (757) 686-2144.

Nationwide/Maritime Differential Global Positioning System (C2CEN)

The Nationwide Differential GPS (N/DGPS) expansion project continues to increase signal coverage throughout the U.S. by bringing additional sites online and improving the N/DGPS infrastructure. Engineering projects include: an ideal medium frequency radiator study that explores and documents the most cost effective approach to fielding a high performance beacon antenna; development of a Remote Transmitter Control Interface (RTCI) for the N/DGPS GWEN transmitter; engineering of a next generation reference station; and contracting of a SC1000 battery charger upgrade. Planning for system component recapitalization is underway with engineers exploring options for more robust antenna tuning unit designs; higher performing, lower cost reference station/integrity monitor designs; commercial options for a trans-

portable beacon antenna; and technology improvements aimed at increasing system performance. C2CEN N/DGPS Point of Contact is Mr. Dave Wolfe at (757) 686-4015.

Tender Deployable DGPS System (C2CEN)

Tender Deployable Differential Global Positioning System (DGPS) System (CG/PSN-1) systems are fielded aboard CGC KUKUI in Hawaii, CGC SPAR in Alaska and CGC SASSAFRAS in Guam. Annual system grooms are underway. During the grooms, the Command and Control Engineering Center (C2CEN) is installing improved VHF datalink hardware in the systems. USCG C2CEN has procured ruggedized, water-resistant notebook computers to embed in the system. These computers are intended to prevent failures caused by exposure to salt air. C2CEN has a technical writer working to improve the system's technical manual and documentation. The timeline for the groom and upgrade process is 9-12 months. Additional efforts include field support of the system, completion of the cutter navigation interfacing study and development of a computer based training program. C2CEN CG/PSN-1 Point of Contact is Mr. Ben Otteni at (757) 686-2175.

Flight Deck Video System Upgrade (C2CEN)

Flight Deck Video System (FDVS) installations are in full swing. The project, formally known as FDCCTV, has had a name change to help avoid confusion with existing non-supported closed circuit television (CCTV) systems such as shipboard security CCTV. The FDVS is a required system for safety of flight deck operations. The FDVS shall not be integrated or associated with any shipboard security or entertainment system. An Engineering Change Approval (ECA) has been submitted and approved for WMEC-210 [Medium Endurance Cutter] FDVS and WMEC-270 FDVS, and an Engineering Change Request (ECR) has been submitted for WAGB-399 [Icebreaker] FDVS. The Electronics Integrated Logistics Plan is being finalized and the Engineering Logistics Center (ELC) has been supplied with an adequate number of seed stock.

Upgrades for WMEC-270, WMEC-210, WAGB-399 FDVS have been completed. However, the accompanying drawings for these upgrades have not been finalized. C2CEN has tasked the Coast Guard (CG) Yard with revising the drawings. Once the revised drawings are reviewed and approved by C2CEN, which should be mid Fiscal Year 2004, the CG Yard will distribute them to the cutters.

Upgrades for WHEC-378 [High Endurance Cutter] FDVS are ongoing. C2CEN personnel, with the assistance of ship's crew and Electronic Systems Support Unit (ESU) personnel, are installing the upgrades. The aim for the WHEC FDVS-378 was to upgrade the system during the ongoing WHEC-378 Shipboard Command and Control System (SCCS) project. Unfortunately, it didn't work out due to logistical issues and scheduling conflicts. The major goal of the installations is the replacement of antiquated Pelco and Vicon equipment and the Conraq video monitor on the bridge. These will be replaced with American Dynamics

pan/tilts (AD-1240-24H), American Dynamics controllers (AD-1200A) and Nortech 18" LCD VGA flat screen monitors. FDVS video will be routed via the SCCS, which means C2CEN personnel will be bypassing the unsupportable FDVS Dynair switcher. The Statnet panel will be the new means for selecting FDVS. FDVS will be a closed system, the FDVS monitor, on the bridge, will not share a video display with anything other than the Maritime Forward Looking Infrared (MARFLIR) display. The Dynair switcher is FDVS equipment that many ships have used to patch their entertainment and security systems in to. C2CEN's aim is not to remove this equipment, just bypass it. The Dynair switcher will become the ship's responsibility in the event that it fails. The black and white, zoom and fixed cameras will not be replaced or upgraded.

Currently, 75% of all ships requiring FDVS have the newest hardware. Nine 378s, the HALEY and the HEALEY are the only cutters operating with the antiquated and unsupportable hardware. A more concrete installation schedule is currently being finalized. C2CEN plans to have an installation schedule established, for all the remaining cutters, during the first quarter of Fiscal Year 2004. C2CEN FDVS Point of Contact is ETCS Lautenschlager at (757) 686-2196.

Fleet Logistics System (FLS) (G-SLI)

Fleet Logistics System (FLS) is designed to automate the management of USCG cutter and small boat logistics. This includes maintenance actions, procurement and supply activities, and associated financial transactions.

Maintenance and development support for FLS has recently transferred to the Operations Systems Center (OSC) at Martinsburg, West Virginia, under the Systems Engineering Services Technical Services (SETS) contract awarded to QSS. This has temporarily slowed the development of new functionality and bug fixes, but OSC has been coming up to speed quickly. By the time this article is printed, FLS 2.1 will have been released. FLS 2.1 contains enhanced provisioning functionality for the Engineering Logistics Center (ELC). Following the deployment of 2.1, maintenance releases will be deployed to production on a three-week schedule. These releases are targeted at improving FLS usability, in direct response to user complaints. FLS 3.0, which includes asset tracking functionality for the electronics community, and FLS 4.0, which includes the direct integration with the Large Unit Financial System (LUFS) and the Contract Information Management System (CIMS), are the last major version releases under the FLS acquisition project. This work will be completed by OSC, and at the time of this writing, no timeline exists for their release. Additional information is available on the OSC Intranet site, and will be distributed periodically by the Office of Logistics Information (G-SLI) through Status of Logistics System messages.

Naval and Electronics Supply Support System (NESSS) (G-SLI)

Naval and Electronics Supply Support System (NESSS), previously Supply Center Computer Replacement (SCCR), is one of four automated information systems that comprise the family of Coast Guard logistics systems known as the Vessel Logistics System (VLS). NESSS supports the business process of the Engineering Logistics Center (ELC) and the Coast Guard Yard. NESSS is Windows GUI upgrade to SCCR, and was built using state-of-the-

art software application tools and databases from Oracle Corporation. It incorporates over 10 external interfaces with USCG and U.S. Navy systems and over 1,000 application modules. Originally designed to move a myriad of legacy applications off aging hardware, NESSS has evolved into a fully integrated system linking the functions of provisioning and cataloging, unit configuration, supply and inventory control, procurement, depot-level maintenance and property accountability, and a full financial ledger. The system is completely matrix driven, allowing for maximum user configuration and adaptation. All modules of SCCR have been converted to the NESSS GUI. The ELC is in the process of biweekly rolls of modules to production.

Configuration Management Plus (CMPlus) 5.0 is completing final testing at Operation Systems Center (OSC) Martinsburg. CMPlus 5.0 is the Windows GUI upgrade to CMPlus, and includes a variety of new features, such as an improved maintenance schedule and simplified Casualty Report (CASREP) preparation. Upon completion of OT&E it will be presented to the Telecommunication and Information Systems Command (TISCOM) for certification and shortly thereafter deployment of the upgrade will commence to field units. Deployments will continue throughout FY04. The deployment of CMplus 5.0 will include a visit from a Configuration Management Implementation Team (CMIT) or Maintenance and Logistics Command (MLC) representative to assist in completing the upgrade, and provide unit training on the upgrades and enhancements that CMplus 5.0 will provide. The upgrade and training should take no longer than four days and will be tailored to each units needs and daily business practices. You will be receiving a call from a deployment scheduler with available dates for the upgrade and training. If you have not been contacted, call the CMIT at (410) 762-6641.

Automated Requisition Management System (ARMS) (G-SLI)

Automated Requisition Management System (ARMS) completed testing of its new e-mail functionality. The utilization of the send mail functionality replaces the X.400 function within ARMS, which enabled units to email ARMS Query menu reports. This is a repair of functionality that was lost when X.400 was no longer supported. Once the new functionality is released, a pop-up message will appear upon login, informing users of the new feature.

CG Data Network Plus (CGDN+) Backbone Upgrades (TISCOM)

The Coast Guard increasingly relies on the CG Data Network Plus (CGDN+) to conduct the daily business of the Coast Guard. Enterprise applications, Internet access, and e-mail all rely on CGDN+ for transporting data to and from end-users. To keep up with the ever-growing usage of CGDN+, TISCOM (Telecommunication and Information Systems Command) periodically and systematically implements improvements to the CGDN+ infrastructure.

During the second quarter of Fiscal Year 2003 (FY03), circuits and routers at critical CGDN+ backbone sites were upgraded. Hardware and software upgrades were installed to improve performance, increase redundanc, and to enhance capabilities at our five core routers Operations Systems Center (OSC), Finance Center (FinCen), HQ, Integrated Support Commands (ISCs Alameda and Seattle) and four external routers (OSC, FinCen, HQ, ISC Alameda). Bandwidth was significantly upgraded between our core routers by replacing multiple 1.5Mbps T1 circuits with multiple meshed 45Mbps T3 circuits. An external ring was also created by connecting our four external routers with 45Mbps T3 circuits.

In the first quarter FY04, the circuits and routers at five more backbone

sites (ISC Boston, ISC Cleveland, ISC Miami, ISC New Orleans and ISC Portsmouth) are being upgraded to significantly improve the bandwidth where the five sites connect to the core of CGDN+. This is being accomplished by replacing multiple T1 circuits with redundant 45Mbps T3 circuits. The new T3 circuits are ISC Boston-ISC Cleveland, ISC Cleveland-ISC New Orleans, ISC New Orleans-HQ, OSC-ISC Miami, ISC Miami-ISC Portsmouth and ISC Portsmouth-FinCen.

TISCOM(tsd-1c) Point of Contact is LT Tamez, (703) 313-5553.

Coast Guard Cutter SMILAX (Yard)

The Yard safely docked the Coast Guard Cutter SMILAX on 17 July 2003 to begin an anticipated three month Maintenance Sustainment Availability (MSA). The substantial sustainment work items eliminated problems with obsolete and unsupportable engineering equipment/systems. Some of those work items included: new main engines, generators, switchboard, engine/power distribution control systems, reduction gears, shafts, props, and shaft seals and modifications to the fuel piping/air intakes. The SMILAX is a 170' construction tender homeported in Atlantic Beach, North Carolina.

Hurricane Isabel and the Yard (Yard)

The Yard experienced unprecedented flooding during Hurricane Isabel that visited Baltimore with a vengeance during the early morning hours of 19 September 2003. The tropical storm holds the record for the highest flood tides in the Baltimore-Annapolis area within the past 100 years. Hurricane Isabel delivered its fury to the shipyard. The tide reached three to four feet above ground level along the Yard's east bulkhead and covered the piers on the waterfront as well as Arundel Cove. Water level rose to two feet on the first floors of several buildings along the waterfront. Accompanied by wind gusts of 50-60 mph, Hurricane Isabel left no catastrophic building damage. Ninety percent of the shipyard had power on the morning of the 19th, and there was minimal electrical damage. Clean-up of downed tree limbs and water damage inside buildings continued throughout the weekend. Much of the damage minimization was due to exceptional planning, preparation and responsiveness on the part of the Yard team, including tenants and visiting cutters. The Yard's "always ready" posture resulted in protection of vital equipment, parts and cutters before and during this severe, record breaking storm.

"Sir, I Have Relieved the Watch."

With These Words Captain McCullough Becomes New Gold Ancient Mariner

"Sir, I Have Relieved the Watch." ***With these words, Captain "Mac" McCullough became the 11th Gold Ancient Mariner of the United States Coast Guard, a title established 25 years ago to honor the Coast Guard officer with the longest service at sea. The Ancient Mariner is charged with keeping a close watch to ensure that sea service traditions are continued and that the time honored reputation of the Coast Guard is maintained. Captain McCullough has served in the U.S. Coast Guard for 37 years, 16 of which have been at sea. He is the current Commanding Officer of the Project Resident Office, Marinette, Wisconsin. (Official USCG photo)***

Donning the traditional garb of an Ancient Mariner -- a "fore & aft" style hat, gold braided shoulder epaulets and a nautical log glass -- Captain Richard "Mac" McCullough recently became the 11th Gold Ancient Mariner of the United States Coast Guard. The Captain's new title distinguishes him from among the Coast Guard officer corps by having the longest service time at sea -- a tribute to his career that has spanned the past 37 years, including 16 years sea duty.

Captain McCullough accepted the Ancient Mariner honor during ceremonies on the 27th of June 2003, fittingly held at the Coast Guard's century old shipyard -- the Coast Guard Yard in Baltimore, Maryland. Vice Admiral Thad Allen, Coast Guard Chief of Staff, presided over the "Change of Watch of the Gold Ancient Mariner" ceremony.

The Captain relieved Captain William Cheever who had served as the Gold Ancient Mariner since 1999. Captain Cheever retired from his position as Commanding Officer of the Coast Guard Yard after a 41 year distinguished Coast Guard career. As required by the regulations governing the Ancient Mariner program, the Captain, upon retirement, passed down the Ancient Mariner title to the next officer in line.

Captain McCullough enlisted in the Coast Guard in June, 1966. Throughout his career, he has served on nine Coast Guard cutters -- the CHINCOTEAGUE, CAPE UPRIGHT, BUTTONWOOD, POLAR STAR, DEPENDABLE, SALVIA, SWEETGUM, POLAR SEA and DECISIVE. His shore assignments included LORAN Station Hokkaido, Japan; Coast Guard Base Honolulu, Hawaii; Marine Safety Detachment Greenville; Group Key West; Naval Engineering Support Unit Honolulu; and Vessel Support Branch MLCLANT.

The Oldest and the Newest. ***The Coast Guard held the "Change of Watch of the Gold Ancient Mariner" at the U.S. Coast Guard Yard on June 27th, 2003. Traveling to Baltimore, Maryland from Cape May, New Jersey were members of the Cape May Band who provided musical support for the ceremony. Several of the Band's musicians were new Coast Guard recruits who enjoyed posing for a photo with the Coast Guard's Ancient Mariner, Captain "Mac" McCullough. (Official USCG photo)***

The Captain's early enlisted assignments were as an Electricians Mate. A Naval Engineer by trade, the Coast Guard promoted him in 1977 to Chief Petty Officer and to Chief Warrant Officer in 1979.

Captain McCullough attended Officer Indoctrination School at Yorktown, Virginia, and received his commission as a Lieutenant (junior grade) in 1981. He served as Commanding Officer of the Cutter DECISIVE homeported in Pascagoula, Mississippi, from June 2000 to May 2002. Holding back to back commands, today Captain McCullough is Commanding Officer of the Project Resident Office, Marinette, Wisconsin.

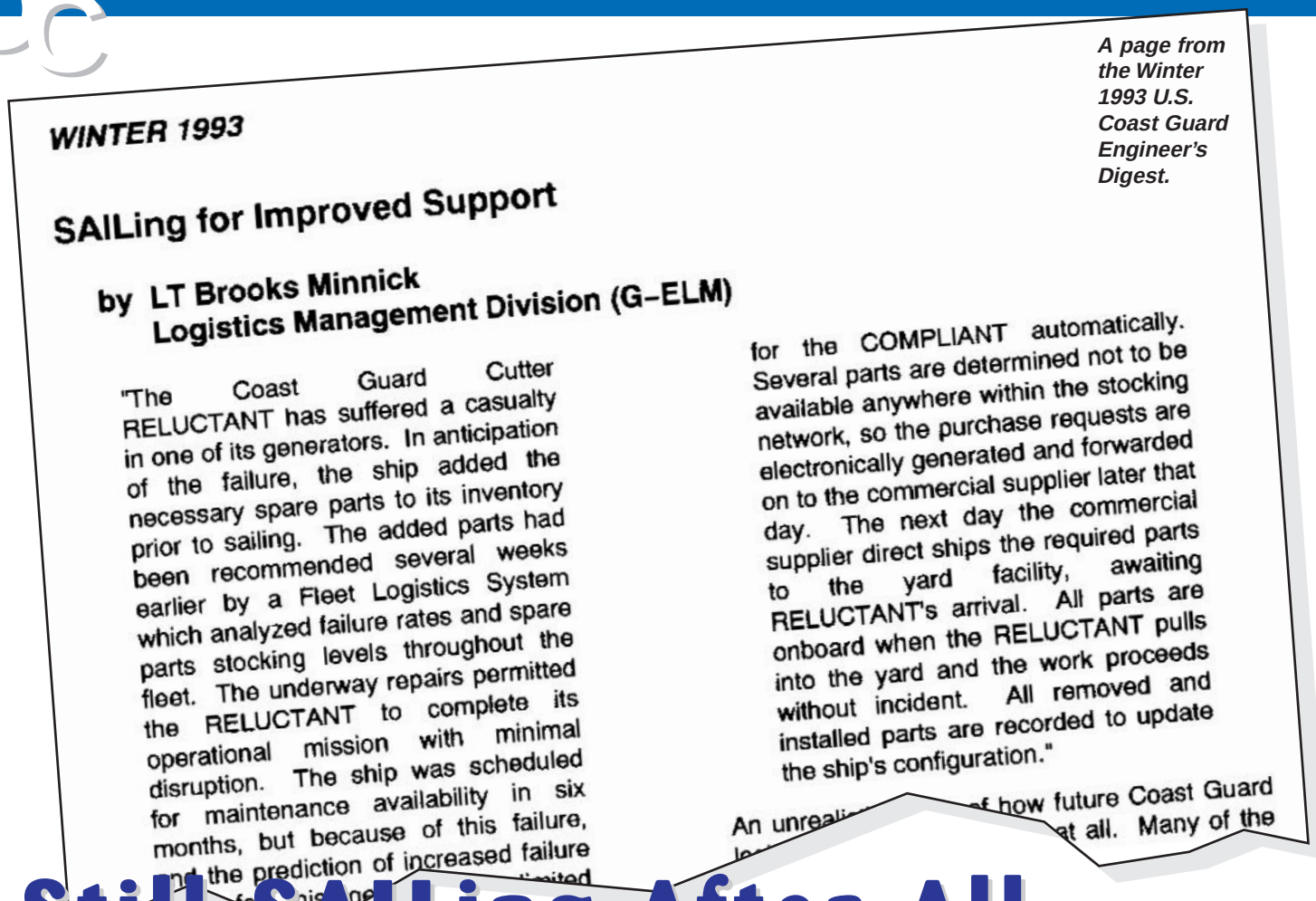
Assuming the title of the Coast Guard's Gold Ancient Mariner, Captain McCullough commented, "I enlisted in the Coast Guard 37 years ago and have gone from seaman recruit to Captain. Don't let anyone talk you out of your dreams. Continue to get promoted, and try to get the type of jobs you enjoy. And remember, pass on what you have learned to others."

The Coast Guard initiated the Gold and Silver Ancient Mariner program in 1978 to honor the Coast Guard officer (Gold) and Coast Guard enlisted member (Silver) with the earliest date of qualification as a Cutterman.

The Cutterman designation comes after five years of sea service. The Ancient Mariner must, however, have a minimum of 10 years sea duty to qualify for the honor. The title not only recognizes seagoing longevity, but extols the Cutterman's personal character and high performance standards. Cuttermen are called upon to go forth in all weather and to submit to the elements with little more than their experience to safely carry them through their missions. This title recognizes the most seasoned practitioners of the ancient and honorable art of seamanship as well as reflects the Coast Guard's core values of honor, respect and devotion to duty.

Also attending the "Change of Watch" ceremony was the Coast Guard's Silver Ancient Mariner, Master Chief Boatswains Mate Michael Gibbs. BMCM Gibbs has over 15 years of sea duty and has served aboard five cutters. He currently is the Officer-In-Charge of the Coast Guard Cutter CHIPPEWA, homeported in Buchanan, Tennessee. Master Chief Gibbs is a 34 year Coast Guard veteran.

The "Change of Watch of the Gold Ancient Mariner" preceded the Coast Guard Yard "Change of Command and Retirement" Ceremony on the 27th. During the latter event, Captain Ronald J. Rábago became the 37th Commanding Officer of the 104 year old shipyard, the Coast Guard's only shipbuilding and ship repair facility.



WINTER 1993

SAILing for Improved Support

by LT Brooks Minnick
Logistics Management Division (G-ELM)

"The Coast Guard Cutter RELUCTANT has suffered a casualty in one of its generators. In anticipation of the failure, the ship added the necessary spare parts to its inventory prior to sailing. The added parts had been recommended several weeks earlier by a Fleet Logistics System which analyzed failure rates and spare parts stocking levels throughout the fleet. The underway repairs permitted the RELUCTANT to complete its operational mission with minimal disruption. The ship was scheduled for maintenance availability in six months, but because of this failure, and the prediction of increased failure

for the COMPLIANT automatically. Several parts are determined not to be available anywhere within the stocking network, so the purchase requests are electronically generated and forwarded on to the commercial supplier later that day. The next day the commercial supplier direct ships the required parts to the yard facility, awaiting RELUCTANT's arrival. All parts are onboard when the RELUCTANT pulls into the yard and the work proceeds without incident. All removed and installed parts are recorded to update the ship's configuration."

An unrealis of how future Coast Guard at all. Many of the

A page from the Winter 1993 U.S. Coast Guard Engineer's Digest.

Still SAILing After All These Years

A Reflection on Where We've Been, Where We Are and Where We're Going

by CDR Brooks Minnick
Chief, Office of Logistics Information (G-SLI)
Edited by LCDR Mitch Eckstrom

***"Our past is the key to our future ..."* - Winston Churchill**

In 1992, several months after reporting to G-ELM (Logistics Management Division) out of Grad School as a Lieutenant, I was tasked to pen the first published article (see inset) on the SAIL project for the "Winter 1993" edition of the *Coast Guard Engineer's Digest*. For those of you who haven't been around that long, the *Engineer's Digest* was the G-E (Office of Engineering, Logistics & Development) sponsored publication that later evolved into the G-S (Systems Directorate) sponsored *System Times*, which you hold in front of you today.

SAIL, which stood for **S**ystems to **A**utomate and **I**ntegrate **L**ogistics, was a concept and a project who's objective was to restructure and redesign the core logistics systems that supported vessels (cutters and boats) and the systems installed on them. In the 1993 article, I detailed the logistics support activities around the fictionalized cutters RELUCTANT and COMPLIANT, as we imagined the improved support that a new logistics system, delivered through the SAIL effort, would ***someday*** provide.

In my newly attained position as Chief of the Logistics Information Office (G-SLI), I've elected to declare "***someday***" here, and take an opportunity to reflect on the legacy of the SAIL initiative, and on the work to deliver on SAIL's promises. We've made some substantial, albeit at times very painful, progress, but in many respects I feel we're only about to reach the starting line, and begin to accrue the benefits from our vessel logistics Information Technology (IT) investments.

The Rise and Fall of SAIL

The SAIL initiative was a righteous one; the concept sound, the goals laudable. It grew out of several embarrassing audits and logistics debacles, like the 378 FRAM [Fleet Rehabilitation and Modernization] in the 1980s, which spotlighted Coast Guard logistics inefficiencies. When I arrived on the project, the SAIL effort was focused heavily on analysis; commissioning study after study in an attempt to distill our current logistics processes and systems into something we could make sense of, so that we could chart the way ahead. This was no small task, especially when you consider that the Coast Guard had no logistics program office prior to 1987. Consequently, our logistics "system," if you could call it that, was a veritable patchwork quilt of disconnected processes and stove piped IT capability.

Frankly, the analysis work of SAIL wasn't very appealing to me, so I was secretly pleased when a month or so after penning that article for the SAIL team I was detailed across the hall to another G-ELM office to help support our "legacy systems" -- ARMS (Automated Requisitioning Management System), SCAMP (Shipboard Computer-Aided Maintenance Program), PPA (Personal Property Accountability) -- which needed care and feeding until SAIL replacement systems came on-line. This was roll up your sleeves work, on systems that were in use by real Coasties, and much more to my liking. However, I felt a bit like a rat leaving a sinking ship when within a year of that internal reassignment the SAIL project came under intense pressure and scrutiny, and was abruptly killed. The SAIL acronym became a "four letter word," and was scarcely mumbled again within G-E, and then G-S, for the remainder of my first HQ tour.

VLS - Rising From SAIL's Ashes

While the SAIL initiative itself was killed, its ideas and necessary system development initiatives were not. CMPlus, the cornerstone application of the nascent Configuration Management (CM) Project, was deployed to a single cutter in 1992, and carried on unabated after SAIL's demise. In fact, the CM Project charter was expanded in Fiscal Year 1995 (FY95) from the original 101 cutters, to include all cutters and standard boats. It was around this time that two additional system initiatives were reformed as major acquisition projects within Acquisition (G-A). The first was the effort to build a consolidated supply management system for the newly formed Engineering Logistics Center (ELC). It was accel-

erated due to system obsolescence and resulted in the development of SCCR, or Supply Center Computer Replacement, which we just recently renamed NESSS (for Naval and Electronics Supply Support System). The second was the Fleet Logistics System (FLS) effort that followed SCCR. It focused primarily on the maintenance management needs of the Maintenance and Logistics Commands (MLCs) and their subunits, and was managed by the same Acquisition project office, G-AFL (Fleet Logistics Project Manager).

Today we collectively refer to these major logistics systems, which had their origins during the SAIL project, as the Vessel Logistics System, or VLS. Just as SAIL was not a system in and of itself, VLS is not a system, but an "encompassing term" used to refer to the collection of applications used to provide vessel logistics information management capability. Presently VLS consists of the Fleet Logistics System (FLS), Configuration Management Plus (CMPlus), the ELC/YARD system known as NESSS (formerly SCCR), the Automated Requisition Management System (ARMS) and the Naval Engineering Technical Information Management System (NE-TIMS).

Four Years Later

When I left the newly formed G-S in 1996 for a four-year operational tour, the CM Project was struggling to make CMPlus run on a CTOS workstation (SWSII) without tripping the cutter's generator offline, and the SCCR and FLS projects were just warming up. Having escaped the collapse of SAIL, and any direct involvement with logistics IT systems of the future, I assumed that my involvement with our logistics IT systems had ended. When the detailer called in 2000, "inviting" me back into G-SLS (note: G-SLS followed G-ELM, and preceded the establishment of G-SLI) to serve as Program Manager for the VLS applications, it was clear what assuming had done for me.

