

**SAN FRANCISCO, SAN PABLO AND SUISUN BAYS  
HARBOR SAFETY PLAN**

**June 2002**

**Pursuant to the  
California Oil Spill and Prevention Act of 1990**

**Submitted by the  
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# TABLE OF CONTENTS

TABLE OF MAPS

TABLE OF APPENDICES

INTRODUCTION AND MEMBERSHIP OF THE HARBOR SAFETY COMMITTEE

EXECUTIVE SUMMARY

- I. GEOGRAPHICAL BOUNDARIES
- II. GENERAL WEATHER, TIDES AND CURRENTS
- III. AIDS TO NAVIGATION
- IV. ANCHORAGES
- V. HARBOR DEPTHS, CHANNEL DESIGN, AND DREDGING
- VI. CONTINGENCY ROUTING
- VII. VESSEL TRAFFIC PATTERNS
  - SHIP TRAFFIC
  - HISTORY AND TYPES OF ACCIDENTS AND NEAR ACCIDENTS
- VIII. COMMUNICATION
- IX. BRIDGES
- X. SMALL VESSELS
- XI. VESSEL TRAFFIC SERVICE
- XII. TUG ESCORT / ASSIST FOR TANK VESSELS
- XIII. PILOTAGE
- XIV. UNDERKEEL CLEARANCE AND REDUCED VISIBILITY
- XV. ECONOMIC AND ENVIRONMENTAL IMPACTS
- XVI. PLAN ENFORCEMENT
- XVII. OTHER: SUBSTANDARD VESSEL EXAMINATION PROGRAM
- XVIII. HUMAN FACTORS WORKING GROUP AND PREVENTION THROUGH PEOPLE WORKING GROUP

XVIV WORK GROUP YEARLY REPORTS

- FERRY OPERATORS WORK GROUP
- NAVIGATION WORK GROUP
- PREVENTION THROUGH PEOPLE WORK GROUP
- TUG ESCORT WORK GROUP
- UNDERWATER ROCKS WORK GROUP

**TABLE OF MAPS**

|       |  |
|-------|--|
| Map 1 | Geographic Limits of the Harbor Safety Plan      |
| Map 2 | Bay Marine Terminals                             |
| Map 3 | Vessel Traffic System San Francisco Service Area |
| Map 4 | Tug Escort Zones                                 |

**TABLE OF APPENDICES**

|             |  |
|-------------|--|
| APPENDIX A: | Bay Sites of the Physical Oceanographic Real-Time System (PORTS)<br>Instruments that Measure Currents, Tides, Meteorological Data and Salinity |
| APPENDIX B: | Clearing House List of Tanker Movements and Total Vessel Movements in<br>2001 in San Francisco Bay   |
| APPENDIX C: | VTS Report on Near Misses for 2001.  |
| APPENDIX D: | Clearing House List of Certified Tug Escort Boats.   |
| APPENDIX E: | Clearing House Report on Escorted Vessel Movements for 2001  |
| APPENDIX F: | Amended Tug Escort Regulations Effective October 4, 2001   |
| APPENDIX G: | Underwater Rocks Near Alcatraz Island: Location, Isometric Profile and<br>Summary of Rock Removal Alternatives and Costs                       |
| APPENDIX H: | Vehicular Bridge Inventory   |
| APPENDIX I: | Coast Guard Marine Safety Office Bay Pollution Statistics through 2001.  |
| APPENDIX J: | Recommendations for conducting Escort Training on San Francisco<br>Bay   |

## INTRODUCTION AND MEMBERSHIP OF THE HARBOR SAFETY COMMITTEE

*In 1990 the California Legislature enacted the Oil Spill Prevention and Response Act (OSPRA). The goals of OSPRA are to improve the prevention, removal, abatement, response, containment and clean up and mitigation of oil spills in the marine waters of California. The Act (SB 2040) created harbor safety committees for the major harbors of the state of California to plan “for the safe navigation and operation of tankers, barges, and other vessels within each harbor ... [by preparing] ... a harbor safety plan, encompassing all vessel traffic within the harbor.” The Harbor Safety Committee of the San Francisco Bay Region was officially sworn in on September 18, 1991 and held its first meeting that date. The original Harbor Safety Plan for San Francisco, San Pablo and Suisun Bays was adopted on August 13, 1992. SB 2040 mandates that the Harbor Safety Committee must annually review its previously adopted Harbor Safety Plan and recommendations and submit the annual review to the OSPR Administrator for comment.*

*The full committee of the Harbor Safety Committee holds regular monthly public meetings. The committee chairman appoints a series of subcommittees to review the mandated components of the Harbor Safety Plan and timely issues. All committee and subcommittee meetings are noticed to the public. Public comments are received throughout discussions of the various issues, which results in full public participation in developing the Harbor Safety Plan recommendations of the San Francisco Bay Region*

*The San Francisco Bay Harbor Safety Plan encompasses a series of connecting bays, including the San Francisco, San Pablo, Suisun Bays, and the Sacramento River to the Port of Sacramento and the San Joaquin River to the Port of Stockton. It is almost a hundred miles from the San Francisco lighted horn buoy outside the bay to the Ports of Stockton or Sacramento. The 548-square-mile Bay has an irregular 1,000 mile shoreline composed of a variety of urban and suburban areas, marshes and salt ponds. Several significant islands are within the Bay, including Angel Island, Alcatraz Island, Yerba Buena Island and Treasure Island. Map 1 depicts the geographic boundaries of the area covered by the Harbor Safety Plan.*

*The San Francisco Bay system is the largest estuary along the Pacific Coast of North and South America. Waters from the two major river systems and the Bay flow through a single opening at the Golden Gate Bridge, which is less than a mile wide at its narrowest point. Because of the volume of water moving through the narrow opening on a daily basis, strong tides and currents occur in the Bay. While the Bay is extremely deep (356 feet) by the Golden Gate Bridge because of the swiftly moving volume of water, the Bay is very shallow at its extremities and subject to sedimentation from the rivers emptying into the Bay. Sediment is deposited outside the entrance to San Francisco Bay where a semicircular bar extends out into the Pacific Ocean. A dredged Main Ship Channel allows deep-draft ships to navigate into the Bay. About two-thirds of the Bay is less than 18 feet*

*deep. The Bay is significantly shallower due to human alteration. Over a hundred years ago the bay was larger and deeper prior to the gold mining era. Hydraulic miners pumped vast quantities of muddy tailings silting the streams, rivers and Bay system. As a result, the present Bay has widely varying depths. The Bay bottom is predominantly mud.*

*The Bay has a number of hazards to navigation, such as strong tides and currents and variable bottom depths, which confine large vessels to specified shipping lanes within the Bay. Navigating the Bay becomes more complex during periods of restricted visibility due to winter storms and fog during the spring months when heavy runoff from melting snows floods the river systems that drain into the Bay. The San Francisco Bar Pilots regularly compile recommended guidelines for safe navigation entitled "Port Safety Guidelines for Movement of Vessels on San Francisco Bay and Tributaries." The 1992 recommended guidelines are currently being updated and revised by the Bar Pilots Association. The guidelines are sent to members of the shipping industry, and are based on a general consensus among pilots as to recommended navigation practices.*

*The natural harbor of the Bay serves the shipping and fishing industries. There are eight ports, twenty-one marine terminals, and naval facilities at Concord Naval Weapons Station and Moffet Field. Military and contract commercial vessels move explosives to the Concord Naval Weapons Station along the Contra Costa/Solano County shoreline. Because the water depths near refineries in Contra Costa and Solano Counties cannot safely accommodate larger oil tankers, large tankers lighter oil to smaller tankers or barges to move cargo in Bay to marine terminals. Map 2 identifies the location of marine terminals in the Plan area. In addition, an expanding ferry system annually makes over 71,000 (1997) trips, mainly to and from San Francisco in the central part of the Bay. As highway congestion increases, ferry traffic substantially increased in the Bay. Because much of the Bay shoreline is urbanized, recreational boating and the growing sport of board-sailing are popular with an estimated 20,000 boat berths around the Bay, exclusive of the Sacramento and San Joaquin Rivers.*

*The shipping industry is a particularly vital part of the Bay Area economy. Shipping spokesmen estimate that approximately 100,000 jobs are dependent upon the shipping industry and that the industry contributes \$4.5 billion to the economy.*

*Thus, vessel traffic in the Bay consists of a complex variety of inbound and outbound vessels, wholly in-Bay vessel movements, tugs, government vessels, ferry passenger ships, recreational boats, commercial and sports fishing boats, board-sailors and personal watercraft (jet skis) within the series of bays, channels and rivers that comprise the San Francisco Bay planning area.*

## Membership of the Harbor Safety Committee of the San Francisco Bay Region

The following is a list as of June 2001 of the 16 voting, their alternates, and 3 non-voting members of the Committee:

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None at present.

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American Ship Management  
  
Vice Chair .....Scott Merritt  
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**Harbor Safety Committee Work Groups**

Working Group Assignments  
June 2001

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Nick Salcedo

**Water Transit Working Group**

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**Navigation Working Group**

Captain Larry Teague (Captain Eric Dohm), chair  
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### **Human Factors Working Group**

Don Watters, chair

Tom Wilson (Norman Chan)

### **Prevention Through People Working Group**

Margot Brown, chair

Nick Salcedo

### **Tug Escort Working Group**

Joan Lundstrom, chair

Captain Margaret Reasoner (Rich Smith)

Stu McRobbie (Todd Covini)

Brian Dorsch (Captain Doug Lathrop)

### **Plan Update Work Group**

Scott Merritt, chair

### **PORTS Funding Work Group**

Scott Merritt, chair

## EXECUTIVE SUMMARY 2001 EXECUTIVE SUMMARY

The Harbor Safety Committee is concerned with navigation, environmental issues, and security issues that impact the San Francisco Bay Area.

The Harbor Safety Committee enjoyed good member and public participation at its monthly meetings. The Committee is a fine example of government agencies, Federal and State, Private industry, and the Public working together to provide guidance in the formation and oversight of navigation safety in San Francisco Bay.

Tug escort regulations were reviewed for timeliness and to see if the original assumptions used were still valid. The review continued into 2002.

The Committee enjoyed active participation of the U.S. Army Corp of Engineers. Since becoming an active member the time it takes for U.S. Army Corp of Engineers charts to be transmitted to the San Francisco Bar Pilots has been reduced to days from months thus improving navigation safety within the bay.

Through the “Underwater Rocks” work group the Harbor Safety Committee is assisting the U.S. Army Corp of Engineers is managing a study to identify the impacts of lowering the “Underwater Rocks” west of Alcatraz Island. Good progress continues on this complex project.

Thru it’s work groups the Harbor Safety Committee has developed and published brochures for geographic terminology used in radio communications, “Where the Heck is Collinsville”. This brochure is the recreational boating community. Also with the assistance of the U.S. Coast Guard the brochure, “Safe Transit Program, Guide for Preventing Engine and Steering Failures” is being developed for the shipping industry.

In March 2001, the Harbor Safety Committee hosted the national meeting of Harbor Safety Committee’s. A well attended and informative two-day event.

Since it’s inception, The Harbor Safety Committee, through its work groups has adopted the following recommendations to reduce the risk of oil spills in the San Francisco Bay Region. Many recommendations have been implemented while others are still outstanding. The recommendations have been organized into “Yet to be Implemented” and “Implemented” sections. Each Chapter of the Harbor Safety Plan contains the complete text, background and status of each recommendation.

## RECOMMENDATIONS YET TO BE IMPLEMENTED

### **I. Geographical Boundaries**

No recommendations.

### **II. General Weather, Tides and Currents**

1. The Harbor Safety Committee supports the efforts to increase funding to NOAA. In light of congressional initiatives that would reduce the NOAA's funding or dissolve the agency entirely by eliminating, privatizing or transferring its functions to other agencies, Harbor Safety Committee members and interested members of the public should continue to request federal and state funding for PORTS to insure system support after the demonstration period. The Committee urges that the OSPR Administrator support PORTS as a high priority and that OSPR continue to seek and allocate funds to maintain the system once it is installed. The Harbor Safety Committee recommends that the Marine Exchange of the San Francisco Bay Region be designated as the non-profit entity to operate, maintain and market the uses of the PORTS program following conclusion of the federal demonstration project. The Committee further requests that NOAA expedite the update of tide and current data using the latest technology available and publish the water level and current atlases to replace the tidal current charts recalled because of inaccuracies.

### **III. Aids to Navigation**

No recommendations.

### **IV. Anchorages**

### **V. Harbor Depths, Channel Design, and Dredging**

2. The Committee recommends immediate surveys by the Corps of Engineers for Corps-maintained deep-water navigation channels and by NOAA for all other channels used by deep draft vessels or oil barge traffic that have not been formally surveyed within the last five years. Heavily traveled navigation lanes should be designated by the Corps of Engineers (COE) as project areas in order to ensure frequent, up-to-date surveys of channel depths. Of highest priority are those areas where known shoaling has taken place. Such areas would include shoaling areas east of Alcatraz and west of the Oakland Harbor.

3. The Committee further recommends that NOAA update its charts in a timely fashion to reflect survey information from NOAA, COE and independent sources. NOAA should improve the frequency of published data on channel depths in areas heavily trafficked by oil tankers and barges. NOAA should devise a system to quickly alert VTS, masters and pilots.

4. Establish a new two-way Traffic Separation Scheme north of Alcatraz to allow safer navigation of deeply laden tankers. Several areas, such as Harding, Arch, and Shag Rocks, should be reduced to a minimum of 55 feet depth MLLW.

The Harbor Safety Committee requests the U.S. Army Corps of Engineers to: further refine the Initial Cost Estimates for the Removal of Harding, Arch, Shag, and Blossom Rocks, an Unnamed Rock and Alcatraz Shoal; re-examine East Alcatraz Shoal; evaluate the forty-foot shoal south of the Bay Bridge; and survey the position of two charted wrecks one located near Blossom Rock and the other near the Bay Bridge.

In order to provide funds to match federal funds for lowering the rocks off Alcatraz Island, the Harbor Safety Committee supports a state appropriation as the local match as this project would reduce the risk of oil spills in the Bay which is of substantial benefit to the general public and to the environment.

5. Eliminate the dogleg at buoy “C” of the San Rafael main ship channel in order to maintain proper two-way traffic separation. The Traffic Separation Scheme should be re-routed eastward after due dredging of the western side of Anchorage Area No. 5. \* This recommendation, along with all others in this Plan, should be the subject of a complete environmental analysis and examination of alternatives before implementation.

## **VI. Contingency Routing**

1. The high degree of cooperation and consultation between pilot organizations, the U.S. Coast Guard, port authorities and appropriate agencies and contractors should continue from the project planning stage through the construction stage of projects that may impact safe navigation in the Bay. The planning stage should include an evaluation of various alternatives to ensure harbor safety.

2. OSPR should request CalTrans, railroads, and various counties owning bridges for advance notice of work that would temporarily or permanently reduce bridge clearances. Advance notice should be provided as far in advance as possible through the Local Notice to mariners to assure that vessels are alerted to these hazards.

## **VII. Vessel Traffic Patterns**

1. The Coast Guard and VTS should devise a more consistent system of reporting accidents and near accidents, standardized with other areas. The annual reports should together be analyzed on an annual basis by the Coast Guard and a report made to OSPR with recommendations on the effectiveness of navigational safety measures. The committee adopted a definition of a reportable ‘Near Miss’ situation to standardize reporting along the California Coast.

## **VIII. Communication**

No recommendations.

## **IX. Bridges**

1. OSPR should request CalTrans and other bridge operators such as the Golden Gate Bridge and Southern Pacific Railroad to install energy-absorbing fendering, instead of wooden or plastic fendering, on all area bridges when replacing damaged fenders and for all new construction.

## **X. Small Vessels**

11. A representative(s) of the Harbor Safety Committee should meet with representatives of the San Francisco Boardsailing Association to promote safer navigation in the Bay by discussing such issues as boardsailing race schedules, race course locations, Inland Steering and Sailing Rule 9 requirements, characteristics of large vessels and tug/barge operations in the Central Bay in relation to boardsailors, and possible education efforts such as posting signs at areas frequented by large numbers of boardsailors (e.g., Crissy Field and Rio Vista) to warn of vessel traffic dangers.

12. Place Additional Emphasis on Recreational Boater Education and Law Enforcement on the Waterways as follows:

- 1) OSPR should put additional emphasis on boater education and law enforcement on the waterways. This can be addressed by the Outreach Program, developed in 1994 and coordinated through the State Department of Boating and Waterways.
- 2) Educational target areas should be identified such as marinas and boat ramps. Boat rental establishments, including personal water craft (jet skis), should also be targeted for an educational thrust, as inexperienced boaters in rental boats are a continuous source of problems.
- 3) The Coast Guard's "Sea Partners Program," a marine environmental protection outreach initiative, should be utilized, in conjunction with the Coast Guard Auxiliary, to disseminate boater safety materials to recreational boaters in the Bay area.
- 4) Kayakers should be approached in the same manner as boardsailors were previously approached to promote safer navigation in the Bay. Kayakers have become a problem for vessel traffic due to reckless operation by some individuals.
- 5) The public school system should be encouraged to include Boater Education in the curriculum.

Consideration should be given to providing funds dedicated specifically for increased law enforcement on the waterways.

## **XI. Vessel Traffic Service**

**No recommendations**

## **XII. Tug Escort / Assist for Tank Vessels**

**No recommendations**

## **XIII. Pilotage**

1. Amend the California Harbor and Navigation Code to require that shipping company employees eligible to pilot vessels in the Bay area must hold a Master's license with pilotage endorsement and have made at least 20 trips as pilot trainee or observer on vessels over the routes to be piloted within a one-year period.
2. Amend Coast Guard regulations for pilotage to adjust the limit to 10,000 gross tons for tank barges carrying oil or other petroleum products as cargo to 5,000 gross tons.

## **XIV. Underkeel Clearance and Reduced Visibility**

1. The Committee recommended guidelines for underkeel clearances of tank vessels carrying oil or petroleum products as cargo.

## **XV. Economic and Environmental Impacts**

No recommendations.

## **XVI. Plan Enforcement**

**No recommendations**

## **XVII. Other: Substandard Vessel Inspection Program**

**No recommendations**

## **RECOMMENDATIONS IMPLEMENTED**

The Harbor Safety Committee, through its work groups adopted the following recommendations to reduce the risk of oil spills in the San Francisco Bay Region. Each Chapter of the Harbor Safety Plan contains the complete text, background and status of each recommendation. These recommendations have been implemented by the responsible agency.

### **I. Geographical Boundaries**

No recommendations.

### **II. General Weather, Tides and Currents**

2. For the San Francisco main ship channels from the COLREGS Demarcation Line to and between the southern tip of Bay Farm Island and the Southern Pacific Railroad Bridge: a) The maximum speed for all power driven vessels of 1,600 or more gross tons shall not exceed 15 knots through the water from the COLREGS Demarcation Line to and between the southern tip of Bay Farm Island and Southern Pacific Railroad Bridge; and b) Power driven vessels of 1,600 or more gross tons shall in any case have their engines ready for immediate maneuver and shall not operate in control modes or with fuels that prevent an immediate response to any engine order ahead or astern or preclude stopping their engines for an extended period of time. \*

### **III. Aids to Navigation**

No recommendations.

### **IV. Anchorages**

Adopt pre-designated anchorage areas within the existing general anchorages throughout the VTS-SF area and in particular within general anchorage No. 9 so that safer and more disciplined anchoring practices may be managed by VTS-SF. \*

### **V. Harbor Depths, Channel Design, and Dredging**

1. Facility owners/operators should conduct annual condition surveys noting depths alongside and at the head of their facilities in accordance with standards set by NOAA and including any additional information. \*

### **VI. Contingency Routing**

No recommendations.

### **VII. Vessel Traffic Patterns**

No recommendations.

### **VIII. Communication**

1. Due to increasing congestion on Channel 13, the USCG is proposing to shift the primary VTS channel to Channel 14. The Harbor Safety Committee endorses the Coast Guard's efforts to improve the existing system. \*

2. The Harbor Safety Committee recommends the acquisition of adequate backup power supplies for the San Francisco Bar Pilots and San Francisco Marine Exchange communications systems. At a minimum, portable diesel generators obtainable commercially should be procured and arrangements made to provide means of powering minimal lighting and communications circuits. \*

### **IX. Bridges**

2. Bridge clearance gauges should be installed where needed, particularly drawbridges. \*

3. Water level gauges should be installed at approach points to bridges. \*
4. Request the Golden Gate Bridge Highway and Transportation District to install a racon (radio beacon) to mark the center of the channel between the towers of the Golden Gate Bridge to better serve the mariner, particularly during periods of restricted visibility and heavy seas. \*
5. Request the Department of Transportation (Caltrans) to install racons on the D–E span of the San Francisco–Oakland Bay Bridge (instead of the G–H span), and the A–B span because the spans vary in height and width and currents can reach considerable velocities running parallel to the towers. \*
6. Request Caltrans and the Golden Gate Bridge District to shield bridge floodlights to reduce the glare for ships. \*

## **X. Small Vessels**

1. A meeting should be convened by the Harbor Safety Committee with the state OSPR, Fish and Game officials, herring fishermen, Coast Guard, and representatives of the Ports to discuss ways to avoid problems such as nets impeding navigation lanes or berthing areas, nets blocking the egress of fire boats, oil spill response boats and pilot boats, etc. This meeting could result in yearly pre-season meetings with fishermen, Fish and Game mailers to the fishermen informing them of spill prevention concerns, or other actions. \*
2. Pilots, Masters, and other interested parties should be invited to witness a series of races from the St. Francis Yacht Club race deck to obtain a view of events from the competitors' level. \*
3. Race officials and other interested parties should be invited aboard a large tanker while underway to get the pilot's perspective of racing vessels. \*
4. The Yacht Racing Association of San Francisco Bay should furnish full annual race schedules to all interested shippers, and, in particular, the Harbor Safety Secretariat for distribution. \*
5. The Yacht Racing Association should furnish optional courses and rounding marks used by participating entities. The race committee for each day's event should choose a course compatible with anticipated large vessel traffic. \*
6. The Coast Guard Auxiliary should observe and report infractions. The U.S. Coast Guard suggested that a mailer be prepared, to be inserted with vessel license renewal notices, advising owners of Inland Steering and sailing rules, Rule 9. \*

7. Expand the distribution of existing educational pamphlets available from the U.S. Coast Guard. These pamphlets provide information regarding the above-mentioned courses and the phone number for the Boating Education Hotline at 1–800–336–2628 that would provide information regarding the scheduling of these classes. Distribute these educational pamphlets by: enclosing them in the boat registration renewal notices sent to boat owners by the Department of Motor Vehicles in the State of California (a follow-up mailing might also be considered to remind boat owners of these courses); enclosing them in local boat marina mailings to slip renters; requesting marinas to offer a one-time slip rental rebate for completion of a safe boater course. \*
8. Encourage vessel operators to document and report violations of the Rules of the Road to the local U.S. Coast Guard office. This would include a direct request to the San Francisco Bar Pilots to assist in this reporting effort. \*
9. Make public by publishing punitive actions taken against offenders by the U.S. Coast Guard. This information should be distributed to local yachting and boating magazines and marina newsletters. In addition, the California Department of Motor Vehicles should distribute a summary of punitive activities to registered boat owners. \*
10. Encourage the ongoing efforts of the local U.S. Coast Guard Auxiliary and Power Squadron organizations in their boating education and safety effort. \*

## **XI. Vessel Traffic Service**

1. Scope of Coverage
  - a. Develop standard VTS traffic management procedures for U.S. ports that conform to international standards. \*
  - b. Make mandatory for civilian and military vessels the current voluntary participation in VTS and extend required participation to include vessels certified to carry 49 passengers or more (i.e., ferries). \*
  - c. Incorporate the provisions of International Rule 10 in the federal regulations regarding VTS. \*
  - d. Expand the area of sensor coverage by VTS–SF to monitor the navigable waters of San Pablo Bay north of the San Rafael–Richmond Bridge and east of the Carquinez Straits to New York Point and Antioch. It is anticipated by this committee that San Pablo Bay may be covered by radar surveillance alone while television monitors, in addition to radar, may be needed in the area of the Strait where continuous change of heading could make radar monitoring alone difficult. Sensor coverage expansion has been repeatedly requested. \*
2. Changes in VTS Operations and Requirements

- a. Adopt a dedicated VHF working frequency, Channel 14, for the exclusive use of VTS–SF ship/shore communication system. Channel 13 should continue to be monitored and used for ship/ship communications. \*
  - b. Upgrade the current equipment used by VTS–SF to include state-of-the-art technology (U.S. Coast Guard, *Port Needs Study: Vessel Traffic Services Benefits*, Volume I: Study Report and Volume II, Appendices, Part 2). \*
3. The Harbor Safety Committee supports continued federal funding for VTS–San Francisco in order to ensure navigational safety in the San Francisco Bay Area. \*

## **XII. Tug Escort / Assist for Tank Vessels**

Over a period of five years, the Harbor Safety Committee took the following steps to establish tug escorting in the Bay:

- 1) Adopted Interim Tug Escort Guidelines in 1992.
- 2) Adopted Permanent Tug Escort Guidelines in 1993.
- 3) Adopted Revised Permanent Tug Escort Guidelines in 1995.
- 4) Amendments to Revised Permanent Guidelines Adopted January 1996 (Revised tug escort regulations effective January 1, 1997).
- 5) Recommended establishing a technical pilotage committee to review waterways specific maneuvers of tankers and tugs.

## **XIII. Pilotage**

3. To prevent unlicensed persons from performing pilotage, it is recommended that the California Harbors and Navigation Code be amended to increase the penalty for acting as a pilot while not holding a pilot license from the maximum penalty for a misdemeanor of \$1,000 to a maximum penalty of \$25,000. \*

## **XIV. Underkeel Clearance and Reduced Visibility**

2. Because it may be more dangerous for a vessel to remain offshore in the Pacific Ocean in the approaches to the Bay during periods of restricted visibility, vessels inbound from the Pacific Ocean should continue to proceed from the Pilot Area into the Bay to a safe anchorage. \*
3. Ships within the Bay at a dock or at a safe anchorage should not commence movement if visibility is less than .5 nautical miles throughout the intended route, unless the Pilot's assessment of all variables listed under general principles is that the vessel can proceed safely. The Pilot's local knowledge should include knowledge of historic weather patterns during that time of year, current weather reports, and checking with reporting stations along the route. \*

## **XV. Economic and Environmental Impacts**

No recommendations.

## **XVI. Plan Enforcement**

The Coast Guard and the State Department of Fish and Game should coordinate policies and procedures to the greatest extent possible with each other and with other federal, state, and local agencies. \*

## **XVII. Other: Substandard Vessel Inspection Program**

Support the U.S. Coast Guard vessel inspection program of targeting substandard vessels in the Bay. \*

## I. GEOGRAPHICAL BOUNDARIES

The policies and recommendations contained in the San Francisco Bay Harbor Safety Plan address vessel safety in the marine waters of San Francisco, San Pablo and Suisun Bays. For purposes of the Harbor Safety Plan, the eastern boundary includes those waters subject to tidal influence up to the Ports of Sacramento and Stockton. The western boundary of the plan is inscribed by a circle with a radius of six nautical miles (nm) centered on San Francisco Approach Lighted Horn Buoy SF (37° 45. 0'N., 122° 41.5'W) including the Main Ship Channel to the COLREGS demarcation line (see Map 1). This includes the Offshore Vessel Movement Reporting System, Vessel Traffic Service and Traffic Separation schemes within the area. The following NOAA charts cover the Harbor Safety Plan Area:

It should be noted the following plan elements apply to a smaller geographic area:

**Vehicular Bridge Management:** The westernmost boundary is the COLREGS Demarcation Line, between Pt. Bonita and Mile Rocks, and the easternmost boundary includes the Rio Vista Bridge over the Sacramento River and the Antioch Bridge over the San Joaquin River.

**Tug Escort:** The easternmost boundary of the tug escort area is one mile beyond the Ryer Island Ferry Terminal and on the San Joaquin River one mile beyond the Antioch Bridge. Tug escort zones are described in Chapter XII.

## II. GENERAL WEATHER, TIDES AND CURRENTS

San Francisco Bay is the largest harbor on the Pacific Coast of the United States. It is made up of a series of connecting bays and harbors, of which San Francisco Bay, San Pablo Bay and Suisun Bay are considered jointly for the purposes of the San Francisco Bay Harbor Safety Plan. Most of the information presented here has been derived from the *U.S. Coast Pilot, Pacific Coast*. It is augmented with observations from local sources.

Ships traveling into the Bay encounter diverse weather, currents, tides and bottom depths. Because of the often varied and changing set of harbor conditions, mariners must be observant about up-to-date conditions to navigate safely. For example, while the heaviest rains occur in January and February, spring is the windiest season; fogs frequently shroud the narrow sea lanes around the approach to the Golden Gate Bridge and the Carquinez Strait; heavy rip tides and currents occur in the Central Bay; shoals may shift into navigation lanes. Knowledge of these factors is essential to understanding navigation in the Bay.

The movement of vessels in San Francisco Bay should be guided by certain general principles.

- The safe navigation of the vessel shall be the duty of the Master who shall have full command of the vessel, whether or not a Pilot is on board. With a Pilot on board, it shall be the duty of the Master and Pilot to fully comply with all safety and navigational provisions of applicable state, federal and international regulations for safe navigation.
- Nothing in the guidelines shall require a Master or Pilot to move any vessel in any condition unless the Master and the Pilot of the vessel agree that the movement can be safely accomplished.
- The decision-making process by the Master or Pilot shall consider all relevant factors, including, but not limited to:
  - ◆ The characteristics of the vessel, such as maneuverability, size and draft;
  - ◆ The quality of the vessel's radar capabilities;
  - ◆ Tide, current, and wind conditions on the intended route;
  - ◆ Time of the day in relation to whether the fog may be in a cycle of "burning off" or lifting;
  - ◆ Possible hazards along the route, such as bridges, and amount and nature of vessel traffic; and
  - ◆ Visibility conditions at the dock, en route and at the destination, and assessment of whether these conditions are changing.

- The Master and Pilot must be allowed the flexibility to cautiously proceed during periods of minimum visibility if deemed prudent based upon the Pilot's local knowledge of the Bay, including localized weather patterns, and the assessment of the factors outlined above in relation to the specific route to be taken.

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## WEATHER

### 1. Winds.

Bay area weather is seasonably variable with three discernible seasons for marine purposes.

**Winter.** Winter winds from November to February shift frequently and have a wide range of speeds dependent on the procession of offshore high and low pressure systems. Calms occur between 15 to 40% of the time inside the bay and 10 to 12% outside. Extreme wind conditions of 50 knots gusting to 75 knots have occurred during the winter. The strongest winds tend to come from the Southeast to Southwest ahead of a cold front.

**Spring.** Spring tends to be the windiest season with average speeds in the bay of 6–12 knots per *Coast Pilot*. Extremes are less likely than during the winter but wind speeds from 17–28 knot winds up to 40% of the time. Wind direction stabilizes as the Pacific High Pressure System becomes the dominant weather influence. Northwesterly winds are generated and reinforced by the sea breeze. Inside the Bay, winds are channeled and vary from Northwest to Southwest.

**Summer.** Summer winds are the most constant and predictable. The winds outside the Golden Gate are normally from Northwest to North and are generated by the strong Pacific High Pressure System. This condition lasts through October until the system weakens and the winter cycle starts again. Winds inside the Bay are local depending on the land contours acting on the onshore flow. One of the few occurrences that will alter this pattern is when a high pressure system settles over Washington and Oregon. When that happens a Northeast flow develops bringing warm dry air with it. This will clear away the summer fog.

**Safety Issues Associated with Winds.** Adverse wind conditions may cause ships at anchor, such as at Anchorage 9, to change position and drag anchor away from the intended mooring position. Winds in San Pablo Bay may be particularly strong and must be taken into consideration by tankers transiting to oil terminals along the Contra Costa County shoreline. Apparent significant discrepancies exist in the reported winds noted in the *Coast Pilot* and observations made by local professional mariners and recreational boaters. Possible causes for this are the locations of reporting sites on land where deflection and channeling of wind provides data at variance with conditions on the water.

### 2. Fog.

(See Chapter XIV. Underkeel Clearance and Reduced Visibility.)

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## TIDES AND CURRENTS

### 1. Currents.

The currents at the entrance to San Francisco Bay are variable, uncertain and at times attain considerable velocity. Immediately outside the bar is a slight current to the North and West known as the Coast Eddy Current. The currents that have the greatest effect on navigation in the bay and out through the Golden Gate are tidal in nature.

**Golden Gate Flood Current.** In the Golden Gate the flood or incoming current sets (direction of flow) straight in with a slight tendency to the North shores and with heavy turbulence at both Lime Point and Fort Point when the flood is strong. This causes an eddy or circular current between Point Lobos and Fort Point.

**Golden Gate Ebb Current.** The ebb or outgoing current has been known to reach more than 6.5 knots between Lime and Fort Points. It sets from inside the North part of the Bay toward Fort Point. As with the flood, it causes an eddy between Point Lobos and Fort Point, and a heavy rip and turbulence reach a quarter of a mile south of Point Bonita.

**Golden Gate Current Maximums.** In the Golden Gate the maximum flood current occurs about an hour and a half before high water, with the maximum ebb occurring about an hour and a half before low water. The average maximums are 3 knots for the flood and 3.5 kts for the ebb.

**Inner Bay Currents.** Inside the Golden Gate the flood sets to the Northeast and causes swirls and eddies. This is most pronounced between the Golden Gate, Angel Island, and Alcatraz Island. The current sets through Raccoon Strait (north of Angel Island) taking the most direct path to the upper bay and the delta area. The ebb current inside the Golden Gate is felt on the South shore first. The duration of the ebb is somewhat longer than the flood due to the addition of runoff from the Sacramento and San Joaquin River systems.

