This document is part of Appendix A, and includes Portable Damage Control Drain Pump Discharges: Nature of Discharge for 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)

Portable Damage Control Drain Pump Discharges: Nature of Discharge

April 1999

NATURE OF DISCHARGE REPORT

Portable Damage Control Drain Pump Discharges

1.0 INTRODUCTION

The National Defense Authorization Act of 1996 amended Section 312 of the Federal Water Pollution Control Act (also known as the Clean Water Act (CWA)) to require that the Secretary of Defense and the Administrator of the Environmental Protection Agency (EPA) develop uniform national discharge standards (UNDS) for vessels of the Armed Forces for "...discharges, other than sewage, incidental to normal operation of a vessel of the Armed Forces, ..." [Section 312(n)(1)]. UNDS is being developed in three phases. The first phase (which this report supports), will determine which discharges will be required to be controlled by marine pollution control devices (MPCDs)—either equipment or management practices. The second phase will develop MPCD performance standards. The final phase will determine the design, construction, installation, and use of MPCDs.

A nature of discharge (NOD) report has been prepared for each of the discharges that has been identified as a candidate for regulation under UNDS. The NOD reports were developed based on information obtained from the technical community within the Navy and other branches of the Armed Forces with vessels potentially subject to UNDS, from information available in existing technical reports and documentation, and, when required, from data obtained from discharge samples that were collected under the UNDS program.

The purpose of the NOD report is to describe the discharge in detail, including the system that produces the discharge, the equipment involved, the constituents released to the environment, and the current practice, if any, to prevent or minimize environmental effects. Where existing process information is insufficient to characterize the discharge, the NOD report provides the results of additional sampling or other data gathered on the discharge. Based on the above information, the NOD report describes how the estimated constituent concentrations and mass loading to the environment were determined. Finally, the NOD report assesses the potential for environmental effect. The NOD report contains sections on: Discharge Description, Discharge Characteristics, Nature of Discharge Analysis, Conclusions, and Data Sources and References.

2.0 DISCHARGE DESCRIPTION

This section describes the portable damage control drain pump discharge and includes information on: the equipment that is used and its operation (Section 2.1), general description of the constituents of the discharge (Section 2.2), and the vessels that produce this discharge (Section 2.3).

2.1 Equipment Description and Operation

Damage control (DC) systems are the fluid, electrical, and ventilation systems that contribute to combating fires, controlling or removing smoke and/or water, or transmitting power and communications. Facilities for dewatering compartments in the event of an emergency consist of fixed drainage systems within the vessel and portable equipment, such as electric submersible pumps, P-250 or P-100 pumps, and eductors (Figure 1). Portable DC dewatering equipment is used in emergencies to assist recovery from fire and flooding events by removing fluids from damaged compartments or from compartments without drainage systems located close to, or below, the waterline. Emergency situations are not incidental to the normal operation of the vessel and therefore not considered in this report. The only required operation which produces a discharge incidental to the normal operation of the vessel is during planned maintenance system (PMS) activities for the equipment. This report addresses only planned maintenance activity discharges from this equipment.

Three basic types of dewatering equipment used in damage control situations are described below.

- **Portable electric submersible pumps** are used to dewater compartments that do not have an installed drainage system. The pump is driven by an electric motor enclosed in a watertight case that allows the pump to operate while submerged. These pumps are fitted with strainers to prevent debris from clogging the impeller. This pump does not use a suction hose, and the fluid is discharged through a fire hose.

- **Portable engine-driven pumps** are designed for firefighting but can also be used for dewatering operations. Engine-driven pumps take suction through a hard rubber hose and discharge through a fire hose. The P-250 has a pumping capacity of 250 gallons per minute (gpm). The P-100 pump is driven by an air-cooled diesel engine and has a pumping capacity of 100 gallons per minute (gpm). The P-1 (Figure 2) and P-5 (CG-P1B and CG-P5) are gasoline-driven portable pumps used by the U.S. Coast Guard (USCG). The P-5 is similar in design to the P-1, but it has a larger pumping capacity. The P-1 has a pumping capacity of 120 gpm, and the P-5 has a pumping capacity of 200 gpm.[1,2]

- **Portable eductors** Portable eductors are actuated from the discharge of a P-250 or P-100 pump or through a fire hose using the vessel's installed firemain. A suction hose is not used with portable eductors because the eductor is submerged during operation. The eductor discharges through a fire hose which is lead directly overboard.

