THE CNE TRAINING, OVERSIGHT & MONITORING (TOM) PROGRAM

Brian D. Lee, P.E.

Program Goal:

Equip for Performance: Equip every European Navy Activity's Environmental and Public Works (PWs) staffs with the knowledge it takes to run their individual wastewater collection and treatment service with reliable, consistent compliance results. The program is a CINCUSNAVEUR funded and supported program for overseas wastewater treatment plants. The program can be exported to overseas drinking water plants.

Program Objectives:

1. Improve an Activity's ability to adhere to the procedures and practices that are documented in the Treatment Plant's OMSI manual, IAP (Internal Assessment Plan) and subsequent EMS (Environmental Management System.)
2. Improve an Activity's ability to comply with the Chapter 4 FGS Standards and/or the conditions of effluent discharge imposed by the host country's Base Commander.
3. Afford an early warning of probable major capital expense associated with the sewer system and treatment plant infrastructure.

Scope:

This program, known as the Training, Oversight & Monitoring (TOM) Program will be directed toward each Activity that has a wastewater treatment plant(s). Specifically the program is directed toward the NAS I and NAS II plants at NAS Sigonella, the main base and Marathi pier plants at NSA Souda Bay and the Santo Stefano plant at NSA LaMaddalena. Not all wastewater discharges at the Activities listed above are included in this program; only domestic wastewater plant operations are included. These plants are mission critical assets for sustaining routine base operations. These discharges also have the potential to introduce the most harm to the environment and receive the most scrutiny from the host nation if they do not function well. Other critical discharges can be added if necessary.

Justification:

The United States Navy is a guest military in the host countries of Spain, Italy and Greece. In as much as we protect the resources of our own country, we also should appropriately respect the resources of our host. This very premise is the basis for the exhaustive comparison of host country laws and the US benchmark standards of the OEBGD. The comparison yields the DoD country specific Final Governing Standards. Our wastewater discharges, particularly the most voluminous discharges from our wastewater plants, have the potential to impact our host's environment. It is therefore important to manage wastewater in such a way that honors our relationship with the host country. To not do so introduces the possibility that our coveted relationship with the host military and the country at large could be damaged. Hence, by virtue of a respectful relationship with the host military, the Navy is enabled to train for readiness, project force, effect it's overall mission, and act as an appropriate instrument of foreign policy.

Activity Environmental Mangers and their Utilities counterparts in Public Works Utilities provide the critical interface with the host country military relative to wastewater discharges. The effectiveness of the base specific management systems that integrate people and operative wastewater equipment is critical if the relationship with the host country is to be honored and guarded when such military are themselves held to the laws of their own country. Because of the need to protect our relationship with the host country, the CNE TOM Program has been established and includes the following technical elements:

1. *Operator and Program Manager Training*: This is the "people" component of the system. The workforce at CNE bases rotates and a language barrier often exists between US English speaking personnel and the host

country nationals. Bi-lingual operator training should therefore be designed and given to the US Civilian, U.S. military or host country national work force that runs the WWTP. Program Manager training should be web-based and designed to help the environmental staff understand the technology at the plant, the discharge permit and other requirements that are in the FGS. Training on the wastewater program elements also should be provided to environmental mangers and utilities directors on an as-needed basis. A centralized CNE Wastewater Training website is under consideration.

2. *Monitoring and Reporting*: It is proposed that plant effluent monitoring take on two forms: pollutant screening and routine compliance monitoring. Pollutant Screening, although not specified in the latest FGS, is needed to determine which, if any, of the parameters can be eliminated from routine monitoring required by the FGS simply because such pollutants (for which there are standards) do not exist in the waste stream. Doing pollutant screening should save an activity on the cost of doing routine monitoring. The pollutant screening process should provide site-specific discharge limits for each wastewater plant discharge. Routine monitoring of only the pollutants that are known to routinely exist in the waste stream should be monitored at the frequency prescribed by the FGS. Some host country permits, held by the host military, may supercede this approach; but a screening effort should help an activity prepare for the issuance of a permit if the permit application asks for a thorough characterization of the wastewater stream.

The reporting part of this sub-element is a system of uniform record keeping that documents plant performance, permit compliance as appropriate, and compliance with FGS limits. All CNE activities are faced with the need to develop Standard Operating Procedures (SOP) including those for record keeping. It is the intent of this program to assist activities with the development of these SOPs.