When I returned, CMPlus had been deployed to over 300 units, SCCR had been "completed," and FLS was under development, having already been deployed to the MLC(v) staffs. SCAMP was still in use, but not for long, as the CGDN (Coast Guard Data Network) stood down and the last CTOS workstations were retired. Since returning in 2000, the G-SLI staff has toiled over the VLS applications in an attempt to deliver on the promise of SAIL. While progress on systems of this complexity can be maddeningly slow, and at times underwhelming for our logistics customers, the G-SLI team has always given a full measure of effort to provide logistics information management capability to the vessel and the electronics communities. It hasn't been easy, and we've got the bruises and scars to prove it. So do our users. The following are some reflections (i.e., hindsight) on how we've done, what we'd do differently if we had to do it again, and what the future might hold in store for not only vessels and electronics, but all Coast Guard logistics systems.

Monday Morning Quarterback

Hindsight is always 20/20, and these reflections are not meant to condemn the efforts of those who came before me who didn't have the luxury of looking back. I recognize that there are decisions I'm making now that my successor will puzzle over, if not outright curse. That being said, if I had to do it again, I'd:

***Under promise, over deliver*:** The Chief of Staff sure got this one right in his eCG ALCOAST. We've seen examples of overselling projects in order to get them approved, and the VLS applications were no exception. In a January 2001 FLS brief to the Resource Director, I asked; "When did IT people start promising that their systems would print money starting on the day they were conceived?". It was a rhetorical question, obviously, and one he could have rightfully asked of me, but the fact is that project "savings" were reaped by the resources folks before a single line of code was ever deployed. Experience demonstrates that large IT initiatives take more effort to bring on-line than simply maintaining the status quo, creating a negative payback and user hardship during the early phases. Payback only comes after a lot of hard work to implement capability, change work processes and culture, and instill system discipline.

It's a business system, not an IT system. IT is no silver bullet. In my experience, the only "killer applications" are e-mail and the Internet. Everything else involves a complex relationship between IT capability, business policy, business process, training and data management in order to be successful. This is particularly true in applications that attempt to automate complex business

functions like logistics. People look to the IT system to fix business ills, and sometimes IT people advocate that their systems will do just that. They won't. If all the pieces aren't in place, the system will fail to deliver on its promise, and will be (conveniently) blamed as a result. The VLS experience has served to drive home this point.

Build shore side support first. For a lot of reasons that have to do with project approvals, the budget process, and the complexities of the shore side support process, the completion and deployment of the unit level application (CMPlus) preceded the shore side IT pieces (e.g., SCCR and FLS) needed to make CMPlus truly valuable to the unit. Consequently, users blame CMPlus for not adding value to their work. This is an understandable position from a user perspective, but fails to recognize how the VLS "system of systems" needs to function. As a result, we have many negative perceptions to overcome as we still struggle to implement the shore side IT capability and work processes that will push updated configuration, maintenance and supply information to field units to make their job easier. Completing the support capability first, or at least in parallel, with the unit level system is the more prudent course.

Configuration first. As the "Circle of Logistics" depicts, configuration drives maintenance, which in turn drives supply. Problems with the latter two are often symptoms of problems with the first. The ECONOP (Engineering Logistics Concept of Operation) recognizes this basic principle (“ … the logistics system will be configuration based, ... “), and the CM Project was founded upon it. Unfortunately, our inability to manage the configuration information for units because the shore side support pieces weren't built (see prior bullet) has caused us to work "backwards" through the circle. Continuing to focus extensive effort on maintenance and supply management, without first getting our arms around configuration management, will be inefficient at best, and fruitless at worst. Further, the advertised benefits of SAIL and VLS will never be realized until we lay a solid CM foundation.

Requirements versus Preference. The FLS project has a terrific requirements document, and there are few who would take issue with any of its aspects. However, it's the interpretation and implementation of those foundational business requirements that can be maddening. Get two users in a room to discuss the implementation of the same requirement, and you'll find you actually have two "requirements" instead of one. Obtaining consensus takes time and effort, and typically one of the two users will be less satisfied than the other. Scott Adams, the creator of DILBERT, has made a career detailing this basic truth in his comic strips. The only way out of this box is rock solid leadership by the HQ business program that "owns" the requirement. These programs

must make the hard call, figuratively bash user's heads together when consensus isn't possible, and back up the IT development shop when users don't get exactly what they want. In a program as broad and diverse as vessel and electronics logistics support, anything less will only lead to frustration and failure.

Integration is key (aka "Stovepipes are easy"). The VLS applications are pieces of a whole, and they need to function that way. However, a separate project team developed each of the individual applications, at different times, and without the benefit of a systems integrator responsible for VLS in its entirety. Consequently, we're still working to better integrate the pieces and resolve the different "look and feel" attributes of each application in accordance with the ECONOP vision for the same look and feel. Despite its problems, SAIL was the integrating vision to keep these pieces together, and when SAIL dissolved, the focus on integration stumbled. We're looking to regain our footing, and recently transferred development and maintenance responsibility for all the VLS applications to OSC (Operations Systems Center), where they will be managed under a single system integrator.

Integrated Logistics Support (ILS) Planning. When I managed SCAMP in G-ELM, G-ENE (now G-SEN - Office of Naval Engineering) gave me $165K a year, which I gave to EECEN, and we "fielded" the application (i.e., mailed disks) to all the major cutters. When small cutters, groups and stations called requesting the software, we were told to tell them "Sorry, you're not an authorized user." So, in keeping with the finest can-do Coast Guard tradition, they "pirated" it. The program didn't request training, so it wasn't funded. Life was simple. Boy was I naive. Today, I share the widespread recognition that VLS is a "whole `nother animal," and I have found myself struggling to get my arms around how to adequately support it ... or even know what to support. One thing is crystal clear; if VLS isn't better supported, it will implode. Thanks to the addition of a Navy "loggie" to our staff, I was shown the light: ILS (Integrated Logistics Support). So, in accordance with the System Integrated Logistics Support (SILS) Manual, we formed a VLS ILS Management Team (ILSMT) to begin to address our support deficiencies. And while we still have MUCH to do, the results of this holistic approach to system support is beginning to pay off (see next bullet).

VLS Sustainment Team (VLSST: "vee list"). There was a (mis) perception that once these applications were built and deployed, they would be more or less self-sustaining. Reflecting this perception was the fact the Configuration Management Implementation Team (CMIT), which has deployed CMPlus since project inception, was slated to "stand down" this year. CMPlus was deployed, and the job was done. If that's the model for how we support and train these applications, the applications will fail, and the business community will suffer as a result. We routinely encounter units who have "lost the bubble" on how to employ CMPlus. They need to be retrained in the application, and "reinvigorated" in how to use the CMplus tool to help run their unit logistics program. This stuff is too complex; people rotate, and units don't have the time to just figure it out over and over again. We've been successful in retaining the CMIT, and in competing for funding to add additional resources to plus up this team; thus creating a VLSST to fully support the entire VLS application family. It was our newly inspired ILS focus that made the case for a VLSST apparent, and generated the justification and rationale to make it become a reality.

Reflecting on Our Successes

I realize that some of our less ardent "supporters" might respond to this section with a "What successes?", or "This should be short!" We're pretty thick-skinned by this point but we understand the sentiment and from where it emanates. It's not without justification. Setting our critics aside for the moment, and a propensity to NOT toot our own horn, please indulge a little reflection on the progress we've made:

CMPlus - In use at over 450 diverse units, ranging from cutters to NESUs (Naval Engineering Support Units) to LORAN stations to Air Stations. A CMPlus Windows GUI version is being readied for release, and should be fully deployed before FY04 ends. At the time of this writing, we are initiating a pilot project to take CMPlus to Boat Forces field units, providing a much needed information management capability for that logistics community.

NESSS - Formerly SCCR, this application has also been upgraded to a Windows GUI. The SCCR effort succeeded in consolidating 35 individual applications used at two ICPs (Inventory Control

Points), into a single application for the ELC and the Yard.

FLS - After a very bumpy ride that saw audits, budget cuts, a change in contractors and a transfer of the project from G-AFL to G-SLI, the FLS acquisition effort is winding to a close. A long engineering change work list remains, and there is much deployment work to be done, but the application is poised to enable the management and the mining of configuration, maintenance and supply information from all of those unit level CMPlus unit databases. FLS has become a cornerstone of both MLC(v) cutter support process, and is used by them to provide business intelligence, and answer HQ data calls on a variety of subjects. Incorporation of electronics support activities within the application looms on the near horizon.

CFO Act Compliance - The VLS applications have enabled the Coast Guard to obtain positive audit findings under the CFO (Chief Financial Officer) Act for three years running.

The Way Forward

This has been a retrospective on VLS. Its primary purpose is to learn from our past, and inform others of our decision-making as we chart the way forward. Looking ahead, the following opportunities, obstacles and challenges present themselves:

G-SLI Charter. As the context of this article clearly demonstrates, G-SLS was primarily the logistics information office for the naval and electronics communities. Aviation and civil logistics information management responsibility has been executed within those engineering program offices. G-SLI was chartered to look across G-S, and manage the entire portfolio of logistics related information management systems. Now, in the wake of moving all VLS software support to OSC, G-SLI is poised to alter our staffing structure and assume the full responsibilities for which we were formed.

Single Logistics System. Recently, RADM Brown restated the G-S commitment to a single logistics system, as called for within the ECONOP. Each of the engineering disciplines has labored mightily to build logistics information management capability for its program (Naval/Elex: VLS; Aviation: ALMIS (Aviation Logistics Management Information System); Civil: CEDS/FEDS (Civil Engineering Data System/Facility Engineering Data System)). The task to migrate toward a common system will not be an easy one, but it is worthy of our best effort.

HQ Reorganization. As we strive to maintain a common purpose and course, the transfer of G-C (Command, Control, Communications and Computer Directorate) to CG-6 from G-S promises to create some logistics and information management challenges. Resolving to work within common information management systems can serve to facilitate cooperation and coordination.

IDS (Integrated Deepwater System). The Integrated Deepwater System has resolved to bring yet another system on line. It is called the Logistics Information Management System (LIMS). This presents challenges for our "single logistics system" vision, but also presents an opportunity to reinvent a common system across the engineering disciplines.

DHS (Department of Homeland Security). As the DHS CIO (Chief Information Officer) looks to standardize systems across the department, the possibility of extending the use of our internal systems to other DHS agencies is very real. This presents an opportunity to raise the stature of our systems, and add resources as a result, but also presents daunting challenges for meeting more diverse user requirements and maintaining configuration control.

A Journey, Not a Destination

All of this work is part of a journey, and while we may have a notion today of the destination, it will likely change tomorrow. We'll adjust our course, and the journey will continue. In truth, there is no logical end. Since I began this writing with a quote from Churchill, allow me to end it the same way.

"Every day you may make progress. Every step may be fruitful. Yet there will stretch out before you an ever-lengthening, ever-ascending, ever-improving path. You know you will never get to the end of the journey. But this, so far from discouraging, only adds to the joy and glory of the climb." - **Winston Churchill**

The Trail to ELC Dorado

by CWO4 (F&S) Terry Manning
021 Electronic Systems Branch
Engineering Logistics Center

THE sun had reached the bottom of the narrow canyon where Placer Creek flowed. The warmth felt good on my face and shoulders. I had been following the trail for weeks now and was no closer to learning what was on the Engineering Logistics Center's (ELC) website, than I had been when I started. I drew up near a small pool and let my horse drink. Reaching into my saddlebags, I took out the three small bottles my father had left to me. The labels read *"Electronic Equipment APL's," "ELEX Nomenclature Requests"* and *"ELC Supply Advisories."* These fueled my quest to learn more of what was available at the ELC. The trail ahead of me looked well traveled and I knew the towns of Tiscom and C2Cen lay not far, but something was pulling me towards the dim outline of a trail climbing to my right.

The two small pillars of rocks marking the entrance to the trail suggested that the Ancient Ones might have used it long ago. I swung the roan up the path that clung perilously to the cliff face. From somewhere, something tugged at my memory. A conversation I had overheard between two elderly prospectors in the Cross Keys Saloon. They had spoken of a town with a mine nearby. A mine full of some of the most valuable information they had ever found. Their words of *"Excess Property," "NE-TIMS"* and *"Manufacturers Codes"* drifted through my brain. I thought I knew this country pretty well, but I had never come across any area matching their description. I reached a boulder-strewn area with a small grassy patch, Eli's Basin I figured.

I let my horse crop at the grass as I got down to make a pot of coffee. Gathering wood, I heard a noise and turned around in time to see a pack rat scurrying to its den. It was then I noticed the sign. It was well weathered, made of rough-hewn wood, with an arrow and the words "Town of Intra Net" crudely written across it. Looking around, I immediately saw the opening between two enormous boulders, marked by the scars where others had passed before, and there, half covered in earth, were two more bottles.

Peering at the stained labels I could make out *"MICA Users Guide"* and *"Engineering Change Status."* Forgetting the coffee and swinging into the saddle, I guided my horse through the maze of rocks and gradually emerged into a beautiful valley. At one end of the valley sat a town, obviously long deserted. Scanning the contours of the land, my eyes soon spotted a small outcropping of crumbling granite and below it was the opening I sought.

It was high up on the left side, about three-quarters of the way down the grassy expanse. I was soon at the mine's entrance and peering into the dark shaft drilled into the mountainside. I was surprised to find on a small ledge just inside the entrance, several dusty candles. Striking a match, I lit a candle and worked my way deeper into the darkness. The pounding of my heart echoed in my head and I felt a drop of sweat rolling down my cheek. The shaft veered to the right and rounding a corner, I stood awestruck. The candle-light reflected off hundreds of small crystals that adorned the wall, but my attention was glued to the row of bottles lining the hand cut shelf on the opposite wall of the small cavern.

I knew I had finally found the treasure of ELC Dorado. Scrawled on the rock above the shelf were the words **"ELC Products and Services List."** Dusting off the label of the first bottle, I read *"MILSTRIP Requisitioning Procedures."* The next read *"M4410.5 ELEX Material Identification Manual."* These two were followed by titles like *"ROD/QDR Status," "OPNAV 4790/CK, Ships Configuration Change Form," "ELC Mandatory Turn-In," "CGPMS Feedback"* and *"Telephone Directory."* I knew that this place would take sometime to explore, but the information I could pack out of here would be invaluable. Looking around I realized that I could not carry out all this knowledge in one trip, but that I would have to come back again and again. To ensure that I didn't forget the way, I took out a stubby pencil and my tally book. I wrote the following directions:

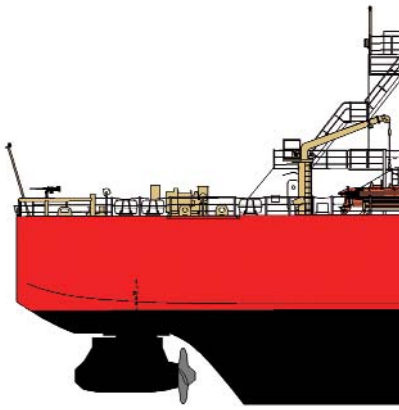
Head To The Placer . . . Stop . . . Two Pillars . . . Can Go West to Eli's Basin . . . Enter, Left and Center Boulders, A Little Tight . . . Under the Shelf of Crumbling Granite . . . Mine Isn't Lit (bring lantern).

I rode back into town, swung down off the roan and headed to the Cross Keys to relieve my dry and dusty throat. It was empty except for Sam, the bartender, who was polishing a glass at the far end of the bar. Sam slid me a shot of non-alcoholic rotgut and ambled over. Said he hadn't seen me around for a while. I told him my tale, showed him bottles of *"ELEX Support Gram"* and *"Points of Contact,"* and then the directions to the mine. He said that's a lot to write down if you intend to share it with everyone. I thought about it for a minute and then ripped a piece of paper out of my tally book and wrote: http://cgweb.elcbalt.uscg.mil. That should do it I thought. I slid the empty glass back to Sam and headed for the hotel, looking forward to a good night's rest. Tomorrow, I would start spreading the word of the treasures of ELC Dorado.

CONSTRUCTION OF MULTI-PURPOSE

by LT Eric Jones
PRO Marinette

GLIB's Engine Room Compartment: Marinette Maine Corporation does a lot of the fabrication of the hull blocks inverted -- so the bottom is actually the overhead.



On 6 June 2003, construction of the multi-purpose Great Lakes Icebreaker, U.S. Coast Guard Cutter (USCGC) MACKINAW WLBB-30, began. This significant achievement marks the end of a design period that has been ongoing since the Coast Guard awarded the $82,500,000 project to Marinette Marine Corporation on 15 October 2001. The new MACKINAW is scheduled for delivery in October 2005. The missions of the multi-purpose cutter are heavy icebreaking services, maintaining floating Aids-to-Navigation on the Great Lakes, marine environmental protection, search and rescue, and maritime law enforcement.

The principle characteristics of the MACKINAW are: Length 240 feet, Beam 58 feet, Draft 16 feet, Displacement ~3500 Long tons. The major equipment on board the MACKINAW will be two ABB Azipod drives rated at 3360 Kilowatts each for propulsion. The ship's service and propulsion power will be provided by three 3612 Caterpillar Diesel Generators, which will supply 3130 Kilowatts each, and a auxiliary/emergency generator will provide 718 kilowatts. For increased maneuverability, a 500 hp bow thruster will provide 10,000 lbs of thrust. There will also be a 20-ton, 60-foot telescoping hydraulic boom crane.

MACKINAW will incorporate state of the market technology. One technical advance will be integrated electric propulsion, which means that the diesel generators provide power for both ship's hotel service electrical power and for propulsion. MACKINAW will be the first United States Coast Guard or Navy asset to be delivered with Azipods for propulsion, supplied by ABB Oy of Finland. The Azipods can provide 100% thrust through 360 degrees rotation, providing superior directional control.

MACKINAW will have an advanced Integrated Bridge System (IBS) provided by Kongsberg-Simrad of Norway. The IBS includes an Electronic Charting system (ECDIS), Automatic Radar Plotting Aids (ARPA), Dynamic Positioning System (DPS), and numerous other sensors and displays that provide crucial navigation information to the Officer of the Deck (OOD). The IBS will allow for a single person to perform the duties that

GREAT LAKES ICE BREAKER BEGINS IN NORTHEAST WISCONSIN

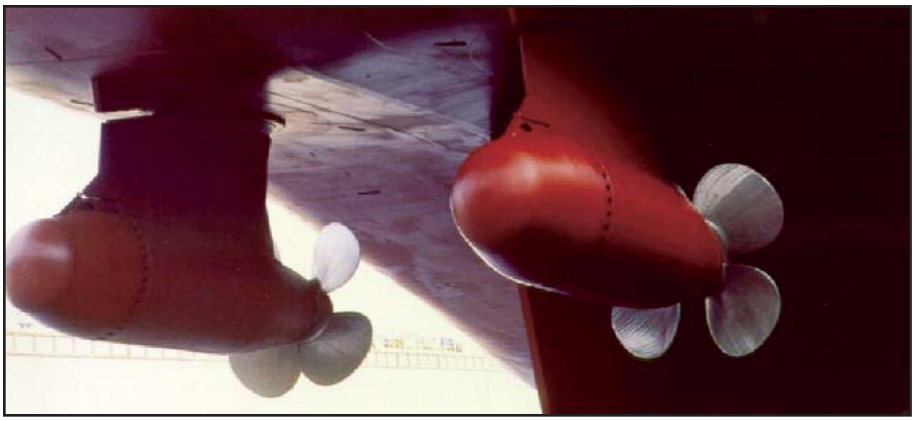


ABB Azipods.

The lower unit of the Azipod structure. The left side is the propeller end. (ABB, Finland)

would require three to four people on a non-IBS equipped ship. In addition, the bridge will have multiple Machinery Plant Control and Monitoring System (MPCMS) displays and Closed Circuit Television (CCTV) displays so that the OOD will be able to monitor what is going on inside and outside the cutter.

In addition, the heaviest ice seasons on the lakes shouldn't encumber the new MACKINAW. Although smaller in size, the MACKINAW's 9012 shaft horsepower will give the vessel a power-to-length ratio that exceeds the current MACKINAW. Maneuverability will surpass and icebreaking capabilities will be comparable to the current MACKINAW. MACKINAW's hull form was jointly designed in partnership with Marinette Marine and the Finland based Kvaerner Masa-Yards Artic Research Center (MARC). The hull incorporates features of MARC's patented double acting concept. The double acting concept utilizes a bow designed solely for transiting in open water and a stern designed for transiting in ice. To ensure optimal icebreaking performance in both directions, the Coast Guard has elected to retain the traditional ice breaking bow form. This hull form's exceptional performance was validated through thorough model testing at MARC and SSPA of Sweden.

The principal ice breaking characteristics of the MACKINAW are:

Level Ice:	32 inches at 3 knots Ahead 14 inches at 10 knots Ahead 32 inches at 2 knots Astern
Brash Ice:	12 feet at 3 knots Ahead 12 feet at 2 knots Astern
Maneuvering:	Turn 180° in 300 foot channel in 32 inch level ice and 12 foot brash ice in under five minutes.

Innovative Remediation Strategy to Treat Hexavalent Chromium Former Electroplating Shop, USCG Support Center Elizabeth City, North Carolina

by Donald R. Malone, PE, ARCADIS, Raleigh, North Carolina
J.P. Messier, U.S. Coast Guard Support Center, Elizabeth City, North Carolina

Reprinted with permission from the August/September 2002 issue of *the Professional Engineer* magazine.

The United States Coast Guard (USCG) Civil Engineering Unit, Cleveland (CEU-Cleveland) retained ARCADIS, Inc. (ARCADIS) to design, implement, and monitor interim measures to remediate soil and groundwater below a former electroplating shop at the USCG Support Center in Elizabeth City, North Carolina. The electroplating shop site is located within an expansive aircraft complex (Figure 1). The primary contaminant at the site was hexavalent chromium (Cr6+), which was accidentally released many years ago from a leaky tank that contained chromic acid. Chromium was present in soil above the water table and in groundwater as a result of this release.

When chromium-containing chemicals are released to the subsurface, their disposition will depend on several factors including exchange capacity of the soil, depth to groundwater, and valence state of the chromium in the released chemicals.

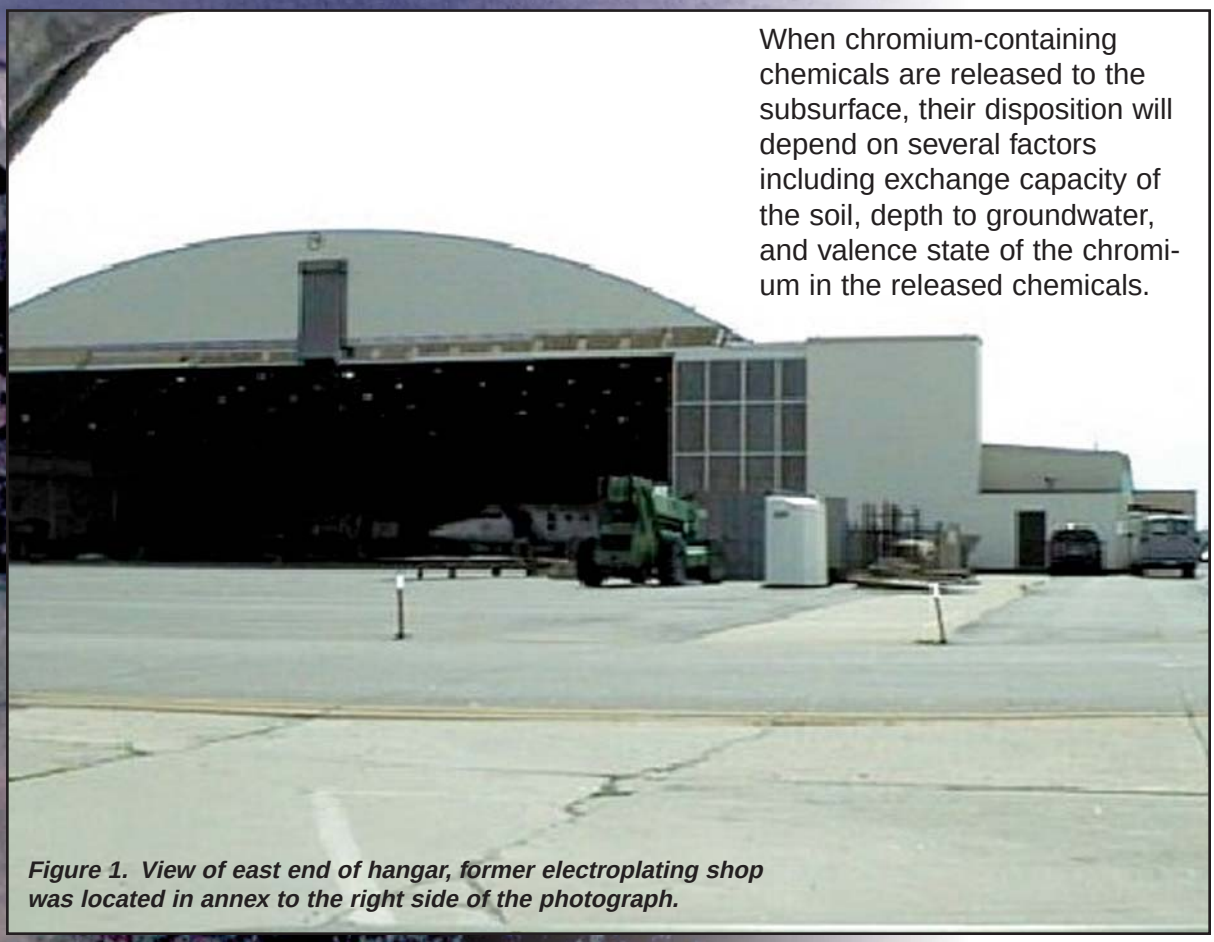


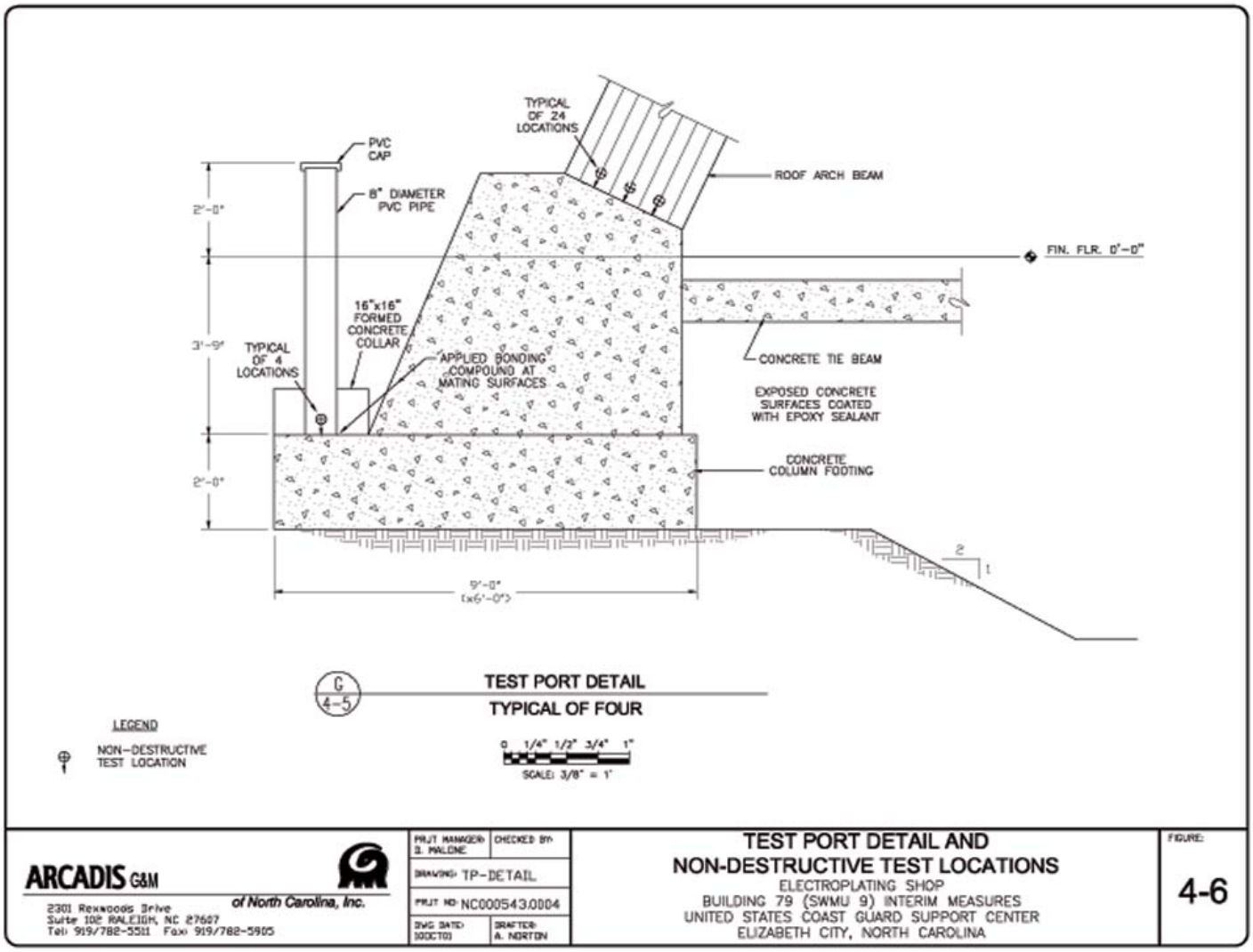
Figure 1. View of east end of hangar, former electroplating shop was located in annex to the right side of the photograph.

