UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

February 27, 2007 In Reply Refer To: WTR-7

Rich Anderson, Department Head
Occupational Health, Safety and Environment Department
667 Safeguard Street, Suite 100 (Code 106)
Pearl Harbor, HI 96860-5033

Re: April 11, 2006 Clean Water Act Inspection

Dear Mr. Anderson:

Enclosed is the February 27, 2007 report for our April 11, 2006 inspection of the direct discharging wastewater sources at the dry docks at the Pearl Harbor Naval Shipyard. Please submit a short response to the findings in Sections 1 through 4 of this report to EPA and Hawaii DOH, by **April 30, 2007**. The main findings are summarized below:

1 The underlying objective of the NPDES permit is to prevent, through full implementation of proper BMPs, all discharges related to dry dock operations that could cause or contribute to water quality standards violations in the receiving waters.

2 The outfall discharges have not consistently met the water quality standards for copper, zinc, and nutrients, as applied by the NPDES permit end-of pipe. Neverthless, the dry docks are consistently found to be operated in accordance with the BMPs.

3 To address the violations, PHNSY has (1) identified both process and non-process pollutant sources, (2) implemented BMPs to control the process-related sources, and (3) drafted site-specific standards for copper. The BMPs essentially isolate process-related contaminants from contact with rainwater and control the discharges of process-related contact wastewaters into the dry dock sewers. Turbidity and temperature violations have not been addressed. Not all of the BMPs are incorporated into the NPDES permit.

4 The detection limit for copper is not low enough to determine compliance.

I appreciate the helpfulness of the staff from each of the commands extended to me during this inspection. We remain available to the PHNSY and the State of Hawaii to assist in any way. Please do not hesitate to call me at (415) 972-3572, or Greg V. Arthur of my staff at (415) 972-3504, or e-mail arthur.greg@epa.gov.

Sincerely,

Original signed by:

Greg V. Arthur
CWA Compliance Office

cc: Mike Tsuji, Hawaii DOH

U.S. ENVIRONMENTAL PROTECTION AGENCY

REGION 9

CLEAN WATER ACT COMPLIANCE OFFICE

NPDES COMPLIANCE EVALUATION INSPECTION

REPORT No. 3

NPDES Permittee:	United States Navy (NPDES Permit HI 0110230) **Pearl Harbor Naval Ship Yard – Dry Docks**
Facility No.1:	Pearl Harbor Naval Complex • Naval Facilities Engineering Command Hawaii • Pearl Harbor Naval Shipyard and Intermediate Maintenance Facility • Naval Station Pearl Harbor • Fleet and Industrial Supply Center Pearl Harbor
Facility No.2	Hickam Air Force Base • United States Air Force 15th Airlift Wing • Hawaii Air National Guard • Logistics Readiness Squadron • Aerospace Ground Support

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Date of Inspection:	Apr 10, 2006 - Pearl Harbor Naval Shipyard – Dry Docks Apr 13, 2006 - Close-out Interview

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Inspection Participants:

US EPA:	Greg V. Arthur, CWA Compliance Office, (415) 972-3504
Hawaii DOH:	None
PHNSY:	Glenn Atta, Environmental Engineer, (808) 473-8000 x4460 Lenora Mau, Environmental Manager, (808) 473-8000 x4465
Report Prepared By:	Greg V. Arthur, Environmental Engineer, USEPA Region 9 February 27, 2006

1.0 Scope and Purpose

On April 10-13, 2006, EPA conducted an NPDES compliance evaluation inspection of the Pearl Harbor military installations. The purpose was to ensure compliance with the NPDES permits and the Federal regulations covering the discharge of domestic and non-domestic wastewaters into waters of the United States from the Fort Kamehameha wastewater treatment facility (Fort Kam), and the Pearl Harbor Naval Shipyard (PHNSY) dry docks, as well as the non-domestic discharges from service area sources into the Fort Kam sewer system, and sludge disposal from Fort Kam. The overall inspection consisted of the following:

- The on-site inspection of the Fort Kam wastewater treatment facility;
- On-site inspections of the 15 industrial activities qualifying as Federal categorical sources and specifically regulated by the Fort Kam NPDES permit at internal outfalls;
- On-site inspections of the PHNSY dry docks and 15 other selected industrial activities;
- Close-out briefings with staff from Navy Region Hawaii, NAVFAC Hawaii, PHNSY, and Hickam AFB;
- Review of Navy Region Hawaii instructions 11345.5 and 11345.2C for the industrial wastewater sewer discharge permit system program and the applicable limits;
- Review of 2004-2005 influent, effluent and sludge data for Fort Kam;
- Review of 2004-2006 effluent data for the PHNSY dry docks;
- Review of 2004-2005 effluent data for the permitted internal outfalls;
- Review of the 2004 and 2005 Navy Region annual reports on industrial wastewaters.

This is the third of three reports. This third report covers the findings pertaining to the direct discharges to the harbor from the Pearl Harbor Naval Shipyard (PHNSY) dry docks. The first report issued on July 28, 2006 covers the Pearl Harbor Naval Complex non-domestic wastewater sources into the Fort Kam sewer service area, and the Fort Kam wastewater treatment facility. The second report issued on October 27, 2006 covers the Hickam Air Force Base non-domestic wastewater sources into the Fort Kam sewer service.