### 2. Tides.

Tides in the San Francisco Bay Area are semi-diurnal in that there are usually two cycles of high and low tides daily but with inequality of the heights of the two. Occasionally the tidal cycle will become diurnal (only one cycle of tide in a day). As a result, depths in the Bay are based on “mean lower low water” (MLLW) that is the average height of the lower of the two daily low tides. The mean range of the tide at the Golden Gate is 4.1 feet, with a diurnal range of 5.8 feet. During the periodic maximum tidal variations the range may reach as much as 9 feet and have lowest low waters 2.4 feet below mean lower low water datum.

**Safety Issues Associated with Current and Tide Conditions.** In late 1991, the National Oceanic and Atmospheric Administration (NOAA) stopped publishing the local tidal current charts from use due to significant errors in predictions and because the errors exceeded NOAA standards. Because of the variable depths of the Bay, safe navigation is highly dependent upon accurate tidal and current charts.

PORTS has been installed to give near-real time tide and current information on a six-minute basis. This is one of the more modern systems in the nation. PORTS is managed by the Marine Exchange with funding from OSPR and technical assistance from NOAA/NOS.

## **Recommendations**

**II.1. Physical Oceanographic Real-Time System (PORTS).** The Harbor Safety Committee supports the efforts to increase funding to NOAA. In light of congressional initiatives that would reduce the NOAA's funding or dissolve the agency entirely by eliminating, privatizing or transferring its functions to other agencies, Harbor Safety Committee members and interested members of the public should continue to request federal and state funding for PORTS to insure system support after the demonstration period. The Committee urges that the OSPR Administrator support PORTS as a high priority and that OSPR continue to seek and allocate funds to maintain the system once it is installed. The Harbor Safety Committee recommends that the Marine Exchange of the San Francisco Bay Region be designated as the non-profit entity to operate, maintain and market the uses of the PORTS program following conclusion of the federal demonstration project. The Committee further requests that NOAA expedite the update of tide and current data using the latest technology available and publish the water level and current atlases to replace the tidal current charts recalled because of inaccuracies. (May 1999) The committee submits that this recommendation is still valid.

**STATUS.** The Physical Oceanographic Real-Time System continues to be of great benefit to recreational boaters, commercial shippers, vessel masters and pilots in providing accurate knowledge of winds, currents and other environmental parameters used by the San Francisco maritime community.

The P.O.R.T.S. information hub, called the InfoHub, was installed in April 1997 and provides many value-added, user-friendly website screens that display the P.O.R.T.S. data in various modes and scales. Data to the information hub is first quality-controlled at the Data Acquisition System (DAS) located in Vallejo.

The data is the quality-controlled automatically and in much greater detail on a 24-hour/7-day per week basis under a program called the Continuous Operating Real-Time Monitoring System or CORMS. CORMS employs knowledgeable oceanographers at NOAA's National Ocean Service headquarters in Silver Spring, Maryland that monitor data quality and sensor performance using data quality control tests and remote sensor and DAS diagnostics. Bad data is not posted but is replaced by the most current correct value.

Management of the P.O.R.T.S., including administrative, field maintenance and repair and the information hub was handed over to the Marine Exchange of the San Francisco Bay Region, located at Lower Fort Mason Center in San Francisco. The PORTS Advisory Committee has made a recommendation to request general state funding to continue operating the system.

Access to PORTS information may be obtained by logging onto the website at <http://www.sfmex.org>. The same information may be obtained by contacting the voice response number (707) 642-4337.

## **SPEED OF VESSELS**

The San Francisco region is well known for occurrences of dense fog. San Francisco had an average of 60 to 70 foggy days per year when visibility was less than one half mile. Of the major ports in the United States, the Bay has the highest number of foggy days. In contrast, San Diego Harbor experiences fog an average of 24 days a year. In addition to hazards created by weather, tide and current, and depth conditions, vessels must transit under a number of major bridges. In the Central Bay, where vessel traffic is heaviest, vessels must make abrupt movements to navigate around Alcatraz Island or transit under the Bay Bridge to the Port of Oakland.

The Coast Guard Marine Safety Office San Francisco Bay proposed that maximum speed limits be set for vessels in the Bay to improve safe navigation. The Vessel Traffic Service (VTS), in a two-week survey in 1993, noted three large commercial vessels traveling at speeds between 18 to 20 knots within the Central Bay, which was considered excessive, taking into consideration the narrow confines of the shipping lanes, the distance required for large vessels to stop, the many hazards and the number of other vessels generally present such as commercial ships, ferries, recreational boaters, tugs, etc. In May 1993, VTS tracked the speed of 206 vessels inbound and outbound within the Central Bay, which included tankers, ships and tugs with tow. From this sample, it was concluded that the vast majority of vessels were traveling 15 knots or less.

The Captain of the Port approached the Harbor Safety Committee and requested that the Committee formally comment. After a number of public meetings, the Committee agreed that maximum speed limits should be established for the main ship channels based on the operating characteristics of ships transiting in the Bay. For example, industry related that lower speeds, such as a 12 knot limit, would unnecessarily restrict the maneuverability of some ships in swift currents. Also certain ships can operate only in ranges of full speed and ahead half which may not coincide with an upper speed limit. Taking this information into consideration, the Harbor Safety Committee endorsed the 15 knot speed limit. In addition, the committee recommended that all vessels be in a response mode that would not delay an immediate reaction to an engine order. It was agreed the speed proposed was the maximum speed of an independently operated vessel. Vessels required to be escorted would still be governed by the speed at which assistance could be rendered as outlined in the tug escort regulations.

### **Recommendations**

**II.2. Maximum Speed.** For the San Francisco main ship channels from the COLREGS Demarcation Line to and between the southern tip of Bay Farm Island and the Union Pacific Railroad Bridge:

- 1) The maximum speed for all power driven vessels of 1,600 or more gross tons shall not exceed 15 knots through the water from the COLREGS Demarcation Line to and between the southern tip of Bay Farm Island and Union Pacific Railroad Bridge.
- 2) Power driven vessels of 1,600 or more gross tons shall in any case have their engines ready for immediate maneuver and shall not operate in control modes or with fuels that prevent an immediate response to any engine order ahead or astern or preclude stopping their engines for an extended period of time.

**STATUS.** Federal regulation 33 CFR Parts 162 and 165 became effective May 3, 1995, limiting vessel speed to 15 knots for power driven vessels of 1,600 or more gross tons within the main ship channels (Regulated Navigation Areas) of San Francisco Bay. This also applies to a tug with a tow of 1,600 or more gross tons. The regulation implements the Harbor Safety Committee recommendation of setting a maximum speed limit on vessels to improve safe navigation within the congested areas of the Bay where the ability of a vessel to maneuver in the event of an emergency is severely constrained. No further action is necessary.

### III. AIDS TO NAVIGATION

The waters of the San Francisco Bay Area are marked to assist navigation by the US Aids to Navigation System. This system encompassed buoys and beacons conforming to the International Association of Lighthouse Authorities. The US Aids to Navigation System is intended for use with nautical charts. The exact meaning of a particular aid to navigation may not be clear to an individual unless the appropriate nautical chart is consulted. Additional important information supplementing that shown on charts is contained in the *Light List*, *Coast Pilot* and *Sailing Directions*.

In 1992, the Coast Guard, working with the Harbor Safety Committee, thoroughly reviewed the layout and marking of the main ship channels. This review, known as the Waterway Analysis and Management System Study (WAMS), was conducted under the auspices of the Marine Safety Office and involved pilots and industry representatives. As a result of this review, the layout of the main ship channels was significantly changed by the substitution of precautionary areas for the pre-existing two-way Traffic Separation Scheme (TSS) in many parts of the Bay. The traffic routing scheme was originally established in 1972. The revised routing scheme reflects current traffic patterns and corrects the problems of contrary vessel movements noted in the Harbor Safety Plan.

The revised traffic routing scheme established a deep-water traffic lane, a precautionary area between the main ship channel traffic lanes and the deep water, and Central Bay traffic lanes, and expanded the Central Bay precautionary area. The northern traffic lanes are redesigned (narrow) channels and the separation zones in the channel deleted. The Coast Guard established Regulated Navigation Areas for the San Francisco Bay, and the ship channels of Oakland Harbor, Richmond Harbor/Southampton Shoal Channel, North Ship Channel, San Pablo Straight Channel, Pinole Shoal Channel and the channel under the Union Pacific Railroad Bridge in the Carquinez Strait.

Major hazards to navigation in the Bay as previously described in the plan are bridges and rocks, both above and below the water. There are twelve racons on bridges in the Bay Region. This is of major importance because racons are invaluable for precise radar navigation particularly in fog, which is common to the Bay. Racons appear on radar screens as large coded signals extending in an arc behind the racon position. When placed on the center span of bridges, the mariner can align the ship directly under the center of the span, even in limited visibility. The Harbor Safety Committee emphasized the importance of racons on bridges (See Chapter IX, *Bridges*, for recommendations on racons).

A light marks most of the rocks in the Bay. A lighted buoy and a racon mark Harding Rock, a submerged rock near a main shipping area off of Alcatraz Island. Harding Rock is the submerged rock nearest the deep-draft shipping lane to the west of Alcatraz Island. Arch and Shag Rocks, which are submerged near Harding Rock, are unmarked. The Coast Guard determined that it was not necessary to mark these rocks as they are well outside of the shipping channel. In 1987, a container ship sustained extensive damage to its hull by passing over Arch Rock. In September 1996, the Coast Guard established the San Francisco Bay North Channel Lighted Buoy 1 in position 37-49.9N, 122-24.5W to mark the shoal east of Alcatraz Island for deep-draft vessel traffic. (Reference Local Notice to Mariners #38/96). Southern Channel rebouyed to better mark deep-water channel for laden tankers 12/00.

As a result of the tragic accident on Big Bayou Canot in the southern United States where a barge caused a railroad bridge to collapse, the Federal Department of Transportation directed the Coast Guard to inspect bridge navigation lights and fendering systems on all bridges that commercial vessels can reach. In the San Francisco Bay/Delta, 106 bridges were inspected. Almost two-thirds had some discrepancy, primarily minor navigation light outages. Almost all discrepancies have been corrected.

## IV. ANCHORAGES

Because of the extent of the Bay, a number of federally designated anchorages have been established in the San Francisco, San Pablo, and Suisun Bays and the San Joaquin and Sacramento Rivers. The *Coast Pilot*, lists the area's anchorages and limitations.

Within the Anchorage 9 area, lightering of tankers and bunkering of vessels occurs.

Because of the number of active military bases that were situated around the Bay, the Coast Guard established several explosive anchorages, primarily within Anchorages 5 and 9 (see Map 1). Explosive Anchorage 14, within General Anchorage 9, was realigned in 1997 to provide deeper water for vessels with drafts of 38 feet or greater, laden with explosives, to safely anchor. This also minimized potential overcrowding of vessels anchored within General Anchorage 9. The anchorages are used at specified times for ammunition ships, such as during the recent Persian Gulf War. Notice of activation of an explosive anchorage is made in the Coast Guard Notice to Mariners to advise vessels not to anchor within the area while vessels are loaded with, loading or unloading explosives.

### **Recommendation**

**IV.1.** Adopt pre-designated anchorage areas within the existing general anchorages throughout the VTS-SF area and in particular within general anchorage No. 9 so that safer and more disciplined anchoring practices may be managed by VTS-SF with due consideration for pilot and vessel master concerns.

**STATUS.** Anchorage No. 9 has been divided in two areas: the western side has been designated for deep draft vessels and the eastern side for lighter draft vessels. In addition, current instructions require that vessels not anchor closer than 750 yards from one another. In response to users' requests, VTS-San Francisco issued revised instructions to increase the distance between vessels at anchor to about 1,000 yards as general practice, but in no case less than 750 yards. This safe distance would also be maintained by vessels transiting through, or close by, anchorage No. 9.

No further action is necessary.

## V. HARBOR DEPTHS, CHANNEL DESIGN, AND DREDGING

San Francisco Bay is one of the world's greatest natural harbors. The tributary of rivers and streams that empties into San Francisco Bay carry large quantities of silt into the harbors and shipping channels of the Bay. Therefore, channel depths must be regularly maintained and shoaling must be prevented in order to accommodate deeper draft vessels. Maintenance dredging accounts for approximately 5,000,000 cubic yards of sediments dredged from the San Francisco Bay, Sacramento and San Joaquin ship channels. Beginning in 1868, Congress passed the River and Harbor Act and the federal government began dredging a channel to create a main ship channel in the approaches to San Francisco Bay. Actual channel depths may vary from project depths and must be checked with the most recent hydrographic surveys. Presently the project depth of the main ship channel from the Pacific Ocean into the Bay is 55 feet deep and 2,000 feet wide (U.S. Army Corps of Engineers, 1991). However, continual sedimentation flowing out of the river systems into the ocean reduces the main channel from its authorized depths. According to the U.S. Army Corps of Engineers, there are no current plans to change the entrance channel's authorized width or depth within the next decade. The depth of the main channel limits the draft of vessels able to enter the Bay.

During the past century the federal government deepened a number of shipping channels, removed various shoals, and reduced rocks near Alcatraz Island. Present channels leading to the various Bay Area ports are at project depths ranging from 35 feet MLLW to 45 feet MLLW.

To the north, navigation channels in San Pablo Bay and Mare Island Strait have been improved by the federal government beginning in 1902 (U.S. Army Corps of Engineers, 1991). A 600-foot wide, 11-mile long channel, with an authorized project depth of 35 feet, extends through San Pablo Bay to Carquinez Strait. The Suisun Bay Channel in the Carquinez Strait has a project depth from 30 to 35 feet. To the east the Suisun Bay Channel is 35 feet deep to the mouth of the New York Slough.

Deep draft vessels in the Bay must carefully navigate many of the main shipping channels because channel depths in some areas are just sufficient for navigation by some of the modern larger vessels, depending upon how deeply laden the vessel is. Groundings have been reported mostly in the Sacramento and San Joaquin River Channels and near the Southampton Shoals. Due to the narrow width of most channels, groundings cause serious delays to vessels requiring transit through the blocked channel or shoaled area. In addition, groundings can damage vessels and may lead to associated risks, such as flooding and oil spills. There are submerged rock outcroppings in the Bay where groundings might split open the hull of a ship. More importantly, the maneuvering of deep draft ships in channels with marginal depths may pose higher navigational risks, given the complexities of tides, currents, and weather conditions in the Bay.

**Surveys.** Specific areas with high interest levels are surveyed on a frequent basis. Even charts based on modern surveys may not show all seabed obstructions or shallow areas due to mobile bottoms (localized shoaling). The variable hydrodynamics of the Bay estuary reflect a variety of factors such as drought and flood cycles, dredging projects, and in Bay dredge disposal that may affect navigation channels. It is possible that strong seismic events may result in changed geomorphology within the Bay due to liquefaction and lateral spread. Recent observations have indicated that manmade channels may be influencing tidal currents to a greater degree than anticipated with consequent effect on sediment accretion. There are additional indications that not as much dredged material deposited in the Alcatraz dump site may be making its way to sea as estimated, causing alterations in the bottom topography and silt recirculation in the north and middle San Francisco Bay regions. (It is thought that a recent shoal near the navigation channel east of Alcatraz Island may be caused by the migration of dredge material initially deposited at the Alcatraz dumpsite, which is southwest of the island.) *What is the basis for this last statement? Depths of 42-50 ft in the area bounded by Alcatraz Island, Blossom Rock, Pt Blunt (Angel Island) and the shoal north of Yerba Buena Island (Treasure Island) appear in the 1859 survey of the Bay by CPT W.R Palmer, Coast Survey Office.*

**Navigational Issues Associated with Channel Design and Dredging.** Harding, Shag, and Arch rocks are large submerged rocks located approximately one to one and a quarter nautical miles northwest of Alcatraz Island. The tops of the rocks are 36, 37, and 33 feet respectively below the surface of the water at Mean Lower Low Tide (MLLW). The submerged rocks are within the outbound navigation lane of the shipping channel that passes north of Alcatraz Island that is designated one way for vessels going out to sea. Inbound vessels sail south of Alcatraz Island. However, ships with a draft of more than 38 feet sail north of Alcatraz in the outbound navigation lane in order to maintain safe depths in the deeper waters within this area. Blossom Rock is located approximately 1 nautical mile to the southeast of Alcatraz Island, posing a potential hazard to navigation for deep draft vessels transiting Central San Francisco Bay and South of the San Francisco/Oakland Bay Bridge. The top of Blossom Rock is 40 feet below the surface of the water at MLLW. Harding, Arch, Shag and Blossom Rocks were lowered some decades ago for the shipping lanes, but today's large tankers and container ships have deeper drafts and now must avoid the submerged rocks. Lowering the rocks to accommodate the most modern ships would help create sufficient depths for a new two-way navigation lane north of Alcatraz Island, as well as provide a greater margin of safety for vessels transiting the area between Alcatraz and Treasure Islands.

In addition to the problem of insufficient channel depths near the submerged rocks off Alcatraz Island, channel depths in an area south of the Richmond–San Rafael Bridge pose a hazard to navigation. The West Richmond Channel is a segment of the Baldwin Ship Channel located a few miles south of the Richmond–San Rafael Bridge where ships maneuver to transit under the bridge, sailing north principally to the refineries along the Contra Coastal and Solano County shorelines. The concern is to have sufficient channel width to line up a vessel to clear the supports of the Richmond–San Rafael Bridge. If the “dog leg” were dredged at this time to 35 feet, the Corps of Engineers estimates that minimal dredging would be involved, as much of the area in question is now at that depth.

The frequent shoaling and silting in the channels of the San Francisco Bay and its tributaries require channel surveys to be conducted on a routine basis. These surveys, combined with regularly scheduled dredging of major ship channels, will provide better information on actual channel depths, maintain project depth and reduce the risk of vessel groundings. Emergency surveys should be conducted when there is evidence that shoaling has occurred. Emergency dredging should be conducted as appropriate when shoaling is discovered.

## **Recommendations**

**V.1. Operators Surveys.** The Committee concurs with the U.S. Coast Guard that, in addition to the NOAA surveys, facility owners/operators should conduct annual condition surveys noting depths alongside and at the head of their facilities. These surveys should be conducted in accordance with standards set by NOAA and finalized at the end of the year for chart and publication updates. Additional information by NOAA should reflect local pilotage issues such as currents, tidal ranges, depth of water needed to safely navigate to and alongside facilities and piers, unique meteorological conditions and aids to navigation maintained by the facility. The most updated information should be published in the *Coast Pilot* to reflect changed conditions, particularly relating to hazards to navigation.

**STATUS.** No further action is necessary.

**V.2. Surveys.** The Committee recommends immediate surveys by the Corps of Engineers for Corps-maintained deep-water navigation channels and by NOAA for all other channels used by deep draft vessels or oil barge traffic that have not been formally surveyed within the last five years. Heavily traveled navigation lanes should be designated by the Corps of Engineers (COE) as project areas in order to ensure frequent, up-to-date surveys of channel depths. Of highest priority are those areas where known shoaling has taken place and where changes in bottom contours have been reported to differ by more than two feet from NOAA charts. Such areas would include shoaling areas east of Alcatraz and west of the Oakland Harbor. The Committee urges that NOAA permanently assign a field survey schedule of areas identified by pilots as subject to shoaling.

**V.3. Charts.** The Committee further recommends that NOAA update its charts in a timely fashion to reflect survey information from NOAA, COE and independent sources. When surveyed channel depths vary more than one foot from a NOAA chart, such information should be provided to VTS (Coast Guard), masters and pilots of deep-draft vessels as soon as available. NOAA should improve the frequency of published data on channel depths in areas heavily trafficked by oil tankers and barges. NOAA should devise a system to quickly alert VTS, masters and pilots.

**STATUS OF SURVEYS AND CHARTS.** Charts 18645, 18649, 18650, 18653, 18654, 18655 and 18657 have been designated for priority maintenance by NOAA in 1997 (Figure 1). These charts were placed on an accelerated updating and publication schedule (every 6 to 12 months) at that time. See Figure 1 for a schedule of the updated editions.

### San Francisco Bay NOAA Nautical Charts

Figure 1.

|    | chart number | chart edition | chart date | date next edition | chart scale | chart title                               |
|----|--------------|---------------|------------|-------------------|-------------|---|
| 1  | 18640        | 23            | 22-Mar-97  | ***               | 1:207,840   | San Francisco to Point Arena              |
| 2  | 18645        | 23            | 26-Apr-97  | ***               | 1:100,000   | Gulf of the Farallones                    |
| 3  | 18649        | 59            | 26-Apr-97  | 1-Dec-99          | 1:40,000    | Entrance to San Francisco Bay             |
| 4  | 18650        | 47            | 5-Apr-97   | 1-Jun-00          | 1:20,000    | S.F. Bay: Candlestick Pt. to Angel Island |
| 5  | 18651        | 40            | 29-Jul-95  | ***               | 1:40,000    | S.F. Bay: Southern Part                   |
| 6  | 18652        | 29            | 16-Aug-97  | 1-Apr-00          | 1:80,000    | Small Craft Chart: S.F. Bay to Antioch    |
| 7  | 18653        | 8             | 17-Jul-99  | ***               | 1:20,000    | S.F. Bay: Angel Island to Pt. San Pedro   |
| 8  | 18654        | 39            | 28-Sep-96  | 1-Nov-99          | 1:40,000    | San Pablo Bay                             |
| 9  | 18655        | 55            | 26-Oct-96  | 1-Jul-00          | 1:10,000    | Mare Island Strait                        |
| 10 | 18656        | 50            | 8-Aug-92   | ***               | 1:40,000    | Suisun Bay                                |
| 11 | 18657        | 17            | 3-Jul-99   | ***               | 1:10,000    | Carquinez Strait                          |
| 12 | 18658        | 29            | 13-Mar-99  | ***               | 1:10,000    | Suisun Bay: Roe Island and Vicinity       |
| 13 | 18659        | 12            | 3-Feb-96   | 1-Oct-99          | 1:10,000    | Suisun Bay: Mallard Island to Antioch     |
| 14 | 18660        | 1             | 25-Sept-99 | ***               | 1:40,000    | San Joaquin River, Antioch to Medford I   |
| 15 | 18661        | 24            | 17-Jan-98  | 1-Oct-99          | 1:40,000    | Sacramento and San Joaquin Rivers         |

|    |       |    |           |          |           |                             |
|----|-------|----|-----------|----------|-----------|-----------------------------|
| 16 | 18662 | 18 | 23-May-92 | 1-Nov-99 | 1:40,000  | Sacramento River            |
| 17 | 18663 | 3  | 25-Jul-92 | 1-Oct-99 | 1:20,000  | Stockton Deep Water Channel |
| 18 | 18664 | 11 | 4-Jul-92  | 1-Apr-00 | 1:20,000  | Sacramento to Colusa        |
| 19 | 18680 | 28 | 5-Jul-97  | 1-Jun-00 | 1:210,668 | Point Sur to San Francisco  |

\*\*\* Not in the FY2000 chart plan. The FY2000 chart production plan calls for printing 222 new editions.

NOAA's Office of Coast Survey (CS) has designed this chart maintenance plan to provide support for the nation's largest commercial ports and trade routes. Selection of these ports and routes is based upon the tonnage and value of goods moving through them. NOAA's increased budget will permit the compilation, printing and distribution of 360 new editions in Fiscal Year 1998 and 360 new editions in Fiscal Year 1999. Annual production of 400 new editions is necessary to maintain NOAA's entire national suite of nautical charts in a state of currency. Under previous manual chart compilation methods, a typical chart was compiled in about 30 weeks. Automation has reduced this time requirement to around 8 weeks per chart.

Raster Chart Products: NOAA has been active in developing electronic charts products. NOAA's entire suite of 1,000 nautical charts are available in raster format from nautical chart agents. Over 1.2 million electronic charts have been sold since their release in 1996. There are 75 software developers that have produced 25 different navigational software applications utilizing these raster chart images.

Print-on-Demand Charts (POD): POD charts are just around the corner pending the establishment of regional printing locations for the first phase of the project. The POD allows CS to update charts immediately and electronically transmit the updated information to users. A means to update raster charts by the user is still in the works. The user will be able to download Notice to Mariner corrections and other chart corrections from the internet website or bulletin board that can be merged with the existing file (on CD-ROM or other media) using a "raster-differencing" application that in essence performs a pixel-by-pixel comparison between the existing chart and corrections to produce an updated chart version. Beta testing of this experimental process is still in progress.

Vector-Based Charts: NOAA is building a data base to produce an accurate and detailed vector electronic navigational chart (ENC) for major U.S. ports and shipping lanes. The vector charts will include "active" information on navigationally significant features such as aids to navigation, bridges, anchorages, obstructions, wrecks, rocks, cables, traffic separation schemes, pipelines, platforms, cautionary and dredged areas. NOAA has created a prototype vector-based chart for the area of Sault Ste. Marie, in the Great Lakes and is working on the areas of the Mississippi River.

CS plans to complete the data collection process for major U.S. ports and shipping lanes by the end of 1998. Plans are still in the works for producing several ENC's in San Francisco Bay.

Hydrographic Surveys: NOAA began contract hydrographic surveys in the Bay in April 1999. The areas to be surveyed include three areas in Carquinez Strait, the south bay--Anchorage 9 and a re-survey of the areas shoaling northeast of Alcatraz Island. Survey priorities are typically identified through the HSC Navigation Work Group.

**V.4. Underwater Rocks.** Establish a new two-way Traffic Separation Scheme north of Alcatraz to allow safer navigation of deeply laden tankers and container ships. Several areas, such as Harding, Arch, Shag and Blossom Rocks, should be reduced to a minimum of 55 feet depth MLLW.

The Harbor Safety Committee requests the U.S. Army Corps of Engineers to:

Complete the ongoing Feasibility Study associated with the Federally authorized San Francisco Central Bay Rock Removal Project.

- Further refine the Initial Cost Estimates for the Removal of Harding, Arch, Shag, and Blossom Rocks, an Unnamed Rock and Alcatraz Shoal;
- Re-examine East Alcatraz Shoal;
- Evaluate the forty-foot shoal south of the Bay Bridge; and
- Survey the position of two charted wrecks one located near Blossom Rock and the other near the Bay Bridge.

In order to provide funds to match federal funds for lowering the rocks off Alcatraz Island, the Harbor Safety Committee supports a state appropriation as the local match as this project would reduce the risk of oil spills in the Bay which is of substantial benefit to the general public and to the environment.

- **BACKGROUND:** In 1992, the Harbor Safety Committee recommended that the submerged rocks off Alcatraz Island should be lowered to a minimum of 55 feet MLLW to reduce the risk of a major oil spill from tankers. At the request of the Committee and the Coast Guard, the U.S. Army Corps of Engineers undertook an initial study of the feasibility of lowering the rocks. The report, entitled *Rock Removal Interim Report, Initial Appraisal, April, 1994* analyzed the economic feasibility, the operational considerations, and the probable environmental impacts which might result from the lowering of the rocks to -55 feet MLLW. The Corps report focused on the lowering of Harding, Shag, Arch, and Blossom Rocks, an unnamed rock west of Arch Rock and a portion of Alcatraz Shoal, which were identified as major hazards to navigation, especially to deep draft oil tankers. Approximately 20% of the inbound tankers have drafts in excess of 38 feet. Harding, Arch, Shag and Blossom Rocks rise to within approximately 35-40 feet of the surface of the water. However, the Harbor Safety Committee decided to pursue the matter further because the rocks are dangerously close to the narrow routes traveled by the deepest draft tankers and ships (See Appendices for the location and isometric profile of the rocks). If a loader tanker became disabled close to the underwater rocks, a tug escort may be ineffective in keeping the vessel off the rocks. An Underwater Rocks Work Group was appointed by the chair of the Harbor Safety Committee consisting of representatives of the Coast Guard Marine Safety Office, San Francisco Bar Pilots, Vessel Traffic Service (VTS), State Lands Commission, Port of Oakland, U.S. Army Corps of Engineers, and the San Francisco Bay Conservation and Development Commission (BCDC). The group's goal is to identify navigational safety and environmental issues, costs, construction alternatives, funding sources and possibly recommending a prioritized list of lowering the rocks according to risk and benefit. In October 1996, an oil spill occurred in Central San Francisco Bay from a ship in dry dock at Pier 70, San Francisco. Over 8,000 gallons of oil spilled and spread by a winter storm, fouled marinas, piers, and beaches, mainly along the San Francisco waterfront. The spill killed or injured scores of water birds in the Central Bay. Known as the Cape Mohican Spill, clean-up over a two-month period cost \$10 million - for a relatively minor amount of oil on the water. The spill, visible to many thousands of people around the Bay and widely publicized in the media, led to renewed public interest in preventing vessel accidents that might cause spills in the Bay. The hazardous underwater rocks off of Alcatraz Island were compared to the rocks in Prince William Sound, which ruptured the tanker EXXON VALDEZ, with well-known, catastrophic results to the environment. As a result of this focus, in late February 1997, Congressman George Miller from Contra Costa County proposed federal legislation to lower the rocks to 55 feet below the low tide mark. Miller's legislation, called the San Francisco Bay Shipping and Fisheries Enhancement Act, or BaySAFE, is based on initial studies by the US Army Corps of Engineers, the US Coast Guard, and the Underwater Rocks Work Group report on navigation safety issues. The bill (HR 882) authorizes 100% federal funding for a Corps of Engineers' \$100,000 reconnaissance study of the rocks; a \$2-3 million feasibility engineering study; and \$28 million for construction and mitigation that is also dependent upon local matching funds. A Feasibility Cost Sharing Agreement between the Corps and the California State Lands Commission was signed in March 2000. The State of California has provided matching funds through the State Lands Commission. Federal funds have been allocated for the feasibility study for the project. The results of the Feasibility Study will be a

report documenting existing conditions, risks and benefits, alternatives, environmental impacts, potential mitigation, costs, recommendations for further planning, engineering, design and real estate activities. The Feasibility Report is required to provide a basis for a decision on Federal participation in the construction of the Project. An Environmental Impact Statement/Report and Design Memorandum will be prepared as a part of the Study.

**STATUS. The Corps of Engineers is in the process of conducting the Feasibility Study associated with the Federally authorized San Francisco Central Bay Rock Removal Project. The purpose of the project is to take actions to prevent groundings on the rock mounds in Central San Francisco Bay near the existing deep-draft channels. The prevention of groundings could significantly reduce the risk of oil and fuel spills from occurring in the Central Bay. These actions would further serve to improve navigational safety and reduce significant environmental and economic damages within all of San Francisco Bay. The Feasibility Study will include ongoing and completed technical investigations, environmental documentation, alternative analysis, potential mitigation measures, costs, and economic analysis. The feasibility study is currently scheduled to be completed during the summer of 2003. Re-examine East Alcatraz Shoal. The Corps of Engineers has agreed to evaluate the forty-foot shoal south of the Bay Bridge under the authority of San Francisco Harbor maintenance dredging. NOAA will continue to survey the position of two charted wrecks one located near Blossom Rock and the other near the Bay Bridge.**

**V.5. Dredge Dog Leg at Buoy “C”.** Eliminate the dogleg at buoy “C” of the San Rafael main ship channel in order to maintain proper two-way traffic separation. The Traffic Separation Scheme should be re-routed eastward after due dredging of the western side of Anchorage Area No. 5. This recommendation, along with all others in this Plan, should be the subject of a complete environmental analysis and examination of alternatives before implementation.

**STATUS.** In 1993, the Harbor Safety Committee deleted the recommendation to dredge the dog leg at buoy “C” of the San Rafael main ship channel, but retained the statement that: “This recommendation, along with all others in this Plan, should be the subject of a complete environmental analysis and examination of alternatives before implementation.”

The Coast Guard has eliminated traffic lanes. Re-analysis of this recommendation indicates there is no substantial danger to vessels in retaining the dogleg configuration. Pilots must make passing arrangements in order to use the deep-draft portion of the channel. The Corps of Engineers concluded that the bend serves to direct vessels away from the Tiburon Peninsula, reducing the danger of grounding and increasing the maneuvering room for multiple vessel movements.

## VI. CONTINGENCY ROUTING

The high concentration of ship transits plus the concentration of population and facilities around the Bay requires many dredging and construction projects to occur on a frequent basis. The committee reviewed current procedures for routing vessel traffic during construction and dredging operations.

A number of activities on the Bay may impact the routing of vessels, namely dredging and construction. Dredging of the shipping lanes is essential for safe navigation to the ports and marine terminals because so much of the Bay is shallow and subject sedimentation. Therefore, maintenance dredging occurs on an ongoing basis. In addition, major projects to deepen the Baldwin Ship Channel and various ports have taken place to accommodate the modern deep-draft vessels. Six major bridges span Bay shipping lanes. Ongoing maintenance of bridge fenders occurs. Projects are proposed to strengthen the supports of several bridges for seismic safety. Within the next ten years, CalTrans proposes to construct a new parallel bridge between Benicia and Martinez spanning the Carquinez Strait shipping channel, a new Carquinez Bridge, and a new parallel Bay Bridge span is proposed. Maintenance work and new work on the bridges may impact navigation lanes.

Typically, the construction process proceeds as follows:

- During early planning stages of a project that might impact the navigation of vessels, the project proponent consults with affected pilot organizations, the US Coast Guard, affected port authorities, and appropriate agencies to assure that consideration is given to the safety of navigation and temporary or permanent restrictions that may impact the movement of vessels.
- During the construction planning stages of channel dredging projects and construction projects that may impact the navigation of vessels, representatives from the affected pilot organizations, the US Coast Guard, and affected port authorities attend pre-construction conferences to ensure that procedures and communications with vessels and pilots as well as any restrictions proposed to be placed on the movement of vessels.
- During construction or dredging projects that may impact safety of navigation of vessels, representatives of affected pilot organizations, the US Coast Guard and the affected port authorities attend weekly progress meetings to ensure that up-to-date information is available to vessels and pilots. Frequent meetings enable the close coordination, which is sometimes required to allow the project to proceed smoothly without adversely affecting the safe movement of vessels.

The Captain of the Port has authority under the Ports and Waterways Safety Act to direct vessel movement in case of emergency to ensure the safety of the Port and navigation. The Captain is empowered to create safety zones and to exclude vessel traffic in the event of an oil spill or other disaster or emergency.

