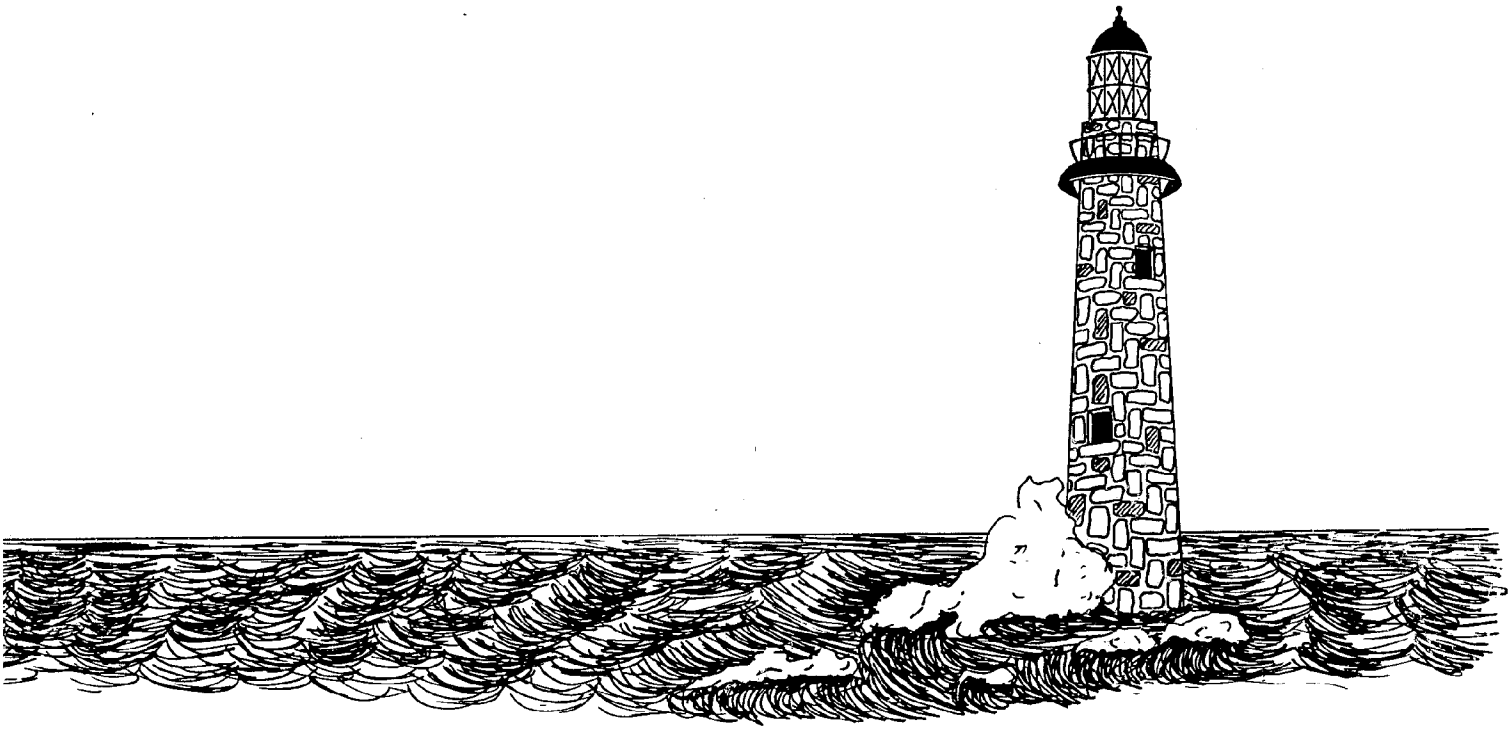
Portsmouth Harbor Marine Firefighting Contingency Plan

OPERATION MANUAL

JUNE 1988



PORTSMOUTH HARBOR MARINE FIREFIGHTING

CONTINGENCY PLAN

OPERATION MANUAL

June 1988

Prepared by: MARITECH of Newmarket, New Hampshire
Principals: Captain David B. Moskoff
Daphne M.N. Fotiades

Prepared for: New Hampshire State Port Authority
Director: Ernest Connor

In Conjunction with

New Hampshire Office of State Planning
Principals: William Ray
Stephanie D'Agostino

U.S. DEPARTMENT OF COMMERCE NOAA
COASTAL SERVICES CENTER
2234 SOUTH HOBSON AVENUE
CHARLESTON, SC 29405-2413

"The New Hampshire Coastal Program provided a grant for the preparation of this manual which was financed in part by the Coastal Zone Management Act of 1972, as amended, administered by the Office of Ocean and Coastal Resources Management, National Oceanic and Atmospheric Administration." June 1988. To MARITECH.

TH9130.P67 1988
MAY 15 1987
Property of CSC Library

PORTSMOUTH HARBOR MARINE FIREFIGHTING
CONTINGENCY PLAN

OPERATION MANUAL

TABLE OF CONTENTS

i	MAINTENANCE SHEET	Record of Changes
1.0	INTRODUCTION	Background Purpose Participants Legal Basis Maintenance
2.0	JURISDICTIONS	
3.0	NOTIFICATION	
4.0	'PLAN' ACTIVATION	
5.0	ROLES AND RESPONSIBILITIES	Vessel Personnel Municipal Fire Departments U.S.C.G. Agencies
6.0	COMMUNICATIONS	
7.0	EQUIPMENT AND RESOURCES	Inventory Special Resources
8.0	FACILITY INFORMATION	
9.0	COMMAND POST	
10.0	EMERGENCY OPERATING CENTER (EOC)	
11.0	STAGING	
12.0	INCIDENT RESPONSE POSITIONS	
13.0	STRATEGY AND TACTICS	
14.0	STABILITY	
15.0	VESSEL MOVEMENT WITH FIRE ONBOARD	
16.0	FIRE CONTROL BERTHS	
17.0	GROUNDING, SCUTTLING AND SINKING SITES	
18.0	ENVIRONMENT	
19.0	APPENDIX	

MAINTENANCE SHEET
for the
PORTSMOUTH HARBOR MARINE FIREFIGHTING
CONTINGENCY PLAN

OPERATION MANUAL

Change Number	Date Change Recorded	Person Recording Change

1.0 INTRODUCTION

1.1 Background

The New Hampshire Port Authority has undertaken to develop a Marine Firefighting Contingency Plan (hereinafter referred to as 'Plan' or PHMFCP) for the Port of Portsmouth and Piscataqua River. The 'Plan' is conceptually different from other U.S. port and Portsmouth Harbor marine incident plans. The PHMFCP Operation Manual is derived in part from these plans. It has been developed with the intent to avoid conflict with the Portsmouth Harbor and regional plans listed in Section 1.1.1. The Operation Manual is intended to complement COTP plans for the Port of Portsmouth which have been promulgated by MSO, Portland, Maine. At this time, however, several port and emergency plans on which this 'Plan' is based, are undergoing revisions and updating. Until those revisions are finalized and all plans coordinated, there are plan information differences. The differences are basically Notification Schemes, the Jurisdiction Grid, task descriptions, checklists and similar information.

The Portsmouth Harbor Marine Firefighting Contingency Plan has been promulgated by the New Hampshire Port Authority and Office of State Planning as a series of project components. These include Inventory, Fire Hazard Assessment, Training, Needs and Recommendations, and, this Operation Manual. As a component of this 'Plan', the Operation Manual has been developed to help provide for increased coordination of the established multi-agency response to fire onboard a vessel. The 'Captain of the Port(COTP) Joint Piscataqua River Marine Disaster Plan' is the recognized marine firefighting and marine disaster plan for Portsmouth Harbor. LPG incidents are covered under the 'COTP LPG Vessel Management Plan and LPG Emergency Contingency Plan'.

The PHMFCP Operation Manual contains 1.)enhanced information from the plans listed in Section 1.1.1, and, 2.)various matters not written into the existing marine incident plans relevant to marine firefighting. Information contained herein is 1.)unique to the Portsmouth Harbor Marine Firefighting Contingency Plan both in format and content, and 2.)generally accepted standard for ports and harbors throughout the United States, customized and developed for Portsmouth Harbor, New Hampshire and Maine.

No plan should be considered finalized as contingency planning is an ongoing process. According to the USCG Marine Safety Manual, "A contingency plan enables decision makers to take expeditious and predictable actions to prevent or mitigate potentially disastrous conditions. Contingency planning does not replace good judgment and experience in an emergency; however, it augments those qualities significantly...Contingency planning is a long-established practice among emergency services, its goal being to maximize efficiency when an emergency occurs."

Every marine fire event is different. Plan participants and agencies change. Ideas change; concepts change and new information is constantly being researched. Marine firefighting principles change. New products also affect strategy, tactics and decision making. The guidelines set here must always be applied on a case by case basis. **Never hesitate to seek technical and professional expertise. Marine firefighting is highly specialized and it is impossible to determine all events that may occur and/or actions to take.** Concerns of and interpretations by participants in the development of this 'Plan' and Operation Manual, and generally accepted practices may change. Do not hesitate to question, confirm or redesign.

1.1.1 Plans.

Experience from previous marine firefighting incidents has clearly indicated the importance of contingency planning and the identification of necessary resources from federal, state, local and private levels. A marine firefighting incident, particularly of a major nature will most likely require resources beyond those locally available. Accordingly, a number of existing local plans were combined into the PHMFCP, and marine fire resources were identified to address these issues.

Plans reviewed for applicability to the Portsmouth Harbor Marine Firefighting Contingency Plan (PHMFCP) include:

- -COTP LPG Vessel Management and Emergency Contingency Plan
- -Emergency Oil Spill Containment and Removal Strategies for Piscataqua River Terminals
- -Inventory of the Natural Resources of the Great Bay Estuarine System
- -COTP Joint Piscataqua River Marine Disaster Plan
- -New Hampshire Hazardous Materials Incident Emergency Response Plan
- -Oil and Hazardous Materials Pollution Contingency Plan
- -Oil Pollution Control Training Manual: NHWSPCC and Coastal Energy Impact Program
- -Sea-3, Inc. Emergency Procedures

Plans that were not reviewed nor incorporated in the development of the PHMFCP, but are also important to the port area include: the 'MSO Portland Subregional Oil and Hazardous Substances Pollution Contingency Plan', those under consideration by the Portsmouth Naval Shipyard, Newington Mass Casualty Plan, and all waterfront facilities and agency response plans, among several.

Agencies with responsibility for Portsmouth Harbor and outlying marinas and harbor areas, as well as marinas outside the COTP zone within state boundaries, have marine firefighting concerns. The 'Plan' as is, does not specifically lend itself to incident response in these areas. Further contingency planning by individual fire departments, waterfront facilities, New Hampshire and Maine State agencies, and federal agencies is encouraged based upon the meetings, discussion and flow of information between February 1988 and May 1988. Due to the organizational and jurisdictional uniqueness of Portsmouth Harbor, response planning for facilities and harbors should be done as individual pre-fire plans where not already done so.

1.2 Purpose

The purpose of this Operation Manual is to provide increased coordination between organizations and resources responding to a marine fire incident for the protection of Portsmouth Harbor. The manual includes information on prefire as well as marine firefighting incident response activities. It addresses multiple agency response to a waterborne emergency. It lists current resources of equipment and personnel. The manual may help establish design of a comprehensive resource and information system which enables more timely and facilitated response efforts.

This Operation Manual should not be viewed as the ultimate version for enhancements are desirable. The schematics need to be monitored and tested at regular intervals by marine fire incident response agencies and other participants.

1.3 'Plan' Participants

Participation in the development of this project and use of this Operation Manual is voluntary. Twenty nine (29) agencies listed in various incident plans were invited to participate in the development of the PHMFCP. These groups represent a cross section of agencies who may or will be involved in marine fire incident response. However, the list is not all inclusive. In the event of a major marine fire, it is possible that other plans may be initialized and other agencies will join. Accordingly, all agency response will be automatic per existing plans. Activity and response may come from many, including Maine, New Hampshire, U.S. Department of Transportation and U.S.C.G., Department of Defense and Portsmouth Naval Shipyard and Pease Air Force Base, municipal and private agencies.

1.3 'Plan' Participants (continued)

The list of those who were contacted throughout the project follows in the format used for PHMFCP development purposes.

Shorebased

Department of Transportation - New Hampshire
Fire Marshal - New Hampshire Department of Safety
Maine, Department of Environmental Protection
Maine, York County Emergency Management Agency
Municipal Fire Departments of:

Newington, N.H.	Rye, N.H.
New Castle, N.H.	Eliot, Maine
Portsmouth, N.H.	Kittery, Maine

Office of State Planning - New Hampshire
New Hampshire Department of Safety HAZMAT Inspectors
New Hampshire Fire Standards and Training Commission
Office of Emergency Management - New Hampshire Governor's
Pease Air Force Base

Marine Shipboard

Isles of Shoals Steamship Company
Portsmouth Naval Shipyard
Portsmouth Navigation Division
United States Coast Guard

Marine Shoreside

Granite State Minerals
Bureau of Bridge Maintenance
National Gypsum Company, Inc.
New Hampshire Port Authority
New Hampshire Water Supply and Pollution Control Commission
Public Service Company of New Hampshire
Sea-3, Inc.
Simplex Wire and Cable Company, Inc.
C.H. Sprague & Son Company, Inc.

This is not a mutual aid Operation Manual per se. The PHMFCP operational organization relies on implementation of the existing mutual aid organization of the involved agencies and plans listed under Section 1.1.1 Plans, and Section 1.3 'Plan' Participants. Mutual aid agreements are signed for other plans whose implementation may be compatible with use of this Operation Manual and the PHMFCP project components. It should be recognized that effective mutual aid is necessary to a major marine fire incident. Mutual aid requests should be originated through appropriate channels according to existing arrangements.

1.3 'Plan' Participants (continued)

Events can occur however, which necessitate the withdrawal of mutual aid resources by a response agency. According to policy of the 'Piscataqua River Marine Disaster Plan', "Should the need arise for participating agencies to withdraw their resources during a response under this plan, it should be done after discussion with other agencies on scene." The 'Piscataqua River Marine Disaster Plan' does not apply to all agencies and is a voluntary plan. However, this practice applies to most mutual aid agreements. Conditions may also occur which limit resources to 'assistance as available' which is the policy of most federal agencies.

1.4 Legal Basis

The Portsmouth Harbor Marine Firefighting Contingency Plan Operation Manual has no authority to supersede existing plans, arrangements or agreements between various local, state, federal, private agencies and parties; nor does implementation of this Operation Manual exclude the invocation of any other plan listed herewith, or, recognized elsewhere either locally, statewide (Maine or New Hampshire), federally or private. The Operation Manual and PHMFCP integrate information and statements from existing plans. This is not to designate, or imply consent or approval by any agency as to the legal basis or acceptance of this 'Plan'; or that this 'Plan' takes precedence over any other existing plan or plans.

This Operation Manual is currently a guideline to be used in conjunction with accepted plans. All reasonable attempts have been made to use accurate and reliable information. Use of information from any plan does not imply, suggest, endorse, or recommend validity and accuracy of plans.

1.5 'Plan' Maintenance

The PHMFCP is under the authority of the New Hampshire Port Authority. Considerations regarding 'Plan' and Operation Manual maintenance should be directed to the Director, New Hampshire Port Authority, Box 506, Portsmouth, New Hampshire, 03801.

2.0 JURISDICTIONS

Jurisdictions are ofttimes considered the territorial range of authority or control of an agency. They sometimes include lines of authority and chain of command. For this Operation Manual, jurisdiction is defined in standard terminology as the right and power 1.) to interpret and apply a plan within its jurisdiction, 2.) of authority or control, 3.) of administration and rule, and 4.) within the territorial range of an agency.

Understanding the complexity of jurisdiction and change of command has been one of the more difficult challenges past marine fire response agencies have coped with. A triangle of incident command is formed by the Chief Fire Officer, Captain of the Port and Captain of the vessel; unless a Defense Area is involved, or the incident is declared a pollution or HAZMAT occurrence. Very basically said, the Chief Fire Officer has responsibility for the municipality and adjacent area as they fall under Incident Command. The COTP has responsibility for the safety of the Port. The Captain has responsibility for the vessel and crew. Wherever the chain of responsibility leads from or points to, each commander has an obligation to protect life and structure within their jurisdiction. It is difficult to prepare for disagreements between any one or all of these Commanders. However, written understandings regarding the authority of Incident Command may help and should be considered for an Operation Manual.

This section contains three parts on jurisdictions. The first is a **List of Jurisdictions.** It is derived from key marine incident plans for some key marine incident organizations. This information is included to supply an understanding of how jurisdiction is defined for Portsmouth Harbor within the PHMFCP scope. Only information supplied by the jurisdictional agency is included except for that of fire departments.

The second part is a **Jurisdiction Grid.** It was developed from existing information and discussed during workshops and afterwards. It charts jurisdictional control as the relationship between territorial boundaries and the nature of an incident. The detail and format of the Grid is unique to Portsmouth Harbor. It has been reviewed by and developed with appropriate authorities. However, its legal basis is only insofar as it may be adopted by existing plans, and has been preliminarily agreed to by agency representatives. It is at this time, an up-to-date and detailed listing of who is in charge and under what circumstances. The third part is **Change of Command.** Since this is an important issue for Portsmouth Harbor's multi-jurisdiction environment, some examples have been highlighted.

2.1 Part One: Jurisdiction By Plan for Some Key Marine Fire Incident Response Agencies.

1.Municipal Fire Departments:
In general:
Jurisdiction: The geographical boundaries of the municipality including the waters of the Piscataqua River up to the middle of the river and state boundary, extending along the shoreline and sided by boundaries of adjacent municipalities. Marine firefighting incident jurisdiction for municipal firefighters is also determined by the nature of the incident.

2.United States Coast Guard:
COTP Portland, Maine LPG Vessel Management Plan and LPG Emergency Contingency Plan
Jurisdiction: Navigable Waters of the United States

MSO Portland, Maine Subregional Oil and Hazardous Substances Pollution Contingency Plan
Jurisdiction: Discharges of oil or hazardous substances into or upon the navigable waters of the United States, adjoining shorelines, or into or upon the waters of the contiguous zone.

USCG MSO Piscataqua River Marine Disaster Plan (also referred to as COTP)
Jurisdiction: Navigable waters of the United States and adjacent waterfront facilities on the shores of Maine and New Hampshire

3. Vessel: Jurisdiction: Master has responsibility for the safety of the vessel and crew.

4.Sea-3, Inc.:
Sea-3, Inc. Contingency Plan
Jurisdiction: The Chief Fire Officer is in charge of an incident at Sea-3, Inc.: such incident being within the geographical boundaries of the Newington township. Presumably the Chief Fire Officer is from the Newington Fire Department. (See Needs and Recommendations - National Defense Areas.)

5.New Hampshire Governor's Office of Emergency Management:
N.H. Hazardous Materials Incident Response Plan
Jurisdiction: Covers all of New Hampshire which includes those areas of the harbor that are within state boundaries. Jurisdiction does not override local jurisdictions and is, by definition, a support-role type of jurisdiction.

Jurisdiction by 'Plan' (continued)

6.New Hampshire Fire Marshal:
N.H. Hazardous Materials Incident Response Plan
Jurisdiction: In charge of hazardous materials transportation incidents for all areas of New Hampshire within state boundaries and those of New Hampshire harbor areas. This is under review.

7.N.H. Department of Safety/Division of Enforcement:
N.H. Hazardous Materials Incident Response Plan
Jurisdiction: Covers all of New Hampshire which includes those areas of the harbor that are within state boundaries. Case by case.

2.2 Part Two: Jurisdiction Grid

No single organization has the sole responsibility for fighting ship fires in and along the Piscataqua River. Numerous agencies are tasked with protecting the harbor, river, adjoining waterways and land which may be affected by a marine fire incident response. While the US Coast Guard is commonly thought to be responsible for all ship fires, this is not the case. Coast Guard firefighting activity is limited. **USCG authority and responsibility to handle marine firefighting is not comprehensive.** (See Section 5 Roles and Responsibilities)

The Jurisdiction Grid following on pages 9 and 10 outlines initial **Incident Command (IC) / On Scene Coordinator (OSC)** for several locations of vessel fire according to the nature of the incident and who is in overall charge. This grid addresses jurisdictional authority for various local (Maine and New Hampshire), state (Maine and New Hampshire), and federal agencies including Department of Transportation and Department of Defense.

Federal agencies will be represented by a federal On Scene Coordinator (OSC). As circumstances dictate, the federal OSC may also act as OSC in overall charge; IC in other terms. When a Chief Fire Officer assumes IC, a federal OSC will also be present though not in overall charge. To avoid semantics and confusion on whether the individual is called IC or OSC per its organization's title, a '/' has been inserted between titles. The term 'IC/OSC' indicates overall in charge of an incident, whether or not the individual is called IC or OSC acting in overall charge.

It is not customary in United States' ports for private agencies to command an incident. This is so for facility owners and operators as well as vessel owners and operators. Salvage companies and the like are generally brought in after initial response operations and command.

PORTSMOUTH HARBOR MARINE FIREFIGHTING
1988 JURISDICTION GRID
FOR
VESSEL FIRE INCIDENT COMMAND/
VESSEL FIRE ON SCENE COORDINATOR

OCCURRENCE OF FIRE ONBOARD A VESSEL BY LOCATION AND THE NATURE OF THE INCIDENT WITHOUT POLLUTION AND HAZARDOUS MATERIALS

FIRE EVENT	INITIAL INCIDENT COMMAND/OSC
MOORED AT FACILITY:	
1. PIER/WHARF	Chief Fire Officer
2. DOCKING/UNDOCKING	Chief Fire Officer
NOT MOORED AT FACILITY:	
3. ANCHORED WITHIN MAINE OR NEW HAMPSHIRE FIRE DEPT. JURISDICTION	COTP or COTP REPRESENTATIVE
4. IN TRANSIT ENTER WITHOUT FIRE; FIRE OCCURS	COTP or COTP REPRESENTATIVE
5. IN TRANSIT ENTER WITH FIRE UNDER CONTROL	COTP or COTP REPRESENTATIVE
6. IN TRANSIT COLLISION/HARD AGROUND IMMOVABLE	COTP or COTP REPRESENTATIVE
7. IN TRANSIT COLLISION/GROUNDING IMMEDIATELY MOVABLE	COTP or COTP Representative

The term IC/OSC indicates overall in charge of an incident whether or not the agency refers to the position as Incident Command or On Scene Coordinator. Federal agencies are represented by an OSC when acting as over all in charge or as federal agency representatives.

VESSEL FIRE INCIDENT COMMAND/ VESSEL FIRE ON SCENE COORDINATOR

OCCURRENCE OF FIRE ONBOARD A VESSEL BY LOCATION AND THE NATURE OF THE INCIDENT WITHOUT POLLUTION AND HAZARDOUS MATERIALS

FIRE EVENT	INITIAL INCIDENT COMMAND/OSC
MISCELLANEOUS:	
8. PNSY: WATERFRONT	PNSY Chief Fire Officer
9. PNSY: DEFENSE AREA	PNSY Chief Fire Officer
10. PAFB:PLANE WITH VESSEL ON WATER	Undetermined
11. PAFB: DEFENSE AREA-DFSP	PAFB Fire Department
12. PAFB: DEFENSE AREA-Sea-3, Inc.	Undetermined
13. VISITING VESSEL-DOT	Undetermined
14. -DOD	Undetermined
15. -Foreign	Undetermined
16. SMALL CRAFT-RECREATIONAL:AFLOAT 17. SMALL CRAFT-COMMERCIAL :AFLOAT	USCG Station Portsmouth Harbor in charge. Discretion used for vessel size and response capability.
18. SMALL CRAFT-RECREATIONAL:DOCKED 19. SMALL CRAFT-COMMERCIAL :DOCKED	Chief Fire officer in Charge. Remain at pier. No setting afloat unless permission granted by the COTP.
20. OUTSIDE FIRE DEPT. JURISDICTION/ IN JURISDICTION OF THE COTP	The COTP will consult with Chief Fire Officers for the decision to bring the vessel in.
21. STRADDLES STATE AND MUNICIPALITY BOUNDARY	COTP or COTP Representative
22. USCG STATION PORTSMOUTH HARBOR	Per the USCG Portsmouth Harbor Plan

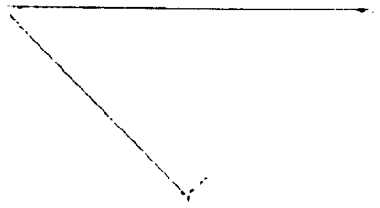
2.3 Part Three: Change of Command

There are events which may affect a change of command. Possibilities include inter-agency jurisdiction change, intra-agency change, geographic change, inability to perform, and request to change.

For example, due to the generally transited navigation routes of the harbor, a vessel underway may change jurisdiction between states, municipalities and federal areas. Referring to the Grid for vessels with fire underway or anchored, the OSC (IC in other terms) is the COTP MSO Portland, Maine even as it changes geographical water boundaries. As soon as the vessel is docked or docking, OSC shifts to landbased IC of the municipality or agency where it has docked. To reverse this, if it is decided to move the docked vessel per orders of the COTP consulting with appropriate agencies, the IC originating with the landbased agency shifts to the USCG COTP OSC as it moves from the dock. Another example for a vessel underway is a person to person, intra-agency change of command. During the time it takes the COTP to travel from Portland, Maine to the Portsmouth Harbor area, the COTP may appoint a federal OSC to command until the COTP arrives to assume command. If the COTP is also IC/OSC, most likely this same representative will fill both positions until assumption of command by the COTP. The appointment of the COTP representative will be on a case by case basis. Incident Command for a vessel underway with fire may by circumstance, also temporarily rest with the vessel's master, familiarly known as the Captain.

Refer to the Jurisdiction Grids on Pages 9 and 10 for the jurisdictional listing of these occurrences. Depicted below is the triangle of command formed by the Chief Fire Officer, Captain of the Port and Captain (Master) of the vessel.

Chief Fire Officer **Captain of the Port**



Captain of the Vessel

3.0 NOTIFICATION

The notifications for marine fire call-ups are:

1. **Vessel Moored at Facility**
2. **Vessel Not Moored When in Transit or Anchored.**

The incident is without declaration of pollution or hazardous materials. **Refer to pages 15 and 16 for the Notification layout. It should be noted that these Notification schemes have not been finally approved. They MUST be tested and all parties MUST agree to their use.**

Notification schemes from the following plans were pictographically compiled and united into the call-ups for these two Marine Fire Incident Notification Schedules. Since the PHMFCP is a combination of these 'Plans', the notifications differ accordingly.

-State of New Hampshire Oil and Hazardous Materials Pollution Contingency Plan:P.79
-State of New Hampshire Oil and Hazardous Materials Pollution Contingency Plan:Initial Oil-Hazardous Material Spill Notification
-Newington Oil Spills Notification Procedure
-Newington Hazardous Material Spills Notification Procedure
-New Hampshire Hazardous Materials Incident Response Plan: Hazardous Materials Notification
-Piscataqua River Marine Disaster Plan-Plan Activation
-COTP LPG Facility/Vessel Moored Incident:Emergency call-up
-COTP LPG Plan for Vessel Harbor Transit Incident:Emergency Call-up
-Concept of York County Emergency Management Agency: Emergency Operating Center initiation: On-scene coordinator

3.1 General Basis of Notification/Call-up

Some of the general rationale for both layouts is combined in this section. It is mentioned for information purposes as there are differences between existing schemes and these charts regarding, 1. sequence of calls and, 2. agency contacts from existing notifications. Refer to the charts to follow these points.

Rationale:

ROW 1.: Most likely to be first observers/first callers. Each group is able to telephone or marine radio.

Facility personnel-designated per existing plans; may be first to note incident; maintain contact with vessel or are able to make notification for vessel; first on scene/first caller.

Vessel personnel-designated per existing plan; first on scene.

USCG on Scene-may be first on scene per existing LPG plan-MSO; relationship with and proximity to New Castle Group;

Bridge Operators-excellent observation of harbor; monitor channel 13; may be first observer/first caller.

Pilot-first on scene; marine radio communications capability.

Tug Operators-first on scene; marine radio communications capability.

ROW 2: Have the capability and responsibility to initialize long series of vital telephone calls.

USCG Station Portsmouth Harbor -excellent observation point; 24 hour monitoring of marine radio and full time dispatch; landline telephones; marine radio telephones; link with COTP; relationship with fire departments; trained in emergency response; back-up to round one of calls. Early notification also affects immediate dispatch of SAR boats and 'assistance as available'. Boats are usually crewed and depart New Castle Station within two minutes of notification.

Row 3 and on: Emergency services responsible and capable of initializing next series of calls.

Local Municipal Fire Department-important to notify as soon as possible for incident response; has dispatch to follow emergency operating procedures and additional notifications. The municipal fire department will call the Portsmouth Naval Shipyard Fire Department.

Newington Dispatch agency (**Durham dispatch**) operates from Durham-expected to soon have two full-time professional dispatchers on duty 24 hours a day who will in turn notify other fire departments on alert status or as conditions warrant.

3.1 Notification (continued)

State Police-will notify local police; NH Office Of Emergency Management and Maine Emergency Management Agency, and others as appropriate.

NHOEM and MEEMA-may initialize various emergency plans as necessary; NHOEM may activate the Hazardous Materials Incident Response Plan; OEM/CD will open the EOC as appropriate in Concord. Maine agencies will have been notified starting their chain of emergency operations and EOC openings as appropriate.

USCG MSO Portland-required to be notified; can appropriately organize maritime operations; responsible for port safety; will notify appropriate federal agencies; Maine and New Hampshire State Police and environmental agencies as required; tugs and pilots to get underway; will notify the Portsmouth Naval Shipyard Tugboats, NHPA and NH Dept. of Transportation.