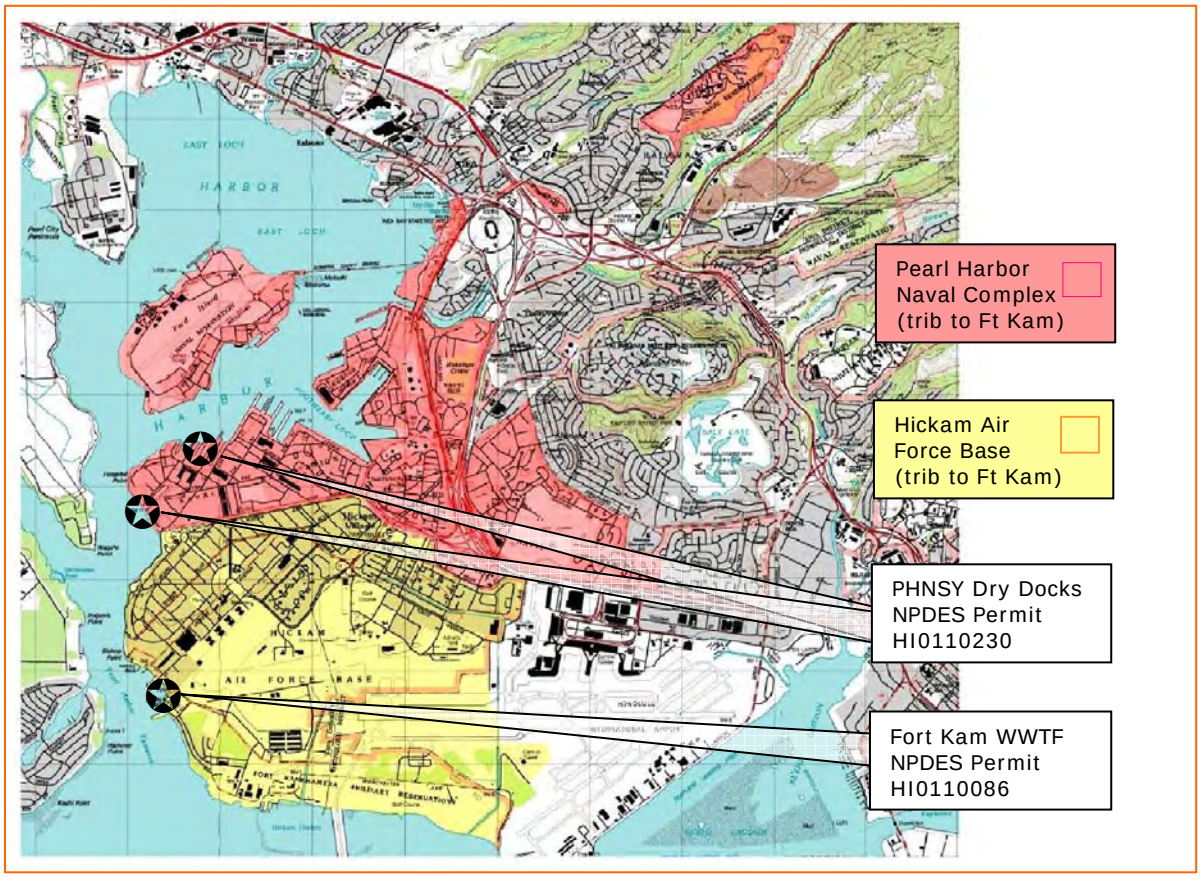
The inspection participants related to the PHNSY dry docks are listed on the title page of this report. Arthur conducted the inspections of the PHNSY dry docks on April 10 and the final close-out briefing on April 13.

1.1 Background

A 1996 EPA report documented findings of a comprehensive evaluation of the Pearl Harbor military installations. After extensive consultations with the Navy, HDOH issued a revised Ft Kam NPDES permit on December 31, 2001, a PHNSY NPDES permit on January 15, 2002, and the final Fort Kam permit modifications on December 23, 2004. Three reports for this April 2006 comprehensive review of the Pearl Harbor military installation together cover Fort Kam, the non-domestic sources into its service area, and the discharges of non-domestic wastewaters from the shipyard dry docks to the waterways. These reports do not cover storm water run-off into and from the storm sewers authorized under another NPDES permit.

1.2 Description of the Facilities

The military installations comprise the Pearl Harbor Naval Complex and the Hickam Air Force Base, which together generate and collect domestic and non-domestic wastewater for discharge to the Pacific Ocean under the authority of two NPDES permits issued for Fort Kam and the Pearl Harbor Naval Shipyard dry docks.



1.3 Pearl Harbor Naval Shipyard Dry Docks Configuration and Operation

PHNSY owns and operates four permanent dry docks constructed in the 1920's designated as DD#1, DD#2, DD#3, and DD#4. After a ship is floated in, a caisson vessel is maneuvered across the dry dock entrance and filled with sea water to sink and seal it in place. The impounded sea water is then pumped out to settle the ship on pre-positioned piers and blocks. The caisson vessels are refloated to allow sea water back in to refloat the ships after repair activities have been completed. PHNSY maintains the dry docks dewatered in stand-by.

The dry docks are constructed below grade. DD#1, DD#2 and DD#3 are grouped alongside of each other. DD#4 is sited across from the other three. Each dry dock has drainage sewers leading to deep well sumps below the floor outfitted with high-volume pumps to dewater the dry docks. Sump pumps in DD#4 discharge to two separate outfalls designated in the

NPDES Permit HI0110230 as Outfall Nos. 4A and 4B. Sump pumps in DD#1 and DD#3 either outlet into the DD#2 sump or, when DD#2 is flooded, discharge to two outfalls designated in the NPDES permit as Outfall Nos. 1 and 3. Sump pumps in DD#2 discharge to two outfalls designated in the NPDES permit as Outfall Nos. 2A and 2B. These six outfalls are designated in this report for the purposes of this inspection as NPDES-1, NPDES-2A, NPDES-2B, NPDES-3, NPDES-4A, and NPDES-4B.

Photo:
NPDES Permit
HI0110230
Outfalls 2A, 2B, 3

Taken By:
Glenn Atta
PHNSY Envr Engr

Date:
04/10/06

The NPDES sample points are located along the outfall force mains rising from the dry dock sumps to the harbor discharge. The outfall risers have built-in taps and permanent composite samplers. The sampling tap waters discharge to the Fort Kam sewers.

Photo: Outfall 3 Discharge Force Main
Taken By: Glenn Atta, PHNSY Envr Engr
Date: 04/10/06

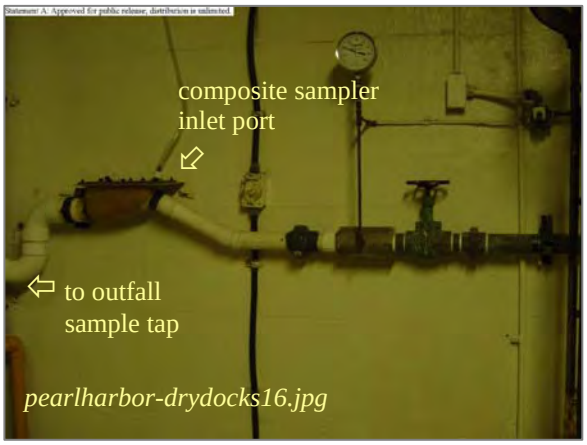


Photo: Outfall 3 NPDES Sampling Tap
Taken By: Glenn Atta, PHNSY Envr Engr
Date: 04/10/06

See Appendices 1 and 2 for an overview schematic of wastewater handling at the Pearl Harbor Naval Complex, and specifically of the PHNSY dry docks in more detail.