Compliance record keeping provides the following advantages to the activity:

a. Effluent data tabulation provides a historical record so that correlations of plant performance can be made relative to base operations.

b. Data tabulation is the basis for macro performance troubleshooting and process adjustment.

c. Records explicitly demonstrate compliance when appropriate averaging techniques as required by FGS s are applied to the data.

d. Effluent records document what is being introduced to the host country environment and indicate performance when the host military asks for proof.

e. A tabulated record provides documentation of compliance for the annual IAP, EAP, or IG inspection.

At the time of an inspection both the screening results and the routine monitoring should provide an adequate record of compliance. It is desirable, although not imperative, that the reporting methodology should be consistent across the claimancy. In other words, all dischargers under the CNE claimancy should tabulate their effluent quality into a standard format. To prove compliance against FGS chapter 4 standards individual data pieces may have to be averaged. A standard method of recording effluent data quality, data manipulation, and reporting up the chain is needed. Having a standard method of reporting performance assists when there are personnel transfers, documents plant performance, gives positive proof of compliance, gives advance warning that action needs to be taken, and gives documented justification for funding repairs and plant improvements. Efforts to establish standard SAPs (sampling and analysis plans) are currently underway by LANTDIV.

3. *Planning for Compliance*: Compliance is effected and sustained when corrective action is anticipated and then executed. Planning for compliance includes getting requirements articulated into the POM and prioritized in the execution planning process through public works, or the claimancy. Planning for compliance includes not only participating actively in the POM process for NECA, OBOS and MR1 monies but it also includes the public works efforts to get trouble calls answered, critical parts ordered, work requests issued into engineering or planning, and requesting NEPSS and Utilities support from the EFD/EFAs. This program includes support to activities for the development of base specific draft SOPs for effective compliance planning.

4. *System Evaluation*: There are many sub functions of the system that benefit from evaluation. LANTDIV has already begun a pilot service using a combination of in-house and AE contract personnel to inspect the functionality of the physical plant at each of CNE's wastewater treatment operations. The on-site evaluation is an integrated quick check from both the utilities and environmental perspectives. Evaluations are done on an annual basis. There are a series of broad questions that can be reviewed at each site visit:

- What is broken and how long has it been broken?
- Can the plant support the hydraulic demands expected of it?
- At what level is the plant performing and perhaps why? (Indicators of performance: effluent quality, number of spills and by-passes, quality of sludge)
- Are we using chemicals economically?
- Is the plant getting the support it needs?

The plant evaluations should not be extremely detailed but they are intended to flag areas that require further support and planning action, perhaps even bring attention to neglected issues so that they can be reprioritized and justified for advance funding. The eval-visits should be tailored to the activity in terms of the activity's ability to implement the program. A more mature base program should be evaluated at a more complex level than a program that is just getting started or is being rebuilt due to a change in personnel. As the activity's program builds proficiency, changes are made in the FGS, or crucial issues arise that are of interest to the claimant, new technical elements should be introduced. A simple two to three page report, with no fluff, should be the output of the annual evaluations. The report should be written for the Base Environment Programs director, PWO, and COMFARMED with the objective to report on the status of the plant infrastructure and how well it is being operated and supported.

5. *Support Site Visits*: Annual evaluations will entail discovering issues and emerging requirements that need to be acted upon by the activity to "plan for compliance." Wastewater Activity Representatives at the Environmental Division at the EFD-EFAs will share the report and the detailed back-up field notes with EFD Utility Engineers. The EFD will follow up with the Activity Program Director for an onsite visit to discuss the report and make plans for appropriate Utilities Engineering, OMSI, and NEPSS support. Products and services that are needed to support follow-on efforts will be subject to current policies controlling the use of centralized NEPSS and Utility Program funding.

If you have questions or comments, please contact Brian D. Lee, telephone (757) 322-4753, fax (757) 322-4799/4805 or LeeBD@efdlant.navfac.navy.mil.