Others-other appropriate agencies to alert or advise of a potential or ongoing incident listed in existing plans.

3.2 Differences with Existing Notification Schedules

The Notification charts integrate several plans. Major differences include:

1. Double notification of the Maine and New Hampshire State Police for verification purposes . The fire departments notify State Police early in the chain. USCG MSO notifies State Police later in the chain.

2. Portsmouth Naval Shipyard (PNSY) mutual aid. The local fire departments will notify the PNSY fire department. The USCG will notify the PNSY tugboats.

3. Additions. Marine terminals and Marinas were added per consideration of the Newington notification scheme and the need for incident status notification along the river. **Terminals, marinas and piers will be notified by the fire department within whose jurisdiction they are located.**

4. Change of dispatch. For vessel fire moored, dispatch has been changed to Newington. It is no longer Portsmouth.

5. USCG Station Portsmouth Harbor (SAR New Castle). Are able to start SAR immediately.

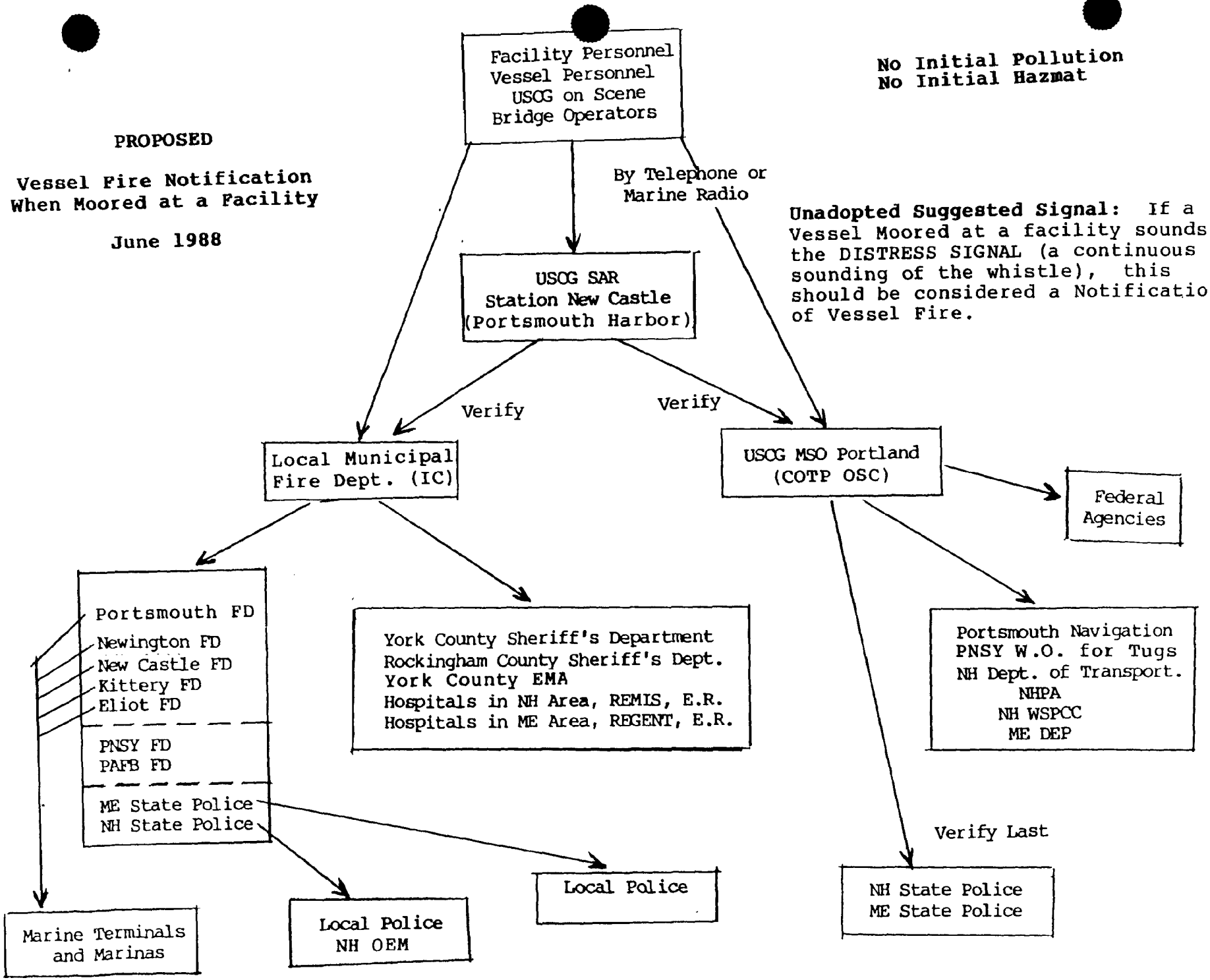
6. **Additions.** Vessel distress signal for 'Fire Aboard'indicated as a continuous sounding of the whistle.

PROPOSED

Vessel Fire Notification When Moored at a Facility

June 1988

No Initial Pollution
No Initial Hazmat

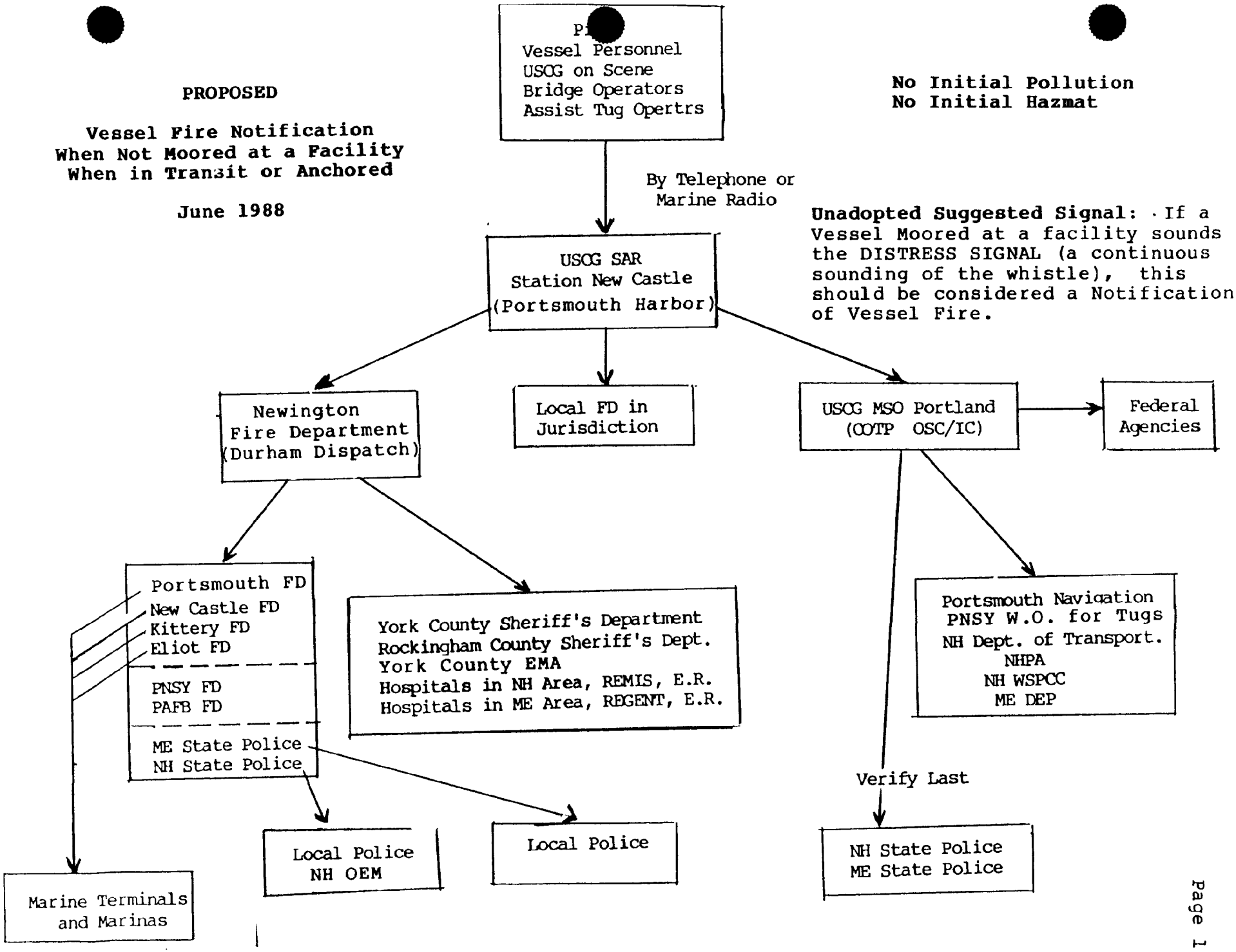


Unadopted Suggested Signal: If a Vessel Moored at a facility sounds the DISTRESS SIGNAL (a continuous sounding of the whistle), this should be considered a Notification of Vessel Fire.

PROPOSED

Vessel Fire Notification
When Not Moored at a Facility
When in Transit or Anchored

June 1988



No Initial Pollution
No Initial Hazmat

Unadopted Suggested Signal: If a Vessel Moored at a facility sounds the DISTRESS SIGNAL (a continuous sounding of the whistle), this should be considered a Notification of Vessel Fire.

4.0 PLAN ACTIVATION

The PHMFCP does not have a formal activation process. The Operation Manual is designed for use as a guideline to marine firefighting incident response. Initiation and activation of marine incidents, medi-vac, pollution, HAZMAT, police, transportation, evacuation, and other plans and issues should already be organized through emergency plans. **Some of these plans are being revised.**

The following description of circumstances which activate some incident 'Plans' relevant to marine firefighting is included for information purposes. As a guideline, the Operation Manual may be used in conjunction with these 'Plans' provided that differences, such as Notification schemes, are appropriately and reasonably worked with.

USCG MSO Piscataqua River Marine Disaster Plan.
Initialization/Activation: The plan is activated at the request of a Chief Fire Officer of New Castle, Newington, Portsmouth, Eliot, Kittery, PAFB, PNSY or the COTP, when a fire or other disaster is of such magnitude that several or all the listed communities will or may be impacted.

COTP Portland, Maine LPG Vessel Management Plan and LPG Emergency Contingency Plan
Initialization/Activation: Notice of arrival of gas ship scheduled to make a port call in Portsmouth.

Sea-3, Inc. Contingency Plan
Initialization/Activation: Incident to cause initial alarm to be struck.

MSO Portland Subregional Oil and Hazardous Substances Contingency Plan
Initialization/Activation: Discharges of oil or hazardous substances into or upon the navigable waters of the U.S., adjoining shorelines, or into or upon the waters of the contiguous zone.

N.H. Hazardous Materials Incident response Plan
Initialization/Activation: Any HAZMAT incident reported to State Police Communications.

5.0 ROLES AND RESPONSIBILITIES

Among the major items to design for an effective response effort are Roles and Responsibilities. Roles and Responsibilities can be detailed description of various tasks. An agency or response person who assumes a role, should have as complete as possible an understanding of that role, and the accompanying responsibility. The Roles and Responsibilities which have been assigned in 'Plans' of Section 1.1.1, are listed in the 'PHMFCP Needs and Recommendations Assessment'. They should be considered for inclusion in this manual following appropriate procedures. Due to a number of issues described in the Needs and Recommendations Assessment, only generalized descriptions of three groups are included in the Operation Manual. These are for informational purposes only as follows:

5.1 Master of the Vessel and Crew: The master and crew can be integral elements of response. A general organizational chart of vessel personnel appears on Page 19.

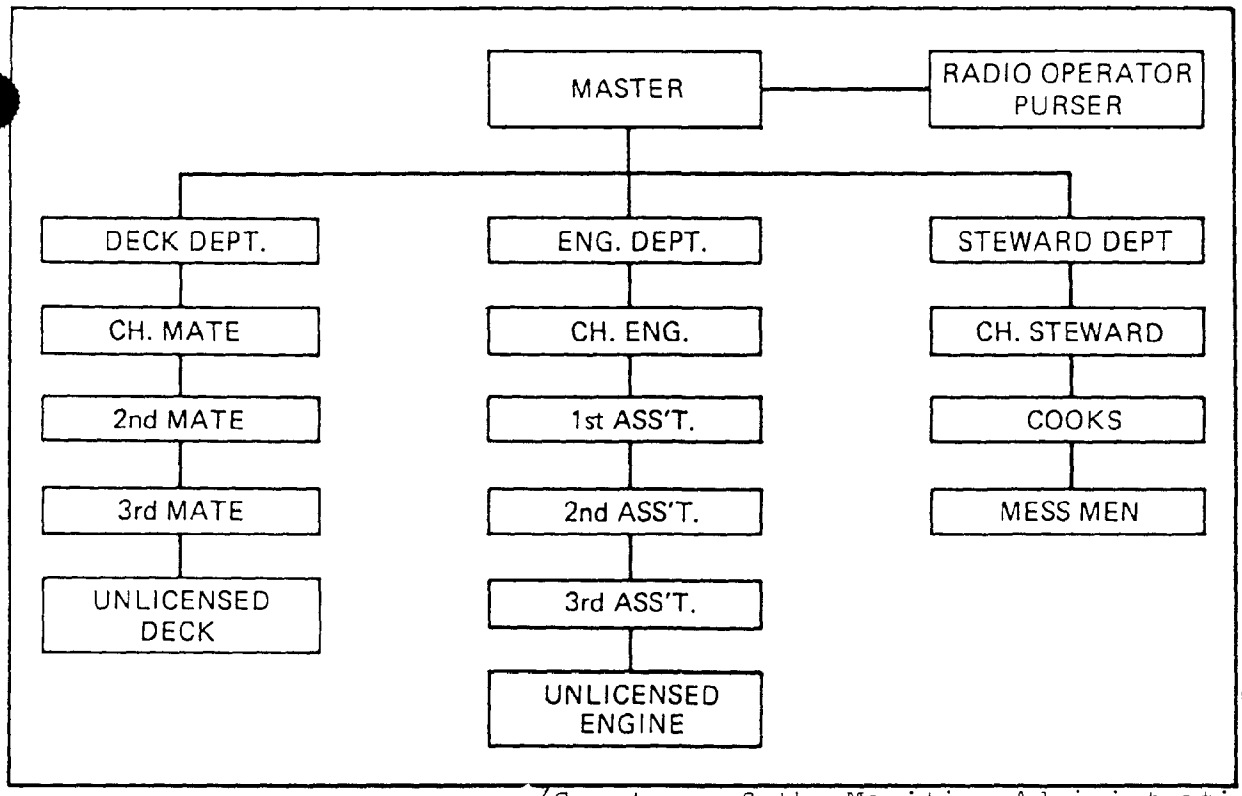
The Master (Captain), officers and crew are familiar with the vessel, cargo, and vessel fire protection system. The Chief Engineer and Engineering officers are particularly familiar with the ship's fire protection and vessel systems.

According to the Marine Safety manual,

> "The presence of local firefighters does not relieve the master of command or transfer the master's responsibility for overall safety on the vessel. However, the master should not countermand any orders given by the local firefighters in the performance of firefighting activities, unless action taken or planned clearly endangers the safety of the vessel or crew."

Policy regarding the relationship between local firefighters and the master should be developed for Portsmouth Harbor regarding jurisdictional in charge and expectations of each party. If this is not developed and conflicts arise, the above quote may be of assistance in resolving a dispute for the interpretation as to who is in charge.

Vessel Personnel



The chain of command aboard ship. (Courtesy of the Maritime Administration)

Towards the smallest possible crew

15,000 ton cargo liner
circa 1960

Master

Deck Department	*Engine Department*	*Catering Department*
Chief Officer	Chief Engineer	Ch Steward/Purser
2nd Officer	2nd Engineer	2nd Steward
3rd Officer	3rd Engineer	Chief Cook
4th Officer	4th Engineer	2nd Cook/Baker
2 Cadets (Deck)	5th Engineer	Butcher
Radio Officer	6th Engineer	3 Stewards
4 Quartermasters	C/Electrician	2 Catering Boys
1 Carpenter	2nd Electrician	
1 Bosun	2 Cadets (Engine)	
1 Bosun's Mate	1 ER Storekeeper	
8 Able Seamen	1 Donkeyman	
2 Ordinary Seamen	4 Greasers	
2 Boys	2 Boys	TOTAL 55

30,000 ton Containership
circa 1987

Master
Deck Department
Chief Officer
2nd Officer
3rd Officer
Radio/Electronics Officer
Engine Department
Chief Engineer
2nd Engineer
3rd Engineer
6 General Purpose Ratings
Catering
1 Cook
1 Cook/Steward
TOTAL 16

30,000 ton Containership
circa 1990

Master
Chief Watchkeeper } Deck or
2nd Watchkeeper } Engine
3rd Watchkeeper Communications
1 Electronics Specialist
4 Mechanics
1 Cook
TOTAL 10

Seatrade Publications

5.0 Roles and Responsibilities (continued)

5.2 Municipal Fire Departments: Local Fire Departments are responsible for fire protection within their jurisdiction. When the Chief Fire Officer assumes position of Incident Command, examples of Roles and Responsibilities may include:

-assume position of Incident Command if fire is at the pier
-assume charge of all aspects of the landbased fire fighting operation. This action does not relieve the Master of command of the vessel; nor should it conflict with circumstances when 1. the COTP is IC/OSC, 2. the COTP is federal OSC, 3. Defense agency assumes federal OSC.
-establish and position personnel at the Command Post
-formulate a plan of action for the extinguishment of the fire and the safety of personnel and property
-direct the activities of all personnel and equipment engaged in firefighting
-determine the need for and request mutual aid
-request dispatch of necessary personnel and equipment
-make all requests for USCG personnel and equipment through the COTP
-establish liaison with vessel master and crew
-establish liaison with other agencies as appropriate and in accordance with initiation of other plans
-establish workable communications system if not pre-established
-procure damage control plans, damage stability data and stability information of the vessel from pre-fire planning files or on scene. Begin stability monitoring.
-request assistance from police regarding pre-assigned roles
-request assistance from emergency management and civil defense agencies regarding pre-assigned roles
-alert Bureau of Bridge Maintenance to observe and be alert for bridge openings and closings and evacuation if necessary
-alert railroad companies of incident response underway and SOP on train movements through the area
-may request Temporary Flight Restrictions (TFR's) to provide a safe operation environment for disaster relief aircraft and prevent air congestion from observing aircraft(also through Pease and COTP)
-request assistance from Red Cross as predetermined
-activate medical emergency plans as appropriate and within jurisdiction
-assume roles and responsibilities through other plans
-assume Incident Command per conditions of 'Change of Command' Section 2.3 of this Operation Manual

5.2 Mutual Aid Fire Departments: Perform normal operating procedures.
-respond according to activated plans

5.0 Roles and Responsibilities (continued)

5.3 US Coast Guard: The USCG has responsibility for safety and security of ports and waterways as outlined in the Marine Safety Manual and the COTP and MSO Portland, Maine plans. The Captain of the Port (COTP) has federal responsibility for the safety and security of the port. USCG Station Portsmouth Harbor acts according to pre-assigned USCG SAR roles and responsibilities.

> "The COTP renders assistance as available, based on the level of training and the adequacy of equipment. The Commandant intends to maintain this traditional "assistance as available" posture without conveying the impression that the Coast Guard is prepared to relieve local fire departments of their responsibilities."(Marine Safety Manual)

Various roles and responsibilities the COTP may assume during marine fire incident response include:

-assume federal OSC as provided under jurisdictional authority
-assume OSC/IC if vessel is not docked
-assume operational control of Coast Guard forces
-establish safety or security zones as necessary
-may control the movements of vessels and boats
-may obtain tugs, towboats and Pilots as necessary
-may request Temporary Flight Restrictions (TFR's) to provide a safe operation environment for disaster relief aircraft and prevent air congestion from observing parties
-provide information on waterfront facilities which may be involved
-respond to pollution or hazardous materials discharges. Removal activities may be delayed until it is safe to proceed.
-provide advice on marine issues to fire departments
-assume roles and responsibilities through other plans
-assume Incident Command under conditions of Change of Command, Section 2.3 Operation Manual

6.0 COMMUNICATIONS

Landbased and marine based firefighting require orderly and planned communications operations. Basic communication considerations include:

-Use designated frequencies only unless authorized to use others.

-Do not engage in speculation over radio circuit. Radiotelephone communications are monitored by numerous parties.

-Traffic should be limited to essential communications.

-Limit transmission time; Others may need to use the frequency.

-Establish and use dedicated landline relays and communcation systems.

-Establish a dedicated marine firefighting channel/frequency.

-Establish communication SOP.

-Prepare backup communications.

Marine incident radio communications vary from those of typical structure fires both in kind and number of response agencies. Accordingly, a number of ongoing activities may be using radios. These activities include:

-Search and rescue
-Resource coordination
-Harbor traffic control
-Movement of involved vessel(s)
-Fire control
-Hazardous materials control
-Pollution control

6.1 Frequencies.

For a marine fire, the municipal firefighters will probably use the VHF-FM frequencies normally used and designated per the 'Piscataqua River Marine Disaster Plan.' These are:

-INITIAL TONE	154.190	
-LOCAL GOVERNMENT	Various	
-SEACOAST	154.190	(usually channel 1)
-FIREGROUND (FMARS)	154.280	(usually channel 2)

If the incident is large, many agencies may be toned during the initial 20-30 minutes. It should be anticipated that SEACOAST may be difficult to work during this period. LOCAL GOVERNMENT frequencies may not be clear if shared with local police who are heavily involved in traffic control and/or resident evacuation.

The most likely waterborne units able to communicate on SEACOAST and FIREGROUND are the PNSY tugs unless others are given a fire department radio. However, floating units will probably have marine radios. According to the 'Piscataqua River Marine Disaster Plan', "the working radio frequency for all water based responding units will be 157.100 MHz, channel 22FM".

Other important radio channels/frequencies include:

-CH 6	156.30	Safety
-CH 12	156.60	Vessel Traffic Management
-CH 13	156.65	Navigation
-CH 16	156.80	Calling; Distress
-CH 21	157.05	Government (USCG)
-CH 22	157.10	Government (USCG)
-CH 23	157.15	Government (USCG)
-CH 81	157.075	Government (USCG)
-CH 83	157.175	Government (USCG)

These frequencies may be utilized as designated by the COTP. Their use for ship/ship or ship/shore traffic can be convenient since most vessels are able to monitor "calls" from parties who do not know what channel is being "worked". If the USCG designated working channel (CHANNEL 22) became too crowded during a Portsmouth Harbor fire, the COTP might designate one of the other channels listed above to alleviate the situation. The Communications section in Appendix 20 and the Training Manual identifies various communication systems, capabilities, limitations and logistical concerns. The next page is an Index of Other Commonly Used Marine VHF Frequencies.

Other Marine VHF Frequencies

Channel Designator	Use	Ship TX MHz	Coast TX MHz
6	Safety (IS)	156.300	-
7	Commercial	156.350	X
8	Commercial (IS)	156.400	-
9	Commercial	156.450	X
10	Commercial	156.500	X
11	Vessel Traffic Mgmt.	156.550	X
12	Vessel Traffic Mgmt.	156.600	X
13	Navigation	156.650	X
14	Vessel Traffic Mgmt.	156.700	X
15	Envior.(CS)	-------	156.750
16	Calling;Distress	156.800	X
17	State Cont.	156.850	X
18	Commercial	156.900	X
19	Commercial	156.950	X
20	Port Oper.	157.000	161.600
24	Pub.Corres.	157.200	161.800
25	Pub.Corres.	157.250	161.850
26	Pub.Corres.	157.300	161.900
27	Pub.Corres.	157.350	161.950
28	Pub.Corres.	157.400	162.000
65	Port Oper.	156.275	X
66	Port. Oper.	156.325	X
67	Commercial	156.375	X
68	Non-Commercial	156.425	X
69	Non-Commercial(SC,CS)	156.475	X
70	Non-Commercial(IS)	156.525	-
71	Non-Commercial(SC,CS)	156.575	X
72	Non-Commercial(IS)	156.625	-
73	Port.Oper.	156.675	X
74	Port.Oper.	156.725	X
77	Commercial(IS)	156.875	-
78	Non-Commercial(CS,SC)	156.925	X
79	Commercial	156.975	X
80	Commercial	157.025	X
84	Pub.Corres.	157.225	161.825
85	Pub.Corres.	157.275	161.875
86	Pub.Corres.	157.325	161.925
87	Pub.Corres.	157.375	161.975
88	Commercial	157.425	-

Source: 'NHWSPCC Oil Pollution Control Training Manual' granted permission by Motorola Corporation.

7.0 EQUIPMENT AND RESOURCES

7.1 Inventory

Identification and evaluation of inventory is necessary to plan for and enact marine firefighting response decisions. Since tactical decisions may be based on available resources, it is necessary to identify resources that are particular to marine firefighting needs. Equipment and resources necessary to handle a major marine fire vary in type and quantity depending on circumstances. Mutual aid resources may be provided by related discipline agencies and are also helpful.

In an effort to coordinate with existing plans and operations' inventories, an Inventory was conducted of PHMFCP agencies. All agencies were requested to list only those resources and equipment that would be committed to a mutual aid incident involving Portsmouth Harbor marine fire. The inventory provided by the respondents is listed in Appendices 22 and 23.

7.2 Special Resources

Special resources are available and may be necessary for marine fire incident response. They range from paper documents to a flare gun with which to re-ignite a fire if appropriate. It is important that firefighting forces know what resources can assist them with combat and where these sources can be obtained.

Unique attributes of marine fire incidents include:

- Lack of experience
- Lack of familiarity
- Access limitations to vessel
- Movability of vessel
- Potential amount of combustible material
- HAZMAT/Pollution potential of incident
- Special personnel and equipment hazards
- Special resources

Special resources which are designed for or may be adapted to marine firefighting needs include:

-Special documents and information
-Special firefighting equipment
-Special support equipment and operations
-Special craft and apparatus
-Special fire extinguishing agents
-Special personnel and organizations

These items are detailed in Appendix 21 under Special Resources.

8.0 FACILITY INFORMATION

Facility information may be provided by the facility owner or operator, USCG or Army Corps of Engineer publications. The New Hampshire Port Authority and fire departments have limited facility information. Such information is useful in sizing up an incident and for pre-fire planning. Appendix 24 contains facility information from the following sources:

8.1 The New Hampshire Port Handbook: 1987-1988: Contains pier and facility information on pages 32-38 and important port and harbor information such as tides. This book is available from the New Hampshire Port Authority or Portsmouth Chamber of Commerce. It has been distributed at PHMFCP meetings. The Appendix 24 contains a map of the terminals. **(Current)**

8.2 Directions for Responders: Directions to major harbor terminals. Staging areas for mutual aid equipment/personnel may be different locations.

8.3 U.S. Army Corps of Engineers Piers, Wharves, and Docks - Piscataqua River:Port Series No. 1 : Contains information on location of the waterfront facility, owned by, operated by, purpose for which used, type of construction, description including berthing space, transit sheds, mechanical handling facilities, railway connections, highway connections, water supply, electric current, fire protection other than city, remarks. **(Revised 1985)** Available through the US Army Corps of Engineers and various libraries.

8.4 MSO Subregional Oil and Hazardous Substances Pollution Contingency Plan Section 302.2-1 Piscataqua River Basin: Contains information on Facility name and address, products handled at the facility, and the amount stored in barrels (bbl).**(1987)** Available through the USCG.

8.5 US Coast Guard Monthly Traffic Summary for Portsmouth: Contains current information on vessel activity in Portsmouth usually for tankers, barges, and cargo vessels. **(Monthly.** An example of the **December 1987 Monthly listing is in the Appendix 24.)** Available through the USCG.

Insert Facility/Vessel Pre-Fire Plans.

9.0 COMMAND POST

The purpose of a Command Post is to provide the Incident Command organization with a location from which to 1.receive reports and information, 2. meet with advisors and 3. make decisions. A Command Post is the 'location where emergency personnel will meet for evaluation and coordination of the incident response.' (NH Hazardous Materials Incident Emergency Response Plan). The best and most effective decisions are generally made with accurate information supplied by knowledgeable resources. Also, the environment of the Command Center will usually affect the quality of those decisions.

Criteria to be examined when establishing a Command Post include:

-proximity to fire

-safety of command personnel

-reasonable contact with non-command post personnel

-view of fire area

-sufficient space for advisors and technical experts

-out of the weather

-communications are set-up, functioning, and effective: includes landline telephone(s)

-if a Command vehicle: upwind of the incident site; insure it is remote enough to prevent having to relocate.

-physical comforts for extended stay

-logistics: proximity to copy machines, food, etc.

-locations: landbased or waterbased(not necessarily the vessel on fire):vessel; pier; facility office; IFO; Coast Guard Portsmouth Harbor Station; town halls.

Pre-fire planning on the location of Initial and Secondary Command Posts for the various Jurisdiction Grid scenarios on pages 9 and 10 is recommended. If Response Levels are enacted per the Recommendations, list the various locations on the Chart on page 29.

10.0 EMERGENCY OPERATING CENTER (EOC)

Emergency Operating Centers are operational locations. They may double as an Incident Command Post depending on circumstances. EOCs are also operated by agencies who are not Incident Command. The next page is a Chart of a partial list of EOC and Initial and Secondary Command Post locations for participating agencies. The list is **incomplete.** Completed information may help to locate a particular EOC or Command Post. If a responder has incorrect directions, is unfamiliar with the area, or a change of Command Post has occurred, this information might be useful in this Operation Manual shared by multi-agency response groups.