Many trivalent chromium (Cr3+) containing inorganic compounds are insoluble, and therefore would not impact groundwater to an appreciable degree. Cr3+ also is naturally occurring and can be present in soils at low concentrations. Cr6+ containing compounds are typically man-made for use within industrial processes. The toxicity of chromium is largely dependent on its valence state. Certain Cr6+ compounds are carcinogenic, and Cr3+ compounds are not considered to be toxic (USDHHS, 1992).

Approximately 80-percent of the total chromium present in groundwater at this site was in its Cr6+ state. In addition, total chromium concentrations in groundwater prior to implementing the interim measures were approximately 150 times greater than established groundwater standards and, therefore, remediation was required. The USCG and ARCADIS determined that immobilizing the Cr6+ by converting it to Cr3+ would be an appropriate in-situ treatment method for hexavalent chromium because the site is not very accessible.

Site Description and Background:
The work area was below an annex to an active hangar complex and constrained by multiple structural members (e.g., footings, arch supports, tie beams, and foundations). The hangar was built in the 1950's and the supports for the hangar ceiling were constructed of large laminated-wood arches that were 75 feet tall by 200 feet span. Three of the arches and associated tie beams terminated within the work area, each at a depth of 4.5 feet below ground surface (Figure 2). Because the facility was built over 50 years ago, only minimal design information was available for the building's foundation, arch-support footings, and other subsurface concrete structures.

Figure 2. Profile of arch support and footer with NDT sample port.



Adding to the complexity of the project, maintenance and repair operations for Coast Guard aircraft supported by the facility could not be suspended because of the important role the USCG plays in national security, and the protection and safety of people and shorelines. USCG employees work in offices and repair shops that are immediately adjacent to the former electroplating shop site. USCG and ARCADIS thus had to develop an innovative and robust strategy to overcome these multiple site constraints. Remediation, testing, and health and safety practices were planned and sequenced so that impacted soil was excavated and the Cr6+ present in groundwater was immobilized without impacting the building's structures, operations, or personnel.

Description of Remediation Activities:
The USCG conducted this remediation project as an interim corrective measure within the Resource Conservation Recovery Act (RCRA) process. The North Carolina Department of Environment and Natural Resources (NCDENR), Division of Solid Waste, Hazardous Waste Section provided regulatory support. As the first step in the planning activities, ARCADIS developed an Interim Measures Work Plan that was reviewed and approved by NCDENR. An Underground Injection Control (UIC) Permit was also obtained from the NCDENR, Division of Water Quality (DWQ). The primary activities of the interim measures included excavating chromium-impacted soil below the former electroplating shop, and then injecting a dilute sodium-dithionite solution into the groundwater zone to chemically convert the Cr6+ to Cr3+. Sodium-dithionite is a strong reducing agent which, when injected into soil and groundwater, reacts with Cr6+, converting Cr6+ to its insoluble and significantly less toxic state. The chromium would remain at the site as an insoluble Cr3+ precipitate that would adhere to the soil matrix, immobilizing the chromium.

The strategy to utilize sodium-dithionite at this site was based on previous laboratory and field-scale pilot studies conducted at the site in July 1999 by researchers from the United States Environmental Protection Agency (USEPA) National Risk Management Research Laboratory (NRMRL) (NRMRL, 1998). Cost analyses indicated that only marginal cost savings would be realized by treating the impacted soil in place and/or using ex-situ treatment cells, versus off-site disposal. Therefore, ARCADIS excavated the soil in the vadose zone within the work area, and then segregated, sampled, and analyzed the soil for impacts above applicable remediation goals. Soils that were above these goals were disposed off-site at a commercial treatment and disposal facility. The soils below the water table were treated with sodium-dithionite.

Overview of Chemical Processes:
Based on the research conducted by various scientists (Electrical Power Research Institute [EPRI] [1988]; Garrels and Christ [1965]; Rai et. al., [1986]; Rai et. al., [1987]; and Woods and Garrels [1987]), Cr6+ will have very limited mobility after it is reduced by ferrous iron (Fe2+) because it forms simple chromous-ferrous hydroxides that are insoluble in all but the most oxidizing conditions. These hydroxides can be thought of as a solid solution between two pure admixtures, chromous and ferrous hydroxides. The insoluble precipitates will remain immobilized in the subsurface even after the natural groundwater conditions are re-established. Only a few reaction mechanisms are known to re-oxidize Cr3+ back into Cr6+ (Palmer and Puls, 1994), including oxygen and manganese dioxides (MnO2) at high concentrations. The natural groundwater environment will not promote these re-oxidization reactions.

When sodium-dithionite is released to the subsurface, it spontaneously degrades within 3 to 5 days, reacting with constituents in the soil and groundwater, forming various sulfites, sulfates, and thiosulfates (Amonette et al. [1994]).

$$4SO_2 \Leftrightarrow 2S_2O_4^{2} + H_2O \rightarrow 2SO_3^{2} + S_2O_3^{2} + 2H^{+}$$

Iron compounds that are naturally present in the soil and groundwater are reduced by the sodium dithionite.

$$Fe^{3+}_{clay} + e^{-} \rightarrow Fe^{2+}_{clay}$$

$$Fe^{3+}_{oxid} + e^{-} \rightarrow Fe^{2+}_{aq}$$

Reoxidation experiments by Amonette et al. (1994) have shown that a substantial reductive capacity could be stored in the structural iron of the aquifer sediments, which would provide the potential for additional in situ treatment of hexavalent chromium in the event that any remains after the 3 to 5 day treatment period. The soluble ferrous iron ions will then bond with bicarbonate ions in the aquifer

matrix, forming various ferrous carbonate compounds.

$$Fe^{2+}_{aq} + HCO_3^- \rightarrow FeCO_3 + H^+$$

The ferrous iron ions will subsequently react with hexavalent chromium, reducing it to its Cr3+ state.

Figure 3. Excavating soil within the former electroplating shop.

Figure 4. Applying epoxy to internal concrete structures.

Remedial System Components:
The size of the work area within the former electroplating shop area was approximately 75 feet long and 35 feet wide (Figures 3 and 4). Soil was excavated to approximately 4.5 feet bls, which was also the approximate groundwater depth (Figure 4). Approximately 246 tons (164 cubic yards [yd3] was excavated below the site. Geotechnical evaluations determined that 1:2 slopes adjacent to the support column footings and benching along the excavation sidewalls would adequately protect the soil from destabilizing any foundations. ARCADIS' subcontractor also performed frequent location surveys of the footings and concrete arch supports while the excavation activities commenced to check for potential lateral movement of any structural members. None were observed.

After the target depth of approximately 4.5 feet was obtained, six horizontal injection wells were placed in the bottom of the excavation. Backfilling of the excavation was accomplished in layers. Each succeeding layer did not exceed more than 9 inches prior to compaction (loose), and was compacted in place using a plate tamp to greater than 98 percent of the maximum dry density. A nuclear gauge (ASTM D2922/D15560) was used to test each lift in several locations to ensure adequate compaction.

After backfilling was completed, a North Carolina licensed well driller installed thirty-four vertical injection wells as part of the sodium-dithionite injection system (Figure 5). The work area was located indoor and had both vertical and horizontal space restrictions. Therefore, ARCADIS utilized a small tractor-mounted Geoprobe to install the wells. Five shallow monitor wells and one deep monitor well were

Figure 5 (top). Backfilled with soil and gravel base course, injection wells and injection system installed.

Figure 6 (bottom). Tanker truck with sodium dithionite and chemical feed pump on right.

also installed to monitor groundwater quality during the injection operations and as part of the long-term monitoring program for the site.

ARCADIS injected approximately 30,000 gallons of diluted (0.1 Molar [M]) sodium-dithionite solution into the subsurface (Figure 6) during a 1-week period in May 2001. The average injection flow rate per well ranged from 0.07 to 0.16 gallons per minute (gpm), with an average value of 0.14 gpm.

Potential Impacts to Subsurface Concrete Structures:
Potential for deterioration to the subsurface concrete structures existed due to chemical degradation by the sodium ions present in the sodium-dithionite solution. To minimize this potential, ARCADIS applied an epoxy coating to the top and sides of all subsurface concrete structures (e.g., footings, support column, and tie beams) that were exposed during the excavation activities (Figure 3).

Three acoustic type non-destructive testing (NDT) techniques were employed to evaluate whether the concrete was being chemically deteriorated over time. NDT methods included PulseEcho (PE), Impact Echo (IE), and Resonance Frequency (RF), which determined whether the concrete was becoming porous, fractured, and/or less dense as a result of exposure to the sodium-dithionite. Six testing locations were used on the top of each support column, and two testing locations were used on each footing. Two 8-inch diameter by 6-feet tall PVC pipes were installed on top of each footing to create access ports from the ground surface. A concrete collar was then poured at the base of the access port prior to backfilling the excavation (Figure 2). ARCADIS performed NDT of the concrete structures prior to and on a quarterly basis after completing the interim measures to verify that the concrete support structures remain unim-

pacted. No measurable impacts to the concrete were observed 3, 6, and 9 months after completing the interim measures. NDT will continue on a semi-annual basis to monitor for potential future impacts.

Post-Injection Monitoring Activities:

Post-Treatment Soil Sample Results

After the chemical injection activities were complete, ARCADIS collected soil samples along the excavation periphery at six locations using a stainless-steel hand auger to determine whether soil contamination remained outside the work zone. Cr6+ was not detected in any sample above the laboratory detection limit in the post-treatment soil samples collected in June 2001, suggesting that the interim measures were effective at reducing Cr6+ to Cr3+.

Total chromium was detected in all the soil samples ranging from 2.7 to 58 milligrams per kilogram (mg/kg). Therefore, chromium was still present, but reduced to Cr3+. All sample concentrations were significantly below the USEPA Region 9 Residential Preliminary Remediation Goals (PRGs) for total chromium of 210 mg/kg. Therefore, the interim measures were deemed effective at treating Cr6+ in soil along the periphery of the former electroplating shop area in areas that could not be excavated.

***Post-Treatment Groundwater Sample Results*:**

When anthropogenic materials are released to groundwater, complex changes occur to the groundwater's biogeochemisty. ARCADIS measured various analytical parameters for evidence that would signify success of the interim measures, or suggest that additional treatment techniques might be needed. Monitor wells were sampled 1 month after the injection, and then quarterly during August 2001, November 2001, and February 2002. Five wells below the site were analyzed during each event. Post-injection groundwater data were compared to baseline groundwater data collected in 1999. Field measurements included pH, specific conductance, temperature, oxidation-reduction potential (ORP), and dissolved oxygen (DO). Each groundwater sample was analyzed for RCRA metals (USEPA Method 6010/7470), nitrate and sulfate (USEPA Method 300.0), and Cr6+ (standard method 3500D). A HACH DR/890 colorimeter was used to quantify ferrous iron concentrations in the field. A summary of the baseline and post excavation groundwater data is presented in Table 1.

***Hexavalent Chromium (Cr6+)*:**

Prior to injection in February 1999, the average Cr6+ concentration below the electroplating shop was 3.80 milligrams per liter (mg/L) (Table 1). Sample results from June 2001 revealed immediate and significant reductions in Cr6+ concentrations in groundwater to 0.05 mg/L. Cr6+ concentrations continued to decrease from June 2001 to February 2002, when less than detectable levels of Cr6+ were identified (Table 1). Similar trends were identified for total chromium, suggesting that the Cr6+ had precipitated as an insoluble chromous-ferrous hydroxide.

***Ferrous Iron (Fe2+)*:**

The initial average ferrous iron concentration present in groundwater at the site in February 1999 was 0.09 mg/L (Table 1). Sample results revealed a significant increase in ferrous iron to 6.5 mg/L during the June 2001 sampling event. Ferrous iron increases are a result of the sodium-dithionite solution reducing ferric iron minerals present in the aquifer soils. Moderate decreases in ferrous iron concentrations have occurred since June 2001, which likely result from several causes; continued reactions with reducible materials (including Cr6+), dilution with fresh groundwater, and reactions with carbonates in the aquifer matrix. The average ferrous iron concentration in groundwater 8 months after the injection activities was 1.9 mg/L. Therefore, ferrous iron has the ability to provide continued reduction potential, ensuring continued treatment of Cr6+ in the unlikely event that Cr6+ still remains below the site.

***Sulfate*:**

When sodium-dithionite reacts, it degrades to sodium and sulfate ions. Therefore, sulfate is an important monitoring parameter because it is an end product of sodium-dithionite degradation. The average sulfate concentration observed in groundwater at the site in 1999 was 152 mg/L. After implementing the interim measures, the average sulfate concentrations in the shallow aquifer zone increased substantially to 7,960 mg/L (Table 1).

***Oxidation-Reduction Potential (ORP), pH, and Specific Conductivity*:**

The ORP values in groundwater during 1999 ranged from +287 to -285 millivolt (mV), with an average value of -202 mV (Table 1). In June 2001, the average ORP value in the shallow aquifer zone

Table 1. Summary of Average Constituent Concentrations in Groundwater.

Sample Dates	Constituents: Hexavalent Chromium (mg/L)	Total Chromium (mg/L)	Ferrous Iron (mg/L)	Sulfate (mg/L)	Oxidation-Reduction-Potential (mV)	pH	Specific Conductance (µmhos/cm)
NCAC 2L Standard[1]	**0.11[2]**	**0.05**	**N/A**	**250**	**N/A**	**N/A**	**N/A**
Pre-Injection Concentrations							
February-99	**3.80**	**4.70**	0.09	152	-202	5.81	970
Post-Injection Concentrations							
June-01	0.05 J	0.01	6.5	**7,960**	-336	8.40	24,700
August-01	0.04 J	<0.01	1.5	**7,400**	-294	7.91	17,900
November-01	0.01 J	<0.01	1.2	**5,100**	-300	8.73	14,500
February-02	<0.01	<0.01	1.9	**5,460**	-270	8.08	11,200

mg/L	Milligrams per liter.
mV	Millivolt.
µmhos/cm	micromhos per centimeter
<	Constituent not detected above the reporting limit.
NA	Not Available.
1	Title 15A North Carolina Administrative Code 2L Groundwater Standards.
2	USEPA Region 9 Preliminary Remediation Goal for household tap water.
	Constituent present at above NCAC 2L Standard, or USEPA Region 9 PRGs.
J	Qualified as estimated because value is greater then Total Chromium.

Total Chromium by USEPA Method 6010
Hexavalent Chromium by SM 3500-Cr D
Ferrous Iron by HACH DR/890 Colorimeter
Sulfate by USEPA Method 300.0
Other other methods performed by field electrodes.

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Table 1.

was -336 mV, although ORP levels during the injection activities reached as low as -750 mV. The ORP values were significantly lower during June 2001 as a result of injecting the sodium-dithionite solution, as compared to the samples collected in 1999.

The groundwater pH in the shallow zone in 1999 ranged from 5.37 to 6.16 standard pH units (SU). After completing the interim measures in June 2001, the average groundwater pH in the shallow zone was 8.40 SU. This pH change in the shallow zone resulted from the sodium-dithionite solution, which was buffered with potassium carbonate which had a pH of approximately 10.5 SU. The natural aquifer matrix provided its own buffering capacity so that only minimal pH changes occurred as a result of the buffered sodium-dithionite solution.

The average specific conductivity of ground-water in 1999 was 970 micromhos per centi-meter (mmhos/cm) (Table 1). After completing the interim measures in June 2001, the average specific conductivity of ground-water in the shallow zone was 24,700 mmhos/cm. This change in specific conductivity in the shallow zone was because the sodium-dithionite solution added substantial quantities of sodium and sulfate ions into the shallow groundwater zone.

Sulfate, ORP, pH, and specific conductance levels continue to revert to natural background levels. A deep well installed from 20 to 30 ft bls below the center of the source area did not have any appreciable change in these constituents, suggesting that the sodium-dithionite injected into the shallow zone

did not migrate to the 20 to 30 ft bls interval of the surficial aquifer.

Conclusions:
These data suggest that the interim measures have achieved the objective of creating strong anaerobic conditions in the shallow groundwater zone. ARCADIS anticipates the natural groundwater conditions in the shallow groundwater zone will reestablish over time as fresh groundwater is flushed from upgradient areas. Hexavalent chromium is no longer present in soil and groundwater at the site because it has been reduced to Cr3+. The chromium remains at the site as various chromous (Cr3+)-ferrous (Fe2+)-hydroxides adsorbed to the subsurface matrix. These insoluble precipitates should remain immobilized in the subsurface even after the natural groundwater conditions are re-established because the natural groundwater conditions are not of a sufficient oxidation level to promote re-oxidation to Cr6+. In addition, the ferrous iron that remains at the site will provide continued reduction potential, ensuring continued treatment of Cr6+ in the unlikely event that Cr6+ still remains below the site.

Due to the success of the interim measures, the NCDENR has approved of the USCG's plans to renovate the work area back into useable office space. Groundwater monitoring below and downgradient of the site and NDT will continue for an additional 3- to 5-years to ensure that the interim measures remain successful in achieving the remedial goals for the site.

Acknowledgments: The method for removing oxidized contaminants from groundwater using chemically reduced ferrous iron is a patented process held by Battelle Memorial Institute (U.S. Patent Number 5,783,088). Approval to use this method was obtained from Mr. Jim Amonette, Co-inventor for the patent.

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MLCLANT Management Effectiveness Visit (MEV) Program

by Debra McGillvray
Civil Engineering Division
MLCLANT

The Maintenance and Logistics Command Atlantic, Civil Engineering Division (MLCA(s)) conducts Management Effective Visits (MEV) at each Civil Engineering field unit once every two years. The overall intent of the MEV is to perform a peer review of the management and technical practices at the Civil Engineering field units. Our general goals include the following:

- Improve consistency of key processes between field units.
- Verify conformance with Civil Engineering program goals and objectives.
- Share best practices among the Civil Engineering field units.
- Validate use of personnel regarding source appropriation (Operating Expense; Environmental Compliance and Restoration; Acquisition, Construction and Improvement).
- Identify program and unit areas of emphasis for improvement.

MEV members are a multi-disciplinary team made up of MLCA(s) staff and an ad hoc member from another field unit. An MLCA instruction was issued in June 2001 detailing the MEV process and providing units with a detailed checklist and general guidelines that help them prepare for MEVs. Well in advance of an MEV, the unit receives a letter which also contains the MEV checklist that confirms the dates of the visit. The unit collects and reviews the checklist information, and provides MLCA(s) with a complete package one week prior to the scheduled visit.

The MEV is conducted over a three to four day period. Upon arrival, the MEV Team provides an "in brief" to the Commanding Officer, Executive Officer and other key personnel from the unit. The MEV team uses the checklist information package, staff interviews and records checks to carefully examine all management and technical processes in key business areas. At the end of the MEV, the team provides an "out brief" with feedback on areas of Strengths, Weaknesses, Opportunities and Threats. The MEV team follows up with a written letter report within 30 days of the completion of the MEV. The letter provides more detailed feedback, shares best practices and provides recommended actions resulting from the MEV. It also notes work items for the MLCA(s) staff identified during the visit.

All three of the MLCLANT Civil Engineering Units (CEUs) have had an MEV within the last two years. Best Practices were identified and shared among the units, and results are posted on the MLCA(s) website. Some examples of Best Practices include Facility Asset Survey Boards to identify divestiture opportunities and shortfalls in space requirements; Group Engineering Officer conferences to educate customers on shore support processes; consistency of Planned Obligation Priorities (POP) boards for prioritization of projects; and improved content of websites for customer use.

The Management Effectiveness Visits have been beneficial to the MEV team members and the staffs of the field units, and have helped improve communications, sharing of good ideas and consistency of Civil Engineering practices in line with program goals.

Planning 2028

Need modern state-of-the-art facilities to make your mission highly effective and efficient?

How to get there from here, a primer on planning.

by **Thomas Fodor**
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What is planning 2028? It is a way to create a roadmap a quarter of a century into the future, so that the way may be cleared to recapitalize Coast Guard facilities, currently struggling at a 200[1] year recap rate. It is an integrated set of regional master plans that specifically recommends needed construction, now referred to as Capital Acquisition[2] (CA).

But what is actually needed to build new Federal facilities?

CA project proposals. These are developed as a set of evolving Planning Proposals that are reprioritized at every stage, including after they are approved by Commandant, to ultimately take on life as a congressional line item. These are for 'Major' CAs above the $1.5 million threshold. 'Minor' CAs represent smaller projects that will not confront this threshold, and thus avoid the line item requirement.

Let's first look at the last "planning" documentation step in the process, needed to get new modern state-of-the-art facilities built; the Planning Proposal (PP). A PP is a serious analysis that defines the scope and scale of a problem to be resolved, along with the range of alternative facilities solutions that are fully explored and estimated. Critical components/milestones include:

I. **Mission Requirements/Define Needs:** Collect data, quantify facilities and support needs, refine program.

II. **Unit Kickoff:** Confirm missions, verify needs and highlight specific facility and operational requirements.

III. **Planning Factors:** Develop w/unit and District (or Program) participation. Maintenance and Logistics Command (MLC) to validate w/Area and HQ.

IV. **Alternatives:** Planning factors provide PP direction and basis for analysis. Fully explore all Alternatives.

V. **Research/Substantiate/Participant Perspectives:** Document and justify. Outline all points of view.

VI. **Planning Proposal Draft/Environmental:** Describe impacts of alternatives, appropriate NEPA for phase.

VII. **Preliminary Comments:** Post PP components to the Planning Web for full CG transparency and access.

VIII. **Costs/Total Life-Cycle Costs:** Analysis, conclusions, recommendations, execution strategy and references.

IX. **PP Presentations/Final Comments:** Unit/District etc., presentations, confirm continued project support.

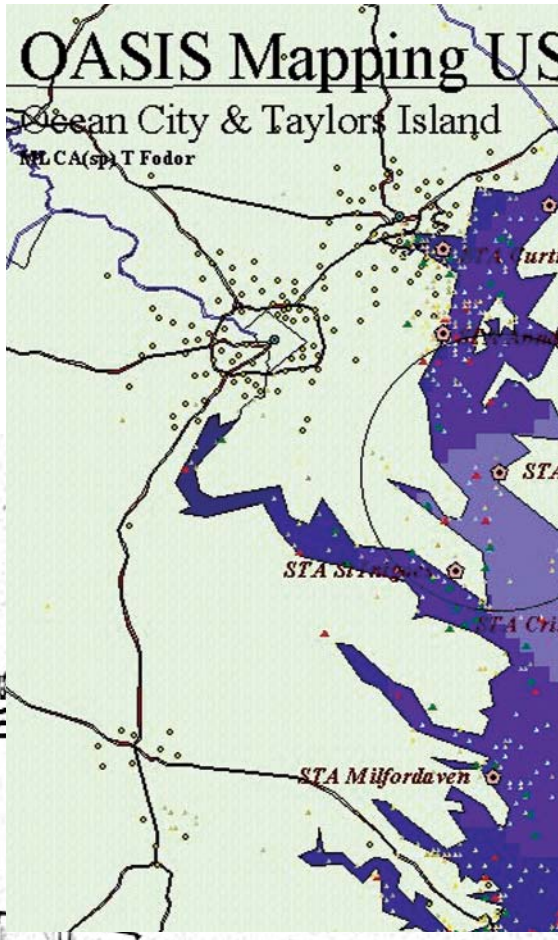
X. **Signature Process:** Endorsements. forward to MLC/AREA, who then endorses it to CPP for decision.

