This document includes Section 3: Data Collection from the "Phase I Final Rule and Technical Development Document of Uniform National Discharge Standards (UNDS)," published in April 1999. The reference number is EPA-842-R-99-001.

Phase I Final Rule and Technical Development Document of Uniform National Discharge Standards (UNDS)

Section 3: Data Collection

April 1999

3. DATA COLLECTION

This chapter describes the efforts that were made to obtain information on the UNDS discharges. An overview of the information collection effort is presented in section 3.1; the surveys issued to gather discharge information are described in section 3.2 along with the list of incidental discharges from Armed Forces vessels that resulted; the consultations with personnel having discharge expertise to review information and identify data gaps are described in section 3.3; section 3.4 describes the consultation and outreach efforts with organizations outside DoD; section 3.5 discusses the approach to discharge sampling and analysis; and section 3.6 lists the references cited in Chapter 3.

3.1 Introduction

Section 312(n)(2)(B) of the CWA lists seven factors to consider when determining if a vessel discharge should be controlled by a MPCD (see section 1.3). One of these factors is the "nature of the discharge." To comprehensively consider this factor as well as the other six factors, EPA and DoD jointly established an UNDS Technical Working Group (TWG) composed of representatives from EPA and the Armed Forces. The TWG gathered and analyzed technical data to identify: 1) the universe of Armed Forces vessels subject to UNDS requirements (described in chapter 2); 2) the characteristics of the vessel discharges, including sources, frequencies, amounts, and specific constituents; 3) relevant U.S. laws, regulations, and international standards that limit or otherwise set standards on the amount of contamination allowed in the discharges; and 4) any controls that are currently in place.

Initial requests were made to each branch of the Armed Forces for discharge information and for information that would allow a list of vessels subject to UNDS requirements to be compiled. Personnel within and outside DoD with specific discharge expertise were consulted to help identify additional available data and data gaps. Where needed, sampling data were collected from various Armed Forces vessels to supplement existing data. The methods that were used to collect discharge information are discussed in the following sections.

3.2 Surveys

Survey questionnaires were issued in 1996 by the Navy to obtain information about vessel discharges and to provide a broad basis for subsequent technical efforts. As part of these surveys, a memorandum was distributed to the Navy's technical community, including Navy fleet commands, subcommands, shore installations, and shipboard operators; other branches of the Armed Forces; and to all other organizations that are represented on the TWG.[1] The memorandum provided background on the UNDS development effort, an explanation of the UNDS scope and approach, and two enclosures. The first enclosure was a report entitled *U.S. Navy Ship Wastewater Discharges*,[2] which provided those surveyed with findings from previous Navy-sponsored efforts on vessel wastewater identification, characterization, and quantification. The second enclosure was a survey entitled *Equipment/System Discharge Stream Questionnaire*.[3] This questionnaire sought information about vessel discharges such as: system description, how

the discharge is generated and released (if applicable), time and location of the discharge, discharge volume, discharge constituents and their concentrations, contributing vessel classes and number of vessels, applicable regulations, currently employed control devices and/or management practices, and any reports or documentation available that were pertinent to the system or the discharge. Survey recipients were requested to review the report, provide comments on its contents, and respond to the questionnaire.

In addition to information from the surveys, information was also obtained during pre-sampling "ship checks" (i.e., vessel inspections) and during other scheduled visits to vessels. During these checks and visits, additional information was often obtained by directly observing discharges and by talking with the ship's crew.

3.3 Consultations with Department of Defense Personnel Having Equipment Expertise

The survey responses helped identify incidental vessel discharges and their characteristics. However, the survey responses did not, in all cases, provide sufficient understanding of the discharges to make well-supported Phase I decisions. Therefore, the Navy and EPA met with vessel discharge experts from the government and the private sector (as consultants to the Navy), including engineers, field-activity representatives, and Navy laboratory personnel. The objective of these consultations was to obtain information that was not obtained from the survey responses, such as:

- system equipment design, operation, and maintenance practices;
- discharge volume and composition;
- the numbers and types of vessels producing the discharge; and
- existing engineering and environmental analysis reports for the discharge including available sampling data.

In addition, these meetings provided information beyond the scope of the surveys, such as:

- potential MPCD options for controlling the discharge;
- ongoing research and development efforts; and
- information useful for assessing the practicability of implementing various MPCD options.