Project Response Agencies Possible Sites for
Emergency Operating Centers (EOCs) and Incident Command Posts

Response Agency	If Fire At: Terminal...	Possible EOC Sites/Tel. (For Any Size Fire)	Initial Command Posts/Tel. (For Initial/Minor Fire)	Secondary Command Posts/Tel. (For Fallback/Major Fire)
Municipal Fire Depts.:				
Eliot FD	N/A	State Rd. 207-439-1355		
Kittery FD	N/A PNSY	Walker St. 207-439-2262		
New Castle FD	N/A USCG Pier	43 Main St. 436-2515		
Newington FD	N/A Sprague-NTN Sea-3, Inc. Simplex W&C	80 Foxpoint 436-5737		
Portsmouth FD	N/A PSNH-Schllr PSNH-Mobil Gold Bond NHPA-State Granite SM	170 Court436-1127/8-5000		
Rye	N/A	563 Washington 964-6411		
Federal Agencies:				
USCG COTP	N/A Offshore			
PAFB FD	N/A DFSP			
PNSY FD	N/A PNSY			
State Agencies:				
ME Dept. Envrn. Protec.	N/A			
ME York County EMA	N/A	Court Hse 207-324-1573/78		
NH Dept. of Safety Insp	N/A			
NH Govenor's OEM	N/A	State EOC NH 800-852-3792		
NH Fire Marshal	N/A			
NH Port Authority	N/A			
NH DES-WSPCC	N/A			

11.0 STAGING

Staging areas may be devised into areas for apparatus, special resources, medical and rescue units, large supplies, feeding and rest, hazardous materials, pollution, police, public works, media, and others. Pre-fire plans should determine the most probable locations of these needs. If this has not been planned, the appointment of a Staging Area Commander should alleviate much of this problem during an incident. The Staging Area Commander may coordinate all activities in the staging area.

This section to be completed with Staging plans.

12.0 INCIDENT RESPONSE POSITIONS

The need to assign tasks to responsible personnel is apparent for a major marine fire incident. This page lists examples of various roles that may be helpful to implement. The 'Incident Command Personnel Checklist' on the following page may be of assistance with this type of organization.

Command Post Supervisor: coordinate and supervise the ongoing activities, present information to the Incident Commander.
Staging Area Commander: coordinate all activities in the staging area. Responsible for briefing and directing companies to appropriate areas. Recording arrival times and ETAs.
Logistics/Procurement Officer: procure firefighting equipment, personnel and firefighting resources as directed by Incident Command; track and monitor cost and expense aspects for later disbursements.
Communication Officer: establish and maintain communication between Command Post and all other participating agencies; monitor operations and be prepared to implement back-up communications.
Coordinator of Air Supply: responsible for air supply and monitoring full and used air bottles as well as advising the Logistics Officer or Incident Command of air status.
Coordinator of Equipment: responsible for establishing equipment area and monitoring equipment. Advises Logistics Officer.
Stand-by area Coordinator: monitoring arrival of resources in the stand-by area and maintaining communication with Staging Area Commander regarding status of resources and equipment arriving and waiting on assignment.
Historian or Scribe: responsible for recording information, important times and events. Information is not only useful to monitoring ongoing efforts but may be used for debriefing and events i.e. legal at a later time.
Special Agency Coordinator: responsible for greeting, recording and monitoring activities of special agency representatives. Appraising Incident Command or Command Post Supervisor or Staging Area Commander of status. Special agencies may include: EPA, National Transportation Safety Board(NTSB), legal counsel, insurance, facility and vessel owners and representatives, Regional Response Team (RRT), Federal Railroad Administration (FRA), etc.
Coordinator of Media/Public Affairs Officer: responsible for media statements and contact between media and Incident Command.
Messenger: responsible for personally communicating information between various officers, coordinators, Incident Command as appropriate.
Other: other FEMA and IC positions as appropriate:i.e. Sector Commander, Safety Officer, Water Supply Officer.
Liaison: Shipboard and Shorebased Incident Command Liaisons to communicate messages between shoreside command and vessel command.

INCIDENT COMMAND PERSONNEL CHECKLIST
for
PORTSMOUTH HARBOR MFCP

Location_____Date_____Time_____
Suggested Personnel Include:

Title/Description	Name	Time Notified	Enroute w/ETA	Time On Scene
Fire Chief/Fire Officer				
Vessel's Master/Officer				
USCG COTP/Representative				
Terminal Manager/Rep.				
Vessel Owner/Rep. (Agent)				
Cargo Owner/Rep. (Agent)				
Insurance Representatives				
Vessel Chief Engineer				
Vessel Chief Mate				
Marine Chemist(s)				
Harbor Pilot(s)				
N.H. Fire Marshal/Rep.*				
N.H. Port Authority Dir.				
N.H. OEM Representative				
N.H. DES - W.S. & P.C.				
York County EMA Rep.				
Maine D.E.P. Rep.				
Medical Response Rep.				
Logistics Fire Officer				
Staging Area Commander				
Command Post Historian				

* Presently, Fire Marshal is in charge of N.H. HAZMAT vessel incidents.

13.0 STRATEGY AND TACTICS

Considerations on strategic and tactical actions are always on a case by case basis. Pages 32 - 48 contain information which may be used in this regard. The sequence of information is:

1. **STRAT/TAC Action Outlines:** Reviewed in the training program. Possible actions to take for various locations and types of shipboard fires. (Pages 34-38).

2. **Information Gathering Sheets:**

   A. Initial Response: Important types of information to gather for size-up and response planning. The information is also useful to relay to other agencies who may initialize appropriate action in addition to fire department response. (Page 39)

   B. Secondary Vessel Information: Continue size-up, provide more detail on vessel condition, vessel cargo, Search and Rescue (SAR). (Page 40)

3. **Operational Checklists:**

   A. Incident Command Personnel: various personnel, name and activity times for monitoring whereabouts of key personnel. (Page 32)

   B. Vessel Information and Documents: List of pertinent information to obtain for response efforts. Tracking the document inventory. (Page 41)

   C. Vessel Fire Containment: Tactics and issues to be considered for fire containment. (Page 42)

   D. Vessel CO2 Smothering: Approaches and information regarding CO2 issues. (Page 43)

4. **Associated Tables:**

   A. CO2 Guidelines (Page 44)

   B. CO2 Tables I, II, II: for concentrations of CO2 and conversion. (Pages 45,46,47)

   C. Time-Temperature Grid: useful for temperature recording of CO2 and inerted spaces. (Page 48)

STRAT/TAC Action Outlines

Possible actions to take for various locations of shipboard fires.

Accommodation Space Fires.

1. Rescue primary.
2. Secure power.
3. Ventilate through portholes if necessary only when all resources are ready. Cover against interior spread.
4. Extinguish: Use quick attack if possible.
5. Flash-over potential HIGH.
6. Check for fire extension.
7. Extinguishers not usually effective (application techniques)
8. Overhaul thoroughly - remove wall and ceiling panels.
9. Do Not rely on watertight or fire resistive bulkheads to act as fire stop.
10. Air and personnel critical.

Fires in Cargo Holds.

1. Rescue primary.
2. Close all openings to hold(s).
3. Batten down hatches.
4. Consider using fixed system.
5. Tighten down hatches (caulk if needed).
6. If cargo is nitrates or sulfates, use speed and water.
7. Never use steam smothering if explosives are present.
8. NEVER ENTER HOLD WITHOUT SCBA.
9. Place charged hose lines on deck.
10. If entry is made, use hose lines.
11. Investigate adjoining holds.
12. Cut holes only as needed and NOT in outer skin of vessel.
13. Have plugs available for all holes cut.
14. Cool skin of vessel.
15. Close all side openings early.
16. Standby while cargo is unloaded.

STRAT/TAC Action Outlines (continued)

Engine Room Fires.

1. Rescue personnel.
2. Consider using fixed system . The S/S POMEROL has Steam Smothering for the bunker tanks and CO2 for the engine room; the C/S LONGLINES has CO2 for the engine room.
3. Secure all non-essential engine room systems.
4. Cool boundaries.

If an attack must be made:

5. Establish vertical ventilation.
6. Establish attack teams (3 deep).
7. Access and attack.
8. Use foam and dry chemical on fuels.
9. Check for extension.
10. Divert critical systems to alternates, if possible.

Machinery Room Fires.

1. Rescue personnel.
2. Enter from as low as possible.
3. Secure all automatic controls.
4. Secure all power to area.
5. Cool boundaries.
6. Establish vertical ventilation.
7. Establish attack teams (3 deep).
8. Access and attack.
9. Check for extension.

Electrical Room Fires.

1. Rescue personnel.
2. Secure all power.
3. Cool boundaries.
4. Attack as a Class A fire.
5. Check for extension.

STRAT/TAC Action Outlines (continued)

Chemical Tanker Fires.

1. Rescue personnel.
2. Shut down cargo pumps.
3. Shut down all power to area.
4. Attack from up-wind.
5. Attack with Universal foam AND dry chemical.
6. Keep adjacent tanks cool.
7. Consider using fixed systems if available.
8. Be prepared to evacuate one-half mile down-wind.
9. Protect all teams with hose lines.
10. Use SCBA.

Petroleum Tanker Fires.

Deck Fires:

1. Rescue personnel.
2. Attack from upwind (still use SCBA).
3. Shutdown cargo and disconnect lines if possible.
4. Secure source of fuel on deck.
5. Maneuver ship if necessary.
6. Secure all pumping.
7. Use fixed foam monitors, if available.
8. Use foam hand lines as second choice and backup.
9. Cool crews with water.
10. Close ullage hatches, PV valves, vents, manholes, sounding manifolds and fuel lines.
11. NEVER APPLY WATER ON TOP OF FOAM THAT IS ON THE DECK.
12. Cool surrounding deck and structures with water.
13. Replenish foam blanket as needed.
14. Attack burning pressure leaks with dry chemical then blanket with water fog or foam ONLY IF YOU MUST EXTINGUISH.

Petroleum Tanker Fires (continued)

Tank Fires:

1. Rescue personnel.
2. Energize inert gas system.
3. Maneuver ship to bring wind and seas to best advantage of firefighting.
4. Status of tanks on fire:
   a. loaded
   b. partially loaded
   c. empty
   d. inerted
   e. gas free
5. Secure all tank vents.
6. When fighting tank fires, consider the following:

   a. Attempt to apply extinguishing agent(s) directly on burning fuel through a hole, vent line, rupture, ullage cover, or manhole.

   b. If unable to get extinguishing agent on burning liquid, attempt to:
      1. cool tank with water
      2. inject foam through vents
      3. press up the tank with fuel or water
      4. extinguish fire by injecting inert gas
      5. defuel the tank
      6. a combination of the above recommendations

   c. Prevent fire from spreading to surrounding tanks by the following or any combination of the following:
      1. cooling down with water
      2. if ruptured but not burning, cover with foam. (Do not put water on cargo that has been covered with foam.)
      3. press-up with fuel or water
      4. inerting
      5. maneuvering ship
      6. after fire has been extinguished, cool down surrounding tanks, deck, and cargo long enough to prevent a flash

NOTE: The above actions may take several hours or days.

LPG Guidelines for Emergency Procedures. (COTP LPG Emergency Contingency Plan. Appendix I).

1. Shut off source.
2. Normally LPG fires should not be extinguished until the source can be shut off.
3. In the event of ignition, use water to cool down tanks, piping, equipment and structures. Use water spray to protect involved personnel.
4. Use high velocity fog in the dispersion of LPG vapors. Never apply high velocity fog to the liquid.
5. Personnel remain upwind of leaks.
6. If it is necessary to remove an LPG vessel from a facility dock to a safer area within the port, a delay of 30 to 60 minutes for disconnect must be expected.
7. Review detailed information on LPG emergency procedures and the physical properties of flammability, specific gravity, expansion ratio, and vapor pressure in the 'COTP LPG Plan Appendices.

Fires in Fore and After Peaks.

1. Rescue personnel.
2. Shut down all power to area.
3. Contain in vertical zone.
4. Attack from below if possible.
5. Consider piping in smothering agent.
6. Consider high-expansion foam.
7. Expend all options before sending teams down a 'chimney' into a fire.

INITIAL RESPONSE INFORMATION
for
PORTSMOUTH HARBOR MFCP
(Primary Information)

Location_____Date_____Time_____

Get as many details as possible concerning the fire, the vessel and injuries. Always verify information as soon as practicable.

Suggested information:

Location of Vessel _____

Vessel Name _____

Type of Vessel _____

Possible Victims, Injuries, Deaths _____

Primary Cargoes _____

Type of Fire _____

Location of Fire on Vessel _____

Hazardous Chemicals/ Commodities Onboard_____

Number of Crew _____

Language(s) of Crew _____

Number of Passangers _____

Local Vessel Agent _____

Jurisdictions _____

Incident Command(IC) _____

On Scene Coord.(OSC) _____

HAZMAT Incident _____

Pollution Incident _____

_____ _____

SECONDARY VESSEL INFORMATION
for
PORTSMOUTH HARBOR MFCP
(Secondary Information)

Location_____Date_____Time_____
Suggested information includes:

NOTE: This information will normally be sought after the INITIAL INCIDENT INFORMATION (Primary Info) has been acertained.

FIRE INFORMATION

Vessel Access _____

Shoreside Exposures _____

Is Fire Under Control_____

Extent of Fire _____

Crew's Initial Response and Effect_____

Assistance Required _____

Classes of Materials Involved (A,B,C,D) _____

Specific Cargos and Stores Involved _____

Amount and Types of Fuels/Bunkers _____

Designate Staging and Supply Areas _____

VICTIM INFORMATION

Personnel Accounting: Crew, Passenger, Facility, Bridge, Other Vessel, etc. _____

Determine Missing Personnel _____

Locate Victims _____

Determine Injuries - Type and Extent _____

Provide Medical Aid _____

Provide or Arrange for Transportation _____

VESSEL INFORMATION AND DOCUMENTS CHECKLIST
for
PORTSMOUTH HARBOR MFCP

Location_____Date_____Time_____

Suggestions Include:

Information and/or Documents	Requested Yes	Requested No	Available Yes	Available No	At C.P. Yes	At C.P. No	Notes
1. Obtain Primary Vessel Info (See Primary Info Sheet)							
2. Obtain Secondary Info Sheet (See Secondary Info Sheet)							
3. Vessel Plans: A. Prefire Plan or Survey							
B. Fire Control Plan							
C. General Arangement Plan							
D. Other Plans/Blueprints							
4. Vessel Cargo Information: A. Dangerous Cargo Manifest							
B. General Cargo Manifest							
C. Cargo Arrangement/Layout							
5. Vessel Communications: A. Portable FM Radios							
B. Marine Radios							
C. Sound Powered Telephones							
D. Electric Telephones							
E. Cellular Telephones							
F. Other_____							
6. Vessel Stability: A. Trim/Stability Booklet							
B. Damage Stability Docmnt							
C. Damage Control Document							
D. Primary Stability Info (See Stability Info Sheet)							
E. Secondary Stability Info (See Stability Sheet on Page 50)							

VESSEL FIRE CONTAINMENT CHECKLIST
for
PORTSMOUTH HARBOR MFCP

Location_____Date_____Time_____

Suggestions Include:

Tactic/Task	Requested Yes	Requested No	Completed Yes	Completed No	Notes/Comments
1. Establish or secure ventilation as appropriate in area of fire.					
2. Establish boundaries. Consider using vessel's vertical zones. Determine Class A (60 Min) and Class B (30 Min) bulkheads.					
3. Close all fire doors if possible.					
4. Close all watertight doors if possible.					
5. Close doors, ports, hatches and ventilators as appropriate.					
6. Cool all 6 sides of fire area as necessary. Consider using vessel's equipment for this purpose. Water should come off surface warm or hot. Use all water sparingly.					
7. Secure electrical power to affected area and consider de-energizing the lines that run through fire area.					
8. Endeavor to move combustibles away from bulkheads and decks in proximity of fire.					
9. Remove hazardous cargo if possible.					
10. Maintain fire watch of all adjacent areas (sides, above and below). Use fixed heat detectors for additional monitoring capability.					

VESSEL CO2 SMOTHERING CHECKLIST
for
PORTSMOUTH HARBOR MFCP

Location_____Date_____Time_____

Suggestions Include:

DO NOT ATTEMPT to smother explosives, nitrates, or sulphates.
If oxidizing agents in cargo, REMOVE if possible.
(See Portsmouth Harbor MFCP Training Manual Section 5 Pages 11-17)

Tactic/Task	Requested Yes	Requested No	Completed Yes	Completed No	Notes/Comments
1a. Call for a Marine Chemist					
1b. Call for Additional C02 if Necessary					
2. Stop all mechanical fans/ ventilation to/from space.					
3. Close all dampers, doors, hatches, vents, ports, accessing space. Consider leaving one (1) vent open to prevent over-pressure of space. Close after complete initial discharge.					
4. Insure all personnel are evacuated from space to be flooded.					
5. Consider having protected personnel monitor open CO2 Room for manifold leaks.					
6. Doublecheck that: A. No personnel in space. B. Fans off-Space sealed.					
7. Discharge CO2 for initial concentration of 60% or more. If 2 valve control system, 1st Valve Control then Cylinder Control. (Remember to close bleed vent from item #3 above).					
8. Maintain at least 80% CO2 concentration if possible. Do not open space for at least 48 hours if possible.					
9. Monitor temps and gases at approx. 15 min. intervals.					
10. Consider logistics getting extra CO2 to vessel.					

CO2 GUIDELINES

1. Be certain personnel are evacuated.

2. Seal the space and secure ventilation.

3. Sequentially pull the control and cylinder release valves as appropriate.

4. No concentration of CO2 can be considered excessive.

5. Strive for an initial target application of 60%. Guidelines to achieve 60% level are:

   o Calculate total cubic feet of space.
   o Divide this volume by 9.
   o Apply this number (in pounds of CO2) to space.

   Volume of Space/9 = # Lbs. CO2 for Initial Application.

6. Try to obtain 80% CO2 concentration to provide a reasonable safety margin to insure extinguishment. Endeavor to maintain 80% CO2 or better concentration for at least 48 hours before opening space.

7. Monitor gas and temperature readings. Usually accomplished by marine chemist.

8. Other inert gases may be substituted but different guidelines may apply.

9. See Also PHMFCP Training Manual.

CO2 TABLE I

Minimum Percent (%) Concentrations of CO2 to be used for Extinguishment of Various Materials are listed below. Use Table II to calculate all ships' CO2 systems to 34%. Use Table III to calculate higher concentrations. Attempt to achieve as high a concentration as practical with available amount of inerting gas.

Material	Percent
Acetylene	66
Acetone	31
Benzol	37
Benzene	37
Butadene	41
Butane	34
Carbon Disulphide	66
Carbon Monoxide	64
Coal or Natural Gas	37
Cyclopropane	37
Dowtherm	46
Ethane	40
Ethyl Ether	46
Ethyl Alcohol	43
Ethylene	49
Ethylene Dichloride	25
Ethylene Oxide	53
Gasoline	34
Hexane	35
Hydrogen	78
Isobutane	36
Kerosene	34
Methane	30
Methyl Alcohol	31
Pentane	35
Propane	36
Propylene	36
Quench & Lube Oils	34
Miscellaneous:	
Dry electrical wiring insulation hazards in general	50
Small electrical machines, wire enclosures under 2000 cubic feet	50
Bulk paper storage and ducts	65

CO2 TABLE II

Pounds of CO2 to achieve a minimum 34% concentration. As gas is available, endeavor to achieve higher percentage to insure sufficient concentration for extinguishment. Use Table III for calculating quantities necessary for higher concentrations. Any openings that cannot be closed at the time of extinguishment should be compensated for by the addition of not less than one pound of CO2 per square foot of opening.

Volume = Length x Width x Height = Total Cubic Feet

Space in Cubic Feet	Lbs. of CO2/Cubic ft.	Conversion Factor
Start- 140	1 pound per 14	.072 x cu.ft.
141 - 500	1 pound per 15	.067 x cu.ft.
501 - 1,600	1 pound per 16	.063 x cu.ft.
1601 - 4,500	1 pound per 18	.056 x cu.ft.
4501 -50,000	1 pound per 20	.050 x cu.ft.
Over 50,000	1 pound per 22	.046 x cu.ft.

Example:

Engine Room:	L	x	W	x H	=	Volume in Cu.Ft.
	50	x	50	x 50	=	125,000 Cu.Ft.
	Cu.Ft.	x	Conv.Factor		=	Lbs. of CO2
	125,000 Cu.Ft.	x	.046		=	5750 Lbs. CO2

Therefore, 5750 Lbs. of CO2 are required to achieve a 34% concentration for the Engine Room of 125,000 Cu. Ft.

To achieve an 80% concentration, multiply the Conversion Factor for 80% by the 5750 Lbs. required for a 34% concentration.

3.71	x	5750 Lbs.	=	21,333 Lbs. of Co2

Therefore, 21,333 Lbs. of CO2 are required to achieve an 80% concentration for the Engine Room of 125,000 Cu. Ft.

CO2 TABLE III

Conversion Factors applied to 34% concentration. Apply these factors for specific material in Table I after using Table II to calculate pounds of CO2 necessary for 34% concentration.

Percent	Factor
35%	1.05
36%	1.08
37%	1.11
38%	1.14
39%	1.18
40%	1.21
41%	1.25
42%	1.28
43%	1.32
44%	1.36
45%	1.40
46%	1.44
47%	1.48
48%	1.52
49%	1.56
50%	1.60
51%	1.65
52%	1.70
53%	1.75
54%	1.80
55%	1.85
56%	1.90
57%	1.95
58%	2.00
59%	2.07
60%	2.14
61%	2.20
62%	2.26
63%	2.32
64%	2.39
65%	2.46
66%	2.53
67%	2.60
68%	2.67
69%	2.74
70%	2.81
71%	2.89
72%	2.98
73%	3.06
74%	3.14
75%	3.22
76%	3.30
77%	3.40
78%	3.50
79%	3.60
80%	3.71
81%	3.82
82%	3.95

TIME-TEMPERATURE GRID

For Recording Temperatures of Inerted Spaces.

Date:_____ Person Recording_____ Rcrdng Eqpmnt_____

Location	Time	Temp	Time	Temp	Time	Temp	Time	Temp

14.0 STABILITY

The intent of stability information in the Operation Manual is to provide a basic understanding of vessel stability and dewatering to Portsmouth Harbor fire personnel who must comprehend and base decisions upon expert advice that should be available during an incident. Special resources are important to stability monitoring and calculations.

Though some degree of stability is built into a vessel, the vessel's stability may become precarious. This may be due to the introduction of large amounts of water among several reasons. It is important that landbased firefighters understand the principles of stability and need for dewatering in order to practice prudent strategy and tactics.

The Stability Section in the Appendix is an enhanced version of Section Seven in the 'PHMFCP Training Manual'. It includes basic information, how to figure calculations with examples, and explains the various resources for stability and dewatering analysis. Stability is one of the more difficult marine studies for the municipal Chief Fire Officer/Incident Commander to learn. Due to the importance of stability concerns and the degree of difficulty in learning the subject, it is advised to review stability information as often as possible. The stability information on pages 50 and 51 are checklist issues and concerns of vessel stability for Incident Command use.

VESSEL STABILITY INFORMATION
for
PORTSMOUTH HARBOR MFCP

Location_____Date_____Time_____
Suggested information includes: (See Stability section and Appendix 26)

PRIMARY STABILITY INFORMATION

Vessel Drafts:		PORT		STBD	Comments
Get the vessel's drafts as soon as possible. Read the hull marks.	Fwd	_____	Fwd	_____	_____
	Mid	_____	Mid	_____	_____
	Aft	_____	Mid	_____	_____
	Mean	_____	Mean	_____	_____

Vessel List: (In Degrees)	PORT	STBD	Comments
A. Inclinometer Onboard	_____	_____	_____
B. From Water - Fwd/Aft	_____	_____	_____
C. Diff. in Mdshp Marks	_____	_____	_____
D. Best Guess/Estimate	_____	_____	_____
E. Other_____	_____	_____	_____

Vessel Cargo Tank Status _____

Vessel Cargo Hold Status _____

Vessel Double Bottom & Deep Tanks _____

Other Ballast, Fuel & Water Tanks _____

Depth of Water at Site _____ Minus(-) Deepest Draft =_____ Clearance Dist

Type of Bottom Material (Rock, Glacial Till, etc.)_____

Tides Over the Next 48 Hours:	HIGH Time	HIGH Height	LOW Time	LOW Height	COMMENTS
1. Always consider the height of the tide when predicting the vessel's bottom clearance.	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____
2. Also, convert all net water weight forecasts to increased mean draft with the vessel's TPI Factor.	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____

SECONDARY STABILITY INFORMATION

Water Flow Into Vessel_____

Vessel Dewatering Capability_____

Water Weight Net Gain/Loss_____

Vessel Watertight Capability_____

Mooring Line Status_____

VESSEL STABILITY CHECKLIST
for
PORTSMOUTH HARBOR MFCP

Location_____Date_____Time_____
Suggestions Include: (See accompanying Stability section of this Manual.)

CAUTION: DO NOT Counterflood (add water low in vessel) to improve stability if free surface is the cause of the list.

Tactic/Task	Requested Yes	Requested No	Completed Yes	Completed No	Notes/Comments
1. Gather stability info and maintain during incident. (See Stability Info Sheet)					
2. Obtain Trim and Stability Booklet, assoc. documents and info from crew - most likely Master, Chief Mate.					
3. Determine and establish primary and secondary flooding boundaries. A. Close watertight doors. B. Seal spaces-plug leaks.					
4. Coordinate expertise to assist with stability matters (crew, MSO, NHPA, Pilots, PNSY, Strike Team)					
5. Have Vessel Critical List determined for present loaded condition.					
6. Calculate rate of water introduction/flooding.					
7. Calculate dewatering rate: A. Vessel's fixed pumps. B. Vessel's portable pumps. C. Pumps brought onboard.					
8. Reduce Free Surface first: A. Pump out spaces. B. Completely fill spaces.					
9. Lower Center of Gravity: A. Remove high weights. B. Move high weights down. C. Add weight low.					
10. Lowering height of water within the vessel: A. Keep drains clear. B. In accom. areas, remove deck plumbing fixtures. C. Drain swimming pools.					

15.0 VESSEL MOVEMENT WITH FIRE ONBOARD

Pursuant to United States Coast Guard Marine Safety Manual Vol. VI, Ports and Waterways Activities, Section 8.E. Firefighting On Vessels 1. Essential Considerations: "Often , the COTP must make the difficult decision whether to allow a burning vessel to enter or be moved within the port." According to the Marine Safety Manual, "A request for entry into the port by a burning vessel under declaration of "force majeure" should be evaluated under criteria listed in the Marine Safety Manual. For Portsmouth Harbor, it would be an unusual case to bring a burning vessel into the harbor per the COTP considerations. There is the possibility of anchoring it off Gunboat Shoals, or as conditions warrant, the vessel may go to Portland, Maine for assistance.

Basic USCG considerations for allowing a burning vessel to enter or be moved within the port are stated in the Marine Safety Manual as:

a. Location and extent of fire
b. Class and extent of cargo involved
c. Possibility of explosion
d. Possibility of sinking/capsizing
e. Hazard to crew or other resources at present location
f. Weather forecast
g. Maneuverability of vessel (Is it a dead ship?)
h. Effects on bridges
i. Alternatives if the vessel is not allowed entry or movement
j. Inspection to determine that the fire is already contained and under control
k. Little likelihood it will spread
l. A great possibility exists that the fire may be extinguished with available port equipment before secondary explosion or spread of fire
m. Appropriate parties, including officials have been consulted.

Other general criteria include:

a. Fire Chiefs within whose jurisdiction the vessel will move have been consulted, as well as other appropriate parties
b. shoreside firefighting is ready
c. pier for firefighting
d. firefighting capability
e. pollution potential - equipment and resources ready
f. HAZMAT potential - equipment and resources ready
g. stability and dewatering situation
h. must obtain plans of vessel
i. status of vessel extinguishing systems
j. have contacted owners, agents or master of vessel regarding arrangements to pay for all costs
k. liability, insurance
l. availability of tugs and barges
m. if no SOP exists, this type of information should be considered.

16.0 FIRE CONTROL BERTHS

Several considerations are involved in the selection of a pier for vessel fire suppression and salvage operations. These include pier flammability and combustibility, proximity to other piers, structural and safety integrity, access for boats, vehicles, and staging areas. Suitability of site selection may be determined by municipal, state and federal regulations and, opinions. For site specific determination, the US ARMY Corps of Engineers Port Series Number One contains a detailed listing of facility and equipment. NFPA 300 series documents also provide suggestions for safe firefighting piers and suitable pier design. NFPA 1405 should address this issue when released in 1989. It is suggested that a review of standards from several disciplines, including oil companies terminal and waterfront facility design specifications, for pre-fire planning is helpful.

Other considerations include:

- location readily accessible to equipment and resources including adequate water supplies
- sufficient water depth; however, the depth of water should not exceed the depth of the vessel's hull. For large vessels in Portsmouth Harbor, this should not be a critical concern as most berths have depths of forty-five feet or less. The depth should not be so deep as to cover the vessel's main deck in the event of sinking
- the harbor bottom should be as level as possible, preferably sandy sediment or fine glacial tills as is the case at some Portsmouth sites
- severity of the fire
- possible spread of fire to shore areas
- possible damage to piers and shore facilities
- potential loss of facility revenue
- proximity of the pier to populated areas, bridges, railroad, highways, national defense areas
- environmentally sensitive areas
- water and electricity availability
- prevailing winds and currents
- pollution potential
- HAZMAT potential
- vessel cargo
- vessel stability
- vessel extinguishing systems
- vessel plans
- vessel construction

17.0 GROUNDING, SCUTTLING AND SINKING SITES

Grounding, scuttling and sinking sites require review of: environment, navigational hazard, salvage operations, available resources and the vessel and cargo issues. The offshore grounding site selection criteria may be different from harbor grounding and anchorage site selection. Portsmouth Harbor sites must account for limited waterborne firefighting capability, harbor activity and harbor use. The lack of shoreside International Shore Connections further limits the use of makeshift waterborne firefighting platforms. Criteria selected from the Marine Safety Manual for anchoring or grounding locations includes:

- bottom material; regarding the risk of rupturing vessel hull
- water depth, shallow enough so it will not sink below the main deck level, yet deep enough that fireboats, salvage barges, and tugs can approach
- environmental conditions: environmental protection

Criteria for intentional sinking are similar. These areas can be selected pre-incident. A good selection comes from using the input from related disciplines.