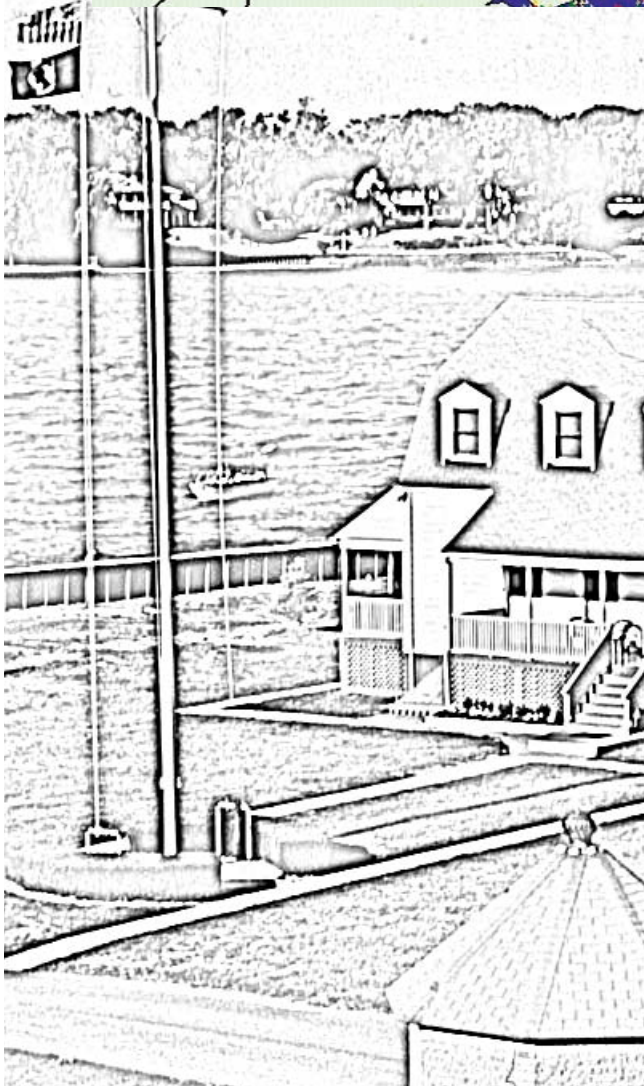
Maintenance and Logistics Command Atlantic's Civil Engineering Division (MLCA(s)) currently requests Civil Engineering Unit planners to develop at least one PP per District per year. Theoretically a PP may be developed by anyone. When in-house production capacity is unavailable, a PP prepared by consultants costs about $70,000[3]. Over the past few years, subject to complexity, the process has taken anywhere from a few months[4] to a few years. A July 1st request to submit PPs to MLCA(s) provides MLC/AREA reviews prior to HQ's consideration for approval, to assure that construction may begin in the Fiscal Year (FY) budget as early as three years later. 2003 PPs can possibly aim for an FY06 construction start.

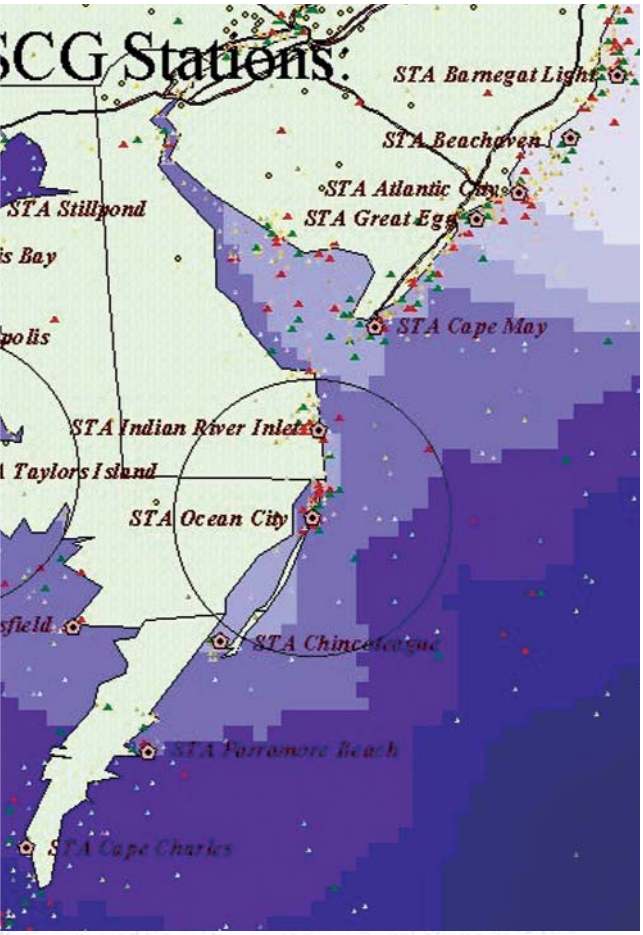
To view progress on any PP, go to the Planning Web: http://cgweb.lant.uscg.mil/projectplanning then click on the Planning Proposal tab at the top of the page. Select a PP of interest, then click on the "details" box on the left, for a look at the status of the components/milestones and the Point of Contact responsible. To view a PP or component, click on a date in red. Documents are PDFs to assure full accessibility.

To get a PP started, a project has to be identified, and a brief Problem Statement (PS) written and endorsed. This can be electronically prepared and submitted on the 'Planning Web' by clicking on "Problem Statements," then on "Submit New." Thereupon the MLCA(s) assigns an SFRL[5] number. The PS is then added to the unprioritized SFRL list, and goes through the approval process. But before it can actually proceed to the PP stage, the project has to be prioritized by its District Planned Obligation Priorities (POP) board or comparable MLC, AREA or HQ program, and designated a top priority. It must be important, it must have strong support and it must be compelling, to compete for limited CA resources.

Inadequate or deteriorating facilities, new or changed missions, engineering inspections or biennials, an RSA or Commandant direction, can all serve to identify facilities related problems requiring recapitalization. But this has mostly been an individual process, producing single documents. Where possible, master plans have been effective in simultaneously identifying multiple







projects within a long term development process, while Districts have used aging facilities to create lists of multiple projects, to feed the PP process. These project lists are reprioritized annually by respective Districts or programs, to determine which CA project should proceed as their next number one PP to get underway during the coming year. That decision is made within a context that evaluates its own backlog for all its CA facility needs. This process must recognize the number and scale of projects the Coast Guard as a whole can undertake annually and the professional planning resources available to produce PPs.

Sufficiently concerned about the project identified as failing, before it can be recapitalized? Thinking about using other funds to meet critical building requirements? Don't!

Barring exceptional circumstances, potential CA projects may not use repair and maintenance funds. A PP or a PP waiver -- rarely granted -- is the way to go. Although a lease may be a workaround, but for significant expenses the process may well exceed a decade with little guarantee of success.

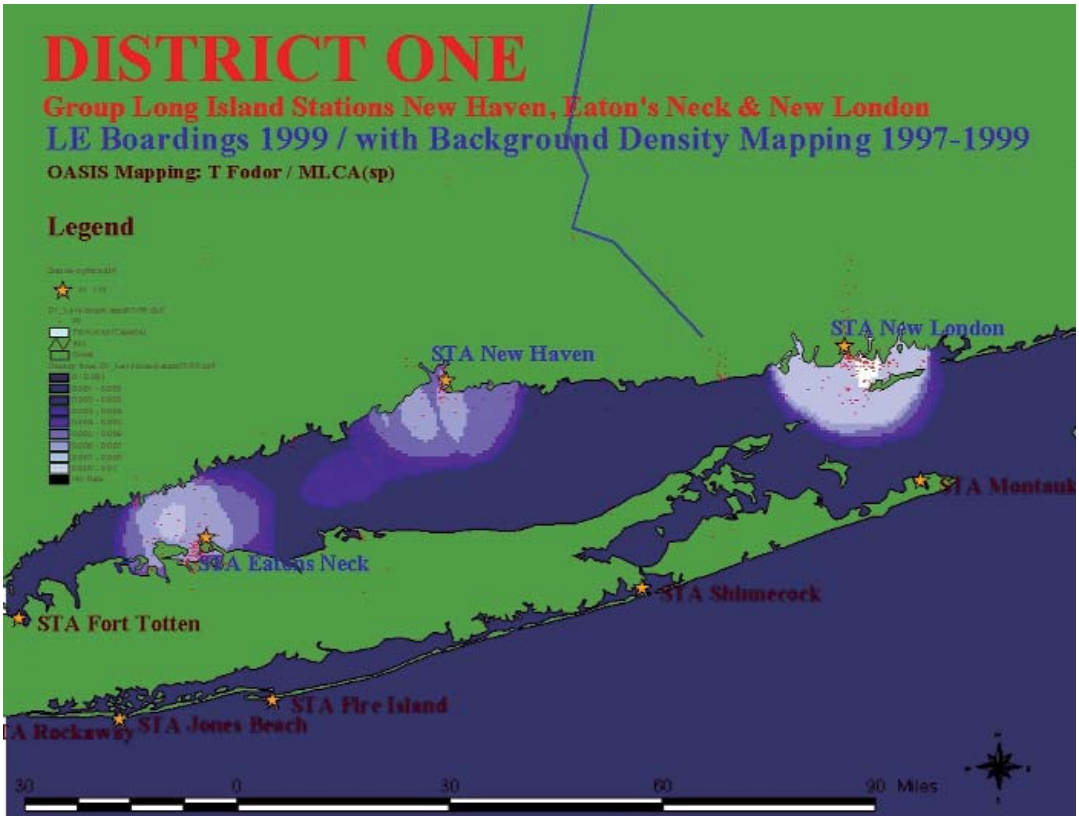
Now that the documentation required to recapitalize critical facilities have been put into context, the question is what can be done for the future? To avoid this repetitive annual struggle, and encourage operational units to focus on their operations, and not have units devote increasing energies into maintaining facilities that have long passed their useful service lives -- let's focus on how things can improve in the future.

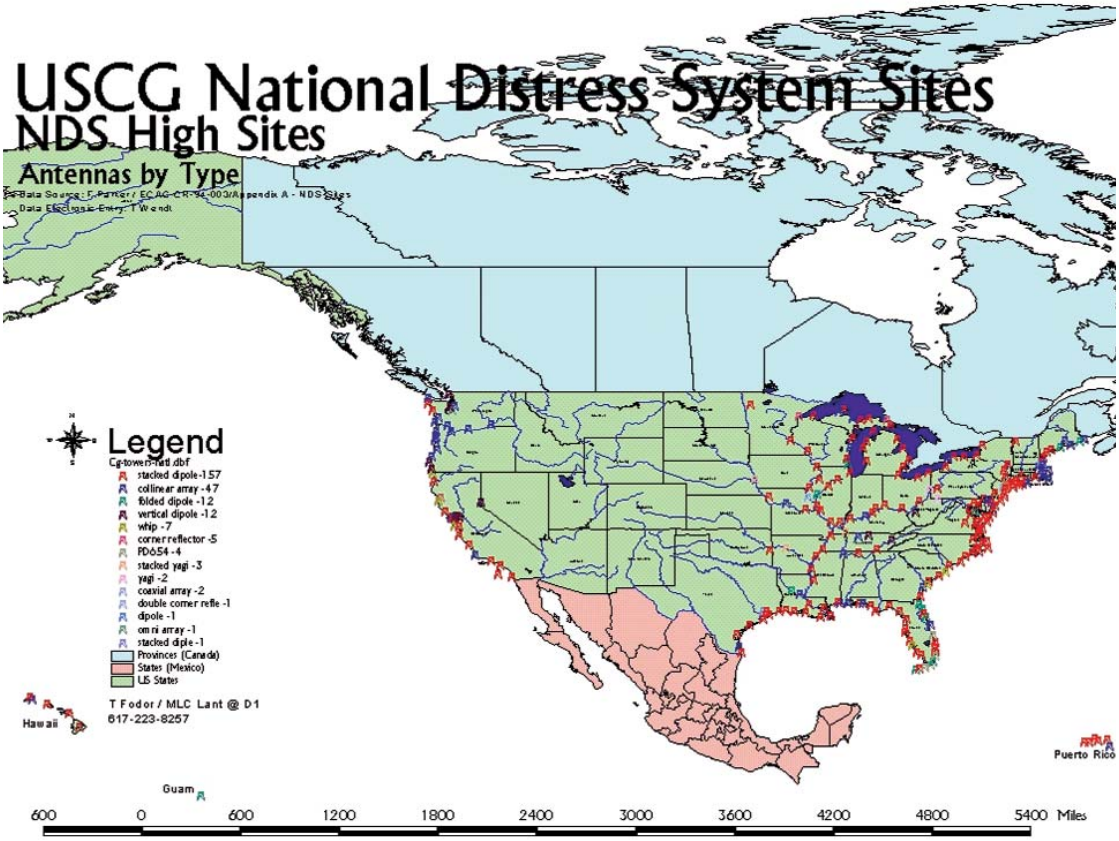
This brings us back to Planning 2028.

Imagine two national maps side by side. On the left, the map highlights all current USCG sites nationally. On the right, all proposed USCG facilities, optimally planned to be in place 25 years from now, hence 2028. This would enable a comparison of where we are now and where we should be in a quarter of a century.

Of course, Planning 2028 evolves as its premises are reanalyzed, its mission objectives and response profiles updated, and its assumptions scrutinized, in an iterative ongoing process. If it's formally updated every second year, then two years hence it becomes Planning 2030. It is actually envisioned as an electronic model, whose components are developed as a series of interactive modules based on mission requirements and response capabilities. This model would enable a planner to test assumptions based for example, on the capacity of new vessels, aircraft and equipment.

The parameters may change but the fundamental relationships remain. The baseline depends upon and begins with missions. Components of the critical CG missions: Safety, National Defense, Maritime Security, Mobility and Protection of Natural





Resources, are weighted and allocated to each 'cell' across affected waterways, waterfronts and landscapes nationally. Changing demographics, 'special' facilities and supporting agencies in part provide variables that have an impact on CG response levels and requirements.

Then in a gaming fashion, the question best posed is to those that currently execute these missions, are most familiar with the specifics of a location, and have an understanding of the range of alternative approaches to monitoring and response. The question is to determine the appropriate vessel, aircraft and/or equipment needed to respond to the range of threats perceived. Range and capacity help determine optimal distances and overlaps needed for the most effective, efficient and flexible responses. This is repeated, integrating actual experience and expertise in guiding the construction and testing of the model, for each of the critical mission components.

Once missions are identified and their response level determined, the required vessel, aircraft and/or equipment is specified within a zone. Then the operational personnel directly need-

ed may be calculated based on that program's standards. Space requirements can then be extracted, and a capital construction budget developed. Alternative site specific opportunities are identified, with current CG or government owned sites initially considered, as a way to integrate acquisition costs.

As units are arrayed across the landscape, both support and management hierarchies can then be fully factored in, along with their personnel, space, equipment and cost requirements.

Plan 2028 would be developed as a zero based initiative, not taking into account the location of current CG facilities. Only later will currently owned optimally located facilities be integrated into the calculation. In terms of analytical process, the highest priority areas are analyzed first, with its respective range of alternatives considered, in an encompassing fashion, until there is full coverage. This is then contrasted with an approach that begins the automated analysis at one border and proceeds sequentially to the next.

It merits mention that the critical nature of siting CG facilities comes from its unique mission requirements. Unlike other branches of the military, whose primary task is mostly training, until it's time to perform their mission at an unknown location, at some to be determined future date. For most CG units, their mission is now, and it is in proximity to where they're at or should be. Siting for the CG is thus mission critical.

This planning process depends upon identifying levels of continuous mission coverages based upon current and evolving needs, preferably in the form of expanded specific Regional Strategic Assessments (RSA) prepared by operations. A baseline document, an OASIS[6] image, would present the geographic "terrain" based on historical and projected information. For example, Search and Rescue, Law Enforcement and Environmental events are easily mapped in conjunction with types and quantities of, maritime transportation; commercial, recreational and illegal traffic; critical natural and built infrastructure; etc., to help determine the appropriate level of protection needed for an area. This map is a scalar construct, that develops the specifics at the unit level, where integrated multi-mission and mission specific units are arrayed and then built up with needed hierarchical management and support capabilities.

Planning 2028 when complete will provide a national image of CG mission requirements by location, optimal response platforms, required personnel, needed facility types and sites, square footages and costs, with ongoing verifications and updates. This image, in comparison to the current footprint, will suggest a preferred migration pattern that will help focus facility requirements and define CG spatial needs over the next quarter of a century.

So how can Planning 2028 help clear the way to recapitalize CG facilities nationwide? By being fully accessible and assuring full transparency, Planning 2028 may also serve as a catalyst to recapitalization. Planning 2028 will provide the Commandant, Congress, the press and the public with a picture and the cost of modernizing CG facilities to best meet our homeland security objectives. ST

Notes:

1 The $8 billion dollar shore plant will take 200 years to recapitalize at a rate of $40 million a year. Although this was the recent level, its now rapidly approaching zero annually, with an expectation that it will again rise before facilities fall.
2 Formerly called Acquisition, Construction and Improvement (AC&I).
3 Although seemingly high, recent Atlantic Area consultant prepared PP's cost $70,000 plus with an instance over $100,000.
4 Under normal circumstances the "standard" PP should take between 6 months and a year to complete.
5 Shore Facilities Requirements List
6 OASIS stands for Operational And Shore facilities Information System, currently a single platform planning tool developed and actively used by this author for project specific, regional and national assessments upon request, for example. The Mid Atlantic PP.

Lessons Learned During Winter Construction at Station Ketchikan

by LCDR David Savatgy
U.S. Coast Guard Headquarters

Cold weather and driving rain during steel erection in February.

COMDT NOTICE 11010 of 25 June 1997 Facilities Authorized Covered Moorings

The temperature exceeds 90 degrees F more than 60 days per year.

Measurable rainfall occurs more than 180 days per year.

The temperature falls below 32 degrees F more than 140 days per year.

Measurable snowfall occurs more than 50 days per year.

Civil Engineering Unit (CEU) Juneau's first Acquisition, Construction & Improvement (AC&I) project in over 10 years was to replace Station Ketchikan's boathouse with an improved and more functional structure. The new 47' boat would not fit into the previous boathouse unless the mast was brought down, a manpower intensive operation, especially after long Search and Rescue (SAR) cases. Ketchikan clearly met the requirements for a new boathouse according to COMDT Notice 11010 of June 1997.

In addition to being a unique building in an exposed location, the project was challenging because construction was started during the winter of 2001 in order to finish before the peak boating and SAR season. The project's exposed marine location meant that the contractor had to work in harsh driving and freezing rain. Ketchikan normally receives over 150 inches of rain each year and experiences an average of 225 rain days annually. Upon my first visit to the project site it was hard to imagine more difficult working conditions. The congested site was exposed to the full force of winds that often exceeded 50 knots, and the rain seemed to drive sideways into any exposed crevice.

In addition to the covered moorings for the boat, the structure included approximately 2000 square feet of Machinery (MK -- Machinery Technician) shop, office

space and storage. An overhead crane rail and large bay doors were installed to accommodate a future lifting hoist. This item is not normally authorized at CG Stations, however, Station Ketchikan routinely assists with logistics runs to nearby LORAN Station Shoal Cove, including transporting supplies and heavy items. Accordingly, an overhead crane was authorized. As the building neared completion, it was discovered that the prevailing winds tended to pressurize the inside of the building and an alternate design for the doors and door operators was developed.

It should be no surprise that it takes longer to build a project in the winter. In fact, this subject is well documented in arctic engineering literature. Productivity and efficiency decrease with the decrease in temperature. The exposed project location amplified this effect, making crane lifting operations and steel erection difficult at best. As the schedule slipped, strategies were developed to minimize impacts to the customer such as using a portion of the new boathouse to operate small boats while the office spaces were completed.

The new boathouse structure observed at low tide in the summer 2002. The 22+ ft tidal range required that all under pier work be carefully timed and coordinated.

An important part of any project is managing the customer's expectations. This was difficult as the span of the project involved three different Officers In Charge. As with any new building, some issues were not discovered until occupancy commenced. This is to be expected since any new building typically undergoes a break-in period when systems are evaluated and adjusted. Several building leaks were discovered and corrected by the contractor, after it was determined that the building was breathing properly and moisture was not condensing on any surfaces within the roof cavity. A new ridge cap assembly was installed because the original assembly had undergone paint failure and was allowing rain to enter the building envelope. Windows and louvers were also adjusted in order to eliminate water intrusion from driving rain.

Ultimately we were able to deliver a high quality, well-designed facility that provides a more hospitable environment for conducting boat maintenance and station operations. The classic saying that the last portion of the work takes the most effort to complete proved true, and required patience and understanding from the customer. In the end, the building was a great success.

Shore Facility Asset Management Evaluation Visits

by LCDR Greg Burg
Electronic Systems Support Unit Cleveland

The Shore Facilities Asset Management Evaluation Visits (SFAME Visits) were developed through a partnership with Coast Guard Civil Engineering Unit Cleveland (CEU), the General Services Administration (GSA) and the Fifth Coast Guard District. The goals of SFAME Visits are to validate whether or not CG real property satisfies operational requirements and to provide proper long-term shore facility planning. There were several previous practices or issues that the visits attempted to address. First, we put significant effort into changing the past practice of holding onto excess real property for a potential future use. Second, we aligned shore plant priorities and information with the District Staff, which facilitates long-term capital asset decisions. With a long-term focus, the District Staff is also able to make better short-term AFC43 prioritization decisions. As an added benefit, these visits also serve to inform local shore facility managers of new policies such as the CG Shore Facility Capital Asset Management program.

The evaluation visits are made to all owned real property and the core team includes the operational planner, a real property specialist, a CEU Planner, a GSA property disposal specialist, the Civil Engineering Coordinator (CEC) and the local unit representatives. The real property is compared between inventories from the property files, the Civil Engineering Data System (CEDS) and the GSA property inventory. The plot plan is reviewed and areas of potential property divestiture are addressed. The CEDS building inventory is verified with particular focus on the buildings that are past their expected life. Any further issues are discussed with the unit to determine if there are gross deficiencies within the unit such as maintenance burdens caused by excess space or real property shortfalls that impede the unit's ability to operate effectively. Then a walk-through of the property and buildings is conducted. From this, a report is generated with recommendations for capital improvements and real property actions (divestiture, demolition, problem statements, etc.).

As the Visit procedures were developed and refined, it became evident that there were many other benefits resulting from the SFAME Visits, including:

- The Civil Engineering Unit Commanding Officer receives an independent review of the CEC program.
- There is a large-scale review of all assets in the inventory so that long-term planning and operational decisions can be made in an informed, focused environment.

- CEDS data is reviewed and corrected to provide a more accurate Plant Replacement Value (PRV). In the past, many sites had been incorrectly marked "Inactive" in CEDS while awaiting disposal in the GSA pipeline (Coast Guard still has maintenance and protection responsibility/costs).

- It provides a unique and independent opportunity to receive feedback on customer service provided by the CEU.

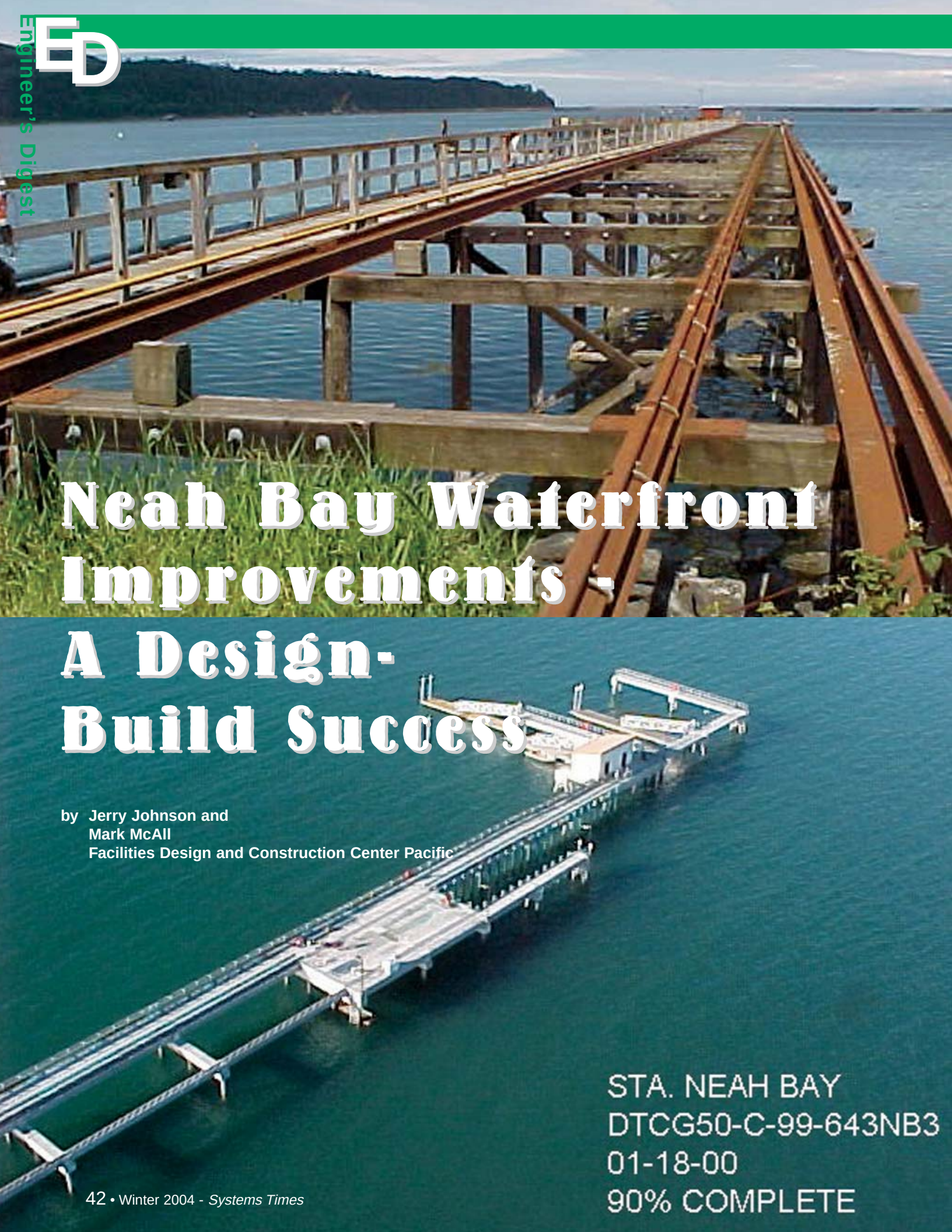
- Though the GSA representative is along to assist with disposal issues, they provide a unique and independent review of the operational need to retain particular property.

- The visits ensure that the GSA Worldwide Inventory matches the CEDS data and any discrepancies resolved.

Fifth District SFAME Visit results were proof that this simple yet innovative process is a valuable tool in the Coast Guard's management of capital assets. The team recommended divestiture or demolition of 100,000 square feet of building space, divestiture of 27 acres of owned real property, identified five major planning projects and identified one GSA relocation program candidate. CEU Cleveland is currently in the process of completing such visits to District Nine properties. In the three (out of five) Groups completed, the recommendations have varied. This is likely due to the more mature shore plant. So far, the team recommended 11K square feet of buildings and 13.5 acres of property for divestiture. The SFAME team identified 12 federal or local government agencies using CG property without a formal realty agreement -- which were subsequently rectified. In addition 12 (Acquisition, Construction & Improvement (AC&I) or AFC43) projects were recommended to reconfigure space to better meet unit's operational needs. In addition four housing, security and energy efficiency projects were created.

