

7.18 Sewage Safety



Enabling Objectives

A large aircraft carrier is shown from an elevated perspective, sailing on a blue ocean under a clear sky. The ship's deck is visible, and it is moving towards the right of the frame, leaving a white wake behind it.

- **Explain the Procedures and Safety Requirements of Sewage System Maintenance**
- **Explain the Requirements, Regulations and Procedures for MSD/CHT Tank Entry**

References

NSTM 593: Pollution Control

**NAVMED P-5010-7: Wastewater Treatment
& Disposal, Chapter 7**

**OPNAV 5100.19D: NAVOSH Program
Manual Section C-15**

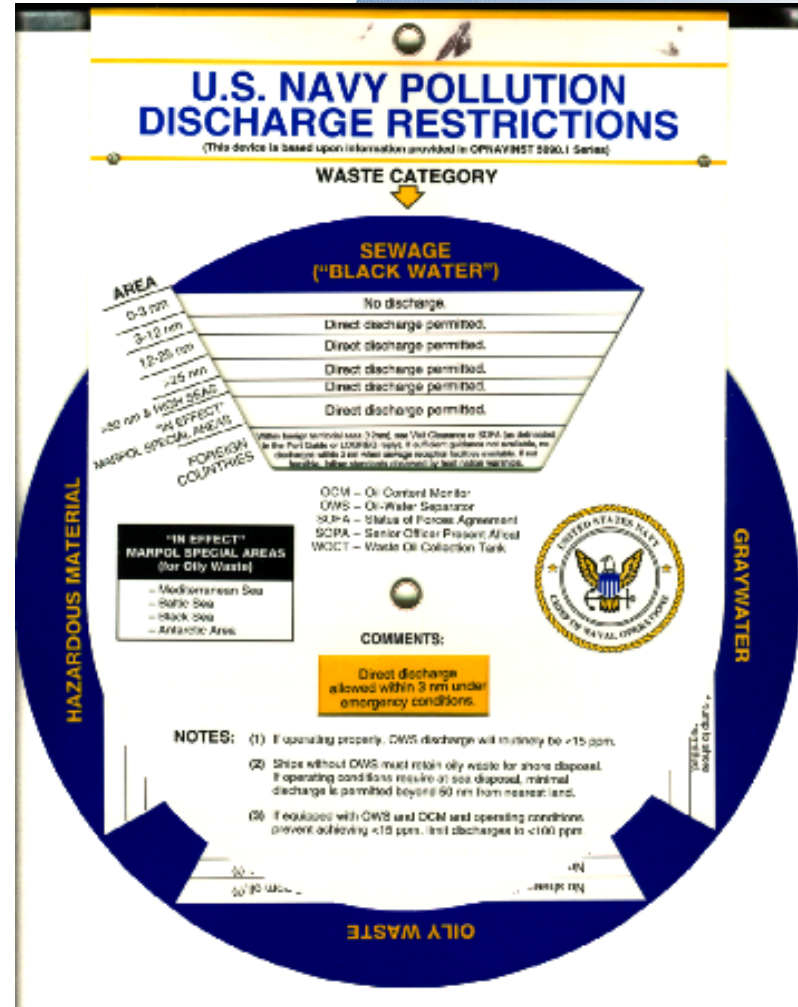
**Engineering Operating Sequencing System
(EOSS)**

NSTM 074 VOL3 REV4

USN POLLUTION DISCHARGE RESTRICTIONS DEVICE



- CHECK WITH OOD BEFORE DISCHARGING SEWAGE
- SHOWS RESTRICTIONS FOR SEWAGE, GREYWATER, HAZMAT, OILY WASTE



Marine Sanitation Device (MSD)



- **Equipment Designed to Prevent the Discharge of Untreated or Inadequately Treated Sewage**
- **A Fancy Way to Say “CHT System”**



CHT



- Collection, Holding and Transfer System

 - « Piping, Tanks, Pumps, Aeration Components

- Often Erroneously Used in Reference to Sewage, itself.