Maintenance schedules for the portable electric submersible pump and portable eductors do not include a requirement for operation that will produce a discharge.[3] The USCG P-1 and P-5 pumps are pre-packaged for transfer to a vessel in distress, and periodic maintenance schedules do not include a requirement to operate the pumps to produce a discharge. The maintenance schedules for the Navy, the Military Sealift Command (MSC), and Army P-100 and P-250 pumps include a requirement to operate the pumps monthly for 10 minutes and annually for 15 minutes: the annual check is concurrent with a monthly check.[4] Current USCG maintenance schedules require P-250 pumps to be operated for 30 minutes each month, but the maintenance procedures are expected to be changed to require only a 15 minute run each month.[5,6]

2.2 Releases to the Environment

During maintenance, P-250 and P-100 pumps are operated to demonstrate proper function by pumping seawater adjacent to the vessel via a hard rubber suction hose through the system and discharging it directly overboard through a fire hose.[7]

The P-250 pump uses a portion of the pump discharge to cool the engine exhaust. This cooling water is discharged separately from the pump discharge and is not considered part of this discharge stream. It is addressed in a separate NOD report entitled "Portable Damage Control

2.3 Vessels Producing the Discharge

All Navy, MSC, and USCG surface ships can discharge seawater from portable DC drain pumps. There are 906 emergency fire pumps on Navy surface vessels. The MSC maintains 137 pumps, and the USCG has 370 pumps on its surface vessels. The Army is currently equipped with 60 P-250 MOD 1 pumps and six P-100 pumps. The Air Force does not use portable pumps on any of their water craft. The numbers of individual pumps within the fleets are: [8,9,10,11,12,13,14]

	P-250 MOD 1	**P-100**
Navy	70	836
MSC	0	137
USCG	370	0
Army	60	6
Totals	500	979

The Navy is completely converting to P-100 pumps, and it is estimated that all P-250's in Navy service will be replaced by P-100's by the end of 1998.[8] The Army has also begun to replace P-250's with P-100 pumps, but a timetable for complete conversion has not yet been developed

As mentioned previously, the USCG P-1 and P-5 pumps are pre-packaged for transfer to a vessel in distress. These pumps are not required to be operated during periodic maintenance so these pumps produce no discharge incidental to normal vessel operations.

3.0 DISCHARGE CHARACTERISTICS

This section contains qualitative and quantitative information that characterizes the discharge. Section 3.1 describes where the discharge occurs with respect to harbors and near-shore areas, Section 3.2 describes the rate of the discharge, Section 3.3 lists the constituents in the discharge, and Section 3.4 gives the concentrations of the constituents in the discharge.

3.1 Locality

As part of equipment maintenance, the portable damage control equipment is operated within 12 nautical miles (n.m.).

3.2 Rate

Individual vessel discharge volumes from emergency pumps will vary depending on the numbers and types of pumps aboard each vessel. Therefore, flow rates will be calculated on a fleet-wide basis instead of a ship-by-ship basis.

Using standard maintenance operating schedules, pump inventory data, and pump discharge rates, discharge flow estimates were calculated as shown in Table 1. During monthly maintenance activities, the Navy, MSC, and Army run pumps for approximately 10 minutes and for approximately 15 minutes during annual maintenance checks. The USCG currently operates its pumps for 30 minutes per month. The resulting total annual discharge is approximately 49,062,500 gallons.

Approximate annual flow rates for representative ship types are listed below:

Ship Type	Pump Type Carried and Number per Ship	Pump Flow Rate (gpm)	Annual Operating Time (Minutes/Year)	Total Yearly Flow rate per Ship
Surface Combatant (DD, DDG, CG, FFG)	4 - P-100's	100	125	50,000
Large Auxiliary or Amphibious Ship (e.g.: AFS, AOE, LPD, LSD)	6 - P-100's	100	125	75,000
USCG Cutter (WHEC)	3 - P-250's	250	360	270,000
Army Watercraft (LCU-1600)	1 - P-250's	250	125	31,250

3.3 Constituents

The portable DC drain pump discharge is seawater that is pumped during maintenance activities. The seawater contacts rubber suction hoses and the rubber lining of firehoses. It also contacts the wetted components of the pump (e.g. impeller). The pumps and hoses are not

expected to contribute measurable amounts of pollutants to the discharge because the residence times of the seawater within the equipment is less than 5 seconds.