In contrast, SFAME Visits are different from past practices. The visits are almost the opposite approach of a space study or GSA Utilization Study that often starts with an academic application of the space standards for the unit Personnel Allowance List (PAL), and then verify the actual facilities against the standards. Clearly the space standards are an average and only work in "normal" situations. The SFAME Visit verifies if the space is being used correctly and if we own the right amount of real property. This differs from a GSA property survey in time and complexity. The GSA survey goes in depth into the allowed space and often misses the simple aspects of whether the property is being employed to correctly meet the mission (Why is the LORSTA providing cutter storage?). Likewise, these surveys differ from Biennial Inspection. We are taking a critical look at the need for owning real property instead of plotting the best course to maintain it for the next 3-5 years. For example, the CG owned a section of beach on the east coast located across the street from the station, and not used for any purpose other than occasional recreational swimming. The public had access to the beach in the past and any future access could cause a potential liability if someone were injured.

SFAME Visits are an important part of the Shore Facility Capital Asset Management program. Additional information concerning SFAME Visits and the steps to complete one are available on CEU Cleveland's Intranet site at http://10.9.16.180/ceucleveland/PL/SFCAM%20Methodology.doc.



Neah Bay Waterfront Improvements - A Design-Build Success

by Jerry Johnson and
Mark McAll
Facilities Design and Construction Center Pacific

Station Neah Bay is located in the remote northwestern corner of Washington at the mouth of the Strait of Juan de Fuca. The site requires a 600-foot long pier to access the small boats due to shallow water conditions near the shoreline. The existing timber pier also supports a rail-mounted boat haulout to transit the small boats to a maintenance building on shore. This pier had been condemned due to deterioration of the piles and significant deflection due to wave action from the numerous storms common in the area.

An Acquisition, Construction & Improvement (AC&I) project was approved to replace the 600' long pier, provide a new boat haulout capable of hoisting the new 47' Motor Life Boat (MLB), new mooring floats for the station's three boats and a small maintenance/storage building on the pier. The project's $3.3 million budget was marginal for an all concrete solution. Further complicating the project were the site's remote location, notoriously poor weather and constant wave/swell conditions. The 35% design solution prepared by the in-house team indicated the project could not be constructed within the designated budget.

A Design-Build Solution: Having worked with a number of highly skilled waterfront designers and contractors in the area, we pursued a design-build approach to capitalize on their expertise. The thought was if the designer and contractor could jointly develop a solution, which would utilize the strengths of the contractor and minimize on-site construction time, maybe we could provide a workable long-term solution within the budget.

Contracting: The most critical factor, and the main difference between the traditional design-bid-build approach and the design-build approach is the necessity to include ALL required features in the solicitation package. Instead of trying to be prescriptive in how to build the new pier, we opted to prepare a performance-based specification and allow the design-build teams to use their creativity and expertise to give us the best and most economical solution. The result was a specification that provided detailed design parameters and expectations, and included the 35% in-house design to illustrate the requirements and intent. The only specific mandates included as part of the technical specification were the Division I requirements, which specified the systems to administer quality control, coordination with CG operations, submittal procedures and warranty requirements.

The two-step solicitation was similar to the standard A-E (Architecture - Engineering) selection process. The first stage being a Request for Qualifications, from which a short list of four design-build teams was developed. The number of teams was limited due to the cost associated with developing their final proposals, estimated to be around $35K. With no compensation available for the unsuccessful teams, we wanted to minimize the impact on the A-E community. Four teams were invited to a "pre-bid" meeting to clarify the overall scope and intent of the project. The question and answer period following this session proved to be very important as all teams gathered additional insight into the project requirements and all received the same information and direction.

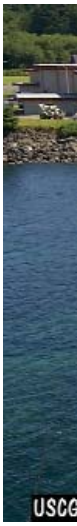
Each design-build team submitted a 35% design solution along with their cost proposal. The selection team evaluated the proposals using a Best Value selection process. All proposals met the design requirements. Three designs used all con-

crete construction, and were within the $3.3 million budget. The ABAM Engineers/General Construction team was awarded the contract. They used an innovative precast concrete solution which met all project requirements and was almost $400 thousand under the project budget. The performance-based solicitation provided an unconstrained opportunity for the teams to creatively capitalize on their expertise and was very successful in meeting our budget limitations.

Construction: As the design-build process was new for both the Coast Guard and the Contractor, partnering was strongly supported by both parties. The partnering process was very similar to that used on other projects and highlighted the similar expectations of both the Coast Guard and the Contractor -- schedule, quality of the finished product, safety and customer satisfaction.

Confusion developed quickly on what exactly was included in the scope of work. The Coast Guard maintained the position that the contract was as specified in the solicitation and what was proposed in the design team's proposal. In essence, we contracted for the lowest cost interpretation of our specification and the team's proposal. This understanding was discussed and accepted at the partnering meeting, but needed to be reinforced with both parties throughout the construction process.

Partnering proved to be critical in the successful completion of this contract. The solicitation required the design to be 100% complete prior to the start of construction. This, however, would severely hamper the Contractor's ability to complete the project on time. A partial Notice-to-Proceed (NTP) was issued to allow the Contractor to fabricate and drive the piles and demolish the existing pier. This proved to not only be a time-saver for the Contractor, but allowed the work to proceed in the summer, avoiding the risks associated with winter work. Once the partial NTP was issued, this project morphed into a "fast track" design-build. This approach increased the risk both for the Contractor and the Government, once the piles were in, it would be very difficult and expensive to modify the design. The A-E and the Coast Guard, on the other hand, had to approve the pile installation without a complete design in hand, a risky approach at this remote site subject to extreme storm conditions and located in a zone 4 seismic area. The only stipulation placed on the Contractor, to allow for the early construction start, was the real-time review and approval of the installation by the project designers. This intimate involvement of the designers in the on-site construction was significantly different than the normal design-bid-build contract, but was instrumental in ensuring a high quality finished product. This on-site involvement was a big impact on the designers due to the 12 hour round trip drive to the site.

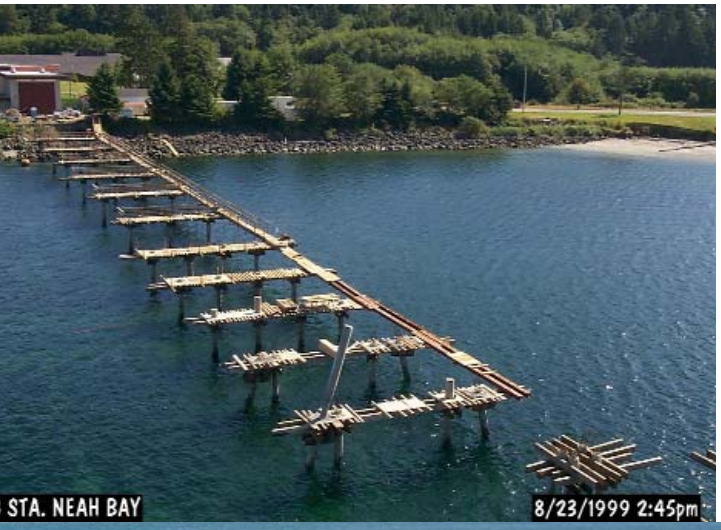


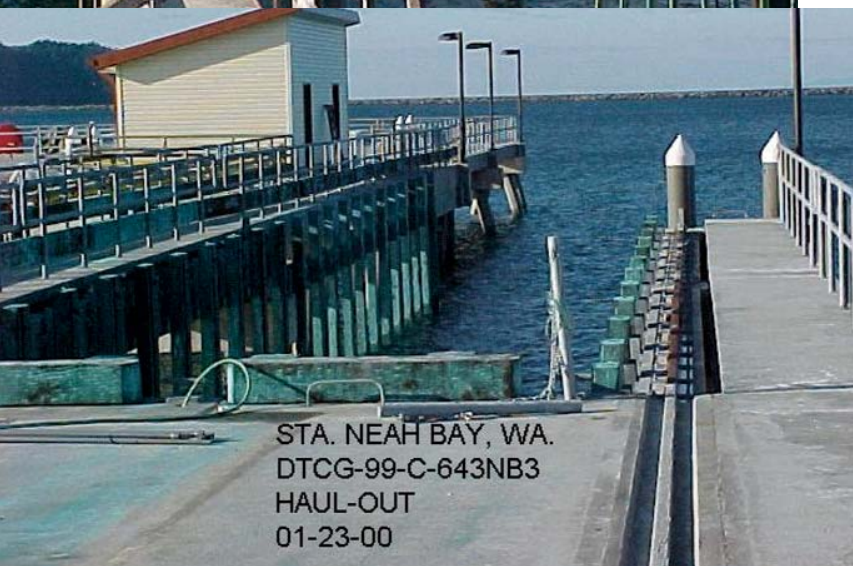
The role of the Government Contract Inspector (CI) for this design-build project was much more nebulous than on a normal project, since he did not have a set of drawings to define the scope of work. Although the Division I specification required approval of all changes and materials by the Engineer of Record, they did not have any direct contractual obligation to the CI. The designer used the "Washington State Standard Specs for Roads and Bridge Construction" to expedite development of their specifications. This made it more difficult for the on-site team to interpret relevant requirements from the myriad of irrelevant information. Fortunately, the weekly look-ahead meetings gave the Contractor and the CI enough time to focus on the required testing and documentation for the upcoming activities. As in a normal project, the CI's role as the day-to-day liaison with the customer and to assist the Government's Project Manager in forecasting potential problems was critical. But in a design-build contract, the CI's ability to ensure the Contractor coordinates his on-site work with the designer is essential, or the Government will lose "control" of the project and long term serviceability may suffer.

Challenges: The design was not the complete 100% package normally developed for a project of this complexity, making it difficult for the reviewers. The design-build team submitted a design which met the general intent and requirements of the project, but lacked the details normally found in a lump-sum low-bid contract. However, since the builder was also the designer, any conflicts or errors would be his to address, since he owned the design, removing the Government from the "middle-man" position we usually find ourselves in. This approach saved considerable time, but passed a lot of responsibility to the field crew to make it work. This method of "just-in-time" design appeared to be a

balance between maximizing the utility of the field crews' abilities and experience, while minimizing the home office overhead and design costs. Similarly, for the in-house review team, they had to readjust their expectations to focus on meeting project requirements versus the detailed technical review they would normally perform. Review of the reviewers comments was necessary to ensure they didn't prescribe how to do the work, adding additional requirements for which we would have to pay.

Change orders, due to design errors or omissions, were non-existent on this type of contract. There were changes, however, due to the varying interpretations of the applicable codes. These occurred when the Coast Guard had a stricter interpretation of code requirements than is normally used in commercial construction. This is a weakness in the specification, and should be addressed as specific project requirements in the solicitation. Negotiating changes on this type of contract is more complex as the scope of the change is also performance based, requiring both parties to estimate the final solution without having an actual design established.





Without adequate funding to cover some of the proposal development costs by the design-build teams, it is difficult to interest firms to prepare proposals. During our debriefs with the unsuccessful teams, this was a unanimous comment. The development of the design solution falls on the design firm, the least capitalized member of the team. They cannot continue to perform design services for which they get nothing in return; so the choice of projects and the number of "short-listed" teams selected to prepare proposals, needs to be well thought out to give the design-build approach a chance to succeed.

Results: Completed 6 months earlier than possible through the traditional design-bid-build process, $400 thousand under budget with almost no change orders, this project was a resounding success! Why did this project work so well? As in all endeavors, it's the people that make the difference. Everyone involved bought into the partnering approach at the outset, and everyone shared the common goals of a high quality product, on-time and under budget. Organizationally, both the Coast Guard and the design-build team shared the risks of the "fast track" build as the design approach, but also reaped the rewards.

Is design-build the panacea for all Coast Guard projects? No, it's simply a tool, which, when used in the right situation, can produce amazing results. But, on the other hand, if not carefully crafted from the outset, it can be a recipe for disaster, because the Government relinquishes a significant amount of control over the design, and any changes after award are both costly and time consuming.

RECONFIGURING SABINE BANK LIGHTHOUSE FOR THE 21ST CENTURY

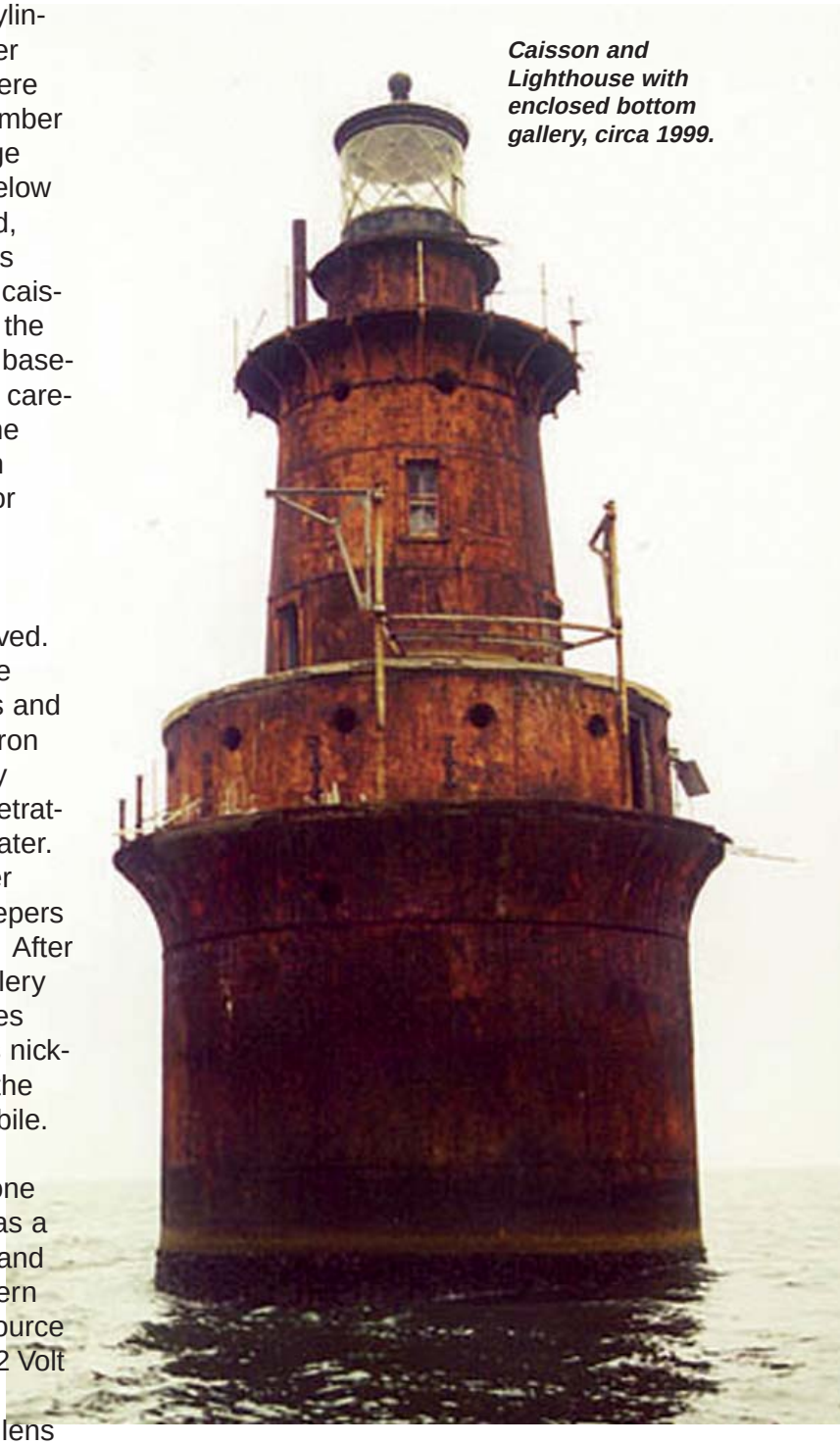
by LT Nathan Podoll
Civil Engineering Unit Miami and
BMC James Simmons
Officer in Charge, Aids to Navigation Team Sabine

Caisson and Lighthouse -- 1905.

Lighthouse erected on shore -- winter 1905.

In the Gulf of Mexico, roughly 15 miles south of the entrance to the Sabine River, Sabine Bank lies hidden a mere 20 feet below the waters surface. To warn the numerous vessels then calling at Port Arthur, Texas, of this potential danger, Congress authorized a sum of $50,000 in 1898 for the construction of a lighthouse on the shoal. The Sabine Bank Lighthouse was the first caisson construction ever attempted in open water by the United States.

The foundation was created by building a floating cylinder with a cutting edge on its lower rim. The cylinder was sunk on top of the bank while more sections were added onto the top. Workmen in a pressurized chamber shoveled the seabed out from under the cutting edge until the caisson settled to a solid footing, 22 feet below the seafloor. Concrete was then forced into the void, plugging the base against the sea. The caisson was filled using the excavated materials. The top of the caisson was not filled, forming a cistern and above that the basement housing the fog signal. The iron caisson basement wall was reinforced with two courses of bricks carefully shaped to fit the curve of the caisson. While the caisson was built, the lighthouse was assembled on shore before being transported out to the caisson for installation. It was first lit on 15 March 1906.



Caisson and Lighthouse with enclosed bottom gallery, circa 1999.

Given its remoteness, keepers often served several weeks or even months on station before being relieved. On 16-17 August 1915, a hurricane passed near the lighthouse, and the resulting high seas tore hatches and a portion of the roof off the gallery level and some iron plates off of the second level. The waves reportedly swept completely over the structure. Seawater penetrated the tower, contaminating the station's drinking water. The keepers kept the light burning until lack of water forced them from the station on 19 August. The keepers returned to relight the signal on the 23rd of August. After the beating the tower took during the storm, the gallery level was enclosed with three-quarter-inch iron plates dotted with thirteen air ports, giving the structure its nickname "The Sparkplug" because of the similarity to the driving force behind that new invention, the automobile.

The light signal used to mark the bank has undergone many changes over the years. The original optic was a third order lens positioned 72 feet above sea level, and powered by an oil lamp. In 1922, an acetylene lantern was placed in the Fresnel lens. In 1960, the light source was converted to a 150-Watt lamp, powered by a 32 Volt DC battery. The Fresnel lens was removed in 1971 when the tower was converted to solar power. The lens is now on display in the Museum of the Gulf Coast in Port Arthur, Texas. Today, the light signal is a standard 155mm lens powered by a single 12 volt DC battery.

In 1922, the last resident keepers left the lighthouse. After being manned for just 17 years, the lighthouse was automated. The tower was temporarily remanned during World War II as a coastal lookout station. However, with no live-in keepers to care for the tower, the distance offshore and the associated costs, the required maintenance continued to be deferred.

Documentation continued of the structure's slow decay for almost 30 years, but repairs were deferred for more pressing operational projects. In 1999, during a visit from Coast Guard Cutter (CGC) PAWPAW, the operators determined the structure reached the point where it was unsafe to service the light.

Spalling concrete ring found during 2000 site survey.

Damaged caisson cellar stairs.

Group and District personnel agreed, and generated the Shore Side Maintenance Request (SSMR) stating an operational need for a continued signal to mark Sabine Bank, preferably a fixed aid. Civil Engineering Unit (CEU) Miami engaged Collins Engineering to design an economical replacement for the signal. The level of decay was again underscored in 2000 when CEU Miami visited the lighthouse to develop the scope of the project with Collins Engineering. One of Collins Engineering engineers surveying the structure fell when a ladder collapsed under him.

Upon review of the original drawings, full demolition of the lighthouse and caisson was estimated at nearly two million dollars. Based on fiscal realities, and the continued need for an aid to navigation, this price tag was unreasonable. The compromise: demolish the lighthouse and replace it with a freestanding Aids to Navigation (ATON) tower of similar focal height on the repaired caisson at an estimated cost of $850,000. This project was funded in part by the Maintenance and Logistics Command (MLC) Atlantic demolition fund that was created to encourage removal of unused real property facilities.

Concurrent with the design, the question of historical value of the structure was addressed. The structure was eligible for Historic Status. While it is outside state waters, it lies on the border between Louisiana and Texas. The National Historic Preservation Advisory Council, both State Historic Preservation offices and the Coast Guard Historians office were consulted. Due to the documented poor condition of the light-

house, the injuries already sustained by personnel attempting to move about inside the structure, and the uncertainty of being able to remove and transport any portion of the structure without endangering lives, it was determined salvaging the lighthouse and bringing it to shore could not be reasonably expected. The best that could be promised were copies of archive drawings along with pictures of the structure.

The final design called for the demolition of the lighthouse, sandblasting of the caisson exterior using lead paint capture techniques, repainting the caisson, repairing the one major structural crack in the caisson that was visible and installing a 15 foot standard ATON tower on a new concrete and steel deck atop the caisson.

In November 2001, the contract was awarded to Astron General Contracting of Jacksonville, North Carolina, for a sum of $682,000. Once on-site the contractor battled bad weather for several months, including several hurricanes that passed close by while the structure was open to the weather. Once the weather settled, the contractor managed to save part of the lighthouse's lantern room and safely transport it ashore. Astron then donated it to the local historical society for display in Lions Park at Sabine Pass, Texas. The rest of the lighthouse was badly deteriorated and scrapped.

The original renovation plan called for reinforcing steel bars bolted through the caisson wall and into the new concrete deck slab. New galvanized steel

Failed Lighthouse stairs.

Major crack running down seaward side of caisson.

columns extending from the new top slab to the existing cellar floor would carry most of the new slab weight, placing little additional weight on the iron caisson structure and tying the caisson together to act as a hoop. As the contractor attempted to break the existing concrete and brick ring loose from the inside of the flared caisson lip, the caisson started to shift, with the concrete ring still firmly in place! Repeated attempts had no positive results. Based on the proven integrity and strength of the existing structure, rather than risk further damage, the decision was made to leave the concrete ring in place. Rebar was bent at 90 degrees and grouted into the old concrete ring to connect it with the new concrete top slab that was elevated above the caisson.

Astron Contracting working from a jack-up barge.

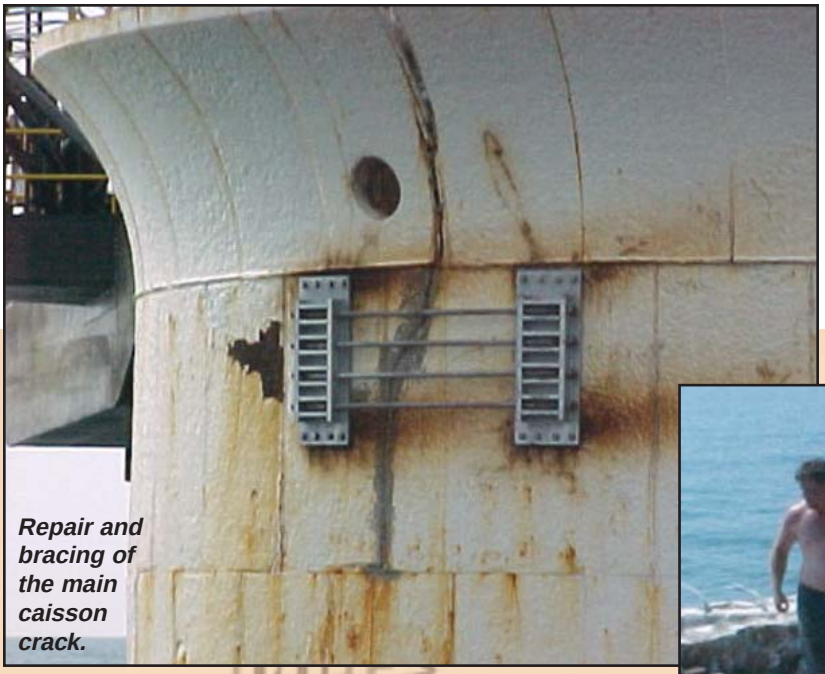
The next challenge came when the contractor completed sandblasting, and multiple new cracks were found in the 100-year-old iron caisson. Instead of acting as a hoop as originally expected, the additional cracks created a structure that might act as a series of horizontal slabs. The additional cracks were not as large as the first one. With the addition of the new reinforced concrete slab, the caisson plates would have additional ability to transfer loads laterally, and increase the strength of the structure. The contractor was directed to drill the ends of these new cracks to prevent the spread (just like a crack in a shipboard damage control situation), and fill them with epoxy to prevent additional moisture intrusion. The larger original crack was reinforced with four tie rods anchored to plates on each side of the crack. These were not designed to close the crack, but to transfer the load across it to prevent more outward bulging of these plates.

Successfully salvaged lantern room.

The final amount of the contract was $797,000. After 3 years of effort on 15 November 2002, the reconfigured Sabine Bank Light was energized and accepted by the Coast Guard.

The Sabine Bank Light renovation is an excellent example of proper asset management -- it solves a pressing operational need by replacing a maintenance intensive facility with one that is virtually maintenance free.

The above information was gathered from Coast Guard Aids to Navigation Team Sabine, Lighthouse Friends.Com, Gulf Coast Lighthouses and the project files at CEU Miami.

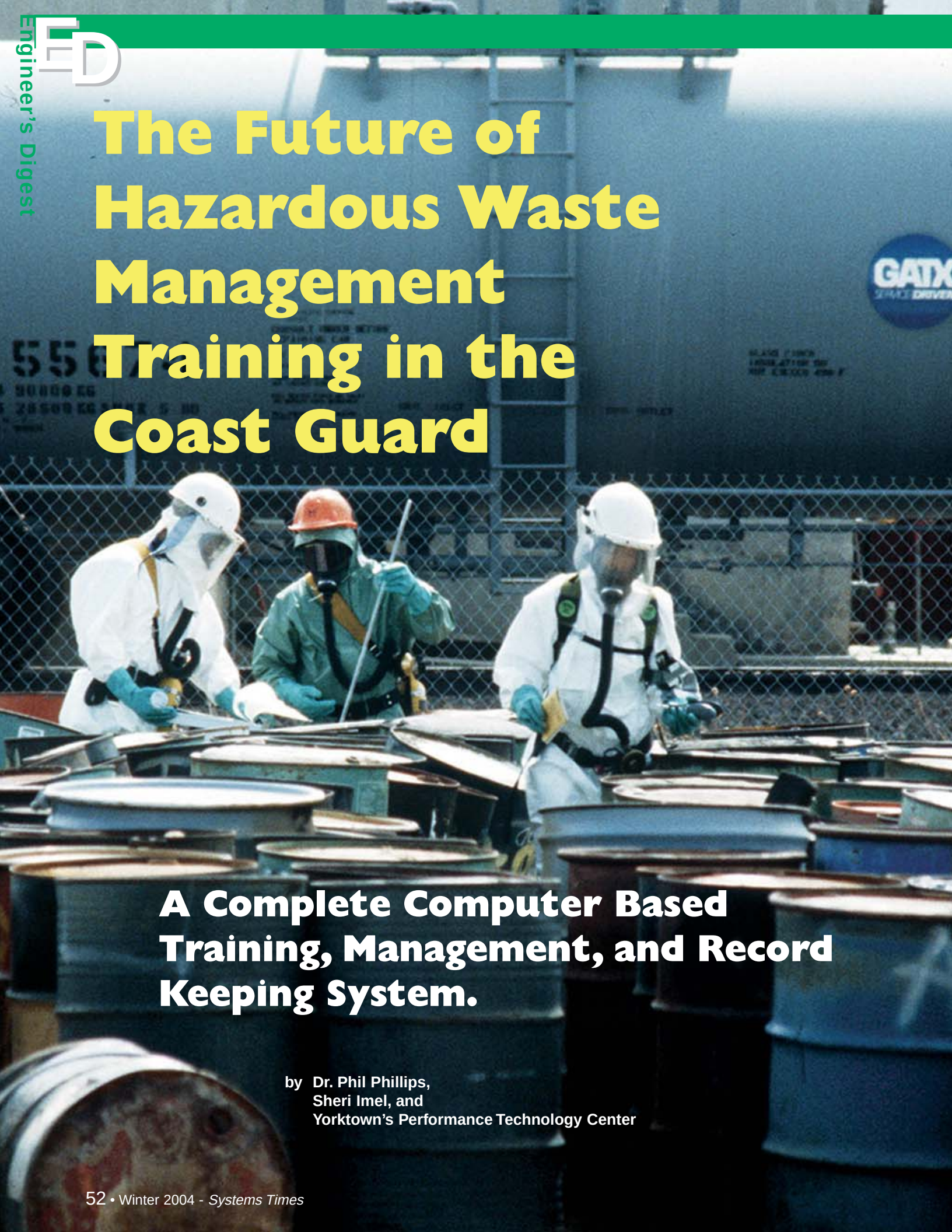


Repair and bracing of the main caisson crack.