The information that was gathered during the numerous consultations on large-vessel systems (i.e., ships and submarines) was supplemented with information on discharges from small Navy watercraft during a meeting with the Navy's small boat group in Norfolk, Virginia. Meetings were also held with Army representatives from the U.S. Army Tank-Automotive and Armaments Command (TACOM) in Warren, Michigan and from the 7th Transportation Group at Fort Eustis, VA to review Army watercraft systems, operations, and discharges.

After the survey responses and information obtained during ship checks were analyzed, DoD and EPA developed a list of 39 types of discharges incidental to the normal operation of Armed Forces vessels. These discharges are listed in Table 3-1.

Table 3-1. Incidental Discharges from Vessels of the Armed Forces

- Aqueous Film-Forming Foam
- Boiler Blowdown
- Catapult Water Brake Tank and Post-Launch Retraction Exhaust
- Catapult Wet Accumulator Discharge
- Cathodic Protection
- Chain Locker Effluent
- Clean Ballast
- Compensated Fuel Ballast
- Controllable Pitch Propeller Hydraulic Fluid
- Deck Runoff
- Dirty Ballast
- Distillation and Reverse Osmosis Brine
- Elevator Pit Effluent
- Gas Turbine Water Wash
- Graywater
- Hull Coating Leachate
- Firemain Systems
- Freshwater Lay-Up
- Mine Countermeasures Equipment Lubrication
- Motor Gasoline Compensating Discharge
- Non-Oily Machinery Wastewater
- Photographic Laboratory Drains
- Portable Damage Control Drain Pump Discharge
- Portable Damage Control Drain Pump Wet Exhaust
- Refrigeration/Air Conditioning Condensate
- Rudder Bearing Lubrication
- Seawater Cooling Overboard Discharge
- Seawater Piping Biofouling Prevention
- Small Boat Engine Wet Exhaust
- Sonar Dome Discharge
- Steam Condensate
- Stern Tube Seals and Underwater Bearing Lubrication
- Submarine Acoustic Countermeasures Launcher Discharge
- Submarine Bilgewater
- Submarine Emergency Diesel Engine Wet Exhaust
- Submarine Outboard Equipment Grease and External Hydraulics
- Surface Vessel Bilgewater/Oil-Water Separator Discharge
- Underwater Ship Husbandry
- Welldeck Discharges

3.4 Consultation and Outreach Outside the Department of Defense

During Phase I of UNDS, DoD and EPA consulted with other interested Federal agencies, States, and environmental organizations. Other Federal agencies that have been involved in UNDS development include the Coast Guard for DOT; the Department of State; and the National Oceanic and Atmospheric Administration for the Department of Commerce. The Coast Guard has been involved in all aspects of UNDS development. The other agencies have participated with DoD, EPA, and the Coast Guard as members of the UNDS Executive Steering Committee

(ESC), which is responsible for UNDS policy development and is composed of senior-level managers. Separately, DoD and EPA provided an overview of the Phase I process and results to the U.S. Fish and Wildlife Service and the National Marine Fisheries Service.

Two mechanisms were used to consult with States. First, a representative from the Environmental Council of the States (ECOS) participates in UNDS ESC meetings. ECOS is the national association of State and territorial environmental commissioners and was established, in part, to provide State positions on environmental issues to EPA. Second, representatives from the Navy (as the lead for DoD), EPA, and the Coast Guard met at least once, and in most cases twice, with each State interested in UNDS development. The states agreeing to these meetings were predominantly those with significant numbers of Navy or Coast Guard vessels.

3.4.1 Initial State Consultation Meetings

In early 1996, the Navy and EPA invited States with a DoD or Coast Guard vessel presence to participate in an initial round of consultation meetings. Of the approximately 40 States invited, 21 requested a meeting. These initial State consultation meetings were held between August and December 1996. State environmental regulatory authorities hosted each meeting, which consisted of a Navy/EPA briefing on UNDS activities and an opportunity to discuss State-specific issues. A Coast Guard representative was present at each meeting to address discharges from Coast Guard vessels. The Navy/EPA briefing summarized the UNDS legislative history and requirements, considerations for evaluating discharges, the technical approach for determining which discharges require control, an overview of the vessels to which UNDS is applicable, and the roles of DoD and EPA in the rulemaking process. The States that participated in the first round of State meetings are listed in Table 3-2. The minutes from these meetings are compiled in the *Uniform National Discharge Standards State Consultation Meetings (Round #1) Compendium of Minutes*.[4]