Effluent

Fancy Name for
“Sewage”



Waste Drains

- Serve “Gray Water”
 - Uncontaminated by Human Excrement
(???)
- Sinks, Sculleries, Scuttlebutts, Showers



Soil Drains

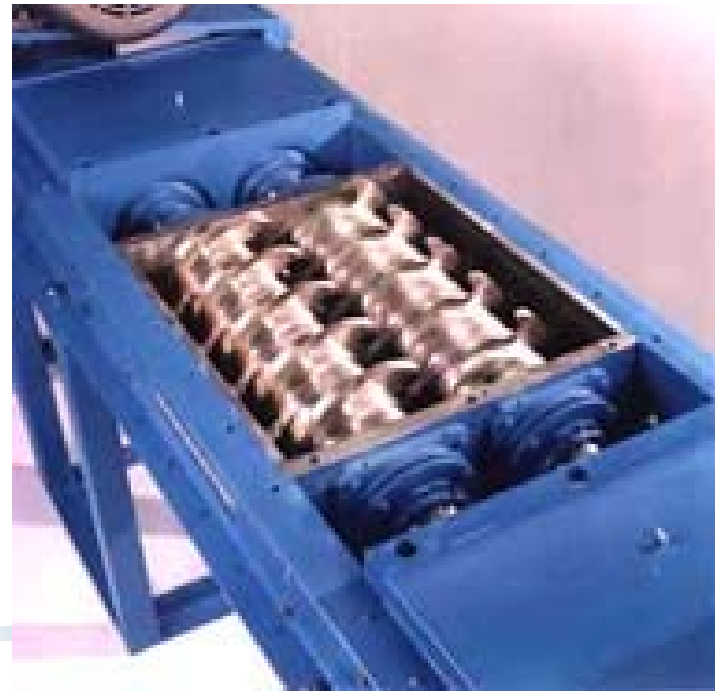
- Serves “Black Water”
 - Contaminated by Human Excrement
- Includes Commodes and Urinals