3.4 Concentrations

The discharge is expected to be seawater with no measurable contribution of constituents from the pumping process.

4.0 NATURE OF DISCHARGE ANALYSIS

Based on the discharge characteristics presented in Section 3.0, the nature of the discharge and its potential impact on the environment can be evaluated. The estimated mass loadings and environmental concentrations are discussed in Section 4.1 and 4.2. In Section 4.3, the potential for the transfer of non-indigenous species is discussed.

4.1 Mass Loadings

The portable DC drain pump discharge is seawater that is pumped during maintenance activities. The seawater contacts rubber suction hoses and the rubber lining of firehoses. It also contacts the wetted components of the pump (e.g. impeller). The pumps and hoses are not expected to contribute measurable amounts of pollutants to the discharge because the residence times of the seawater within the equipment is less than 5 seconds.

4.2 Environmental Concentrations

The discharge is expected to be seawater with no measurable contribution of constituents from the pumping process.

4.3 Potential for Introducing Non-Indigenous Species

There is an insignificant potential for introducing non-indigenous species from this discharge. The seawater pumped through the portable DC drain pumps is discharged in the same location from which it was taken.

5.0 CONCLUSION

The portable DC drain pump discharge has a low potential for causing an adverse environmental effect because the discharge consists of seawater pumped and discharged at the same location from which it was taken. The pumps and hoses are not expected to contribute significant amounts of pollutants to the discharge because the residence time of the seawater within the equipment is less than 5 seconds.

6.0 DATA SOURCES AND REFERENCES

To characterize this discharge, information from various sources was obtained. Process information and assumptions were used to estimate the annual discharge volume. Table 2 shows the source of the data used to develop this NOD report.

Specific References

1. Gallagher, Larry, M. Rosenblatt & Son, Inc. Portable DC Dewatering Equipment, April 1997, Leslie Panek, Versar, Inc.

2. USCG COMDTINST M10470.10C - Chapter 2, Dewatering Pump Kit. Unknown date.

3. Maintenance Index Page (MIP) 6641/Z06-76, Damage Control Stations. April 1995.

4. Maintenance Index Page (MIP) 6641/008-B2, Portable Gasoline/JP-5 Driven Pump. November 1992.

5. USCG Uniform Maintenance Procedure Card (UMPC) R-M-014.

6. Personal Communication, LT Joyce Aivalotis USCG to M. Rosenblatt & Son, June 5, 1997.

7. Steinberg, Bob, M. Rosenblatt & Son, Inc. Portable DC Dewatering Equipment, January 1997, Leslie Panek, Versar, Inc.

8. Personal Communication (Fonecon): Steinberg, Bob, M. Rosenblatt & Son. Status of USN P-250 Replacement Program, 23 January 1998, Mark Hampson, NSWC

9. UNDS Equipment Expert Meeting Minutes - Emergency Fire Pump Wet Exhaust. March 26, 1997.

10. Personal Communication between Chief Warrant Officer Dunbar, USCG and Doug Hamm, Malcolm Pirnie, Inc., January 26, 1997 and March 27, 1997.

11. Personal Communication (Fonecon): Steinberg, Bob, M Rosenblatt & Son. Status of MSC P-250 Replacement Program, 5 February 1998, Joe Bohr, MSC Code N72PC

12. Saponara, N. et al. "UNDS Shipcheck of US Army Watercraft, Fort Eustis, VA, 21-22 January 1998: Trip Summary", undated

13. Personal Communication (Fonecon): Steinberg, Bob, M. Rosenblatt & Son, Inc. Army Purchases of P-100 Pumps, 14 January 1998, Paul Darley, W.S. Darley & Co.