## **Recommendation**

**VI.1 Contingency Routing.** The high degree of cooperation and consultation between pilot organizations, the US Coast Guard, port authorities and appropriate agencies and contractors should continue from the project planning stage through the construction stage of projects that may impact safe navigation in the Bay. The planning stage should include an evaluation of various alternatives to ensure harbor safety.

**STATUS.** In order to reduce chances of accidents and catastrophes occurring during construction of harbor, dredging and waterway modification projects, the long-standing permitting procedures of the San Francisco Bay Conservation and Development Commission, the U. S. Army Corps of Engineers, the U. S. Environmental Protection Agency, and the San Francisco Bay Regional water Quality Control Board should be specifically referenced as mandates. Contractors should be responsible for informing the US Coast Guard in advance of their planned and actual construction so that the Coast Guard may advise and establish Safety Zones and/or provide cautionary notices and/or rerouting orders to mariners. A Safety Zone is a directive concerning a water area, a shoreline area, or a combination thereof to limit access to authorized vessels. The Captain of the Port is authorized to establish temporary safety zones. Planning for alternate contingency routing during a construction project is not the responsibility of the Harbor Safety Committee.

Project planning and engineering are underway for seismic retrofitting of various major bridges in San Francisco Bay. Consistent with this recommendation, close coordination has occurred between the Coast Guard, CalTrans, project contractors, the San Francisco Bar Pilots, and representatives of the Harbor Safety Committee to ensure safety of navigation.

Seismic retrofit work is occurring, or will soon occur, at almost all major highway bridges. The activities will affect mariners on a daily basis for several years. The Coast Guard, with input from the Harbor Safety committee, has worked with the bridge owners and contractors to develop guidelines for construction activity on those bridges. The Coast Guard Marine Safety Office will review the plans for mooring construction equipment at bridge sites to ensure a safe path for navigation. The Coast Guard Vessel Traffic Service will be in communication with contractors so they can pass information about the location of construction equipment or other restrictions on vessel movements.

The Eleventh Coast Guard District, Bridge Section will provide information about bridge activities via telephone, letter, Local Notice to Mariners and Broadcast Notice to Mariners as appropriate. Significant bridge projects presently underway in the Bay Area are as follows:

- The San Francisco-Oakland Bay Bridge, seismic retrofit is in progress west of TI/YBI with few impacts to navigation. Bridge pier fender repairs are in progress east of TI/ YBI, also with few impacts to navigation. The proposed replacement of the east section of the bridge is anticipated within the next several years. A Coast Guard Public Notice is expected to be circulated during 2001, when CalTrans submits their official bridge permit application. A construction plan will be required for coordination of navigational issues, before bridge construction may begin. The reasonable needs of navigation will be met during the work. Updates will continue via the Local Notice to Mariners and Broadcast Notice to Mariners.
- The San Mateo-Hayward Bridge, seismic retrofit has been completed on the navigational channel span. Additional highway deck widening is in progress along the north side of the bridge, east of the navigational channel span. Expected completion date is 2002. Updates will continue via the Local Notice to Mariners.
- The Richmond-San Rafael Bridge seismic retrofit has begun with core drilling, dredging and additional sub-structure work both in and out of the navigational channel spans. Proposals are expected for installation of floating equipment, scaffolding and containment in both navigational channel spans (not simultaneously), between 2001 and 2004. A construction plan will be required for coordination of navigational issues, before the work may begin. The reasonable needs of navigation will be met during the work. Updates will continue via the Local Notice to Mariners and Broadcast Notice to Mariners.
- The Carquinez Bridge replacement and seismic retrofit project has begun. North and south side channel piers for the replacement bridge are under construction. Scaffolding for retrofit work, installed on existing bridge, is moved when requested for passage of vessels. A superstructure construction plan for the replacement bridge will be required for coordination of navigational issues, before the work may begin. It is anticipated that brief periods of channel closures will be requested to allow pulling cables between the newly constructed bridge piers. Demolition of the existing (downstream), bridge will also require advance planning and coordination, prior to Coast Guard approval. Brief channel closures should also be expected during the demolition. The reasonable needs of navigation will be met during the work. Updates will continue via the Local Notice to Mariners and Broadcast Notice to Mariners.
- The Benicia-Martinez bridge seismic retrofit is in progress. Navigational impacts have been minimal. Updates will continue via the Local Notice to Mariners and Broadcast Notice to Mariners.
- The proposed new Benicia-Martinez Bridge has been announced in the Coast Guard Local Notice to Mariners No. 15 of 2001, and Coast Guard Public Notice No. 85d. Issues concerning navigational clearances provided by the bridge and access to the MARAD fleeting area upstream of the bridge have been addressed. When permitted, a construction plan will be required for coordination of navigational issues, before the work may begin. The reasonable needs of navigation will be met during the work. Updates will continue via the Local Notice to Mariners and Broadcast Notice to Mariners.
- The Rio Vista drawbridge seismic retrofit is in progress and nearing completion. Several essential night-time closure periods were coordinated with navigation and completed without significant negative impacts. Updates will continue via the Local Notice to Mariners and Broadcast Notice to Mariners.

General information excerpts from the Monthly Local Notice to Mariners:

**GENERAL - NORTHERN CALIFORNIA - REDUCED BRIDGE CLEARANCES DUE TO HIGH WATER.** Mariners are reminded that recent heavy rain and high flows may result in reduced vertical and horizontal navigational clearances through bridges. Flotsam and drift may be accumulating on bridge piers and abutments. Mariners should approach all bridges with caution and due consideration to existing navigational conditions. Notification of bridge-related discrepancies during normal working hours should be provided to the Eleventh Coast Guard District Bridge Section by telephone at (510) 437-3514. During non-working hours, nights, weekends, and holidays, notification should be provided to the cognizant Coast Guard Command duty watch stander via marine radio, or telephone, to ensure appropriate notices to mariners.

**GENERAL - STATEWIDE POWER ALERTS.** Mariners are notified that drawbridges, bridge communications, bridge navigational lighting, and bridge racons may experience random outages during California's "Stage 3" Power Alerts and "Rolling Blackouts." Some drawbridges may be secured in the closed-to-navigation position during impending power outages to prevent losing control of the draw span in mid-operation. When possible, advance notice of bridge outages will be provided via marine radio. Vessel operators should approach all bridges and bridge construction sites with caution and due consideration to existing power supply conditions.

**GENERAL - SAFETY AT BRIDGE CONSTRUCTION SITES.** Most bridges in the San Francisco Bay Area are undergoing seismic retrofit. Construction and retrofit activities at these bridges will involve the use of scaffolds, temporary trestles, and marine construction equipment. General information about construction activities will be provided in the weekly publication of this Local Notice to Mariners. Immediate information will be provided by Broadcast Notice to Mariners. On some projects, mariners may contact the bridge via marine radio Channel 13 in advance to determine conditions at the bridge, and if necessary, have scaffolding moved for safe passage of navigation. Commercial vessels are requested to provide VTS with "air draft," and their vertical clearance requirement to assist the bridges in anticipating the need for moving scaffolding. Mariners are advised to transit the work site with minimum wake to ensure safe working conditions at the bridge

The cooperation of the navigation community during essential bridge work is greatly appreciated.

## VII. VESSEL TRAFFIC PATTERNS

### Ship Traffic

A wide variety of commercial, military and government vessels enter, exit and transit the Bay. Many vessels such as barges and small tankers remain entirely within the Bay due to the shallow depth of much of the Bay and the distances between facilities. Full container ships, oil tankers and bulk carriers account for the greatest percentage of ship arrivals. Other categories of ships include vehicle carriers, break bulk, chemical tankers, and passenger ships. Occasionally, surface combatants, naval auxiliaries such as oil tankers, supply ships, and submarines make calls at this harbor. Government vessels include those of the United States Coast Guard, the Army Corps of Engineers, and NOAA.

The precise amount of oil shipped annually into and within the Bay is difficult to determine. Federal staff responsible for carrying out the Oil Pollution Act of 1990 has studied U. S. ports where high volumes of oil were moved. Based on an analysis of oil transits in United States ports during the past five years, San Francisco Bay ranked seventh in the volume of oil transported. In comparison, Los Angeles/Long Beach Harbor ranked fifth in the United States in this category. Another measurement of oil movement was a weighted index of oil volumes and vessel traffic. By this measurement, San Francisco Bay oil movements were the same as Valdez, Alaska which ranks third highest in the United States after New York and Houston/Galveston Harbors.

Due to the shallow depths of portions of the Bay near marine terminals along the Contra Costa and Solano County shorelines, a number of large oil tankers lighter oil to smaller ships. Lightering is the process of unloading oil from a larger ship into smaller vessels in order to reduce the draft of the larger vessel. The tanker can then proceed to the marine terminal and continue unloading the balance of its cargo. Lightering primarily takes place at Anchorage 9, just south of the Oakland-Bay Bridge. Lightering operations take place monthly at Anchorage 9, primarily by SeaRiver Maritime vessels. Companies such as SeaRiver Maritime are members of the Clean Bay Cooperative and arrange to have Clean Bay station a skimmer boat at Anchorage 9 during the lightering operation. Non-member companies general contract with Clean Bay to provide this stand-by service in order to provide immediate response in case of an oil spill.

For calendar year 2000, the Marine Exchange reported a total of 3,184 vessel arrivals in the Bay. This is 8 more arrivals than reported in 1999 and 218 more arrivals than reported for 1998. The total number of tanker arrivals in the Bay for 1999 was seven hundred and one (701), but decreased to six hundred and thirteen (613) in 2000. (See Appendix B for a summary of vessel traffic totals for 2000 and a list of all tanker arrivals as provided by the Clearinghouse). The number of inter-Bay shifts of tankers (incomplete)

### Government and Naval Transits for 2001

Naval vessel transits.....78

Public vessel transits.....2915

## **History and Types of All Accidents and Near Accidents**

**Accidents.** The Coast Guard compiles reports of marine accidents or reportable casualties of commercial, military, and recreational vessels. A “reportable casualty” is defined in Title 46, Part 4, Code of Federal Regulations as grounding, loss of primary steering or propulsion or associated control system, by which the seaworthiness of a vessel is adversely affected or fitness of service, loss of life, injury beyond first aid, and damages over \$25,000.

**Near-Accidents.** The Vessel Traffic Service (VTS), managed by the U. S. Coast Guard, summarizes near-accidents or close calls reported within the area covered by VTS. Possible near-accidents may not be reported outside VTS boundaries as well as accident occurrences within the VTS area. Incident reports are designed to include near-collisions, vessels impeding progress of other vessels, and violations of the rules of the road.

VTS personnel emphasize that categorizing an incident as a near-miss is a subjective determination based upon available information. (See Appendices for the current VTS Incident Report Summary).

## **Analysis and Actions Taken to Alleviate Re-Occurrences**

Major bridges span Bay ship channels, connecting various populated areas of the Bay. The bridges are important traffic connectors in which large vessels must carefully navigate underpilings.

With the exception of the Golden Gate Bridge, vessels have struck all major Bay bridges within the past ten years. The most serious recent accident relative to a potential major oil spill occurred in 1988 when a 57,692 ton oil tanker hit the Carquinez Bridge, creating a 200-foot-long split in the ship’s hull, exposing several oil tank compartments. However, because the tanker emptied its load of crude oil at a refinery along the Carquinez Strait a few hours earlier, a major oil spill did not occur. A representative of CalTrans stated that a radar beacon (racon) device was installed on the Carquinez Bridge after this accident occurred.

Previously, in 1971, two tankers collided in the main ship channel west of the Golden Gate Bridge, resulting in an oil spill. As a direct result of this accident, the Vessel Traffic Service (VTS) was established for the Bay. Up-to-date information on ship movements, weather and aids to navigation, etc. are reported; a traffic separation scheme was established. The VTS system is more fully described in a separate chapter.

The U. S. Coast Guard Marine Safety Office for the San Francisco Bay commented as follows on corrective actions taken by the Coast Guard in response to accidents and near-accidents:

“All marine casualties occurring in the subject area meeting those criteria set forth in Title 46, Code of Federal Regulations, Part 4 are assigned to an investigation by Investigating Officers located in the Investigations Department at the U. S. Coast Guard Marine Safety Office, San Francisco Bay, located in Alameda, CA. These investigations are conducted to obtain information surrounding the apparent cause of the casualty so that corrective action can be taken and subsequent casualties of the same nature can be avoided. Examples would include: the re-occurrence of equipment failure involving the same or similar equipment on various vessels; accidents involving similar human factors where fatigue is an issue necessitating additional crew members; multiple groundings or allisions in the same general area necessitating new, improved, or additional navigational aids. The severity of the casualty would delineate the level of investigation conducted.

Casualty investigations are also conducted to ascertain whether personnel misconduct, negligence or drug/alcohol use was a factor in the casualty. In such instances, a personnel investigation would be conducted with possible outcomes including: no action; verbal admonishment; written letter of warning; or suspension and revocation proceedings. Procedures such as these are administrative in nature and affect a person’s license or Merchant Mariner’s Document. Civil penalty procedures would be warranted in a situation where a law or regulation has been violated. Civil penalty procedures are the only actions appropriate against the following: foreign flag vessel; personnel aboard foreign flagged vessels licensed under the authority of another nation; federally licensed pilots operating aboard a foreign flagged vessel while under the authority of another nation; federally licensed pilots operating aboard a foreign flagged vessel while under the authority of a State Pilot’s license; and unlicensed U. S. citizens. If a violation were criminal in nature, such action would be reported to and pursued by the U. S. Attorney’s Office. Personnel Investigations are considered to be remedial in nature with behavior modification being the intended goal.”

In addition, The Coast Guard has taken the following actions to alleviate re-occurrences of vessel accidents and near-accidents.

- 1) The forwarding of information to the *Coast Pilot* on unique tidal and non-tidal currents and supporting the establishment of PORTS to ensure that the mariner is properly informed of updated information;
- 2) The planned revision of the Tidal Current Tables once accurate information is obtained; and
- 3) Ongoing dialog with the San Francisco Bar Pilot Association on subjects such as Rule 9 violations, drug and alcohol testing procedures, congestion points in the subject area and casualty reporting.

## **Recommendation**

**VII.1. Coast Guard/VTS Accident and Near-Accident Reporting System.** The Coast Guard and VTS should devise a more consistent system of reporting accidents and near-accidents, standardized with other areas. The Coast Guard should analyze both the annual reports on an annual basis and a report is made to OSPR with recommendations on the effectiveness of navigational safety measures. The committee adopted a definition of a reportable “near-miss” situation to standardize reporting along the California Coast.

**STATUS.** In 1992, the Harbor Safety Committee recommended that the Coast Guard and VTS devise a more consistent system of reporting accidents and near-accidents, standardized with other areas and analyze the statistics on an annual basis with recommendations for improvements. This recommendation has been essentially accomplished in San Francisco Bay.

As part of this effort, The Harbor safety Committee worked for adoption of a statewide definition of “near-miss.” The following definition was adopted by the five California Harbor Safety Committees:

“A reportable “Near-Miss Situation” is an incident in which a pilot, master, or other person in charge of navigating a vessel, successfully takes action of a non-routine nature to avoid a collision with another vessel, structure, or aid to navigation, or the grounding of a vessel, or damage to the environment.”

The Committee also participated in establishing a system for voluntary reports of “near-miss” situations for the Coast Guard in order to prevent vessel accidents. A voluntary reporting form was adopted and included in the Vessel Traffic Service, San Francisco, June 1995 User’s Manual. In addition, the Captain of the Port included the report form in the Marine Safety Office newsletter and the San Francisco Bar Pilots Association made the report form available to its members. However, due to the Freedom of Information Act (FOIA), the Coast Guard determined that anonymity could not be provided to persons making reports. Subsequently, in 1996, no written reports of “near-misses” were received by the Coast Guard Marine Safety Office or by VTS.

The three (3) near-misses reported in 1997 are a substantial reduction from nineteen (19) reported in 1996. Unfortunately, the MSO was unable to obtain enough information to process a civil penalty case on any of these incidents. Several civil penalty cases from near-misses in 1996 were closed with payment made by the offending party during 1997. The education program on Rule 9 of the Rules of the Road seems to be working. The MSO will continue its educational efforts.

Progress has been slow in standardizing marine accident reports with other areas because of the problems of guaranteeing anonymity for someone making a voluntary report and protecting against legal liability or penalties. The issue of how to establish a system for voluntary reports of near-misses continues to be explored elsewhere, both on the West Coast through the SMART Forum in Washington State, and nationally by the Coast Guard.

## VIII. COMMUNICATION

### **Navigational Bridge Management.**

Consideration of harbor safety should include the transit of the vessel from the sea buoy to the anchorage or dock. In such a situation involving the services of a pilot, the assumptions are: Captains have the best knowledge of their vessel characteristics, and Pilots are hired for having the best knowledge on local conditions.

To safely navigate when underway requires the integration of such skills with other members of the bridge watch. Teamwork is therefore necessary in order to best utilize the respective skills and equipment. This is all the more important to avoid one-person errors and impact the trend in statistics which confirm that a high percentage of casualties occur in restricted or pilotage waters.

Important elements in bridge management which should be considered are:

- 1) Preplanning of the transit by the bridge team using all available reference sources.
- 2) Information exchange with the pilot. This would include transit plan and pertinent details of vessel characteristics and equipment, especially any mechanical limitations.
- 3) Monitoring the vessel position and actions of the pilot to ensure compliance with the passage plan.
- 4) Recording relevant and important information
- 5) Communications within the bridge team as well as externally, consistent with protocols.

For more detailed information, reference should be made to the American Petroleum Institute publication titled “*Guidelines for Developing Bridge Management Teams*” and International Chamber of Shipping, “*Bridge Procedures Guide.*”

### **Radio Communications**

Existing communication systems for the maritime community in the San Francisco Bay Area are almost exclusively on marine VHF (very high frequency) radio. The level of usage is variable with periodic time spans of saturation as recreational boaters and fishermen utilize the frequencies. Additional communication modes include telex and cable to agents/pilots; and as the VHF frequencies become more congested, the increasing use of cellular telephones.

## Current Usage

| CHANNEL   | USE   |
|---|---|
| <b>SAN FRANCISCO BAY COMMON FREQUENCY USAGE</b> |   |
| 06  | Intership safety. Also often used for non-distress traffic between USCG and other vessels.  |
| 10  | San Francisco Bar Pilots<br>Pilot Boats<br>Agents<br>San Francisco Marine Exchange  |
| 12  | Vessel Traffic Service San Francisco offshore traffic. Used between outer limit of Offshore Precautionary Area and VTS outer limit (38 nautical mile radius from Mt. Tamalpais) |
| 13  | Bridge to bridge navigation   |
| 14  | Vessel Traffic Service San Francisco in-shore traffic. Use from outer limit of Offshore Precautionary Area, throughout San Francisco Bay, up to Stockton and Sacramento.        |
| 16  | Hailing/distress/safety   |
| 21A   | U.S. Coast Guard reserved working frequency between USCG units only   |
| 22  | Notice to Mariners  |
| 23A   | U.S. Coast Guard reserved working frequency for communications between USCG units and other vessels   |
| 7A, 11,<br>18A, 19A                             | Common tug working frequencies  |
| 79A, 80A,<br>88A                                | Commonly used by fishing vessels  |
| 7A, 8, 9, 11,<br>18A, 19A                       | Port Operations — Commercial intership and ship to shore working channels. Commercial vessel business and operational needs.  |
| 9, 68, 69,<br>71, 72, 78A                       | Port Operations — Non-commercial; supplies repairs, berthing, yacht harbors/marinas.  |

| TUG COMPANY CHANNELS  |   |
|---|---|
| 7A  | Chevron Shipping  |
| 9   | Westar Marine Services  |
| 10  | Crowley Maritime<br>SeaRiver Maritime   |
| 18A   | American Navigation<br>Bay & Delta Towing<br>Brusco Tug & Barge<br>Oscar Niemeth Towing<br>Sacramento Tugboat Company<br>Sanders Towboat<br>Seaway Towing Company<br>Tweed Towing |
| MARINE OPERATORS  |   |
| 26, 84, 87  | San Francisco   |
| 27, 28, 86  | Sacramento, Stockton, Delta   |
| VESSEL TRAFFIC SERVICE RADIO COVERAGE   |   |
| Present coverage of the Bay Area by VHF–FM radio is considered adequate for communicating with VTS. |   |

## 2. Existing Equipment

- A. San Francisco Vessel Traffic Service. The VTS communications suite consists of four identical systems located at Yerba Buena Island, Marin Headlands, Marin County, and near Concord.
- B. **San Francisco Bar Pilots.** The San Francisco Bar Pilots' headquarters is located at the East end of Pier 9, San Francisco. The antenna for the primary system is located on Mount Tamalpais.

All pilot boats have GPS. The **Pittsburg** has a GPS receiver. The **California, San Francisco** have all Furuno electronic equipment, which includes the electronic chart system, radars, DGPS, and fathometer. The Drake and **Golden Gate** have LEICA GPS Navigators.

The **California, San Francisco, Drake** and **Golden Gate** have PC-based electronic chart systems with Nobeltek software and raster charts.

The **California, San Francisco, and Golden Gate** have AIS equipment (auto identification system).

C. **San Francisco Marine Exchange.** The Marine Exchange is located at Fort Mason Center, San Francisco. The Exchange shares a Mount Tamalpais antenna with the Bar Pilots.

- 1) A Motorola 50-watt transceiver on Channel 10.
- 2) Standard transceiver with a local antenna monitoring Channels 13, 14, & 18A.

### **Recommendation**

VIII.1. VTS Channel. Due to increasing congestion on Channel 13, the USCG is proposing to shift the primary VTS channel to Channel 14. The Harbor Safety Committee endorses the Coast Guard's efforts to improve the existing system.

**STATUS.** The VTS operating channel was changed to Channel 14 VHF-FM on August 15, 1994. The decision to change to Channel 14 was based on recommendations made by the Quality Action Team (QAT), consisting of persons from various maritime organizations within the San Francisco Bay Area. The change has significantly reduced the amount of radio traffic on Channel 13. No further action is necessary.

The San Francisco Marine Exchange, a non-profit agency which serves as the Clearinghouse for tug escorting of regulated tankers and barges, purchased and installed a back-up generator for its communications system, as recommended by the Harbor Safety Committee. Public and private funding sources to maintain and expand the communications system, including back-up power, will be further explored by the Marine Exchange. No further action is necessary.

## IX. BRIDGES

The San Francisco Bay Area is crossed by a number of bridges for automotive and rail traffic. The vast majority of shipping traffic works in areas covered by suspension or fixed bridges with substantial vertical clearance.

**Geographic Boundaries.** The boundaries of the area in this chapter are set in the West by the COLREGS Demarcation Line (Between Pt. Bonita and Mile Rocks), and in the East to include the Rio Vista Highway Bridge in the Sacramento River and the Antioch Highway Bridge in the San Joaquin River. The Eastern boundary exceeds the boundary set by SB 2040, ch. 7.4, section 8670.3(h), which defines the marine waters and which sets the boundary as a line running North and South through a point where the Contra Costa, Sacramento, and Solano Counties meet.

The decision to extend the boundary further to the East was made in order to include in this project the Antioch and Rio Vista Bridges, as both bridges are encountered by ocean going vessel traffic bound for the Ports of Stockton and Sacramento.

### Schedule of Bridge Openings

Bay Area bridges that open or swing do not do so on a fixed schedule. Swinging bridges are normally used for railroads and are maintained in the open position. They are only closed for the passing of a train, then return to the open position. The bascule (a counter-weighted drawbridge) for vertical lift bridges are tended and may be opened by contacting the bridge keeper on VHF radio.

Oceangoing vessels may transit under two vertical lift bridges, the Martinez, Southern Pacific RR Bridge and the Rio Vista Highway Bridge. Both bridges are manned 24 hours a day and open for vessel traffic upon request. Approximately 30 minutes notice is required and the bridges may be contacted by VHF or telephone.

| BRIDGE                       | VHF CHANNELS | PHONE NUMBER   |
|------------------------------|--------------|----------------|
| Martinez-Southern Pacific RR | 13           | (510) 228-5943 |
| Rio Vista                    | 9, 13, 16    | (707) 374-2134 |

### Adequacy of Ship to Bridge Communications

Ship to bridge communications takes place via VHF radio on designated channels. These include channels 9, 13, 16, 17, and 65A. Communications are considered to be adequate by the local pilots.

## **Physical Characteristics of Bridges**

All bridges over navigable waterways are equipped with lights marking the channel, the center of the bridge, and in the case of drawbridges, the closed or fully open positions. Most are equipped with sound producing devices which are used during periods of reduced visibility. Descriptions of the lights and sound signals are readily available on the charts or the *Light List*, published by the USCG.

The Bay/Delta area now has twelve racons on bridges, which represents the majority of racons placed on bridges in the United States. The racons are justified because the harbor has the highest number of foggy days in the nation where visibility is less than one-half mile together with a high volume of vessel traffic transiting under the bridges.

A racon is a radar sensor that send out a distinctive radar emission that shows up as a distinctive mark on ship's radarscope. Racons are on the following bridges:

- Benicia–Martinez (1)
- SF–Oakland Bay Bridge (3)
- Richmond–San Rafael Bridge (2)
- San Mateo–Hayward Bridge (1)
- Antioch Bridge (1)
- Rio Vista Bridge (1)
- Golden Gate Bridge (1)

To complete the system of racons on Bay/Delta bridges, the Rio Vista Bridge Racon was installed and tested on February 24, 1998 and is now in service. The Racon displays the Morse character “T”. Now that racons have been installed on the major bridges, the Coast Guard is considering eliminating or reducing the range of fog signals at bridges. The Coast Guard believes the fog signals are used now primarily by recreational boaters and the few commercial vessels that do not have radar (e.g., small commercial fishing boats), and is soliciting mariner comments through May 15, 1998.

## **Bridge Clearances**

(See Appendices for most recent list of bridge clearances.)

### **Union Pacific Railroad (UPRR) Drawbridge**

To improve navigational safety for all vessels sailing through the relatively narrow opening of the Union Pacific Railroad Drawbridge at Benicia, the Coast Guard has completed a number of initiatives:

1. Established a Regulated Navigational Area (RNA) at the bridge which prohibits deep draft vessel transits when visibility is less than 1000 yards. The Coast Guard is proposing to revise the RNA. The revision would change the name of the bridge that is the focus of the RNA to reflect a change in corporate name, add a third visibility checkpoint, and clarify the procedures for downbound vessels which are moored between the Union Pacific Railroad Bridge and New York Point that intend to transit the RNA once underway.

2. Installed white lights on the main channel piers to better identify the primary navigation channel. The white pier lights recommended for installation on the main channel piers have provided better visibility in foggy conditions and have been made permanent.
3. Asked UPRR to change the working frequency of the bridge radiotelephone to VHF-FM Channel 13, to allow vessels and bridge operators to communicate directly instead of using Vessel Traffic Service Channel 14.
4. Investigated bridge malfunctions and created natural working group to find solutions to process and equipment problems.
5. Had CalTrans make modifications to the racon on the adjacent highway bridge which has improved the signal to downbound vessels.
6. Evaluated the obstructive character of the bridge under the Truman-Hobbs Act of 1940. Long term process to determine if increasing bridge clearances will provide benefits to navigation greater than the costs of modifying the bridge. The outcome of such a study would determine if the bridge should be altered.

Most of the recommended bridge improvement items have been completed by Union Pacific Railroad (UPRR). UPRR has installed a new auxiliary power system including new generators and transformers, along with a new signal system. New enhancements include replacement of the bridge lift motors, installation of a computerized system to monitor train locations and track conditions and a computer system to track vessels upbound or downbound for the bridge.

To address the problems occurring with the operation of the UPRR Bridge, industry, the pilots and Coast Guard continue to interface with the bridge owners via the UPRR Bridge Working Group. The working group meets bi-monthly to address problems with the bridge and to develop solutions. The working group is coordinated by the Bridge Section of the Coast Guard Eleventh District and is regularly attended by representatives from both rail and marine industry, as well as Coast Guard MSO and VTS. Under the working group's direction Union Pacific has developed a formal training program for bridge operators which includes ship rides for familiarization and better understanding of potential or near-miss situations. The working group created a mishap matrix to capture incidents involving the bridge. Input to the matrix come from both the Coast Guard and Union Pacific Railroad and is used as a problem solving tool and historical reference.

## **Recommendations**

**IX.1. Energy-Absorbing Fenders for Bridges.** OSPR should request Caltrans and other bridge operators such as the Golden Gate Bridge and Southern Pacific Railroad to install energy-absorbing fendering, instead of wooden or plastic fendering, on all area bridges when replacing damaged fenders and for all new construction.

**STATUS.** The seismic retrofit of the Richmond–San Rafael Bridge will not include energy-absorbing fenders (like the hydraulic fenders at the Benicia–Martinez Highway Bridge), however the existing fender will be replaced (“in kind”) with plastic laminate material which has improved energy absorption. CalTrans will install a similar fendering system on the new Benicia Highway Bridge and on other bridges undergoing seismic modifications. OSPR continues to encourage CalTrans and other bridge owners in the Bay Area to consider energy-absorbing fenders where possible.

**IX.2. Bridge Clearance Gauges.** Bridge clearance gauges should be installed where needed, particularly drawbridges.

**STATUS.** Bridge level gauges are already in place at area bridges where needed. It was noted, however, that the bridge level gauges, which are simply numbered wooden boards affixed to a bridge and indicating the clearance between the water and the raised portion of the bridge, are of little use to larger vessels, as the gauges do not become visible before the vessels are committed to making their transit. No further action is necessary.

**IX.3. Water Level Gauges.** Water level gauges should be installed at approach points to bridges.

**STATUS.** The PORTS system, currently being installed by NOAA, includes a system of electronic water level gauges located at area bridges, which will indicate the level of the tide at the measured points on a real time basis. No further action is necessary.

**IX.4. Golden Gate Bridge Racon.** Request the Golden Gate Bridge Highway and Transportation District to install a racon (radio beacon) to mark the center of the channel between the towers of the Golden Gate Bridge to better serve the mariner, particularly during periods of restricted visibility and heavy seas.

**STATUS.** Installation of the racon was completed on April 11, 1995, by the Golden Gate Bridge District. Recreational boaters have indicated that fog signals should be retained in their present configuration as an aid to smaller vessels not equipped with radar. No further action is necessary.

**IX.5. Bay Bridge Racons.** Request the Department of Transportation (Caltrans) to install racons on the D–E span of the San Francisco–Oakland Bay Bridge (instead of the G–H span), and the A–B span because the spans vary in height and width and currents can reach considerable velocities running parallel to the towers.

**STATUS.** This has been accomplished. No further action is necessary.

**IX.6. Shading Flood Lights on Bridges.** Request CalTrans and the Golden Gate Bridge District to shield bridge floodlights to reduce the glare for ships.

**STATUS.** No further action is necessary. Floodlights were a problem at the Oakland Bay Bridge some years ago in conjunction with the bridge's 50th birthday celebration. This lighting has since been removed. The U.S. Coast Guard Bridge Section received only positive feedback when the Golden Gate Bridge towers were lighted. No additional objections have been noted.

## X. SMALL VESSELS

### Background

Within the Bay, many recreational boats, windsurfers and commercial fishermen transit navigational shipping lanes and some approaches to port and marine terminal facilities. The central part of the Bay, with the heaviest concentration of population in close proximity to the shoreline, boasts the largest number of small boat marinas along the San Francisco, Alameda, Contra Costa, and Marin County shorelines. Two-thirds of approximately 20,000 Bay Area marina berths are located in the central Bay. This number does not include facilities on the Sacramento and San Joaquin Rivers. While only a percentage of boat owners are on the Bay at a given time, on a sunny weekend up to 1,000 boats may participate in races and various events on the Bay.

The last Sunday in April (Opening Day on the Bay), Memorial Day, and Labor Day are times of extreme congestion by small vessels. There are many occasions where six or eight races may be held in the same venue, vessels starting at five minute intervals. This may lead to more racing congestion than a single large popular regatta. Race instructions now carry a warning regarding interfering with large vessels.

Personal watercraft sports, more commonly referred to as jet skiing, is also popular in the Bay Area. Skiers can easily access the water from public launches, marinas, and private docks. Personal watercraft can attain speeds up to 40 knots per hour and are not dependent upon calm waters or wind. Because of this versatility, operators frequent main ship channels, narrow estuaries, and the open Bay in addition to shallower waters. It is estimated that roughly 5,000 personal watercraft are used in the Bay (Kawasaki Jet Ski representative, 1992).

In addition, boardsailing has become a popular Bay Area sport. Primary locations for boardsailing are Crissy Field, the Larkspur Ferry Terminal, Coyote Point in San Mateo County, the Glen Cove Marina in Benicia, and Rio Vista. From Crissy Field, located along the northern shoreline of the San Francisco Peninsula just east of the Golden Gate Bridge, strong winds propel boardsailors across the main shipping lane where inbound and outbound tankers, container ships and other vessels transit under the Golden Gate Bridge.

Coast Guard representatives and ship operators note that small craft are difficult to visually spot during periods of restricted visibility. Because of the size of the vessel, radar images are poor which may create a possible hazard to navigation.

The Bay Area commercial fishing fleet is made up of approximately 1,000 boats (Pacific Coast Federation of Fishermen's Associations, 1992). However, of this number, about 150 to 200 boats are used full-time for commercial fishing, principally berthed in San Francisco, Sausalito and Oakland. Many of the licensed commercial fishermen are essentially part-time operators, fishing on weekends and holidays by trailering small boats to launch ramps. In the Bay the only commercial fish caught are herring and anchovies with herring the most important in-Bay fishery. During the December to March herring season, additional boats from other areas enter the Bay to lay their nets. The State Department of Fish and Game controls the number of boats fishing in the Bay during the herring season and regulates the manner of fishing. The herring fishery is highly competitive because during a short period of time large profits can be realized.