1.4 Pearl Harbor Naval Complex And the Fort Kam Wastewater Treatment Facility

The Pearl Harbor Naval Complex supports the Pacific fleet by providing ships berthing and repair as well as fleet supply, housing and other support services, including sewer service and domestic sewage treatment at Fort Kam. The Commander of the Navy Region Hawaii provides overall command and coordination. The Pearl Harbor Naval Complex involves a number of other commands, in particular, PHNSY and Intermediate Maintenance Facility (IMF), the Naval Station Pearl Harbor (NAVSTA), and the Navy Facilities Engineering Command (NAVFAC) Hawaii. Many operations began before the 1940's. The Pearl Harbor Naval Complex does not rework aircraft, manufacture printed circuit boards, or refine oil.

1.5 Hickam Air Force Base

Hickam operates military flight operations, maintenance hangers, aircraft wash racks, and non-destructive testing, photo, and x-ray labs. Hickam also serves as the home base of a number of aircraft. The 15th Airlift Wing is the host department with its tenants including a C-17 transport aircraft squadron, the Hawaii Air National Guard (HiANG) 154th Wing, a Logistics Readiness Squadron (LRS), Aerospace Ground Support (AGE), among others. No aircraft rework, printed circuit board manufacturing, or electroplating is done on-site. Hickam began operations before the 1940's.

1.6 Facility SIC Code

The Pearl Harbor Naval Shipyard is assigned the SIC code for national security (SIC 9711).

2.0 Pearl Harbor Naval Shipyard Dry Docks Wastewater Sources, Handling, Treatment, and Discharge

Process-Related Wastewaters

The ship repair functions are accomplished as set forth in the PHNSY Instruction 5090.5 (NAVSHIPYD&IMPFPEARLINST 5090.5) which implements the dry dock water pollution control plan. The dry dock operations that could generate wastewaters include hydroblasting, painting, sand blasting, grinding, chemical cleaning and flushing, chemical soaking, the replacement of lead ballast and zinc/aluminum anodes, hydrotesting, and non-contact cooling. All of these operations have the potential to produce contaminated process-related contact wastewaters. Each operation generating a wastewater is under internal regulation of the PHNSY Instruction 5090.5 which requires best management practices ("BMPs") for each. The BMPs essentially isolate process-related contaminants from contact with rainwater and limit the discharge of contaminated process-related contact wastewaters to the dry dock drainage sewers.

Hydroblast Tail Waters – Hydroblasting involves the water spray removal of sea growth and slime from ship hulls, heat exchangers, and ballast tanks. The BMPs require the hydroblasting to occur after the dry dock is broom cleaned and the floor drains are bermed to prevent the carryover of blast detritus with the hydroblast tailwaters to the harbor through the sumps and their outfalls. The BMPs also require containment and off-hauling of tailwaters from the hydroblasting for paint or surface preparation or of heat exchangers or ballast tanks. The BMPs require the blast debris and other trash to be removed often.

Chemical Cleaning/Flushing/Soaking Wastewaters – The BMPs prohibit the release of chemical cleaning wastewaters to the dry dock floor. Instead chemical cleaning wastewaters are to be collected for off-site disposal or discharge to the Fort Kam sewers. All non-domestic discharges such as chemical cleaning wastewaters into the Fort Kam sewers are subject to the requirements of COMNAVREG Hawaii Instructions 11345.2D and 11345.5A as administered by NAVFAC and implemented at the dry docks by PHNSY Code 106 personnel.

Hydrotest and Pump Test Tailwaters – The BMPs allow the discharge of these wastewaters directly to the dry dock sumps only by hose or hard pipe. The BMPs prohibit contact of these wastewaters with the dry dock floor in order to prevent any inadvertent washdown of contaminants into the dry dock drainage sewer.

Ships Bilge Waters – Oily bilge wastewaters are collected to holding tanks for NAVFAC pick-up and delivery to the Bldg 1920 Bilge Oily Wastewater Treatment System for treatment prior to discharge into the Fort Kam sewers. The discharge from the Bldg 1910 BOWTS to the sewers is subject to the requirements of the COMNAVREG Hawaii Instructions 11345.2D and 11345.5A.

Rainwater Runoff – The BMPs require the use of drop cloths, floor coverings, and other containment methods to prevent the release of paint over-spray resulting in contact with the dry dock floor. The BMPs require secondary containment of all paints, fuel, oil and grease containers, hazardous materials storage, and mechanized equipment stored within the dry

dock. The BMPs prohibit the use of corrosion inhibitors in wet sandblasting or the hazardous waste accumulation within the dry docks. The BMPs require physical capture of blasting grit, removed scale and rust, and the removal of these solids from the dry dock floor at the end of each shift in order to prevent the entrainment of these solids in rainwater runoff. In particular, external hull sandblasting occurs inside fully-enclosed constructed containment. The BMPs further require broom or vacuum cleaning of the dry dock floor and if necessary foam blockage of the drainage sewer gratings to prevent sand blasting solids and debris from being washed into the dry dock sumps during storm events. The BMPs require new zinc and aluminum anodes and lead ballast to be covered or wrapped in plastic to prevent exposure to rain and contact with rainwater runoff and spent anodes and ballast to be entirely contained within drums or sealed crates.

Single-pass Non-contact Cooling Waters – The BMPs require uncontaminated non-contact cooling waters to be discharged by hose or hard pipe directly to the dry dock drainage sewer. The BMPs prohibit contact of these wastewaters with the dry dock floor in order to prevent any inadvertent washdown of contaminants into the dry dock drainage sewer. Cooling water can also involve the use of portable dockside chlorination, which operates under a third NPDES permit that establishes residual chlorine limits.

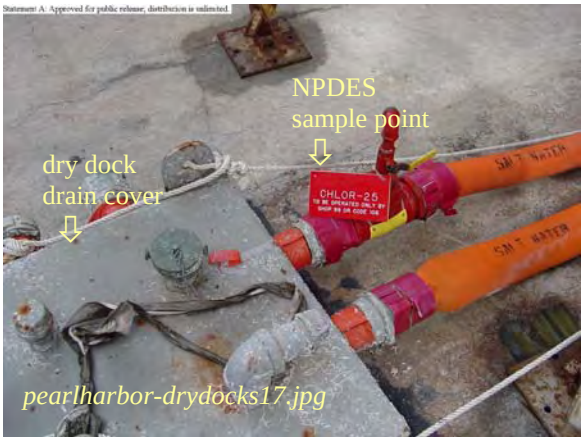


Photo: Dockside Chlorinator Sample Point
Taken By: Glenn Atta, PHNSY Envr Engr
Date: 04/10/06

Dry Dock Dewatering – The dry docks are pumped out through the sump pumps prior to starting the ships rework. The BMPs allow an initial washdown of the dry dock floor immediately after dewatering and prior to the start of ships repair work.