Other considerations include:

- effects on Defense areas
- bridge and water traffic
- marinas
- involvement of two states: New Hampshire and Maine
- out of harbor: Isles of Shoals and vessel traffic in and out of the Port of Portsmouth

Insert Locations:

Grounding, Scuttling and Sinking Sites and Relevant Information.

18.0 ENVIRONMENT

Environmental concerns are of great significance to the protection of Portsmouth Harbor. Marine fire incident response efforts should be coordinated with the various agencies tasked with environmental protection. Such agencies include the USCG, EPA, New Hampshire Water Supply and Pollution Control Commission, and Maine Department of Environmental Protection among others. There are various plans addressing environmental issues. For New Hampshire they include 'The Oil Pollution Control Training Manual', 'The Oil and Hazardous Materials Contingency Plan', and 'Emergency Oil Spill Containment and Removal Strategies for Piscataqua River Terminals'. Environmental considerations are important if it is necessary to scuttle or sink the vessel.

Various concerns include:

1. Selection of Grounding, Scuttling and Sinking Sites.
2. Salvage Operations Procedures.
3. Pollution Issues.
4. Hazardous Materials Issues.
5. The Environment and Commercial and Recreational Activity.

19.0 APPENDIX

This Appendix, similar to the information guides interspersed throughout this Manual, contains reference guide information which may be helpful for organizing vessel fire response efforts.

20.0 Communications:
- Narrative

21.0 Special Resources:
- Narrative
- Equipment Lists

22.0 Project Agency Inventory Information:
- General Information Sheets
- 2-Way Radio Communications Inventory
- Fire Department Apparatus and Onboard Equipment
- Fire Station Stored Equipment

23.0 Vessel Inventories:
- Condensed Vessel Inventories

24.0 Portsmouth Harbor Terminals:
- NHPA Diagram of Portsmouth Harbor and Terminals
- Directions for Responders to Terminals
- Army Corp of Engineers Piers, Wharves and Docks
- USCG MSO Portland Subregional Oil and Hazardous Substances Pollution Contingency Plan waterfront facility information on the Piscataqua River Basin.
- USCG Vessel and Cargo Information: December 1987

25.0 Stability:
- Narrative

26.0 Tables: To provide marine-related mathematical conversions:
- Common Equivalents
- Determining Water Flow Through Holes
- Static Head Pressure, Gallons Vs. Cubic Feet

27.0 Intentionally left blank

28.0 Intentionally left blank

29.0 Glossary

30.0 Acronym List and Abbreviations

31.0 Bibliography

COMMUNICATIONS

This section identifies various communication systems, capabilities, limitations and logistical concerns.

Radio Communications

Radio communication planning is necessary to minimize confusion and misinformation. Fireground communication considerations for planning should include:

- The likelihood that many firefighting and emergency response agencies may be operating at the incident.
- What common frequencies are available and what pre-assignments can be practically addressed?
- What established, recognized radio procedures and call signs can be used by the participating agencies?
- Limitations of portable radios onboard vessels.

Hardware. In addition to fire department radios, vessel, terminal facility, USCG and others may have radios. Some may have FM handheld portables that are very useful, particularly for large scale incidents. Others may have transportable or mobile units that can also be of great benefit. Uncoordinated, a number of problems might occur.

Radio capability such as programmability, scanning, simplex, low/high wattage outputs, fixed channels and frequencies should be considered when determining who may most need special features. Features for handhelds to be used inside a large steel vessel include:

- intrinsically safe or explosion proof
- minimum 5 or 6 watt output capability
- resistance to high humidity environments
- capability to attach remote microphones
- availability of charged spare batteries
- capability to charge spare batteries

Shipboard fire incidents are often complex situations requiring hours and sometimes days to control. Therefore, it is important to have spare handhelds and batteries as the hours wear on. Inadequate information and communications due to lack of radio equipment can be costly.

Radio Communications (continued)

Presently, there are no full channel marine radios listed in the inventories of municipal Portsmouth Harbor fire departments. **Marine radios operate within the VHF-FM Maritime Mobile Frequencies 156-162 MHz band.** They have dedicated channels corresponding to specified frequencies. Large vessels will generally have at least two marine radios. Mounted units will most often be located in the wheelhouse or the radio room. They are normally electrified by the ship's emergency circuit. Therefore, the radios would be operable by the ship's emergency generator(s) should the main generators fail. At least one radio is usually backed up by battery in case ship generated electrical power is unavailable.

Agencies that have marine radios include:

- o USCG units
- o Portsmouth Pilots, Inc. (3 handheld portables)
- o Portsmouth Navigation Tugs (2 mobiles in each)
- o PNSY Tugboats YTB 771 & YTL 602
- o NHPA Director (1 handheld portable)

Another type of radio is the **single sideband radio (SSB).** Large vessels will probably have one. It may not have battery backup since SSBs are usually more powerful radios. Some USCG cutters have SSBs. Also, landline telephone patch can be performed by marine operators for SSB traffic. This radio could be important if the vessel was inbound with fire onboard, and, was outside the 50 +/- mile marine radio range.

Many large vessels and marine terminals have their own handheld FM portables. These radios will probably have preset frequencies which should not interfere with fire department frequencies. This provides for multiple dedicated working channels besides 154.280 (FIREGROUND). These radios may be intrinsically safe and are useful to safe operation in certain areas. An expanded list of marine radiotelephone channels is provided at the end of this section.

Concerns. The heavy steel construction of most large vessels will **inhibit interior transmission/reception** capabilities of most portable radios. Radio surveys will indicate the extent, if any, of limitations that may exist. If inside an accommodation area that is above the waterline and experiencing radio difficulty, find a room against the outside. Try the radio next to a porthole or window. The radio's capability should significantly improve.

Radio Communications (continued)

Disadvantages. There are two major disadvantages of the handheld radio. One is **public exposure** of the transmissions. The other is the susceptibility of the transmissions to interference, especially from more powerful units. Scanners have given everyone the ability to monitor almost anyone's conversation and **high wattage units** can blast through channels from dozens of miles away. An Incident Commander on the pier deciding the ship's fate with the Master on the bridge may need more privacy and less interference than handhelds may provide.

Microwave Telephone Communications

Cellular Telephone. Cellular telephones operate in the 800-900 MHz bands from repeater towers that provide coverage to specific geographical areas. Dover's tower would be used for Portsmouth Harbor communications. Some vessels may already have the phone onboard and be immediately accessible by either another cellular or landline-linked telephone.

SATCOM Telephone. Many larger vessels may also have Satellite Communications (SATCOM) onboard. This unit's voice circuit has extremely high integrity and reliability. With SATCOM, calls can be placed or received just like a landline telephone through the vessel's microwave satellite relay system. If the vessel is inbound and on fire, this unit will succeed where cellular may not, because it essentially has no limiting range. SATCOM is, however, very expensive to use with charges about $10 per minute for the voice circuit. When calling the vessel, it is possible to reverse the charges or charge the call to the vessel's owner or operator.

Intra-Vessel Fixed Communication Systems

Most large vessels have their own phone systems, intercoms, public address systems, and other vessel communication systems. It was previously mentioned that many ships have FM radios. If the ship has an FM radio, often the compatible "base" FM units are fixed in the wheelhouse, cargo office and/or engine room control station.

Sound Powered Phones. Large vessels, especially US Government vessels, will usually be fitted with sound powered phones (see photograph on next page). These phones are located throughout the vessel at critical locations such as the wheelhouse, engine room control station, emergency diesel generator room, cargo control room, bow lookout post and steering gear room.

Sound Powered Phone

(Text by MARITECH)

(Photo Courtesy Dept. of Transportation)

Sound powered telephones are a reliable means of communication within the vessel. They are not subject to the limitations of radios. They have advantages over runners in that simultaneous conversations by two or three parties can be conducted.

Sound powered telephones do not require an outside source of electricity as do ship's intercoms or "talkbacks" and public address systems. They make their own power supplies through two different methods.

To signal another station onboard, set the selector switch to the station number you are calling. Station numbers are listed on the index. Then crank the generator handle. Be sure to give at least three or four rapid cranks to activate a bell or buzzer by the magneto current. This cranking rings a bell or sounds the buzzer at the station being called.

On the inside of the handset is a spring-loaded button which MUST BE DEPRESSED to either listen or talk. The speaker's voice activates a diaphragm in the mouthpiece which transmits the sound to the receiving station. Speech should be clear and forceful, particularly if loud background noise exists.

Intra-Vessel Fixed Communication Systems (continued)

Electric Telephone. Most commercial vessels including tugs, have electric telephones. These will be much like landbased telephones with rotary or push button operation. However, they depend on the vessel's electricity to operate. On larger ship's, they will probably be on the emergency circuit.

"Talkback" or Intercom. The master control for this unit is usually in the wheelhouse. The unit may function as follows. The master control unit can monitor selected stations on a one way basis. The master control station always receives unless a sub-station is deliberately monitored through the sub-station's speaker/microphone. The sub-station does not usually have the ability to call the master control unit. This system may also be connected to the vessel's emergency generator circuit like the telephones. These systems vary from vessel to vessel.

Public Address System. This system operates similarly to landbased systems. It might be useful for immediate notification of many people. A good example would be a decision to evacuate the vessel. It might also be prudent to establish some Universal Evacuation Signals and Procedures with the ship's whistle and general alarm bells for personnel onboard. The International Distress Signal for all vessels is "a continuous sounding of any fog apparatus" (i.e. ship's whistle).

Runners. As mentioned, a major vessel fire incident requires numerous agencies using large numbers of radios operating on common frequencies. One of the methods to minimize radio traffic is the use of "runners" or messengers as situations dictate. Messages and/or responses are walked back and forth between parties. Advantages and disadvantages of using runners should always be considered.

Concerns. Communication equipment onboard seagoing vessels is subject to considerable abuse from daily routine. Therefore, most equipment is extremely rugged and dependable as long as the unit and wire trunks remain intact.

Sound powered and battery operated units will be independent of the vessel's electrical supply. Loss of the vessel's generation capability does not necessarily become the loss of critical communication equipment. This will depend on the individual vessel. The wheelhouse need not be abandoned as a communications center because vessel-generated electricity is lost. Successful communications require flexibility and resourcefulness.

SPECIAL RESOURCES

This section details six areas of special resources for marine fire incidents of:

- Special documents and information
- Special firefighting equipment
- Special support equipment and operations
- Special craft and apparatus
- Special fire extinguishing agents
- Special personnel and organizations

Special Documents and Information

Vessel Inventory or Survey. A sample MARITECH vessel inventory has been provided each fire agency on the harbor. As possible, this information should be obtained for larger vessels. It will take vessel and fire department time to complete. However, once completed the agencies are more prepared to respond if fire occurs.

General Arrangement Plan. This plan shows the vessel layout including accommodation areas, machinery spaces, cargo tanks or holds and miscellaneous storerooms and spaces.

Vessel Fire Control Plan. Most self-propelled vessels more than 100 gross tons should have this plan. This is basically a general arrangement plan of the vessel showing for each deck:

- o the various fire retardant bulkheads
- o fire detection and manual alarm systems
- o fire extinguishing systems
- o fire doors, compartment ingress/egress
- o ventilation systems including dampers and remote stops

Incident Command should obtain a copy of the vessel inventory as well as a copy of the vessel's Fire Control Plan. These can be most helpful. Any number of reasons may make it difficult to obtain this information during an incident. Fire Control Plans are required to be kept near the gangway in a watertight container.

Vessel Safety Plan. This plan illustrates the locations of safety equipment that may not be found on the Fire Control Plan. Example items are lifeboats, resuscitators and lifejackets.

Special Documents and Information (continued)

Vessel Trim and Stability Booklet. This booklet contains information that is needed regarding vessel stability. The booklet should be obtained as soon as possible along with the other documents. It is necessary for stability issues. Information usually included in the booklet is:

- o The vessel's Hydrostatic Curves (or Curves of Form)
- o The Hydrostatic Table -displacement, DWT, TPI, etc.
- o The Curve of Righting Levers (or Stability Curve)
- o Data of flooding effects on compartments singly/combined

Special Firefighting Equipment

The following items of equipment should be made available to firefighters, particularly fire combat teams. These pieces will assist with safe, effective fire combat.

60 Minute Air Packs	Especially if fire is deep in large ship
60 Minute Spare Tanks	Large number of spares may be needed
4500# Cascade System	To recharge tanks at fireground site
4500# Air Compressor	To recharge tanks or cascade system
Special Water Nozzles	As appropriate
Lifevests/Floatcoats	If approved FF equipment
Intl. Shore Connection	See Sect. 5 - PHMFCP Training Manual
Foam Eductors	If using foam for vapor suppression
Foam Pick-up Tubes	For local foam access and application
Foam Nozzles	For application of mechanical foam
Infrared Detectors	To see fire through dense smoke
Explosimeters	For detecting combustible atmospheres
Monitoring Equipment	Thermocouples, O2 & CO2 monitors, etc.

The next section, Appendix 22, lists the Special Firefighting Equipment from the inventories of the fire departments that responded to the project survey. No 60 Minute Air Packs and no International Shore Connections were listed.

Special Support Equipment and Operations

Vessel fires may take several days to ultimately extinguish. Therefore, special support equipment should be available and in quantities beyond those normally needed. These resources would be used by incident response groups. Some equipment and operations not normally used might include:

Spare Radio Batteries	Many spares needed if long duration
Battery Chargers	Sufficient to recharge spares
Special Portable Radios	High wattage, intrinsically safe, etc.
Copier Machine	For plans, instructions and other info
CAMEO Computer	For plumes and HAZMAT information
Recording Equipment	For documentation (tape recorder, video)
Portable Pumps	For vessel dewatering-intrinsically safe
Water Eductors	For vessel dewatering
Diving Equipment	For survey or dewatering assistance
Oxy-Acetylene Torches	For dewatering assistance or other
Underwater Torches	For cutting holes (Isothermic Torch)
Hoisting Equipment	To move equipment/personnel on/off ship
Cargo Handling Equipt.	For removing cargo from vessel
Mooring Equipment	To replace/enhance vessel equipment
Shoring/Patching Aids	For control of watertight integrity
Tarps and Sealing Aids	For control of space being smothered
CO2 Transfer Equipment	To aid bulk transfer (hose, couplings)
Remote Ignition Device	Ignition/re-ignition LPG (i.e.flare gun)
Portable Generators	Trailer-mounted 50 KW unit at PNSY
Portable Light Units	For outside nighttime or inside vessel
Light Strings	As above (may require explosion-proof)
Extra Extension Cords	For department electrical equip onboard
Smoke Ejectors & Fans	For ventilation-smoke/fumes/fresh air
Ejector and Fan Socks	To assist ventilation tactics
Forcible Entry Equipt.	Especially metal cutting FE saw
Spare Fuel for Equipt.	If incident of long duration
Hand Trucks or Dollies	For movement of heavy equip (pumps/gens)
Fork Lift Trucks	To move drums of agent/palletized equipt
Personnel Shelters	For rest/recovery, rain or cold weather
First Aid Stations	If large mass casualty or potential of
Canteen Trucks/Huts	For food/refreshments if long duration
Portable Heatrs/Lights	For above shelters in cold weather/night
Outhouses	For obvious reasons

Special Craft and Apparatus

Search and rescue (SAR) activity around the harbor may best be accomplished by the USCG SAR Unit stationed at New Castle. They have equipment and apparatus suitable to SAR. Their boats are staffed and away from their facility within two (2) minutes of notification. Their 41 foot high speed patrol boats can exceed 25 knots (29 MPH) and may be on scene in a matter of minutes. These boats may also provide limited firefighting capability for small fires. The USCG Cutter TAMAROA, stationed in New Castle, may be the first large Coast Guard vessel on scene. Cutters' personnel contingents are considerable and well trained to deal with different types of incidents. However, it is not the USCG's responsibility to fight large shipboard fires.

Once notified of the incident, according to the 'Piscataqua River Marine Disaster Plan', the USCG Group Portland may take charge of the SAR operations. Depending on the scope of the incident, they may request additional watercraft from USCG Base South Portland including USCG cutters. USCG Group Portland may also request helicopter assistance as necessary. However, helicopters near the scene will produce excessive noise and may also produce VHF interference. This could be disruptive to local communications. USCG helicopters servicing this area will be responding from Air Station Cape Cod with about 45 minute response. They should be able to communicate on marine channels, especially distress/calling channel 16 (156.80 MHz) and channel 22 (157.10 MHz).

The local military bases at Portsmouth Naval Shipyard in Kittery and Pease Air Force Base in Newington-Portsmouth may provide specialty pieces of apparatus and watercraft. The inventory includes two tugboats with mounted firefighting monitors (YTB-771 & YTL-602) at PNSY and 3 crash trucks at PAFB. If available to assist, these units should respond quickly due to their close proximity. If off hours, the PNSY tugs require about 45 minutes to staff and warm up.

Special craft and apparatus would therefore include:

USCG SAR Boats	For SAR, FF and waterborne support
USCG Cutters	IC/OSC firefighting and water support
USCG Helicopters	For SAR, offdock personnel/equip support
Portsmouth Navigation	Tugs for various waterborne support
YTB-771 PNSY	Firefighting tugboat-2000 GPM
YTL-602 PNSY	Firefighting tugboat- 500 GPM
PNSY Barges and Boats	Offshore equipment/personnel transfer
Lines Boats	For assisting with mooring lines at pier
Harbormaster Boats	For SAR, traffic, waterborne support
Private Boats	Waterborne support-SAR/traffic/pollution

Special Craft and Apparatus (continued)

Mobile Command Post	If Mobile On Scene IC Post-NH OEM/S.Port
SCBA Service Trucks	To recharge expended SCBA bottles/tanks
Foam and Crash Trucks	If large amounts of foam are required
Trailer-Mounted Equipt	Foam generators, elec. generators, etc.
School Buses and Vans	For person transfer to/from fireground
Flatbed/Pickup Trucks	Transfer equip & foam to/from fireground

Special Fire Extinguishing Agents

Here again, the local military units are good sources of supply. PAFB has four to five thousand gallons of AFFF and will probably loan out at least half of it if necessary. They must retain adequate supplies for the protection of the base. The USCG SAR Unit at New Castle, the TAMAROA, and PNSY each maintain supplies of AFFF totaling hundreds of gallons. Within the IEU Mutual Aid System, hundreds more could be mustered.

If the incident is of great magnitude, many thousands of gallons of foam may be needed. Catastrophic fires could require tens of thousands. Airbases and airports probably have the best stockpiles and may provide supplies. Regional airports include:

- Loring Air Force Base
- Manchester Airport
- Portland International Jetport
- Logan International Airport (Massport)
- All New York/New Jersey Airports

Another important source of large foam supplies is the foam manufacturer. There are few firms in the United States producing these products. Most offer 24 hour emergency service to deliver very large amounts of foam directly from their sites. PAFB has indicated that emergency shipments of items like foam, may be flown into the facility unless defense requirements conflict.

Foam Types. Except for the 2000 gallons of fluroprotein foam stored at the Fuel Storage fixed unit, foams in the Seacoast area are mostly the AFFF type. AFFF has very quick knockdown power but may lose its vapor suppression control in a relatively short period of time compared to protein-based foams. For polar solvent Class B fires, AFFF may not be as effective. These products may require more specialized universal polar solvent, alcohol-resistant or alcohol-type foams.

Stabilizers. To prolong the effectiveness of the foam, firms offer a stabilizing agent to be mixed with the foam prior to application on the fireground. With stabilizer, vapor suppression can be extended many times that of unstabilized foam, depending on the foam and the product burning.

Special Fire Extinguishing Agents (continued)

New Products. New water-applied fire extinguishing agents are being introduced and researched. One product, is a jelly-like agent that smothers the fire with a coating it produces. The PNSY Fire Department has purchased this product for their protection.

Bulk Carbon Dioxide. In the section on fixed systems, steps to seal and smother fire with CO2 were discussed. Possible time frames for proper inertion of a space may be days. It may be necessary to re-inert the space for reasons such as improper space sealing. It may be possible to use an alternate inerting agent other than CO2. If available, however, CO2 should be used in most cases because of its inherent firefighting qualities.

Bulk CO2 will normally be delivered in tanker trucks at about zero degrees farenheit under about 270 PSI. Transfer logistics require a very long single length of special hose, maybe hundreds of feet. Without this hose, or its equivalent, bulk transfer is not possible. Presently, no local inventories or emergency plans list such a hose.

Special Personnel and Organizational Resources include:

Personnel:

Marine Chemist - Has equipment and expertise to obtain temperature readings, check for presence and concentration of gases, may assist with chemical related hazard concerns.

Media - Keep public informed and assist with keeping unauthorized personnel away from danger

Pilots - Necessary to move vessels, knowledge of marine environment.

Translators - For communication and translating documents. Should be familiar with fire and the marine environment.

Organizations:

Barge - Offload cargo or fuel; provide firefighting platform, remove containers or cargo from vessels.

Crane - Remove containers or cargo from vessel.

Environmental - For protection and cleanup.

Port Authority - Is familiar with port and operations that may be affected by Incident Command decisions.

Salvage - Vessel casualty operations.

Tug companies - Needed to move vessels.

PORTSMOUTH HARBOR MARINE FIREFIGHTING CONTINGENCY PLAN
AGENCY INVENTORY AND SURVEY
May, 1988

Code **ELOT** Code **ELOT**

A. General Information

1. Agency Name.....**Eliot Fire Department**
2. Mail Address.....141 State Road, Eliot, Maine 03903
3. Site/Station 3a...141 State Road
   Locations 3b.
   3c.
   ****
4. Phone Numbers: * **EMERGENCY** * Workdays Nights/Weekends
   Main Number *1-207-439-1355
   Site 3a. **********
   Site 3b.
   Site 3c.
5. Dispatch Center Name....Kittery Dispatch
   Address.....Kittery, Maine
   Business Phone.....Not Known
   # Dispatchers per Shift.Not Known...1 I Think
6. Comments_____

B. Key Personnel Information

	Rank/ Title	Name First....Last	Home Phone	Work Phone	Call Sign
1.	Chief	Richard Wood	439-0166		17C
2.	Asst Chief	Gerald Moynahan	439-3409		17C1
3.	Captain	Dennis Spinney	439-4323		17C2
4.					
5.					
6.					
7.					

C. General Personnel Information

	# Total Personnel	# Certified (Fire Fighter 1)	# Familiar With Large Vessels Prior Feb. 1988 *
1. Permanent:			
2. Part Time:			
3. Volunteer:	45	7	1
4. Call:			
5. Auxiliary:			

6. Comments_____
* Percent of agency staff familiar prior Feb. 1988....02%

D. Radio Communications

1. Radio Call Sign.....KCD 355

2. Main Frequencies Used

2a. Initial Tone:	154.190	Chnl#	1
2b. Operations:	154.190	Chnl#	1
2c. Local:	154.310	Chnl#	2
2d. Other:	154.280	Chnl#	3

PORTSMOUTH HARBOR MARINE FIREFIGHTING CONTINGENCY PLAN
AGENCY INVENTORY AND SURVEY
May, 1988

Code **NEWC** Code **NEWC**

A. General Information

1. Agency Name.....**New Castle Fire Department**
2. Mail Address.....43 Main Street, New Castle, N.H. 03854
3. Site/Station Locations 3a...43 Main Street
   3b.
   3c.
   ****
4. Phone Numbers:

	* EMERGENCY	* Workdays	Nights/Weekends
Main Number	* **436-2515**	* 436-1132	436-1132
Site 3a.	**********		
Site 3b.			
Site 3c.			

5. Dispatch Center Name....Rye Fire Department
   Address.....563 Washington Road, Rye, N.H. 03870
   Business Phone.....964-6411
   # Dispatchers per Shift.One (1)
6. Comments_____

B. Key Personnel Information

	Rank/ Title	Name First...Last	Home Phone	Work Phone	Call Sign
1.	Chief	Richard H. White	436-9025	431-2000 X240	31C
2.	Asst Chief	Richard A. Hopley	436-3694	431-2000 X243	31C1
3.	Captain	Rene Boisvert	436-5556	436-8709	31C2
4.	Lieutenant	Warren Jones	436-8441	436-8744	3103
5.	Lieutenant	Scott Whitehouse	436-6532	431-2000 X240	3104
6.					
7.					

C. General Personnel Information

	# Total Personnel	# Certified (Fire Fighter 1)	# Familiar With Large Vessels Prior Feb. 1988 *
1. Permanent:			
2. Part Time:			
3. Volunteer:			
4. Call:	25	20	0
5. Auxiliary:			

6. Comments_____
* Percent of agency staff familiar prior Feb. 1988....00%

D. Radio Communications

1. Radio Call Sign.....KQR 417 New Castle Fire Department

2. Main Frequencies Used

2a. Initial Tone:	154.190	Chnl#	1
2b. Operations:	154.280	Chnl#	2
2c. Local:	153.905	Chnl#	4
2d. Other:	154.415	Chnl#	3

PORTSMOUTH HARBOR MARINE FIREFIGHTING CONTINGENCY PLAN
AGENCY INVENTORY AND SURVEY
May, 1988

Code **NWTN** Code **NWTN**

A. General Information

1. Agency Name.....**Newington Fire Department**
2. Mail Address.....80 Fox Point Road, Newington, N.H. 03801
3. Site/Station Locations 3a...Corner of Fox Point Road & Nimble Hill Road
   3b.
   3c.

4. Phone Numbers:	* EMERGENCY	* Workdays	Nights/Weekends
Main Number	* 436-5737	* 436-9441	
Site 3a.			
Site 3b.			
Site 3c.			

5. Dispatch Center Name....Durham/ UNH Dispatch
   Address.....College Rd, Service Building, Durham, N.H. 03824
   Business Phone.....862-1392
   # Dispatchers per Shift.1 sometimes 2
6. Comments_____

B. Key Personnel Information

	Rank/ Title	Name First....Last	Home Phone	Work Phone	Call Sign
1.	Chief	Larry Wahl	436-7638	436-9441	33-C
2.	Asst Chief	Norman Rogers	431-1825	742-2028	33-C2
3.	Captain	Robert Wayss	431-4069		33-K1
4.	Captain	Joseph Sukeforth	436-8743		33-K2
5.					
6.					
7.					

C. General Personnel Information

	# Total Personnel	# Certified (Fire Fighter 1)	# Familiar With Large Vessels Prior Feb. 1988 *
1. Permanent:	2	2	1
2. Part Time:			
3. Volunteer:			
4. Call:	29	16	5
5. Auxiliary:			

6. Comments_____

* Percent of agency staff familiar prior Feb. 1988....19%

D. Radio Communications

1. Radio Call Sign.....KCC 991

2. Main Frequencies Used

2a. Initial Tone:	154.190	Chnl#	1
2b. Operations:	154.280	Chnl#	2
2c. Local:	154.115	Chnl#	4
2d. Other:		Chnl#	

PORTSMOUTH HARBOR MARINE FIREFIGHTING CONTINGENCY PLAN
AGENCY INVENTORY AND SURVEY
May, 1988

Code **PORT** Code **PORT**

A. General Information

1. Agency Name.....**Portsmouth Fire Department**
2. Mail Address.....170 Court Street, Portsmouth, N.H. 03801
3. Site/Station Locations 3a...170 Court Street
   3b...2700 Lafayette Road
   3c.
   ****

4. Phone Numbers:	* EMERGENCY	* Workdays	Nights/Weekends
Main Number	* **436-5000**	* 431-2003 X244	431-2003
Site 3a.	**********	431-2003 X246	
Site 3b.			
Site 3c.			

5. Dispatch Center Name..Portsmouth Fire Department
   Address.....170 Court Street, Portsmouth, N.H. 03801
   Business Phone.....431-2003
   # Dispatchers per Shift..1
6. Comments_____

B. Key Personnel Information

Rank/ Title	Name First....Last	Home Phone	Work Phone	Call Sign
1. Chief	Randal Sage		431-2003	40C
2. Deputy	George Pierce		431-2003	40C1
3. Deputy	Richard Mason		431-2003	40C2
4. Captain	Ralph DiBernado		431-2003	40-0-1
5. Captain	Edward Tully		431-2003	40-0-2
6. Captain	Everett Weare		431-2003	40-0-3
7. Captain	Frank Fernald		431-2003	40-0-4

C. General Personnel Information

	# Total Personnel	# Certified (Fire Fighter 1)	# Familiar With Large Vessels Prior Feb. 1988 *
1. Permanent:		59	
2. Part Time:			
3. Volunteer:			
4. Call:		16	
5. Auxiliary:			

6. Comments_____
* Percent of agency staff familiar prior Feb. 1988_____

D. Radio Communications

1. Radio Call Sign.....KCB 207

2. Main Frequencies Used				
	2a.	Initial Tone:	154.190	Chnl# 1
	2b.	Operations:	154.280	Chnl# 2
	2c.	Local:	153.905	Chnl# 3
	2d.	Other:	_____	Chnl#_____

PORTSMOUTH HARBOR MARINE FIREFIGHTING CONTINGENCY PLAN
AGENCY INVENTORY AND SURVEY
May, 1988

Code **RYE** Code **RYE**

A. General Information

1. Agency Name.....**Rye Fire Department**
2. Mail Address.....563 Washington Road, Rye, N.H. 03870
3. Site/Station Locations 3a. 563 Washington Road, Rye, N.H. 03870
   3b.
   3c.