Forming the new concrete deck. Note rebar protruding from concrete ring at edge of structure.

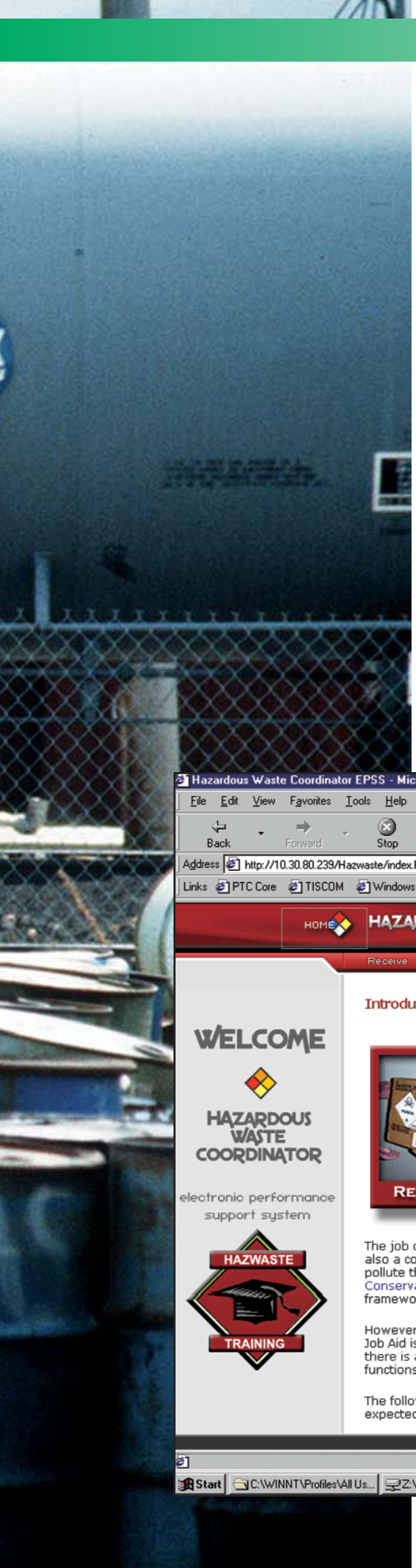
Finished product.

The Future of Hazardous Waste Management Training in the Coast Guard



A Complete Computer Based Training, Management, and Record Keeping System.

by Dr. Phil Phillips,
Sheri Imel, and
Yorktown's Performance Technology Center



Environmental and hazardous waste management at Coast Guard facilities is about to take a quantum leap forward with a computer based job aid that includes centralized hazardous waste record keeping. Also being developed is a real time computer based training system for hazardous waste coordinators. The job aid will enable hazwaste coordinators to generate all paperwork for hazardous waste management and to electronically store all data on a central server. The computer-based training will have a live instructor available at specific times and enable annual training without the expense of traveling to a training site. Proper environmental and hazardous waste management is an absolute necessity for optimal performance of Coast Guard facilities, and is an essential component of shore facility capital asset management. If hazwaste is managed and disposed properly, contamination problems and future clean-up liabilities are eliminated. This fiscal year the Coast Guard is spending over nine million dollars on clean-up actions related to past activities that have caused contamination.

Users of the on-line training will be guided through tutorials and actually be able to wander through a hazardous waste storage area and examine individual containers, labels and layout. The entry screen (Figure 1) and the screen for the virtual tour of a haz-

Figure 1. Entry screen for the Hazardous Waste Coordinator Electronic Performance Support System (HWCEPPS).

ardous waste storage facility (Figure 2) give an idea of what this system looks like.

The Coast Guard is unique among the Armed Services in that it is a small service with a large number and diversity of physical facilities. This diversity and wide geographic variation creates a major environmental compliance challenge. Hazardous waste management training is the major contributing factor to an excellent environmental compliance track record throughout the Coast Guard. Atlantic Area comprises 40 states east of the Rocky Mountains, Puerto Rico and the Virgin Islands. It has over 400 shore and 167 afloat units at over 170 physical installations. The Maintenance and Logistics Command Atlantic (MLCLANT) provides supply and support services to commands throughout the Atlantic Area. MLCLANT's Civil Engineering Division offers legislatively mandated training for Coast Guard unit hazardous waste coordinators. On average, MLCLANT trains up to 250 personnel per year at a cost of approximately $200,000.

Periodic training for hazardous waste coordinators is required under the Resource Conservation and Recovery Act, Hazardous Materials Transportation Uniform Safety Act and Occupational Safety and Health Act. MLCLANT's program has been designed to cover the spectrum of needs from those who generate small quantities of regulated or hazardous waste to industrial facilities that are large quantity generators. MLCLANT provides 28 hours of initial or 12 hours of refresher training annually for at least one individual from each unit that generates hazardous waste. The trained individual

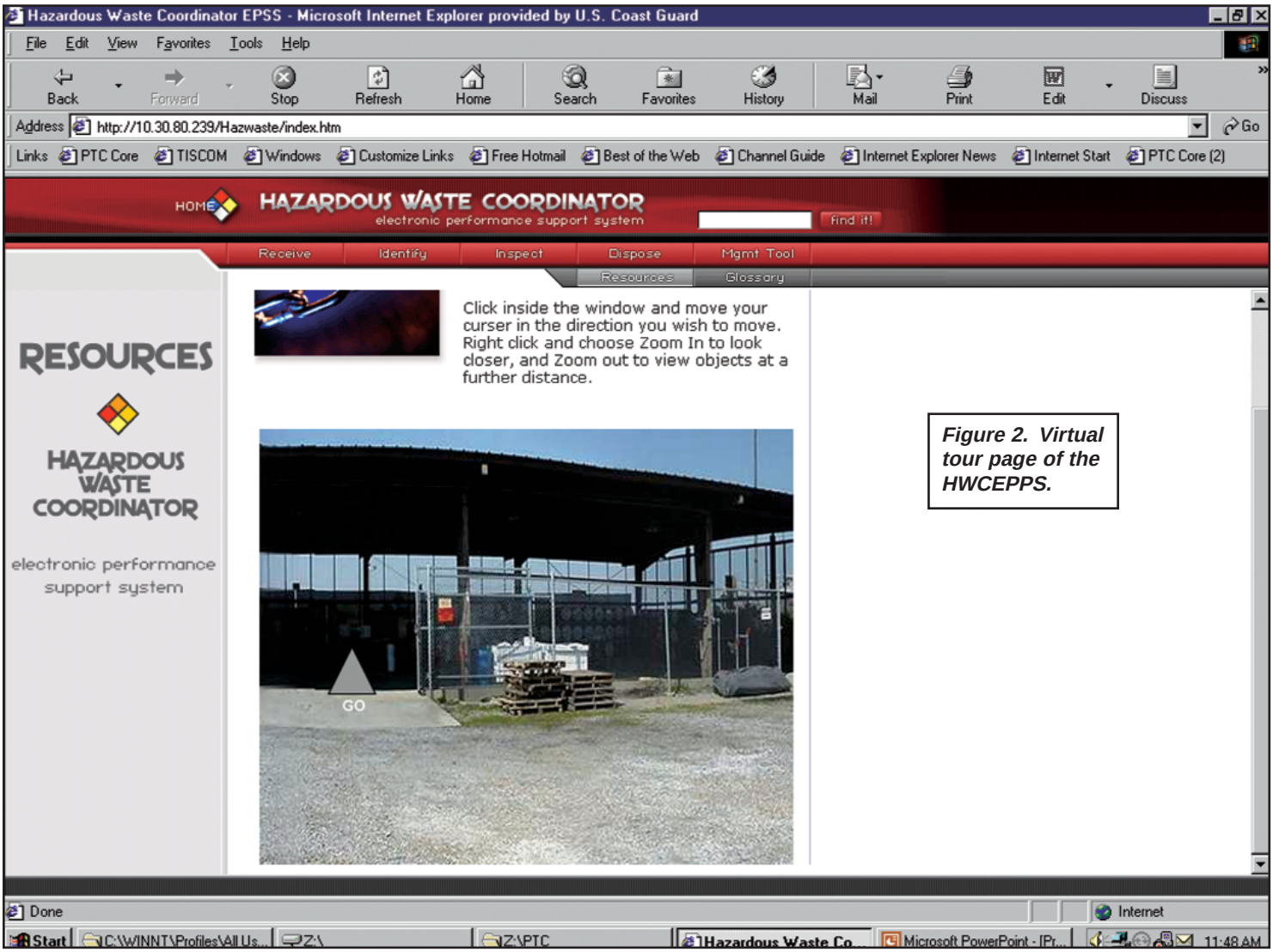


Figure 2. Virtual tour page of the HWCEPPS.

serves as the hazardous waste coordinator, and is responsible for manifest preparation and overall management of hazardous waste at the unit. We also accommodate, to the extent possible, training for alternate coordinators and others who wish to learn about environmental compliance. The 28-hour initial training is generally the first formal exposure that a hazardous waste coordinator has to environmental compliance. Special emphasis is placed on scrutiny of contractor-supplied manifests and approaches to hazardous waste generation reduction, analysis of individual unit needs, and local compliance problems. The 12-hour refresher training fulfills Resource Conservation and Recovery Act (RCRA), Department of Transportation (DOT) and Occupational Safety and Health Administration (OSHA) annual training requirements.

With the advent of computer based and web-based training, we decided to explore the possibility of providing hazardous waste management training on-line or with CD-ROM. Not only would this alternate delivery method save thousands of dollars per year, it would provide training opportunities right at the members' homes or units. In 1997, Training Center Yorktown's Performance Technology Center (PTC) conducted a job task analysis to determine exactly what comprised the "world of work" for a hazardous waste coordinator. Results of the job task analysis revealed which tasks were considered most important, most difficult and performed most frequently. This information was used to develop a job task flow chart outlining hazardous waste management procedures. Training developers used the flow chart as a

framework for the web-based system. Working with Coast Guard hazardous waste management experts, PTC generated a detailed step-by-step handbook that coordinators can use as a guide for managing waste at their facilities. PTC is using this handbook as a basis for the on-line job aid and training modules.

Unlike commercially available web-based training, this system is being designed specifically for Coast Guard hazardous waste coordinators. The goal of this training is to acquaint trainees with the tools needed to perform their jobs and to resolve compliance problems at their units. In essence, the training is a "how to" for unit coordinators. The job aid will include automated information on common Coast Guard hazardous wastes, step-by-step instructions for on-site management and useful web links. Interactive training modules are being developed to engage the student without the boredom associated with typical "page-turner" on-line training. Students will also be able to talk with a live instructor at designated times. Embedded in this system will be database collection programs designed to capture data on unit level hazardous waste generation.

When will this system be completed and deployed? Sooner than you think. We tested the system at selected units throughout the Coast Guard during the summer [2003] and anticipate full scale rollout in FY04!

Mock Dock Puts You in the Dock Master's Seat

by LCDR Steven Hendershot
Maintenance and Logistics Command Atlantic (vs)

True to our word, Maintenance and Logistics Command (MLC) Atlantic Naval Engineering Specifications Branch has raised the bar for port engineer training aids once again. In the Summer 2003 issue of the *Systems Times*, we explained our role in preparing port engineers to oversee safe dry-dockings of Coast Guard cutters and the value of working models to illustrate stability principles and docking techniques. At this fall's port engineer course, we introduced our pneumatically operated Mock Dock, designed and built at home by our own staff members.

Built in three distinct sections of clear acrylic with opaque internal structure elements, the model operates much the same as a real dry dock, by ballasting and de-ballasting internal tanks with water. Operating in a shallow tank of water, the Mock Dock can demonstrate the relative stability of the ship-dock system at different phases of a lift, when side-blocks must be hauled in, how the free-surface effect of sloshing liquids reduces stability, how to correct for uneven loading on a dock, how to stay within the structural limitations of a dock and how dry dock design factors affect docking safety. Loosely connecting the sections with rubber bands enabled us to simulate both shear and bending stresses dry docks experience and how the operator can correct for them by adjusting the buoyancy of a section in proportion to the load placed upon it. While less visible on steel docks, these stresses can cause a real dry dock to buckle and drop a ship. Course participants, using the six-levered control console, tried their hand at lifting a model 110' WPB (Patrol Boat) and became instant believers in the importance of adequate stability and proper blocking.

We built a model travel lift to demonstrate proper sling loading, boat placement and avoidance of interferences. We also blocked a four-foot model hull on a full set of miniature blocks, using two acceptable block designs and one unacceptable design, illustrating how good block design prevents hull plate from being over-stressed and cutters from being overturned in high winds.

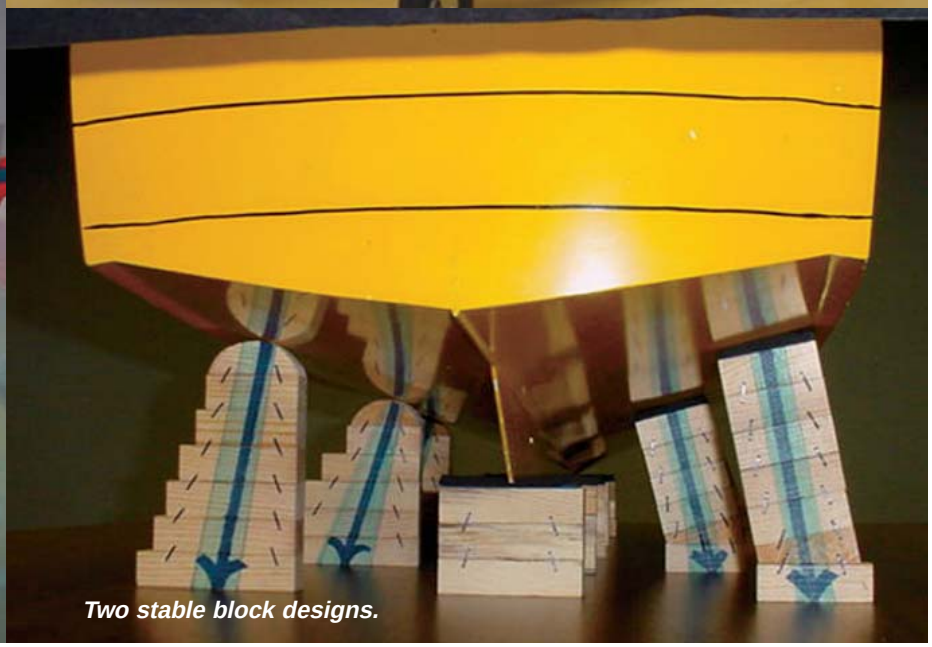
To our knowledge, no other commercial or government entity employs a working dry dock simulator in its training, and we can't imagine why. If all of these educational benefits weren't enough, working models make training fun and thus more memorable back on the dry dock floor, where the stakes are a great deal higher.

Mock Dock with control station.

Even loading on Mock Dock's three sections.

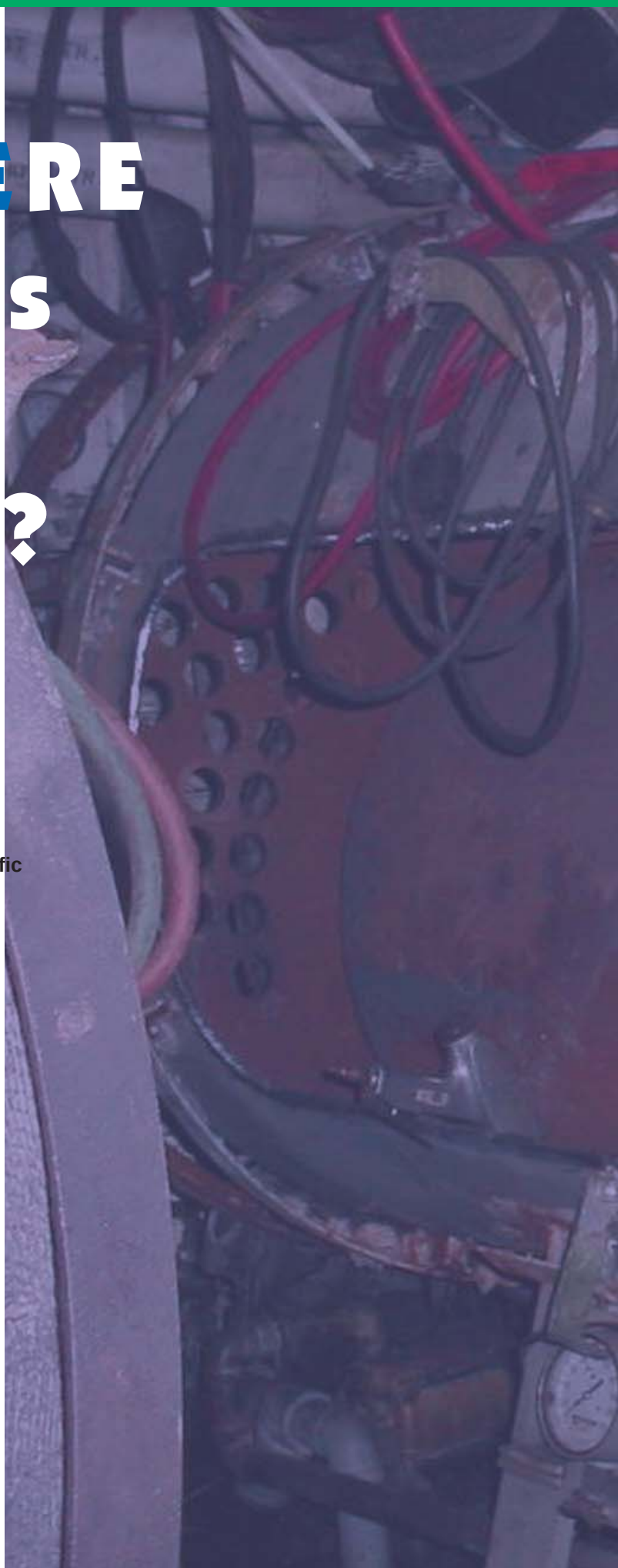
Travel lift with evenly loaded slings.

Forward end of Mock Dock lifting a 110' Patrol Boat.



Two stable block designs.

ARE THERE ANY BT's IN THE HOUSE??



Compiled by LT David Socci
Naval Engineering Division
Maintenance and Logistics Command Pacific

The following excerpts were modified for Coast Guard application, taken from U.S. Army Installation Support Center, Alexandria, VA. Public Works Technical Bulletin 420-49-21, 10 November 1999.

BOILER WATER TREATMENT LESSONS LEARNED - Many, if not all, Coast Guard assets are facing problems with boiler systems related to water treatment. One of the most common problems is difficulty in preventing the formation of scale or the occurrence of corrosion in these heating systems. As a result of these problems, system life, reliability, efficiency and safety are drastically reduced as documented through costly boiler repairs and replacements within the fleet. Many of these problems are preventable through proper boiler water chemistry maintenance and treatment. The following lessons learned show the facts of "why" boilers require such attention to operation, monitoring, testing and inspection, along with some helpful suggested actions.

Enormous amounts of water are required, used and consumed daily in boiler water operations. However, water normally contains various levels of contaminants, dissolved solids (minerals) and dissolved gases. These contaminants cause major operational problems and damage to boilers unless they are removed or controlled on a **continuing basis**. The correct application of chemical treatment programs can eliminate many problems associated with boiler operations, but other problems also impact operations.

Inadequate Management Support. Every Coast Guard installation operates under the same official policy guidance in the form of Commandant Instructions, Directives and Publications. However, every unit under those guidelines has its own personal mode of operation and style of management. Although boiler water treatment is but one small area of operations, it is critical in making the difference between an operational and non-operational boiler -- eating with flatware or plastic utensils; clean dishes or a mountain of discarded paper plates; drying clothes in laundry or on a clothes line; tempered supply air or artic air blasted directly into berthing areas. Reduced management support is reflected in these most common ways:

- Inaccurate direction or lack of water chemistry knowledge.
- Plants operating without assigned first-line supervisors.
- Managers lack of face-to-face communications with operating personnel.
- Lack of initial or ongoing training for all levels of managers and operators.
- Lack of or inadequate safety program.
- Lack of proper maintenance procedures and records.
- Lack of materiel order and appearance of the plant.

The successful operation of boilers requires accurate analysis of the water that is used, proper treatment to remove corrosive minerals and gases, and careful attention to the controls and procedures for the taking of water samples, their testing and all required inspections. Obviously the key player here is the boiler operator and of course, assigned supervisors. A basic knowledge of boiler mechanics and water chemistry is an absolute requirement -- whether through formal training or On-the-Job-Training (OJT).

Inadequate control of oxygen is a major source of boiler corrosion. Mistakes are made in the mechanical removal of dissolved oxygen and/or the chemical scavenging of oxygen. This results in corrosion pitting attack by oxygen on boiler water tubes and feedwater lines which calls for expensive replacement of failed piping and downtime for the boiler.

Mechanical removal of oxygen is accomplished with a deaerator (DA). The DA works by heating the water to a boil at which point the solubility of dissolved oxygen and other dissolved gasses are at their lowest level. The undissolved gasses are vented to the atmosphere and the deaerated water is used as boiler feedwater. The little remaining dissolved oxygen should be no more than the parts per billion (ppb) range which is scavenged by chemical treatment.

A properly operated DA requires a pressure vessel at 3-4 psi above atmospheric and a water temperature measured at the storage section of 8 degrees F above the boiling point for water at the installation's altitude. The visible steam plume coming from the DA's vent contains the unwanted oxygen and other gasses. The DA removes most but not all of the dissolved oxygen. The remainder must be

reacted with oxygen scavengers such as sodium sulfite. This is key given the specifications of today's leading marine boiler manufacturers require the removal of all dissolved oxygen from the feedwater.

Unfortunately, our cutters are outfitted with only condensate return tanks and hotwells. In accordance with COMDTINST M9000.6 (Series) Naval Engineering Manual, feedwater temperature is required to be maintained at approximately 200 degrees F, which will only assist in the removal of some dissolved oxygen.

Inadequate treatment of carbon dioxide is a major cause of condensate piping corrosion and boiler deposits. Carbon dioxide comes from the decomposition of the carbonate and bicarbonate alkalinity that is naturally present in the makeup water. The decomposition occurs in the boiler and the carbon dioxide that is formed is volatile enough to escape with the steam and later condense in the condensate system forming carbonic acid which is acidic and corrosive. The presence of carbon dioxide can be easily determined by measuring the pH of the condensate, carbon dioxide lowers the pH. A reading below pH 7.5 indicates corrosive levels of carbon dioxide.

One method to reduce the amount of carbon dioxide produced in the boiler is to reduce the amount of makeup water used. This is accomplished by maintaining the optimal "cycles of concentration" through proper blowdown and also by recovering as much condensate as possible. Cycles of concentration, often measured with conductivity or total dissolved solids reading, should not exceed the point where scaling or carryover occurs. The amount of condensate returned to the hot well can be increased by eliminating wasted steam and repairing condensate leaks. Another method to reduce carbon dioxide is to reduce the alkalinity (bicarbonate) in the makeup water. Dealkalizers remove alkalinity from the makeup water which is the precursor of carbon dioxide. This is a form of external treatment. Yet another method is to neutralize the carbonic acid using neutralizing amine treatments, which are used to raise the feedwater pH to between 7.5 and 8.5.

Inadequate control of scale and sludge impacts boiler performance. Scale buildup results from dissolved and suspended solids. Hardness ions, primarily calcium and magnesium, in the feedwater can come from seawater, shore and potable water systems. Even a small amount will form objectionable scales. Sludge deposits on the tubes are usually caused by partly treated waterborne solids that have not been removed by system blowdown. External treatment systems such as Magnetic Water Treatment and Coordinated Phosphate Chemical Treatment, the only two authorized feedwater treatment systems on board Coast Guard cutters, are designed to remove unwanted minerals before they enter the boiler system. Problems develop when external treatment capacity is exceeded, allowing the unwanted minerals to enter the boiler. The inadequate capacity can result from improper sizing of external treatment equipment or excessive makeup water usage.

Improper blowdown is a major cause for scale formation and wasted energy. Scale and sludge can result even when chemicals are applied at the desired treatment levels when there is insufficient blowdown. In a number of cases, boiler blowdowns have been treated as a separate procedure to the chemical treatment program, rather than part of the overall treatment plan. At the same time, excessive blowdown wastes energy, water and chemical treatment. The most common problem is excessive blowdown.

Surface blowdown is used to control Total Dissolved Solids (TDS) wherever practical. This is achieved with a manual throttling valve or an automated microprocessor blowdown controller. It is best to control surface blowdowns in consistent small frequent increments rather than infrequent long increments. This avoids wide swings in TDS level as well as chemical levels.

Bottom blowdown is used to remove sludge. It is not intended to control TDS unless it is the only blowdown option available. The frequency of bottom blowdown depends on feedwater quality and the type of treatment program being followed. Boiler load also impacts blowdown requirements. The heavier the load, the more frequent bottom blowdown is required.

Inadequate sampling and testing procedures result in improper chemical treatment. Inaccurate gathering and analysis of water samples

can result in losing control of the treatment program. This can lead to a higher cost of chemical treatment, misapplication of treatment, reduced efficiency and even boiler failure. Chemical test results are only as accurate as the sample collected. Therefore, the sample collected must be truly representative of the system conditions. A poor sample will yield results that may call for unwarranted corrections or adjustments to the treatment program.