Comminutors

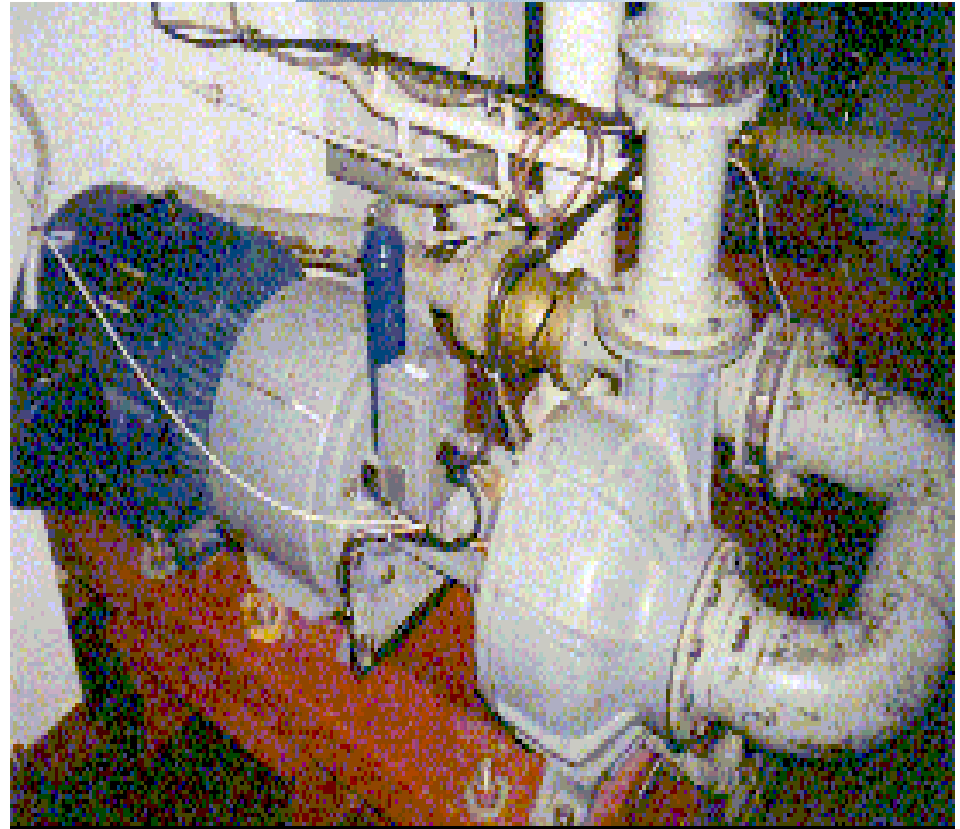
Macerator, Grinder Pump

Motor Driven Grinder
Used to Pulp or Liquify
Solids Before they Enter
CHT Tank



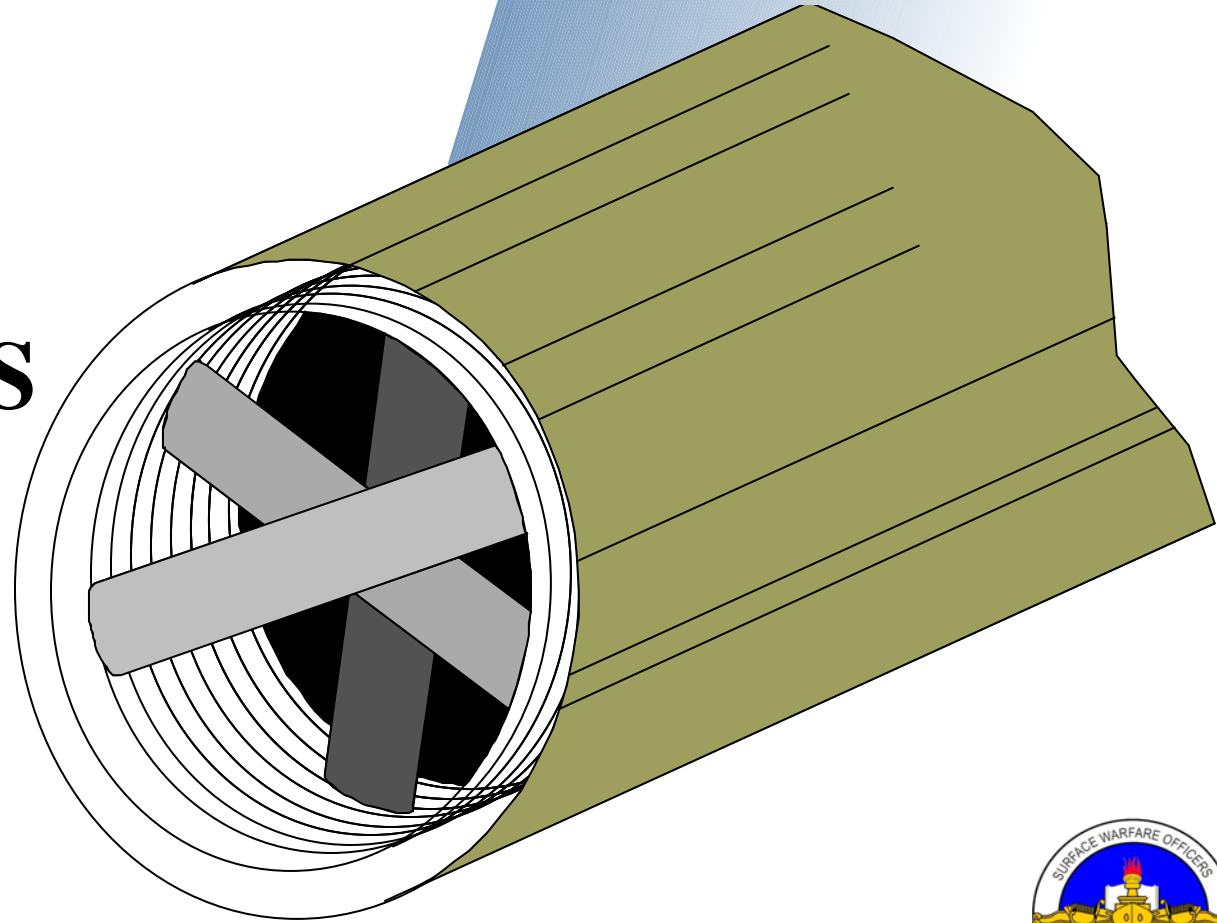
Effluent Pump (Eddy Pump)