4. Phone Numbers:	* **EMERGENCY** *	Workdays	Nights/Weekends
Main Number	* **964-8683** *	964-6411	964-6411
Site 3a.			
Site 3b.			
Site 3c.			

5. Dispatch Center Name....Rye Fire Department
   Address.....563 Washington Road, Rye, N.H. 03870
   Business Phone.....964-6411
   # Dispatchers per Shift.1
6. Comments_____

B. Key Personnel Information

	Rank/ Title	Name First....Last	Home Phone	Work Phone	Call Sign
1.	Chief	George Moynahan, Jr.	964-8044	964-6411	42C
2.	Asst Chief	Bruce Walker	964-6034	964-6411	42C2
3.	Captain	Ian Johnston	964-6058	964-6411	42-03
4.	Lieutenant	Leon Blaisdell	431-4067	964-6411	42-04
5.					
6.					
7.					

C. General Personnel Information

	# Total Personnel	# Certified (Fire Fighter 1)	# Familiar With Large Vessels Prior Feb. 1988 *
1. Permanent:	7	7	2
2. Part Time:			
3. Volunteer:			
4. Call:	14	10	0
5. Auxiliary:			

6. Comments_____

* Percent of agency staff familiar prior Feb. 1988....10%

D. Radio Communications

1. Radio Call Sign.....KCD 685

2.					
Main Frequencies Used	2a.	Initial Tone:	154.190	Chnl#	1
	2b.	Operations:		Chnl#	
	2c.	Local:	156.240	Chnl#	2
	2d.	Other:	154.280	Chnl#	3

PORTSMOUTH HARBOR MARINE FIREFIGHTING CONTINGENCY PLAN
AGENCY INVENTORY AND SURVEY
May, 1988

Code **NHDT** Code **NHDT**

A. General Information

1. Agency Name..**N.H. Dept. of Transportation, Bridge Maintenance**
2. Mail Address...PO Box 483, Hazen Drive, Concord, N.H. 03302
3. Site/Station Locations 3a.ME-NH Bridge Authority (Long Brdg-Bypass Rtl)
   3b.Memorial Bridge (US Rtl)
   3c.High Level Bridge (US I 95)
   ****
4. Phone Numbers:

	* EMERGENCY *	Workdays	Nights/Weekends
Main Number	271-3667/485-5767	271-3667	
Site 3a.(Opertr)	436-2432	436-2432	436-2432
Site 3b.(Opertr)	436-3830	436-3830	436-3830
Site 3c.		436-1099(Supt of 3 Bridges)	

5. Dispatch Center Name..State Offfice Build, Hookset Toll Plaza
   Address.....PO Box 398, Hookset, N.H. 03106
   Business Phone....Emergency 485-5767 Office 485-3851
   # Dispatchers per Shift.Center in Hookset manned 24 hrs/7days
6. Comments...Hooksett has Master List of N.H. Department of Transportation Personnel - N.H. D.O.T. personnel handle Maine - N.H. Bridge Authority.

B. Key Personnel Information

	Rank/ Title	Name First...Last	Home Phone	Work Phone	Call Sign
1.	See Above				
2.	Administrator	Kenneth R. Olsen	753-4765	271-3667	
3.	Sr. Supt.	Richard Giles	679-5426	436-1099	
4.					
5.					
6.					
7.					

C. General Personnel Information

	# Total Personnel	# Certified (Fire Fighter 1)	# Familiar With Large Vessels Prior Feb. 1988 *
1. Permanent:	N/A		
2. Part Time:			
3. Volunteer:			
4. Call:			
5. Auxiliary:			

6. Comments_____
* Percent of agency staff familiar prior Feb. 1988_____

D. Radio Communications

1. Radio Call Sign.....

2.	Main Frequencies Used	2a.	Initial Tone:	Chnl#
		2b.	Operations:	Chnl#
		2c.	Local:	Chnl#
		2d.	Other:	Chnl#

PORTSMOUTH HARBOR MARINE FIREFIGHTING CONTINGENCY PLAN
AGENCY INVENTORY AND SURVEY
May, 1988

Code **NHFM** Code **NHFM**

A. General Information

1. Agency Name.....**N.H. Fire Marshal Office**
2. Mail Address.....Hazen Drive, Concord, N.H. 03305
3. Site/Station 3a.
   Locations 3b.
   3c.
   ****
4. Phone Numbers: * **EMERGENCY** * Workdays * Nights/Weekends
   Main Number * **271-3294** * 271-3294 271-3636
   Site 3a. **********
   Site 3b.
   Site 3c.
5. Dispatch Center Name....State Police Dispatch
   Address.....Hazen Drive, Concord, N.H. 03305
   Business Phone.....271-3636
   # Dispatchers per Shift.2 Plus Supervisor
6. Comments_____

B. Key Personnel Information

	Rank/ Title	Name First...Last	Home Phone	Work Phone	Call Sign
1.	Fire Marshal	Bill Toland	778-8779	271-3294	904
2.	Deputy	Allen Britton	889-1833	271-3294	907
3.					
4.					
5.					
6.					
7.					

C. General Personnel Information

	# Total Personnel	# Certified (Fire Fighter 1)	# Familiar With Large Vessels Prior Feb. 1988 *
1. Permanent:	11	5	0
2. Part Time:			
3. Volunteer:			
4. Call:			
5. Auxiliary:			

6. Comments_____
* Percent of agency staff familiar prior Feb. 1988....00%

D. Radio Communications

1. Radio Call Sign.....KCA 999 (NH State Police)

2. Main Frequencies Used
   2a. Initial Tone: Chnl#
   2b. Operations: Chnl#
   2c. Local: Chnl#
   2d. Other: Chnl#

PORTSMOUTH HARBOR MARINE FIREFIGHTING CONTINGENCY PLAN
AGENCY INVENTORY AND SURVEY
May, 1988

Code **NHPA** Code **NHPA**

A. General Information

1. Agency Name.....**N. H. Port Authority**
2. Mail Address.....PO Box 506, Portsmouth, N.H. 03801
3. Site/Station Locations 3a...555 Market Street, Portsmouth
   3b.
   3c.

4. Phone Numbers:	EMERGENCY	Workdays	Nights/Weekends
Main Number		436-8500	692-3135
Site 3a.			
Site 3b.			
Site 3c.			

5. Dispatch Center Name..
   Address.....
   Business Phone.....
   # Dispatchers per Shift..
6. Comments....Facility work hours are 8-5 weekdays. No night, weekend, or holiday work without prior arrangements.

B. Key Personnel Information

	Rank/ Title	Name First....Last	Home Phone	Work Phone	Call Sign
1.	Director	Ernest Connor	692-3135	436-8500	
2.	Manager	Ivan Milton		431-8500	
3.	Foreman	Robert Moore	436-7560	431-8500	
4.					
5.					
6.					
7.					

C. General Personnel Information

	# Total Personnel	# Certified (Fire Fighter 1)	# Familiar With Large Vessels Prior Feb. 1988 *
1. Permanent:	13	0	6
2. Part Time:	5	0	
3. Volunteer:			
4. Call:			
5. Auxiliary:			

6. Comments_____
* Percent of agency staff familiar prior Feb. 1988.....33%

D. Radio Communications

1. Radio Call Sign.....Port Authority

2.	Main Frequencies Used			
		2a.	Initial Tone:	Chnl#
		2b.	Operations:	Chnl#
		2c.	Local:	Chnl#
		2d.	Other:	Chnl#

PORTSMOUTH HARBOR MARINE FIREFIGHTING CONTINGENCY PLAN
AGENCY INVENTORY AND SURVEY
May, 1988

Code **PNAV** Code **PNAV**

A. General Information

1. Agency Name.....**Portsmouth Navigation Division**
2. Mail Address.....PO Box 472, Portsmouth, N.H. 03801 1
3. Site/Station 3a.
   Locations 3b.
   3c.

****

4. Phone Numbers:	* EMERGENCY	* Workdays	Nights/Weekends
Main Number	* 436-1209	* 436-1209	436-1209
Site 3a.	**********		(Answering Serv.)
Site 3b.			
Site 3c.			

5. Dispatch Center Name..Same as Above
   Address.....
   Business Phone.....
   # Dispatchers per Shift..
6. Comments...23 Ft. runabout with 200 H.P. motor.

B. Key Personnel Information

	Rank/ Title	Name First...Last	Home Phone	Work Phone	Call Sign
1.		Richard Holt	436-1097	436-1209	
2.		Shirley Holt	436-7317	436-1209	
3.		Mathew Cote	1-207-439-9177	436-1209	
4.					
5.					
6.					
7.					

C. General Personnel Information

	# Total Personnel	# Certified (Fire Fighter 1)	# Familiar With Large Vessels Prior Feb. 1988 *
1. Permanent:	13		3
2. Part Time:			
3. Volunteer:		3	
4. Call:			
5. Auxiliary:			

6. Comments
* Percent of agency staff familiar prior Feb. 1988.....23%

D. Radio Communications

1. Radio Call Sign.....

2. Main Frequencies Used			
	2a.	Initial Tone:	Chnl#
	2b.	Operations:	Chnl#
	2c.	Local:	Chnl#
	2d.	Other:	Chnl#

PORTSMOUTH HARBOR MARINE FIREFIGHTING CONTINGENCY PLAN
AGENCY INVENTORY AND SURVEY
May, 1988

Code **NHWS** Code **NHWS**

A. General Information

1. Agency Name.....**DES - N.H. Water Supply and Pollution Control**
2. Mail Address....6 Hazen Drive, PO Box 95, Concord, N.H. 03301
3. Site/Station Locations 3a.Concord, N.H. Only
   3b.
   3c.
   ****

4. Phone Numbers:	* EMERGENCY *	Workdays	Nights/Weekends
Main Number	*1-800-852-3411	271-3503	271-3636
Site 3a.	**********		
Site 3b.			
Site 3c.			

5. Dispatch Center Name..State Police Dispatch
   Address.....Hazen Drive, Concord, N.H. 03305
   Business Phone.....271-3636
   # Dispatchers per Shift..
6. Comments_____

B. Key Personnel Information

	Rank/ Title	Name First....Last	Home Phone	Work Phone	Call Sign
1.	N/A - Pollution Control Personnel Only				
2.					
3.					
4.					
5.					
6.					
7.					

C. General Personnel Information

	# Total Personnel	# Certified (Fire Fighter 1)	# Familiar With Large Vessels Prior Feb. 1988 *
1. Permanent:	3	0	0
2. Part Time:			
3. Volunteer:			
4. Call:			
5. Auxiliary:			

6. Comments_____
* Percent of agency staff familiar prior Feb. 1988.....00%

D. Radio Communications

1. Radio Call Sign.....N/A

2.	Main Frequencies Used	2a. Initial Tone:	Chnl#
		2b. Operations:	Chnl#
		2c. Local:	Chnl#
		2d. Other:	Chnl#

PORTSMOUTH HARBOR MARINE FIREFIGHTING CONTINGENCY PLAN
AGENCY INVENTORY AND SURVEY
May, 1988

Code **SEA3** Code **SEA3**

A. General Information

1. Agency Name.....**Sea-3, Inc.**
2. Mail Address.....103 Old Dover Road, Newington, N.H. 03801
3. Site/Station 3a...Same
   Locations 3b.
   3c.

****

4. Phone Numbers:	* EMERGENCY	* Workdays	Nights/Weekends
Main Number	* **431-5990**	* 431-5990	431-5990
Site 3a.	**********		
Site 3b.			
Site 3c.			

5. Dispatch Center Name..Same
   Address.....Same
   Business Phone.....Same
   # Dispatchers per Shift..1
6. Comments_____

B. Key Personnel Information

	Rank/ Title	Name First....Last	Home Phone	Work Phone	Call Sign
1.	Sr. VP	Lawrence Heffron	964-5704	436-6225	
2.	Manager	Paul Bogan	431-5224	431-5990	
3.	Maintnce.	John Mielke	778-0286	431-5990	
4.					
5.					
6.					
7.					

C. General Personnel Information

	# Total Personnel	# Certified (Fire Fighter 1)	# Familiar With Large Vessels Prior Feb. 1988 *
1. Permanent:	15	N/A	15
2. Part Time:	N/A		
3. Volunteer:			
4. Call:			
5. Auxiliary:			

6. Comments_____

* Percent of agency staff familiar prior Feb. 1988.....100%

D. Radio Communications

1. Radio Call Sign.....KYF 700

2. Main Frequencies Used			
	2a. Initial Tone:		Chnl#
	2b. Operations:	464.675	Chnl#
	2c. Local:		Chnl#
	2d. Other:		Chnl#

PORTSMOUTH HARBOR MARINE FIREFIGHTING CONTINGENCY PLAN
AGENCY INVENTORY AND SURVEY
May, 1988

Code **SMPX** Code **SMPX**

A. General Information

1. Agency Name.....**Simplex Wire and Cable Company**
2. Mail Address.....PO Box 479, Portsmouth, N.H. 03801
3. Site/Station Locations 3a...2073 Woodbury Avenue, Newington, N.H.
   3b.
   3c.

****

4. Phone Numbers:

	EMERGENCY	Workdays	Nights/Weekends
Main Number	436-6100	436-6100	436-6100
Site 3a.			
Site 3b.			
Site 3c.			

5. Dispatch Center Name..Simplex Wire and Cable Guard Station
   Address.....2073 Woodbury Avenue, Newington, N.H.
   Business Phone.....436-6100
   # Dispatchers per Shift..2
6. Comments....Guard Station is manned 24 hrs/ 7 days per week.
20 Ft. flat boat - no motor - attached to pier.

B. Key Personnel Information

	Rank/ Title	Name First....Last	Home Phone	Work Phone	Call Sign
1.	Guard Station		436-6100	436-6100	
2.	The Guards will notify the appropriate personnel at Simplex.				
3.					
4.					
5.					
6.					
7.					

C. General Personnel Information

	# Total Personnel	# Certified (Fire Fighter 1)	# Familiar With Large Vessels Prior Feb. 1988 *
1. Permanent:	603	0	0
2. Part Time:	256	0	0
3. Volunteer:	0	0	0
4. Call:	0	0	0
5. Auxiliary:	0	0	0

6. Comments_____

* Percent of agency staff familiar prior Feb. 1988....00%

D. Radio Communications

1. Radio Call Sign.....Base Station - Portables 1-5

2. Main Frequencies Used

2a.	Initial Tone:	Chnl#
2b.	Operations:	Chnl#
2c.	Local:	Chnl#
2d.	Other:	Chnl#

Note: NH DES-WSPCC lists no units.
NH Fire Marshal lists no units.

Portsmouth Harbor Marine Firefighting Contingency Plan
Project Agencies 2-Way Radio Communications

May 1988

2-Way Radio Sections Equipment/Information	Eliot Fire Dept	New Castle Fire Dept	Newington Fire Dept	Portsmouth Fire Dept	Rye Fire Dept	NH Dep Trns Brdge Maint	NH Port Authority	Portsmouth Navigation	Sea-3, Inc.	Simplex Wire Wire & Cable
1. Radio Call or Sign	KCD 355	KQR 417	KCC 991	KCB 207	KCD 685		Call NHPA		KYF 700	
Main Frequencies Used:										
a. Initial Tone/Channel	154.190/1	154.190/1	154.190/1	154.190/1	154.190/1					
b. Operations/Channel	154.190/1	154.280/2	154.280/2	154.280/2					464.675	
c. Local/Channel	154.310/2	153.905/4	154.115/4	153.905/3	156.240/2					
d. Other/Channel	154.280/3	154.415/3			154.280/3					
2. Marine Radiotelephone										
a. No. of Handhelds Units	0	1	1	0			1	3*	1	
All Invtry Chnls/Partial		22	13,16,22,23				All	1ALL,2 6-16	7,13,16,77	
b. No. of Mobile Units	0		1-Car,1-Uty		2					
All Invtry Chnls/Partial			13,16,22,23		16					
c. No. of Fixed Units	0	1			1	2-1 Ea Brdg				
All Invtry Chnls/Partial	0	22			16,23	13,16				
3. Handheld FM Portables										
a. Make	Motorola	Mtrla MT500	Motorola	Motrla 500	Motorola	Ritron			Motorola	Regency
b. No. of Units	2	5	6	14	2	3			4	5
c. Maximum Wattage	5	5	5	5?	5					
d. No. of Remote Mikes	2	2		4						5
e. No. of Channels	4	4	2/8, 4/4	8	4	1				1
f. Frequencies	See Sec #1	See Sec #1	See Sec #1						See Sec 1&2	153.23
g. Intrinsically Safe	x	No	No	No	No	No			Yes	
h. No. of Spare Batteries	0	2	2	5	2	0			Yes	1
i. No. of Chargers/Capacity	2/1	3	7	24	2	3			2	5
4. Other Handheld FM Prtbles										
a. Make	Sonar		Maxon		G.E.					
b. No. of Units	3		9		2					
c. Maximum Wattage	5		5		5					
d. No. of Remote Mikes										
e. No. of Channels	1		4		4/22					
f. Frequencies	154.190		See Sec #1							
g. Intrinsically Safe	?		No							
h. No. of Spare Batteries	0		0		2					
i. No. of Chargers/Capacity	3/1		9		2					

* Portsmouth Navigation usually works CHNLS 7 & 77 between vessels or between ship and dock.

Note:
1. The only foams carried are AFFF type.
2. All vehicles have FIREGROUND 154.280.
3. No vehicles have 60 minute air packs.
4. No 3 inch hose was inventoried.
5. Only NWTN listed Around-the-Pump Proportioners (for 33E1 & 33E2).

Portsmouth Harbor Marine Firefighting Contingency Plan
Fire Department Agency Inventory - May 1988

Fire Department Vehicle Apparatus and Onboard Equipment
(For Commitment of Mutual Aid For Marine Fire)

Floating Apparatus: See at bottom
Codes: Eliot FD.....ELOT
New Castle FD.....NEWC
Newington FD.....NWTN
Portsmouth FD.....PORT
Rye FD.....RYE

Type Equipment	Fire Dept Code	Year Built	Call Sign	Pump Cap.	Tank Cap.	30 Minute Air Packs	30 Minute Spare Tanks	Capacity Portable Genertr	Capacity Pump	Light Units	Smoke Eject	3% AFFF Foam	6% AFFF Foam	In-Line Educt	Pick Up Tubes	Foam Nozzles 1.5"	Foam Nozzles 2.5"	Longest Ladder Onboard	Fire Hose Onboard 5"	Fire Hose Onboard 4"	Fire Hose Onboard 2.5"
Engine / Pumper	ELOT	1964	17E2	750	500	4	0	500W	No	2	1	0	0	0	0	0	0	22'		x	x
	NEWC	1972	31E1	1000	600	5	8	3500W	No	2	0	0	10	1	0	0	0	24'	600		1200
	NEWC	1982	31E2	1000	500	6	6	5000W	200	5	1	0	10	1	0	0	0	35'	600		1200
	NWTN	1972	33E1	1000	750	5	4	No	No	0	1	40	0	0	0	1	0	24'		1500	500
	NWTN	1977	33E2	1250	750	5	4	No	No	0	1	0	40	0	0	1	0	24'		1500	500
	PORT	1988	40E1	1500	500	6	6	Yes	No	2	1	5	0	0	1	0	0		800		
	PORT	1987	40E2	1500	500	6	6	Yes	No	2	1	5	0	0	1	0	0		800		
	PORT	1974	40E3	1500	500	6	6	Yes	No	2	1	5	0	0	1	0	0		800		
	PORT	1983	40E4	1000	500	6	6	Yes	No	2	1	5	0	0	1	0	0		800		
	PORT	1967	40E5	750	500	2	2	No	No	0	0	0	0	0	0	0	0				
	RYE	1969	42E2	1000	500	4	4	5000W	No	3	1	5	0	0	Yes	0	0	24'		1100	700
	RYE	1976	42E4	750	500	5	5	3500W	No	3	1	0	5	0	Yes	0	0	18'		1100	700
Tanker	RYE	1969	42T1	300	1200	0	0	No	100	0	0	5	5	0	Yes	0	0				400
Ladder / Pumper	NWTN	1986	33L1	1500	250	5	4	1500W	No	2	1	0	0	0	1	0	0	75,35		1200	500
Utility	NEWC	1988	31U1																		
	NWTN	1974	33U			2	0	3500W	No	3	0	0	0	0	0	0	0	20			
Hose Wagon	NEWC	1979	31H1																1200		
Command Vehicle	NWTN	1986	33Car1			1	0														
Boats	ELOT		None	Length 14', Row Boat																	
	NWTN		Boat-1	Length 17', 70 HP Outboard																	
	NWTN		Boat-2	Length 14', 18 HP Outboard																	

Portsmouth Harbor MFCP May 1988

Stored Equipment Quantities At Fire Stations

	ELOT	NEWC	NWTN	PORT	RYE
1. Intl. Shore Connections:					
2. 15 Min. Emerg. Escpe Pcks:			2		
3. 30 Minute Air Packs:	9				
4. 60 Minute Air Packs:					
5. 30 Minute Spare Tanks:	8	2	10		
6. 60 Minute Spare Tanks:					
7. Cascade System:				1	
8. 2500# Air Tank Compressor:					
9. 4500# Air Tank Compressor:					
10. Explosimeters:		1		1	1
11. Port. Pumps #/Capacity:	1-250	1-200	1-250		1-100
12. Port. Pumps #/Capacity:	1-150		1-150		1-50
13. Submer Pump #/Capacity:					
14. Submer Pump #/Capacity:					
15. Port. AC Gen. Capacity:	1-500W				
16. Port. AC Gen. Capacity:					
17. Port. DC Gen. Capacity:					
18. Portable AC Light Units:	1	2			
19. Portable DC Light Units:					
20. Smoke Ejectors:	2				
21. Foam In-line Eductors:	1	3			
22. Foam Pick-up Tubes:	1				
23. Foam Nozzles 1 1/2":	1				
24. Foam Nozzles 2 1/2":					
25. 3% Protein Foam:					
26. 6% Protein Foam:					
27. 3% Fluroprotein Foam:					
28. 6% Fluroprotein Foam:					
29. 3% AFFF:	15		175	20	30
30. 6% AFFF:		10			
31. 3% Jet-X Hi-Ex Foam:					
32. 6% Jet-X Hi-Ex Foam:		65			
33. Diving Equip:					
34. Thermocouples:					
35. Infrared Heat Detectors:		1			
36. CO2 Transfer Equip:					
37. Explosion-proof Equip:					

38. Other Equip or Foams: NWTN - 75 gallons of alcohol type AFFF

PORTSMOUTH HARBOR MARINE FIREFIGHTING CONTINGENCY PLAN
VESSEL INVENTORY AND SURVEY
(For Vessels over 25 Feet in Length)
May, 1988

A. General Vessel Information

1. Vessel Name	M/V EUGENIA MORAN	7. Type	Tug
2. Nationality	US	8. Reg. Length	107 Ft.
3. Type Propulsion Power	Diesel	9. Reg. Beam	33 Ft.
4. Rated Horsepower	2860	10. Max. Draft	16 Ft.
5. Fuel(s) Used	Diesel	11. Gross Wt.	282 Ton
6. Thruster(s)	0	12. Max. Speed	12 Kts.

B. Personnel Information

1. Maximum number of passengers permitted: 0
2. Minimum number of crew permitted: 4
3. Normal number of crew: 4
4. Basic language(s) of Officers: US
5. Basic language(s) of Crew: US
6. Number of personnel in Vessel Fire Contingent: 0
7. Is Engine Room continuously staffed while in Portsmouth? No
8. If No, when staffed? 0800-1500, or underway
9. Master's/Captain's Name: S. H. Holt
10. Master's/Captain's Name:
11. Owner's Name: Portsmouth Navigation
    Address: PO Box 472 Portsmouth
    Workday Phones: 436-1209
    Nights/Weekends Phones: Same
12. Operator's Name: Portsmouth Navigation Div.
    Address: 34 Ceres St. Portsmouth
    Workday Phones: 436-1209
    Nights/Weekends Phones: Same

C. Voice Communications Within Vessel

1. Handheld Portables: None
2. Base Station Location(s) (To Above Portables): None
3. Sound Powered Telephones?.....No
4. Electric Telephones?.....Yes
5. Talkback/Intercom System?.....No
6. Public Address System?.....No

D. Voice Communications Between Vessel and Shore

1. Radio Call Sign:
2. FM Fire Radios: None
3. Marine Radios (Radiotelephone)

	Handheld	Base With Battery Backup	Base Without Battery
3a. # of Units:		2-Synsize	
3b. Locations:			
3c. Channels:			

4. Normally Guarded Marine Channels in Portsmouth: None
5. Normal Marine Channels Worked in Portsmouth: 7, 13, 16, 77

E. Vessel Firefighting Equipment

1. Compressed Air Breathing Apparatus: N/A
2. Hydrants threads or couplings? Threads
3. Diameters/Type threads: 2 1/2 NPT, 1 1/2 IPT
4. Nozzle Type(s): All Purpose
5. Intl. Shore Connection Locations: None
6. Fire Control Plan Tube Locations (Please attach one copy for Portsmouth Harbor Inventory purposes): None

F. Alarm and Indicator Panel Locations N/A

G. Emergency Stops Locations

1. Fuel Pumps None
2. Fuel Pumps None
3. Cargo Pumps None
4. Cargo Pumps None
5. Vapor Compressors None
6. Inert Gas Blower None
7. Ventilation Fans None
8. Ventilation Fans None

H. Vessel Electrical Generators

1. Emergency	Location	Output (KW or KVA)	Prime Mover
1a. N/A			
1b.			
1c.			

2. Non-Emergency	Location	Output (KW or KVA)	Prime Mover
2a.	ER	60 KW	Diesel
2b.	ER	30 KW	Diesel
2c.			
2d.			

3. Comments

I. Vessel Fire Pumps

1. Emergency Fire Pumps (If not electric, list PM under 'Motor')

	Location	Capacity (GPM)	Motor Size (KW or KVA)
1a.			
1b.			
1c.			

2. Non-Emergency Fire Pumps

	Location	Capacity (GPM)	Prime Mover
2a.	ER	100	Electric Motor
2b.			
2c.			
2d.			
2e.			

3. Comments

J. Vessel Fixed Dewatering Pumps

1. Emergency Dewatering Pumps (Will run off emergncy generators)

	Location	Capacity (GPM)	Motor Size (KW or KVA)
1a.	N/A		
2a			
3a.			

2. Non-Emergency Dewatering Pumps

	Location	Capacity (GPM)	Prime Mover
2a.	N/A		
2b.			
2c.			
2d.			
2e.			

K. Vessel Fixed Extinguishing Systems (Please list only remote release control locations--assuming local release at bottles)

1. Carbon Dioxide (C02) Fixed Bottles
   - 1a. Spaces Protected ER
   - 1b. Release Locations ER
   - 1c. # of Bottles 2 Capacity Each 100 lbs
   - 1d. Bottle Locations ER

PORTSMOUTH HARBOR MARINE FIREFIGHTING CONTINGENCY PLAN
VESSEL INVENTORY AND SURVEY
(For Vessels over 25 Feet in Length)
May, 1988

A. General Vessel Information

1. Vessel Name	M/V NANCY MORAN	7. Type	Tug
2. Nationality	US	8. Reg. Length	100 Ft.
3. Type Propulsion Power	Diesel	9. Reg. Beam	25 Ft.
4. Rated Horsepower	1600	10. Max. Draft	13 Ft.
5. Fuel(s) Used	Diesel	11. Gross Wt.	228 Ton
6. Thruster(s)	0	12. Max. Speed	11 Kts.

B. Personnel Information

1. Maximum number of passengers permitted: 0
2. Minimum number of crew permitted: 4
3. Normal number of crew: 3
4. Basic language(s) of Officers: US
5. Basic language(s) of Crew: US
6. Number of personnel in Vessel Fire Contingent: 0
7. Is Engine Room continuously staffed while in Portsmouth? No
8. If No, when staffed? Vessel Underway
9. Master's/Captain's Name: R. C. Holt
10. Master's/Captain's Name:
11. Owner's Name: Portsmouth Navigation
    Address: PO Box 472 Portsmouth
    Workday Phones: 436-1209
    Nights/Weekends Phones: Same
12. Operator's Name: Portsmouth Navigation Div.
    Address: 34 Ceres St. Portsmouth
    Workday Phones: 436-1209
    Nights/Weekends Phones: Same

C. Voice Communications Within Vessel

1. Handheld Portables: None
2. Base Station Location(s) (To Above Portables): None
3. Sound Powered Telephones?.....No
4. Electric Telephones?.....Yes
5. Talkback/Intercom System?.....No
6. Public Address System?.....No

D. Voice Communications Between Vessel and Shore

1. Radio Call Sign:
2. FM Fire Radios: None
3. Marine Radios (Radiotelephone)

	Handheld	Base With Battery Backup	Base Without Battery
3a. # of Units:		2	
3b. Locations:			
3c. Channels:			

4. Normally Guarded Marine Channels in Portsmouth: None
5. Normal Marine Channels Worked in Portsmouth: 7, 13, 16, 77

E. Vessel Firefighting Equipment

1. Compressed Air Breathing Apparatus: N/A
2. Hydrants threads or couplings? Threads
3. Diameters/Type threads: 2 1/2 NPT, 1 1/2 NPT
4. Nozzle Type(s): All Purpose
5. Intl. Shore Connection Locations: None
6. Fire Control Plan Tube Locations (Please attach one copy for Portsmouth Harbor Inventory purposes): None

F. Alarm and Indicator Panel Locations N/A

G. Emergency Stops Locations

1. Fuel Pumps None
2. Fuel Pumps None
3. Cargo Pumps None
4. Cargo Pumps None
5. Vapor Compressors None
6. Inert Gas Blower None
7. Ventilation Fans None
8. Ventilation Fans None

H. Vessel Electrical Generators

	Location	Output(KW or KVA)	Prime Mover
1. Emergency			
1a.	N/A		
1b.			
1c.			
2. Non-Emergency	Location	Output(KW or KVA)	Prime Mover
2a.	ER	30 KW	Diesel
2b.			
2c.			
2d.			