### **Vessel Traffic Incidents**

- Ⓟ **Recreational Boats.** Thousand of recreational boats are concentrated near the major inbound and outbound Bay shipping lanes. While many sailboats and motorboats are on the Bay, particularly on weekends, few near-misses or accidents are reported to the Coast Guard and VTS. A number of reported and unreported 'near-misses' occur which might be prevented by small boats properly yielding the right-of-way to large vessels that cannot change course.
- Ⓟ **Boatsailors.** No accidents or near-accidents involving boardsailors and vessels have been reported to the Coast Guard or VTS during the past years. However, many boardsailors cross in front of tankers and container ships off Crissy Field which is close to the Golden Gate Bridge. Competitive races are sponsored at this location during the year.
- Ⓟ **Personal Water Craft.** While a number of injury accidents involving personal water craft (jet skis) have occurred during the past three years, none involved a collision with a vessel and no fatalities have occurred in the Bay Area (California Department of Boating and Waterways, 1992). One fatality occurred in the Delta in 1991 at Suicide Beach.
- Ⓟ **Fishermen.** In 1994 a fatal accident occurred when a fishing vessel collided with an inbound container ship just west of the Golden Gate Bridge. The fishing vessel sank and two lives were lost. Various individuals have recounted possibly dangerous situations involving herring fishermen. A herring fisherman laid a large net around the oil skimmer boat at the Chevron Long Wharf; a herring net impeded a container ship docking in the Oakland harbor; a herring net delayed a pilot boat leaving to meet an inbound vessel; herring nets have been laid around fire boats at the Ports of Oakland and San Francisco. The nets may pose an impediment to emergency response vessels such as fireboats and oil skimmers. Nets near terminal docking areas may possibly cause unsafe ship maneuvers.

## Public Education

Currently, the following boater education programs are available to the boating public in the nine Bay area counties.

|                                     | <b>Subjects</b>   |
|-------------------------------------|---|
| U.S. Power Squadrons                | Boating Safety Rules of the Road, Basic Rescue<br>(A home video course is available for purchase) |
| U.S. Coast Guard Auxiliary          | Boating Safety Rules of the Road, Basic Rescue  |
| Department of Boating and Waterways | Water Safety/Grades K–12, General   |

In addition, the U.S. Coast Guard operates a Boating Safety Hotline that dispenses information and reference to local classes.

After reviewing information on licensing of small recreational boat operators, it was agreed that, at this time, emphasis on boater education and enforcement on the waterways would be a more effective approach to deal with unsafe operators rather than instituting the licensing of small boat operators.

### **Recommendations**

**X.1. Herring Fishermen.** A meeting should be convened by the Harbor Safety Committee with the state OSPR, Fish and Game officials, herring fishermen, Coast Guard, and representatives of the Ports to discuss ways to avoid problems such as nets impeding navigation lanes or berthing areas, nets blocking the egress of fire boats, oil spill response boats and pilot boats, etc. This meeting could result in yearly pre-season meetings with fishermen, Fish and Game mailers to the fishermen informing them of spill prevention concerns, or other actions.

**STATUS.** OSPR supports continued coordination among federal, state, municipal, and fishing organizations prior to each herring fishing season. No further action is necessary.

**X.2. Observation of Sailboat Races.** Pilots, Masters, and other interested parties should be invited to witness a series of races from the St. Francis Yacht Club race deck to obtain a view of events from the competitors' level.

**STATUS.** In the past the St. Francis Yacht Club invited representatives of the Harbor Safety Committee to observe a sailboat race, but no one attended. No further action is necessary.

**X.3. Observation of Boats from a Tanker.** Race officials and other interested parties should be invited aboard a large tanker while underway to get the pilots' perspective of racing vessels, if practicable.

**STATUS.** A tanker operator (SeaRiver Maritime) is willing to permit representatives of the small boat community to observe navigation on a tanker bridge on in-Bay transit. No further action is necessary.

**X.4. Annual Racing Schedules.** The Yacht Racing Association of San Francisco Bay should furnish full annual race schedules to all interested shippers, and, in particular, the Harbor Safety Secretariat for distribution.

**STATUS.** Racing Schedules have been furnished to the Marine Exchange for distribution and will be routinely furnished for future events. No further action is necessary.

**X.5. Optional Race Course Information.** The Yacht Racing Association should furnish optional courses and rounding marks used by participating entities. The race committee for each day's event should choose a course compatible with anticipated large vessel traffic.

**STATUS.** The Yacht Racing Association has provided and will provide future information to the Marine Exchange regarding optional courses and rounding marks. No further action is necessary.

**X.6. Rule 9 Infraction.** The Coast Guard Auxiliary should observe and report infractions. The U.S. Coast Guard suggested that a mailer be prepared, to be inserted with vessel license renewal notices, advising owners of Inland Steering and sailing rules, Rule 9.

**STATUS.** The Coast Guard reports the following actions were taken. The Coast Guard Auxiliary is prohibited from taking any law enforcement action; it is an educational organization. The Auxiliary conducted 188 Safe Boating Courses in Northern California in 1992 with 1,278 graduates. The Auxiliary changed its Boating Safety Course curriculum to specifically include information on Rule 9, its meaning and the constraints to navigation for larger vessels in the confined shipping channels of the Bay.

With all document renewals the Coast Guard included flyers on Boating Safety Courses and information on obtaining safety pamphlets. The Coast Guard routinely includes information on Rule 9 infractions to applicants for marine parade and regatta permits. Prior to the commencement of a sailboat race, the committee boat must check in with VTS. No further action is necessary.

**X.7. Educational Pamphlets.** Expand the distribution of existing educational pamphlets available from the U.S. Coast Guard. These pamphlets provide information regarding the above-mentioned courses and the phone number for the Boating Education Hotline at 1-800-336-2628 which would provide information regarding the scheduling of these classes.

Distribute these educational pamphlets by: enclosing them in the boat registration renewal notices sent to boat owners by the Department of Motor Vehicles in the State of California (a follow-up mailing might also be considered to remind boat owners of these courses); enclosing them in local boat marina mailings to slip renters; requesting marinas to offer a one-time slip rental rebate for completion of a safe boater course.

**STATUS.** The California Department of Motor Vehicles distributes educational pamphlets in boat registration renewal notices. OSPR has an implementation plan to work with marinas to get their assistance in boater education, such as enclosing educational pamphlets in marine mailings, and requesting marinas to encourage completion of safe boater courses.

No further action is necessary.

**X.8. Report Rule 9 Violations.** Encourage vessel operators to document and report violations of the Rules of the Road to the local U.S. Coast Guard office. This would include a direct request to the San Francisco Bar Pilots to assist in this reporting effort.

**STATUS.** The Eleventh Coast Guard District Commander has encouraged the San Francisco Bar Pilots to report Rule 9 infractions. It is acknowledged there is some difficulty in positively identifying the boat numbers from the bridge of a large vessel.

The Coast Guard Vessel Traffic Service (VTS) includes near miss reporting in the VTS Users' Guide for San Francisco Bay. In 1997, the number of reported Rule 9 incident involving ships and small boats (recreational and fishing vessels) decreased by more than half over the previous year. The reduction in the number of near misses is presumed due to increased awareness of Rule 9 by small boat operators. (See the Appendixes for the list of near miss incidents reports.)

The following is a breakdown of the types of commercial vessels that experienced near misses with small boats in 1997:

- 3 — Tankers
- 2 — Container ships
- 1 — Bulk ship
- 1 — Tug with tow
- 1 — Tug without tow

Five incidents occurred involving fishing vessels and three with recreational boats. The number of incidents involving fishing boats increased from 4 in 1996 to 5 in 1997 while recreational boat incidents decreased from 14 to 3. The need for continuing education of small operators is addressed in Recommendation X.12. listed below.

**X.9. Publicize Rule 9 Infractions.** Make public by publishing punitive actions taken against offenders by the U.S. Coast Guard. This information should be distributed to local yachting and boating magazines and marina newsletters. In addition, the California Department of Motor Vehicles should distribute a summary of punitive activities to registered boat owners.

**STATUS.** In 1994, the Office of Oil Spill Prevention and Response (OSPR) initiated an outreach program to coordinate the distribution of boating and waterway safety information to the public. This information is now being distributed by the Department of Motor Vehicles. The educational effort should include the Pacific Inter-Club Yacht Association wording to address Rule 9 infractions in all club race instructions. The Yacht Racing Association should also add a Rule 9 requirement to all their race instructions that the act of interference will result in disqualification.

The Coast Guard has been including information on Rule 9 violation cases in the Marine Safety Office newsletter. This newsletter receives wide distribution among the various groups navigating on the Bay including small boat operators.

**X.10. Coast Guard Auxiliary Education Efforts.** Encourage the ongoing efforts of the local U.S. Coast Guard Auxiliary and Power Squadron organizations in their boating education and safety effort.

**STATUS.** A tanker operator (SeaRiver Maritime) is willing to permit members of the Coast Guard Auxiliary to observe navigation of a tanker, from the ship's perspective, during an in-Bay transit. This might help to educate both safe boating course instructors and their students on the hazards of reckless operation of small boats in commercial traffic areas. No further action is necessary.

**X.11. Boardsailors.** A representative(s) of the Harbor Safety Committee should meet with representatives of the San Francisco Boardsailing Association to promote safer navigation in the Bay by discussing such issues as boardsailing race schedules, race course locations, Inland Steering and Sailing Rule 9 requirements, characteristics of large vessels and tug/barge operations in the Central Bay in relation to boardsailors, and possible education efforts such as posting signs at areas frequented by large numbers of boardsailors (e.g., Crissy Field and Rio Vista) to warn of vessel traffic dangers.

**STATUS.** Several years ago a representative of the Harbor Safety Committee met with representatives of the San Francisco Boardsailing Association and the San Francisco Bar Pilots Association to aid in preparing a comprehensive guide to boardsailing in the Bay. A section was included on the hazards of sailing in shipping lanes near large vessels and tugs with barges.

OSPR has an implementation plan to work with the National Park Service to improve the sign at Crissy Field to include more information about the dangers of board sailing in the main shipping lanes by the Golden Gate Bridge.

**X.12. Place Additional Emphasis on Recreational Boater Education and Law Enforcement on the Waterways as Follows:**

1. OSPR should put additional emphasis on boater education and law enforcement on the waterways. This can be addressed by the Outreach Program, developed in 1994 and coordinated through the State Department of Boating and Waterways.

2. Educational target areas should be identified such as marinas and boat ramps. Boat rental establishments, including personal water craft (jet skis), should also be targeted for an educational thrust, as inexperienced boaters in rental boats are a continuous source of problems.
3. The Coast Guard's "Sea Partners Program," a marine environmental protection outreach initiative, should be utilized, in conjunction with the Coast Guard Auxiliary, to disseminate boater safety materials to recreational boaters in the Bay area.
4. Kayakers should be approached in the same manner as boardsailors were previously approached to promote safer navigation in the Bay. Kayakers have become a problem for vessel traffic due to reckless operation by some individuals.
5. The public school system should be encouraged to include Boater Education in the curriculum.
6. Consideration should be given to providing funds dedicated specifically for increased law enforcement on the waterways.

**STATUS.** OSPR has drafted an implementation plan to address the recommendations to enhance recreational boater education and to encourage greater enforcement of navigational rules and laws on the waterways.

## XI. VESSEL TRAFFIC SERVICE

The Coast Guard established the VTS system in 1972 in San Francisco Bay following a serious collision between two tank vessels that resulted in great environmental damage to the Bay. The Coast Guard continues to operate the VTS system and monitors nearly 400 vessel movements per day. The region is considered a difficult navigation area because of its high-traffic density, frequent episodes of fog, and challenging navigational hazards. In 1996 Congress considered reducing the current level of funding for VTS-San Francisco. In response to Congress' initiatives, the Harbor Safety Committee voted to support continued federal funding to maintain VTS-San Francisco at its current level in order to ensure navigational safety in the Bay.

The US Coast Guard's VTS for the San Francisco area has five components: (1) radar and visual surveillance, (2) VHF communications network, (3) a position reporting system, (4) traffic routing within the Bay, (5) an operations center that is staffed 24 hours a day. The geographic area served by VTS-

SF includes San Francisco Bay, its seaward approaches, and its tributaries as far as Stockton and Sacramento.

### 1. VTS Position Reporting Requirements

Vessel position reporting requirements vary according to the location within the VTS Service Area; offshore, in the Bay Area within VTS radar-surveillance capability, and in the Bay Area beyond the VTS radar coverage.

**Offshore.** Vessels are asked to make radio reports when entering or exiting the offshore VTS reporting area, which extends approximately 30 miles from the Golden Gate Bridge. This boundary is outside VTS's offshore Point Bonita radar surveillance range except in the south. Inbound vessels are asked to report 15 minutes prior to crossing the offshore boundary, upon entering the respective Traffic Separation Scheme (TSS), and upon entering the precautionary area. Outbound vessels are asked to report once at the San Francisco Sea Buoy, again at the TSS entrance buoy, at the terminus of the TSS, and finally at the outer boundary of the VTS area. Radio reports include the name and type of vessel, route, course, speed, position, and estimated times of arrival to various geographic locations. The Vessel Traffic Center (VTC) broadcasts a traffic report every 30 minutes: at minute 15 and 45 of each hour.

**Within the Bay.** VTS radar surveillance extends from the San Mateo Bridge to the Carquinez Bridge, covering most of South San Francisco Bay, all of the Central Bay, and all of San Pablo Bay. Vessels report upon getting underway, docking, mooring, or anchoring in or when departing from this area. Amplifying reports are made when passing under certain bridges, when pilots change, when emergencies arise, and when deviating from standard procedures. Ferries operating on a scheduled route report only upon departure.

## 2. Traffic Routing within San Francisco Bay

On May 3, 1995, the Coast Guard established seven Regulated Navigation Areas (RNAs) to reduce vessel congestion where maneuvering room is limited. These RNAs apply to the waters of the Central Bay, Oakland Harbor, San Pablo Bay, and the Union Pacific Railroad Bridge. There are four VHF radio/communications sites located throughout the Bay which give VTS full radio coverage. VTS operates on channel 14 VHF-FM for inshore traffic and channel 12 for offshore traffic, and monitors channel 13 throughout the VTS area.

**Staffing.** There are approximately 30 Coast Guard and civilian personnel attached to the VTS. The VTC is staffed with four watchstanders – a supervisor and three controllers – rotating on 8-hour shifts.

## 3. VTS Training Program Overview.

The VTS Training Program is structured as follows:

### Vessel Traffic Control Specialist Qualification Training

| A. TRAINING PHASE   | 1. HOURS |
|---|----------|
| VTS Indoctrination and Fundamentals <ul style="list-style-type: none"> <li>• Mission and philosophy of operation</li> <li>• Federal and local rules and regulations</li> </ul>  | 80       |
| <ul style="list-style-type: none"> <li>• Delegation of authority</li> <li>• In-depth VTS area geography</li> </ul>  | 80       |
| Using the Vessel Traffic Service System (extensive off-the-air practice) <ul style="list-style-type: none"> <li>• Surveillance (traffic management) computer system operation</li> <li>• Traffic Management concepts and procedures</li> <li>• Communications procedures</li> </ul> | 80       |
| On-the-job training (live, on-the-air) <ul style="list-style-type: none"> <li>• One-on-one coached proficiency training in the VTS operations center</li> </ul>   | 300      |
| On-the-job training (live, on-the-air) <ul style="list-style-type: none"> <li>• Closely supervised but un-coached performance assessment</li> </ul>   | 48       |
| <ul style="list-style-type: none"> <li>• Oral Examination Board chaired by the Commanding Officer</li> </ul>  |          |

## Supervisory Vessel Traffic Control Specialist (SVTCS) Qualification Training

Only personnel who demonstrate superior performance and leadership as Vessel Traffic Control Specialists are considered for supervisory training.

SVTCS candidates complete a minimum of 40 hours of supervisory on-the-job training.

They are qualified upon completion of an oral examination.

Qualification renewal (maintenance of qualification)

The qualification renewal process can consist of the following:

- Written rules and regulations exam
- Watch supervisor recommendation
- Completion of annual vessel ride and visit requirements
- Re-certification by the Commanding Officer

4. **Outreach and Partnership.** The San Francisco Bar Pilots and the US Coast Guard Vessel Traffic Service San Francisco, as well as other members of the maritime community, continue to share professional information in order to foster a teamwork approach to the issue of navigation safety within the San Francisco Bay Area. VTS participates in the following outreach and partnership programs.

**VTS-Pilots Issue Committee (VPIC).** Founded in 1995, the VPIC work group, comprised of VTS's CO, Operations Officer, Operations Administrator, and the Training Coordinator along with three members of the San Francisco Bar Pilots, meet approximately every month to discuss how VTS and the Bar Pilots can better serve each other. Both agencies might bring in scenarios or review recorded tapes, then discuss the transactions from their respective points of view. For example, VTS may explain why a particular deviation request from RNA regulations was not granted. With the VPIC interaction, VTS can explain the response from a VTS point of view. On the other hand, the pilot members may explain why the requested deviation seemed safer from the pilot's point of view.

Examples of items that came out of VPIC meetings include: the automation of information exchange between VTS and the Pilots; developing communication protocol to resolve communication issues around marine construction projects; refining internal reporting procedures in order to provide mariners with more accurate reports of ongoing marine construction in the Bay area.

**San Francisco Vessel Mutual Assistance Plan (SF-VMAP).** SF V-MAP is composed of member vessels, the Coast Guard, and passenger vessel operators who came together to develop an emergency response plan that would ensure a sufficient level of safety exists on small passenger vessels and enhance local capabilities to manage a catastrophic, waterborne Search and Rescue incident. VTS was active in the creation of this plan and continues to participate in annual drills and meetings.

**Union Pacific Railroad Drawbridge Natural Working Group.** This group is composed of members of the maritime community, the pilots organization, various offices within the Coast Guard, the Union Pacific Railroad, and major train lines to address the ability of the bridge to consistently provide a prompt response to lift requests or provide timely notification to an approaching vessel if mechanical problems or train movements would cause a delay in the bridge's response.

**Outreach.** VTS personnel spend hundreds of hours with people from various segments of the San Francisco Bay maritime community to learn about mariners' concerns and to educate VTS participants about how they can get the most out of VTS. VTS personnel are active members on the Underwater Rocks Work Group, AIS Joint Planning Partnership, and the Prevention Through People Work Group. Outreach efforts have also included many non-traditional stakeholders in the Bay area, such as California Department of Transportation bridge engineers responsible for overseeing the various seismic retrofit projects in progress throughout the Bay.

**Fishing Vessel Safety Group.** VTS is a participant in the FVSG. A VTS representative meets every other month with group, which comprises representatives of other Coast Guard units, local fishermen groups, and state agencies.

**Marine Events.** San Francisco Bay has more marine events than any other port or city in the United States. VTS has an outreach program to the boating public. VTS works closely with Group San Francisco during the permit process and yachting organizations to prevent recreational vessels from impeding commercial traffic. VTS hosts annual Marine Event Workshops aimed at educating even coordinators about commercial maritime traffic, rule 9, and VTS operations.

**VTS Shipride Program.** All VTS personnel are required to conduct approximately 6 ship rides and shore-side visits each year. This, by far, is the best method of direct, person to person interface and the sharing of suggestions. The requirements cover almost all areas of the maritime community: piloted ships, tugs, ferryboats, and shore facilities.

## Recommendations

### XI.2. Changes in VTS Operations and Requirements

- a. Upgrade Equipment. Upgrade the current equipment used by VTS-SF to include state of the art technology (US Coast Guard, Port Needs Study: Vessel Traffic Services Benefits, Volume 1: Study Report and Volume II, Appendices, Part 2)

Status. The initial installation of upgraded equipment was completed in 1997. In December of 2000, VTS completed a scheduled upgrade which included a new version of software used to operate the CGVTS system, installation of state of the art hardware, and a complete renovation of VTS' communication system. The communication system upgrade involved replacing radios at each of the VTS' four high sites, converting from an analog to a digital microwave system, and installing a new radio control system within the VTC.

## XII. TUG ESCORT / ASSIST FOR TANK VESSELS

### Background

In 1990, Senate Bill 2040 (the Oil Spill Prevention and Response Act) mandated that tug escorting was beneficial for tanker operations and directed expeditious development of escorting regulations on San Francisco Bay. The requirement is based on the legislative finding that there is a navigational safety advantage of tug escorts. Tug escorts can improve tanker safety in at least two ways. Tug escorts can serve as emergency maneuvering aids in the event of loss of steering or propulsion. A tug escort may also assist as an independent aid in the navigation of a tanker.

The Final Report of the States/British Columbia Oil Spill Task Force (1990) concluded that the risk of an oil spill could be reduced by 8% to 11% with the mandatory use of tug escorts. That report, endorsed by the State of California, suggested that the escorts be highly maneuverable, have speed complementary to the tanker with sufficient power to control tanker direction, and that the power and number of escort tugs should be proportionate to the deadweight tonnage of the tanker.

The Harbor Safety Committee (HSC) established a Tug Escort Subcommittee, which created Interim Guidelines for tug escorting in San Francisco Bay. The Interim Guidelines recommended: minimum requirements for tug escort equipment and crews; a formula for matching tugs to tankers; establishing a central Clearing House to measure bollard pull and monitor and document compliance with the regulations; setting tug escort zones in the Bay; and various operational considerations. OSPR caused emergency regulations to be established in the winter of 1992 based on the Interim Guidelines.

In the spring of 1993, the HSC adopted a revised set of Permanent Guidelines to supersede the emergency regulations. The Permanent Tug Escort Guidelines differed from the Interim Guidelines in a number of significant respects. The Permanent Guidelines altered the formula for matching tugs to vessels by changing the bollard pull formula from ahead static bollard pull equal (or greater) than the dead weight tonnage of a regulated vessel to the astern static bollard pull in the same ratio. Additionally performance standards for stopping a tanker; equipment standards and inspection of tugs; positioning of regulated vessels; and training requirements for tug escort crews were established. During the State's administrative process, OSPR chose to reject the permanent guidelines on the basis of their lack of rationale and scientific basis for matching tugs to tankers.

The subcommittee began what turned out to be a two-year process of preparing a scientific study through use of a consultant and holding extensive public hearings on the results. Based on State funding concerns and time limitations, industry volunteered to engage a consultant in conjunction with an industry-based Technical Advisory Group and the Tug Escort Subcommittee acting as a policy board. Glosten Associates was hired to prepare a professional study focusing on the specific of tug escorting on San Francisco Bay. Additionally, the State funded a peer reviewer, Michael M. Bernitsas of the University of Michigan, to review the consultant's work and to mitigate concern regarding bias. Their reports were completed in the winter of 1994.

The Glosten Study had adopted a dual-failure standard, that is the simultaneous loss of both propulsion and steering, as the basis for measuring the force (tanker demands) required to recover from the tanker machinery failure and remain within the tactical area of performance. Further, the tactical area was based on the ninety-fifth percentile of success in stopping the tanker within the available reach and transfer. After review of the enabling scope of work and industry concerns regarding the likelihood of a dual failure and the attendant tanker demands, the dual standard was thought to be unreasonable. The subcommittee set up various working groups to review failure probability, waterway characteristics, commercial and navigational safety implications of demand standards and requested that Glosten calculate demands based on single failures.

These efforts resulted in a second Glosten Study and reports on failure probability and waterway specific characteristics. The subcommittee reviewed these reports and adopted a single failure standard for the development of matching criteria.

The process involved close involvement and participation by the interested public and OSPR. On August 10, 1995, the full Harbor Safety Committee reviewed and adopted the Tug Escort Subcommittee's guidelines on a vote of twelve to one. The Harbor Safety Committee promptly transmitted the new guidelines and recommendations to OSPR for implementation.

The Committee publicly reviewed the regulatory language proposed by OSPR. During the review of the regulations, several issues were identified as not being in compliance with the Committee's recommendations. The most critical issues related to the intended use of checklists to review and develop a transit-specific plan versus OSPR's new requirements that plans be filed with OSPR thirty days in advance. OSPR subsequently agreed to modify its proposed language to comply with the intent of the Committee's guidelines, which the Committee adopted in January 1996.

OSPR held a hearing on the proposed permanent tug escort regulations on March 19, 1996. Approximately 15 people testified at the hearing. Most supported the new regulations but a sizable group protested the use of a single-failure standard instead of a dual-failure standard. Many of the commenter also suggested minor modifications to the regulations, such as individualized, company-specific check lists and reducing pilot liability. Written comments were also received.

In addition to the public hearing process on regulations, OSPR is required by law to have regulations reviewed by the State Inter-Agency Oil Spill Prevention Committee, which reviewed and approved the regulations for implementation, and by the Technical Advisory Committee (TAC), which is purely advisory and has no approval or disapproval authority. The issue of dual- versus single-failure standard was again debated.

The new Tug Escort regulations became effective January 1, 1997. (See Appendices for current list of certified tug escorts, the current Clearing House Report on escorted vessel movements and Appendix G for Amended Tug Escort Regulations which became effective January 1, 1997.)

It should be noted that the 1997 Tug Escort regulations requires that the OSPR Administrator must:

“review the matching criteria and other program elements within two years of the effective date of this subchapter. The program review will include a survey of the tanker-related incidents in U.S. waters to determine the types of failures that have occurred, an assessment of tug technology and any advances made in design and power, and the tug escort organizations. At the conclusion of the review, the Administrator will determine whether it is necessary to modify the tug/tanker matching criteria or any other provision of the program requirements.”

This OSPR review must take place by January 1, 1999, to determine whether any changes to the tug/tanker matching formula should be made.

The Clearing House reports that industry has changed their procedures to comply with the new regulations and that there have been no significant problems in implementing the regulations. (See Chapter XVI Plan Enforcement.)

### **Recommendations**

**Technical Pilotage Committee.** The Harbor Safety Plan calls for establishing a technical pilotage committee to review waterway-specific maneuvers.

**STATUS.** This recommendation is pending, awaiting the call of the Chair of the Harbor Safety Committee.

## XIII. PILOTAGE

Pilotage is an extremely important issue to Bay shipping because of complex local conditions consisting of narrow navigation channels, many bridges, swift tides and currents, variable weather patterns, and large numbers of ships and small vessels. For over one hundred fifty years, the state has regulated pilotage over the Golden Gate bar by creating the State Board of Pilot Commissioners in 1850 to regulate pilotage.

**Federal Pilots.** Federal pilots are licensed by the U.S. Coast Guard to handle American flag vessels under registry. Only a few federal pilots operate within the Bay.

**Inland Pilots.** An inland pilot is required to have both a state license and a federal license to pilot vessels solely inside of the Golden Gate. The state has not authorized any new inland pilots since 1985. One pilot continues to operate as an inland pilot. The State Board of Pilot Commissioners regulates inland pilots.

**Pilots.** This category of pilots is also referred to as Bar Pilots. A state license is required for a pilot to handle vessels entering the Bay and operating inside the Bay. A federal pilot's license is also required. The State Board of Pilot Commissioners regulates the number, licensing, training and disciplining of pilots for the Bays of San Francisco, San Pablo and Suisun.

**Pilotage for the Ports of Stockton and Sacramento.** The Ports of Stockton and Sacramento have separate pilotage authority from the Board of Pilot Commissioners. In practice, these ports use both inland and (bar) pilots licensed by the state.

**Docking Pilots.** Section 1179 of the Harbors and Navigation Code allows shipping companies who expressed their intent to the Board of Pilot Commissioners before July 1, 1983, to have their own employees used as pilots in lieu of (bar) pilots. In the Bay, one shipping company uses its own employee(s) as pilots for docking who are not subject to State Board of Pilot Commission regulations. The employee has a federal pilot's license.

### Recommendations

#### **XIII.1 Shipping Company Employees Who Serve as Pilots.**

The California Harbor and Navigation Code, Section 1179 regarding use of shipping company employees for piloting vessels should be amended to read:

“Notwithstanding any other provisions of this division, any shipping company which regularly employed its employees, or expressed its intent to the Board of Pilot Commissioners to use its employees for piloting vessels on the Bays of San Francisco, San Pablo and Suisun on or before July 1, 1983, may employ and use its employees in that manner in lieu of pilots provided under this Chapter so long as these employees shall hold a master's license with pilotage endorsement and have made at least 20 trips as pilot trainee or observer on vessels over the routes to be piloted within a one-year period.”

Pilots within this category, known as docking pilots, are not presently required to have completed local trips within the Bays and are not subject to jurisdiction of the State Board of Commissioners. The OSPR Administrator should pursue making this change to the California Harbor and Navigation Code.

**STATUS.** As of this date, no amendment to the California Harbors and Navigation Code has been proposed to require that shipping company employees eligible to pilot vessels in the Bay area must hold a Master's license with pilotage endorsement and have made at least 20 trips as pilot trainee or observer on vessels over the routes to be piloted within a specified period of time.

In 1997 OSPR made preliminary inquiries to assess the scope of piloting performed by shipping company employees. OSPR requested that the Harbor Safety Committee convene a meeting of the Pilotage Subcommittee to discuss this recommendation with a view towards the development of rationale and legislative strategy. To date the Harbor Safety Committee has not responded to this request.

### **XIII.2. Require Pilots on Board Vessels Towing Barges Over 5,000 Long tons.**

The U.S. Coast Guard should amend 46 C.F.R. 15.812 to change the provision for pilotage requirements by adjusting the limit of 10,000 gross tons for tank barges by amending Section 15.812(e) to read:

“A licensed individual qualifying under paragraph (c)(2) of this section may serve as pilot of coast-wise seagoing tank barges or tank barges operating upon the Great Lakes totaling not more than 10,000 gross tons carrying cargoes subject to the provision of 46 U.S.C. Chapter 37, **or tank barges operating on the Bays of San Francisco, San Pablo and Suisun, carrying not more than 5,000 long tons of oil or other petroleum products as cargo.**”

The Committee concluded there should be federal licensing requirements for the operation of tugs towing 5,000 to 10,000 long tons of oil or other petroleum products as cargo in order to ensure local knowledge of the Bays. The OSPR Administrator should request that the U.S. Coast Guard make this change to federal licensing requirements.

**STATUS.** In 1997 OSPR reviewed this recommendation and, based on this review, requested that the Harbor Safety Committee convene a meeting of the Pilotage Subcommittee to discuss this recommendation with a view towards clarifying terms, developing rationale and implementing strategy. To date the Harbor Safety Committee has not responded to this request.

### **XIII.3. Amend Harbors and Navigation Code to Prevent Unlicensed Person From Performing Pilotage.**

The Pilotage Subcommittee reviewed federal and state pilotage licensing. To prevent unlicensed persons from performing pilotage, it is recommended that legislative language in the California Harbors and Navigation Code be strengthened, by increasing the penalty for acting as a pilot while not holding a pilot license, from the maximum penalty for a misdemeanor of \$1,000 to a specified maximum penalty of \$25,000, as follows:

“(A) Every person who does not hold a license as pilot or as an inland pilot issued pursuant to this division, and who pilots any vessel into or out of any harbor or port of the bays of San Francisco, San Pablo, and Suisun, or who acts as a pilot for ship movements or special operations upon the waters of those bays, is guilty of a misdemeanor.

“(B) If a vessel refuses or neglects to take and employ a pilot, the vessel, its master, owner operator, charterer, consignee or agent shall: (1) Forfeit and pay to a pilot suing for same a sum equal to the pilotage of the vessel, recoverable by an action in the courts of this state or the pilot may pursue his remedy by filing an action in admiralty in a United States Court, either in personal or in rem, to enforce the lien given him on the vessel, as the pilot may see fit and proper to do; (2) Be liable to pay a civil penalty of up to twenty-five thousand dollars, which penalty shall be payable to the general fund of the State of California; and (3) Be liable to the pilot for all costs and attorney fees incurred.”

**STATUS.** Senator Milton Marks introduced legislation (SB 1641) that was signed into law in 1996 requiring the use of pilots on San Francisco Bay. The recommendation has been carried out. No further action is called for.

## XIV. UNDERKEEL CLEARANCE AND REDUCED VISIBILITY

### 1. Underkeel Clearance.

Many of the navigation channels within the Bay are subject to shoaling because of the nature of the Bay system which is more fully described in the section on harbor depths, channel design and dredging. Accurate tidal information is essential in order to calculate required underkeel clearances. This is particularly critical in the Bay region where one-foot clearances may occur in certain channels. The committee reiterates its support for “real time” accurate measurement of tides, such as the PORTS system recommended in Chapter II General Weather, Tides and Currents.

### Recommendations

#### **XIV.1. The committee determined that the following guidelines should be adopted for underkeel clearances of tank vessels carrying oil or petroleum products as cargo:**

Underkeel clearance is the minimum clearance between the deepest point on the vessel and the bottom of the vessel in still water conditions. Tank vessels carrying oil or petroleum products as cargo shall maintain minimum underkeel clearances as listed below. The underkeel clearances are minimum standards during normal weather conditions. Masters and pilots shall at all times use prudent seamanship and shall evaluate the need for clearance in excess of these guidelines in adverse weather conditions, or when other circumstances would require such evaluation.

- a. Vessels west of the Golden Gate Bridge: Ten percent (10%) of the vessel’s draft.
- b. Vessels under way east of the Golden Gate Bridge: Two feet (2)
- c. Vessels at final approach to berth and at berth: Always afloat.

**STATUS.** On July 30, 1996, the Coast Guard published the Final Rule (effective November 27, 1996) regarding Operational Measures to Reduce Oil Spills for Existing Tank Vessels of 5,000 gross tons or more without double hulls. In part, the regulations required the Master to calculate the vessel’s deepest navigational draft, the controlling depth of the waterway and the anticipated underkeel clearance. In addition, the Master and Pilot were to discuss the tankship’s planned transit and required owner notification. Following issuance, the Coast Guard received comments expressing concern regarding the new provisions. Because of these concerns, the Coast Guard suspended the effective date of the owner notification part of the Final Rule. Coast Guard Headquarters is currently reviewing the comment submissions.

A working Group has been formed with representatives from the San Francisco Bar Pilots, Coast Guard, Port authorities and tankship companies to evaluate the process of calculating, in a dynamic condition, underkeel clearances with the goal of promulgating COTP guidance on minimum clearances for the San Francisco Bay Area.

## 2. Reduced Visibility

Fog is a well known problem in the Bay Area, particularly around the Golden Gate. It is most common during the summer, occasional during fall and winter, and infrequent during spring. Unfortunately the long-term fluctuations are not predictable but daily and seasonal cycles are.