**Pump for
Discharging
Sewage from the
Tank**

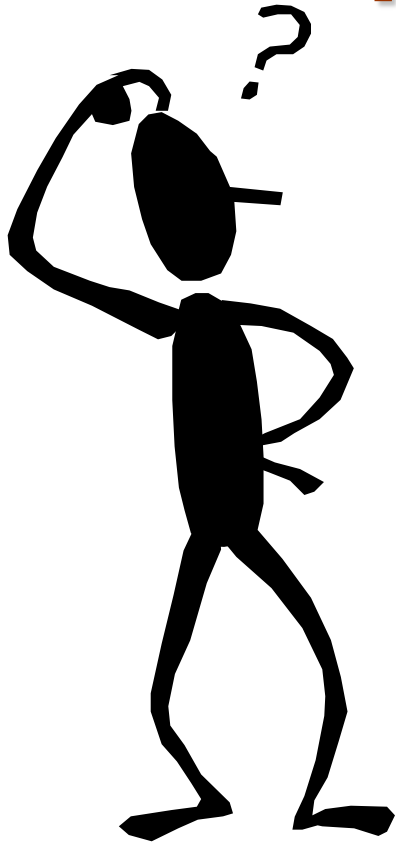


PREVENTION OF CLOGGED LINES

- CLOG TRAPS
- INDOC.
TRAINING
- POD NOTES
- WORKING
PARTIES



So Why Do We Have These Systems Anyway???



HISTORY

- Shipboard Sewage has Been Discharged Overboard for Centuries
- 1972: CNO Policy Adopted Requiring Installation of CHT Systems Aboard Naval Ships

HISTORY

- **Design Goal: Provide Capacity to Hold Sewage Generated over 12 Hours for large ships, 3 hours for small ships.**

- *LPD-17 is looking at holding Gray Water up to 36 hours.*

- **Sufficient Time to Transit 3 NM Restricted Zone...???**

MODES OF OPERATIONS



MODES OF OPERATION

INPORT

- Pier side, all waste and soil drains to tank, then to pier riser



**WASTEWATER TREATMENT FACILITY
ALAMEDA, CALIFORNIA**



MODES OF OPERATION

TRANSIT



- Within 3 nm of coast:
- All Black Water diverted to tank
- Grey Water below W/L - to tank
- Grey Water above W/L - overboard



MODES OF OPERATION AT SEA

- Beyond 3 nm:
 - all Grey Water and Black Water overboard



NOTES:

WARNING: PERSONNEL ENGAGED IN SEWAGE TRANSFER HOSE OPERATIONS SHALL NOT CONNECT OR DISCONNECT POTABLE WATER HOSE.

WARNING: PERSONNEL ENGAGED IN SEWAGE TRANSFER OPERATIONS MUST WEAR PROTECTIVE RUBBER GLOVES, RUBBER BOOTS AND COVERALLS.

WARNING: SEWAGE SPILLS, SEWAGE TRANSFER HOSE CONNECTIONS AND THE HOSE EXTERIOR SHOULD BE WASHED DOWN WITH HOT POTABLE WATER CONTAINING A STOCK DETERGENT.

WARNING: IF SPILLAGE OCCURS NOTIFY MEDICAL DEPARTMENT.

NOTE: Comply with the following environmental protection instructions:

- a. Environmental and Natural Resources Protection Manual, OPNAVINST 5090.1 (series).
- b. NAVAL SHIPS' TECHNICAL MANUAL, NAVSEA S9086-T8-STM-010, CHAPTER 593, POLLUTION CONTROL.
- c. MANUAL OF PREVENTIVE MEDICINE, NAVMED P-5010-7, CHAPTER 7, WASTEWATER TREATMENT AND DISPOSAL ASHORE AND AFLOAT.
- d. Appropriate Fleet and Type Commander directives.