- **Sample Point**: Boiler samples should be collected at the continuous surface blowdown line using a sample cooler for operator safety and to prevent flashing. If there is no continuous blowdown line then a sample can be collected from the water column beneath the sight glass which again should be cooled, approximately 100 degrees F.

- **Sampling Technique**: Sample lines should be flushed thoroughly to minimize contaminants from stagnant water in the lines. Sample containers should be clean prior to taking a sample. Containers should be dedicated for sample type, i.e., Boiler, Feedwater, Condensate, etc. Heavy duty, high temperature, polypropylene, wide mouth bottles are recommended over glass.

- **Interval Between Sample and Analysis**: For some elements in boiler water, it is critical that the interval between sample collection and analysis be as short as possible. Long intervals may allow some chemicals to continue reacting so that smaller than actual amounts will be found. An example of this is sulfite which continues to react with oxygen from the atmosphere over time. Different constituents in boiler water have different degrees of stability. Some must be tested immediately after removal, such as sulfite, hydroxide and pH. Others can last indefinitely when properly contained. The recommended order of testing is: 1.) Sulfite; 2.) Causticity and pH; and 3.) All other tests.

- **Problematic Testing**: The problems that often rise in boiler water testing is the lack of consistency in following correct procedures and or interpreting results.

1. **Phosphate Testing:** The first step for determining a free phosphate residual is to

filter the boiler water sample with a 0.45 micron filter to remove phosphate that has reacted with calcium. An excess of a polymer can cause some of the reacted phosphate to pass through this filter yielding erroneously high results, so it is important to keep polymer dosage within control limits, which may need to be verified by a lab. The free phosphate is measured by comparing the resulting blue color in the prepared test sample with a comparator block, given a series of various shades of blue color standards. Color can be judged visually or with a spectrophotometer. Tannin or rust can interfere with the visual determination in which the sample can be decolorized using a special grade of a decolorizing filter.

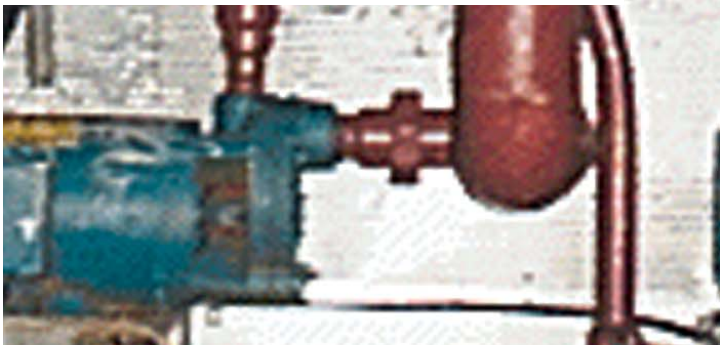
2. **Conductivity and TDS Testing:**
Blowdown is generally controlled as a function of Total Dissolved Solids (TDS) which is calculated from neutralized conductivity measurements. Excessive blowdown causes TDS to be to low resulting in wasted energy, water and chemical treatment. Insufficient blowdown results in excessive TDS and risks the deposition of scale on boiler tubes and carryover of boiler water into the steam. The first step in obtaining an accurate reading is to have a conductivity meter that is properly calibrated for the range that is being tested. Some conductivity meters have "built in" calibration but these must always be verified against an external standard. Comparing one calibration standard against another independently prepared standard gives some idea if the standards are in agreement and therefore correctly prepared. The next step in measuring boiler water conductivity is to properly neutralize the sample using an organic acid like gallic acid. This neutralizes the contribution of hydroxide ions which we do not wish to include in the estimate of TDS. The sample's conductivity is also affected by temperature so all readings should be done on samples that have cooled to room temperature for consistency. Finally the neutralized conductivity measurement is used to calculate boiler water TDS. Neutralized conductivity times the factor 0.7 = ppm TDS. The factor changes slightly if tannin is used as a dispersant as shown below.

Tannin Number	Factor
0	0.7
1	0.8
2-3	0.9
4-5	1.0

✧ **Polymer/Phosphonate/Chelant Testing:** Many boiler water treatment programs are getting away from phosphate and moving toward all polymer, phosphonate and/or Chelant programs. Specific test procedures are available to test for these. However, it is recommended to send samples to an outside laboratory for analysis to verify results obtained from your system.

Poor records cause ineffective boiler operations. Well documented logs of water testing results are necessary to indicate the current status and trends of chemical treatment and general boiler operations. Records are particularly valuable for preventing boiler failures or determining the cause of failures that do occur. Well maintained records can predict the condition of the boiler before inspections are performed.

✧ **Suggested actions:** Maintain log records that are organized and easy to read or they are not useable. Many units use computer generated spreadsheets and databases that are created on board. Records should be reviewed by supervisory personnel to see if all parameters are within specified control limits. If they are consistently out of the control range, then corrective action is required. Test results should be periodically verified by an independent testing laboratory to make sure that accuracy is being achieved. Records worth keeping can include:



Makeup Water	Water meter readings. Hardness. Conductivity.
Feed Water	Water meter readings. Hardness. Alkalinity. Iron. Silica. pH. Conductivity.
Boiler Water	Sulfite. Phosphate. Causticity or pH. Alkalinity/Causticity. Chloride. Silica. Polymer. Conductivity.
Condensate	pH. Conductivity. Iron. Hardness.
Chemical Treatment	Dosages. Chemical pump settings.

Inspections are invaluable for boiler operations. Boiler inspections are necessary to document the effectiveness of the water treatment program. Proper chemical treatment application and record keeping can allow one to predict the condition of the boiler, however, the inspection, documents the condition. Proper documentation allows for comparison to previous inspections to see if the condition of the boiler has changed for the better or worse. Photos and videos should be used wherever practical.

- Suggested actions. Obtain documents from the previous inspection, if applicable, to serve as a reference for the present condition of the boiler.

- Inspect the watersides of the boiler. In many cases the view will be limited especially for water tube boilers. Fiber optics video inspection equipment is useful for this purpose. Look for the presence or absence of deposits. If present, note the thickness of the deposit and obtain a sample for laboratory analysis. Good control of external treatment, chemical treatment and blowdown will prevent deposits from forming.

- Inspect the watersides for corrosion control effectiveness. The metal should have a thin layer of magnetite (ferrous-ferric oxide), this is a self-limiting form of corrosion that is a protective film. Magnetite has a grayish/brown appearance. Its presence is indicative of good pH control. The metal should not show any pitting due to oxygen corrosion attack.

- Inspect the mud drum of the boiler. There should be no significant accumulation of sludge which indicates that adequate bottom blowdown control has been accomplished.

THE NEW GENERATION OF MARINE WATER TREATMENT TECHNOLOGY HAS ARRIVED!!

by LT D. Socci
Naval Engineering Division
Maintenance and Logistics Command Pacific

Around 1993, a ship alteration was approved which introduced Magnetic Water Treatment (MWT) for Ship Service Boilers on various classes of Coast Guard vessels. This "simplified" non-intrusive method of treating boiler feedwater was advertised and designed to eliminate the need for hazardous chemicals used for water treatment and testing, reduce boiler Preventive Maintenance System (PMS), eliminate the need for active scale removal (acid flushing), improve heat transfer efficiency and boiler service life.

Background: Scaling and internal corrosion of boilers are expensive, serious problems which are traditionally treated with various chemical additives. Scale removal is usually accomplished with some type of acid flush, while excessive corrosion usually results in replacement of tubes and or other internal components. Treatment and flushing chemicals must be handled as hazardous waste, are dangerous to personnel, often require special stowage aboard ship and pose a threat to the environment. When correctly installed, the MWT system provides a permanent, consistent, environmentally safe method of preventing scale and corrosion in boilers.

No external power is required, and installation can be done without taking the system down since the magnets are mounted external to the piping. The use of MWT coupled with the advances in sensing technology also provide an opportunity to shift from traditional chemical titration type water testing to relatively inexpensive and in most cases, faster electronic means of testing boiler feedwater. With MWT there is no need to test for Phosphates (pH) since that measurement's purpose is to assist in determining the amount and type of treatment chemical to add. The Alkalinity test is replaced by a direct measurement of pH and instead of blowing down the boiler on a periodic basis (every 1-2 days), Total Dissolved Solids (TDS) level is used to determine when the blowdown threshold is reached. Both pH and TDS measurements are performed with a hand held electronic tester, which provides direct and instantaneous digital readout.

Results: After approximately 10 years of the MWT high life, the ships are enjoying the elimination of on board chemicals, reduced exposure of chemical hazards to personnel and excessive phosphate release into the environment. Reduced boiler PMS ... absolutely. Blow down the boiler and conduct water tests

daily, clean the burner nozzle every 6 months and check magnet continuity once a year, this equates to a daily investment of only 1.6 hours for a hot shot Fireman (FN) or rated Third Class Machinery Technician (MK3) to keep that auxiliary boiler humming (example given is for the 210' Medium Endurance Cutter (WMEC) platform). Extended boiler service life ... not exactly. Within the past 3 years, the need for complete boiler shell renewal and or tube replacement rose dramatically on the High Endurance Cutter (WHEC) and WMEC platforms within the Maintenance and Logistics Command Pacific (MLCPAC) fleet. Another noticeable trend is the inclusion of boiler feedwater and condensate piping renewal spec's showing up in dockside availability maintenance packages.

What Went Wrong: One doesn't have to search long or hard on the web to find positive and or negative endorsements regarding the use of magnets to cure just about anything, including the treatment of boiler feedwater. Labeled as myth, magic, fringe-science, water pseudoscience and quackery, it's easy to conclude that magnetic water treatment does not stand up to consistent and reliable performance or success. Although, the magnet folks do claim a conspiracy against them, by large chemical manufacturing companies.

Lets explore a little where MWT missed the mark. Magnetic water treatment doesn't address the dissolved oxygen problem. Remember the primary cause of corrosion to boiler tubes and feedwater piping read in the “Lessons Learned” article, page 58? Today's boiler manufactures are now calling for zero dissolved oxygen in their specifications for adequate feedwater. The only way to achieve this is to have an efficient deaerator system and proper chemical scavenging of the remaining dissolved oxygen. Another major qualifier is pH. Current MPC instructions have you check for pH under the MWT program, but what do you do if it's below 7.5 and aggressively attacking your condensate piping? Again, only special formulated neutralizing amines can allow for proper adjustment and control of pH. So really the only thing MWT addresses is solids. The problem with this approach to boiler maintenance is boiler blowdown now becomes your sole source of any boiler system protection. Lets say the target control range for TDS is 3,500 - 5,000 ppm -- above 5,000 ppm risks scaling and carryover. Below 3,500 ppm due to excessive blowdowns is wasteful of energy and water, which creates another given problem of having to add makeup water. The more makeup water needed the more likely unwanted carbon dioxide will be introduced into the water cycle. And this vicious cycle repeats itself until boiler tubes, shells, feedwater and condensate piping are all replaced with new material, $$$$.

Treatment Alternatives: The solution to reduce boiler related casualties and or complete tube and shell failure is futile, unless managers and operators alike take ownership for the entire steam generation system aboard their assigned platform. An ownership and priority status that is in the same category as, lets say, main propulsion and electrical generation systems. Complete boiler system knowledge, understanding and training is crucial for the member tasked with being labeled as the resident boiler expert/operator.

- What are other marine communities doing about this universal problem with boiler water chemistry? The U.S. Navy still supports sulfite chemical treatment of boiler systems as prescribed in NSTM, Chapter 220, Volume 2. The Military Sealift Command (MSC) has turned to outside sourcing, which provides for a vendor supported water treatment program, consisting of select treatment chemicals, injection/metering equipment, test equipment and support services.

- What is MLCPAC doing to assist the PACAREA [Pacific Area] fleet? For the WHEC platform an automatic boiler water treatment system that continuously monitors the water chemistry, then, from the test results, chemicals are automatically injected at key points throughout the system for proper chemical balance and protection.

- For the WMEC platform, the automatic treatment system is impractical due to the bulky size and required lay down area needed for operation. Right now, progress is being made to piggyback the established MSC contract and out source to the vendor supported boiler water treatment program. The Coast Guard Cutter STEADFAST has been selected to pilot this program for a year.

The obvious goal here is to eliminate premature failure to shell, tubes, feedwater and condensate piping and to achieve maximum service life from our boilers. Additionally, the Coast Guard will align with current industry standards for best marine boiler maintenance practices. I hope these series of articles will spark an interest with our young technicians in striving to become professional grade boiler operators and maintainors, and build a sense of urgency with managers as to how critical these systems are to crew habitability, and the over all mission capability of the cutter.

C2CEN's Customer Coordination and Analysis Section Overview

by LT Martin Delgado
Command and Control Engineering Center

The U.S. Coast Guard Command and Control Engineering Center (C2CEN) Customer Coordination and Analysis Section provide field units two unique services. The first is a System Management and Engineering Facility (SMEF) Trouble Reporting Desk (SMEF Desk) and the second is the C2CEN website.

System Management and Engineering Facility (SMEF Desk)

C2CEN established the SMEF Desk to provide technical liaison with Maintenance and Logistic Commands, Engineering Logistics Center (ELC), other Headquarter Units, Districts and operational field units via the chain of command. The SMEF Desk is designed around an easy to use database for tracking trouble calls, Casualty Reports (CASREPS), equipment configurations and installation locations to allow problem/resolution queries. The database is designed to improve communications between the SMEF Desk and field units. In summary, the objectives of the C2CEN SMEF Desk are:

- Provide a single point of contact at C2CEN for technical queries on systems we deploy.
- Provide timely response to all queries for technical assistance or information and ensure queries receive the appropriate level of attention, including follow-up.
- Track equipment failures and failure resolutions in the SMEF Desk database to allow a search and query capability for troubleshooting efforts as well as failure trend analysis for support managers.
- Act as liaison for field units to C2CEN afloat and shore support personnel and C2CEN Integrated Product Teams (IPT).

C2CEN SMEF Desk personnel have developed a web-based Electronic Equipment Troubleshooting Database for systems that C2CEN supports. The database is populated with CASREP and trouble call data since 1999, and is currently available to Atlantic (LANT) and District 5 (D5) area units. Plans are to make this database available to all units in CGDN+. For more information or to access the SMEF database, please e-mail smefdesk@c2cen.uscg.mil or call Pamela Tallman or Wendy Zumbrum at (757) 686-2156.

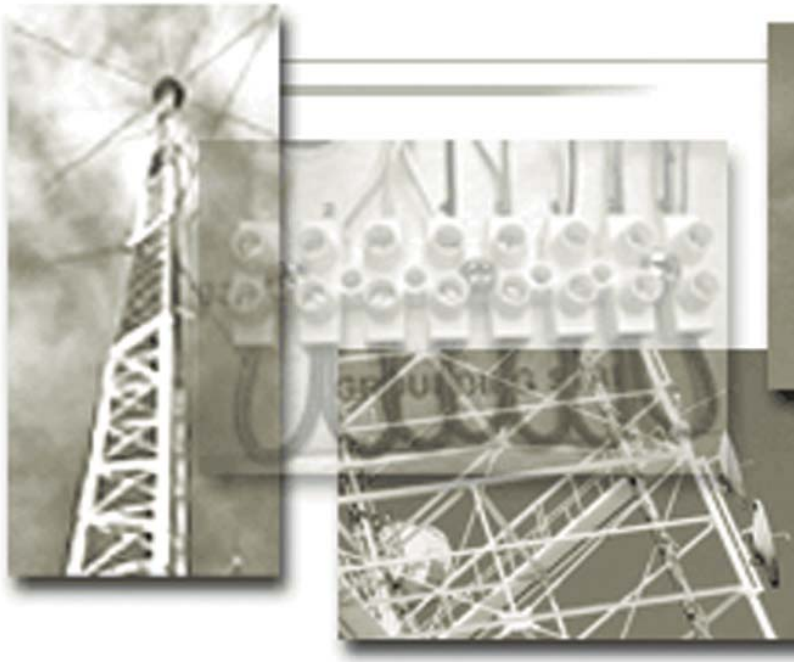
Image from C2CEN Website.

C2CEN SMEF Desk also offers a Report Service. The report provides information on failures, including detailed failure analysis and time to repair, and configuration of C2CEN equipment or systems installed at a unit or Coast Guard wide. For more information, please e-mail smefdesk@c2cen.uscg.mil or call Pamela Tallman or Wendy Zumbrum at (757) 686-2156.

Recently, you may have received a phone call or e-mail from C2CEN SMEF Desk personnel and thought, "When did C2CEN begin telemarketing?". On 3 December 2002, C2CEN implemented a new Customer Feedback Survey Program. SMEF Desk personnel will contact you via telephone or e-mail within three days after C2CEN personnel provided technical assistance. The SMEF Desk will ask questions regarding quality of the service provided, performance of the installed equipment and the documentation that accompanied the equipment. This survey also allows you to add specific comments, suggestions, complaints and ideas to assist us in improving the product or service we deliver to you. The program was designed to measure customer satisfaction and to use these results to build a better system. In the first two quarters of Fiscal Year 2003 we received over 130 surveys, which have greatly helped improve the service we provide.

C2CEN Website

In March 2003, C2CEN rolled out a completely renovated Intranet website (CGWeb) located at http://cgweb.lant.uscg.mil/c2cen/. This site is designed to be intuitive, user friendly and provides information operators, technicians and managers would be looking for on C2CEN supported systems. Available documents on the website include SMEF Advisories, Equipment Integrated Logistics Support Plans (EILSPs), Field Changes, and weekly updates on the products we support, as well as projects currently in progress. If there is something that you would like to see on the site or have feedback regarding the new C2CEN website, please fill out the website feedback form at http://cgweb.lant.uscg.mil/C2cen/Feedback/webindex.htm, or contact Terra Powers via e-mail at tpowers@c2cen.uscg.mil or via phone at (757) 686-2151.



eDGPS Technology Symposium

17-19 June 2003 - Portsmouth, Virginia

by LT Mike Parsons
Command and Control Engineering Center

The Coast Guard Command and Control Engineering Center hosted an enhanced Differential Global Positioning System (eDGPS) symposium of experts from industry, academia and government on 17-19 June 2003 in Portsmouth, Virginia. The symposium served two purposes: first, it set a course for improving capabilities, accuracy and robustness, in a post Selective Availability environment using current major infrastructure, and second, it allowed a forum to discuss methods of improving Coast Guard Maritime and Nationwide DGPS partnerships, and possible integration with other systems.

Attendees gave many cutting-edge presentations. Each presentation sparked fascinating conversations exploring potential enhancements that can be folded into pending technology refresh and equipment recapitalization efforts. Major points of discussion included: next generation Reference Station and Integrity Monitor architecture; signal coverage and accuracy comparison studies; deploying datalink performance improvements; leveraging the system's dedicated network to improve accuracy and continuity; employing new antenna technology to mitigate multipath issues; developing a gateway to allow other service providers to channel information to users on the DGPS datalink; exploring approaches to eliminating skywave; and pursuing incorporation of National Oceanic and Atmospheric Administration's (NOAA) new atmospheric correction product.

Symposium attendees explored a number of attractive opportunities for improvements including: engineering a 1000 baud datalink; achieving 10cm-20cm accuracy throughout a beacon's coverage area; exploring compact or compressed datalink formats; expanding interagency partnerships;

Photo from C2CEN website.

strengthening international ties between service providers; remaining committed to the work of standards committees; ensuring the interests of legacy users are safeguarded; and establishing working groups to champion these goals. All agreed that in order to ensure the safety of mariners and to better serve all who depend on DGPS systems, we must look forward to newly available equipment, systems, methods, data formats and possible new uses of this system. Equipment and system engineering must take advantage of new policies and technologies without adversely impacting legacy equipment uses. The group adjourned on a high note amidst great enthusiasm for the amazing future that lies ahead for DGPS systems.

POC is LT Mike Parsons at C2CEN (757) 686-4076.

DGPS Attendees

***Rear**: Dave Wolfe (C2CEN), Keith Gross (CG Academy), Brenden Cook (CSI), Joe Chop (C2CEN), Steve Briggs (Trimble), Changdon Kee (Seoul National University), Ron Pridgon (C2CEN), Mike McKaughan (CG Academy), Walt Fowler (Raven), Jay Spaulding (R&D Center), Peter Douglas (Northern Lighthouse Board/IALA), Satish Mittal (Leica Geo Systems), Bob Markle (RTCM), Chris Bartone (Ohio University), Sun Wee (Canadian CG), Yuki Yhahn (Ohio University), Kendal Ferguson (XYZs of GPS), Ben Remondi (XYZs of GPS), Per Enge (Stanford University), Seth Gutman (NOAA), Len Allen (FRA), Sunil Bisnath (University of S. Mississippi), Rudy Kalafus (Trimble/RTCM SC-104), Richard Snay (NGS/CORS), Richard Hartnett (CG Academy), Tom Mackie (Trimble), Christian Oates (JJMA), Aaron Morton (University of Calgary), Jim Arnold (FHwA)*

***Front**: Mike Parsons (C2CEN), Rene Jaquen (Thales), John Killers (C2CEN), Mark Moriarty (CGHQ G-SCE), Alvin Dalmida (NAVCEN), Jim Greenberg (UNAVCO), Al Cleveland (C2CEN), Marek Dziewicki (Urzad Morski Gdyni Poland/IALA), Flavel Blyden (C2CEN).*

Not pictured: Curtis Dubay (NAVCEN), Thom Harrington (NAVCEN), Ron Hatch (NAVCOM), Gerard Lachapel (University of Calgary), Ken Proctor (ATG), Jacob Ramos (C2CEN), Robert Snow (Thales), Charles Stevens (Raytheon)

PROTOTYPE IMPLEMENTATION PLAN FOR A PROJECT MANAGEMENT & BALANCED SCORECARD REPORTING SYSTEM

This is part one of a two part series. Part two will be published in the Spring 2004 *Systems Times*.

1. INTRODUCTION

The Maritime Homeland Security Integration Team (MHLS-IT) was chartered by the Chief of Staff of the U.S. Coast Guard to integrate implementation of all aspects of the Coast Guard's MHLS activities and facilitate communications between the various operating and support programs within the Coast Guard.

Excerpt from charter, ***"The Maritime Homeland Security Integration Team (MHLS-IT) will facilitate communication and integrate implementation of all aspects of the MHLS strategy:***

- ❑ ***Advise senior management on the Coast Guard's unfolding Homeland Security mission.***
- ❑ ***Provide timely Gantt chart progress reports to the MHLS Guidance Team for consolidated performance tracking by senior management."***

Following 9/11, USCG stakeholders met to identify Homeland Security projects. Approximately 125 projects were identified and have been tracked by MHLS-IT on an ongoing basis.

Project information was originally tracked using the Business Process Management System (BPMS) provided to MHLS-IT, along with supporting personnel for three months. Drawbacks of BPMS are that it was limited to a local server environment (could not be accessed by multiple users); required users to be knowledgeable about MS Project; and did not provide trend analysis, project archival, or business intelligence reporting capabilities.

As a result of the need for a more sophisticated Automated Information System (AIS) to support its mission, MHLS-IT developed a Statement of Work and sent out Requests for Proposal. Additionally the President's Management Agenda has issued new requirements for all Federal Agencies to support Performance Management of projects and to adopt reporting systems that provide for performance measurement and metrics which the current project management tools do not provide.

The proposed budget for the U.S. Government provides that:

> ***Federal programs should receive taxpayer dollars only when they prove they achieve results. The federal government spends over $2 trillion a year on approximately 1,000 federal programs. In most cases, we do not know what we are getting for our money. This is simply unacceptable. Good government -- a government responsible to the people whose dollars it takes to fund its operations -- must have as its core purpose the achievement of results. No program, however worthy its goal and high-minded its name, is entitled to continue perpetually unless it can demonstrate it is actually effective in solving problems.***

Thus the burden will be on programs to demonstrate performance and to practice ***Performance Management*** and methodologies to provide program metrics and measurement with a requirement for evidence that programs and projects are well designed, well managed and can prove they are working.

Balanced Scorecard is now a key element of Performance Management because it translates an organization's goals and strategies into performance indicators where measurement on performance can be made. Performance Management provides a process for ***positive change in USCG project organizational management, culture, systems and processes***.

Balanced Scorecard reporting provides a key tool for Performance Management by illustrating cause-and-effect relationships between Key Performance Indicators (KPIs) that dictate project success.

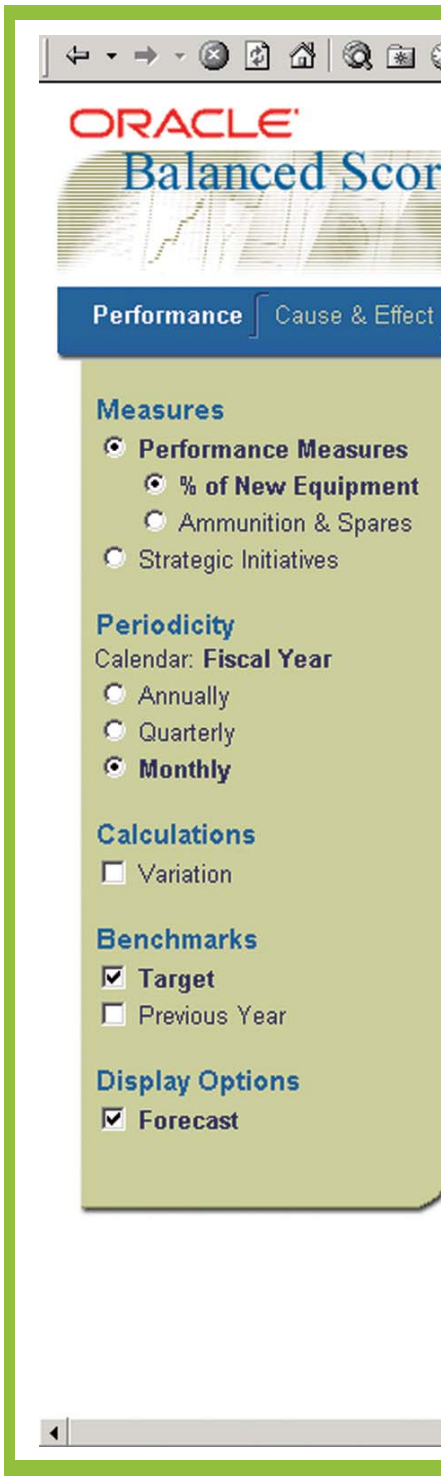
The Balanced Scorecard is a strategic measurement and management system that translates USCG's organizational strategy into a comprehensive set of ***Key Performance Indicators (KPIs)***. The Balanced Scorecard goes beyond the traditional emphasis on achieving schedule and project objectives to include the performance drivers of these activities and objectives. For the Prototype Project described herein, the KPIs

will be primarily project schedule and activity based, relying on project schedule and control along with Balanced Scorecard to provide for analysis of key activity indicators to support management action and decision making process as well as process control where projects are not meeting targeted requirements. Eventually the application can be extended to include indicators of financial and cost management, resource allocation, quality and other performance metrics.