CYCLODEXTRIN ENHANCED REMOVAL OF ORGANIC CONTAMINANTS FROM GROUNDWATER AT NAB LITTLE CREEK

Dawn Hayes, P.E.
Installation Restoration

LANTDIV is working with the Environmental Security Technology Certification Program (ESTCP) to explore innovative treatment technologies at Naval Amphibious Base (NAB) Little Creek, an NPL site located in Virginia Beach, VA. ESTCP is a corporate Department of Defense (DoD) program that promotes innovative, cost-effective environmental technologies through demonstration and validation at DoD sites. Any DoD site can self nominate their facility to be considered for numerous technology demonstrations under this program.

NAB Little Creek has been chosen as a test location to demonstrate a new technology for the treatment of non-aqueous phase liquids (NAPL). NAPL, including many chlorinated organic compounds and complex mixtures of these compounds, have been a common groundwater contaminant at many DoD sites. NAPL contamination is often difficult and time consuming to remediate. Because NAPL does not have the same flow dynamics as water, conventional groundwater pump-and-treat systems are typically used to treat only the dissolved phase of the contamination. Since such a minute portion of the contamination is contained in the dissolved phase, these systems typically only scratch the surface of the problem. This method of remediation often leads to extraordinary costs and decades of operation until groundwater clean-up standards are met.

We are striving to find ways to improve upon NAPL remediation. Chemically enhanced flushing technologies have shown promise of advancement toward this goal. The premise of this technology is based upon flushing the contaminated porous medium with chemical agents to increase contaminant solubilities and mass removal rates. Dr. Thomas B. Boving with the University of Rhode Island Department of Geosciences and Dr. John E. McCray with the Department of Geology and Geological Engineering Colorado School of Mines have developed an application utilizing cyclodextrins to remediate groundwater contaminated with NAPL. In this application, a non-toxic modified sugar, hydroxypropyl-cyclodextrin (HPCD), is injected into the subsurface in an aqueous solution. The potential benefits of the

cyclodextrin technology include reduced clean-up times, increased cost effectiveness, reduced mobilization of the NAPL chemical, and the fact that the flushing agent is non-toxic and does not remain in the subsurface for extended periods of time.

NAB Little Creek has been selected to host a demonstration project using cyclodextrin. A former plating shop area is currently being addressed for NAPL contamination under the Installation Restoration Program (IRP) of the Navy, in coordination with the EPA and VDEQ. The main chemical of potential concern in groundwater at this site is trichloroethene (TCE), which falls in the NAPL category. The pilot study will focus on treating the most concentrated portion of the aerial extent of TCE contamination in groundwater. The project is expected to commence this summer in combination with graduate courses offered at the respective universities. This project will be used to demonstrate that cyclodextrin enhanced in-situ treatment of NAPL contaminated aquifers and groundwater is a cost effective and safe remediation alternative to stand-alone pump-and-treat technologies.

If you have questions or comments, please contact Dawn Hayes, 757-322-4792 or hayesdm@efdlant.navfac.navy.mil.

Vulnerability Screening Tool and Initial Response Plans (IRP) for Navy Drinking Water Systems

Jim Harris, P. E.
Potable Water & Asbestos

Background

The events of 11 Sept 01 prompted CINCLANTFLT (CLF) Environmental to recognize the vulnerability of their water systems and study the available resources to respond to an attack. It was realized early in the process that the coordination of all the different agencies and disciplines was a lengthy and difficult task. As a result, CLF Environmental requested a screening tool and Initial Response Plan be developed as an interim measure to evaluate the vulnerability of their water systems to physical, biological, or chemical terrorist attacks, and to implement a response plan in the event of an occurrence. EFDLANT, EFANortheast, and EFDSouth responded by assembling an assessment team to research and develop tools and plans.

Objective

The team's primary objective was to develop a series of questions (henceforth called a screening protocol) to evaluate the vulnerability of Atlantic Fleet shore installation water systems to terrorist attack. This screening protocol is intended to be a desktop tool for the user (EFDs/EFAs, Fleet and Activities) to implement and provide an initial assessment of a water system's vulnerability to attack. This screening tool should cover both physical attack as well as 'contamination' attack (biological, chemical or waste agent).

The team's secondary objective was to develop and outline a contingency response plan to respond to a 'contamination' attack. The task included developing procedures for responding to threats and/or attacks on the water systems, and identifying available local and federal resources. The final product would be used as an Initial Response Plan to be implemented in the event of an attack from chemical and biological Weapons of Mass Destruction (WMD) on the potable water supply systems.