NOTE: Prior to commencing any procedure, verify that all applicable Planned Maintenance System requirements have been accomplished.

PROCEDURE

The following evolution will take place
(DATE) _____ at (TIME) _____:

Circle one:
 In-port to transit (SDIT)
 Transit to at-sea (SDTA)
 At-sea to transit (SDAT)
 Transit to in-port (SDTI)
 In-port shifting of berth (SDIT/SDTI)

The following personnel will man stations as indicated:

PROCEDURE	
<u>STATION</u>	<u>PERSONNEL</u>
HT shop telephone talker	_____
Forward sewage collection system valve operators	_____
_____	_____
_____	_____
After port sewage collection system valve operators	_____
_____	_____
_____	_____
After stbd sewage collection system valve operators	_____
_____	_____
_____	_____
Fwd CHT Pump Room operator	_____
Fwd CHT Pump Room telephone talker	_____
Aft CHT Pump Station operator	_____
Aft CHT Pump Station telephone talker	_____
Shore connection telephone talker	_____
Forward (Port/Starboard)	_____
Aft (Port/Starboard)	_____
Shore connection hose handling team	_____
Forward (port/starboard)	_____
_____	_____
_____	_____
Aft (port/starboard)	_____
_____	_____
_____	_____
Remarks:	_____

NOTES:

PREFACE

Command is primarily concerned with potential health hazards to personnel and environmental protection during any sewage disposal collection, holding or transfer evolution.

The collecting capacity of the CHT sewage holding tanks is approximately 327,000 gallons forward and 7,200 gallons aft. The holding time of the tanks is 12 hours based on a sewage flow of 30 gallons per man per day.

Judicious use must be made of the holding time available taking into consideration ecological problems which may be caused in transit when passing bathing beaches, passing over oyster beds, etc.

EXISTING STATUS

The Commanding Officer has approved the Sewage Disposal Evolution Plan (SDEP) as submitted by the Sewage Disposal Officer.

RESULTING STATUS

Sewage disposal collection, holding, and transfer (CHT) evolution has been completed.

WARNING: IF SPILLAGE OCCURS, NOTIFY MEDICAL DEPARTMENT.

NOTE: Comply with the following environmental protection instructions:

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- b. NAVSHIP'S TECHNICAL MANUAL, NAVSEA S9086-T8-STM-010, CHAPTER 593, POLLUTION CONTROL.
- c. MANUAL OF PREVENTIVE MEDICINE, NAVMED P-5010-7, CHAPTER 7, WASTEWATER TREATMENT AND DISPOSAL, ASHORE AND AFLOAT.
- d. Appropriate Fleet and Type Commander directives.

NOTE: Prior to commencing any procedure, verify that all applicable PMS maintenance requirements have been accomplished.

- IN-PORT MODE TO TRANSIT MODE (SDIT)
- 1. Two hours prior: Receiving facility notified of evolution.
 - 2. When required, two hours prior: Nested ship(s) notified of evolution.
 - 3. Sewage Disposal Officer request OOD to pass over the 1MC: "Set the sewage disposal detail."
 - 4. Sewage Disposal Officer request OOD to pass over the 1MC: "Personnel not involved in sewage disposal operations stand clear of the shore connections while sewage transfer hose is being handled."
 - 5. Sewage Disposal Officer report to OOD: At _____ (time), waste plumbing drains were diverted overboard. The sewage transfer hose is disconnected and clear of the ship. The CHT system is aligned for transit mode.
 - 6. OOD have deck log entry made and report to CDO: At _____ (time), waste plumbing drains were diverted overboard. The sewage transfer hose is disconnected and clear of the ship. The CHT system is aligned for transit mode.
- TRANSIT MODE TO AT-SEA MODE (SDTA)
- 1. OOD notify Sewage Disposal Officer: Ship has exited restricted waters.
 - 2. Sewage Disposal Officer request OOD to pass over the 1MC: "Set the sewage disposal detail."
 - 3. Sewage Disposal Officer report to OOD: At _____ (time), soil plumbing drains were diverted overboard. The CHT system is aligned for at-sea mode.
 - 4. OOD have deck log entry made: At _____ (time), soil plumbing drains were diverted overboard. The CHT system is aligned for at-sea mode.
- AT-SEA MODE TO TRANSIT MODE (SDAT)
- 1. When required, request barge service for anchorage.
 - 2. One hour prior to entering restricted waters, OOD notify Sewage Disposal Officer: Ship will be in restricted waters in one hour.