**Summer.** Summer fog is dependent on several routine conditions. The Pacific High becomes well established off the coast and maintains a constant Northwest wind. It also drives the cold California Current south and causes an upwelling of cold water along the coast. Air closest to the surface becomes chilled so that the temperature increases with altitude. This forms an inversion layer at about 500–1,500 feet. Moist, warm ocean air moving toward the coast is cooled first by the California Current, then more by cold coastal water. Condensation occurs and fog will form to the height of the inversion layer. This happens often enough to form a semi permanent fog bank off the Golden Gate during the summer. Under normal summer conditions a daily cycle is evident. A sheet of fog forms off the Golden Gate headlands during the morning and becomes more extensive as the day passes. As the temperature in the inland valleys rise, a local low pressure area is created, and a steady in draft takes place. By late afternoon the fog begins to move through the Golden Gate at a speed of about 14 knots on the afternoon sea breeze. Once inside the bay it is carried by local winds. In general the north part of the bay is the last to be enveloped and the first to clear in the morning. There are times when the flow is so strong that the sea fog penetrates as far east as Sacramento and Stockton. If it continues for a few days, cooler ocean air replaces the warm valley air and causes the sea breeze mechanism to break down. Winds diminishes and the Bay Area clears for a few days. Slowly the valley reheats and starts the cycle again.

**Winter.** Winter fogs are usually radiation fog or “tule” fog. With the clear skies and light winds, land temperature drops rapidly at night. In low damp, places such as the Delta and central valley (where tules and marsh plants grow) it results in a shallow radiation fog (moist sea air reacting to cold land mass) which may be quite dense. In contrast to the summer fog that moves from sea to land at about 14 knots, the winter tule fogs move slowly seaward at about 1 knot.

Fog patterns can differ within the Bay region on the same day because of the unique geography of the Bay, which consists of two mountain ranges, the large expanse of bays, and a major river system. For example, on a summer day, a ship going under the Golden Gate Bridge may be in dense fog, while Benicia, its destination some thirty miles away, may be in bright sunshine. Conversely, on a winter day, tule fogs may completely obscure the Carquinez Strait, while high fog or sunshine may occur in the Central Bay. This phenomenon is more completely described in the book, *Weather of the San Francisco Bay Region*, by Harold Gilliam characterizes Bay region weather as: “Probably no comparable area on earth displays as many varieties of weather simultaneously as the region around San Francisco Bay. Because of these complex forms of the land, there is actually no such thing as Bay Region climate.”

Bay fog patterns occur in daily, weekly and seasonal cycles. A daily cycle might occur during the summer when fog rolls in from the cool ocean over gaps along the coastal hills at night, to be “burned off” by the morning sun. The incoming cool, heavy sea air begins to replace the rising, warm land air, and the valley nearest the Bay cools off. When the valley cools sufficiently, the fog system breaks down and the area will be fog-free for a few days until the entire process begins again. This cycle can continue weekly. However, depending on the location, an area may experience high fog, dense fog or relatively little fog. Depending upon high and low pressure systems over the continent, these cycles may be erratic.

**Safety Issues Associated with Adverse Weather Conditions .** Reduced visibility during periods of fog requires that mariners observe caution particularly when going under the bridges spanning the Bay. At times shipping is stopped in the Carquinez Strait when low fog reduces visibility to unsafe distances. Generally during periods of dense fog, ships remain at their dock. If a ship is underway, the decision might be made to anchor until there is improved visibility. In addition, radar targets may be difficult to obtain during periods of decreased visibility, especially images of small vessels. Due vigilance must be used in the more heavily traveled navigation lanes, where deep draft vessels cross movements with other large vessels. Notwithstanding, the Captain of the Port has the authority to prohibit movement of vessels within all or portions of the Bay during adverse weather conditions.

Because of the large size of the Bay (500 square miles), the longer distances traveled to the various ports, and the diverse weather conditions encountered in the Bay, mariners are dependent on accurate weather forecasting for vessel movements. To increase the reliability of Bay Area marine weather forecasts, the National Weather Service installed a weather radio devoted exclusively to marine weather data.

The National Weather Service pointed out that the new doppler radar is not capable of tracking weather patterns below 3,500 feet because of the radar’s elevation above sea level. This is particularly important to Bay area mariners because wind patterns below 3,500 feet can radically shift in a short period of time, signaling an abrupt change in the weather. Because of the coastal hills, very localized wind conditions exist just outside the Golden Gate at the entrance to the harbor and else where in the Bay. In February, 1996, three container ships were significantly damaged by strong winds suddenly shifting in the Oakland Harbor. The cost to install a ‘wind profiler’ was estimated to be \$250,000. However, funds for the ‘wind profiler’, which would provide real time wind information, have been denied. Until more sophisticated equipment can be installed, the National Weather Service is encouraging input on real time conditions from the maritime community by contacting the National Weather Service at (408) 656-1710 x245 or (800) 437-2689 and ask for extension 245.

## **Recommendations**

**XIV.2. Restricted Visibility.** Because it may be more dangerous for a vessel to remain offshore in the Pacific Ocean in the approaches to the Bay during periods of restricted visibility, vessels inbound from the Pacific Ocean should continue to proceed from the Pilot Area into the Bay to a safe anchorage.

**STATUS:** No change to recommended guidelines.

**XIV.3.** Ships within the Bay at a dock or at a safe anchorage should not commence movement if visibility is less than .5 nautical miles throughout the intended route, unless the Pilot's assessment of all variables listed under general principles is that the vessel can proceed safely. The Pilot's local knowledge should include knowledge of historic weather patterns during that time of year, current weather reports, and checking with reporting stations along the route. This guideline acknowledges that the Bay region is a series of bays and rivers, in-Bay distances are long and that there is not a single Bay region climate, but a series of many microclimates with variable fog.

**STATUS:** No change to recommended guidelines.

## XV. ECONOMIC AND ENVIRONMENTAL IMPACTS

The Harbor Safety Plan must identify and discuss the potential economic and environmental impacts of implementing the provisions of the Plan, and describe the significant differences in the restrictions that could vary from port to port within the geographic boundaries of the plan.

### **Economic Impacts**

In order to make an economic assessment of the impacts of implementing the plan, recommendations which have a cost implication are identified with their potential economic impact. The following recommendations have a direct cost and an economic impact:

- **Tides and Currents.** Federal, State and/or local funding is necessary for NOAA to conduct frequent, up to date surveys of major shipping channels and turning basins, and for the San Francisco Marine Exchange to operate and maintain the P.O.R.T.S. system.
- **Harbor Depths, Channel Design and Dredging.** Conducting comprehensive annual condition surveys noting depths alongside and at the head of their facilities would be a cost for each facility owner or operator. Conducting more frequent, up to date surveys of channels known to shoal rapidly (i.e. Pinole Shoal Channel and Bulls Head Channel) would require an allocation of funds from the U.S. Corps of Engineers and NOAA.

Establish a new, two way traffic separation scheme north of Alcatraz by lowering areas such as Arch Rock, Harding Rock, and Shag Rocks to a minimum of 55' MLLW would cost between \$25 to \$43 million of federal and state (local) funds. More precise estimates depend on Corps of Engineers studies to determine the material composition of the submerged rocks, the preferred method of engineering and on subsequent removal estimates.

- **Bridge Management.** The cost of installation and maintenance of energy absorbing fendering systems, bridge clearance gauges, water level gauges at bridge approach points, navigational lighting and racons on bridges over navigable waterways, where needed, would be borne by the individual bridge owners and operators such as the Union Pacific Railroad, CalTrans and the Golden Gate Bridge District.
- **San Francisco Vessel Traffic Service (VTS).** Expand VTS to north of the San Rafael Bridge and east of the Carquinez Strait and upgrade the existing VTS to include state-of-the-art technology (federal funds).
- **Tug Escorts.** The cost of tug escorts and standby tugs for ships and barges underway carrying more than 5,000 long tons of oil bulk as cargo in tug escort zones defined in the Plan are directly borne by the shipper.
- **Pilotage.** Future recommendations for pilotage may have cost implications.

- **Small Vessels.** Federal, State and/or Local funding is necessary to maintain and enhance the publication and distribution of pamphlets, brochures, videos, signs and other materials to increase boater education on shipping lanes, rules of navigation and safety guidelines for recreational boaters operating smaller vessels.

Each of the recommendations listed above has a cost that would be incurred by a commercial operator, port facility, or government agency if that recommendation were implemented. To that extent, these would be economic impacts of the Harbor Safety Plan. Generally these items of cost are either capital items (such as new navigational equipment on bridges) or additional duties for an established agency.

The economic impact of the Harbor Safety Plan appears to fall equally on government agencies and private industry. The Corps of Engineers, NOAA, bridge owners and operators, and each port and facility operator would be required to spend money to improve facilities they own or operate in order to meet the recommendations of the Harbor Safety Plan. In addition, private industry would be required to meet the cost of escort tugs and possible increased pilotage.

### **Differences in Restrictions from Port to Port**

Eight ports are within the geographic boundaries of the Harbor Safety Plan: San Francisco, Oakland, Encinal Terminals, Richmond, Redwood City, Benicia, Sacramento, and Stockton. Nothing in this Plan would disadvantage anyone of these port as compared to any other port within the plan area.

### **Environmental Impact**

San Francisco Bay is a unique geographical area. It is the largest estuary on the Pacific Coast north of South America and south of Alaska with a shoreline, including sloughs and certain waterways, of approximately 1,000 miles. Sixty-five percent of the rainfall in California drains into rivers and creeks that feed the Bay.

Because of its size and shelter from the open ocean, San Francisco Bay is one of the most important harbors in the world. San Francisco Bay is the fifth busiest port in the United States in total ship calls and in deadweight tons. Reflecting the trend in total U.S. commodities, a large percentage of the material shipped is petroleum. Chemical shipments are also substantial. Although popular, the Bay has a number of challenges to navigation, such as shallow waterways, narrow shipping lanes, vessel traffic, strong tides and currents, and occasional bad weather conditions, such as dense fog and strong winds.

The Harbor Safety Plan has increased the level of navigational safety for the San Francisco Bay Region and the Ports of Sacramento and Stockton.

A major oil spill accident could cause millions of dollars in damage to the marine environment, adversely affecting a variety of Bay resources including wildlife habitats, water quality, commercial and recreational fishing, recreational areas, businesses, personal property and human safety. San Francisco Bay is part of the Pacific Flyway; in the winter months over one million birds use the area which could be severely impacted by a sizeable oil spill. The marshlands, mudflats, and open water of San Francisco Bay Estuary provide essential fish and wildlife habitat--food, water, shelter and other benefits--for over 500 species of fish, amphibians, reptiles, birds, and mammals. Twenty of these species are threatened or endangered with extinction. In addition, there are almost as many invertebrate species in the ecosystem as all other animals combined, bringing the total number of species that use the Estuary to over 1,000. Just outside the Golden Gate, several marine sanctuaries cover some of the most productive coastal waters in the world. Spilled oil and certain clean-up operations can threaten the different types of marine habitats and other Bay resources.

As mentioned above, the Harbor Safety Plan has increased navigational safety throughout San Francisco Bay, thereby reducing the likelihood of a maritime accident that could result in the spill of a hazardous material, such as oil. Further, the Harbor Safety Committee, composed of representatives from the maritime community, port authorities, pilots, tug operators, the United States Coast Guard, the Office of Spill Prevention and Response, the petroleum and shipping industries, and others with expertise in shipping and navigation regularly meet to develop additional strategies to further safe navigation and oil spill prevention and update the Harbor Safety Plan accordingly. As such, the Harbor Safety Plan has an overall beneficial impact on the environment since it furthers navigational safety and oil spill prevention, thereby helping protect the Bay from the adverse environmental impacts of a potential oil spill.

## XVI. PLAN ENFORCEMENT

The Oil Spill Prevention and Response Act charges that the Harbor Safety Committee ensure that the provisions of the plan be fully and regularly enforced. Traditionally, the Coast Guard has been responsible for the regulation of vessel movements and inspections through the authority vested with the Captain of the Port. Within the geographic boundaries of the Harbor Safety Plan, almost all oil terminals are privately operated and outside of the jurisdiction of local port authorities, with the exception of Pacific Gas and Electric power plant terminal at Pier 70 in the Port of San Francisco, and Gibson Oil Terminal at the Port of Redwood City. Therefore, the Coast Guard has been the mainstay of enforcement within the plan boundaries, and it is expected that the Coast Guard will continue in this role.

Under the Act, the State Lands Commission and the Department of Fish and Game have dramatically increased roles and enforcement responsibilities. The State Lands Commission, along with facilities inspection, inspects vessels that are moored alongside the above-mentioned privately operated terminals, and monitor the cargo transfer operation. In the event, of a violation, and depending upon the nature of the violation, the appropriate state or federal agency is notified. The Department of Fish and Game is charged with the enforcement of state regulations under the Act and will initiate vessel inspections similar to that which the Coast Guard is already doing, and has the power to impose criminal and civil penalties for violations.

Tug Escorts are monitored by the Clearing House. The Clearing House will confirm that all applicable tankers are escorted by an appropriate tug, and that the escort tug is on station prior to the movement of the vessel. In the event that the tug is not on station, the Clearing House contacts the pilot, the master of the vessel, and the shipping company and/or agent and advise them accordingly. The vessel is not to move until the escort tug is on station. The Clearing House notifies the Department of Fish and Game if the vessel moves without escort. In the event that the tug breaks down during an escort, the master and the pilot will determine the safest course of action, whether to stop, to return, or to proceed.

Plan Review of the Harbor Safety Plan is mandated to take place on or before June 30th of each year. At this time, all aspects of the Harbor Safety Plan are assessed and the findings and recommendations for improvements are sent to the Administrator. Annual review will help ensure full, regular, and uniform enforcement.

### **Tug Escort Violations, 2001**

Since the inception of the Tug Escort regulations in 1993 the trend on the number of reported violations has continued to decline. Enforcement personnel from the Office of Spill Prevention and Response only investigated one suspected tug escort violation during the 2001 calendar year. The investigation revealed that the vessel was carrying a non regulated cargo and that no violation had been committed

One formal letter of warning was issued and several cases are still pending action.

## **Recommendation**

**XVI.1. Coordination of Enforcement Responsibilities.** The Coast Guard and the State Department of Fish and Game should coordinate policies and procedures to the greatest extent possible with each other and with other federal, state, and local agencies. Cooperation and coordination between agencies will minimize enforcement of all federal, state, and local regulations. This cooperation is essential since, relative to the Harbor Safety Plan, the Coast Guard is the primary enforcement agency for federal regulations, and the State Department of Fish and Game is the primary enforcement agency for state regulations.

**STATUS.** No further action is necessary.

## XVII. OTHER: SUBSTANDARD VESSEL INSPECTION

### Substandard Vessel Examination Program

#### Recommendation

**XVII.1.** Support the U.S. Coast Guard vessel examination program of targeting substandard vessels in the Bay.

**STATUS.** Beginning May 1, 1994, the Coast Guard implemented a revised vessel boarding program designed to identify and eliminate substandard ships from U.S. waters. The program pursues this goal by systematically targeting the relative risk of vessels and increasing the boarding frequency on high risk (potentially substandard) vessels. Each vessel's relative risk is determined through the use of a Boarding Priority Matrix which factors the vessel's flag, owner, operator, classification society, vessel particulars, and violation history. Vessels are assigned a boarding priority from I to IV with priority I vessels being the potentially highest risk. This program also aligns Coast Guard efforts with international initiatives through reliance upon a two-tiered boarding process where the greatest effort, and most detailed examinations, are reserved for the highest risk vessels.

The International Maritime Organization (IMO) adopted an amendment to SOLAS with provisions entitled "*Special Measures to Enhance Marine Safety*" which became effective January 1, 1996. These provisions allow for operational testing during Port State examinations to ensure Masters and crews are familiar with essential shipboard procedures relating to ship safety.

The Vessel Boarding Branch (VBB) continued its mission in identifying and eliminating substandard foreign commercial vessels from US waters by use of the Coast Guard's risk-based boarding priority matrix system. In calendar year 2000, the Captain of the Port, San Francisco Bay detained 6 vessels due to major safety discrepancies under SOLAS, other IMO conventions and U.S. law, including the arrest of one vessel's captain for falsifying records and making false statements to Coast Guard officials. Inadequate crew performance accounted for 2 of these vessels (33.3%), poor material conditions accounted for 2 vessels (33.3%) and violations of the ISM code accounted for another 2 vessels (33.3%) including one tankship that was found to have ballast tanks in an explosive condition. Overall, VBB boarded 373 (16%) of the 2287 foreign vessels that transited San Francisco Bay. This translates into a detention ratio of nearly 2% of the vessels boarded.

## XVIII.HUMAN FACTORS WORKING GROUP AND PREVENTION THROUGH PEOPLE WORKING GROUP

### 1. Human Factors Working Group

**XVIII.1** In Y2000, the Human Factors Working Group was assigned only one topic. It met once on February 3, 2000.

#### **Scope and Purpose**

**Scope:** San Francisco Bay and Tributaries: To study the movement of ships along a continuous berth or pier for the purpose of repositioning.

**Purpose:** To review and make a recommendation to the Harbor Safety Committee as to the risk of line hauling vessels along the dock in San Francisco Bay. The review and recommendation should consider the relative safety of the operation and mitigating factors that reduce the level of risk.

#### **Process:**

***Reviewed current operations:*** We had representatives from every major terminal in the Bay that regularly engaged in line hauling operations. We also had members of the Tanker Operators, Ship Operators, Tugboat service providers, San Francisco Bar Pilots, OSPR, State Lands Commission, the United States Coast Guard and a Naval Architect/Marine Engineer. We went through, in detail, the processes and procedures currently employed in the industry when ships are line hauled.

***Performed a Risk Assessment:*** The Group then began the process of Risk Assessment. It reviewed historical data from the KURE incident in Humboldt Bay. We took a look at all casual factors and changes in practice taken as a result of those incidents.

#### **CONCLUSIONS**

- Terminal operations in the Bay appear to be healthy. “Few, if any, recordable incidents.”
- A pre-op plan is critical.
  - This includes a face-to-face pre-shifting conference between ship and facility
- Captains are discouraged by economics to hire tugs. Terminals and facilities should seriously look at Criteria that will help justify then requiring the use of a tug to protect the terminal property. Terminals should develop Criteria for when tugs should be used, i.e. environmental conditions.

- Sharing of information by operators is a valuable tool that should be encouraged. All terminals agreed to look at the best sharing practices.
- Pilot participation in the majority of these operations would not bring any additional level of safety. Unusual or longer moves involving tugs may warrant participation of a pilot.
- The key to a good record is in existing practices and procedures. These are both formal and informal.
- This forum did not address more irregular line haul moves that take place from time to time in the Bay, such as vessels shifting one or more full berths for repairs or during layup.

### **Recommendation**

*The Working Group's recommendation is that the terminals should look at formalizing their practices and procedures into policies to ensure continued safe operations as staff turnover occurs.*

## **2. Prevention through People Working Group**

**XVIII.2.** Recent analysis indicates that up to 80% of all marine casualties are caused by people, not material or systems' failures. Prevention of accidents through examining human and organizational factors is receiving increased attention by government and industry as the maritime industry becomes more mechanized.

The Prevention through People Working Group, (hereafter PTP), was appointed by the Harbor Safety Committee of the San Francisco Bay Region on October 16, 1997.

The membership in the PTP Working Group varies depending on its project schedule. All meetings are attended by representatives of the Secretariat, VTS, MSO, Bar Pilots, State Lands Commission, and such other members of the Harbor Safety Committee as may be interested in its proceedings.

STATUS: Margot J. Brown, National Boating Federation, remains as the Chair of the PTP Working Group. Meetings take place at least once a month, usually at the offices of the State Lands Commission Marine Facilities Office in Hercules, CA.

The Working Groups main emphasis remains in the area of communications. The "Guide to Recreational Vessel Communications" was printed and distributed in 2001, thanks to funding provided by the California Department of Boating and Waterways.

Work has proceeded on a brochure entitled "Where the Heck is Collinsville", a guide to marine geography and facility names in the San Francisco Bay area. The Office of Spill Prevention and Response will sponsor publication of this guide, early in the year 2002. "Mariner, do you speak Channel 14" will have to be reprinted as a companion to the above brochure.

## XIX. WORK GROUP REPORTS

### FERRY OPERATORS WORK GROUP ACCOMPLISHMENTS & GOALS

The Ferry Operators Work Group has been looking for a solution regarding wake issues along the San Francisco waterfront. The possibility of wake signage posted along the waterfront to eliminate this problem was one option, but later decided due to numerous issues it would be put on the back burner. It was recommended that word of mouth and working together with the Bay Area Ferry Operators and other maritime groups and agencies could resolve this problem.

The work group also drafted a letter on behalf of the Harbor Safety Committee to our congressional representatives supporting additional funding for the design of a new debris removal vessel to work in conjunction with the existing vessel, the MV Raccoon. The HSC approved the letter.

The goals for this group include enhancing communication among the ferry operators and providing resources and a venue to work toward solutions on matters arising relating to the safe operation of ferries on the San Francisco Bay.

May 9, 2002

TO: Captain Lynn Korwatch, Clearinghouse Executive Secretary  
FROM: Captain Larry Teague, HSC Navigation Work Group  
SUBJECT: Annual report

Captain Korwatch,

The following is a list of the Accomplishments and Goals of the Navigation Work Group:

**ACCOMPLISHMENTS:**

- 1.) We have successfully developed a system to electronically receive COE surveys, thus eliminating the long previously experienced delays. We have a much closer working relationship with the COE and NOAA, which greatly benefits the information and expertise shared.
- 2.) We identified the need for the Avon Turning Basin and developed a suitable design. To that end, we assisted Contra Costa County and the COE in expediting the design and permit process.
- 3.) We worked closely with, and provided assistance, to the Port of Oakland with their 50 ft. channel project.

**GOALS:**

- 1.) To continue to work with the COE and NOAA to develop an even better format for electronic charts, looking to merge COE surveys with NOAA Vector charts.
- 2.) To continue to work with Contra Costa County and the COE to complete the Avon Turning Basin project.
- 3.) To develop a working relationship with the Sacramento District COE in order to develop electronic charts of the Sacramento and San Joaquin Rivers, similar to the system developed with the San Francisco District.

Respectfully submitted,

Captain Larry Teague

## **Prevention Through People Work Group Accomplishments**

From: Margot Brown

Subject: PTP Annual Review

STATUS: Margot J. Brown, National Boating Federation, remains as the Chair of the PTP Working Group. Meetings take place at least once a month, usually at the offices of the State Lands Commission Marine Facilities Office in Hercules, CA.

The Working Groups main emphasis remains in the area of communications. The "Guide to Recreational Vessel Communications" was printed and distributed in 2001, thanks to funding provided by the California Department of Boating and Waterways.

Work has proceeded on a brochure entitled "Where the Heck is Collinsville", a guide to marine geography and facility names in the San Francisco Bay area. The Office of Spill Prevention and Response will sponsor publication of this guide, early in the year 2002.

## TUG ESCORT WORK GROUP

From: Joan Lunstrom

Subject: Tug Escort Work Group Annual Review

### Last Year's Goals:

Permanent Tug Escort Regulations for the Bay have been in effect since 1997. The Tug Escort Work Group decided this was time to review major parts of the regulations, not necessarily to make changes, but to update industry practice, experience and relevant studies. The following areas were identified for study:

- Tug/Tanker Matching Matrix
- Full Redundancy: Standards in Regulations?
- Clearinghouse: Scope of Work
- Fittings on Tankers: Information Only

In addition, the Work Group decided to pursue the 1998 Harbor Safety Committee recommendation that vessels carrying dangerous cargo be required to have tug escort. This recommendation would require approval by the State Legislature.

### Accomplishments:

1. Tug/Tanker Matching Matrix. The Work Group, comprised of representatives of the Harbor Safety Committee, and a broad range of representatives of the maritime industry, reviewed the following information:
  - a. Methods and Assumptions Used in Calculation of the Default Selection Matrix, by David Gray, Glostern Associates, as presented to the Tug Escort Work Group on Nov. 7, 2001.
  - b. Long Beach Full Scale Trials, Sea River Maritime
  - c. Strait of Georgia Full Scale Trials, Sea River Maritime
  - d. Marine Exchange Total Tanker Arrivals for 2000 in San Francisco Bay
  - e. Graph: Frequency of Deadweight Tonnage Arriving in San Francisco Bay in 2000
  - f. Pilot Incident Report of Main Engine Failure M/T Acoaxet, October 26, 2001, Capt. Gregg Waugh

Based upon this review and discussion of the initial premises which were the basis of the matrix, the Work Group concluded that the tug/tanker matching matrix remained valid and should not be modified. The Harbor Safety Committee accepted these findings at its February 14, 2002 meeting.

2. Recommendations for Conducting Escort Training on San Francisco Bay. However, as a result of its study of the Tug/Tanker Matching Matrix, the Work Group determined that in order for tug escorts to be effective in an emergency, training of escort tug and ship crews under pilot direction should be addressed. The Work Group concluded that training exercises could not be mandated by regulation as the training exercises must be individual to the tugs and vessels because of the wide variety of tankers, barges and tugs and variety of conditions. For example, 268 different tankers called in the Bay in 2000.

Instead, a subcommittee was formed to draft generic 'Recommendations for conducting Escort Training on San Francisco Bay, which would be voluntary, by agreement, at the ship master's discretion. Draft of the Recommendations were circulated to various tug, tanker and barge companies and to the San Francisco Bar Pilots. Subsequently, at the May 9, 2002 Harbor Safety Committee meeting, the Committee approved the Recommendations for inclusion in the Harbor Safety Plan (see Appendix F). The Secretariat, through the Marine Exchange, then will send a letter on behalf of the Committee to all affected parties in the maritime community, encouraging companies to adopt the Recommendations. Also the Tug Escort Work intends in one year to review the progress of the training through informal reports from industry.

Goals for Next Year:

1. Proposed Mandatory Tug Escort for Vessels Carrying Dangerous Cargo.
2. Continue Review of Tug Escort Regulations:
  - a. Full Redundancy: Standards in Regulation?
  - b. Clearinghouse: Scope of Work?
  - c. Fittings on Tankers: Information Only

Respectfully submitted,

Joan Lundstrom

Memorandum

Date: May 7, 2002

To: Harbor Safety Committee, San Francisco Bay Region

From: Len Cardoza

Subject: Underwater Rocks Work Group 2001 Annual Report

2001: The Underwater Rocks Work Group accomplished the following goals and objectives during calendar year 2001:

a. Revised the project purpose statement as follows:

The Purpose for the San Francisco Central Bay Rock Removal Project is to take actions to prevent groundings on the rock mounds in Central San Francisco Bay near the existing deep-draft channels. The prevention of groundings could significantly reduce the risk of oil and fuel spills from occurring in the Central Bay. These actions would further serve to improve navigational safety and reduce significant environmental and economic damages within all of San Francisco Bay.

b. Worked closely with the Corps of Engineers to complete the following key technical studies in support of the Federally authorized Feasibility Study to investigate the lowering of rocks identified as hazards to navigation in the Central San Francisco Bay, and posted them on the San Francisco District, Corps of Engineers Website, [www.spn.usace.army.mil/](http://www.spn.usace.army.mil/) (Click on publications/studies for reports referenced below).

- Benthic Survey
- Marine Geophysical Investigation
- Cultural Resources Survey.

c. Worked closely with the Corps of Engineers to make significant progress on the following technical studies in support of the Feasibility Study:

- Risk Assessment Model.
- Oil Spill Model.

d. Prepared a listing of preliminary alternatives as part of the plan formulation process for the project. They include Structural Measures (Rock Lowering Alternatives and Channel/Lane Rerouting Alternatives) and Non-Structural Alternatives (Enhanced Tug Escort, Clean-up Response, and Aids to Navigation). Initiated a discussion of construction techniques and disposal of rock rubble; environmental comparisons; and the no action (without project) alternative necessary to complete the NEPA/CEQA process.

2002. The Underwater Rocks Work Group identified the following goals and objectives for calendar year 2002:

a. Complete the following key technical studies in support of the Feasibility Study:

- Risk Assessment Model.
- Oil Spill Model.

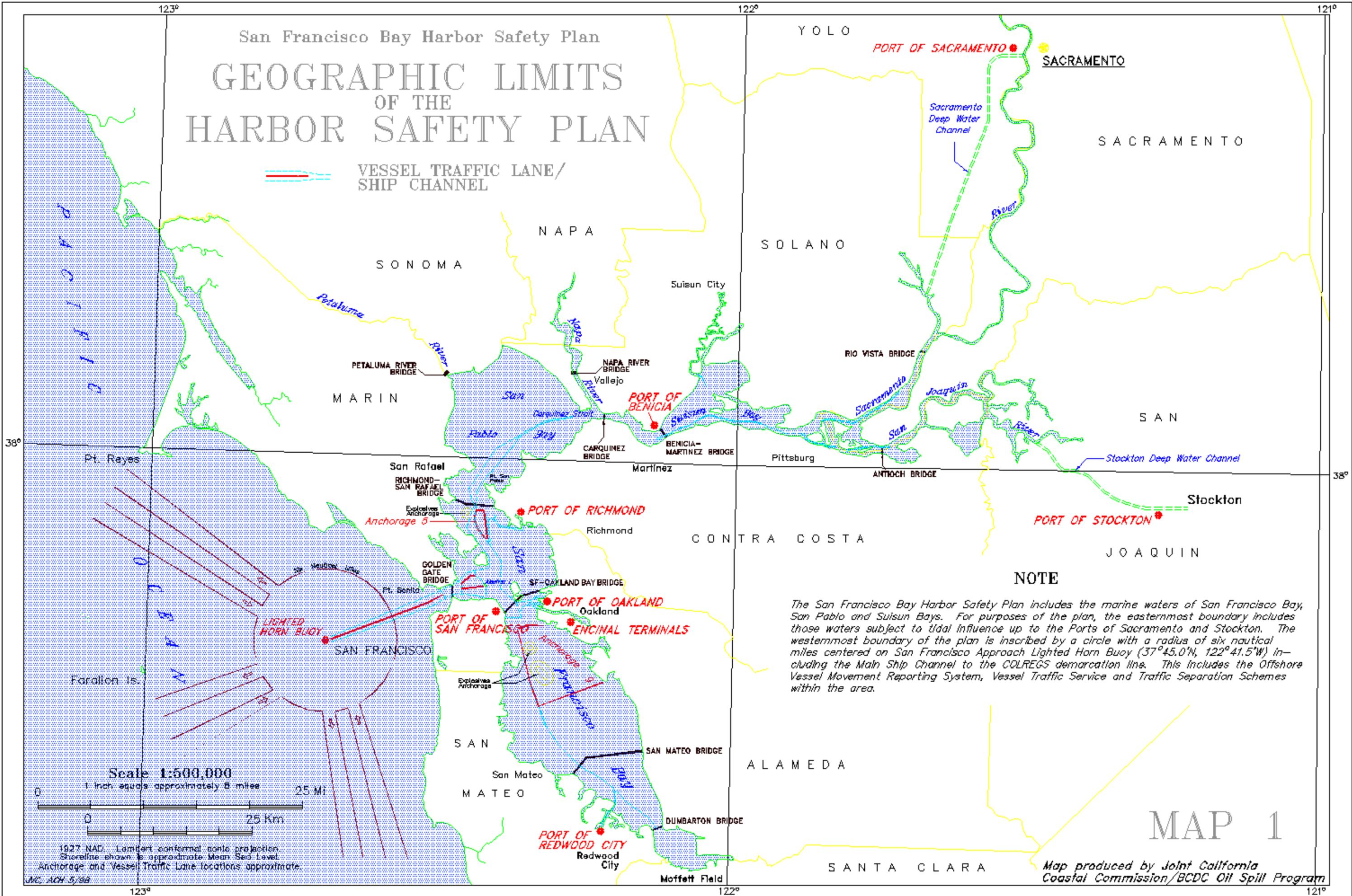
b. Schedule and conduct the F-3 Conference (Feasibility Scoping Meeting). The conference will focus on the present project area conditions, and the economic analysis / risk assessment for the project, together with preliminary alternatives analysis.

c. Complete the draft Environmental Impact Statement/Report for the project.

# San Francisco Bay Harbor Safety Plan

## GEOGRAPHIC LIMITS OF THE HARBOR SAFETY PLAN

VESEL TRAFFIC LANE/  
SHIP CHANNEL



### NOTE

The San Francisco Bay Harbor Safety Plan includes the marine waters of San Francisco Bay, San Pablo and Suisun Bays. For purposes of the plan, the easternmost boundary includes those waters subject to tidal influence up to the Ports of Sacramento and Stockton. The westernmost boundary of the plan is inscribed by a circle with a radius of six nautical miles centered on San Francisco Approach Lighted Horn Buoy (37°45.0'N, 122°41.5'W) including the Main Ship Channel to the COLREGS demarcation line. This includes the Offshore Vessel Movement Reporting System, Vessel Traffic Service and Traffic Separation Schemes within the area.