14. Personal Communication (VoiceMail): Chew, Don, LCOL, USAF, HQ, USAF (ILTV).

Portable damage control pumps on Air Force Watercraft, 21 January 1998, Bob Steinberg, M. Rosenblatt & Son, Inc.

General References

USEPA. Toxics Criteria for Those States Not Complying with Clean Water Act Section 303(c)(2)(B). 40 CFR Part 131.36.

USEPA. Interim Final Rule. Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants; States' Compliance – Revision of Metals Criteria. 60 FR 22230. May 4, 1995.

USEPA. Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants. 57 FR 60848. December 22, 1992.

USEPA. Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California, Proposed Rule under 40 CFR Part 131, Federal Register, Vol. 62, Number 150. August 5, 1997.

Connecticut. Department of Environmental Protection. Water Quality Standards. Surface Water Quality Standards Effective April 8, 1997.

Florida. Department of Environmental Protection. Surface Water Quality Standards, Chapter 62-302. Effective December 26, 1996.

Georgia Final Regulations. Chapter 391-3-6, Water Quality Control, as provided by The Bureau of National Affairs, Inc., 1996.

Hawaii. Hawaiian Water Quality Standards. Section 11, Chapter 54 of the State Code.

Mississippi. Water Quality Criteria for Intrastate, Interstate and Coastal Waters. Mississippi Department of Environmental Quality, Office of Pollution Control. Adopted November 16, 1995.

New Jersey Final Regulations. Surface Water Quality Standards, Section 7:9B-1, as provided by The Bureau of National Affairs, Inc., 1996.

Texas. Texas Surface Water Quality Standards, Sections 307.2 - 307.10. Texas Natural Resource Conservation Commission. Effective July 13, 1995.

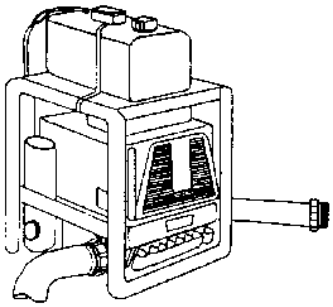
Virginia. Water Quality Standards. Chapter 260, Virginia Administrative Code (VAC) , 9 VAC 25-260.

Washington. Water Quality Standards for Surface Waters of the State of Washington. Chapter

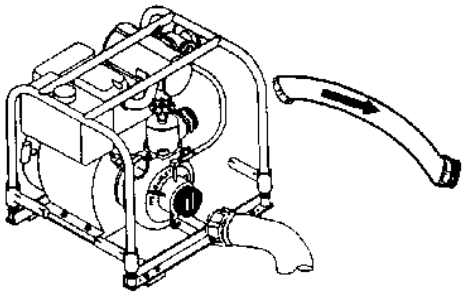
173-201A, Washington Administrative Code (WAC).

Committee Print Number 95-30 of the Committee on Public Works and Transportation of the House of Representatives, Table 1.

The Water Quality Guidance for the Great Lakes System, Table 6A. Volume 60 Federal Register, p. 15366. March 23, 1995.

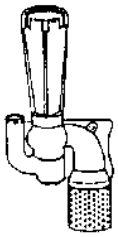


P-250 PUMP (MOD 1 OR MOD2)