PROCEDURE

3. Sewage Disposal Officer request OOD to pass over the 1MC: "Set the sewage disposal detail."
4. Sewage Disposal Officer report to OOD: The CHT system is ready to commence collecting soil plumbing drains.
5. Thirty minutes prior to crossing the three-mile mark, OOD notify Sewage Disposal Officer: Shift the CHT system to the transit mode.
6. Sewage Disposal Officer report to OOD: At _____ (time), soil plumbing drains were routed to and are being held in the CHT sewage holding tanks. The CHT system is aligned for transit mode.
7. OOD have deck log entry made: At _____ (time), soil plumbing drains were routed to the CHT sewage holding tanks. The CHT system is aligned for transit mode.

TRANSIT MODE TO IN-PORT MODE (SDTI)

1. Sewage Disposal Officer request OOD to pass over the 1MC: "Set the sewage disposal detail."
2. Sewage Disposal Officer report to OOD: The CHT system is ready to commence collecting waste plumbing drains.
3. Sewage Disposal Officer request OOD to pass over the 1MC: "Personnel **not** involved in sewage disposal operations stand clear of the inboard shore connections while sewage transfer hose is being handled."
4. Sewage Disposal Officer report to OOD: At _____ (time), the sewage transfer hose was connected to _____ (receiving facility). Waste plumbing drains were routed to the CHT sewage holding tanks. The CHT system is aligned for in-port mode.
5. OOD have deck log entry made and report to CDO: At _____ (time), the sewage transfer hose was connected to _____ (receiving facility). Waste plumbing drains were routed to the CHT sewage holding tanks. The CHT system is aligned for in-port mode.

COMPONENT PROCEDURE

SEWAGE COLLECTION SYSTEM (AFTER PORT)

C. P. NO.

SCS

C. P. DESCRIPTION

SHIFTING FROM IN-PORT MODE TO TRANSIT MODE
 SHIFTING FROM TRANSIT MODE AT-SEA MODE
 SHIFTING FROM AT-SEA MODE TO TRANSIT MODE
 SHIFTING FROM TRANSIT MODE IN-PORT MODE

PROCEDURE

SHIFTING FROM IN-PORT MODE TO TRANSIT MODE

NOTE: Numbers refer to valves as numbered in diagrams DCHT and DGWD.

NOTE: Initial system alignment shall be in accordance with Valve Table VTI.

NOTE: The sewage disposal collection, holding, and transfer (CHT) system is aligned with soil and waste drains routed to the CHT tanks. The air blowers are in operation. Sewage pumps are operating in the automatic mode transferring sewage to the receiving facility through the shore connections.

WARNING: WHEN WORKING IN SPACES WHERE SEWAGE CONTAMINATION IS A POSSIBILITY, RUBBER GLOVES, RUBBER BOOTS, AND COVERALLS MUST BE WORN.

WARNING: EATING, DRINKING, AND SMOKING ARE PROHIBITED.

WARNING: WHEN SPILLAGE OCCURS, WASH DOWN WITH HOT POTABLE WATER CONTAINING A STOCK DETERGENT.

WARNING: WHEN SPILLAGE OCCURS, NOTIFY SEWAGE DISPOSAL OFFICER AND MEDICAL DEPARTMENT.