# MAP 1

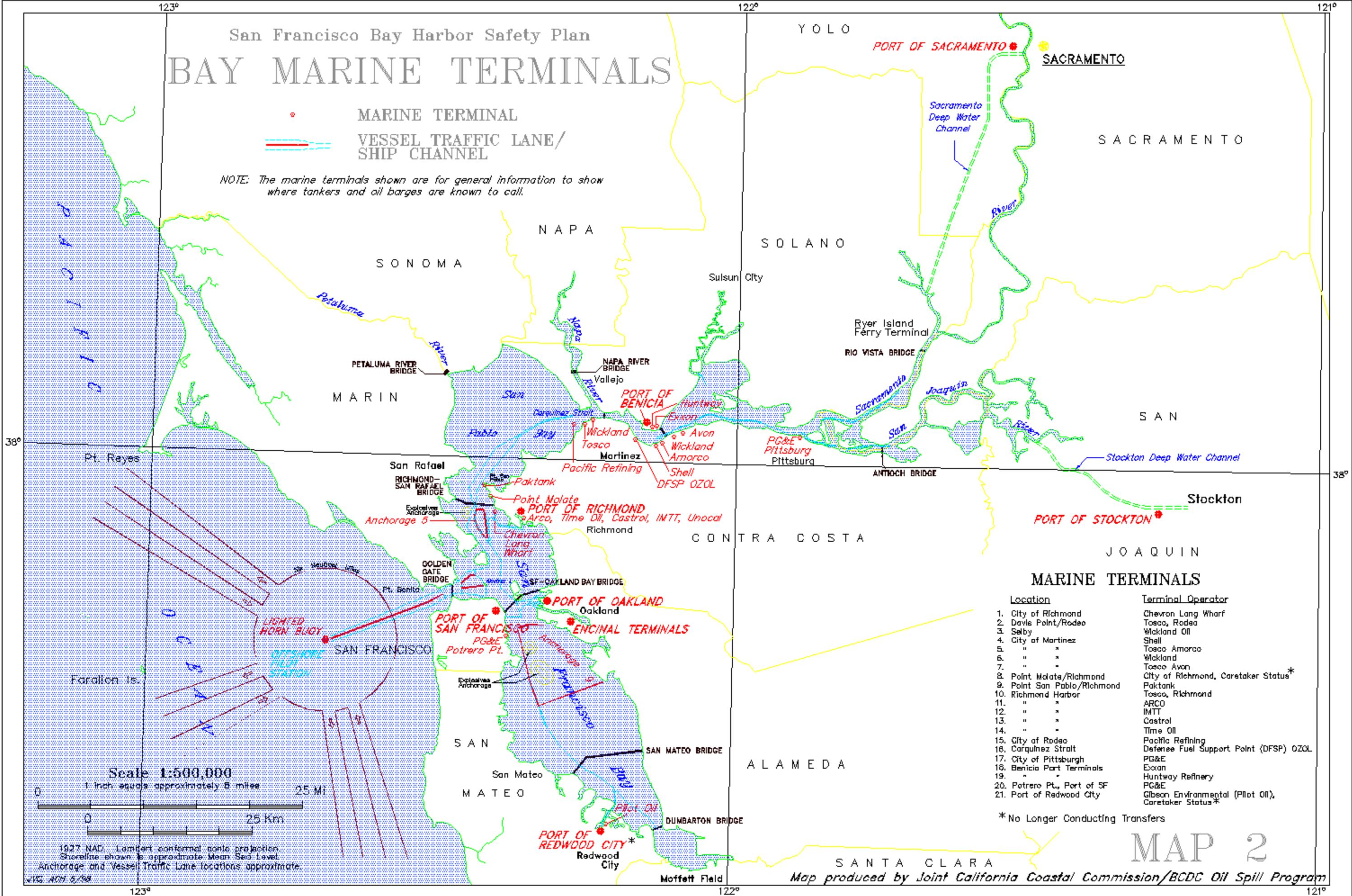
Map produced by Joint California Coastal Commission/BCDC Oil Spill Program

# San Francisco Bay Harbor Safety Plan

## BAY MARINE TERMINALS

● MARINE TERMINAL  
— VESSEL TRAFFIC LANE/  
 SHIP CHANNEL

NOTE: The marine terminals shown are for general information to show where tankers and oil barges are known to call.



### MARINE TERMINALS

| Location                    | Terminal Operator                                   |
|-----------------------------|---|
| 1. City of Richmond         | Chevron Long Wharf                                  |
| 2. Davis Point/Rodeo        | Tosco, Rodeo  |
| 3. Selby                    | Wickland Oil  |
| 4. City of Martinez         | Shell   |
| 5. " "                      | Toaco Amarco  |
| 6. " "                      | Wickland  |
| 7. " "                      | Toaco Avon  |
| 8. Point Malate/Richmond    | City of Richmond, Caretaker Status*                 |
| 9. Point San Pablo/Richmond | Paktank   |
| 10. Richmond Harbor         | Tosco, Richmond                                     |
| 11. " "                     | ARCO  |
| 12. " "                     | IMTT  |
| 13. " "                     | Castrol   |
| 14. " "                     | Time Oil  |
| 15. City of Rodeo           | Pacific Refining                                    |
| 16. Carquinez Strait        | Defense Fuel Support Point (DFSP) OZOL              |
| 17. City of Pittsburg       | PG&E  |
| 18. Benicia Port Terminals  | Exxon   |
| 19. " "                     | Huntway Refinery                                    |
| 20. Potrero Pt., Port of SF | PG&E  |
| 21. Port of Redwood City    | Gibson Environmental (Pilot Oil), Caretaker Status* |

\*No Longer Conducting Transfers

## MAP 2

Map produced by Joint California Coastal Commission/BCDC Oil Spill Program

1927 NAD, Lambert conformal conic projection.  
 Shoreline shown is approximate Mean Sea Level.  
 Anchorage and Vessel Traffic Lane locations approximate.

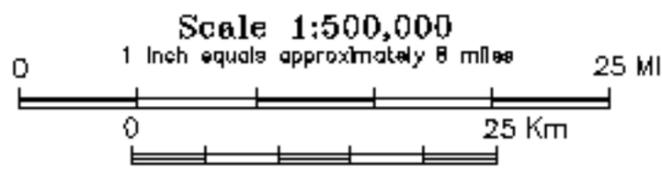
123°

122°

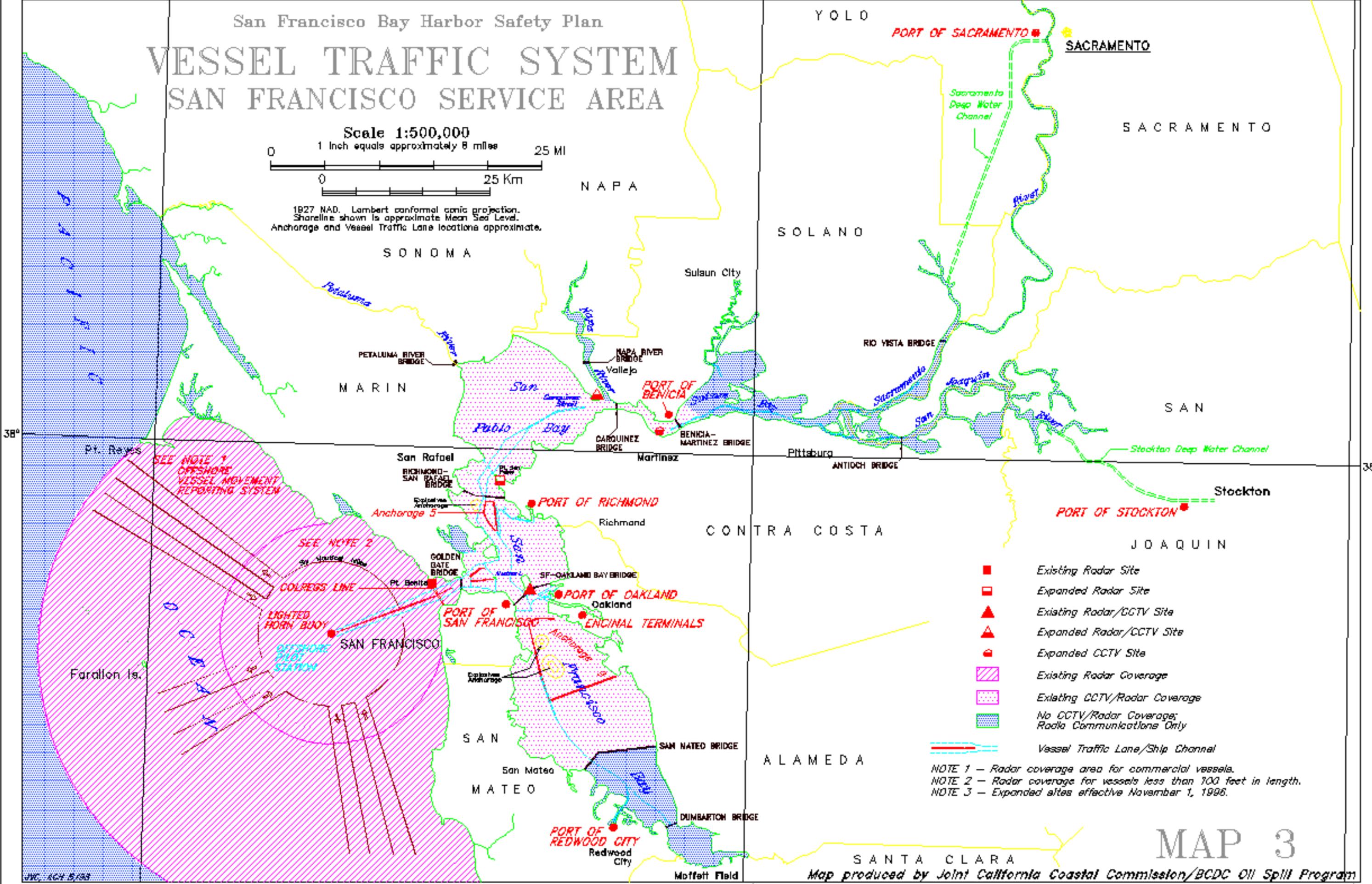
121°

# San Francisco Bay Harbor Safety Plan

## VESSEL TRAFFIC SYSTEM SAN FRANCISCO SERVICE AREA



1927 NAD, Lambert conformal conic projection.  
Shoreline shown is approximate Mean Sea Level.  
Anchorage and Vessel Traffic Lane locations approximate.



- Existing Radar Site
- ▣ Expanded Radar Site
- ▲ Existing Radar/CCTV Site
- ▴ Expanded Radar/CCTV Site
- Ⓜ Expanded CCTV Site
- ▨ Existing Radar Coverage
- ▩ Existing CCTV/Radar Coverage
- ▧ No CCTV/Radar Coverage; Radar Communications Only
- Vessel Traffic Lane/Ship Channel

NOTE 1 - Radar coverage area for commercial vessels.  
NOTE 2 - Radar coverage for vessels less than 100 feet in length.  
NOTE 3 - Expanded areas effective November 1, 1996.

### MAP 3

Map produced by Joint California Coastal Commission/BCDC Oil Spill Program

JVC 604 B/83

123°

122°

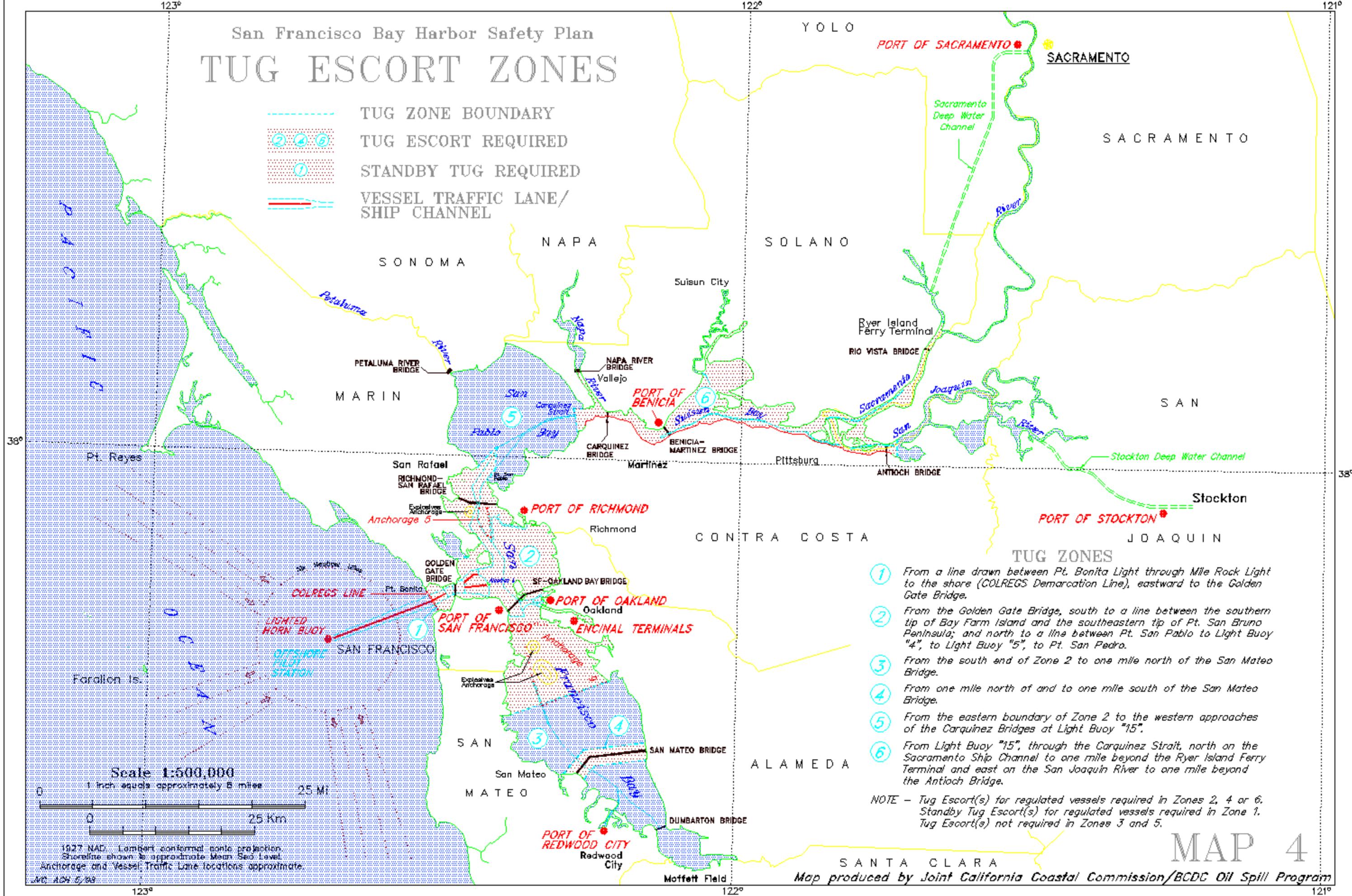
121°

38°

38°

# San Francisco Bay Harbor Safety Plan TUG ESCORT ZONES

-  TUG ZONE BOUNDARY
-  TUG ESCORT REQUIRED
-  STANDBY TUG REQUIRED
-  VESSEL TRAFFIC LANE/  
SHIP CHANNEL



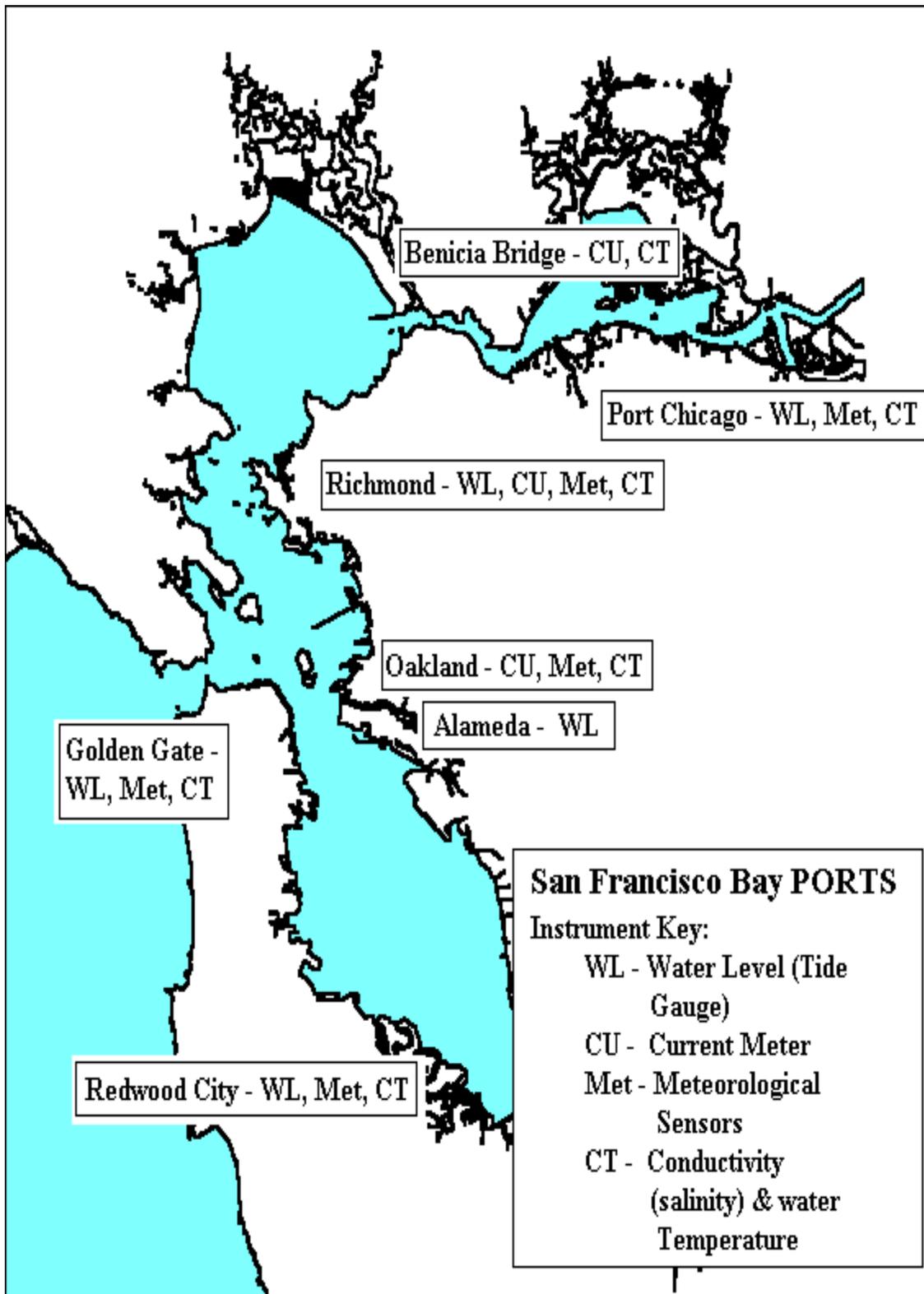
- ### TUG ZONES
- ① From a line drawn between Pt. Bonita Light through Mile Rock Light to the shore (COLREGS Demarcation Line), eastward to the Golden Gate Bridge.
  - ② From the Golden Gate Bridge, south to a line between the southern tip of Bay Farm Island and the southeastern tip of Pt. San Bruno Peninsula; and north to a line between Pt. San Pablo to Light Buoy "4", to Light Buoy "5", to Pt. San Pedro.
  - ③ From the south end of Zone 2 to one mile north of the San Mateo Bridge.
  - ④ From one mile north of and to one mile south of the San Mateo Bridge.
  - ⑤ From the eastern boundary of Zone 2 to the western approaches of the Carquinez Bridges at Light Buoy "15".
  - ⑥ From Light Buoy "15", through the Carquinez Strait, north on the Sacramento Ship Channel to one mile beyond the Ryer Island Ferry Terminal and east on the San Joaquin River to one mile beyond the Antioch Bridge.

NOTE - Tug Escort(s) for regulated vessels required in Zones 2, 4 or 6.  
Standby Tug Escort(s) for regulated vessels required in Zone 1.  
Tug Escort(s) not required in Zones 3 and 5.

## MAP 4

Map produced by Joint California Coastal Commission/BCDC Oil Spill Program

1927 NAD, Lambert conformal conic projection.  
Shoreline shown to approximate Mean Sea Level.  
Anchorage and Vessel Traffic Lane locations approximate.





## Comparative Vessel Movement Totals

|                              | <b>2000</b> | <b>2001</b> | <b>Change</b> |
|------------------------------|-------------|-------------|---------------|
| Total vessel arrivals        | 3,186,314   | 3,144,000   | -1%           |
| Total vessel interbay shifts | 1,706,450   | 1,450,000   | -18%          |
| Total tanker arrivals        | 707         | 784         | 10%           |
| Total tanker interbay shifts | 1,050       | 859         | -22%          |

**Harbor Safety Committee of the  
San Francisco Bay Region Clearing House**  
**Fort Mason Center, Bldg. B, Suite 325  
San Francisco, CA 94123-1380  
Ph. (415) 441-3019 Fax (415) 441-1025**

## Total Tanker Arrivals for 2001 in the San Francisco Bay Region

| Vessel            | Flag | Length | Deadweight | Number of Arrivals |
|-------------------|------|--------|------------|--------------------|
| ACOAXET           | BHS  | 179    | 35,608     | 23                 |
| AFRAGOLD          | ML   | 243    | 86,648     | 1                  |
| AI DING HU        | CH   | 219    | 65,000     | 1                  |
| AKADEMIK SEMENOV  | CY   | 151    | 17,485     | 4                  |
| ALAM BERKAT       | MY   | 182    | 47,236     | 1                  |
| ALAM BITARA       | MY   | 181    | 45,513     | 1                  |
| ALFIOS I          | LBR  | 228    | 63,105     | 1                  |
| ALKAIOS           | BHS  | 225    | 66,234     | 1                  |
| ALKMAN            | BHS  | 225    | 18,524     | 1                  |
| ALLEGIANCE        | USA  | 187    | 34,397     | 4                  |
| ALTAIR VOYAGER    | BHS  | 259    | 135,829    | 1                  |
| AMERICAN PROGRESS | USA  | 183    | 46,095     | 2                  |
| ANELLA            | LBR  | 247    | 97,002     | 1                  |
| ANIARA            | LBR  | 178    | 40,738     | 1                  |
| ANIARA(TTA)       | LBR  | 178    | 40,738     | 1                  |
| ANMAJ             | LBR  | 178    | 44,772     | 1                  |
| ANTARES (GIB)     | GIB  | 174    | 29,954     | 1                  |
| ANTARES (TCH)     | GIB  | 174    | 29,954     | 1                  |
| ARAFURA SEA       | PA   | 244    | 99,500     | 1                  |
| ARAMIS            | CY   | 217    | 60,090     | 5                  |
| ARCADIA (TTA)     | GR   | 219    | 62,654     | 3                  |
| ARCTURUS          | NO   | 141    | 8,650      | 1                  |
| ARGIRONISSOS      | GR   | 183    | 45,425     | 1                  |
| ASIA STAR         | SGP  | 158    | 22,755     | 3                  |
| ASOPOS            | LBR  | 229    | 63,381     | 1                  |

| <b>Vessel</b>       | <b>Flag</b> | <b>Length</b> | <b>Deadweight</b> | <b>Number of Arrivals</b> |
|---------------------|-------------|---------------|-------------------|---------------------------|
| ATLANTIC SWAN       | DN          | 135           | 10,501            | 1                         |
| B.T.ALASKA          | USA         | 290           | 188,099           | 1                         |
| BELGRACE            | NIS         | 183           | 43,534            | 1                         |
| BELGREETING         | LBR         | 186           | 43,549            | 1                         |
| BLUE RIDGE          | USA         | 201           | 42,268            | 13                        |
| BOW FORTUNE         | NO          | 171           | 27,954            | 1                         |
| BOW MARINER         | LBR         | 174           | 38,921            | 2                         |
| BOW PRIMA           | GR          | 176           | 45,655            | 1                         |
| BOW PROSPER         | GR          | 177           | 45,655            | 1                         |
| BOW PUMA            | GR          | 170           | 40,092            | 1                         |
| BOW TRANSPORTER     | NIS         | 174           | 36,112            | 1                         |
| BREGEN              | ML          | 243           | 68,159            | 1                         |
| BUM DONG            | KO          | 136           | 17,303            | 3                         |
| BUM JU              | KO          | 135           | 17,248            | 4                         |
| CAP GEORGES         | GR          | 275           | 147,443           | 2                         |
| CAPTAIN H.A.DOWNING | USA         | 207           | 39,385            | 6                         |
| CHALEUR BAY         | ML          | 229           | 71,345            | 1                         |
| CHAMPION TRADER     | NO          | 169           | 30,990            | 3                         |
| CHEMBULK CASABLANCA | BHS         | 141           | 19,399            | 4                         |
| CHEMBULK FAIRFIELD  | PA          | 127           | 16,456            | 2                         |
| CHEMBULK HONG KONG  | DE          | 179           | 32,758            | 1                         |
| CHEMBULK SHANGHAI   | PA          | 136           | 19,500            | 1                         |
| CHEMBULK VANCOUVER  | LBR         | 179           | 33,540            | 1                         |
| CHERRY GALAXY       | PA          | 148           | 18,700            | 3                         |
| CHESAPEAKE          | USA         | 224           | 50,826            | 1                         |
| CHESAPEAKE TRADER   | USA         | 201           | 50,920            | 5                         |
| CHEVRON ATLANTIC    | BHS         | 269           | 149,748           | 7                         |

| <b>Vessel</b>          | <b>Flag</b> | <b>Length</b> | <b>Deadweight</b> | <b>Number of Arrivals</b> |
|------------------------|-------------|---------------|-------------------|---------------------------|
| CHEVRON COLORADO       | USA         | 198           | 39,842            | 52                        |
| CHEVRON EMPLOYEE PRIDE | BHS         | 275           | 156,447           | 15                        |
| CHEVRON MARINER        | LBR         | 261           | 156,380           | 30                        |
| CHEVRON MISSISSIPPI    | USA         | 247           | 71,336            | 12                        |
| CHEVRON WASHINGTON     | USA         | 199           | 39,795            | 27                        |
| CHIMBORAZO             | EC          | 155           | 16,950            | 2                         |
| CHIMBORAZO (TTA)       | EC          | 229           | 66,138            | 1                         |
| CHINOOK MAIDEN         | PA          | 180           | 45,217            | 1                         |
| COAST RANGE            | USA         | 201           | 40,631            | 24                        |
| CONDOLEEZZA RICE       | BHS         | 246           | 135,829           | 4                         |
| COTOPAXI               | EC          | 228           | 66,100            | 4                         |
| DARTAGNAN              | CY          | 224           | 61,762            | 2                         |
| DENALI                 | USA         | 290           | 191,117           | 2                         |
| DILMUN FULMAR          | CY          | 110           | 9,149             | 1                         |
| DILMUN TERN            | CY          | 151           | 16,946            | 1                         |
| EGRET                  | PA          | 228           | 60,678            | 1                         |
| EKAVI                  | CY          | 228           | 64,972            | 1                         |
| EKTORAS                | CY          | 214           | 53,500            | 2                         |
| ELBE                   | LBR         | 231           | 66,800            | 1                         |
| EMERALD RAY            | PA          | 227           | 71,637            | 2                         |
| EUPEN                  | LU          | 180           | 29,121            | 1                         |
| EVINOS                 | LBR         | 229           | 61,728            | 2                         |
| EVROS                  | LBR         | 178           | 39,990            | 3                         |
| EVROTAS                | LBR         | 209           | 53,534            | 1                         |
| FAITH IV               | SGP         | 229           | 63,765            | 3                         |
| FERTILITY L.           | CY          | 177           | 39,611            | 3                         |
| FORMOSA ELEVEN         | LBR         | 175           | 33,200            | 2                         |

| <b>Vessel</b>    | <b>Flag</b> | <b>Length</b> | <b>Deadweight</b> | <b>Number of Arrivals</b> |
|------------------|-------------|---------------|-------------------|---------------------------|
| FORMOSA NINE     | LBR         | 175           | 36,230            | 1                         |
| FORMOSA SEVEN    | LBR         | 167           | 35,657            | 2                         |
| FORMOSA SIX      | LBR         | 167           | 35,622            | 3                         |
| FORMOSA TEN      | LBR         | 175           | 36,233            | 1                         |
| FOSSANGER        | NO          | 171           | 40,257            | 1                         |
| FOUR BRIG        | CY          | 219           | 73,072            | 4                         |
| FOUR SCHOONER    | CY          | 219           | 72,500            | 4                         |
| FREJA SPRING     | PA          | 183           | 47,110            | 2                         |
| FUJIGAWA         | PA          | 149           | 17,845            | 4                         |
| GAS COLUMBIA     | PA          | 162           | 22,700            | 1                         |
| GAZ DIAMOND      | PA          | 160           | 17,577            | 3                         |
| GAZ KANDLA       | PA          | 184           | 21,380            | 4                         |
| GAZ MASTER       | ML          | 163           | 15,230            | 4                         |
| GAZ SUPPLIER     | NIS         | 194           | 29,528            | 2                         |
| GEORGE SHULTZ    | LBR         | 259           | 136,055           | 1                         |
| GERD             | NIS         | 171           | 31,501            | 1                         |
| GINGA EAGLE      | PA          | 154           | 19,999            | 2                         |
| GINGA FALCON     | PA          | 152           | 19,998            | 1                         |
| GINGA HAWK       | PA          | 148           | 19,316            | 2                         |
| GINGA KITE       | PA          | 148           | 18,700            | 2                         |
| GOLD RIVER (TCH) | VC          | 146           | 13,000            | 1                         |
| GOLDEN EAGLE     | LBR         | 218           | 62,153            | 1                         |
| GOLDEN GATE      | USA         | 223           | 63,141            | 2                         |
| GOLDEN JANE      | PA          | 180           | 16,450            | 2                         |
| GOLDEN TIFFANY   | PA          | 149           | 16,465            | 2                         |
| GONEN            | LBR         | 173           | 47,102            | 1                         |
| GRAN ESPERANZA   | PA          | 246           | 106,684           | 2                         |

| <b>Vessel</b>        | <b>Flag</b> | <b>Length</b> | <b>Deadweight</b> | <b>Number of Arrivals</b> |
|----------------------|-------------|---------------|-------------------|---------------------------|
| GULF NOMAD           | BHS         | 178           | 44,803            | 1                         |
| GULFBREEZE           | ML          | 127           | 12,964            | 1                         |
| HARTING              | HK          | 170           | 29,998            | 1                         |
| HATAKAZE             | PA          | 150           | 17,548            | 1                         |
| HERMION              | NIS         | 157           | 20,567            | 1                         |
| HESIOD               | BHS         | 178           | 23,719            | 1                         |
| HESNES               | ML          | 243           | 64,990            | 3                         |
| HMI BRENTON REEF     | USA         | 189           | 46,500            | 5                         |
| HMI DIAMOND SHOALS   | USA         | 174           | 46,094            | 7                         |
| HMI NANTUCKET SHOALS | USA         | 183           | 46,069            | 3                         |
| HMI PETROCHEM        | USA         | 192           | 41,819            | 1                         |
| HOBBY                | LBR         | 229           | 63,910            | 1                         |
| IOANNIS              | ML          | 182           | 47,106            | 1                         |
| IVER EXAMPLE         | NL          | 183           | 45,970            | 1                         |
| IVER GEMINI          | CY          | 179           | 28,840            | 1                         |
| IVER LIBRA           | CY          | 179           | 28,840            | 1                         |
| IVER PRIDE           | NL          | 179           | 28,840            | 3                         |
| IVER PROSPERITY      | LBR         | 177           | 30,000            | 2                         |
| IVER SPLENDOR        | PHL         | 174           | 29,820            | 2                         |
| JAG LAXMI            | IND         | 243           | 105,051           | 1                         |
| JAG PRANAM           | IND         | 182           | 50,600            | 1                         |
| JAG VAYU             | IND         | 192           | 28,400            | 1                         |
| JO BIRK              | NL          | 175           | 39,293            | 1                         |
| JO BREVIK            | NIS         | 183           | 33,490            | 3                         |
| KAEDE                | JAP         | 156           | 21,481            | 1                         |
| KAMOGAWA             | PA          | 149           | 17,712            | 2                         |
| KANDILOUSA           | GR          | 183           | 45,962            | 1                         |

| Vessel           | Flag | Length | Deadweight | Number of Arrivals |
|------------------|------|--------|------------|--------------------|
| KAPITAN KOROTAEV | CY   | 151    | 17,400     | 2                  |
| KINGFISHER       | PA   | 228    | 60,585     | 1                  |
| KISOGAWA         | PA   | 140    | 17,740     | 1                  |
| KITE             | PA   | 106    | 4,995      | 1                  |
| KOA SPIRIT       | BHS  | 253    | 113,333    | 1                  |
| KOWLOON          | PA   | 177    | 48,531     | 1                  |
| KOYAGI SPIRIT    | LBR  | 222    | 95,000     | 4                  |
| LAND ANGEL       | PA   | 217    | 62,226     | 2                  |
| LEOPARD          | SGP  | 172    | 46,100     | 1                  |
| LEPTA MERMAID    | PA   | 180    | 45,908     | 2                  |
| LEYTE SPIRIT     | BHS  | 245    | 98,744     | 1                  |
| LIPETSK          | RUS  | 183    | 23,876     | 2                  |
| LODESTAR QUEEN   | PA   | 132    | 13,705     | 1                  |
| LOS ROQUES       | ML   | 220    | 61,130     | 1                  |
| MAGELLAN SPIRIT  | LBR  | 246    | 95,007     | 1                  |
| MAGPIE           | PA   | 235    | 64,818     | 1                  |
| MAPLE GALAXY     | PA   | 148    | 21,860     | 3                  |
| MARGARA          | ML   | 229    | 60,913     | 2                  |
| MARINE CHEMIST   | USA  | 205    | 36,526     | 10                 |
| MARINE PIONEER   | HK   | 115    | 10,412     | 2                  |
| MARY ANN         | MH   | 229    | 64,239     | 1                  |
| MATSUKAZE        | PA   | 150    | 17,676     | 1                  |
| MAUI EXPORTER    | PA   | 175    | 29,998     | 1                  |
| MAURANGER        | NIS  | 183    | 33,695     | 1                  |
| MELODIA          | SGP  | 172    | 41,450     | 1                  |
| MERLION PARK     | PA   | 179    | 41,354     | 1                  |
| MIKOM ACCORD     | SGP  | 183    | 46,500     | 1                  |