3. Comments

I. Vessel Fire Pumps

1. Emergency Fire Pumps (If not electric, list PM under 'Motor')

	Location	Capacity (GPM)	Motor Size (KW or KVA)
1a.			
1b.			
1c.			

2. Non-Emergency Fire Pumps

	Location	Capacity (GPM)	Prime Mover
2a.	ER	100	Diesel
2b.			
2c.			
2d.			
2e.			

3. Comments

J. Vessel Fixed Dewatering Pumps

1. Emergency Dewatering Pumps (Will run off emergncy generators)

	Location	Capacity (GPM)	Motor Size (KW or KVA)
1a.	N/A		
2a			
3a.			

2. Non-Emergency Dewatering Pumps

	Location	Capacity (GPM)	Prime Mover
2a.	N/A		
2b.			
2c.			
2d.			
2e.			

K. Vessel Fixed Extinguishing Systems (Please list only remote release control locations--assuming local release at bottles)

1. Carbon Dioxide (C02) Fixed Bottles
   - 1a. Spaces Protected ER
   - 1b. Release Locations ER
   - 1c. # of Bottles 2 Capacity Each 100 lbs
   - 1d. Bottle Locations ER

PORTSMOUTH HARBOR MARINE FIREFIGHTING CONTINGENCY PLAN
VESSEL INVENTORY AND SURVEY
(For Vessels over 25 Feet in Length)
May, 1988

A. General Vessel Information

1. Vessel Name	M/V E.F. Moran Jr.	7. Type	Tug
2. Nationality	US	8. Reg. Length	103 Ft.
3. Type Propulsion Power	Diesel	9. Reg. Beam	27 Ft.
4. Rated Horsepower	1600	10. Max. Draft	12 Ft.
5. Fuel(s) Used	Diesel	11. Gross Wt.	226 Ton
6. Thruster(s)	0	12. Max. Speed	10 Kts.

B. Personnel Information

1. Maximum number of passengers permitted 0
2. Minimum number of crew permitted 4
3. Normal number of crew 4
4. Basic language(s) of Officers US
5. Basic language(s) of Crew US
6. Number of personnel in Vessel Fire Contingent 0
7. Is Engine Room continuously staffed while in Portsmouth? No
8. If No, when staffed? Underway
9. Master's/Captain's Name M. L. Cote
10. Master's/Captain's Name
11. Owner's Name Portsmouth Navigation
    Address PO Box 472 Portsmouth
    Workday Phones 436-1209
    Nights/Weekends Phones Same
12. Operator's Name Portsmouth Navigation Div.
    Address 34 Ceres St. Portsmouth
    Workday Phones 436-1209
    Nights/Weekends Phones Same

C. Voice Communications Within Vessel

1. Handheld Portables
2. Base Station Location(s) to above portables
3. Sound Powered Telephones?.....Yes/No
4. Electric Telephones?.....Yes/No
5. Talkback/Intercom System?.....Yes/No
6. Public Address System?.....Yes/No
7. Comments Voice tube Wheelhouse to Engine Room

D. Voice Communications Between Vessel and Shore

1. Radio Call Sign
2. FM Fire Radios None

3. Marine Radios (Radiotelephone)	Handheld	Base With Battery Backup	Base Without Battery
3a. # of Units:		2	
3b. Locations:			
3c. Channels:			

4. Normally Guarded Marine Channels in Portsmouth:
5. Normal Marine Channels Worked in Portsmouth: 7, 13, 16, 77

E. Vessel Firefighting Equipment

1. Compressed Air Breathing Apparatus N/A
2. Hydrants threads or couplings? Threads
3. Diameters/Type threads 2 1/2 NST, 1 1/2 NST
4. Nozzle Type(s) One 1 1/2" Multipurpose
5. Intl. Shore Connection Locations None
6. Fire Control Plan Tube Locations (Please attach one copy for Portsmouth Harbor Inventory purposes) None

F. Alarm and Indicator Panel Locations N/A

G. Emergency Stops Locations

1. Fuel Pumps None
2. Fuel Pumps None
3. Cargo Pumps None
4. Cargo Pumps None
5. Vapor Compressors None
6. Inert Gas Blower None
7. Ventilation Fans 1 Fan foward Engine Room - No shutoff
8. Ventilation Fans 1 Fan foward crew quarters - No shutoff

H. Vessel Electrical Generators

1. Emergency	Location	Output (KW or KVA)	Prime Mover
1a.	N/A		
1b.			
1c.			
2. Non-Emergency	Location	Output (KW or KVA)	Prime Mover
2a.	ER	30 KW	Diesel
2b.	ER	30 KW	Diesel
2c.			(GM 3-71)
2d.			

3. Comments 125 Volts DC 200A located in Engine Room

I. Vessel Fire Pumps

1. Emergency Fire Pumps (If not electric, list PM under 'Motor')

	Location	Capacity (GPM)	Motor Size (KW or KVA)
1a.	N/A		
1b.			
1c.			

2. Non-Emergency Fire Pumps

	Location	Capacity (GPM)	Prime Mover
2a.	ER	150	Diesel
2b.			
2c.			
2d.			
2e.			

3. Comments 3-71 Power Take-off

J. Vessel Fixed Dewatering Pumps

1. Emergency Dewatering Pumps (Will run off emergncy generators)

	Location	Capacity (GPM)	Motor Size (KW or KVA)
1a.			
2a			
3a.			

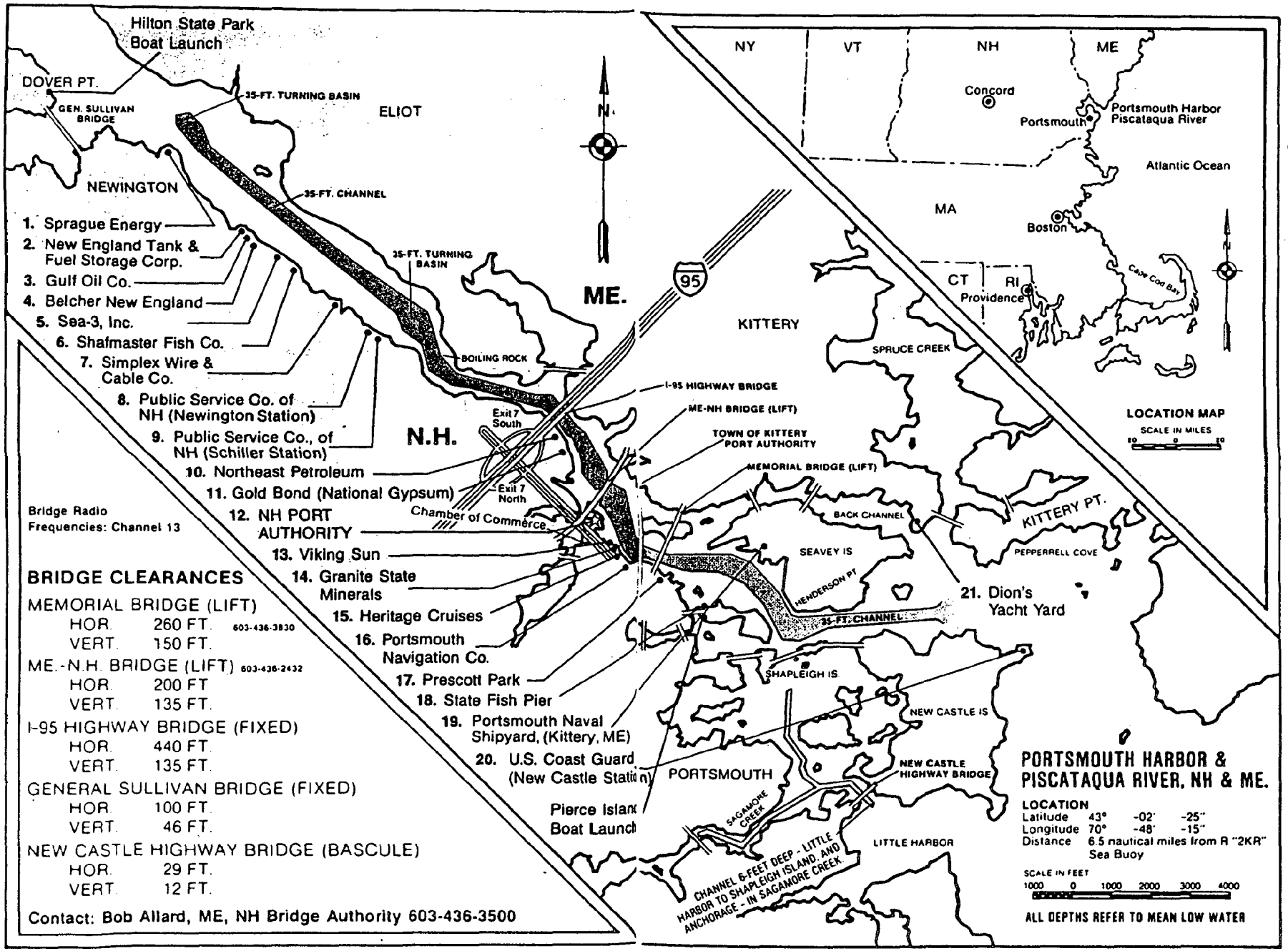
2. Non-Emergency Dewatering Pumps

	Location	Capacity (GPM)	Prime Mover
2a.	ER	150	Diesel
2b.	ER	1600 GPH	1/2 HP Motor
2c.			
2d.			

Comments Diesel is 3-71 Power Take-off

K. Vessel Fixed Extinguishing Systems (Please list only remote release control locations--assuming local release at bottles)

1. Carbon Dioxide (C02) Fixed Bottles
   - 1a. Spaces Protected ER
   - 1b. Release Locations ER
   - 1c. # of Bottles 1 Capacity Each 100 lbs
   - 1d. Bottle Locations ER



NHPA Diagram of Portsmouth Harbor and Terminals

Appendix 24

Directions for Responders to Major Portsmouth Harbor Terminals

NOTE: These are directions for those responding to the waterfront sites. Staging Areas for mutual aid equipment/personnel may be different locations.

Newington:

Sprague:	Spaulding Tnpk north to Exit #4--River Road. If going south on Spaulding Tnpk from Dover, take reverse loop after GS Bridge and get to right. Turn right off ramp 300 yds to Sprague gate--left.
Sea-3 LPG:	Old Dover Road north just past Country Curtains to River Road exit on right as going down hill-go straight onto Patterson Lane 1/2 mi downhill to entrance and gate on right. If Spaulding Tnpk north, take Exit #4--River Road-Turn right off ramp onto River Road-1/2 mi to left turning curve onto Patterson Lane-continue 1/2 mi to entrance and gate on right. If Spaulding Tpk south, take reverse loop after GS Bridge to Exit #4 and follow directions above.
Simplex:	Old Dover Road to entrance across from Filene's at Fox Run Mall.

Portsmouth:

PSNH Schiller:	Gosling Road east at Sundeen's AV Warehouse to end at River-gate on right.
PSNH Mobil:	Gosling Road east at Sundeen's AV Warehouse 1/2 mi to paved entrance on right opposite Mobil tanks-go up hill past brick building-continue and bear next left down hill-pavement rough.
Gold Bond Gypsum:	Market Street to Cutts Road to end--through gate & turn right--go around building to dirt access.
NH Port Authority:	Market Street to steel scrap piles-through gate at traffic light-around shed building.
Isles of Shoals Stmshp:	Market Street next to steel scrap pile and across from the new Sheraton.
Granite State Minrls:	Market Street across from new Sheraton and usually has salt piles in terminal.
Portsmouth Navigation	Tugs located at Ceres Street facility 50 yds. east of Granite State Minerals.

New Castle:

USCG Station	Route 1B to Fort Constitution. Follow signs to USCG Facility.

US Army Corps of Engineers Facility and Pier Information

PIERS, WHARVES, AND DOCKS

Portsmouth, New Hampshire, right bank, Piscataqua River

Corps of Engineers Port Code No. 00600

REFERENCE NUMBER ON MAP	7 Dock Code No. 785	8 Dock Code No. 783	9 Dock Code No. 770
NAME	Portsmouth Navigation Corp. Wharf.	Oar House Dock.	Granite State Minerals Dock.
LOCATION ON WATERFRONT	Approximately 1,200 feet above Memorial Bridge (U.S. Highway 1) foot of Hanover Street extended. Ceres Street	Approximately 1,400 feet above Memorial Bridge (U.S. Highway 1), 64 Ceres Street	Above Memorial Bridge (U.S. Highway 1) between foot of Russell and Deer Streets extended. 227 Market Street
OWNED BY	Portsmouth Navigation Corp., division of Central Wharf Tow Boat Co., Inc.	Society of Colonial Dames; New Hampshire Division.	Granite State Minerals, Inc.
OPERATED BY	do.	Oar House, Inc. and Gallant Industries, Inc.	do.
PURPOSE FOR WHICH USED	Mooring company-owned tugs and harbor pilot boats.	Mooring excursion vessels and miscellaneous craft.	Receipt of salt; receipt and shipment of various dry bulk commodities and heavy lift items.
TYPE OF CONSTRUCTION	Masonry stone bulkhead, solid fill, with timber pile, timber-decked extension; one 40-foot, timber, mooring float located at lower end of wharf.	Steel sheet pile bulkhead with asphalt-surfaced, solid fill fronted by 6-foot-wide timber float.	Steel sheet pile bulkhead with solid fill fronted by steel pile, timber-decked, asphalt-surfaced extension.

DESCRIPTION		Face	Lower side		Face	Sides		Face	Lower side	Upper side
Dimensions	(Feet)	125+40	18		100	31		300	32	50
Depth Alongside at MLW	Do.	16-17	-		12	-		32	-	-
Breasting Distance	Do.	165	-		100	-		300	-	-
Total Berthing Space	Do.	3 abreast.	-		100	-		300	-	-
Width of Apron	Do.	Open and 33			25			32		
Height of Deck Above MLW	Do.	10			1, float.			18		
Load Capacity (Lbs. per Sq.Ft.)		-			-			-		
Lighted or Unlighted		Lighted.			Lighted.			Partly lighted.		

MECHANICAL HANDLING FACILITIES	None.	None.	One 130-ton, electric, pedestal-mounted, revolving crane with 100-foot boom equipped with 6-cubic yard clamshell bucket for unloading salt into storage area at rear. One 6-cubic yard, diesel, front-end loader for reclaiming salt from storage into a portable receiving hopper with gasoline-operated, inclined, belt conveyor for loading trucks; two diesel, crawler cranes, each with 85-foot boom, equipped with 4-cubic yard bucket capable of 20-ton lifts at 35-foot radius when working in tandem.
RAILWAY CONNECTIONS	None.	None.	One surface track in rear of upper end of wharf serves open storage area; connects with Boston and Maine Railroad.
HIGHWAY CONNECTIONS	Via Ceres Street, asphalt, 20 feet wide, from Bow Street, asphalt, 25 feet wide.	Same as Ref. No. 7.	Via Market Street, asphalt, 50 feet wide, from Interstate Highway 95.
WATER SUPPLY (Available to Vessels)	Through one 1½-inch line.	None.	Through one 2-inch line.
ELECTRIC CURRENT (Available to Vessels)	A.C., 110/220 volts.	A.C., 120 volts.	A.C., 110/220 volts.
FIRE PROTECTION (Other than City)	Water line, hose, hand extinguishers, and watchmen.	Hand extinguishers.	Water line, hose, and watchmen.
REMARKS	Tug dispatch and Portsmouth Pilots offices located at rear.	Portsmouth Harbor Cruises operates excursion vessels from wharf.	Approximately 2 acres of open storage area for 50,000 tons of material at wharf, and approximately 8 acres of additional, company-owned, open storage area for 100,000 tons at Boston and Maine Portsmouth rail yard located on east shore of North Mill Pond, approximately 1,500 feet in rear.

PIERS, WHARVES, AND DOCKS

Portsmouth, New Hampshire, right bank, Piscataqua River

Corps of Engineers Port Code No. 00600							00610		
REFERENCE NUMBER ON MAP	10 Dock Code No. 765			11 Dock Code No. 735			12 Dock Code No. 900		
NAME	Viking Wharf.			New Hampshire State Port Authority, Marine Terminal Wharf.			National Gypsum Co., Portsmouth Plant Wharf.		
LOCATION ON WATERFRONT	Approximately 1,500 feet below Maine-New Hampshire Interstate Bridge below Nobles Island. 315 Market Street			Below Maine-New Hampshire Interstate Bridge on Nobles Island.			Approximately 1,000 feet below Interstate 95 Highway Bridge. Freeman's Point		
OWNED BY	Viking of Yarmouth, Inc.			New Hampshire State Port Authority.			Gold Bond Building Products, division of National Gypsum Co.		
OPERATED BY	do.			New Hampshire State Port Authority and John T. Clark & Son of New Hampshire, Inc.			Gold Bond Building Products, division of National Gypsum Co. and Northeast Petroleum Corp. of New Hampshire.		
PURPOSE FOR WHICH USED	Mooring and landing for excursion boats to Isles of Shoals.			Receipt and shipment of containerized and conventional general cargo in foreign and domestic trade; shipment of scrap metal and miscellaneous bulk materials.			Receipt of gypsum rock by self-unloading vessel; receipt of petroleum products.		
TYPE OF CONSTRUCTION	Timber pile, timber-decked, offshore wharf, with 60- by 9-foot timber approach from bank at east end, and 50- by 3-foot timber approach from bank at west end; inclined timber ramp to 20- by 8-foot timber float at east end.			Concrete-filled, steel pipe pile, concrete-decked, part offshore wharf fronted by rubber fender system, with a 45- by 36-foot, concrete, roadway, bridge approach at lower end.			Steel sheet pile bulkhead with solid fill fronted by 3 steel sheet pile, cellular breasting dolphins.		
DESCRIPTION	Face	East side	West side	Face	Lower side	Upper side	Face of bulkhead	Lower side	Upper side
Dimensions (Feet)	135+20	12	12	578	92	75	300	30	30
Depth Alongside at MLW Do.	15	15	8	35	-	-	14-35	-	-
Breasting Distance Do.	135+20	-	-	578	-	-	265@dolphs.	-	-
Total Berthing Space Do.	180	-	-	578	-	-	450	-	-
Width of Apron Do.	12			476122			Open.		
Height of Deck Above MLW Do.	11			14			14 & 16		
Load Capacity (Lbs. per Sq.Ft.)	-			600			-		
Lighted or Unlighted	Lighted.			Lighted.			Lighted.		
TRANSIT SHEDS Number and Description	None.			Two - steel frame, clearspan, metal-covered, concrete floors.			None.		
Length and Width (Feet)				350 by 60	240 by 120				
Height Inside Do.				18	17				
Floor Area for Cargo (Sq.Ft.)				18,000	25,000				
Load Capacity per Sq.Ft. (Lbs.)				600	600				
Cargo Doors (Feet)			Shipside: Rear: Sides: Truck Dock:	Two 15 x 14 Three 24 x 14-15 One 24 x 14 -	- - Four 20 & 16x14 Two 12 x 14				
MECHANICAL HANDLING FACILITIES	None.			John T. Clark & Son of New Hampshire: 5 diesel crawler cranes: NO. / CAPACITY (TONS) / BOOM LENGTH (FEET) 1 / 165 / 110 2 / 50 / 65 1 / 30 / 65 1 / 15 / 50 One 15-, ten 4- and twenty 2½-ton forklift trucks. Additional stevedore equipment is available as required.			Steel tower with hinged-cantilevered boom on 50- by 25-foot, steel pile, concrete-decked platform located at lower side; hopper at outer end of boom receives gypsum from self-unloading vessels, serves inclined, 52-inch, electric, belt-conveyor system extending to open storage area at rear; one hosehandling tower located on center breasting dolphin for unloading petroleum products. Material is reclaimed via bulldozer with ripper loading a level hopper served by a 15-inch conveyor belt extending to plant.		
RAILWAY CONNECTIONS	None.			One surface track serves open storage area in rear; connects with Boston and Maine Railroad.			One surface track serves plant at rear connects with Boston and Maine Railroad.		
HIGHWAY CONNECTIONS	Via Market Street, asphalt, 50 feet wide, from Interstate Highway 95.			Same as Ref. No. 10.			Via Cutts Avenue, asphalt, 20 feet wide, from Market Street extension and Interstate Highway 95.		
WATER SUPPLY (Available to Vessels	None.			Through 3-inch line.			None.		
ELECTRIC CURRENT (Available to Vessels)	A.C., 110/220 volts.			A.C., 110 volts.			None.		
FIRE PROTECTION (Other than City)	Hydrants, hose, and hand extinguishers and pumps and hose on excursion boats.			Hydrants, hose, hand extinguishers, and sprinkler system in one transit shed.			Water line and watchmen.		
REMARKS	"MV Viking Sun" moors at wharf.			Approximately 10 acres of partly-paved, open storage area at rear.			Open storage area at rear of wharf for approximately 200,000 tons of gypsum rock. Gypsum wallboard manufacturing plant at rear. Northeast Petroleum Corp.: One 12 and one 10-inch, pipelines extend from wharf to 5 steel storage tanks at rear, total capacity 55,000 barrels.		

PIERS, WHARVES, AND DOCKS

Portsmouth, New Hampshire, right bank, Piscataqua River

Corps of Engineers Port Code No.

REFERENCE NUMBER ON MAP	13 Dock Code No. -	14 Dock Code No. 870	15 Dock Code No. 864
NAME	Public Service Co. of New Hampshire, Schiller Station Mooring.	Mobil Oil Corp., Portsmouth Terminal Wharf.	C.H. Sprague & Son Co. Wharf.
LOCATION ON WATERFRONT	Approximately 0.7 mile above Interstate Highway 95 Bridge.	Approximately 0.8 mile above Interstate Highway 95 Bridge.	Approximately 0.9 mile above Interstate Highway 95 Bridge.
OWNED BY	Public Service Co. of New Hampshire.	Public Service Co. of New Hampshire.	Public Service Co. of New Hampshire.
OPERATED BY	Not operated.	Mobil Oil Corp.	C.H. Sprague & Son Co.
PURPOSE FOR WHICH USED	Not used.	Receipt of petroleum products; occasional bunkering of vessels.	Receipt of coal and fuel oil.
TYPE OF CONSTRUCTION	Two 30-foot-diameter, steel sheet pile, cellular breasting dolphins 200 feet apart with 80- by 15-foot timber approach to lower dolphin.	Steel pile, concrete-decked, offshore wharf with one walkway and one pipeline approaches; 3 steel sheet pile, cellular mooring dolphins in line with face and connected by catwalks.	Concrete pile, steel beam, concrete-decked, offshore wharf with 100- by 20-foot approach; one steel sheet pile, cellular mooring dolphin, located approximately 100 feet below and to rear of face; wharf is fronted by rubber-cushioned fender system.

DESCRIPTION	13 Dolphins			14 Face	14 Lower side	14 Upper side	15 Face	15 Lower side	15 Upper side
Dimensions (Feet)	230			37	60	30	405	40	40
Depth Alongside at MLW Do.	23			37	-	-	37	-	-
Breasting Distance Do.	230			250	-	-	400	-	-
Total Berthing Space Do.	230			250	-	-	700	-	-
Width of Apron Do.	30			30			Open.		
Height of Deck Above MLW Do.	10			10			11		
Load Capacity (Lbs. per Sq.Ft.)	-			-			500		
Lighted or Unlighted	Unlighted.			Lighted.			Lighted.		
TRANSIT SHEDS Number and Description	None.			None.			None.		
Length and Width (Feet)									
Height Inside Do.									
Floor Area for Cargo (Sq.Ft.)									
Load Capacity per Sq.Ft. (Lbs.)									
Cargo Doors									
MECHANICAL HANDLING FACILITIES	None.			One hosehandling tower on wharf.			One electric, traveling, gantry, 16-inch auger unloader with maximum 78-foot outboard reach travels 380 feet along wharf; unloads onto a 48-inch longitudinal, thence transverse, belt conveyor extending to open storage area atop high bank in rear, rate 1,000 tons per hour. One mast-and-boom derrick with 35-foot boom for handling hose.		
RAILWAY CONNECTIONS	None.			None.			One 500-foot surface track serves tank carloading racks at rear of wharf; connects with tracks of Boston and Maine Corporation.		
HIGHWAY CONNECTIONS	Via plant road, asphalt, 15-20 feet wide, from Gosling Road, asphalt, 30 feet wide.			Same as Ref. No. 13.			Via plant road, paved, 15 feet wide, from foot of Gosling Road, asphalt, 30 feet wide.		
WATER SUPPLY (Available to Vessels	Through 3-inch line.			None.			Through 2½-inch lines.		
ELECTRIC CURRENT (Available to Vessels)	None.			A.C., 220/440 volts.			None.		
FIRE PROTECTION (Other than City)	None.			Chemical carts and hand extinguishers.			Heat sensors and sprinkler system on conveyor, foam system at tanks, hose, hand extinguishers, and security patrol.		
REMARKS	Facility was formerly used for mooring a floating power plant. One 8-inch pipeline extends to wharf from one 30,000-barrel fuel oil storage tank at rear not in use at time of survey.			Mobil Oil Corp.: Two 14-, two 12-, and one 10-inch pipelines extend from wharf to 14 steel storage tanks at terminal on opposite side of Gosling Road, total capacity 550,000 barrels. C.H. Sprague & Son Co. maintains a 10-inch pipeline connection to wharf for bunkering purposes, not in use at time of survey (1984).			Schiller Steam Electric Generating Station located at rear of wharf. Open storage area atop bank has capacity for 53,000 tons. One 16-inch pipeline extends from wharf to 8 steel storage tanks at C.H. Sprague & Son Co. terminal in rear, total capacity 577,000 barrels; one 20-inch pipeline extends from wharf to 2 steel storage tanks serving Newington Power Plant approximately ½ mile upstream, total capacity 566,000 barrels.		

PIERS, WHARVES, AND DOCKS

Newington, New Hampshire, right bank, Piscataqua River

Corps of Engineers Port Code No. 00610

REFERENCE NUMBER ON MAP	16 Dock Code No. 855	17 Dock Code No.	18 Dock Code No. 847
NAME	Simplex Wire and Cable Co. Wharf.	American Trawler Co. Dock.	Defense Fuel Support Point, Newington Dock.
LOCATION ON WATERFRONT	Approximately 1.5 miles above Interstate Highway 95 Bridge. 2073 Woodbury Avenue	Approximately 1.8 miles above Interstate Highway 95 Bridge. Old Dover Road	Approximately 2 miles above Interstate Highway 95 Bridge. Foot of Patterson Lane
OWNED BY	Simplex Wire and Cable Co.	Richard Bruno.	U.S. Government, Department of Defense Logistics Agency.
OPERATED BY	Simplex Wire and Cable Co., Submarine Cable Division.	American Trawler Co., Inc.	New England Tank Industries of New Hampshire, Inc.
PURPOSE FOR WHICH USED	Shipment of wire and submarine cable; receipt of submarine cable to be refurbished.	Receipt of fish and seafood; fueling fishing vessels.	Occasional receipt of petroleum products by tanker; shipment of petroleum products by barge.
TYPE OF CONSTRUCTION	Concrete-filled, steel pipe pile, steel beam, concrete-decked, offshore wharf with 250- by 15-foot approach; 4 steel breasting dolphins below, and one 30-foot square steel pile, concrete-decked, breasting dolphin above, all in line with face.	Steel pile, concrete-decked, L-shaped pier.	Offshore wharf: Row of four steel sheet pile, cellular breasting dolphins connected by catwalk extending to bank from upper dolphin. Two middle dolphins connected by timber deck.

DESCRIPTION	16 Face	16 Lower side	16 Upper side	17 Face	17 Rear of face	17 Lower side	17 Upper side	18 Face	18	18
Dimensions (Feet)	130	30	30	210	185	25+250	275	344		
Depth Alongside at MLW Do.	30	-	-	21	10-11	10-11	10-21	32		
Breasting Distance Do.	690w/dolphs.	-	-	210	185	25+250	275	344		
Total Berthing Space Do.	690	-	-	210	185	25 250	275	300		
Width of Apron Do.	Open.			25			25	40		
Height of Deck Above MLW Do.	15			15				15		
Load Capacity (Lbs. per Sq.Ft.)	-			-				-		
Lighted or Unlighted	Lighted.			Lighted.				Lighted.		
TRANSIT SHEDS Number and Description	None.			None.				None.		
Length and Width (Feet)										
Height Inside Do.										
Floor Area for Cargo (Sq.Ft.)										
Load Capacity per Sq.Ft. (Lbs.)										
Cargo Doors										

MECHANICAL HANDLING FACILITIES	Electric, portable, cable-pulling machines move continuous lengths of cable over covered, inclined, roller system extending to wharf from plant at rear.	Two electric mast-and-boom derricks: One 0.6-ton with 30-foot boom and one 0.4-ton with 20-foot boom.	Timber platform on middle cells has one unused electric, steel, stiff-leg derrick with 40-foot boom.
RAILWAY CONNECTIONS	One surface track serving plant at rear connects with Boston and Maine Railroad.	None.	None.
HIGHWAY CONNECTIONS	Via private driveway, part asphalt and part unpaved, 18 to 20 feet wide, from Woodbury Avenue, asphalt, dual lane.	Via driveway and Old Dover Road, each asphalt, 20 feet wide, from Woodbury Avenue, asphalt, dual lane.	Via driveway, asphalt, 20 feet wide from Patterson Lane, asphalt, 15 to 20 feet wide, from Dover Road U.S. Highway 4 and State Highway 16, asphalt, dual lane.
WATER SUPPLY (Available to Vessels	Through 2-inch line with 1½-inch connection.	Through 1-inch line.	None.
ELECTRIC CURRENT (Available to Vessels)	A.C., 110/208/440 volts.	A.C., 110/220 volts.	A.C., 110/220/240 volts.
FIRE PROTECTION (Other than City)	Water line, hose, hand extinguishers, and watchmen.	Hose and hand extinguishers.	Chemical cart, hand extinguishers, and security patrol.
REMARKS	Special ocean cable-laying vessels berth and load cable at wharf.	One 3-inch salt water pipeline serves pier. Processing plant at rear has freezer storage for 750,000 pounds and refrigerated storage for 300,000 pounds.	One 16- and one 8-inch pipelines extend from wharf to 6 storage tanks at rear, total capacity 360,000 barrels, and one 10- and one 8-inch pipelines extend from tank farm to two steel storage tanks at Pease Air Force Base, total capacity 110,000 barrels.