1. Ensure wrenches are available for operating 1 1/2-inch and remote operated valves.
2. Place/ensure the following valves are in the position indicated:

<u>VALVE</u>	<u>VALVE NO.</u>	<u>POSITION</u>	<u>OPERATOR LOCATION</u>
a. WASTE SCUPPER	3-57-8	OPEN	
b. 3W2P WASTE DIVERTER	3-58-6	OVBD	
c. 3W2P WASTE DIVERTER	2-57-4	OVBD	
d. WASTE SCUPPER	3-57-6	OPEN	
e. 3W3P WASTE DIVERTER	3-58-4	OVBD	
f. 3W2P WASTE DIVERTER	2-57-6	OVBD	

OVERSEAS DISPOSAL

CHECK LOCAL PORT REGULATIONS

- PIER
- BARGE
- TRUCK



OVERSEAS DISPOSAL

CHECK LOCAL PORT REGULATIONS



OVER THE SIDE



Discharge Restriction Exemption

“Sewage Discharge Regulations Shall Not Preclude Overboard Discharge When An Emergency Situation Exists and Failure To Discharge Would Endanger The Health And Safety Of Personnel.”

NSTM 593-4.1.3

DUMP OR DIE CLAUSE

**HYGIENE, SAFETY,
AND SANITATION**



PURPOSE

- Prevent exposure of personnel to raw sewage during high risk operations



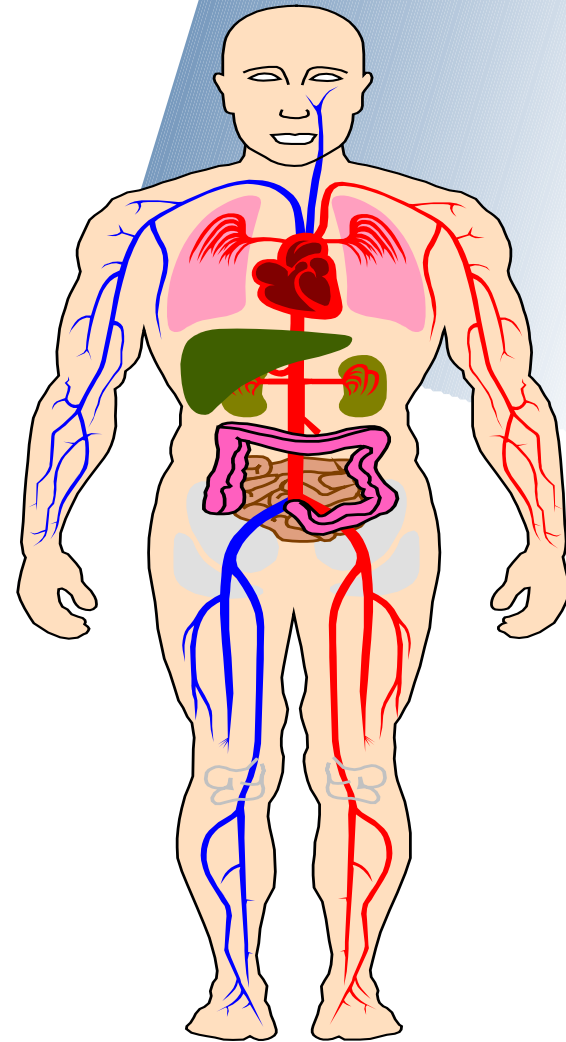
HIGH RISK OPERATIONS

- **Hose Handling**
- **Pump Maintenance**
- **Valve Maintenance**



SYSTEM HEALTH HAZARDS

- Hydrogen Sulfide
- Methane
- Ammonia
- Hepatitis
- Typhoid Fever
- Dysentery
- Cholera



HYGIENE

- PPE - Coveralls, Rubber Boots, Rubber Gloves, Face Shield



✉ HANDLE **POTABLE WATER** HOSES
FIRST

✉ NO EATING, DRINKING OR
SMOKING



HYGIENE

- **Flush system for 10 minutes with salt water prior to disconnect**
- **Keep immunizations current**
- **Wash hands, arms, and face (with soap)**