2.1 Pearl Harbor Naval Shipyard Dry Docks Wastewater Sources, Handling, Treatment, and Discharge

Facility-Related Wastewaters

The dry docks themselves generate a number of wastewaters irrespective of whether they are in operation. Their construction below grade results in leakages and seepage into the dry docks requiring pumping from the dry dock sumps to the harbor. These wastewaters have been previously identified as the primary sources of toxic pollutants found in the NPDES discharges to the harbor.

Ground Water Seepage – Seepage of ground water appears through the walls of the dry in numerous locations within the dry docks. The seepage drains to the dry dock floor into the dry dock drainage sewers for intermittent discharge from the dry dock sumps to the harbor.

Caisson Leakage and Cathodic Protection – Leakage from imperfect seating of the caissons across the dry docks contributes a steady low volume of sea water into the dry dock sumps. Rainfall runoff from the caisson surfaces draining into the collected caisson leakage has been identified as a source of zinc in the NPDES discharges to the harbor. PHNSY will complete the on-going replacement of the zinc cathodic protection anodes installed on the caisson surfaces with aluminum anodes by January 2007.

Sump Cathodic Protection – Zinc cathodic protection anodes that were installed on the sump surfaces and also have been replaced with aluminum anodes.

2.2 Pearl Harbor Naval Shipyard Dry Docks
Dry Dock Refloat Waters

The BMPs require the dry dock to be returned to a "broom clean" condition subject to inspection by PHNSY Code 106 personnel. The BMPs require daily floor sweeping. PHNSY Code 106 personnel provide at least weekly oversight of the dry docks operations. They also perform a pre-inspection the day before the dry dock is reflooded and must formally sign-off after the inspection before refloating of the ship is authorized.

2.3 Inspection Observations

On the day of this inspection, only DD#2 was is use. The other dry docks were dry with no activity. As a result, only some of the BMPs were observed in effect. Specifically observed were shrouds fully-containing sand blasting of the exterior hull, cooling water discharged directly to the dry dock drainage sewer, secondary containment around equipment and staged materials, drop cloth lining of the dry dock floor to catch drips, bilge oily water holding tanks, and "broom clean" conditions on the dry dock floor. There were no activities observed that did not comply with the PHNSY Instruction 5090.5 BMP requirements.

2.4 Photo Documentation

PHNSY Environmental Engineer, Glenn Atta, took four photographs during this inspection. EPA file names to store the digital photos are *pearlharbor-drydocks14.jpg* through *~17.jpg*.

3.0 NPDES Permit Requirements

The NPDES permit must apply Federal BAT/NSPS standards to all regulated sources and the Hawaii water quality standards to the discharge to the ocean.

Summary

The NPDES permit for the PHNSY dry docks imposes (1) outfall discharge limits that apply the Hawaii water quality standards, (2) site-specific BMPs intended to result in compliance with the water quality standards and (3) internal no-net-increase nutrient limits that apply to certain process-related wastewaters prior to drainage into the sumps. Under the NPDES permit, PHNSY also conducted a study to quantify the nutrient content of the non-process related ground water seepages into the sumps, and began the development of toxicity-based site-specific limits for copper, zinc, and lead. Overall, the underlying objective of the permit is to prevent, through full implementation of proper BMPs, all dry dock discharges that could cause or contribute to water quality standards violations in the receiving waters.

The application of the site-specific BMPs and the Hawaii water quality standards was determined through visual inspection. See Appendix 3 for NPDES permit limits.

Requirements

- The NPDES permit must prohibit the discharge of industrial wastewaters subject to Federal BAT/NSPS categorical standards into the dry dock sumps.

Recommendations

- Once pollutant sources have been fully quantified, all pertinent BMPs should be specified and incorporated as enforceable NPDES permit requirements, perhaps best through an enforceable permit requirement to comply with the PHNSY Instruction 5090.5.

- Once the pollutant sources have been fully quantified, in a BMP permit, only discharge limits for indicators should apply (*whole-effluent toxicity, oil and grease, flow, and pH*).

- Once pollutant sources have been fully quantified, the no-net-increase self-monitoring for nutrients could be discontinued.

- Monthly self-monitoring of the sumps for all pollutants of concern should continue. The NPDES permit should then require samples exceeding applicable water quality standards to trigger toxicity reduction evaluations resulting in additional BMPs.

3.1 Hawaii Water Quality Standards

The NPDES permit currently in effect was issued January 15, 2002. It expired on September 30, 2005 but has been administratively extended to be in effect until a new permit is issued.

The NPDES permit applies Hawaii water quality standards to the discharges from the dry dock sumps through six ocean outfalls, designated in this report as NPDES-1, NPDES-2A, NPDES-2B, NPDES-3, NPDES-4A, and NPDES-4B. The water quality standards are applied in a number of ways.

Nutrients – The NPDES permit recognizes that while the dry dock outfall discharges chronically exceed the Hawaii water quality standards, the dry docks themselves, if operated in accordance with PHNSY Instruction 5090.5 BMPs, should be insignificant sources of nutrients. In particular, the BMPs include a prohibition against the application of nitrate-bearing rust inhibitors that were used in the past. As a result, the NPDES permit no longer sets nutrient limits for the outfall discharges but instead imposes internal no-net-increase requirements on certain process-related wastewaters contributing into the sumps. The internal no-net-increase limits do not apply by dry dock but rather to certain process-related wastewaters specified in the permit -- hydrotesting water, pump test water, hull wash water, hydroblasting water, and cooling water, with compliance determined by comparison of the annual averages for intake and discharge. The intake and discharge averages cannot just be directly compared in order verify no-net-increase. Instead, the statistical comparison of annual averages would best involve the use of the one-sided normal test.

The internal no-net-increase limits are not applied to ground water seepage because these flows contribute to the sumps irrespective of operations. Ground water seeps are the identified primary source of nutrients into the sumps. PHNSY is in the process of conducting a groundwater study to further quantify the nutrient content of the seeps.

Conventionals and Indicators – The NPDES permit requires monitoring of the sump discharges through the outfalls for conventional pollutants and the indicators of dissolved oxygen saturation, temperature, whole-effluent toxicity, and pH. The NPDES permit sets limits for the indicators and for turbidity and oil-and-grease but does not apply limits for the other conventional pollutants.

Copper – The NPDES permit applies the national criteria of 2.9 µg/l directly end-of-pipe to the outfall discharges, but allows PHNSY time to develop a site-specific limit with an interim limit of 23 µg/l applied in the meantime. PHNSY indicated its intention to develop a site-specific copper limit just before this permit was issued and began characterization sampling work in 2002. PHNSY submitted a revised project plan in July 2004 to (1) develop and implement BMPs for copper, (2) derive site-specific limits, (3) derive a translator conversion between dissolved and total recoverable copper. The final report was submitted to the State of Hawaii in January 2007. Finally PHNSY also contested the interim limits but has not received a determination.