The approved prototype for a Balanced Scorecard system gives USCG commanders and project managers a toolset to provide an understanding of how their decisions impact not only their direct area of responsibility, but also other departments and the overall USCG strategy.

1.1 Prototype Purpose

The approved prototype implementation is part of a larger pilot program that will evaluate two Commercial-Off-The-Shelf (COTS) products -- ***Oracle Balanced Scorecard*** in conjunction with an implementation of ***Oracle Projects*** to combine a system that will track project schedule and activities and, in a more extensive pilot program, expand to support financial and cost schedule control should it ever be deemed as an enhanced requirement.



The Oracle Balanced Scorecard will provide an active management tool by enabling its deployment across MHLS-IT projects, and should the USCG ever decide to deploy this tool at the enterprise level, its inherent Oracle enterprise infrastructure allows it to easily integrate as such. It links strategy to management action by placing U.S. Coast Guard KPIs right on managers' desktops, giving them direct information concerning project status and quantifiable targets to achieve -- targets directly in-line with USCG project strategy. By illustrating the cause-and-effect relationships between KPIs, Oracle Balanced Scorecard gives managers a clear understanding of how their decisions impact both their direct area of responsibility and overall company strategy.

An improved system is also required to fully enable the MHLS-IT to oversee the activities being conducted by the Homeland Security Project Matrix Teams and to provide vital and relevant information to USCG Senior Leadership regarding Homeland Security activities.

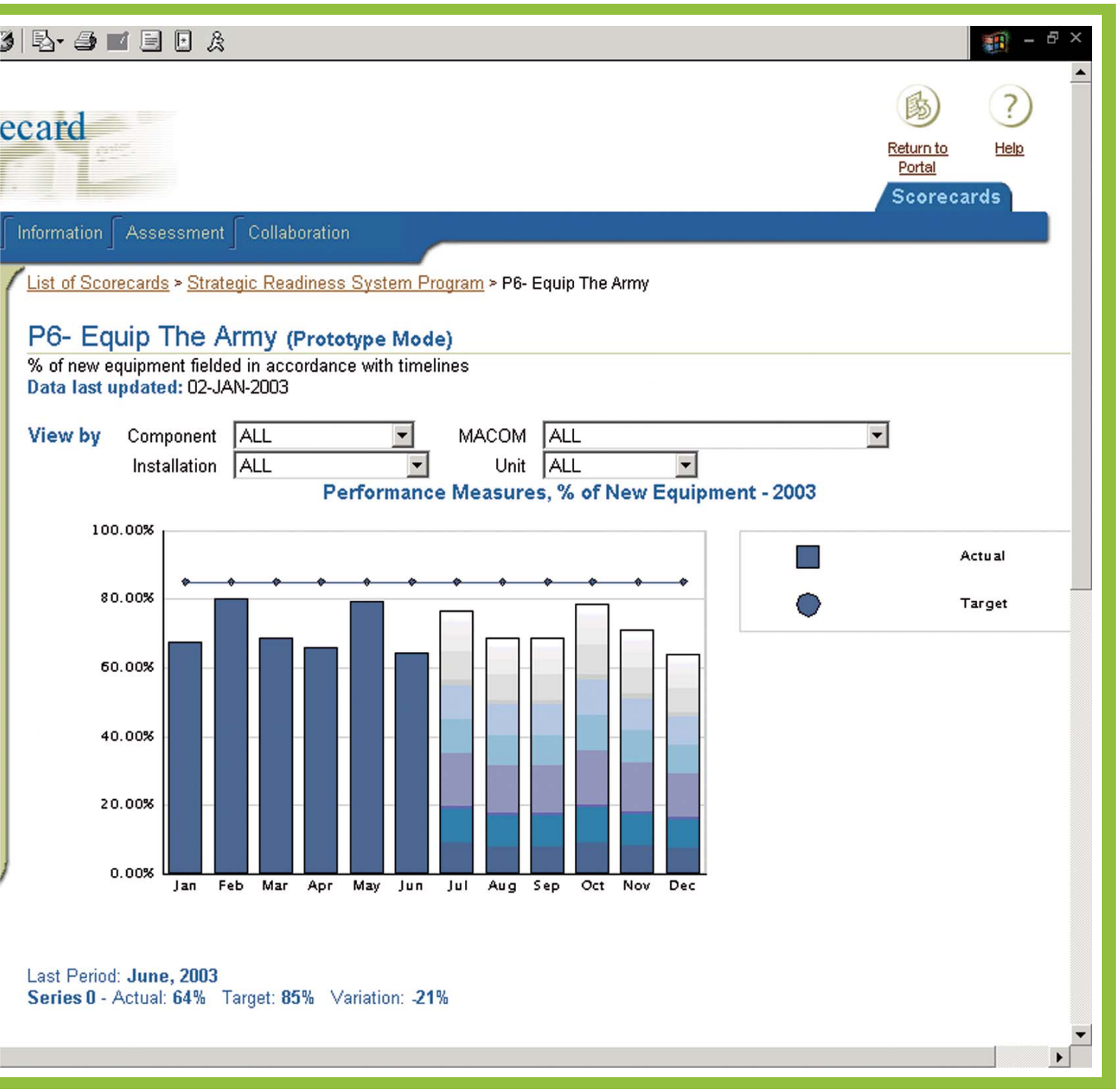
The key business requirements of this solution are that it meet the requirements of the MHLS-IT's charter for information tracking and dissemination, specifically:

- ❑ Advise senior management on the Coast Guard's unfolding Homeland Security mission.
- ❑ Provide timely Scorecard reporting and Gantt chart progress reports to the MHLS Guidance Team for consolidated performance tracking by senior management.
- ❑ Provide a dynamic, real-time, centralized, repository database from which project and performance measures can be processed for monitoring, evaluation and collaborative team interaction for status tracking.
- ❑ Track 100% of Homeland Security projects (as identified by USCG Senior Leadership) with documented activities and updates on a periodic (i.e., weekly) basis, resulting in:

- Improved collaboration among Project Matrix Teams and MHLS-IT,
- Improved tracking of Homeland Security project information, specifically milestones/schedules accomplished,
- Improved information flow to USCG Senior Leadership regarding Homeland Security activities, including current status, issues and achievements, and
- Decreased time spent creating ad hoc reports and Power Point presentations.

The purpose of this Prototype Project is:

1. To evaluate the implementation of ***Oracle Balanced Scorecard*** with ***Oracle Project*** for a limited number of MHLS-IT projects to provide a project management and executive reporting system for USCG



Managers and Commanders and provide the project information and status of projects as outlined above.

2. To analyze a project management and Balanced Scorecard system and toolset for the U.S. Coast Guard senior management.

3. To provide research into the current state "as-is" project management environment within the U.S. Coast Guard -- this will be done through a Prototype Steering Team supporting the Prototype Project and through interviews of key program executives, process group owners, project managers, project leaders and project team members.

4. To provide for MHLS taxonomy and to develop a generic set of project data and metric measurements to improve project planning, tracking and reporting towards Performance Management.

5. To apply metric measurements, primarily schedule and activity control, initially to between six (6) and eight (8) "prototype" projects to begin capturing common data points around project progress/status.

6. To test and evaluate Oracle Project and Balanced Scorecard for managing data and information for six (6) to eight (8) prototype projects, including data in Excel, ePMO, MS Project and other data or management systems.

7. To develop the Cost Benefit from the prototype and develop a plan to continue the rollout of the Oracle Balanced Scorecard and Project to all USCG Homeland Security Integration efforts from the prototype (lessons learned and analysis of Phases 1 and 2).

8. To demonstrate to the Department of Homeland Security a Performance Management toolset to track activities towards meeting the performance goals of each project and provide metric measurements for that effort.

Key Performance Indicators for the prototype project will include:

- ❏ % of Homeland Security Projects (as identified by USCG Leadership) defined in the system (up to 125+ at this point are possible).
- ❏ % of projects updated weekly.
- ❏ Amount of time spent by users in updating the system (system enhancements and process improvements will be ongoing in an effort to minimize user time devoted to maintaining the information in the system).
- ❏ System metrics such as uptime, speed, etc.

1.2 Document Organization

Section 2 Executive Summary provides an overview of the key project points and high level recommendations for the project. The remainder of the document supports this section, providing the detailed information and techniques to be used for implementation of the Phase 1 and 2 of the Prototype and later phases of the project, including project evaluation and eventual full project rollout for a full pilot of the systems for MHLS-IT projects and programs.

1.3 Project Background

Project development for a MHLS Web-based Project Management and Balance Scorecard approach began in mid-October 2002. Stakeholders were engaged and a series of meetings were held to elicit requirements for an automated project and Performance Management system. Requirements were documented, reviewed and accepted and a report was prepared in December, 2002, on key findings.

As part of this evaluation, the MHLS-IT reviewed 15 current Project and Performance Management Commercial-Off-The-Shelf (COTS) applications. The Performance Management review was conducted in parallel with LCMA group to target a unified solution. The COTS products and solutions were evaluated, including current systems used by the USCG such as MS Project, ePMO (GOTS product), BPMS and Excel.

The process for determining the systems requirements and for recommending a COTS Prototype Project application development during this analysis phase included:

- ❑ Requirements Definition for the users of a USCG Performance Management system.
- ❑ Application Evaluation for a systems, including COTS solution reviews.
- ❑ Implementation issues with regards to the USCG enterprise and consistency with future USCG and Department of Homeland Security enterprise framework.
- ❑ Testing, demonstration and trials of the COTS products along with meetings with COTS product vendors to review the capabilities of the 15 COTS solutions.

A proposed COTS product suite and application were selected based on this extensive evaluation. Project and Performance Management functionality of a COTS product was recommended to be prototyped through ***Oracle's e-Business Intelligence Suite*** and based on the following two modules.

- ❑ ***Oracle Projects*** for Project Management.
- ❑ ***Oracle Balanced Scorecard*** for Performance Management.

The proposed solution was outlined in a formal Design Document and presented to MHLS-IT leadership in December 2002 and January 2003. Supporting information, including the 11-step AIS Approval Document and Life-Cycle Costs Worksheet, were also developed and provided to the Chief Information Officer's (CIO) office for review.

1.4 Benefits of a Prototype

The approved prototype project will evaluate the best technical application from ***Oracle's e-Business Intelligence Suite*** based on technical functionality from the analysis of the 15 project management and Balanced Scorecard reporting systems as evaluated by Gartner and by the MHLS-IT staff.

The proposed COTS products from Oracle were determined to be the best of the many excellent project and Performance Management systems available. Oracle BSC and Project were selected for the prototype because they:

- ❑ Meet MHLS-IT requirements for Project and Performance Management.
- ❑ Offer user-friendly interface, familiar look and feel to the developing USCG Web Portal.
- ❑ Provide cost savings by utilizing a project management solution already owned and implemented by USCG.
- ❑ Meets Department of Defense/National Security Agency (DoD/NSA) Security Standards and meets Section 508 of the American Disabilities Act criteria.
- ❑ Provide a future enterprise solution with linkage to Oracle Financials and other USCG applications as/if Performance Management expands into financial, cost, resources, equipment and other functional areas that are tracked by project management systems.

1.5 Related Documents

Maritime Homeland Security Integration Team Web Application Requirements Document, December 9, 2002

Maritime Homeland Security Integration Team Web Application Design Document, February 14, 2003

2. SUMMARY

2.1 Requirements/Scope Summary

Measuring project performance and Performance Management requires a solution to not only track project schedules but provide a management system whereby managers can drill down into each project to determine tasks and activities where a project is not meeting key project requirements and schedule targets.

Key managers practicing Performance Management can be aided in this process by having a desktop toolset to provide information on project performance to assist in understanding of the cost, quality and timeliness of project delivery activities requiring both project schedule and integrated project Performance Management.

This Prototype Performance Management project is the first step toward implementing a common planning, tracking and reporting process for USCG MHLS related projects.

2.2 Constraints/Issues

USCG MHLS projects are already underway and the Program Managers and staff have developed their own COTS and ad-hoc systems to track projects, some very sophisticated and other using simple spreadsheets and software. USCG management needs an immediate solution for tracking the 125 or more projects in order to manage the performance on key goals in support of Homeland Security and integration into the new Department of Homeland Security (DHS).

Implementation time is mission critical as most of the projects support immediate Homeland Security of the United States. The USCG requires a toolset to assist in managing Homeland Security Integration projects and other programs supporting Homeland Security. Therefore, the Prototype program must be tightly designed and managed. The Prototype must be fully ready for rollout, if a decision is made for that extension of the product, at the end of the Prototype phases by late-May, but not later than mid-June and ready for rollout to support all 125 projects.

A constraint will be the ability of key Project Managers and staff to provide guidance to the development team in such a short time, given current MHLS workload. During Phase 1 of the Prototype project, six to eight active projects (out of the total of around 125) will be engaged in the Prototype and Program Managers and key staff must be willing and able to participate in the Steering Team for effective user input and requirements for the Phase 1 product implementation and configuration.

As the Prototype moves into Phase 2, a total of 20 major projects will be included in the project allowing key Project Managers and staff to work with these two COTS products and provide guidance to the development staff for added configuration of the COTS products to USCG user requirements. Phase 2 will also provide for developing solutions to migrate existing data and systems without impacting current operations and support.

The Prototype phases will include a Business Case and Opportunity Analysis that will indicate the lessons learned and recommend further rollout and a full pilot of the system to all 125 projects, with training delivered to key USCG MHLS project matrix team leaders and staff.

This project is intentionally designed to be very short-term in nature and tightly focused on establishing a baseline set of project measurement criteria. To ensure that project objectives are met in the allotted time frame, the Prototype team has adopted a "sampling" philosophy (e.g., quantity of interviews, project reviews, Prototype Project implementations). Therefore not all stakeholders will be interviewed or all current projects and project management systems will be reviewed during the early phases. A key set of six to eight projects will be included initially in the Prototype Project and

key stakeholders and projects will be involved to provide for an accurate sample of the entire population. That will then expand to a total of 20 projects before full rollout. All stakeholders will then become part of the program as all 125+ active MHLS projects.

3. PROJECT OVERVIEW

3.1 Business Objectives

Reference No.	Business Objective Description
0001	Establish a Performance Management system through Balanced Scorecard and a project schedule control capability for MHLS-IT team project management.
0002	Improve collaboration among Project Matrix Teams and MHLS-IT.
0003	Provide timely performance management and Gantt chart progress reports to the MHLS Guidance Team for consolidated performance tracking by senior management.
0004	Implement a Prototype Web-based and common Project Management tracking system and a Balanced Scorecard for performance management for MHLS-IT
0005	Define and implement a common Project Management taxonomy, data consistency and Project Management Best Practices. This will provide cohesiveness in project data, naming conventions and reporting.
0006	Provide a dynamic, real-time, centralized, repository database from which project and performance measures can be processed for monitoring, evaluation and collaborative team interaction for status tracking.
0007	Improved tracking of Homeland Security project information, specifically milestones/schedules accomplished.
0008	Establish Process Components/Elements Comprising Best Practices for Project Management and Performance Measurement.
0009	Improved information flow to USCG Senior Leadership regarding Homeland Security activities, including current status, issues and achievements.
0010	Train USCG Staff, Managers and Project Managers in the used of Project Scheduling, Project Control, and Balanced Scorecard Reporting and in the use of the automated tools.

3.2 Project Objectives

For each Business Objective, the following defines one or more measurable Project Objectives.

Business Objective Ref. No.	Project Objective Ref. No.	Project Objective Description
0001 and 0002	A	Establish a Prototype Project Steering Committee of 6-8 key managers and staff involved in current MHLS-IT project management. Determine from this sample of users the objectives and expected outcomes for common desktop project planning, tracking and reporting, and for Performance Management. Translate those finding into a configuration for the Prototype COTS products.
0003 and 0004	B	Install and test Oracle Project for USCG as a prototype project to provide Gantt and BSC reporting for senior management for the 6-8 projects.
0004	C	Design, configure and implement the COTS prototype products for common planning, tracking and reporting process for MHLS projects. Design an interface for transferring data from existing planning tools (Excel, MS Project, other) into the Prototype COTS systems.
0005, 0006, and 0007	D	Develop common data sets, taxonomy and other common elements for tracking MHLS projects based on the six to eight sample project data and information systems.
0008	E	Achieve management concurrence regarding other potential project management weaknesses that will not be detected by the above processes.
0009	F	Recommend approval for refining and extending the common planning, tracking and reporting solution across the USCG and Department of Homeland Security projects.
0010	G	Train USCG staff during the prototype process on the use of the Performance and Project Management toolsets. Also fill a need for some awareness training for project staff in overall project management tools and techniques that will improve overall USCG Project Management practices. Use training as a CHANGE MANAGEMENT process to change the project management culture, systems and processes for performance management improvements to the processes of project management for USCG MHLS projects.

3.3 Project Scope

The scope of work is intended to provide a phased approach so that the COTS products can be installed, minimally configured and used as soon as possible for initial Prototype testing, application and use with data and information on 6-8 current active projects being used during the Prototype process.

The scope of the Prototype Project supports a Prototype Steering Team to provide a user committee and a sample of the users who now rely on various products and tools to track USCG project. The Steering Team will provide for user requirements and testing of the performance management and scheduling COTS products in order to assure that the development and design and configuration of the COTS during the Prototype Project is consistent with user needs, capabilities and USCG IT requirements.

The phased approach maintains the project as a prototype through two added phases (Phase 1, 2 and 3 combined) as the products are configured to user's needs and requirements, and as data migration solutions are designed and tested to easily allow users of current systems for project tracking to migrate their data and information. The project is then rolled out to all 125+ MHLS projects for full testing, desk side support and data integration in a longer term program.

3.4 Risk Analysis

Project Management at the USCG for MHLS projects is ad-hoc and with disparate data and systems used for project reporting it is difficult to easily collect common data and provide timely or real time reporting. Disparities in data, project management terminology and ad-hoc project reports through various tools results in data inconsistency. Data connectivity, taxonomy and migration must be part of a coordinated and integrated performance management system. The proposed COTS products do not fully support data connectivity at this time with all of the current systems at USCG. Efforts are underway by the vendor to provide for expanded data integration as this project develops, which adds some timing and technical risks to the project schedule.

The risk of not doing this Prototype Project, however, would be the continuation of ad-hoc reporting with a lack of commonality in reporting systems and project management tracking conventions. It will continue the inability to provide for a viable and coordinated performance management system, and the inability to measure and track Homeland Security projects within MHLS. If executive management decides to not pursue the prototype project, the current state would continue to exist.

Part 2 will be printed in the Spring 2004 Systems Times.

Nettie Moment is the 2003 Collateral Duty Civil Rights Service Provider of the Year

Admiral Thomas H. Collins presents Ms. Nettie Moment with the CRSP Award during ceremonies held at Coast Guard Headquarters on 24 July 2003.

Ms. Nettie Moment of the Office of Logistics Policy, U.S. Coast Guard Headquarters, was selected as the 2003 Collateral Duty Civil Rights Service Provider of the year. She received her award on 24 July 2003 during a ceremony where the award was presented to her by Admiral Thomas H. Collins (Commandant) in the Office of Commandant, U.S. Coast Guard Headquarters.

Ms. Nettie Moment serves as a Collateral Duty Equal Employment Opportunity (EEO) counselor for the Coast Guard Headquarters Support Command (HSC). Her sound technical knowledge in the area of Civil Rights and Human Resources, coupled with her exceptional skills in conflict resolution, have proven to be an invaluable service for HSC and led to timely resolution of many complaints at the unit level. In addition, she volunteered for and completed a month long detail at the Defense Equal Opportunity Management Institute (DEOMI). While at DEOMI, she completed graduate-level research on Disability-Related Equal Employment Opportunity issues, part of which was used in a worldwide publication that was widely disseminated throughout the Department of Defense and other Federal Agencies.

Ms. Moment was selected as the 2003 Collateral Duty Civil Rights Service Provider award winner from a field of highly qualified nominees. Congratulations on a job well done ... BZ.

Facility Named for Founder of Coast Guard Yard

Engineering Logistics Center Dedicates Moore Warehouse Complex

RADM Erroll Brown, Assistant Commandant for Systems of the U.S. Coast Guard, (left) and U.S. Congressman Benjamin Cardin of Maryland's Third Congressional District, (right) join CAPT Kevin Jarvis, Commanding Officer of the Coast Guard Engineering Logistics Center, (center) for the unveiling of the cornerstone plaque officially dedicating the Moore Warehouse Complex. (Official USCG photo by PO Charles Pringle, USCG)

The Coast Guard Engineering Logistics Center (ELC) officially opened the new Moore Warehouse Complex during dedication ceremonies held on October 3rd at the Coast Guard Yard in Baltimore, Maryland. The milestone event hosted U.S. Congressman Benjamin Cardin of Maryland's Third Congressional District and Rear Admiral Erroll Brown, Assistant Commandant For Systems of the U.S. Coast Guard, who officiated at the ribbon cutting.

The 12.6 million dollar warehouse complex replaces three 1940 era warehouses at the 104 year old shipyard and eliminates the need for a $l.4 million leased warehouse located in Columbia, Maryland. The latter facility, rented through the General Services Administration for the past 10 years, was 23 miles from the ELC headquarters on the Yard campus. Movement of material from the Columbia warehouse began in mid-October with an estimated completion by summer 2004.

The new warehouse provides 115,000 square feet of storage space and 15,400 square feet of administrative space. The facility reduces the old warehouse footprint by 130,000 square feet and reduces storage space cubic feet by approximately 23%. Improved storage efficiency is attained by increased rack heights. The new warehouse has a 42 foot eave height and utilizes 35 foot high racks. Former warehouse spaces were restricted to rack heights up to 25 feet.

The Moore Warehouse Complex will consolidate all inventory items in support of the worldwide Coast Guard fleet. The new warehouse will contain 3 million pieces -- from tiny screws to main engines -- and 35,000 line items valued at $240 million. The modern, state-of-the-art edifice allows the ELC to efficiently supply critical inventory in support of U.S. Coast Guard global missions, in addition to improving essential logistics management systems.

The warehouse complex is dedicated to and bears the name of Captain John C. Moore of the United States Revenue Cutter Service (RCS), the predecessor of today's Coast Guard. In the late 1800s, then LT John C. Moore petitioned the RCS to construct a small shipyard where the Service's boats could be maintained and repaired. In April 1899, LT Moore established his facility in south Baltimore, and the United States Coast Guard Yard began operation. LT Moore later served as the Yard's second Commanding Officer, from June 1903 to May 1905.

The grand opening of the Moore Warehouse Complex symbolizes the Coast Guard Engineering Logistics Center and the Coast Guard Yard's continued partnership to provide core logistics support to Coast Guard ships around the world. This modern, state-of-the-art warehouse facility greatly enhances the inventory manager's ability to provide the right part, at the right place, at the right time to the Coast Guard fleet.

Commandant (G-S)
United States Coast Guard
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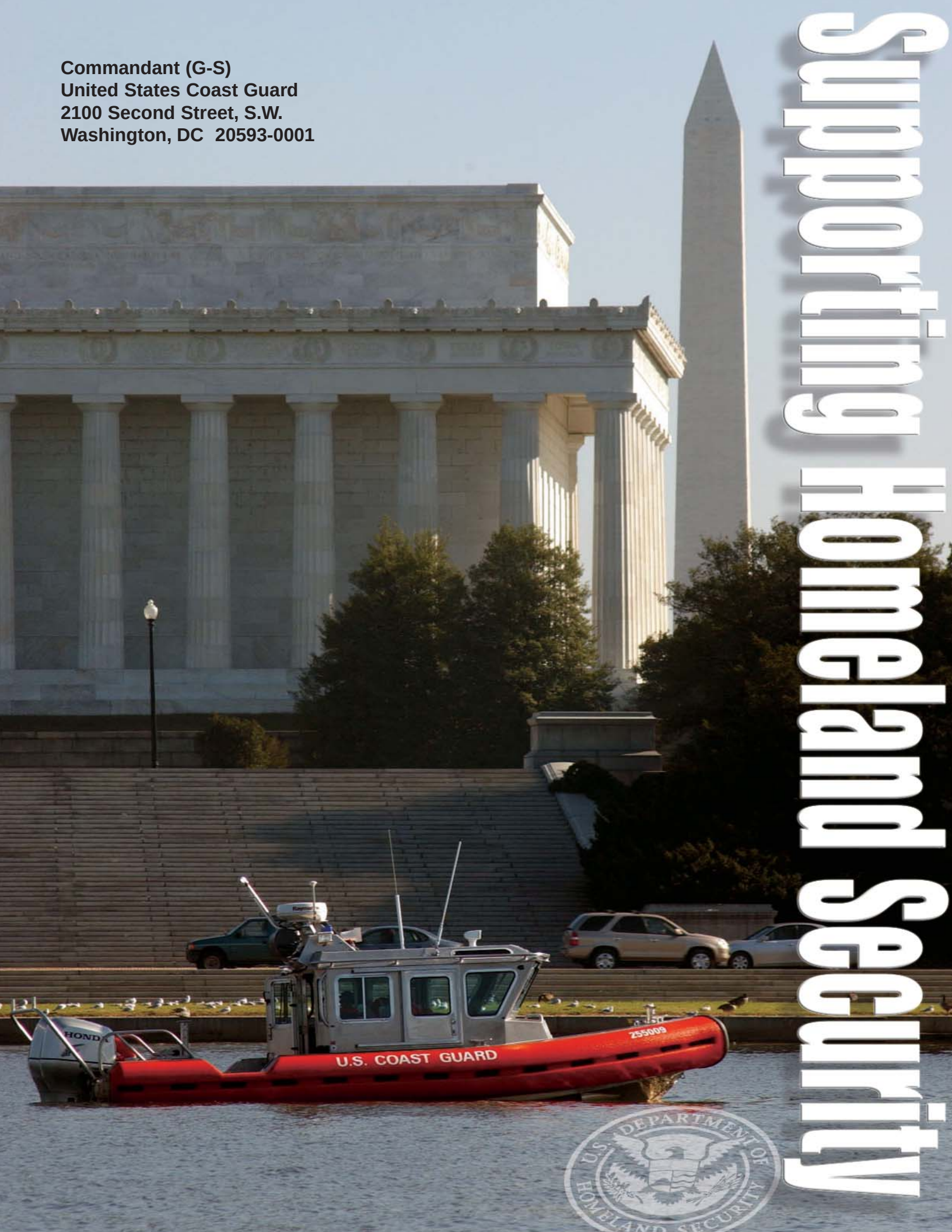
Washington, DC 20593-0001

Supporting Homeland Security