P-100 PUMP

PERI JET EDUCTOR



S-TYPE EDUCTOR

1-1/2" EDUCTOR

Figure 1. Dewatering Equipment

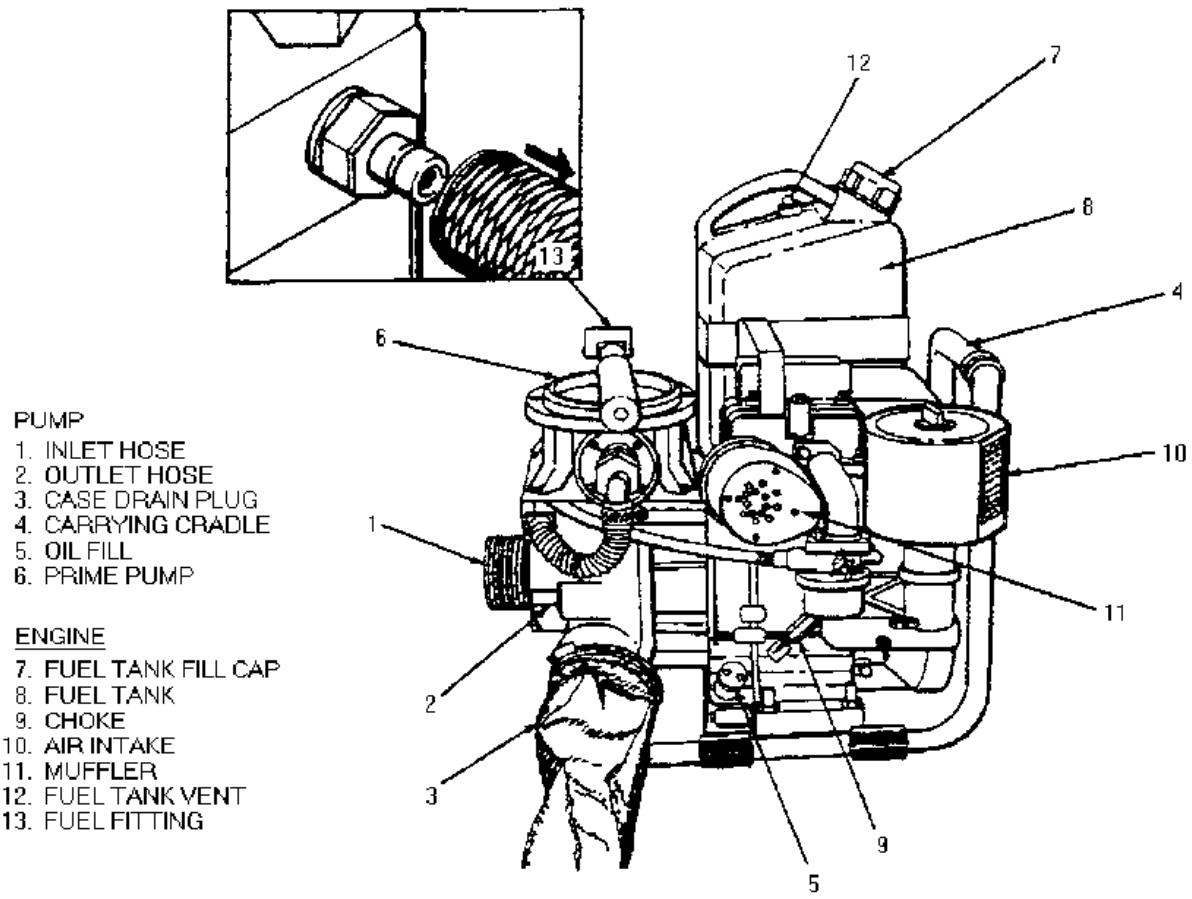


Figure 2. Portable Dewatering Pump (Model CG-P1B)

Table 1. Annual Discharge from Portable DC Drain Pumps

Service	Pump Model	Number of Pumps	Flow (GPM)	Annual Operating Time (Minutes/Year)	Annual Discharge (Gallons/Year)
Navy					
	P-250 MOD 1	70	250	125	2,187,500
	P-100	793	100	125	9,912,500
		Navy Total:			12,100,000
MSC					
	P-250 MOD 1	0	250	125	0
	P-100	137	100	125	1,712,500
		MSC Total:			1,712,500
USCG	P-250 MOD 1	370	250	360	33,300,000
Army	P-250 MOD 1	60	250	125	1,875,000
	P-100	6	100	125	75,000
		Army Total:			1,950,000
				Cumulative Total:	49,062,500

Table 2. Data Sources

	Data Source			
NOD Section	Reported	Sampling	Estimated	Equipment Expert
2.1 Equipment Description and Operation	Equipment manuals PMS cards			X
2.2 Releases to the Environment			X	X
2.3 Vessels Producing the Discharge	X			X
3.1 Locality	X			X
3.2 Rate	PMS cards			X
3.3 Constituents	X		X	X
3.4 Concentrations			X	
4.1 Mass Loadings			X	
4.2 Environmental Concentrations			X	
4.3 Potential for Non-indigenous Species			X	