Lead and Zinc - The NPDES permit applies Hawaii water quality standards for lead and zinc to the outfall discharges and allowed a numerical change derived as part of the PHNSY site-specific study.

Other Toxic Pollutants of Concern - The NPDES permit applies Hawaii water quality standards to the outfall discharges for chromium, mercury, total iron, and tin.

3.2 Site-Specific Best Management Practices

The NPDES permit issued on January 15, 2002 requires the implementation of the following best management practices intended to result in compliance with the water quality standards.

- Hull wash water, hydroblasting for slime and seagrowth water, dry dock seepage water, and rain water may come in contact with the dry dock floor. However, hydrotest water, pump test water, and cooling water must plumbed directed to the drydock floor sumps or drainage trenches, immediately after dewatering the dry dock and prior to the initiation of any repair work.

- The dry dock floor shall not be rinsed off with water except immediately after dewatering and prior to the initiation of any repair work.

- Solid removed from vessel exteriors shall not be washed into the dry dock floor sumps. There shall not be any discharges associated with wet sandblasting. The dry dock shall be kept sufficiently clean at all times to prevent any solids removed from vessels, and any trash generated by the shipyard work, from being blown or washed into the floor sump or off the dry dock. Prior to undocking, the dry dock shall be returned to a "broom clean" condition using dry clean-up methods.

- Spent blasting grit shall be controlled from entering the dry dock drainage system, with clean-up following the guidelines listed in the PHNSY Instruction 5090.5. Using a water hose to collect spent grit is prohibited. Collected spent blasting grit shall be stored in a way that prevents contact with rainfall or surface run-off from storm events.

- Residual chlorine (in cooling water) shall not be discharged from any vessel in Dry Dock Nos. 1, 2 or 4 for more than two hours per day.

PHNSY Instruction 5090.5 addresses not only the permit-required BMPs but also water quality issues. In particular, the PHNSY Instruction also establishes BMPs that (1) prohibit the use of corrosion inhibitors (nitric-acid bearing) in wet sandblasting, (2) prohibit hazardous waste accumulation within the dry docks, (3) require new zinc and aluminum anodes and lead ballast to be covered to prevent contact with rain and runoff, (4) require spent anodes and ballast to be contained within drums or sealed crates, and (5) cause zinc cathodic protection anodes to be replaced with aluminum. It is expected that the BMPs identified to reduce copper would be further included into the PHNSY Instruction 5090.5.

3.3 Federal BAT/NSPS Categorical Standards

The dry docks generate some categorical industrial wastewaters. Tail waters from hydro-blasting for paint or surface preparation or of heat exchangers and ballast tanks, and tail waters from chemical cleaning, flushing, and soaking are collected to holding tanks for testing by PHNSY Code 106 and delivery by truck to the domestic sewers under the Fort Kam NPDES permit. PHNSY Instruction 5090.5 prohibits the discharge of these tail waters to the dry dock sumps.

4.0 Compliance with NPDES Permit Requirements

Dry dock sump discharges must comply with the flow and discharge limitations set forth as the application of the water quality standards. [NPDES Permit §A(1), §A(2), and §A(3)]

Internal discharges to the sumps must comply with the no-net-increase requirements for nutrients. [NPDES Permit §A(3)]

Dry dock operations must follow the BMPs specified in the permit to result in compliance with the water quality standards. [NPDES Permit §A(4) through §A(14)]

Summary

In this inspection as well as in other recent inspections, PHNSY was found to be effectively implementing the BMPs as specified in Instruction 5090.5. Nevertheless, because of NPDES violations of the NPDES permit water quality standards as revealed through sampling, PHNSY has been listed in significant non-compliance for most quarters over the past years. On January 22, 2007, the Department of Defense instituted a policy of "zero tolerance" for significant non-compliance with the Clean Water Act.

In the past, the chronic non-compliance related to dry dock sump sampling was for nutrients attributed for the most part to ground water seepage. The chronic nutrient violations ended once the permit was modified to replace the outfall discharge limits with no-net-increase limits applied to the internal wastewater sources. PHNSY is in the process of completing a ground water study to definitively establish that the dry dock operations under the Instruction 5090.5 BMPs are negligible sources of nutrients. Now under the current permit, the chronic non-compliance is for copper and zinc. The detection limit for copper self-monitoring has been too high to be useful in determining compliance with the water quality standards. PHNSY has just completed a site-specific study on copper toxicity that proposes new BMPs to better control copper. PHNSY has also replaced of zinc anodes with aluminum for catho-dic protection. Otherwise, there have been few violations of the NPDES permit discharge limits as applied to the dry dock sump discharges. Finally, under the current permit, there is also intermittent non-compliance with the NPDES permit limits for turbidity, temperature change, and pH change. None of these are expected to result in significant non-compliance