Table 3-2. States Involved in Initial Consultation Meetings

• Alaska	• Illinois	• Nevada
• California	• Indiana	• New York
• Connecticut	• Kentucky	• North Carolina
• Delaware	• Louisiana	• Rhode Island
• Florida	• Maryland	• South Carolina
• Georgia	• Michigan	• Virginia
• Hawaii	• Mississippi	• Washington

3.4.2 Second Round of State Consultation Meetings

The Navy and EPA held a second round of State consultation meetings from October 1997 through January 1998. Of the 22 States consulted during the second round of meetings, five had not been briefed initially. The second round of consultation meetings provided Navy

and EPA an opportunity to summarize the activities that had taken place since the initial round of consultation meetings. This included discussing the 39 types of vessel discharges that were identified and the preliminary decisions regarding which of the discharges would be proposed to require control. States were given information on the equipment or process generating the discharges, the locations where the discharges occur, vessels producing the discharges, the preliminary results of environmental effects screenings, and the preliminary conclusions of whether MPCDs would be required. States were generally supportive of the UNDS effort. States most commonly expressed interest in matters related to the implementation of UNDS regulations, including enforcement and procedures for establishing no-discharge zones; the relationship between UNDS and other State programs; which vessels are subject to UNDS; and potential MPCD options. States that participated in the second round of consultation meetings are identified in Table 3-3. The minutes from these meetings are compiled in the *Uniform National Discharge Standards State Consultation Meetings (Round #2) Compendium of Minutes*.[5]

Table 3-3. States Involved in the Second Round of Consultation Meetings

- Alaska
- California
- Connecticut
- Florida
- Georgia
- Hawaii
- Indiana
- Kentucky
- Louisiana
- Maryland
- Massachusetts
- Michigan
- Mississippi
- New Hampshire
- New Jersey
- New York
- North Carolina
- Oregon
- Rhode Island
- Texas
- Virginia
- Washington

Separately, city representatives from Portland, OR requested a briefing on UNDS activities. In February 1998, the Navy, EPA, and Coast Guard provided an overview of UNDS to city representatives. This meeting is summarized in the *Uniform National Discharge Standards State Consultation Meetings (Round #2) Compendium of Minutes*.[5]

3.4.3 Consultation with Environmental Organizations

In addition to State meetings, the Navy, EPA, and Coast Guard met with environmental organizations to provide an overview of UNDS and the preliminary results of the first phase of the UNDS regulatory development process. These meetings were held in December 1997 and May 1998 and are summarized in the *Uniform National Discharge Standards State Consultation Meetings (Round #2) Compendium of Minutes*.[5]

3.4.4 UNDS Newsletter and Homepage

To provide a continuous source of information on UNDS and as a way to receive information relative to UNDS, the Navy and EPA publish a newsletter and an Internet web site.

The newsletter contains feature articles on UNDS-related subjects (e.g., nonindigenous species, Navy research and development programs, etc.), provides answers to frequently asked questions, and provides an update on recent progress and upcoming events. The newsletter is mailed to State and environmental group representatives, Armed Forces and EPA contacts, and interested members of the general public. Approximately 360 newsletters are distributed, approximately 200 of which are distributed outside the EPA, DoD, and their contractor's organizations. Electronic copies of the newsletter are available for downloading from the UNDS Internet site (http://206.5.146.100/n45/doc/unds/unds.html). In addition to providing an electronic version of the newsletter, the Internet site provides UNDS legislative information, a summary of the technical and management approach to used to develop the rule, and a description of the benefits expected to result from UNDS. Both the newsletter and the Internet site provide points of contact for obtaining information on UNDS.

3.5 Sampling and Analysis

3.5.1 Approach to Identifying Discharges Requiring Sampling

The available information for each discharge was evaluated to determine if additional data were necessary to adequately evaluate potential environmental effects. Sampling was not required for discharges where existing information was sufficient to characterize the nature of the discharge and to assess potential environmental impacts, if any. Nine of the 39 types of discharges required additional information and were sampled.[6,7] Table 3-4 lists these discharges.