| <b>Vessel</b>        | <b>Flag</b> | <b>Length</b> | <b>Deadweight</b> | <b>Number of Arrivals</b> |
|----------------------|-------------|---------------|-------------------|---------------------------|
| MONNERON             | CY          | 174           | 46,305            | 1                         |
| MYRIAD               | BHS         | 185           | 44,999            | 1                         |
| NAMSAN SPIRIT        | LBR         | 244           | 104,984           | 1                         |
| NAUTILUS             | CY          | 177           | 43,538            | 1                         |
| NCC YAMAMAH          | NIS         | 170           | 28,053            | 1                         |
| NEW ENDEAVOR         | MH          | 174           | 38,985            | 1                         |
| NEW RIVER            | USA         | 207           | 31,300            | 2                         |
| NICOPOLIS            | GR          | 229           | 60,525            | 1                         |
| NORDIC LAURITA       | NIS         | 235           | 68,139            | 1                         |
| ONOZO SPIRIT         | BHS         | 245           | 100,020           | 2                         |
| OSTANKINO            | CY          | 183           | 47,059            | 1                         |
| OVERSEAS BOSTON      | USA         | 261           | 123,692           | 2                         |
| OVERSEAS CHICAGO     | USA         | 273           | 92,091            | 5                         |
| OVERSEAS NEW ORLEANS | USA         | 201           | 43,643            | 2                         |
| OVERSEAS NEW YORK    | USA         | 273           | 91,843            | 1                         |
| PACIFIC HORIZON      | PA          | 180           | 44,370            | 1                         |
| PACTOL RIVER         | LBR         | 161           | 37,270            | 1                         |
| PALMSTAR CHERRY      | BHS         | 245           | 100,024           | 3                         |
| PALMSTAR LOTUS       | BHS         | 245           | 100,314           | 2                         |
| PALMSTAR ORCHID      | BHS         | 245           | 100,047           | 2                         |
| PALMSTAR POPPY       | BHS         | 234           | 100,031           | 1                         |
| PALMSTAR ROSE        | BHS         | 234           | 100,202           | 1                         |
| PANTHER              | SGP         | 172           | 46,100            | 2                         |
| PATRIOT              | USA         | 217           | 35,663            | 2                         |
| PATROKLOS            | CY          | 213           | 61,403            | 1                         |
| PERSEVERANCE         | USA         | 186           | 34,090            | 1                         |
| PLATRES              | PA          | 242           | 96,121            | 3                         |

| <b>Vessel</b>        | <b>Flag</b> | <b>Length</b> | <b>Deadweight</b> | <b>Number of Arrivals</b> |
|----------------------|-------------|---------------|-------------------|---------------------------|
| POLAR ALASKA         | USA         | 290           | 191,459           | 13                        |
| POLAR CALIFORNIA     | USA         | 290           | 127,003           | 11                        |
| POLAR ENDEAVOUR      | USA         | 272           | 141,740           | 1                         |
| POLAR TEXAS          | USA         | 274           | 91,393            | 1                         |
| POLAR TRADER         | USA         | 200           | 50,057            | 7                         |
| PRIAMOS              | CY          | 229           | 65,034            | 2                         |
| PRINCE WILLIAM SOUND | USA         | 268           | 122,941           | 2                         |
| PROBO KOALA          | PA          | 182           | 48,077            | 1                         |
| PROTANK ORINOCO      | LBR         | 229           | 69,131            | 1                         |
| PRUDHOE BAY          | USA         | 247           | 71,873            | 2                         |
| RAINBOW QUEST        | HK          | 183           | 47,221            | 2                         |
| RAYMOND E.GALVIN     | LBR         | 179           | 35,596            | 13                        |
| RED POINT            | ML          | 192           | 46,829            | 1                         |
| RICHARD G.MATTHIESEN | USA         | 187           | 32,572            | 3                         |
| S/R BAYTOWN          | USA         | 238           | 58,643            | 9                         |
| S/R BENICIA          | USA         | 276           | 152,298           | 18                        |
| S/R GALENA BAY       | USA         | 201           | 50,116            | 6                         |
| S/R GALVESTON        | USA         | 168           | 27,726            | 1                         |
| S/R HINCHINBROOK     | USA         | 273           | 92,017            | 6                         |
| S/R LONG BEACH       | USA         | 301           | 214,862           | 17                        |
| S/R NORTH SLOPE      | USA         | 276           | 175,305           | 11                        |
| S/R PUGET SOUND      | USA         | 201           | 50,860            | 7                         |
| SAG RIVER            | USA         | 246           | 70,215            | 2                         |
| SAINT VASSILIOS      | BHS         | 224           | 67,031            | 1                         |
| SAKURA               | PA          | 156           | 22,553            | 1                         |
| SAMUEL GINN          | BHS         | 274           | 156,835           | 16                        |
| SAMUEL L.COBB        | USA         | 187           | 33,122            | 6                         |

| <b>Vessel</b>        | <b>Flag</b> | <b>Length</b> | <b>Deadweight</b> | <b>Number of Arrivals</b> |
|----------------------|-------------|---------------|-------------------|---------------------------|
| SAN SEBASTIAN        | PA          | 229           | 63,798            | 2                         |
| SANKO HERON          | PA          | 236           | 61,540            | 1                         |
| SCARLET TRADER       | PA          | 163           | 32,389            | 1                         |
| SEA NAUTILUS         | LBR         | 248           | 64,900            | 1                         |
| SEABRIDGE            | LBR         | 241           | 105,154           | 1                         |
| SEABULK PRIDE        | USA         | 183           | 46,069            | 1                         |
| SEAFALCON            | MH          | 247           | 97,114            | 2                         |
| SEAMASTER            | LBR         | 242           | 101,134           | 1                         |
| SEISHIN              | PA          | 143           | 15,000            | 4                         |
| SELENDANG MUTIARA    | MY          | 183           | 45,974            | 1                         |
| SELENDANG PERMATA    | MY          | 183           | 45,974            | 2                         |
| SENTOSA SPIRIT       | BHS         | 246           | 97,159            | 4                         |
| SERAYA SPIRIT        | BH          | 247           | 97,119            | 2                         |
| SERIFOS              | GR          | 183           | 46,700            | 4                         |
| SETOKAZE             | BHS         | 151           | 18,253            | 2                         |
| SICHEM MALENE        | SGP         | 116           | 9,214             | 2                         |
| SICHEM MEDITERRANEAN | SGP         | 114           | 7,340             | 1                         |
| SKIROPOULA           | GR          | 242           | 68,232            | 2                         |
| SPRING LEO           | PA          | 139           | 15,389            | 3                         |
| SPRING LYRA          | PA          | 138           | 15,200            | 5                         |
| SPRING ORION         | PA          | 138           | 15,426            | 3                         |
| SPRING URSA          | PA          | 131           | 15,265            | 5                         |
| SPRING VIRGO         | PA          | 138           | 15,247            | 4                         |
| ST.MICHAELIS         | GR          | 183           | 45,574            | 1                         |
| ST.PETRI (SGP)       | SGP         | 182           | 47,228            | 1                         |
| STAR OHIO            | LBR         | 274           | 143,750           | 1                         |
| STOLT CORNWALL       | BHS         | 123           | 12,749            | 1                         |

| <b>Vessel</b>      | <b>Flag</b> | <b>Length</b> | <b>Deadweight</b> | <b>Number of Arrivals</b> |
|--------------------|-------------|---------------|-------------------|---------------------------|
| STOLT STREAM       | CY          | 163           | 22,460            | 1                         |
| STOLT SUN          | CY          | 162           | 22,460            | 1                         |
| STRIMON            | LBR         | 242           | 88,359            | 1                         |
| SUDONG SPIRIT      | BHS         | 246           | 86,359            | 1                         |
| SUN SAPPHIRE       | LBR         | 176           | 40,157            | 1                         |
| TAIBAH             | SAU         | 183           | 45,100            | 1                         |
| TAIPAN             | LBR         | 156           | 22,255            | 1                         |
| TEAM ACTINIA       | CY          | 176           | 40,296            | 1                         |
| TEAM MERKUR        | NIS         | 184           | 41,985            | 3                         |
| TEAM NEPTUN        | NIS         | 182           | 48,330            | 1                         |
| TEAM SATURN        | NIS         | 186           | 45,831            | 1                         |
| TEEKAY SPIRIT      | BHS         | 245           | 100,336           | 1                         |
| THE MONSEIGNEUR    | USA         | 200           | 38,880            | 4                         |
| TONEGAWA           | PA          | 149           | 17,722            | 2                         |
| TONSINA            | USA         | 265           | 124,751           | 3                         |
| TORM ANNE          | SGP         | 180           | 45,507            | 1                         |
| TORM ASIA          | HK          | 180           | 44,372            | 1                         |
| TORRES SPIRIT      | BHS         | 241           | 96,144            | 1                         |
| ULSAN SPIRIT       | LBR         | 244           | 106,679           | 4                         |
| URANUS             | LBR         | 186           | 39,451            | 1                         |
| VARDEN             | LBR         | 243           | 68,000            | 1                         |
| VARG               | LBR         | 242           | 68,157            | 1                         |
| VELOPOULA          | GR          | 228           | 66,895            | 2                         |
| VENTURA (TCH)      | NIS         | 165           | 25,300            | 2                         |
| VINCITA            | NIS         | 161           | 25,300            | 2                         |
| VIVI               | NIS         | 165           | 25,300            | 1                         |
| <b>Grand Total</b> |             |               |                   | <b>784</b>                |

**VTS San Francisco**  
**Reports of Maritime Incidents 2001**

| Type of incident          | Total    |
|---------------------------|----------|
| Allision                  | 2        |
| Anchor Dragging           | 3        |
| Collision                 | 2        |
| Grounding                 | 2        |
| Man Overboard             | 2        |
| Mechanical Failure        | 21       |
| Near Miss                 | 1        |
| Rule Nine                 | 4        |
| Obstruction to Navigation | 2        |
| Total                     | <hr/> 39 |

## **Allision**

March 20, 2001

A tug, with a dry-dock in tow was transiting in San Pablo Bay. VTS reported to the tug that VTS sensors held the tug in the Pinole Shoal Channel which requires a deviation for vessels with drafts less than 20 feet. The operator responded that they were passing buoy 10 and they were out of the channel. At 1402 the tug operator reported that their tow had allided with buoy 10 and the buoy was caught in their tow. The Marine Safety Office and the PACAREA Opcon were informed. At 1445, the tug operator reported that the buoy was free from their tow and was located in a position 2 NM south west of its charted position.

September 11, 2001

Unit 4 was piloting a vessel from sea to the Oakland Outer Harbor. At 0732 he reported to the VTS that he struck Oakland Bar Channel Buoy 1. The pilot did not see any apparent damage to the buoy or the vessel. MSO and the local Aids to Navigation Team were notified.

## **Anchor Dragging**

June 04, 2001

The VTS watch noted that a ship anchored four miles north of the sea buoy appeared to be dragging anchor. The watch informed the ship and requested they check their position. The operator of the vessel reported his anchor was holding. After twenty minutes the VTS watch noted that the vessel had drug another 8/10 of a nautical mile. The watch again notified the ship that they were dragging and would need to reanchor the vessel. The operator reported that they had lost their port anchor and were attempting to anchor with the starboard anchor.

November 24, 2001

A bulk carrier was anchored in anchorage nine while winds were exceeding 40 kts in the Bay due to a winter storm. The master of the vessel reported he was attempting to bring his engines online but was unable to due to a governor malfunction and would be requesting tugs. Due to the high winds the vessel began to drag anchor and requested additional tug support to maintain his position within the anchorage. The tugs were able to hold the vessel until repairs were made and a pilot reanchored the vessel.

June 2002

December 22, 2001

The VTS watch using the Yerba Buena radar observed a vessel dragging anchor in anchorage 9. The inshore controller contacted the vessel and requested they check their position. The watch supervisor informed the pilot dispatcher that the vessel might need a pilot if they continue to drag. The vessel operator reported that they had dropped their second anchor and appeared to be holding. A few minutes later the watch overheard the vessel contact the marine exchange to request tugs and a pilot. The vessel was re-anchored without incident.

### **Collision**

April 14, 2001

A container ship reported passing a small fishing vessel close aboard. Ten minutes later the master reported that they had scraped the fishing vessel as they passed it. While the master was making this report, another vessel reported to Group San Francisco that a small fishing vessel had been struck by a large vessel and was taking on water. Two men were recovered from the fishing vessel. The Marine Safety Office was notified.

September 01, 2001

A tug pushing a dump scow collided with a sailing vessel just off the northeast corner of Angel Island. The tug operator reported that he sounded the emergency signal and attempted to back down when it became apparent that he would collide with the sailing vessel. The sailing vessel proceeded to Angel Island under its own power.

### **Grounding**

April 09, 2001

A pilot reported that the vessel he was piloting had run aground on a sand bar off of New York Point. While backing down the pilot struck Suisun Bay buoy number 30.

July 05, 2001

A ferry operator reported that he had run aground just west of Gateway Ferry Terminal. The vessel's starboard propulsion system had failed causing the vessel to go aground resulting in minor flooding. The vessel proceeded to Bay Ship and Yacht Alameda for repairs.

June 2002

## **Man Overboard**

January 17, 2001

As a commercial vessel was approaching San Francisco from sea, the master discovered one of his crew members was missing and believed the individual may have fallen overboard. VTS relayed this information to Group San Francisco. The master requested to come about and proceed along his trackline, taking him back into the inbound western traffic lane, to search for the individual. The VTS granted permission and informed another inbound vessel of the situation. After 15 hours of searching the man was not discovered and the case was closed.

February 06, 2001

A vessel was in anchorage seven awaiting their pilot for a transit to Stockton. At 0703, the supervisor overheard on channel 10 a foreign male voice say, "I've got a man-overboard". The man repeated his broadcast on channel 10, this time stating the name of his vessel. VTS notified the ferries in the area and the ferry boat MARE ISLAND reported that they would stop and look. VTS hailed the vessel on channel 10 and inquired if they were requesting Coast Guard assistance. The vessel reported they did not need assistance and the man was 300 meters from the stern. VTS informed Group San Francisco and then made a safety broadcast. At 0717, the MARE ISLAND reported they had the man aboard their vessel. The man was transferred to the pilot boat from which he boarded the vessel.

## **Mechanical Failure**

January 10, 2001

A barge parted its tow wire just north of the Golden Gate Bridge. The VTS made a request for assistance broadcast that led to several tugs responding to the situation. The barge was secured and the tug was escorted to its berth.

January 12, 2001

A pilot reported to the VTS that the ship had experienced an engine casualty as they were approaching a berth in Oakland. The pilot used his assist tugs to moor the ship. The ship moored without further incident.

January 25, 2001

A tug with a loaded oil barge reported to the VTS a steering casualty near the Brothers. The VTS notified affected traffic in San Pablo Bay. The tug anchored off of San Pablo light 4 while they waited for parts to fix the steering control. Several hours later the tug received the parts, repairs were made, and the tug continued on its transit.

February 06, 2001

June 2002

As a motor vessel was departing the pilot area the master reported that the vessel was experiencing engine problems. After a few minutes the master reported the engines were working and proceeded out to sea.

February 08, 2001

While transiting through the Main Ship channel a pilot reported that his vessel was experiencing engine problems and he would be exiting the channel to the south. A quarter of an hour later the pilot reported the problems were caused by a loss of cooling water, which had been fixed. The ship was allowed to proceed to anchorage 9 without restrictions.

February 09, 2001

A tug with an empty oil barge was in the mainship channel outbound when the operator reported that they had lost the plant. After five minutes the operator discovered a faulty fuel valve that he then replaced. The tug continued out to sea without further incident.

February 15, 2001

A vessel had just gotten underway from Pier 80 San Francisco when the pilot reported that he was proceeding to anchorage 9 due to engine problems. The vessel's mobility had not been affected, however, the master was not comfortable taking the ship to sea until the problem was corrected. The vessel anchored without incident.

March 12, 2001

As a ship was approaching the pilot area, the vessel's master reported that he was not under command. The pilot boat was approaching the vessel preparing to board the pilot, VTS requested that the pilot contact the vessel once aboard. The pilot reported that the vessel had stopped to investigate a loss of cooling water and was able to proceed into port. The vessel entered port without incident.

March 18, 2001

After departing the pilot area, the master of a vessel reported that he was going to anchor to investigate an overheated bearing. The vessel anchored in the precautionary area approximately six miles north of SFSB. The vessel completed repairs and departed the precautionary area the following morning.

April 06, 2001

A tug reported to VTS an engine room fire. The watch notified Group San Francisco and issued a broadcast requesting assistance from nearby vessels. A tug and two ferries responded to assist the vessel. The tug reported to Group San Francisco that they had activated their installed fire fighting system and the fire was out. The assisting tug tied up along side the tug to hold her on station until another tug could take her barge under tow.

June 2002

May 20, 2001

A pilot reported his vessel had an overheated shaft bearing. The vessel was passing main ship channel 1 and 2 with a visibility of one nautical mile. The vessel proceeded to anchorage 9 under tug escort.

May 21, 2001

As a tanker was coming off the Richmond Long Wharf, the pilot reported he had lost his engines and would anchor until they could investigate the problem. The pilot later reported that the vessel had lost engine control to the bridge but still had local control and he intended to proceed to sea under local control. The Marine Safety Office allowed the ship to proceed without restrictions.

August 04, 2001

A pilot reported that he had lost engines just inside the Richmond Inner Harbor and was letting go his anchor until they could repair the system. Twenty minutes after the initial report the vessel was repaired and continued on to anchorage 9.

August 11, 2001

A pilot reported as he was docking a vessel at Rodeo the vessel had lost its astern propulsion. He had moored the vessel without incident using his assist tugs.

September 16, 2001

A pilot reported that his vessel had an engine control problem coming off the dock. The Chief Engineer was able to restart the engine and was investigating the problem. The vessel was directed to anchor and await a class society inspection.

October 01, 2001

A tug with oil barge reported losing steering control 3/4 nm east of the Golden Gate Bridge. The tug operator reported that the vessel was dead in the water while they investigated the problem and he did not need assistance. Six minutes later the operator reported the engineer had corrected the problem and requested to proceed to sea. MSO was notified and granted the vessel permission to proceed to their next port of call.

October 19, 2001

As an inbound container ship entered the precautionary area the master reported to VTS that the ship had lost astern propulsion, however, he still had ahead propulsion. VTS informed the MSO CDO. A few minutes later the pilot boarded the vessel and reported to the VTS that he would keep station in the precautionary area until directed by the MSO to proceed. The MSO CDO informed the VTS that the vessel could proceed to Oakland under tug escort. Vessel secured at its berth in Oakland without further incident.

June 2002

October 26, 2001

A tanker was approaching the Golden Gate Bridge heading out to sea. At 1542 the pilot reported that the vessel had lost propulsion, his assist tug was made up alongside, he was drifting 1/4 nm northeast of the bridge and requested assistance. The VTS controller made a request for assistance call on channel 14 and notified all inbound/outbound traffic of the casualty. Two tugs responded to the call and reported to VTS that they were enroute to the tanker. The CGC BARRACUDA also responded to the call for assistance. At 1552 the pilot reported that the vessel had regained propulsion and the chief engineer was investigating the problem. The MSO CDO informed the VTS that the tanker was not authorized to depart the Bay. The watch supervisor recommended that the pilot take the vessel offshore and anchor. At 1610 the MSO CDO informed VTS that the vessel would be cleared to go to sea.

November 09, 2001

A tug pushing a loaded dump scow was departing the Larkspur Channel. At 0736 the tug was abeam the C buoy when the operator reported that the wires on his tow had parted and he had lost control of his barge, he was maneuvering to adjust his tow. After twenty minutes he reported the tow was secure and he was continuing his transit to the disposal area.

December 03, 2001

A tug with barge in tow was transiting north of the Main Ship channel heading to sea. Due to recent storms, heavy surf advisories were broadcast for the California coast, swells in the Main Ship Channel were reported at 10-12 feet, making it difficult to track the tug on radar. At 1840 the tug contacted a piloted vessel in the channel and requested to know if the pilot could see his barge since the operator of the tug could not see the barge visually or on radar. The pilot reported that he could see the barge on radar. 10 minutes later another pilot reported that he visually spotted a barge adrift in the middle of the channel near buoys 5 and 6. The tug proceeded to that location to recover the barge. At 1914 the tug operator reported to VTS that he was just south of the channel at buoy 6 and would recover the barge. The operator verified for VTS that the barge did not appear to do any damage to the buoy. Ten minutes later the barge was again in tow and the tug proceeded out to sea.

December 21, 2001

A pilot reported to VTS that the containership he was taking to sea had lost steering control just off Diablo Point and was awaiting tugs. At 1917 the pilot contacted the VTS watch supervisor via cell phone and reported he was using his tugs to turn the vessel around and would be proceeding to anchorage 9. The pilot requested that the two outbound vessels remain east of the Golden Gate Bridge until he had turned the ship. The watch relayed this request to the two outbound pilots. The pilot continued to use his tugs to control the movement of the ship until they were anchored at 2222.

June 2002

## **Near Miss**

July 31, 2001

The VTS watch overheard a pleasure boat attempting to hail a tanker on channel 16. When the tanker did not respond the watch hailed the pleasure boat and inquired about his location. The operator of the boat responded that he was in the Stockton channel, anchored due to an engine failure. The VTS watch contacted the pilot of the ship bound for Stockton and explained the situation and requested he contact the vessel on channel 13. The pilot located the vessel and noted that he was in the center of the channel. He directed the boat to heave anchor as he maneuvered around the small craft.

## **Rule Nine**

March 17, 2001

As a tank vessel was passing Harding Rock, the pilot reported he was making a hard turn to port to avoid colliding with a fishing vessel. Using cameras and with the help of another pilot, the VTS was able to identify the vessel and pass on the report to Group San Francisco.

May 27, 2001

A pilot reported that he had just missed colliding with a sailing vessel north of Alcatraz. The pilot sounded the danger signal twice before ordering a hard left rudder to avoid the vessel. The watch supervisor passed on the report and a description of the vessel to the Marine Safety Office and Group San Francisco.

August 05, 2001

A pilot was transiting the Richmond Channel when he had to go against the bank to avoid colliding with a sailing vessel. The pilot reported that he had just touched the bank and with the help of his tugs he was able to safely reenter the channel.

October 20, 2001

A container ship was inbound at the Golden Gate Bridge proceeding to Oakland. At 1520 the pilot contacted the VTS and asked if the watch could train cameras on his vessel since he had a situation developing with a sailing ship. A tall ship conducting a bay tour could be seen close aboard off the bow of the container ship. The pilot made a hard turn to starboard and cleared astern of the vessel. The VTS supervisor contacted the MSO Command Duty Officer.

June 2002

## **Obstruction to Navigation**

February 05, 2001

The VTS watch was notified by Group San Francisco that there was either an individual or an object suspended below the Golden Gate Bridge. Later the watch was informed the object was a Volkswagen Bug and the CHP planned to cut the vehicle loose.

Working closely with Group San Francisco and the Marine Safety Office, VTS was able to get the CHP to agree to delay cutting down the vehicle until all maritime traffic had safely transited beneath the bridge. The vehicle was later removed without incident.

February 18, 2001

The watch overheard a pilot report to the Union Pacific Railroad Bridge operator that there was an orange safety net hanging from the Highway 680, reducing the clearance over the navigation channel. The watch supervisor contacted CALTRANS and the net was removed.

June 2002

# Certified Escort Boat

| <b>Tug Boat</b> | <b>Tug Name</b> | <b>Zones 1 &amp; 2</b> | <b>Zones 4 &amp; 6</b> | <b>Certification</b> |
|-----------------|-----------------|------------------------|------------------------|----------------------|
| ANAV            | AVENGER         | 28.32                  | 28.32                  | 03/22/04             |
| ANEN            | ENTERPRISE      | 59.81                  | 59.81                  | 10/27/03             |
| ANKA            | KELLEY ANNE     | 12.52                  | 12.52                  | 03/22/04             |
| ANLM            | LYNN MARIE      | 155.99                 | 155.99                 | 10/15/04             |
| ANSA            | SARAH           | 26.86                  | 26.86                  | 06/14/03             |
| ANTI            | TITAN           | 35.56                  | 35.56                  | 03/22/04             |
| BDCA            | DELTA CAREY     | 188.00                 | 171.00                 | 02/28/04             |
| BDDD            | DELTA DEANNA    | 188.00                 | 171.00                 | 04/25/05             |
| BDLA            | DELTA LINDA     | 188.00                 | 171.00                 | 04/25/05             |
| FMAF            | ANDREW FOSS     | 188.00                 | 153.00                 | 09/27/03             |
| FMAN            | ANNA FOSS       | 16.62                  | 16.62                  | 09/27/03             |
| FMBF            | BRYNN FOSS      | 140.00                 | 134.00                 | 10/26/03             |
| FMCF            | CLAUDIA FOSS    | 27.18                  | 27.18                  | 11/30/03             |
| FMDE            | DEAN FOSS       | 14.28                  | 14.28                  | 10/26/03             |
| FMDF            | DANIEL FOSS     | 86.00                  | 86.00                  | 09/20/02             |
| FMKF            | KEEGAN FOSS     | 72.47                  | 72.47                  | 09/27/03             |
| FMRF            | RICHARD FOSS    | 51.00                  | 51.00                  | 12/22/02             |
| FMRM            | RICHARD M       | 35.56                  | 35.56                  | 03/13/05             |
| ONAE            | AMERICAN EAGLE  | 55.95                  | 55.95                  | 05/03/04             |
| ONSE            | SEA EAGLE       | 26.59                  | 26.59                  | 12/11/03             |
| PWRM            | CAPT REINO      | 11.04                  | 11.04                  | 01/27/03             |
| SRCA            | S/R CALIFORNIA  | 170.00                 | 150.00                 | 12/13/03             |
| SRCQ            | S/R CARQUINEZ   | 64.28                  | 64.28                  | 12/13/03             |
| SRMI            | S/R MARE ISLAND | 188.00                 | 171.00                 | 01/22/04             |
| SWPO            | POLARIS         | 18.61                  | 18.61                  | 03/10/03             |
| SWSC            | SOUTHERN CROSS  | 24.65                  | 24.65                  | 03/10/03             |
| SWSU            | MARIN SUNSHINE  | 30.53                  | 30.53                  | 03/10/03             |
| SWVE            | VEGA            | 49.85                  | 49.85                  | 03/27/05             |
| WSBC            | BEARCAT         | 13.61                  | 13.61                  | 12/05/03             |
| WSBL            | BETTY L.        | 13.12                  | 13.12                  | 12/06/03             |
| WSKT            | KITSAP          | 15.25                  | 15.25                  | 12/06/03             |
| WSOR            | ORION           | 49.97                  | 49.97                  | 12/29/03             |
| WSSA            | SAGITTARIAN     | 45.11                  | 45.11                  | 12/06/04             |
| WSSO            | SOLANA          | 26.80                  | 26.80                  | 12/05/03             |
| WSWC            | WILDCAT         | 15.17                  | 15.17                  | 12/06/03             |

Friday, April 26, 2002

# San Francisco Bay Clearinghouse Report For 2001

## San Francisco Bay Region Totals

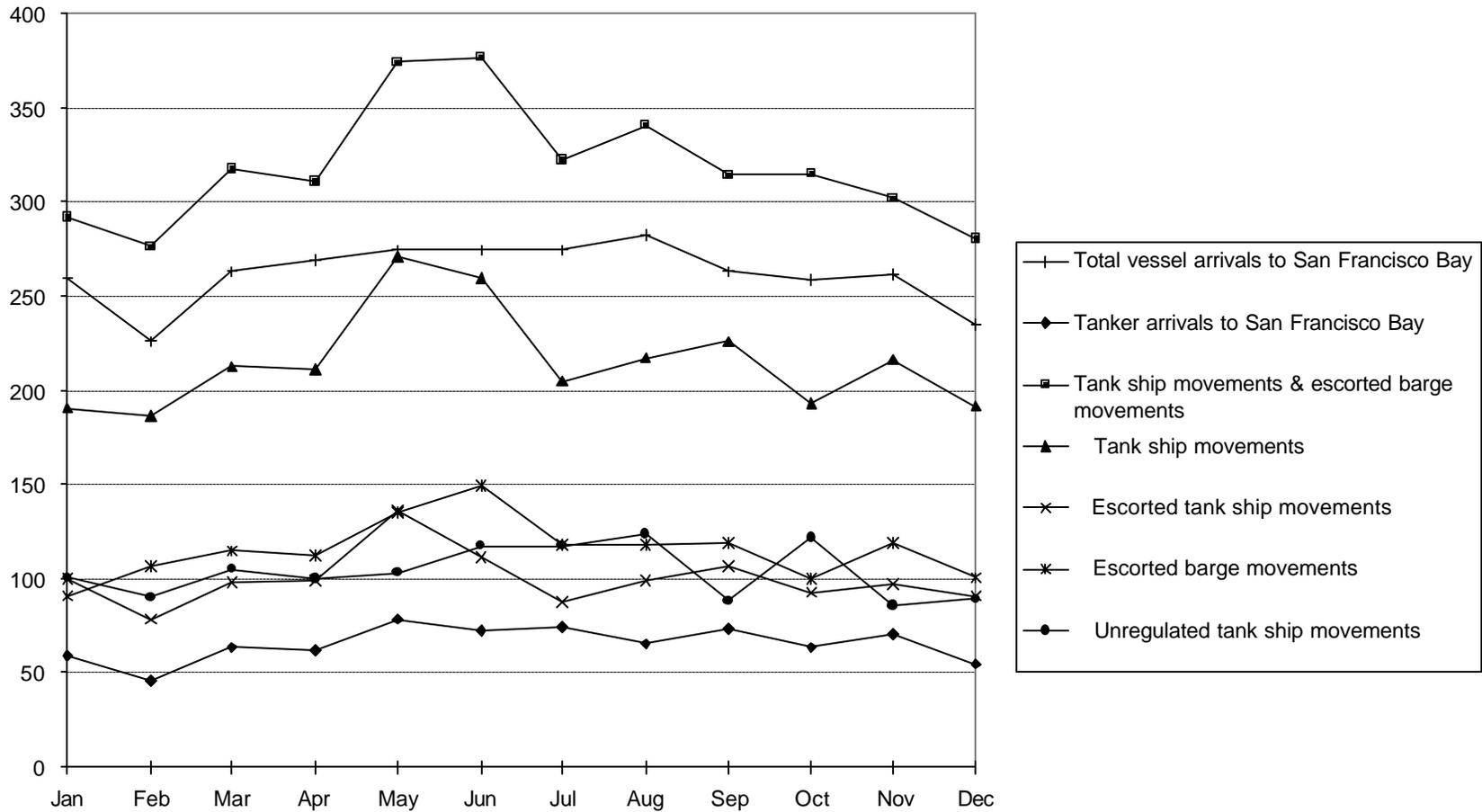
|  |       |        | <u>2000</u> |
|--|-------|--------|-------------|
| Tanker arrivals to San Francisco Bay   | 784   |        | 656         |
| Tank ship movements & escorted barge movements   | 3,823 |        | 3,140       |
| Tank ship movements  | 2,581 | 67.51% | 2,245       |
| Escorted tank ship movements   | 1,197 | 31.31% | 1,020       |
| Unescorted tank ship movements   | 1,384 | 36.20% | 1,225       |
| Tank barge movements   | 1,242 | 32.49% | 895         |
| Escorted tank barge movements  | 668   | 17.47% | 463         |
| Unescorted tank barge movements  | 574   | 15.01% | 432         |
| Percentages above are percent of total tank ship movements & escorted barge movements for each item. |       |        |             |
| Escorts reported to OSPR   | 6     |        | 5           |

| <u>Movements by Zone</u> | <u>Zone 1</u> | <u>%</u> | <u>Zone 2</u> | <u>%</u> | <u>Zone 4</u> | <u>%</u> | <u>Zone 6</u> | <u>%</u> | <u>Total</u> | <u>%</u> |
|--------------------------|---------------|----------|---------------|----------|---------------|----------|---------------|----------|--------------|----------|
| Total movements          | 2,211         |          | 3,611         |          | 1             |          | 1,800         |          | 7,623        |          |
| Unescorted movements     | 1,111         | 50.25%   | 1,847         | 51.15%   | 1             | 100.00%  | 918           | 51.00%   | 3,877        | 50.86%   |
| Tank ships               | 856           | 38.72%   | 1,348         | 37.33%   | 1             | 100.00%  | 602           | 33.44%   | 2,807        | 36.82%   |
| Tank barges              | 255           | 11.53%   | 499           | 13.82%   | 0             | 0.00%    | 316           | 17.56%   | 1,070        | 14.04%   |
| Escorted movements       | 1,100         | 49.75%   | 1,764         | 48.85%   | 0             | 0.00%    | 882           | 49.00%   | 3,746        | 49.14%   |
| Tank ships               | 742           | 33.56%   | 1,149         | 31.82%   | 0             | 0.00%    | 529           | 29.39%   | 2,420        | 31.75%   |
| Tank barges              | 358           | 16.19%   | 615           | 17.03%   | 0             | 0.00%    | 353           | 19.61%   | 1,326        | 17.39%   |

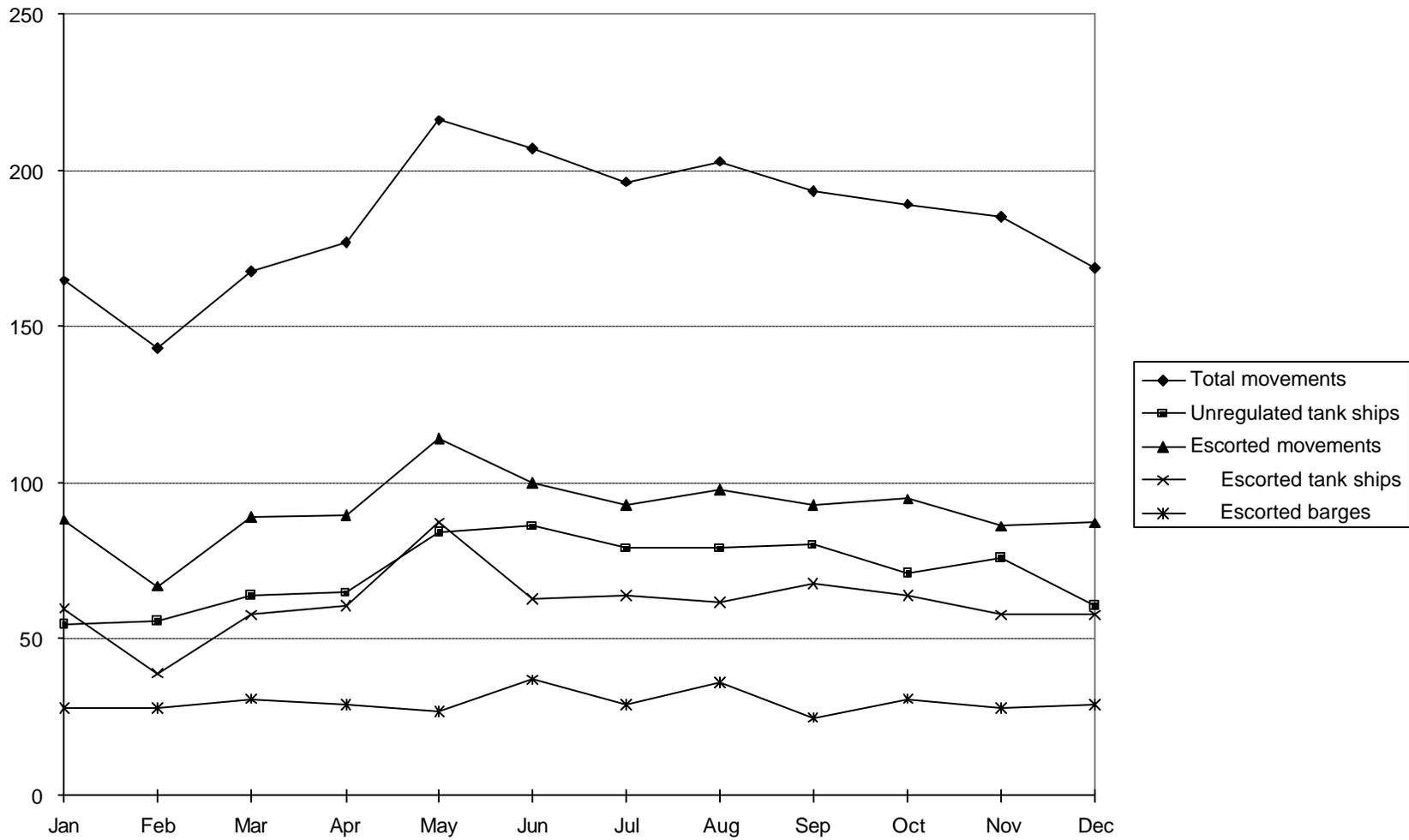
### Notes:

1. Information is only noted for zones where escorts are required.
2. All percentages are percent of total movements for the zone.
3. Every movement is counted in each zone transited during the movement.
4. Total movements is the total of all unescorted movements and all escorted movements.