Screening Tool Approach

The screening tool was initially developed by the team of environmental and utility personnel in a 2 day meeting in October, 2001. The team followed the structured "Coaching Process Design" approach in identifying the issues used to evaluate the vulnerability of the CLF water systems. The Coaching Process uses a focus question that centered on the issues involved in determining how vulnerable CLF water systems are to physical, biological, and chemical attacks.

The team brainstormed the focus question and organized all the ideas and thoughts into groups and gave each group a descriptive header. Each grouping of ideas is called an Affinity Diagram Header. The Diagram Headers allow the team to focus on issue areas and determine how they relate to each other. The eight headers created by the team are:

- Base Target Desirability
- Physical Characteristics of Water Systems
- Water System Security
- Overall Base Security
- Operator Control & Expertise
- System Back-up Capabilities
- Incident Detection Capabilities

- Availability of Engineering Information

Through the use of an affinity diagram, the headers were compared to each other for cause and effect. The issues were prioritized with respect to their impact on the other issues. The more effect an issue had, the higher it's priority. The team developed a series of questions for each header. The questions were compiled into an Excel spreadsheet that automatically assigns values to the answers to each question. The values are totaled and a weighted vulnerability score and a base desirability score is determined based on the priorities of the issues. The final vulnerability and desirability scores indicate which bases are the most vulnerable.

Initial Response Plan Approach

In developing the initial response plan, the team brainstormed the necessary events, as well as the logical sequence of these events if an attack on the potable water system occurs. A list was assembled and the different topic areas were researched including interviewing local, state and federal response agencies to better understand approaches and methodologies. The plan covers goals and objectives, sampling, internal and external notifications, securing water systems and providing alternative water supply. It also provides, in a logical sequence, the steps required for initial response to such a credible threat or incident.

Beneficial Uses

Both the screening tool and initial response plan can be used by the activities, regions, field divisions and at the claimant level. Uses range from a planning and budgeting tool utilized by the claimants or the regions in addition to its specific use by the facility as a guide to prepare a more detailed and thorough initial response plan (IRP) that is tailored for each specific facility.

Summary

This spreadsheet went through numerous iterations and was piloted on certain bases with different team members scoring the same base to check for accuracy and consistency.

The screening tool is intended to be a desktop tool using readily available information. The response plan is intended to be a living document specific to each base to ensure the health and safety of sailors, civilians, and dependents living or working on the facility, ensure an adequate supply of safe drinking water is available to those personnel, and that steps are taken to enable the return of the water system to normal service as soon as practicable while keeping the public fully informed.

What's Next?

Directives are being developed to provide a structured process for performing vulnerability assessments. Congress is working on the following bills, HR3448, HR3178, S1593 and S1608. They provide guidance and authorize funding for vulnerability issues. Also, OSD has a draft instruction, SECNAV 3501, which will define the Navy's program for protecting critical infrastructure.

The Engineering Field Divisions, Atlantic and Southern, have prepared this "boilerplate" initial response plan at the request of CINCLANTFLT for use by its commands. A training program is currently being developed to assist the installations in the use of the IRP. This template will be provided to the activities via the FLT Web Site. The EFDs are ready to assist CLF and the individual Commanders in the preparation of a facility-specific potable water system IRP.

If you have questions or need further information, please contact Jim Harris 757-322-4776 or harrisjf@efdlant.navfac.navy.mil.

LOW IMPACT DEVELOPMENT

PILOT PROJECTS

NAVAL DISTRICT WASHINGTON

Lance Laughmiller, P.E.
Armalia Berry

Introduction

Low Impact Development (LID) is the use of small-scale storm water management controls that are placed at sources of pollution and distributed throughout a facility to control the effects of urban runoff. These sustainable management measures are designed to filter pollutants, control peak runoff rates, and control the volume of runoff that enters receiving waters and wetlands. When used in conjunction with pollution prevention and proper site design this approach is a powerful tool that can be used to help protect and restore the environment.