PIERS, WHARVES, AND DOCKS

Piscataqua River, New Hampshire

Corps of Engineers Port Code No. 00610

REFERENCE NUMBER ON MAP	19 Dock Code No. 845	20 Dock Code No. 840	21 Dock Code No. 260
NAME	Storage Tank Development Corp. Dock.	Sprague Energy Newington Terminal Wharf.	Badger's Island Marine Services Wharf.
LOCATION OR WATERFRONT	Right bank, Piscataqua River, across [illegible] mile above Interstate Highway 95 Bridge. Foot of Patterson Lane	Newington, N.H., right bank of Piscataqua River, approximately 3 miles above Interstate Highway 95 Bridge, near upstream limit of deep-draft navigation. 126 River Road	Approximately 700 feet above Memorial Bridge (U.S. Highway 1), south side of upper portion of Badgers Island, Kittery, Maine. 68 Thorners Lane
OWNED BY	Storage Tank Development Corp.	C.H. Sprague & Son Co.	Charles C. Patten.
OPERATED BY	do.	do.	Badger's Island Marine Services, Inc.
PURPOSE FOR WHICH USED	Receipt and shipment of petroleum products; receipt of asphalt, No. 6 fuel oils, liquefied petroleum gas and methyl-methacrylate. (See Remarks.)	Receipt and shipment of petroleum products, asphalt, tallow and caustic soda.	Mooring fishing boats and other small vessels for repair; mooring miscellaneous vessels.
TYPE OF CONSTRUCTION	Offshore wharf: row of 3 steel sheet pile, cellular breasting dolphins connected by steel pile, timber-decked catwalk with 160- by 4-foot approach of same construction to lower dolphin.	Steel pile, concrete-decked, offshore wharf with 300- by 10-foot steel pile timber-decked approach; one steel sheet pile, cellular breasting dolphin on each side, in line with face. Timber and steel catwalks extend from wharf to breasting dolphins, and continue at angle to 2 steel and concrete mooring dolphins on upper and one on lower sides.	Timber pile, timber-decked, offshore wharf, with 65- by 10- and 80- by 12-foot approaches, fronted by a permanently-moored timber barge and 4 parallel timber floats spaced 36 feet apart connected by a common 5-foot wide float approach from barge.

DESCRIPTION												
		Face			Face	Lower side	Upper side	Four Parallel Floats				Barge
								Outer	Center Piers		Inner	
Dimensions	(Feet)	250			±5	30	30	240X5	190x5	150x5	110x5	110x30
Depth Alongside at MLW	Do.	38			35	30-35	-	11	10	9	8	8
Breasting Distance	Do.	250			225w/dolphs.	-	-	475	375	295	215	105
Total Berthing Space	Do.	700			780	-	-	475	375	295	215	105
Width of Apron	Do.	30&30			Open.			5	5	5	5	30
Height of Deck Above MLW	Do.	14			14			2	2	2	2	12
Load Capacity (Lbs. per Sq.Ft.)		-			-			-				
Lighted or Unlighted		Lighted.			Lighted.			Lighted.				
TRANSIT SHEDS Number and Description		None.			None.			None.				
Length and Width	(Feet)											
Height Inside	Do.											
Floor Area for Cargo	(Sq.Ft.)											
Load Capacity per Sq.Ft.	(Lbs.)											
Cargo Doors												
MECHANICAL HANDLING FACILITIES		One 50-foot-long electric telescopic boom mounted on tower on center dolphin.			Steel framework on platform equipped with electric hoist and one 20-foot rotating boom for handling hose.			One 4-ton, gasoline-hydraulic, mobile crane.				
RAILWAY CONNECTIONS		One 2-car-capacity surface track serves terminal in rear connects with Boston and Maine Railroad.			One surface track with capacity for 3 cars serves terminal in rear connects with Boston and Maine Railroad.			None.				
HIGHWAY CONNECTIONS		Via driveway, asphalt, 20 feet wide, from Patterson Lane, asphalt, 15-18 feet wide, from Spaulding Turnpike (U.S. Highway 4) State Highway 16), asphalt, dual lane.			Via private road, asphalt, 25 feet wide, from River Road, asphalt, 20 feet wide from Spaulding Turnpike.			Via Thorners Lane, asphalt, 20 feet wide, from U.S. Highway 1.				
WATER SUPPLY (Available to Vessels		None.			Through 2-inch line.			Through 3/4-inch line.				
ELECTRIC CURRENT (Available to Vessels)		A.C., 110/220 volts.			None.			A.C., 110/220 volts.				
FIRE PROTECTION (Other than City)		Hydrants, hose, pump, 4-inch fire water line, hand extinguishers, and security patrol.			Water line, hydrant, hose, hand extinguishers, and security patrol.			Water line, hose, and hand extinguishers.				
REMARKS		Storage Tank Development Corp.: Four 16- and one 12-inch pipelines extend from wharf to 6 asphalt storage tanks, total capacity 159,000 barrels; one 150,000 barrel storage tank for No. 6 fuel oil; 4 storage tanks for other petroleum products, total capacity 174,000; and one 15,000-barrel methyl-methacrylate storage tank. At time of survey (1984), methyl-methacrylate was being received only by rail. Dorchester Sea-3 Products, Inc.: One 18-inch pipeline extends from wharf to one 400,000 barrel liquefied petroleum gas storage tank. New England Tank Industries of New Hampshire: One 18-inch pipeline on wharf connects with pipelines and tankage described under Ref. No. 18.			One 16-, one 14-, four 10-, and one 8¼-inch pipelines extend from wharf to 3 asphalt storage tanks, total capacity 65,000 barrels, and 6 petroleum products storage tanks, total capacity 593,000 barrels. One 10-inch pipeline extends to 2 caustic soda storage tanks, total capacity 30,000 barrels and to 6 tallow tanks, total capacity 54,000 barrels.			Two 30-ton marine railways located on upstream side of floats.				

USCG Waterfront Facility Information On the Piscataqua River Basin

302 Transfer, Storage and Processing Facilities

301.1 Purpose and Objectives. This section describes the bulk storage facilities and lists various companies involved in transporting of petroleum products and hazardous substances.

302.2 Bulk Storage Facilities

302.2-1 Piscataqua River Basin

Facility Name and Address	Product	Amount Stored (bbl)
Northeast Patroleum Corp. Preble Way Portsmouth, NH 03801 (603) 436-5147	Kerosene Diesel Fuel Oil #2	549,660
Mobil Oil Corp. Gosling Road Portsmouth, NH 03802 (603) 436-7887	Gasoline Fuel Oil Kerosene Diesel	509,246
C. H. Sprague and Company 290 Gosling Road Portsmouth, NH 03802 (603)436-4120 Newington Station Schiller Station	#6 Fuel Oil #4 Fuel Oil	342,000 560,000 205,000
Fuel Storage Corp. Patterson Lane Newington, NH 03801 (603)436-1551	#6 Oil Asphalt Fuel Oil Kerosene JP4 Methyl Methacrylate	 700,000 15,000
Defense Fuel Support Point Patterson Lane Newington, NH 03801 (603)431-6885	Jet Fuel, JP-4	360,000
Sea-3 Products P.O. Box 1410 Newington, NH 03801 (603)431-5990/2/3	LPG	400,000
C. H. Sprague and Company P.O. Box 1288 Old Dover Road Newington, NH 03801 (603)431-5131	Asphalt Gasoline Fuel Oil #2,#4,#6 Kerosene Diesel Tallow Caustic Soda	 1,046,500 54,000 22,500

USCG Waterfront Facility Information On the Piscataqua River Basin

Facility Name and Address	Product	Amount Stored (bbl)
Whale Co. Oil 3000 Lafayett RD Portsmouth, NH 03801 (603)436-1110	Heating Oil	71
U.S. Navy Kittery, ME (207)438-1000 Ext. 1898 Main Office Ext. 1835 Fuel Plant (207)438-1898 Tom Gillory - Oil Spill Coordinator	Gasoline Diesel Heavy fuel oils	352,000
302.2-2 Saco River Basin		
Brooks Wollen Sanford, ME (207)324-3080	No. 6	40,000
302.2-3 Presumpscot River-Casco Bay Basin		
Central Main Power Co. Cape Elizabeth Station So. Portland, ME (207)799-7561	No. 2	61,000
Central Maine Power Co. W. F. Wyman Station RR #1, P,O, Box 2268 Yarmouth, Maine 04096 (207)846-9055	Bunker C #2 Oil	953,000
British Petroleum Corp. 59 Main Street So. Portland, ME 04106 (207)799-8586	Gasoline Fuel Oil Kerosene	660,000
Gulf Oil Co. 175 Front Street So. Portland, ME 04106 (207)799-5561	Gasoline Heating Oil Kerosene Bunker C	875,000
Northeast Petroleum Corp 1 Clark Road So. Portland, ME 04106 (207)799-4504	Kerosene Fuel Oil # 6 Oil	482,000
Getty Refining & Marketing CO P.O. Box 1590 So. Portland, ME 04106 (207)799-8518	Gasoline Fuel Oil #2	299,100

USCG Vessel and Cargo Information

MONTHLY TRAFFIC SUMMARY FOR
THE MONTH OF DECEMBER 1987

PORTSMOUTH:

TANKERS:

LAGOVEN GUANOCO	20,000
POMEROL	152,000
CHABLIS	210,000
PACIFICA	216,000
PORT BLANC	231,000
OMI CHARGER	100,000
FOSSARINIA	175,000
POMELLA	145,000

TOTAL NUMBER OF TANKERS 8
TOTAL CARGO AMOUNT 1,249,000

BARGES:

B. NO. 65	20,000
E-57	55,000
B. NO. 85	62,000
E-57	54,000
B. NO. 35	18,000

TOTAL NUMBER OF BARGES 5
TOTAL CARGO AMOUNT 209,000

CARGO:

ARCTURUS	2,000	MT TALLOW
YANKEE CLIPPER		CONTAINERS
GOLD BOND TRAILBLAZER	28,268	MT GYPSUM ROCK
JUVENTIA	10,000	MT COAL
ISLAND GEM	9,000	MT SCRAP IRON
YANKEE CLIPPER		CONTAINERS
HAVMANN	7,000	MT LPG
YANKEE CLIPPER		CONTAINERS
HAPPY VALLEY	470	MT STEEL COILS
ZUES		CABLE
YANKEE CLIPPER		CONTAINERS
STOLT AQUAMARINE	4,000	MT CAUSTIC SODA
ISOMERIA	14,400	MT LPG
MITHILDA DEGAGNES	6,500	MT SALT
MARTHA A	2,000	MT TALLOW
GOLD BOND TRAILBLAZER	28,600	MT GYPSUM ROCK
WOENSDRECT	31,500	MT SALT

TOTAL NUMBER OF CARGO VESSEL 17
TOTAL CARGO AMOUNT 143,738 MT PLUS

Vessel Stability

Concepts and Definitions

Introduction. The intent of this section is to provide a basic understanding of vessel stability to Portsmouth Harbor fire personnel who must comprehend and base decisions upon expert advice that should be available during an incident. It is not intended to supply the knowledge that is gained only through specialized education and many years of experience.

Vessel Stability and Equilibrium. Stability is the tendency of a floating vessel to return to an upright position when inclined from the vertical by an external force. If the vessel returns to or remains at rest after being acted upon, it is either in stable or neutral equilibrium. If it continues to move unchecked in reaction to the external force, it is in unstable equilibrium. An unstable vessel therefore, is one that after being inclined, continues to incline, possibly until it capsizes. Throughout an incident, it is desirable to maintain vessel stability and minimize list.

Initial Stability. The ability of the vessel to initially resist heeling from the upright position is determined by its initial stability. The vessel's initial stability characteristics hold true only for relatively small angles of inclination. At larger angles, defined as those over 10 degrees, the ability of the vessel to resist inclining moments is determined by its overall stability characteristics.

Typical Vessel Conditions. This section will generally address stability matters concerning vessels in the following two conditions: (1) floating and (2) whose hulls are intact. Usually, these conditions will exist during the beginning stages of an incident. Stability and weight distribution considerations are relatively uncomplicated when these two criteria are met.

If, for instance, an explosion has ruptured the hull or the vessel has contacted the bottom, considerations will be more involved. These more complex situations may occur singly or in combination and include vessels:

- o Aground
- o Damaged (holed) with free communication
- o Underway with extensive free surface
- o In dry dock, graving dock, synchrolift, etc.

Unquestionably, expert advice should be obtained anytime the stability of the vessel is in doubt. A complete list of consulting resources, including those for vessel stability, should be compiled and maintained. The vessel's crew, who should be most familiar with the vessel's stability situation, may not always be available or able to provide adequate situation assessment.

Center of Gravity. The center of gravity of an intact vessel is the location of the point where the sum of all the weights in the vessel is equal to zero with respect to any axis through this point. The vertical downward force of gravity acts through this point. The center of gravity and its relationship with the vessel's center of buoyancy and righting arm are key factors to understand when determining and controlling vessel stability. The illustration on Page 3 shows this relationship.

The concept of center of gravity, whether for a vessel or other mobile equipment such as an aerial ladder or snorkel, is essentially the same. In essence, the weight of the particular piece of equipment is considered to be concentrated at that point. As an aerial ladder is raised, the unit's center of gravity rises and is counteracted by the inherent weight of the vehicle and its supporting outriggers. Similarly, a vessel's center of gravity also rises as weight is placed higher in the vessel. It differs in that it is unable to provide external support mechanisms (i.e. outriggers) due to the water around it. Vessels, will therefore suffer a loss of stability as water utilized in firefighting is accumulated above the original center of gravity. This is particularly significant in regard to vessels with large superstructures such as passenger ships and car carriers. The higher the weight, the more detrimental the effect. If this vulnerability is not properly understood and controlled, the consequences may severely impact all firefighting efforts. It is an integral part of overall strategy.

Free Surface Effect. Free surface, for firefighting considerations, is the tendency of liquid within a compartment to remain level as the vessel is transversely inclined or heeled providing the compartment is : (1) intact, (2) partially full, and (3) allowing the liquid to move unimpeded from side to side. The free surface effect of loose water anywhere in the vessel will impair stability by raising the center of gravity in an apparent or virtual sense.

Free Surface Critical Factors. If the vessel is listing or develops a list, the liquid will flow to the low side of the compartment and result in an athwartship shifting of weight. This movement causes the apparent height of the center of gravity to rise, impairing stability. The critical factors of free surface are the surface area of the liquid and the breadth of the compartment. The length of the compartment is much less a factor as it varies in direct ratio with the cube of the compartment's beam. The depth of the liquid and its location in the vessel have little relation to the free surface effect for firefighting considerations. Whether the liquid is high or low, on or off centerline, forward or aft, the reduction in stability due to free surface will be the same.

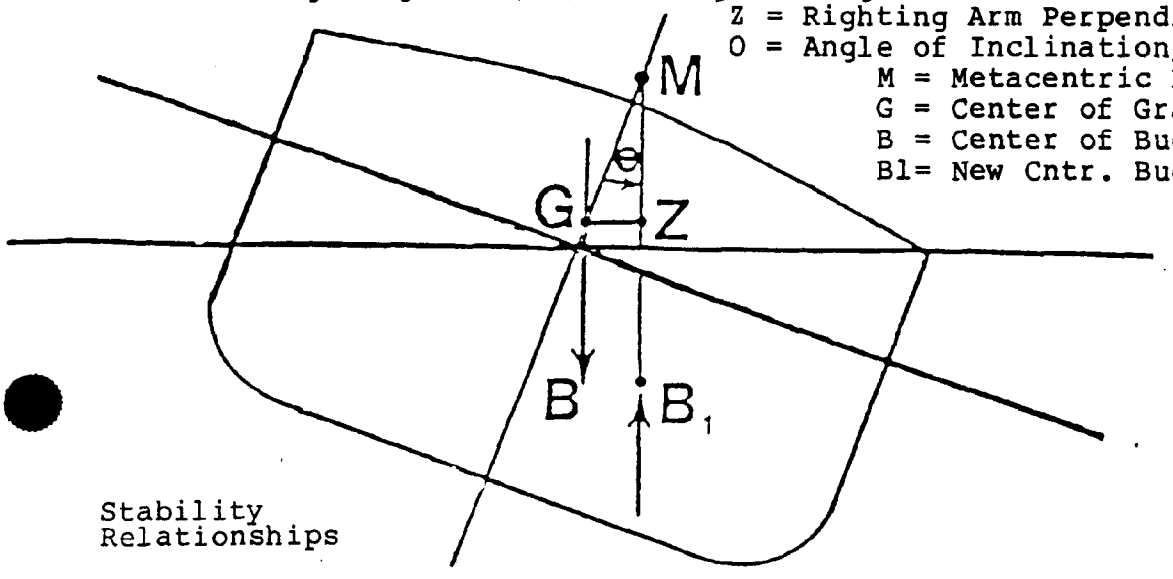
Free Surface Reduction. Pocketing is the effect of the liquid contacting the top of the compartment or exposing the bottom of the compartment. It will reduce the breadth of the free surface area and therefore will have a beneficial effect on stability. Similarly, solid objects projecting through the surface will impede the liquid's movement and be of some benefit. Since the positive effects of pocketing and surface permeability are difficult to determine, they should be considered an extra margin of safety in free surface stability assessments.

Combined Effects. The strongest threat to vessel stability from water-induced firefighting efforts is encountered when the water is (1) confined high in the vessel and (2) is free to travel significant distances across the beam. The consequences of these combined effects may be devastating. Unfortunately, they sometimes trigger other serious problems. Once the vessel begins to heel, this 'domino effect' may quickly compound an already aggravated situation. These concerns will be addressed in the next section.

Center of Buoyancy. If the water that is displaced by the vessel were considered as one homogeneous unit, the center of the displaced volume of water would be considered the location of the vessel's center of buoyancy. It is the geometric center of the underwater form of the vessel. The vertical upward force of buoyancy acts through this point.

Righting Arm. The perpendicular distance between the force of gravity (through the center of gravity) and the force of buoyancy (through the center of buoyancy) is termed the righting arm or righting lever. It is generally calculated at 10 degree intervals of list for several different load conditions of the vessel.

Metacentric Height. The true measure of a vessel's initial stability is called the metacentric height or GM of the vessel (below). It is simply a geometric relationship between the center of gravity (G), the center of buoyancy (B), and the vessel's righting arm (GZ) for a given angle of inclination.



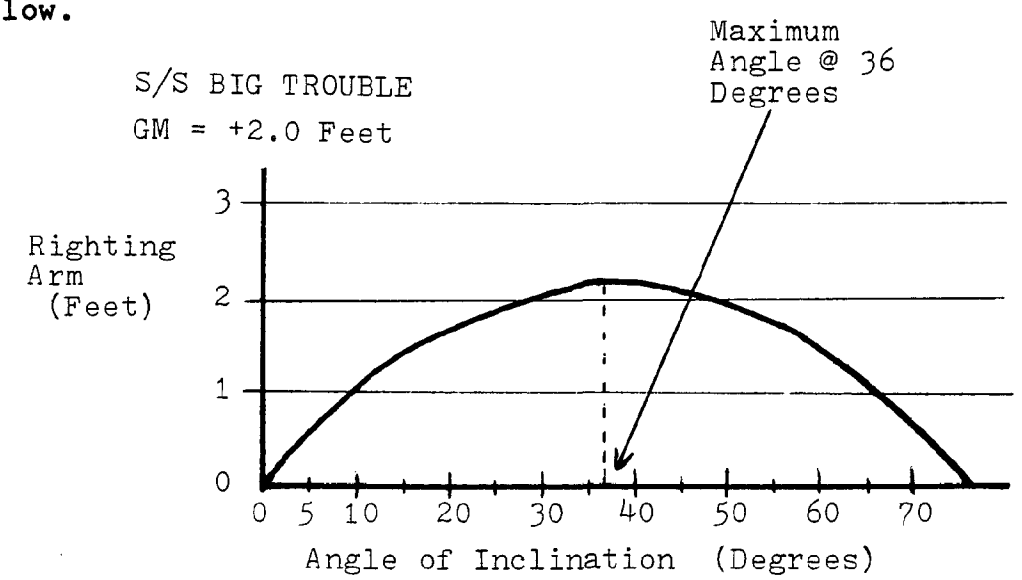
Stability Relationships

Metacentric Height (continued)

If M is above G, the metacentric height (GM) is positive. If M is below G, then metacentric height (GM) is negative. A positive GM indicates the vessel will tend to float upright and will offer resistance to an applied outside force. A negative GM indicates the vessel to be initially unstable and will cease to float upright when even the smallest outside force is applied. An initially unstable vessel may only list at some particular angle and come to rest in a state of stable equilibrium. If the negative GM is large enough, the vessel will not come to rest before capsizing.

This relationship of the vessel's stability and GM is only accurate at small angles of heel (below 10 degrees). As list increases, the overall stability of the vessel is the determining criteria. This can be interpreted through the vessel's stability curves usually found in the vessel's Trim and Stability Booklet.

Stability Curves. The graphic curves depicting the vessel's calculated righting arms at incremental angles of heel are termed the vessel's stability curves. These curves reveal the overall stability characteristics of the vessel. They are extremely important since they quickly reveal the maximum righting arms for the vessel at different conditions of lading (different values of GM). The maximum righting arm, and more importantly, the angle of inclination at which it occurs, is the primary danger indicator when the stability of the vessel is in serious doubt. A fictitious example of a partially loaded vessel with a +2 ft. GM is depicted in the stability curve below.



Note the maximum righting arm attained in this condition is at an approximate inclination angle of 36 degrees. Generally, this maximum angle indicates the point at which the edge of the weather deck becomes submerged. At this point stability drops off rapidly. A vessel suffering a permanent list would be in imminent danger of capsizing long before this angle was reached.

Vessel Stability Concerns

General. The most important concern regarding vessel stability is control of the vessel's list. The inability to maintain the vessel at a reasonable degree of transverse levelness will seriously impact all firefighting operations.

Firefighting Factors Affecting Stability. The introduction of large amounts of water into the vessel as a result of firefighting operations will probably be the most critical factor affecting vessel list. Other factors include:

- o intentional flooding of compartments
- o personnel/equipment movement through watertight doors

Stability Factors Affecting Firefighting. As a vessel's list increases, so do the concerns related to firefighting activities. As the vessel heels, poor footing on slippery decks can slow or stop fire combat teams. It may be difficult to apply and maintain a foam blanket. Other concerns include:

- o increased chance of flammable liquids spilling
- o possible closure problems with automatic fire doors
- o strain and possible failure of mooring lines
- o restriction and loss of vessel access/egress
- o damage or injury from loose objects shifting
- o problems with fixed dewatering drains and suctions
- o loss of vessel machinery due to excessive sustained list

Vessel Factors Affecting Initial Stability. The stability of the vessel is described as its ability to resist heeling from the upright position at small angles of inclination. This ability, which is a function of the vessel's GM, may diminish rapidly as the incident progresses and will depend on current vessel factors such as:

- o the free surface status of all liquids aboard
- o whether or not the hull is intact
- o if contacting ground, flatness of hull bottom
- o whether double bottoms are empty or full
- o if flooding, intactness of watertight boundaries

Instability Factors Affecting Overall Stability. As the vessel destabilizes and list increases to larger angles of inclination, other factors may aggravate the vessel's worsening condition. These include:

- o shifting of loose, bulk dry cargo such as grain or coal
- o flooding from unsecured hull openings like portholes
- o movement of unsecured cargo, machinery, stores, etc.

Instability Factors Affecting Underway Operations. The self-propelled movement of a destablized vessel within a confined waterway may be hampered by operational difficulties. If suffering a large list, trimmed by the bow, or drawing too tight a draft for the available water, operational concerns would include:

- o steering system may function improperly
- o vessel machinery may not function at large lists
- o loss of maneuvering control due to proximity to bottom
- o if poor visibility, needed radar aid may be reduced
- o free surface may cause vessel to flop from side to side

External Factors Affecting Stability. If external factors are anticipated, then it is more likely that negative impacts will be lessened and positive impacts used to their full advantage. External factors would include:

- o adjacent structures such as piers and wharves
- o mooring lines if vessel is listing away from structure
- o range of tide may cause vessel to contact bottom
- o contour of bottom beneath vessel if contact occurs
- o bottom composition beneath vessel such as mud or rock
- o precipitation accumulations of snow or ice on high areas
- o sea state of surrounding water
- o action of passing vessels (wake, suction effect, etc.)
- o unusually intense high winds if significant 'sail' area

Basic Stability Information and Resources

Stability Resources. An Incident Commander with a basic understanding of stability , should be able to make decisions with appropriate consultation. A review of information gathered prior to the incident and during the incident are necessary to the best decision making. Information resources are divided into consulting personnel and documentation. Stability equipment resources are discussed under 'Dewatering'.

Consulting Personnel. Prior to an incident, a regional inventory of stability advisors should be compiled. The list of these agencies and individuals will include the USCG COTP and the Marine Safety Office (MSO) located in Portland, Maine. The COTP or representative wil be on-scene to provide assistance and stability advice. The COTP can also help access and coordinate various federal resources and agencies should additional expertise and/or equipment be necessary. Stability advice may also be obtained from other personnel including:

- o vessel's officers - Master, Chief Mate and Chief Engineer
- o vessel operator/owner representative such as Port Captain
- o Portsmouth Navigation Pilots
- o N.H. Port Authority Director
- o Portsmouth Naval Shipyard Staff
- o salvage masters
- o officers from other vessels
- o marine consultants
- o naval architects
- o maritime academies
- o marine firefighting schools

Documentation. It is prudent to maintain vessel information. This should include information on regularly and occasionally visiting vessels. Since it may be difficult to gather information during an incident, gather information as possible. General information and copies of vessel documents may be available from the owner or operator if you should need information during an incident. In an emergency though, some firms may be able to send information via facsimile. The preferred approach is to be familiar with the vessel's onboard documentation prior to an event. Documentation and other information which may be helpful with stability considerations include:

- o vessel trim and stability booklet or similar document
- o vessel tons per inch immersion factor (T.P.I.)
- o vessel general arrangement plan
- o vessel capacity plan
- o vessel fire control plan
- o vessel docking plan
- o vessel cargo plan
- o slide rule used to calculate trim and stress factors
- o computer or loadmaster used for stability calculations

Obtain Primary Stability Information. Basic stability data should be gathered during the initial stages of an incident. The methods or sources used to obtain the data often affect accuracy. Always endeavor to verify information.

Vessel Drafts. Most large vessels have draft marks as vertical scales on both sides of the hull at the bow and the stern. They are usually incremented in either feet or meters with the bottom of the number being the 'zero' line. Large ships and barges also have draft marks midships on both sides. All drafts should be visually read as soon as possible in order to establish a baseline for future reference. For various reasons, automatic draft gauges for obtaining draft readings remotely should be suspected as inaccurate. If possible avoid using an automatic reading as the primary source of draft information. Consider such readouts a good double check for visual hull observations.

Vessel List. The angle of transverse inclination is normally obtained aboard by reading the vessel's inclinometer. Most vessels have one in the wheelhouse on the bridge deck. Some vessels, particularly large ones, may have additional inclinometers at other locations including the: engine room control flat, cargo control room, Master's office, Chief Mate's office, Chief Engineer's office, or at a prominent centerline location on the main deck. Similar to the drafts, establish a baseline reading as soon as possible for monitoring purposes.

Vessel Status. Determine tank and cargo status. If cargo operations were in progress, the vessel may be considerably more vulnerable to stability problems. This is especially true of bulk carriers and even more so of liquid bulk carriers due to the free surface effect. The location and status of any flooded compartments within the vessel should also be ascertained at this point.

Available Depth of Water. Determine the minimum depth of water at the shallowest location beneath the vessel. Subtract the vessel's present deep draft from the water depth to obtain the vertical distance between the vessel and the bottom. Tidal changes should also be incorporated if applicable.

Type of Bottom Material. If the vessel contacts the bottom, the nature of the bottom can be a very critical factor. For example, the difference between a mud or rock bottom is extremely significant. Vessel aground considerations apply. As above, determine this as soon as possible and insure accuracy.

Secondary Stability Information. If the stability situation is in doubt, the initial assessment should be immediately followed by a secondary assessment. If the vessel's stability is under control and not serious, the following secondary information may be gathered time permitting.

Hull Openings. Assess all direct hull openings, such as portholes or cargo loading doors which may allow water to pour aboard in the event a serious list occurs.