Requirements

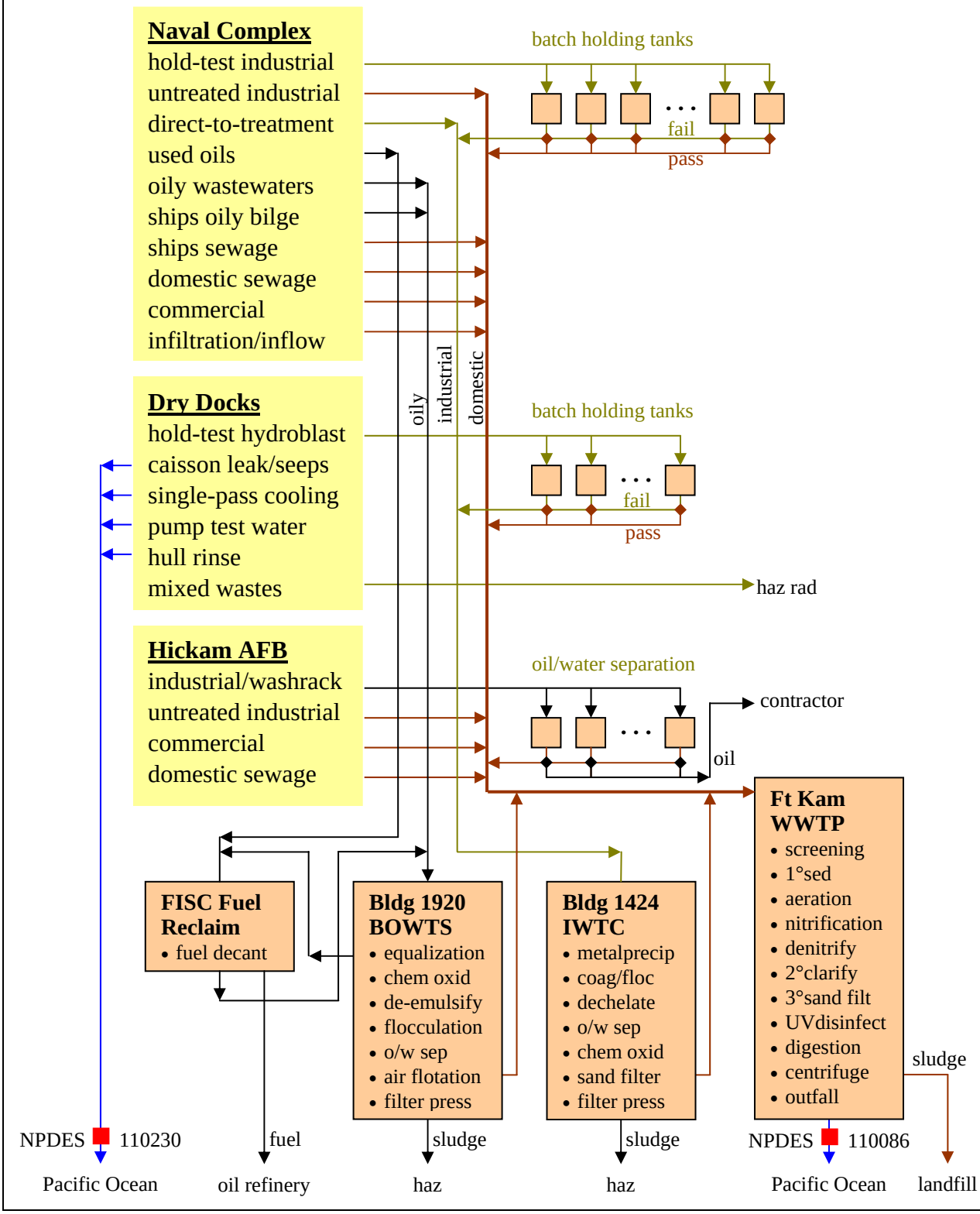
- The analytical detection limit for copper must be below the 23 µg/l interim permit limit.

Recommendations

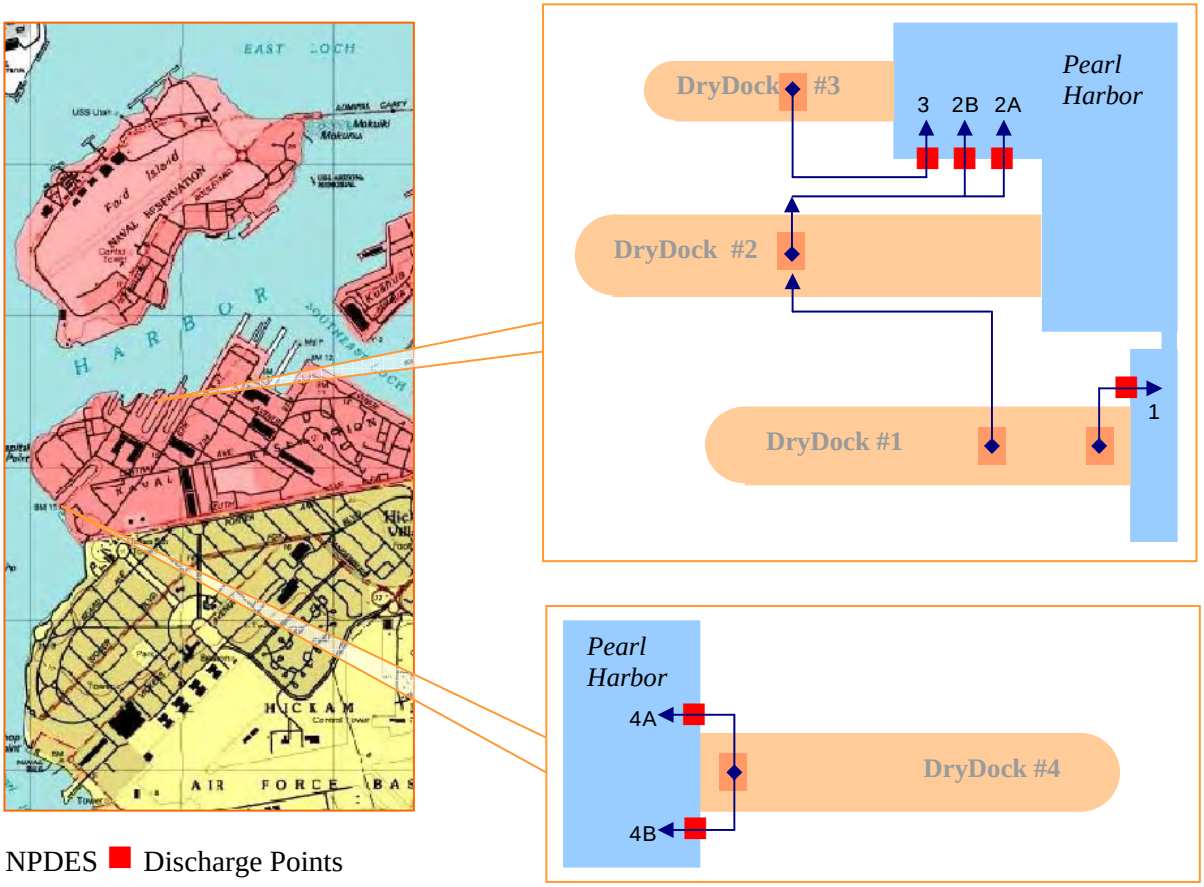
- PHNSY should consider installing seepage intercepts behind the dry dock face where most needed and direct the collected seepage into the Fort Kam sewer system.

- PHNSY should consider installing interceptor boxes and pumps into the Fort Kam sewer system within the dry dock trenches that regularly convey seepage to the sumps.