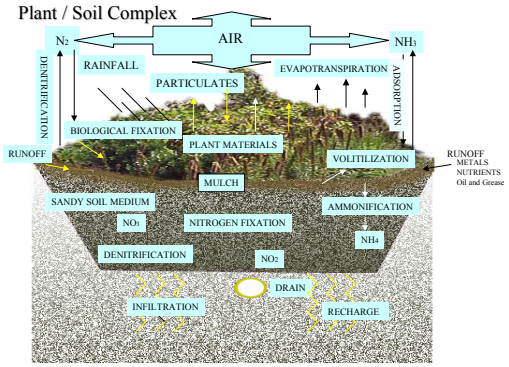
DENTAL CLINIC PARKING LOT BIORETENTION ISLAND

This project is part of an overall initiative by Naval District Washington (NDW) to help maintain and restore the water quality of the Anacostia and Potomac Rivers and the Chesapeake Bay. NDW has installed a series of LID urban-retrofit pilot projects at several Naval District Washington installations including the Washington Navy Yard, U.S. Naval Observatory, the Potomac Annex, the Nebraska Avenue Complex, and the Anacostia Annex.

Entire parking lots, roadways, and open space will be retrofitted with these techniques. The construction costs, effectiveness of controlling pollution, and maintenance requirements will be documented and evaluated. The information on the effectiveness of this technology will then be made available to other Naval and Federal Facilities and the District of Columbia for use in their storm water management and pollution control programs.

Project Areas

Over 10 different types of pollutant filtering, runoff volume control, and runoff peak flow control techniques are in use at the Navy Yard. The two main areas of this first phase of retrofits are in Willard Park and the Dental Clinic parking lots. Individual practices are also installed at other selected locations within the Washington Navy Yard.



BIORETENTION CELL PROCESSES

The Willard Park parking area demonstrates how a parking lot can be retrofitted during replacement or repair of existing structures and how to retrofit existing parking areas with minimal disturbance and with no loss of parking spaces. One of the main LID techniques used in this area and throughout the NDW facilities is bioretention. Bioretention is the use of landscaped areas that use a specialized mix of soils and plants to filter pollutants, reduce runoff volume, and control the timing of runoff. Individual bioretention cells and strips between the parking areas have been installed. Other practices include pavement sections that store water and release it slowly; rain barrels that help conserve runoff, and inlets that are retrofit to control runoff timing or the volume of trash entering the river.

NDW PARKING LOT

The Dental Clinic parking area demonstrates how an entire parking area can be retrofit with LID techniques during a major reconstruction or restoration. The main practices installed here are bioretention islands, sand

filter gutter strips, and permeable pavers between the parking rows. Permeable pavers are individual paving blocks with gravel filled gaps between the bricks that let stormwater infiltrate into a stone filled water storage area below the pavement. This technique is useful for changing the timing or peak runoff rates of stormwater.

DENTAL CLINIC PARKING LOT

Other individual practices implemented throughout the facility include street tree box (pictured below), located just south of the 9th street gate, that filter pollutants, disconnecting building downspouts, storm drain inlet structures that trap sediment, amendments to soils in open space areas that retain water to help reduce peak runoff volume, and additional bioretention structures.

STREET TREE BOX

Street tree filters use the plant/soil complex to filter pollutants and water from runoff to help trees survive during times of drought. The larger and more porous soil areas also help the long-term survivability of the plants.

STREET TREE FILTER

If you have questions or need further information, please contact Lance Laughmiller, 757/322-4811 or laughmillerls@efdlant.navfac.navy.mil or Armalia Berry 202-685-3273 or berryas@efaches.navfac.navy.mil.

Petroleum Storage Tank System Testing Throughout Navy Europe

Barry C. Sass, PE
Petroleum Storage Tank and Spill Response

Overseas environmental requirements are encompassed mainly in a document called the Final Governing Standards (FGS). The FGS for US Navy Europe activities require that all existing Petroleum Oil & Lubricant (POL) Underground Storage Tanks (USTs) meet new system requirements by 1 October 2004 (13 Aug 2004 in Italy). New system requirements include requirements for secondary containment, corrosion protection, leak detection, and the installation of spill prevention equipment. All UST systems not meeting the new system requirements by the 2004 deadline (by either replacement or upgrade) must be properly closed or removed. In the meantime, existing USTs and piping not incorporating leak detection are required by chapter 19 of the FGS to be integrity tested (also known as tightness testing) annually and inventoried monthly to determine system tightness (ensure there are no leaks).