Water Flow. Calculate the amounts of water being introduced throughout the vessel and those anticipated in the coming hours. It may be convenient to determine rates in 'tons per hour' since stability calculations will probably be worked in tons.

Dewatering Capacity. Determine the vessel's fixed dewatering capacity and power supply potentials. As above, it will probably be beneficial to convert all rates to 'tons per hour'.

Watertight Potentials. Determine watertight areas and capabilities of vessel with regard to flooding resistance. Give special attention to watertight doors and closing mechanisms.

Mooring Potentials. Assess the possible dangers to personnel should mooring lines fail as a result of severe strain from the vessel listing away from the pier or wharf. Fiber lines may be subject to melting or burning. Learn what alternatives may be available with the vessel's mooring system and be sure consequences are understood.

Vessel Aground. If the vessel is aground or is in danger of contacting the bottom, other information will be necessary and may include:

- o slope of ground beneath vessel
- o shape of vessel's hull bottom
- o proximity of passing deep-draft traffic
- o sea state forecasts
- o hull stress considerations

Dewatering

Water Weight. Aboard most large vessels weight is measured in long tons of 2240 pounds. A gallon of salt water weighs about 8.5 pounds while fresh water weighs slightly less. This equates to about 264 gallons per long ton. Note that these figures apply to US gallons. Imperial gallons may be used aboard British, Canadian or other vessels and should be adjusted for accordingly.

Water Flow. A 2 1/2 inch hose with an approximate 1 inch nozzle outlet under 100 lbs./sq. in. pressure delivers about 250 gallons per minute. Roughly, this means that a 2 1/2 inch hose delivers about 1 ton of water per minute. At one ton per minute, 60 tons of water weight is added to the vessel each hour a 2 1/2 inch line is in use. A 1 1/2 inch line can be figured at roughly half or about 1/2 ton per minute. These are minimal flow rates and vary significantly with pressure.

Vessel Fixed Pumps. Vessels will usually have bilge pump capability for most machinery spaces and large compartments that are situated in the lower parts of the vessel. Some of these spaces may include:

- cargo holds
- main engine room
- boiler room
- shaft alley area
- cargo pumprooms
- thruster rooms
- forward machinery space

Fixed Pump Suctions. Vessel bilge pumps are usually attached to fixed piping and will therefore have no flexibility regarding movement and positioning of the pumps' suctions. However, these pumps often have the flexibility to "crossover" and draw from a varied number of fixed suctions. Consequently, the fixed system is limited to pumping only water that settles into the lower areas of the vessel. Water that accumulates in upper spaces must be removed by some alternate means.

Fixed Pump Power. Some older steam vessels may have steam reciprocating bilge pumps, but most will have electric bilge pumps that are powered by the vessel's generators. If the vessel's main generators fail, the pumps will most probably be unusable. Emergency generators may often be unable to supply sufficient power to operate separate fire and bilge pumps simultaneously, in addition to the normal emergency load.

Vessel Portable Pumps. Although some vessels may have a few small portable diaphragm pumps that run on compressed air, most vessels will provide limited portable pump capability.

Dewatering (continued)

Vessel Drainage System. Drains located onboard most vessels are designed to gravity drain most spaces that are above the vessel's normal waterline through the hull into the sea. Spaces that are at or below the water line are often drained into the vessel's bilges. Whether they drain overboard or into the bilge, these drains (called "scuppers") are generally small in diameter making them vulnerable to blockage by debris that would almost certainly be present throughout the firefighting efforts. Swimming pools should have their own drain system. In accommodation areas, removal of plumbing fixtures at the deck level may also assist in drainage.

Portable Pumps Brought Onboard. Dewatering arrangements should be made without delay. Moving portable pumps onboard will require hoisting equipment and numerous personnel to assist with positioning. Dewatering considerations should be automatic and must be addressed without delay if the fire is not quickly suppressed. Sources of portable pumps in addition to those of the municipal fire departments may include:

- o USCG COTP
- o Portsmouth Naval Shipyard
- o pollution cleanup contractors
- o industrial pump suppliers
- o salvage companies
- o USCG Strike Teams

Portable Pump Types. Pumps may be powered by a variety of methods including electricity, air, gasoline and water. Of all, the water eductor or ejector pump is probably one of the most efficient devices to position within the vessel. It works on the syphoning principle of a venturi and has no moving parts. These units are extremely lightweight and require no supervision once they are operational.

Cutting Holes. In areas of the superstructure, where the metal is relatively thin, it may be preferable to cut holes to allow water to run out. Do not violate the hull's integrity as a serious list may allow water to pour in the hole rather than out.

Stability Analysis and Monitoring

Critical Angle of List. Once the vessel status is determined as part of primary information , have the vessel's GM computed for its present condition. Use the GM in conjunction with the vessel's Trim and Stability Booklet to determine the maximum righting arm for the vessel's current condition. **One half of the maximum righting arm angle is a good reference point as a critical angle of list.** If this angle is reached, the vessel is in imminent danger of capsizing.

Stability Analysis and Monitoring (continued)

Vessel Drafts. Drafts should be monitored at least every half hour. If the vessel is listing, the drafts on the low side of the vessel will be greater than those on the high side. For this reason, it would be prudent to take the average of the two sides. Also, the midship draft should be exactly halfway between the forward and after drafts. If it is more than 6 inches off of this halfway point, it may be an indication that the hull is being subjected to severe stress. Continue to monitor the vessel's drafts and list for at least 4 hours after discontinuing waterflow into the vessel.

Tons per Inch Immersion. Large vessels' Trim and Stability Booklets generally include a hydrostatic table that describes the vessels' tons per inch immersion (T.P.I.) factors for various drafts. These figures represent the weight, in tons, necessary to sink the vessel one inch. Since this refers to the vessels' mean sinkage, each inch of sinkage will correspond directly with each inch of draft midships. This fact should be used to visually confirm the calculated weight of water being placed aboard the vessel.

Vessel Listing at Pier. Generally, it will be preferred to have the vessel list away from the pier or wharf so that list may be monitored as it progresses. This may require slacking the mooring lines and adjusting vessel access ramps. The alternative, to allow the vessel to lean against the structure, would not only interfere with the list monitoring, but could also lead to damage to both the vessel and the adjacent structure. The vessel's draft will probably increase on the side of the list. This fact combined with the generally deeper water away from the pier, also suggests a list away if possible.

Increase of Draft Due to List. Due to the relative flatness of most vessels' bottoms, the draft will increase as the vessel lists. An approximate value of the increase is equal to half the vessel's breadth times the sine of the angle of list. The formula is as follows:

increase in draft = beam/2 x sine angle of list

Example: Vessel with 92 ' beam listing at angle of 8 degrees
92/2 x sin 8 degrees =
46 x .1392 = 6.4' increase in draft

Original vessel draft = 36.0'
Increase due to list = 6.4'
Vessel deepest draft = 42.4'

Stability Tactics

Vessel List. Generally, the prime stability concern of an Incident Commander is to minimize the vessel's list. Control of the list may be accomplished through a variety of tactics and will depend on the cause(s) of the list and the particular circumstances involved.

Causes of List. As discussed, the two basic causes of vessel list are: (1) a negative GM or (2) an off center position of the vessel's center of gravity. The list may be the result of either one of the causes, or both causes in combination. If negative GM is the cause, any transfers of weight within the vessel should be avoided. It is very possible that a transverse shifting of weight to correct list due to negative GM will result in a worse situation.

List Correction. If the list is due solely to the accumulation of water through firefighting efforts, then the preferred tactic for corrective action is to remove the water. Corrective measures are more complex for other list causing factors such as progressive flooding or large weight shifts.

The following outline is a sequence of actions to help limit and improve an impaired stability situation, and, the list accompanying it.

(1) Determine and establish flooding boundaries.
(2) Remove water from partially flooded areas (remove free surface first).
(3) Remove water from solidly flooded areas.
(4) Transfer weight as appropriate (usually liquids).
(5) Add weight as appropriate (counterflooding).

Establishing Flooding Boundaries. Boundaries should be established to enclose the area subject to flooding. Vertical as well as lateral perimeters should be planned. Action should be swift and efficient.

Free Surface Reduction. There are two basic ways to reduce free surface: (1) completely fill the flooded compartment or (2) completely empty the flooded compartment. Filling may be a faster, more convenient approach but increases the vessel's weight, draft and possibly increases list. Emptying the compartment is much more desirable.

Stability Tactics (continued)

Weight Removal. Removal of liquid and solid weights from higher locations should lower the center of gravity, improve stability and help improve the list.

Weight Transfer. Weight transfer is normally accomplished with liquids since the movement of large amounts of solid objects will probably be impractical. Methods of transfer may include sluicing, pumping and gravitating.

Weight Addition. Similar to transfer, weight addition of liquids will usually be most practicable. This will probably be accomplished through counterflooding the compartment(s) with seawater.

NEVER counterflood if free surface is the cause of the list. The result may be an even greater list to the opposite side. Always start with the lowest spaces available such as the double bottoms or low water tanks. The inherent free surface effect and the additional weight induced by counterflooding or counterballasting make it a "last resort".

Scuttling or Beaching. If it becomes apparent that the vessel is going to be lost due to capsizing or from the fire being too extensive to control, it may be necessary to sink or scuttle the vessel. Under these two circumstances, it may be necessary to sink the vessel at the pier by overall flooding. If time permits, and it is preferable, the vessel may be moved to a suitable beaching ground. There, it may be sunk awash without damage to the hull from a rocky bottom and where the vessel will not create an obstruction to normal shipping.

However, the strong currents of the Piscataqua and the harbor's narrow lift bridges may significantly impact the risk of safely removing a large vessel from its berth. This decision will rest primarily with the COTP.

TABLE A - COMMON EQUIVALENTS FOR PORTSMOUTH HARBOR MFCP

Fresh Water:
(S.G. 1.000)

1 Long Ton (2240 lbs.) = 35.84 Cu. Ft.
1 Long Ton (2240 lbs.) = 6.413 US Barrels
1 Long Ton (2240 lbs.) = 268.9 US Gallons
1 US Gallon = 8.33 lbs.
1 Cu. Ft. = 62.35 lbs.

Salt Water:
(S.G. 1.025)

1 Long Ton (2240 Lbs.) = 35.00 Cu. Ft.
1 Long Ton (2240 Lbs.) = 6.236 US Barrels
1 Long Ton (2240 Lbs.) = 262.6 US Gallons
1 US Gallon = 8.53 Lbs.
1 Cu. Ft. = 64.00 Lbs.

1 US Gallon = 0.0238 US Barrels
= 0.8327 Imperial Gallons
= 0.1337 Cu. Ft.
= 3.7853 Liters

1 US Barrel = 42.00 US Gallons
= 34.973 Imperial Gallons
= 5.6146 Cubic Feet
= 158.98 Liters

1 Cubic Foot = 7.4805 US Gallons
= 0.1781 US Barrels
= 28.316 Liters

1 Long Ton = 2240 Lbs.
= 1.0161 Metric Tons
= 1.12 Short Tons

1 Short Ton = 2000 Lbs.
= 0.9072 Metric Tons
= 0.8929 Long Tons

NAUTICAL EQUIVALENTS

1 Fathom = 6 Feet
1 Shot (Shackle) = 15 Fathoms
1 Nautical Mile = 6,080 Feet
1 Statute Mile = 5,280 Feet
1 Knot = 1.152 Miles Per Hour
1 Atmosphere = 14.7 Lbs./Sq. In.
1 Atmos. Pressure = 34 Feet Water

CONVERSION FACTORS

Cubic Feet x 7.4805 = US Gallons
Diameter x 3.1416 = Circumference
Metric Tons x 0.9842 = Long Tons
Long Tons x 1.0163 = Metric Tons
Meters x 0.3048 = Feet
Feet x 3.2802 = Meters
Liters x 3.7853 = US Gallons

PRESSURE

Metric

1 Kilogram/Sq. Centimeter = 14.233 Lbs/Sq. Inch
1 Kilogram/Sq. Meter = 0.2048 Lbs./Sq. Foot

United States

1 Pound/Sq. Inch = 0.0703 Kilogram/Sq. Centimeter.
1 Pound/Sq. Foot = 4.8824 Kilograms/Sq. Meter

DETERMINING WATER FLOW THROUGH HOLES
(In Gallons per Minute - GPM)

HOLE DIA. IN INCHES	HEAD OF WATER IN FEET												
	2	4	6	8	10	12	14	16	18	20	24	28	32
1	28	40	49	56	63	69	74	79	84	89	97	105	112
2	111	157	192	222	248	272	294	314	333	351	384	415	444
3	250	354	433	500	559	612	661	707	750	790	866	935	1000
4	445	629	770	889	994	1089	1176	1257	1333	1405	1540	1663	1778
5	695	982	1203	1389	1553	1701	1837	1964	2083	2196	2406	2598	2778
6	1000	1414	1732	2000	2236	2449	2646	2828	3000	3162	3464	3741	4000
7	1361	1925	2357	2722	3043	3333	3601	3849	4083	4303	4714	5092	5444
8	1777	2514	3078	3555	3974	4354	4702	5027	5332	5620	6157	6650	7109
9	2249	3181	3896	4499	5030	5510	5951	6362	6748	7113	7792	8416	8997
10	2777	3927	4809	5553	6209	6802	7347	7854	8330	8781	9619	10390	11107
11	3360	4752	5820	6720	7514	8231	8890	9504	10080	10626	11640	12573	13441
12	4000	5655	6926	7997	8941	9795	10579	11310	11996	12645	13852	14961	15995
13	4693	6637	8129	9386	10494	11496	12417	13274	14079	14841	16257	17560	18772
14	5443	7697	9426	10885	12170	13331	14400	15394	16327	17210	18853	20364	21770
15	6246	8834	10820	12494	13969	15302	16528	17667	18740	19754	21640	23374	24988
16	7106	10051	12310	14214	15892	17409	18804	20102	21322	22475	24620	26593	28429
17	8024	11347	13897	16047	17942	19654	21229	22694	24071	25373	27795	30022	32095
18	8996	12722	15582	17992	20116	22035	23802	25445	26988	28448	31164	33660	35985
19	10024	14177	17363	20049	22416	24555	26523	28354	30073	31700	34726	37408	40098
20	11110	15710	19241	22218	24840	27211	29392	31421	33326	35129	38483	41566	44436
21	12244	17316	21208	24488	27379	29992	32396	34632	36732	38719	42416	45814	48977
22	13439	19008	23280	26881	30054	32923	35561	38016	40322	42503	46560	50290	53763
23	14688	20772	25441	29376	32844	35978	38861	41544	44064	46447	50881	54958	58753
24	15995	22622	27707	31993	35769	39183	42323	45245	47989	50585	55414	59853	63986
25	17356	24545	30061	34711	38809	42513	45920	49090	52067	54883	60122	64939	69424
26	18770	26546	32513	37542	41974	45980	49664	53093	56313	59359	65025	70235	75085
27	20242	28627	35061	40485	45264	49584	53557	57254	60727	64012	70122	75740	80971
28	21770	30787	37707	43539	48679	53325	57598	61574	65309	68842	75413	81455	87080
29	23353	33026	40449	46706	52220	57203	61787	66053	70059	73849	80898	87380	93414
30	24992	35345	43289	49985	55885	61219	66125	70690	74977	79033	86577	93514	99971
31	26683	37735	46216	53365	59665	65359	70597	75470	80048	84378	92432	99838	106732
32	28434	40212	49250	56868	63581	69649	75231	80424	85302	89916	98499	106391	113738

STATIC HEAD PRESSURES

Head in Feet	Press. in Lbs. per Sq. In.	Head in Feet	Press. in Lbs. per Sq. In.	Head in Feet	Press. in Lbs. per Sq. In.
1.	.431	35.	15.100	69.	29.948
2.	.868	36.	15.624	70.	30.380
3.	1.302	37.	16.058	71.	30.814
4.	1.736	38.	16.492	72.	31.248
5.	2.170	39.	16.926	73.	31.682
6.	2.604	40.	17.360	74.	32.116
7.	3.038	41.	17.794	75.	32.550
8.	3.472	42.	18.228	76.	32.984
9.	3.906	43.	18.662	77.	33.418
10.	4.340	44.	19.096	78.	33.852
11.	4.774	45.	19.530	79.	34.286
12.	5.208	46.	19.964	80.	34.720
13.	5.642	47.	20.398	81.	35.154
14.	6.076	48.	20.832	82.	35.588
15.	6.510	49.	21.266	83.	36.022
16.	6.944	50.	21.700	84.	36.456
17.	7.378	51.	22.134	85.	36.890
18.	7.812	52.	22.568	86.	37.324
19.	8.246	53.	23.002	87.	37.758
20.	8.680	54.	23.436	88.	38.192
21.	9.114	55.	23.870	89.	38.626
22.	9.548	56.	24.304	90.	39.060
23.	9.982	57.	24.738	91.	39.494
24.	10.416	58.	25.172	92.	39.928
25.	10.850	59.	25.606	93.	40.362
26.	11.284	60.	26.040	94	40.796
27.	11.718	61.	26.474	95.	41.230
28.	12.152	62.	26.908	96.	41.664
29.	12.586	63.	27.342	97.	42.098
30.	13.020	64.	27.776	98.	42.532
31.	13.454	65.	28.210	99.	42.966
32.	13.888	66.	28.644	100.	43.400
33.	14.322	67.	29.078		
34.	14.756	68.	29.512		

GALLONS PER CUBIC FOOT

Cubic Feet	Gallons
0.1	0.75
0.2	1.50
0.3	2.24
0.4	2.99
0.5	3.74
0.6	4.49
0.7	5.24
0.8	5.98
0.9	6.73
1	7.48
2	14.96
3	22.44
4	29.92
5	37.40
6	44.88
7	52.36
8	59.84
9	67.32
10	74.80
20	149.6
30	224.4
40	299.2

Cubic Feet	Gallons
50	374.0
60	448.8
70	523.6
80	598.4
90	673.2
100	748.0
200	1,496.1
300	2,244.2
400	2,992.2
500	3,740.3
600	4,488.3
700	5,236.4
800	5,984.4
900	6,732.5
1,000	7,480.5
2,000	14,961.0
3,000	22,441.6
4,000	29,922.1
5,000	37,402.6
6,000	44,883.1
7,000	52,363.6

Cubic Feet	Gallons
8,000	59,844.2
9,000	67,324.7
10,000	74,805.2
20,000	149,610.4
30,000	224,415.6
40,000	299,220.8
50,000	374,025.9
60,000	448,831.1
70,000	523,636.3
80,000	598,441.5
90,000	673,246.7
100,000	748,051.9
200,000	1,496,103.8
300,000	2,244,155.7
400,000	2,992,207.6
500,000	3,740,259.5
600,000	4,488,311.4
700,000	5,236,363.3
800,000	5,984,415.2
900,000	6,732,467.1
1,000,000	7,480,519.0

CUBIC FEET PER GALLON

Gallons	Cubic Feet
1	.134
2	.267
3	.401
4	.535
5	.668
6	.802
7	.936
8	1.069
9	1.203
10	1.337

Gallons	Cubic Feet
1,000	133.681
2,000	267.361
3,000	401.042
4,000	534.722
5,000	668.403
6,000	802.083
7,000	935.764
8,000	1,069.444
9,000	1,203.125
10,000	1,336.806

Gallons	Cubic Feet
1,000,000	133,680.6
2,000,000	267,361.1
3,000,000	401,041.7
4,000,000	534,722.2
5,000,000	668,402.8
6,000,000	802,083.3
7,000,000	935,763.9
8,000,000	1,069,444.4
9,000,000	1,203,125.0
10,000,000	1,336,805.6

Intentionally Left Blank.

Intentionally Left Blank.

GLOSSARY

abaft: A term used to describe the relative position of an object which is farther aft than another.
abeam: At right angles to the keel.
accommodation ladder: A stairway hung alongside the vessel for boarding and disembarking.
aft: Toward, at or near the stern or rear of a vessel.
aftermost: Nearest the stern.
afterpart: Ship's hull, aft of midships section.
afterpeak: The compartment in the narrow part of the stern, aft of the last watertight bulkhead.
ahead: The direction forward of the bow.
amidships: At or near the midship section of the ship.
anchor ball: As soon as the anchor is "let go" a black ball 2 feet in diameter is hoisted on the forestay to indicate the vessel is at anchor.
astern: The direction abaft the stern.
athwart: Same as abeam.
athwartships: Across the ship at right angle to the center line
ballast: Any weight (usually sea water) used to control the draft of a vessel or to improve the stability of a vessel.
barrel: 42 U.S. gallons; 34.973 Imperial Gallons
beam: The extreme width of the ship.
between ('tween) decks: Cargo space between the lower hold and main deck, divided by bulkheads which are usually watertight and fire resistant.
bilge: Generally space in the lower part of the ship's hold where waste water collects and in which bilge suctions are placed for pumping out.
bitt: A post, usually in pairs, around which mooring or other lines may be made fast.
boat deck: A deck on which lifeboats and auxiliary boats are kept.
bollard: A single or double cast steel post secured to a pier and used for mooring vessels.
bow: The front end of the vessel.
bow stopper: An appliance on the forepart of the windlass, over which the anchor cable runs. It is designed to secure the cable when the windlass brake is slackened off.
bridge, navigating or flying: The uppermost deck from which the ship is navigated.
bulkhead: A vertical partition corresponding to the wall of a room extending athwartships or fore and aft with the length of the ship.
chain locker: A compartment in the forward portion of a ship, usually near the hawse pipes in which anchor chain is stowed.
chartroom: A small room adjacent to the pilot house in which charts and navigating instruments are located.
chock: A heavy saddle of wood or metal through which ropes or hawsers may be led.
cofferdam: A small space left open between two bulkheads as an air space, to protect another bulkhead from heat, fire hazard or collision.
crew: Vessel personnel. (see diagram page 19)

GLOSSARY

davit: A crane arm used in handling small boats, stores, gear, anchor, etc.
deadweight: The total weight of the vessel including cargo, fuel, stores, passengers, etc.
fathom: Six linear feet
forecastle (fo'c'sle): The upper deck forward of the foremast and included in the bow area.
free communication: Term describing a rupture in a vessel's exterior boundary (usually the hull) which allows water to flow freely into and out of the damaged compartment.
free surface: The tendency of a liquid which only partially fills a compartment to remain horizontal.
freeboard: The vertical distance between water line and main deck.
froth: European word for firefighting foam.
gangway: The opening in the bulwarks of a vessel through which persons come onboard or disembark.
halogenated extinguishing agents: Halon;made up of carbon and one or more of the halogen elements: flourine, chlorine, bromine and iodine
hatchways: Openings in the deck giving access to holds, bunker spaces and storerooms.
hawse hole: A hole in the bow through which a cable or chain passes.
heel: Term used to describe a vessel's transverse tilt or list.
high-expansion foam: A foam that expands in ratios of over 100:1 when mixed with water; it is designed for fires in confined spaces.
hold: The cargo space of a ship's hull.
LNG (liquefied natural gas): A natural gas, a hydrocarbon of fossil fuel, consisting mainly of methane stored as a liquid and vaporized and burned as gas.
LPG (liquefied petroleum gas): Any one of several petroleum products such as "butane" or "propane" stored under pressure as a liquid and vaporized and burned as gas.
monitor(sentinel): a large stream nozzle, normally found on tankers, fixed in various locations above the main deck. They are operated by gear-driven wheels or handles and have a 360 arc. Can deliver a stream of water or foam onto a deck type fire.
port side: The left side of a ship, looking forward.
scupper: Any opening or tube leading from the waterway through the ship's side, to carry water from the deck.
shot: Also known as shackle, represents 15 fathoms. Designated by a mark (usually painted white) close to a shackle to indicate the length of anchor line let out.
starboard: The right side of a ship, looking forward.
superstructure, ship: That portion of a ship located above the main deck.
winch: A hoisting or pulling machine fitted with a horizontal single or double drum.
windlass: An apparatus in which horizontal or vertical drums or gypsies and wildcats are operated by means of a steam engine or motor for the purpose of handling heavy anchor chains, hawsers, etc.

ACRONYMS AND ABBREVIATIONS
for
Portsmouth Harbor Marine Firefighting Contingency Plan

AFFF	Aqueous Film Forming Foam
CFR	Code of Federal Regulations (US)
CG	Coast Guard (US)
CO	Commanding Officer
CO2	Carbon Dioxide
COTP	Captain of the Port (USCG)
CP	Command Post
DFSP	Defense Fuel Supply Point
DOD	Department of Defense (US)
EOC	Emergency Operating Center
FAA	Federal Aviation Administration
FHA	Fire Hazard Assessment
GPM	Gallons Per Minute
HAZMAT	Hazardous Materials
IC	Incident Command, Incident Commander
IFO	Incident Field Office (Seabrook)
ISC	International Shore Connection
LPG	Liquified Petroleum Gas
MARAD	Maritime Administration (US)
Medi-Vac	Medical Evacuation
MOU	Memorandum of Understanding
MSC	Military Sealift Command
MSD	Marine Safety Detachment (USCG)
MSO	Marine Safety Office (USCG)
NFPA	National Fire Protection Association
NHCD	New Hampshire Civil Defense
NHPA	New Hampshire Port Authority
NHWSPCC	New Hampshire Water Supply & Pollution Control Commission
NRC	Nuclear Regulatory Commission
NRT	National Response Team
NTSB	National Transportation Safety Board
OCMI	Officer in Charge, Marine Inspection (USCG)
OEM	Office of Emergency Management (NH)
OSC	On Scene Coordinator (Federal)
PAFB	Pease Air Force Base
PHMFCP	Portsmouth Harbor Marine Firefighting Contingency Plan
PNSY	Portsmouth Naval Shipyard
POP-VOP	Port of Portsmouth - Vessel Orientation Program
PSNH	Public Service Company of New Hampshire
R & R	Roles & Responsibilities
REMIS	Regional Emergency Medical Information System
SAR	Search and Rescue
SCBA	Self-Contained Breathing Apparatus
SOP	Standard Operating Procedure
TFRs	Temporary Flight Restrictions
USCG	United States Coast Guard
VOP	Vessel Orientation Program

BIBLIOGRAPHY

Dutton's Navigation and Piloting. Dunlap and Shufeldt; U.S. Naval Institute, Maryland, 1969.

Deepwater Port Inspection Methods and Procedures. Science Applications, Inc.; U.S. Department of Transportation, Washington, D. C., 1978.

Deepwater Ports Approach/Exit Hazard and Risk Assessment. Planning Research Company; Department of Transportation, Washington, D.C., 1979.

Developing Tanker Casualty and Tanker Traffic Databases for 1969-1977. Science Applications, Inc.; Department of Transportation, Washington, D.C., 1979.

Evaluation of Deepwater Ports Mooring Load Monitoring and Prediction Systems. Barr, Tebay, Loeser; U.S. Department of Transportation, Washington, D.C., 1978.

Fire Aboard. Frank Rushbrook; Brown Son & Furguson, Ltd., Scotland, 1979.

Fireboats, Ship and Pier Fires. Andrew C. Casper; San Francisco Fire Department Division of Training, California, 1976.

Fire Fighting Manual For Tank Vessels-CG 329. Department of Transportation; Washington, D.C. 1974.

Fundamentals of Construction and Stability of Naval Ships. Thomas C. Gilmer; United States Naval Institute, Maryland, 1959.

Guide for Investigating Marine Casualties. Robert H. Nicholas, Jr.; EXXON Shipping Company, Texas, 1985.

Hazardous Materials Emergency Planning Guide. National Response Team; Washington, D.C., 1987.

Marine Cargo Operations. Captain Charles L. Sauerbier; John Wiley & Sons, New York, 1956.

Marine Fire Prevention, Firefighting and Fire Safety. Maritime Administration; Washington, D.C., U.S. Government Printing Office.

Marine Safety Manual. Vol.1 and Vol 6. USCG Department of Transportation, Washington, D.C

BIBLIOGRAPHY

MARITECH Facility Checklist. MARITECH, Newmarket, New Hampshire, 1988.

MARPOL 73/78-Regulations for the Prevention of Pollution by Oil (Annex I). U.S. Coast Guard; Department of Transportation, Washington, D.C., 1978.

Merchant Marine Officers Handbook. Edward A. Turpin and William A. MacEwen; Cornell Maritime Press, Maryland, 1965.

New Hampshire Port Handbook. Greater Portsmouth Chamber of Commerce and New Hampshire Port Authority; New Hampshire 1987

Perspectives on Oil Refineries and Offshore Unloading Facilities - Proceedings. Mary Louise Hunter, Editor; Durham, N.H., 1974.

Port Administration and Legislation Handbook. U.A. Tarasca; United Nations, New York, 1969.

Ports of Portland and Searsport, Maine and Portsmouth, New Hampshire. Port Series No. 1. U.S. Army Corps of Engineers; U.S. Government Printing office, Washington, D.C. 1985.

Ports of the World-13th Edition. CIGNA P&C Companies, 1988.

Potentials for a Delaware Deepwater Port. Gladstone Associates; Washington, D.C., 1970.

Public Involvement in Maritime Facility Development. Committee on Impact of Maritime Services on Local Populations; Maritime Transportation Research Board, Washington, D.C., 1979.

Radio Frequency Plan. Department of Transportation, Washington, D.C., 1980.

Tanker Practice. G.A.B.King; Stanford Maritime Ltd., Great Britain, 1974.

Texas A & M Shipboard Training for Shorebased Firefighters. John R. Burns, Jr.; Texas A & M, Texas, 1988.

The Boatswains Manual. H.F. Chase; Brown, Ferguson & Son Ltd., Glasgow, 1968.

'Washington Public Ports Association Safety Committee': Publications, Washington, 1988.

Wharves and Piers. Carleton Greene; McGraw-Hill, New York, 1917.