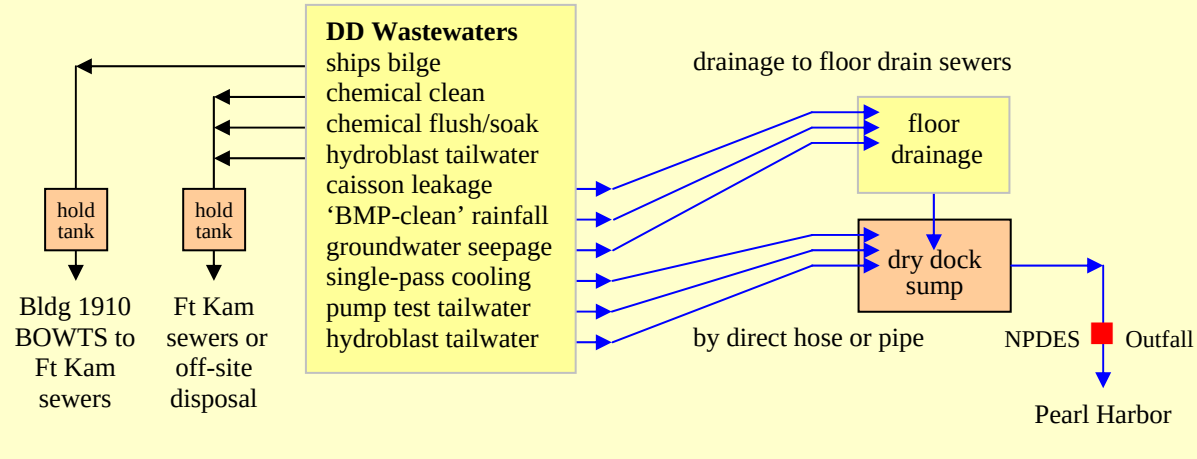
Appendix 1
Pearl Harbor Naval Complex and Hickam Air Force Base
Schematic Overview of Wastewater Handling



Appendix 2
PHNSY Dry Docks
Schematic of the Wastewater Collection and Treatment



Typical Dry Dock Wastewater Handling



Appendix 3
Sewer Discharge Standards and Limits
PHNSY Dry Docks @ Outfalls 1, 2A, 2B, 3, 4A, and 4B

pollutants of concern	NPDES Permit Requirements ⑤				monitor frequency
	ops ⑥ (12mo-av)	seepage (12mo-av)	sumps ⑦ (daily-max)	intake water	
flow (mgd)	-	-	①	③	monthly
total nitrogen (µg/l-N)	②	③	③	③	monthly
ammonia (µg/l-N)	②	③	③	③	monthly
nitrate-nitrite (µg/l-N)	②	③	③	③	monthly
total phosphorus (µg/l-P)	②	③	③	③	monthly
BOD (mg/l)	-	-	③	-	quarterly
COD (mg/l)	-	-	③	-	monthly
TSS (mg/l)	-	-	③	-	monthly
turbidity (NTU)	-	-	4.0	-	monthly
pH min/max (s.u.)	-	-	6.8-8.8 s.u.	-	monthly
pH change (s.u.)	-	-	Δ 0.5 s.u.	-	monthly
temperature (°C)	-	-	Δ 1°C	-	monthly
oil and grease (mg/l)	-	-	15.0 mg/l	-	monthly
total copper (µg/l)	-	-	2.9 µg/l ④	-	monthly
total lead (µg/l)	-	-	140 µg/l	-	monthly
total zinc (µg/l)	-	-	95 µg/l	-	monthly
hex chromium (µg/l)	-	-	1100 µg/l	-	monthly
mercury (µg/l)	-	-	2.1 µg/l	-	monthly
total iron (µg/l)	-	-	③	-	monthly
tin (µg/l)	-	-	③	-	monthly
settleable solids (ml/l)	-	-	③	-	monthly
dissolved oxygen (%sat)	-	-	<60% sat	-	monthly
biotoxicity (%survival)	-	-	80%	-	quarterly
total residual chlorine (µg/l)	-	-	13.0 µg/l	-	monthly

① Daily-max combined discharge flow of 3.7 mgd from Outfalls 1, 2A, 2B, and 3, and of 2.4 mgd from Outfalls 4A, and 4B.
② No net increase of the concentration from intake to discharge based on rolling 12-mo avgs.
③ Monitoring only – No limits.
④ Interim limits of 23 µg/l because PHNSY decided to develop site-specific discharge limits.
⑤ Discharge limits apply to all outfalls.
⑥ Hydrotesting, pump test, and cooling waters are not allowed to come into contact with the dry dock floor but must be discharged by hose or hard piping to the sump or drainage sewers.
⑦ At least one sample per year must be collected during a storm event.

Appendix 4
PHNSY Dry Dock #2 (Outfalls 2A and 2B)
January 2004 – November 2006

pollutants	Jan04-Nov06			permit limits	violation rates		sample count
	mean	99th%	max		d-max	instant	
Δ temp (°C)	0.48	1.12	1.8	± 1.0	-	**1/34**	34
turbidity (NTU)	1.71	8.52	14.0	4.0	**3/34**	-	34
dissolved oxygen (%sat)	81.5	76.7	76	60%	0/33	-	33
BOD (mg/l)	<2.0	1.9	2.1	-	-	-	33
TSS (mg/l)	<10.0	13.0	24.0	-	-	-	35
oil and grease (mg/l)	<10	<10	<10	15	0/35	-	35
COD (mg/l)	100.9	229.6	224	-	-	-	35
toxicity (%survival)	99% ③	-	91%	80%	0/6	-	6
settleable solids (ml/l)	<0.5	0.85	2.0	-	-	-	35
total nitrogen (µg/l-N)	1076	2507	14440	-	-	-	22
nitrite-nitrate (µg/l-N)	93	217	241	-	-	-	22
ammonia (µg/l-N)	81	310	410	-	-	-	22
total phosphorus (µg/l-P)	44	136	194	-	-	-	22
hex chromium (µg/l)	<50	<50	12	1100	0/22	-	22
iron (µg/l)	209	486	1430	-	-	-	35
zinc (µg/l)	122	300	467	95	**20/35**	-	35
tin (µg/l)	<50	<50	<50	-	-	-	35
lead (µg/l)	<50	<50	<50	140	0/35	-	35
copper (µg/l)	19	79	99	23	**5/5** ②	-	31
mercury (µg/l)	<2.0	<2.0	<2.0	2.1	0/35	-	35
pH minimum (su)	8.0 ③	-	7.8	6.8	-	0/35	35
pH maximum (su)			8.4	8.8	-	0/35	
Δ pH (su)	0.08	0.29	0.4	± 0.5	-	0/34	34
flow rate (mgd)	0.92	2.20	2.2	3.7 ①	0/35	-	35

① Daily-max combined discharge flow of 3.7 mgd from Outfalls 1, 2A, 2B, and 3
② Twenty-six samples below detection limit. However, compliance cannot be determined because the detection limit of 50 µg/l was above the interim permit limit of 23 µg/l.
③ median value