As a result, Commander in Chief, U.S. Naval forces Europe (CINCUSNAVEUR or CNE) has turned to LANTDIV's Petroleum Storage Tank Section to satisfy this FGS requirement and complete the required annual CNE tightness testing. LANTDIV is coordinating both the CNE and DESC-funded tightness testing work in one annual project. Performing the CNE and DESC-funded tightness testing in one annual project has saved the Navy

and DESC money by reducing overall mobilization and reporting costs (an estimated savings of 22%). It also reduced the activity coordination effort since the tightness testing contractor can perform all of his work in one visit vice two or three. Tightness testing is typically executed using Tracer® technology. This involves introduction of a tracer gas into the fuel, and gas chromatography is used to check for the tracer outside of the tank. No interruption in operations is required with this method, and the method is third party certified by EPA.

LANTDIV has also been tasked by CNE with some long range planning in support of DESC Europe funded (DESC EUR) tightness testing. A single DD form 1391 identifying theater-wide testing requirements was prepared for DESC funding in FY03. This consolidated 1391 is being submitted to DESC in response to their annual Bulk Petroleum Facilities Maintenance, Repair, and Environmental Programs (MRE) datacall. The DESC MRE datacall comes out in the October timeframe annually and NAVEUR activities should plan on submitting their requirements at this time every year. The consolidated 1391 for FY03 tightness testing also reflects a recent shift in DESC EUR policy to fund tightness testing for field constructed tanks and hydrant tanks (not regulated by FGS) on a biennial basis. Baseline tightness testing for these unregulated tanks can be included in the 1391.

One additional integrity-testing project that LANTDIV has recently been involved in using a newer technology, is the precision testing and condition assessment of an 8" underground fuel (JP5) pipeline at NAS Sigonella, Sicily, Italy. In this project it was required to determine the condition of the underground pipeline from the Bulk Fuels tanks to the Hydrant Day tanks looking for reduced wall thickness, bulges, or other anomalies requiring repair. The project also checked the system for tightness (leakage).

One of the complicating factors in this project was that the pipeline contained 90-degree bends in approximately 6 locations. The method chosen to conduct the testing consisted of: (1) inspecting the pipeline via a "smart pig" furnished by UCISCO Inc. "Inspec" Pipeline Inspection Service and (2) tightness test utilizing a Helium Mass Spectrometer Test Probe. The UCISCO Inspec Pipeline Inspection utilized a multi-mode "smart pig" as shown in Figure (1). The "pig" construction (multiple "pigs" flexibly connected together) allowed for inspection of the pipeline around 90° bends. The "pig" was inserted into the pipeline and pushed through the system with water. The "pig" gathered data on piping internal diameter, wall thickness, and longitudinal location that was used to develop a "condition map" of the pipeline. After the smart pig inspection, the line was pressurized with nitrogen and a small concentration of helium. A Helium Mass Spectrometer Test was run along the length of the line, using a test probe. No helium was detected outside of the line, which translates to no leaks were found. As a result of the inspection it was determined that the pipeline required no repairs and could be returned directly to service. Further, it was discovered by analysis of the pipeline "map" that the pipeline had extensive remaining service life.

LANTDIV has developed expertise in tank and pipeline tightness / integrity testing over the last decade. An Indefinite-Delivery/ Indefinite-Quantity (ID/IQ), Task Order contract with Baker Environmental, Inc. was recently awarded at LANTDIV to provide integrity testing services. The contract also provides other engineering services related to Petroleum Storage Tank (PST) compliance, cleanup, and oil spill response and planning. Baker Environmental, Inc. will be performing the FY02 European Tank Tightness Testing under this contract, and is ready to assist with other tank and pipeline inspection and testing needs that may arise.

For further information on how LANTDIV might be able to help with your tank and pipeline inspection needs, please contact Barry C. Sass, PE at 757-322-4588 or sassbc@efdlant.navfac.navy.mil.

MISSION STATEMENT

- Assist in the prevention and abatement of environmental pollution
- Execute, responsibly and expeditiously, Department of Defense funds entrusted to our care
- Keep our customers and partners informed on all current environmental issues

The Environmental Advisor is a quarterly publication of the Environmental Division. It is designed to keep readers informed on issues relating to the environment. If you are interested in contributing an article, please contact:

Bonnie Capito, Editor, Code EV32
Naval Facilities Engineering Command
Atlantic Division
1510 Gilbert Street
Norfolk, Virginia 23511-2699

DSN 262-4785, or (757) 322-4785
capitobp@efdlant.navfac.navy.mi