HYGIENE

- Wash contaminated spaces with detergent and water (betadyne)
- Never walk through manned spaces with contaminated clothing
- Bag contaminated clothing
- Wash clothes separately
- Clean rubber boots, gloves, and faceshield with disinfectant



HYGIENE



DRIP PANS

- **Food Storerooms**
- **Food Preparation or Messing Areas**
- **Utensil Storage Areas**
- **Medical and Dental Spaces**
- **Berthing Spaces with valves located above bunks**



CHT PUMP ROOM SAFETY

- **Transfer Pumps and Comminutors -
0 leakage**
- **Drip Pans beneath pumps**
- **2 EEBDs in Pump Room**
- **No eating or drinking**



CHT PUMP ROOM SAFETY



- **Exhaust ventilation ducting must be within 9” of deck**
- **Airflow indicators installed**
- **Warning Placards**
- **Wash-up facilities**
- **Fire Hose connection**



TANK ENTRY PROCEDURES



TANK ENTRY

EMERGENCY



- *CO's permission required (IDLH)*
- Follow requirements as per NSTM 593 (page 4-20, steps 1-10)
- Recertify every 4 hours until sludge removed (then 8 hrs)
- Ventilation
- Respiratory protection



TANK ENTRY STEPS 1-10



- Divert all drains overboard, tag out
- Isolate all heads, drains below the level of the overflow discharge
- Ensure valve in overflow discharge line is open
- Operate aeration system if available
- Pump out tank completely
- Open tank wash down valve & fill tank until water is observed coming out from overflow overboard discharge. Secure wash down
- Repeat Steps 5 & 6
- Repeat Step 5
- Secure air supply
- Secure pump isolation valve



SPILL PROCEDURES



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- In-port shifting of berth (SDIT/SDTI)

The following personnel will man stations as indicated:

SEWAGE SPILL CLEAN-UP PROCEDURES

- Procedures should be outlined in your

TOXIC GAS BILL

- Follow the Nine Phases of a Hazardous Material Spill
 - NAVOSH Program Manual



SEWAGE SPILL CLEAN-UP PROCEDURES

- **EVACUATE SPACE IMMEDIATELY**



SEWAGE SPILL PROCEDURES



- **Pass the Word**
- **Notify what type of spill, amount, compartment #**
- **Isolate the compartment**
 - **Secure ventilation**
 - **Close all doors**
 - **Secure all WT fittings**
- **Remove casualties**



SEWAGE SPILL CLEAN-UP PROCEDURES

- **Notify ship's Gas Free Engineer**
- **Test area**
- **Safety watch with respiratory protection**
- **Wash down**
- **Respiratory protection on hand for cleaners**



SEWAGE SPILL CLEAN-UP PROCEDURES

- Gas Free every 2 hours; every 1 hr. if temps above 90 deg F.
- Possible portable ventilation
- Final wash down with stock detergent and water
- Disinfectant
- MDR must certify space as clean



SEWAGE SPILL CLEAN-UP PROCEDURES



- **Contaminated Bilges:**
 - pumped out
 - washed w/ fire hose
 - pumped out again
- **Potable Water Tanks**
 - Monitor daily



SEWAGE DISPOSAL OPERATIONS

- *ALL Operators*

Sewage
Collection,
Holding, and
Transfer (CHT)
Course

- A-652-2141
- STEP CD-ROM

- *Operator / Supervisors*

Shipboard Sewage
Collection, Holding,
& Treatment PQS
NAVEDTRA 43199-C
WATCHSTATIONS

301 - 304



SUMMARY



- We discussed the Procedures and Safety Requirements of Sewage System Maintenance

- We explained the Requirements, Regulations and Procedures for MSD/CHT Tank Entry



REVIEW QUESTION #1



- What is the publication in which CHT Tank Entry Procedures are prescribed?

NSTM 593
POLLUTION CONTROL



REVIEW QUESTION #2

- When are you allowed to perform CHT Tank Entry Procedures?



***EMERGENCY
CO'S PERMISSION***