Appendix 5
PHNSY Dry Dock #4 (Outfalls 4A and 4B)
January 2004 – November 2006

pollutants	Jan04-Nov06			permit limits	violation rates		sample count
	mean	99th%	max		d-max	instant	
Δ temp (°C)	1.25	3.90	4.0	± 1.0	-	**14/33**	33
turbidity (NTU)	0.77	1.78	2.5	4.0	0/35	-	35
dissolved oxygen (%sat)	77.9	69.7	68	60%	0/33	-	33
BOD (mg/l)	<2.0	2.2	4.3	-	-	-	33
TSS (mg/l)	<10.0	11.3	17.0	-	-	-	35
oil and grease (mg/l)	<10	<10	<10	15	0/34	-	34
COD (mg/l)	129.9	277.3	248	-	-	-	35
toxicity (%survival)	97% ③	-	91%	80%	0/6	-	6
settleable solids (ml/l)	<0.5	<0.5	<0.5	-	-	-	35
total nitrogen (µg/l-N)	375	1022	1063	-	-	-	22
nitrite-nitrate (µg/l-N)	28	64	63	-	-	-	22
ammonia (µg/l-N)	116	522	660	-	-	-	22
total phosphorus (µg/l-P)	30	76	70	-	-	-	22
hex chromium (µg/l)	<50	<50	<50	1100	0/35	-	35
iron (µg/l)	59	175	267	-	-	-	35
zinc (µg/l)	31	101	128	95	**2/35**	-	35
tin (µg/l)	3	27	57	-	-	-	35
lead (µg/l)	<50	<50	<50	140	0/35	-	35
copper (µg/l)	13	66	109	23	**4/4** ②	-	32
mercury (µg/l)	<2.0	<2.0	2.1	2.1	0/35	-	35
pH minimum (su)	7.8 ③	-	7.4	6.8	-	0/35	35
pH maximum (su)			8.3	8.8	-	0/35	
Δ pH (su)	0.31	0.69	0.6	± 0.5	-	**3/34**	34
flow rate (mgd)	0.79	2.66	3.4	2.4 ①	**1/23**	-	23

① Daily-max combined discharge flow of 2.4 mgd from Outfalls 4A, and 4B
② Thirty-one samples below detection limit. However, compliance cannot be determined because the detection limit of 50 µg/l was above the interim permit limit of 23 µg/l.
③ median value

Appendix 6
PHNSY Dry Dock #1 (Outfall 1)
January 2004 – November 2006

pollutants	Jan04-Nov06			permit limits	violation rates		sample count
	mean	99th%	max		d-max	instant	
Δ temp (°C)	0.4	-	0.8	± 1.0	-	0/3	3
turbidity (NTU)	0.31	-	0.34	4.0	0/3	-	3
dissolved oxygen (%sat)	79.3	-	77	60%	0/3	-	3
BOD (mg/l)	<2.0	-	2.1	-	-	-	3
TSS (mg/l)	14.5	-	24.0	-	-	-	2
oil and grease (mg/l)	<10	-	<10	15	0/3	-	3
COD (mg/l)	116.4	-	193	-	-	-	3
toxicity (%survival)	-	-	-	80%	0/0	-	0
settleable solids (ml/l)	<0.5	-	<0.5	-	-	-	3
total nitrogen (µg/l-N)	465	-	790	-	-	-	2
nitrite-nitrate (µg/l-N)	31	-	40	-	-	-	2
ammonia (µg/l-N)	65	-	109	-	-	-	2
total phosphorus (µg/l-P)	23	-	30	-	-	-	2
hex chromium (µg/l)	<50	-	<50	1100	0/2	-	3
iron (µg/l)	<50	-	<50	-	-	-	3
zinc (µg/l)	49	-	60	95	0/3	-	3
tin (µg/l)	<50	-	<50	-	-	-	3
lead (µg/l)	<50	-	<50	140	0/3	-	3
copper (µg/l)	<50	-	<50	23	**0/0** ②	-	3
mercury (µg/l)	<2.0	-	<2.0	2.1	0/3	-	3
pH minimum (su)	8.0 ③	-	8.0	6.8	-	0/3	3
pH maximum (su)			8.0	8.8	-	0/3	
Δ pH (su)	0.03	-	0.1	± 0.5	-	0/3	3
flow rate (mgd)	1.1	-	1.6	2.4 ①	0/2	-	2

① Daily-max combined discharge flow of 3.7 mgd from Outfalls 1, 2A, 2B, and 3
② All three samples below detection limit. However, compliance cannot be determined because the detection limit of 50 µg/l was above the interim permit limit of 23 µg/l.
③ median value

Appendix 7
PHNSY Dry Dock #3 (Outfall 3)
January 2004 – November 2006

pollutants	Jan04-Nov06			permit limits	violation rates		sample count
	mean	99th%	max		d-max	instant	
Δ temp (°C)	2.1	-	3.7	± 1.0	-	1/2	2
turbidity (NTU)	0.35	-	0.40	4.0	0/2	-	2
dissolved oxygen (%sat)	78.5	-	76	60%	0/2	-	2
BOD (mg/l)	<2.0	-	2.1	-	-	-	2
TSS (mg/l)	-	-	11.0	-	-	-	1
oil and grease (mg/l)	<10	-	<10	15	0/2	-	2
COD (mg/l)	175.5	-	208	-	-	-	2
toxicity (%survival)	-	-	-	80%	0/0	-	0
settleable solids (ml/l)	<0.5	-	<0.5	-	-	-	2
total nitrogen (µg/l-N)	-	-	1650	-	-	-	1
nitrite-nitrate (µg/l-N)	-	-	50	-	-	-	1
ammonia (µg/l-N)	-	-	<40	-	-	-	1
total phosphorus (µg/l-P)	-	-	30	-	-	-	1
hex chromium (µg/l)	-	-	<50	1100	0/1	-	1
iron (µg/l)	<50	-	<50	-	-	-	2
zinc (µg/l)	39	-	53	95	0/2	-	2
tin (µg/l)	<50	-	<50	-	-	-	2
lead (µg/l)	<50	-	<50	140	0/2	-	2
copper (µg/l)	<50	-	<50	23	**0/0** ②	-	2
mercury (µg/l)	<2.0	-	<2.0	2.1	0/2	-	2
pH minimum (su)	8.0 ③	-	8.0	6.8	-	0/2	2
pH maximum (su)			8.0	8.8	-	0/2	
Δ pH (su)	0.0	-	0.0	± 0.5	-	0/2	2
flow rate (mgd)	-	-	-	3.7 ①	0/0	-	0

① Daily-max combined discharge flow of 3.7 mgd from Outfalls 1, 2A, 2B, and 3
② Both samples below detection limit. However, compliance cannot be determined because the detection limit of 50 µg/l was above the interim permit limit of 23 µg/l.
③ median