Table 3-4. Discharges Sampled During Phase 1 of UNDS

- Boiler Blowdown
- Compensating Fuel Ballast
- Distillation and Reverse Osmosis Brine
- Firemain Systems
- Freshwater Lay-Up
- Non-Oily Machinery Wastewater
- Seawater Cooling Overboard Discharge
- Steam Condensate
- Surface Vessel Bilgewater/Oil-Water Separator Discharge

3.5.2 Approach to Determining Analytes

To determine which constituents to analyze for in the nine sampled discharges, a comprehensive list of approximately 450 candidate analytes was considered, including the "priority pollutants" referenced in § 307(a) of the CWA. Analyses for constituents or analytical groups were not performed if it was evident that these constituents or groups could not be present based on process knowledge. A sampling rationale document was prepared to describe the reasons for excluding analytes from analysis on a discharge-by-discharge basis.[6,7] Table 3-5 shows the categories of analytes that were analyzed in each of the nine sampled discharges.

Table 3-5. Type of Analysis According to Discharge

Discharge	Classicals	VOCs	SVOCs	Metals	Pesticides	PCBs	Mercury	Hydrazine
Boiler Blowdown	x		x	x		x		x
Compensated Fuel Ballast	x	x	x	x			x	x
Distillation and Reverse Osmosis Brine	x		x	x				
Firemain Systems	x		x	x		x		
Freshwater Lay-Up	x		x	x		x		
Non-Oily Machinery Wastewater	x	x	x	x		x	x	
Seawater Cooling Overboard Discharge	x		x	x		x		
Steam Condensate	x		x	x				
Surface Vessel Bilgewater/ Oil Water Separator Discharge	x	x	x	x	x	x	x	x

Notes:
x = constituents analyzed for, but not necessarily detected.
Classicals: Includes analytes such as total dissolved solids (TDS) and total suspended solids (TSS), as well as other classical analytes listed in Table 3-8.
PCBs: polychlorinated biphenyls
VOCs: volatile organic compounds
SVOCs: semi-volatile organic compounds

3.5.3 Shipboard Sampling

For the purpose of UNDS Phase I, samples were collected from ten vessels representing a total of six Navy, Coast Guard, and MSC vessel types. The Navy vessels that were sampled included an aircraft carrier, three surface combatants, two amphibious ships, and a submarine. A Coast Guard cutter and two MSC oilers, which are Naval Fleet Auxiliary Support Force vessels used for fuel transport, were also sampled. The discharges that were sampled on each vessel are presented in Table 3-6. The reasoning for sampling specific discharges on certain vessel classes is contained in the sampling rationale document.[6,7] In addition, the sampling procedures for eight of the ten vessels are presented in sampling and analysis plans (SSAP) prepared for each vessel.[8-15] SSAPs were not prepared for the *USS Mitscher* or the *USNS Big Horne* because they

are the same class of vessel as the *USS Arleigh Burke* and the *USNS Laramie*, respectively. Therefore, the SSAPs for the *USS Arleigh Burke* and the *USNS Laramie* were used when sampling the *USS Mitscher* and the *USNS Big Horne*, respectively. The details of each sampling event are documented in a separate volume of the *UNDS Phase I Sampling Episode Report*, which contains the sampling analytical results and discusses any deviations from the SSAPs.[16] The laboratory methods used to analyze the samples are listed in Tables 3-7 and 3-8.

3.5.4 Quality Assurance/Quality Control and Data Validation Procedures

EPA-approved quality assurance/quality control (QA/QC) and data validation procedures were used throughout the sample collection and sample analysis activities during Phase I of UNDS. The field and analytical QA/QC procedures are described in detail in SSAPs[8-15] and the *UNDS Phase I Sampling Episode Report*.[16] During sample collection in the field, trip and equipment blanks were collected as well as field duplicate samples. Analytical QA/QC included analysis of blanks, matrix spikes, and samples. The analyses followed the QA/QC requirements specified in the analytical methods listed in Tables 3-7 and 3-8.

In addition, the analytical results were validated according to standard EPA procedures. The purpose of the data validation was to detect and then verify any data values that may not reflect actual sample constituents and concentrations. The data validation step was conducted to identify data errors, biases, and outlying data so that such values would not be used when making Phase I decisions.

Table 3-6. Discharges Sampled by Ship

Discharge	***USS John C.***		**Amphibious Assault Ship (LHD)** ***USS Wasp***	**Cruiser (CG)** ***USS Anzio***	**Cutter (WHEC)** ***USCG Dallas***	**Dock Landing Ship (LSD)** ***USS Oak Hill***	**Attack Submarine (SSN)** ***USS Scranton***	**Oilers (T-AO)** ***USNS Laramie*** ***USNS Big Horne***
Boiler Blowdown			x	x	x	x		x
Compensated Fuel Ballast		x						
Distillation and Reverse Osmosis Brine	x		x			x		
Firemain Discharge	x		x			x		
Freshwater Lay-Up							x	
Non-Oily Machinery Wastewater	x	x	x			x		
Seawater Cooling Overboard Discharge	x	x	x		x	x		x
Steam Condensate			x	x		x		x
Surface Vessel Bilgewater / Oil-Water Separator Discharge	x							

Table 3-7. Analytes and Analytical Methods

Target Analytes	Analytical Method
Classicals	see Table 3-8
Volatile Organic Compounds (VOC)	EPA Method 1624
Semi-Volatile Organic Compounds (SVOC)	EPA Method 1625
Metals	EPA Method 1620
Pesticides, Polychlorinated Biphenyls (PCBs)	EPA Method 1656, 1657, 1658, 1660
Mercury	EPA Method 1631
Hydrazine	American Society for Testing and Materials (ASTM) D1385-88

Table 3-8. Classical Analytes and Methods

Target Chemical/Analyte	Analytical Method
Ammonia as Nitrogen (NH_3 - N)	EPA 350
Total Kjeldahl Nitrogen (TKN)	EPA 351
Nitrate/Nitrite (NO_2/NO_3)	EPA 353
Total Phosphorus	EPA 365
Total Suspended Solids (TSS)	EPA 160.2
Biochemical Oxygen Demand (BOD_5)	EPA 405.1
Total Organic Carbon (TOC)	EPA 415.1
Chemical Oxygen Demand (COD)	EPA 410.4
Total Dissolved Solids (TDS)	EPA 160.1
Total Volatile Solids (TVS)	EPA 160.4
Total Petroleum Hydrocarbons (TPH)	EPA 1664
Oil and Grease	EPA 1664/ modified EPA 418.2
Cyanide	EPA 335
Chlorine	DPD* [17]
Alkalinity	EPA 310
Sulfate	EPA 375
Sulfide	EPA 376
Chloride	EPA 325.1

Notes:
* DPD: N,N-diethyl-p-phenylene diamine

3.6 References

1. NAVSEA letter 5090, Ser 00T/136. 1 July 1996.
2. Ships Environmental Support Office (SESO) Naval Surface Warfare Center Carderock Division. "U.S. Navy Ship Wastewater Discharges," TM-63-95/08. 3 July 1995.

3. NAVSEA. Equipment/System Discharge Stream Questionnaire.
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5. U.S. Navy/U.S. EPA. "Uniform National Discharge Standards (UNDS) State Consultation Meetings (Round #2) Compendium of Minutes."
6. NAVSEA. "Uniform National Discharge Standards Rationale for Initial Discharge Sampling." December 1997.
7. NAVSEA. Memorandum to File. Subject: Explanation of Deviations from the Phase I "Rationale for Discharge Sampling" Document. 21 July 1998.
8. NAVSEA. "Specific Sampling and Analysis Plan," USS Stennis (CVN). July 1997.
9. NAVSEA. "Specific Sampling and Analysis Plan," USS Arleigh Burke (DDG). July 1997.
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11. NAVSEA. "Specific Sampling and Analysis Plan," USCG Dallas (WHEC). July 1997.
12. NAVSEA. "Specific Sampling and Analysis Plan," USS Oak Hill (LSD). July 1997.
13. NAVSEA. "Specific Sampling and Analysis Plan," USS Scranton (SSN). July 1997.
14. NAVSEA. "Specific Sampling and Analysis Plan," USNS Laramie (T-AO). July 1997.
15. NAVSEA. "Specific Sampling and Analysis Plan," USS Wasp (LHD). July 1997.
16. NAVSEA. "UNDS Phase 1 Sampling Episode Report," Volumes 1-13. February 1998.
17. American Public Health Association, American Water Works Association, and the Water Pollution Control Federation. Standard Methods for the Examination of Water and Wastewater. Method 4500-Cl G. DPD Colorimetric Method. 17th Edition. Washington, DC: American Public Health Association. 1989.