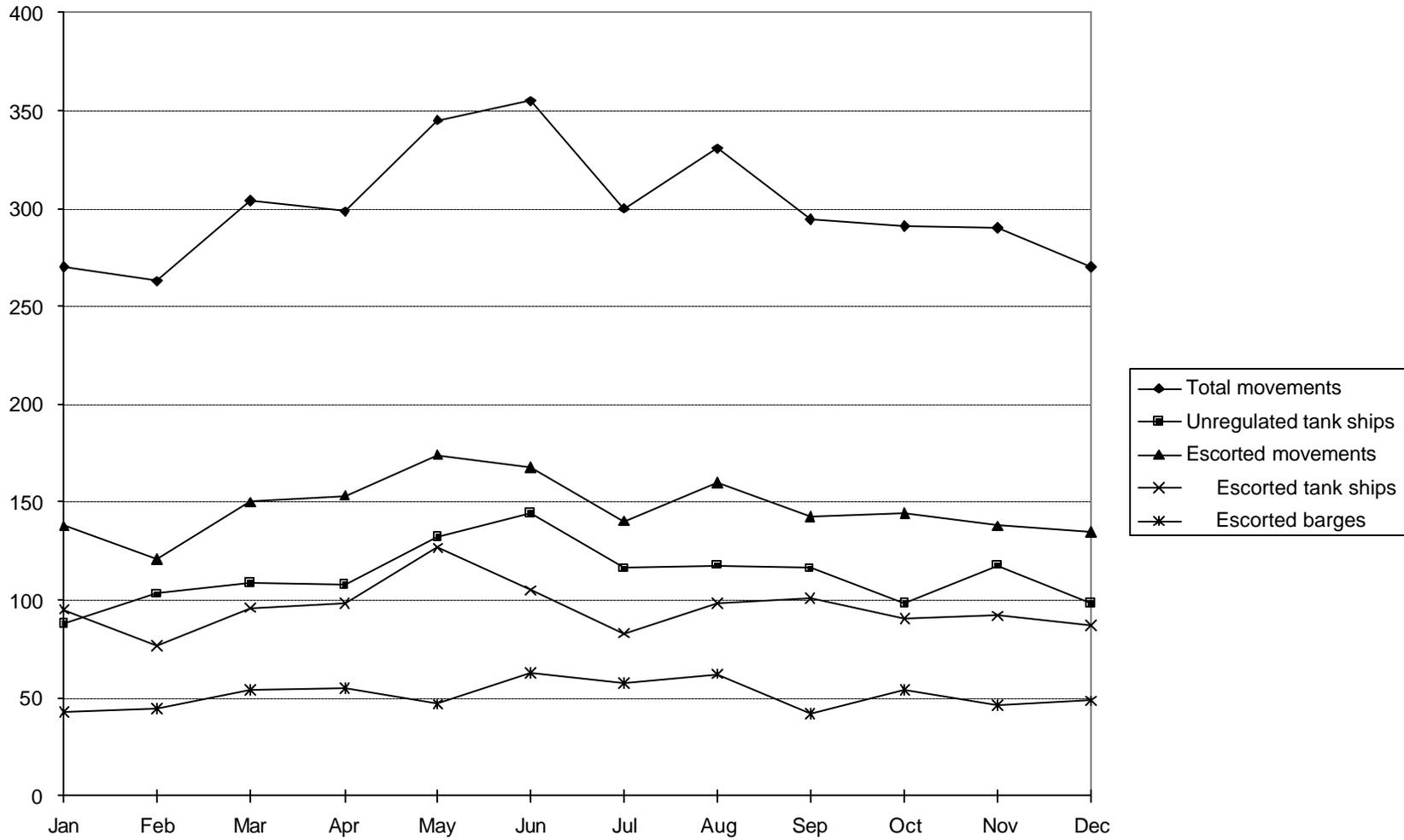
## Total Escort Movements in San Francisco Bay for 2001



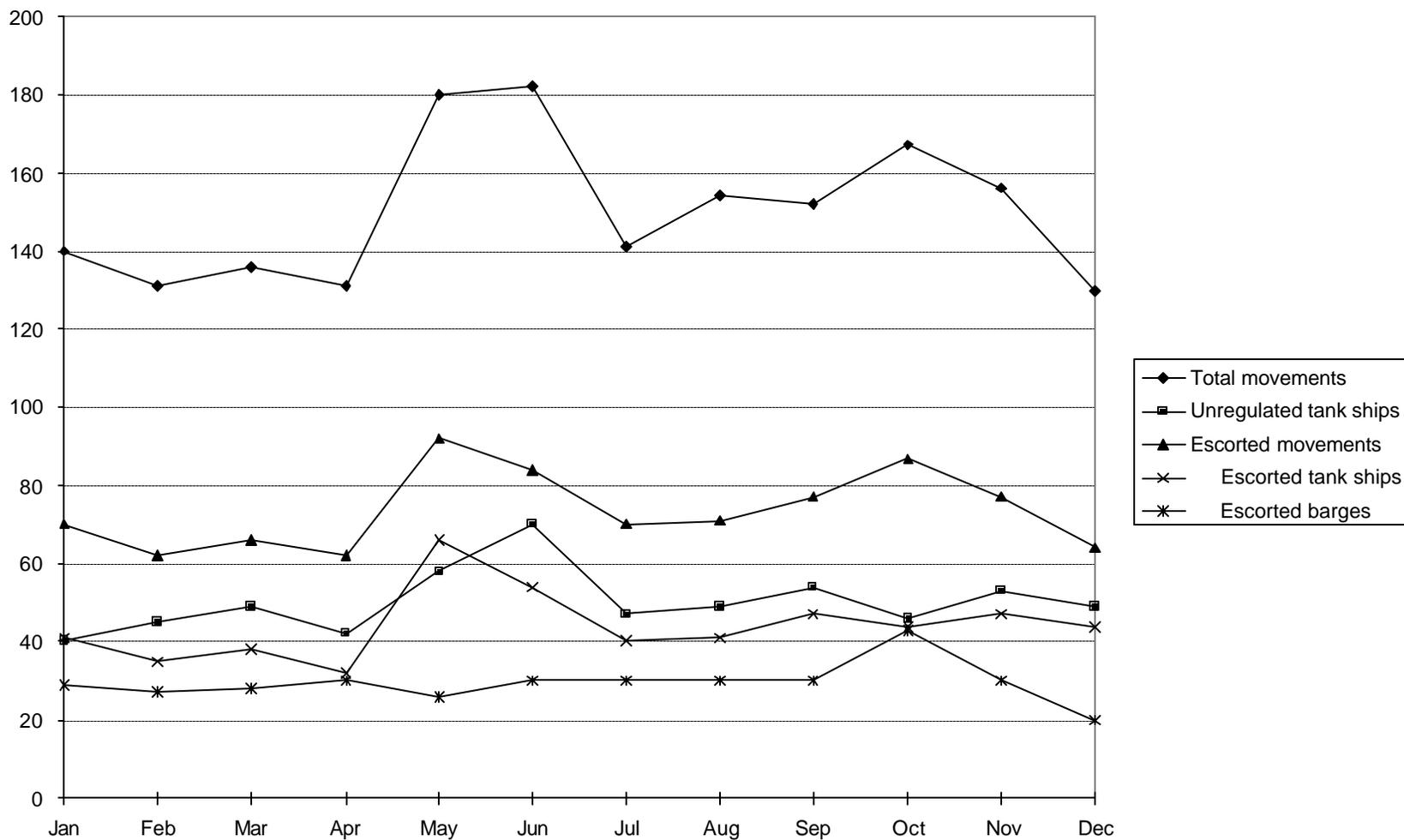
## Zone 1 Totals for 2001



## Zone 2 Totals for 2001



### Zone 6 Totals for 2001



TITLE 14, CALIFORNIA CODE OF REGULATIONS  
SUBDIVISION 4. OFFICE OF SPILL PREVENTION AND RESPONSE  
CHAPTER 4. VESSEL REQUIREMENTS  
SUBCHAPTER 1. TANK VESSEL ESCORT REGULATIONS  
FOR THE SAN FRANCISCO BAY REGION  
SECTIONS 851.1 through 851.10.1  
Amended July 18, 2001  
Effective October 4, 2001

"851.1 Effective Date of this Subchapter"

This subchapter, as amended, shall be effective on October 4, 2001.

Note: Authority: Sections 8670.17.2(a), and 8670.23.1(d), Government Code.  
Reference: Sections 8670.17.2(b), 8670.23.1 (d), (e)(1) and (h) Government Code.

"851.2 Purpose and Scope"

This subchapter sets forth tank vessel escort requirements for the San Francisco, San Pablo and Suisun Bays. These requirements specify that tank vessels carrying 5,000 or more long tons of oil in bulk as cargo shall be escorted by a suitable escort tug or tugs. The escort tugs will be available, and shall respond as needed to influence the speed and direction of travel of the tank vessel in the event of a casualty, or steering or propulsion failure, thereby reducing the possibility of groundings or collisions and the risk of oil spills from these tank vessels. This subchapter establishes the criteria for matching tugs to tankers and barges. Tankers will be matched according to a matrix that correlates a tanker's displacement with the braking force of a tug(s). Barges must be matched based on a one-to-one correlation of the deadweight tonnage of the barge to the braking force of the tug(s).

The Administrator shall review the matching criteria and other program elements within two years of the effective date of this subchapter. The program review will include a survey of the tanker-related incidents in U.S. waters to determine the types of failures that have occurred, an assessment of tug technology and any advances made in design and power, and the tug escort-related rules and policies that are implemented by other coastal states and maritime organizations. At the conclusion of the review, the Administrator will determine whether it is necessary to modify the tug/tanker matching criteria or any other provision of the program requirements.

Note: Authority: Sections 8670.17.2(a) & 8670.23.1(d), Government Code.  
Reference: Sections 8670.17.2(b) and 8670.23.1(e)(1), Government Code.

"851.3 Definitions"

Definitions governing the construction of this subchapter can be found in Government Code Section 8670.3, and Chapter 1 of this subdivision.

Note: Authority: Sections 8670.3, 8670.17.2(a) and 8670.23.1(d), Government Code.  
 Reference: Section 8670.3 and 8670.17.2(a), Government Code.

"851.4 Applicability"

(a) This subchapter shall apply to all tank vessels capable of carrying 5,000 or more long tons of oil in bulk as cargo when these vessels are underway on waters in the San Francisco, San Pablo and Suisun Bays, as follows:

(1) tank vessels carrying 5,000 or more long tons of oil as cargo shall be required to comply with all the requirements in this subchapter;

(1) tank vessels carrying less than 5,000 long tons of oil as cargo shall only be required to comply with the reporting requirement as stated in Subsection 851.7

(b) The escort requirements of this subchapter shall not apply to tank vessels that are only shifting location within an anchorage. Any tug used during such a shifting maneuver need not be an escort tug registered with the Clearing House.

(c) This subchapter shall not apply to tank vessels otherwise covered by the requirements of this subchapter in the event of an emergency. The master of the tank vessel shall report to the Clearing House any deviation from the requirements outlined in this subchapter as soon as practicable, and in no case later than the departure of the tank vessel from the marine waters of the state. For purposes of this section, an emergency shall include, but not be limited to, any of the following:

(1) imminent and immediate danger to the vessel, its cargo, or its crew; or

(2) imminent and immediate danger to a marine terminal, or to the escort tug; or

(3) imminent and immediate danger to a vessel in close proximity to the tank vessel; or

(4) any emergency declared by the Captain of the Port.

(d) This subchapter (except for this Subsection 851.4(d)) shall not apply to tankers with double hulls, as that term is defined in 33 CFR 157.03(kk), when the tanker also has the following:

(1) Fully redundant steering and propulsion systems to include:

(A) two independent propulsion systems each with a dedicated propeller, engine (or motor), electrical generation system, electrical system (including the switchboard), fuel system, lube oil system, and any other system required to provide the vessel with independent means of propulsion; and

(B) two independent rudders each with separate steering systems; and

(C) the propulsion and steering components, as described in Subsection (A) and (B) above, shall be arranged in separate spaces, such that a fire or flood in one space will not affect the equivalent system in the other space(s); and

(D) a bow thruster with an assigned power source;

(2) A Navigation System in compliance with the federal navigational equipment requirements set forth in 33 CFR Sections 164.35, 164.37, 164.38(b), 164.40, 164.41, 164.42, and 164.43.

(3) No exemption to this subchapter shall be allowed for a tanker requesting a U.S. Coast Guard Captain of the Port letter of deviation, pursuant to 33 CFR Sections 164.51, 164.53, and 164.55.

(4) The Administrator may require tankers that are exempt from this subchapter under the conditions outlined in Subsection (d) to periodically demonstrate the tanker and crew's ability to maneuver in response to a partial or total loss of propulsion and/or steering at a level of safety at least equal to that of an escorted tanker.

(e) This subchapter shall apply to all tugs being used to escort tank vessels in waters identified as escort zones.

(f) The tank vessel master remains responsible for the safe navigation and maneuvering of the vessel in all circumstances. The requirements outlined in this section are in addition to, and not a limitation of, any other responsibility created by custom, law, or regulation.

Note: Authority: Sections 8670.17.2(a) and 8670.23.1(d), Government Code.

Reference: Section 8670.23.1(e)(1), Government Code, and  
33 USC 2002(b) and 2007, and 33 CFR 157.03(kk).

#### "851.5 Escort Zone Requirements"

(a) Six tank vessel escort zones are established as follows:

(1)Zone 1: All waters in the area encompassed by a straight line drawn between Point Bonita Light, through Mile Rocks Light to the shore (the COLREGS Demarcation Line), and eastward to the Golden Gate Bridge;

(2)Zone 2: All waters from the Golden Gate Bridge, south to a line drawn between the southern tip of Bay Farm Island and the southeastern tip of Point San Bruno Peninsula, and north to a line drawn from Point San Pablo to San Pablo Bay Light 4 (Light List number 5880), to San Pablo Bay Channel Light 5 (Light List number 5885), to Point San Pedro;

(3)Zone 3: All waters from the southern end of Zone 2 to one mile north of the San Mateo Bridge;

(4)Zone 4: All waters in the navigable channel from one mile north of and to one mile south of the San Mateo Bridge;

(5)Zone 5: All waters from the eastern boundary of Zone 2 to the western approaches of the Carquinez Bridges at Light 15;

(6) Zone 6: All waters from Light 15, through the Carquinez Strait, north on the Sacramento Ship Channel to one mile beyond the Ryer Island Ferry Terminal and east on the San Joaquin River to one mile beyond the Antioch Bridge;

(b) Tank vessels required to have escorts under this subchapter shall be escorted in the zones as specified below:

(1) Escort tugs are required for tank vessels operating within Zones 1, 2, 4, or 6;

(2) Escort tugs will not be required in Zones 3 or 5, or in areas outside of Zones 1 through 6;

(3) No tank vessel may transit in a zone that requires an escort tug unless escorted by a tug or tugs of sufficient size and capability, as specified in sections 851.9 (for tankers) and 851.9.1 (for barges).

(4) In Zone 1, escort tugs shall be stationed as follows:

(A) on an inbound transit, the escort tug shall be in Zone 1 prior to the tank vessel's arrival to the area bounded by an arc eight nautical miles seaward of and centered on Mile Rocks Light; and

(B) on an outbound transit, the escort tug shall remain in Zone 1 until the tank vessel leaves the area bounded by an arc eight nautical miles seaward of and centered on Mile Rocks Light.

Note: Authority: Sections 8670.17.2(a) and 8670.23.1(d), Government Code.

Reference: Section 8670.17.2(a), Government Code

#### "851.5.1 Escort Plans"

(a) All tank vessel masters shall use an Escort Plan for transits through zones 1, 2, 4, or 6. The tank vessel shall not continue or commence a transit through any Escort Zone without an Escort Plan that is complete and adequate. The plan shall document the steps that the tank vessel owner/operator and/or master will take to comply with the requirements of this subchapter. The Escort Plan requirements set forth in this section are only planning standards and may not reflect the exigencies of an actual incident response. However, the Escort Plan must demonstrate that the vessel master is prepared to take the actions necessary to assure a reasonable level of success in providing the protection intended by this subchapter, as stated in section 851.2. The Escort Plan shall include:

(1) the tank vessel's intended route(s);

(2) the intended transit speed(s);

(3) a communication plan, to include the radio frequencies that will be used and any other means of electronic communication;

- (4) the following characteristics of the tank vessel:
    - (A) the location and strength of the bitts and chocks to be used by the escort tugs,
    - (B) the location of the pushing surfaces on the hull that are strong enough to sustain the forces that can be exerted by the escort tug(s),
    - (C) the number of crew assigned to escort-related duties,
    - (D) any pertinent performance characteristics and related limitations of the steering and propulsion system(s);
  - (5) the escort tugs to be used during the transit as required in section 851.9 (for tankers) or 851.9.1 (for barges);
  - (6) the response actions that will most likely be implemented in the event of an emergency, taking into account the available bitts and chocks, pushing surfaces, line type, and expected tides and currents.
- (b) Escort Plans shall be prepared using one of the following:
- (1) a format as designed, completed and submitted by the tank vessel owner/operator; or
  - (2) a Checklist as recommended by the Harbor Safety Committee of the San Francisco Bay region, and approved by the Administrator. The vessel owner/operator shall assure that the vessel master completes the Checklist according to the requirements in this subchapter.
- (c) Review, approval and use of an Escort Plan designed and submitted by the tank vessel owner/operator:
- (1) a tank vessel owner/operator may develop an Escort Plan for a vessel or vessels, and submit that plan to the Administrator for review and approval prior to using the plan for escorted transits;
  - (2) the Escort Plan developed by the vessel owner/operator shall include all the information required in subsection 851.5.1(a). The requirement for information regarding the tug(s) to be used during the transit may be met by stating the size and braking force capacity of the tug(s) needed for each of the vessels covered by the plan.
  - (3) each plan shall be either approved, approved with conditions, or denied within 60 days after the Administrator receives the plan. Approval, once given, may be revoked if it is found that the plan submitter is not complying with the requirements of this subchapter;
    - (A) to be approved, the plan must comply with the requirements in this section, must match tug(s) to the tank vessels in accordance with the requirements in this subchapter, and must demonstrate that the tank vessel owner/operator and/or master maintains a level of readiness that will allow for effective implementation of the plan. The plan submitter shall be notified in writing when a plan has been approved.

- (B) approval shall be denied or revoked if the plan, or the implementation of the plan, does not comply with the requirements of this subchapter. If a plan is denied or revoked, the Administrator shall notify the owner/operator in writing of the reasons for denial or revocation, and provide an explanation of those actions necessary to secure approval. The Checklist form of escort plan, as prescribed in this section, shall be used unless and until a new or revised escort plan is submitted and approved by the Administrator.
- (4) once approved, the master and pilot shall use and comply with the Escort Plan on each escorted transit:
- (A) the details of the Escort Plan shall be reviewed and discussed as part of the pre-escort conference (section 851.7);
- (B) as part of the pre-escort communications, the pilot or, if there is no pilot on board, the master shall notify the Clearing House that the plan has been reviewed, and shall inform the Clearing House of the tugs that have been chosen for the escort.
- (5) the Checklist format, as described in this section, shall be used for all escorted transits unless or until an Escort Plan is submitted by the vessel owner/operator, and approved by the Administrator.
- (d) Completion, review and use of Escort Plans prepared using the Checklist format developed by the Harbor Safety Committee:
- (1) the Checklist shall include all the items enumerated in subsection 851.5.1(a), as well as a schematic drawing of a tank vessel sufficient to illustrate the location of the bitts and chocks, and those areas on the hull that are capable of withstanding the forces exerted by the escort tug(s). The Administrator shall provide a copy of the approved Checklist to the Clearing House for distribution to tank vessel owner/operators, masters and/or pilots.
- (2) the master shall complete the Checklist, and shall verify that all the requisite elements have been included. The master shall sign the Checklist to indicate that, to the best of the master's knowledge, the information on the Checklist is correct, and is in compliance with the requirements of this subchapter. If there is no pilot on board, the master shall notify the Clearing House when the Checklist has been completed and shall inform the Clearing House of the tugs that have been chosen for the escort. The Administrator may request a copy of any Checklist at any time to determine if the planning process has been completed adequately.
- (3) the Checklist shall be completed by the tank vessel master at the following points during a transit operation;
- (A) for vessels arriving from sea, the Checklist shall be completed prior to entering Zone 1;
1. Alternatively, the agent or owner/operator may complete the Checklist and electronically send the completed form to the master and the Clearing House:

- 
- a. before the vessel's estimated time of arrival to the San Francisco Bay Pilotage area, or
  - b. before the vessel's arrival at the San Francisco Bay Precautionary Area, or
  - c. after the vessel's departure from its last Port of Call.
- 

- (B) for in-bay movements or for departures, the Checklist shall be completed prior to beginning the transit.
- (4) if a pilot is on board, the pilot shall review the Checklist as cited in subsection 851.5.1(d) and shall verify that all the elements have been completed adequately. The pilot shall sign the Checklist after reviewing and verifying its adequacy. The pilot shall then notify the Clearing House that the planning process has been completed, and shall inform the Clearing House of the tugs that have been chosen for the escort.
- (A) the pilot shall determine that the Checklist is adequate if the following are met:
    - 1. all the items on the Checklist have been addressed completely; and
    - 2. the information provided demonstrates that the tank vessel master is prepared to take the actions necessary to assure a reasonable level of success in using the escort tug(s) in response to a vessel casualty.
  - (B) if the pilot determines that the Checklist is not adequate, the pilot shall notify the Clearing House, and explain the reason(s) for such determination. The Clearing House shall then immediately notify the Administrator that a Checklist has been determined to be inadequate by the pilot.
  - (C) The Administrator shall review all inadequacy determinations made by a pilot and shall decide whether the determination is appropriate. The Administrator may affirm or overturn such determination, or may provide for conditional approval of a Checklist, as follows;
    - 1. the Checklist will be considered adequate if it is complete, if the tug to tanker match has been done in accordance with this subchapter, and the information provided demonstrates that the tank vessel master is prepared to take the actions necessary to assure a reasonable level of success in using the escort tug(s) in response to a vessel casualty. If a Checklist is determined to be inadequate, the vessel may be ordered to discontinue operations until an adequate Checklist is completed;
    - 2. a Checklist may be approved conditionally if there is a minor deficiency in one or more of the requisite elements. Conditional approval may require that the tank vessel operate under specified precautionary measures (such as operating at a slower speed). If the owner/operator of a tank vessel fails to

comply with the requirements of the conditional approval, the Administrator may order the tank vessel to discontinue operations until an acceptable Checklist for that vessel has been completed and approved.

(D) The pilot is not responsible for delaying or stopping the transit solely because of a plan's inadequacy.

- (5) The tank vessel owner/operator or the master shall ensure a copy of the completed, signed Checklist is submitted to the Clearing House within 14 days after the transit covered by the Checklist. The master, pilot, ship's agent or vessel owner/operator may send the copy to the Clearing House. A copy of the Checklist shall also be maintained aboard the vessel for a period of one year after the transit. A copy of the Checklist shall be made available to the Administrator upon request.

Note: Authority: Sections 8670.17.2(a) & 8670.23.1(d), Government Code.

Reference: Sections 8670.17.2(b) and 8670.23.1(e)(1), Government Code

#### "851.6 Clearing House Responsibilities."

- (a) The Administrator shall establish a Clearing House which shall be responsible for performing escort compliance and monitoring duties, to include the following:

(1) monitor, verify, and record the braking force of each escort tug that will be used to comply with this subchapter;

(2) ensure that the braking force measurement is certified by the American Bureau of Shipping (ABS) or by any member in the International Association of Classification Societies;

(A) the braking force measurement shall be monitored by the Clearing House for those escort tugs that are tested in the San Francisco Bay region;

(B) escort tugs may be tested in another port if the braking force measurement is conducted in a manner consistent with the ABS (or equivalent) standards as used by the Clearing House. The tug owner/operator shall register such measurement with the Clearing House, and shall provide verification that the measurement complies with the ABS (or equivalent) standards.

(3) maintain and publish a register which lists the following for each escort tug whose braking force is measured under this section:

(A) the tug's name;

(B) the tug operator;

- (C) the length of the tug;
  - (D) for tractor tugs, bollard pull ahead or astern, or the braking force determined by an alternate compliance model developed in accordance with the requirements of this subchapter;
  - (E) for conventional tugs, bollard pull astern;
  - (F) type and configuration of the propulsion system;
  - (G) type and configuration of the steering system;
- (4) receive notification of a tank vessel's arrival and/or movement as required under section 851.7;
  - (5) receive notification of the displacement of a tanker, and the tug(s) chosen for an escorted transit. The Clearing House shall use this reported information to determine if the tanker is correctly matched to the escort tug(s) as required in this subchapter, and shall immediately report to the Administrator when such a match has not been done correctly. The verification shall be made prior to the tanker's arrival and/or movement. The Clearing House shall also be responsible for verifying the tug vessel's stability when these tugs are operating westward of the Golden Gate Bridge as specified in Section 851.8(f);
  - (6) receive notification of the deadweight tonnage of a barge and the tug(s) that have been chosen for the escorted transit. The Clearing House shall use this reported information to determine if the barge is correctly matched to the escort tug(s) as required in this subchapter, and shall immediately report to the Administrator if the match has not been done correctly. The verification shall be made prior to the arrival and/or movement of the barge;
  - (7) maintain copies of blank Checklists for distribution upon request to tank vessel owner/operators, masters and/or pilots. Pilots shall have blank Checklists available when boarding the tank vessel;
  - (8) receive notification of the completion of an Escort Plan, or the completion and adequacy of a Checklist, and report to the Administrator when a pilot makes a determination that a Checklist is not adequate;
  - (9) maintain copies of the completed Checklists submitted by the tank vessel owner/operators or masters. Copies must be kept for a period of 3 years from the date of the transit covered by the Checklist. A copy of any Checklist shall be made available to the Administrator upon request;
  - (10) maintain the list of training programs approved by the Administrator and provide a copy of that list upon request to any interested party;
  - (11) receive reports from tug owners, operators or agents of any tug casualty that occurs during an escorted transit, and develop and maintain a database of all such casualty reports;

- (12) monitor compliance with the requirements of this subchapter and report all violations to both the Office of Spill Prevention and Response and the Harbor Safety Committee for the San Francisco Bay Region.

- (b) The Administrator shall ensure that the duties of the Clearing House are performed in an effective and impartial manner. The Administrator may enter into a contract or establish a memorandum of understanding to designate an individual, organization, corporation or agency to operate as the Clearing House.
- (c) The Clearing House shall be authorized to assess and collect a fee to cover the costs incurred in complying with the tug escort requirements of this subchapter. The owner/operators of all escort tugs and all tank vessels required to have a tug escort shall pay the fee assessed by the Clearing House.

Note: Authority: Sections 8670.17.1, 8670.17.2(a) and 8670.23.1(d), Government Code.  
Reference: Section 8670.17.1 and 8670.23.1(e)(1), Government Code

#### "851.7 Communication and Reporting Requirements Before, During and After an Escorted Transit"

- (a) No more than one hour prior to entering or transiting the marine waters of the San Francisco, San Pablo or Suisun Bays, the pilot or, if there is no pilot onboard, the master of a tank vessel shall report the vessel's name and position to the Clearing House, and shall report the status of the vessel as follows:
- (1) tank vessels carrying 5,000 or more long tons of oil as cargo shall report as "*Escort Required*"; or
  - (2) tank vessels carrying less than 5,000 long tons of oil as cargo and requiring no escort need not be reported.
- (b) After completing the review of the Checklist or the Escort Plan, as specified in section 851.5.1, the pilot or, if there is no pilot onboard, the master of the tank vessel shall report the following to the Clearing House:
- (1) a statement that the Escort Planning process has been completed;
  - (2) if a pilot is onboard, a statement from the pilot as to whether the Checklist is completed, and whether the Checklist is or is not adequate;
  - (3) a listing of the tugs that were chosen for the escort during the Escort Planning process;
  - (4) for a tanker, the vessel's displacement;
  - (5) for a barge, the vessel's deadweight tonnage.
- (c) Pre-Escort Conference: Before commencing an escorted transit, the pilot or, if there is no pilot onboard, the master of the tank vessel shall initiate communications with the escort tug(s). During

this pre-escort conference, all parties shall plan and discuss the details of the escorted transit as specified on the Checklist or in the Escort Plan, including, but not limited to, the following:

- (1) the intended route;
  - (2) the intended destination;
  - (3) the speed of the vessel;
  - (4) the positioning of the escort tug(s) relative to the tank vessel being escorted;
  - (5) the manner in which an emergency connection would be made between the escort tug and tank vessel;
  - (6) radio communications, including primary and secondary frequencies; and
  - (7) anticipated weather and tidal conditions.
- (d) The master of the escort tug(s) shall report the name of the tug(s) and the name of the tank vessel to the Clearing House upon arrival at the following locations:
- (1) for inbound tank vessel movements; when passing Alcatraz, and when on-station;
  - (2) for in-bay and outbound tank vessel movements; when on-station at the tank vessel prior to movement of the tank vessel.
- (e) At all times during the escorted transit, the master or pilot of the tank vessel shall maintain direct, two-way radio communication with the master or pilot of the escort tug. The radio communication shall be on a channel agreed to by both the master or pilot of the tank vessel and the master or pilot of the escort tug.
- (f) Reporting tug casualties during and after an escorted transit:
- (1) the master of the escort tug shall immediately notify the master or pilot of the escorted vessel of any casualty that occurs to the tug during the escorted transit. A casualty shall include any loss of main propulsion, primary steering, or any component or system that reduces the maneuverability of the tug, or any other occurrence that adversely affects the tug's ability to perform the escort function;
  - (2) the tug owner, operator or agent shall file a written casualty report with the Clearing House within 72 hours of occurrence. The Clearing House shall maintain a database of these reports for three years.

Note: Authority: Sections 8670.17.2(a) & 8670.23.1(d), Government Code.

Reference: Section 8670.23.1(e)(1), Government Code.

"851.8 Requirements for Escort Tugs; Braking Force Measurement, Crew and Training Standards, Equipment and Stationing Criteria."

(a) Braking force measurement:

- (1) any escort tug used to comply with the requirements of this subchapter must have its braking force verified and registered with the Clearing House, as follows;

(A) for tractor tugs escorting in an ahead position the braking force is measured as the ahead bollard pull;

(B) for tractor tugs escorting in an astern position the braking force is measured as the astern bollard pull;

(C) for conventional tugs the braking force is measured as the astern bollard pull.

- (2) the braking force of each escort tug must be re-measured at least once every 3 years from the date of the initial measurement, or sooner if the operating capability or braking force of the tug has been degraded by 10% or more. The new measurements must be verified and registered with the Clearing House.

(3) The Clearing House shall publish procedures and standards to be followed when conducting braking force measurement. These procedures, entitled "San Francisco Bay Region Clearing House, Rules for Bollard Pull Tests", dated May 19, 2000, are incorporated by reference. These procedures and standards shall be made available upon request to the Clearing House.

(b) Any escort tug used to comply with the requirements of this subchapter, must meet crew standards as follows:

- (1) An escort tug shall have a minimum of four persons on board including one certified tug master and two certified deck hands. The fourth person shall be a crew member capable of resolving mechanical difficulties aboard an escort tug in the event of an emergency;

(2) The requirement for four crew members does not preclude additional deck hands who are gaining experience for certification;

(3) The certified deck hands required under this subsection shall at all times be awake, alert and ready to respond during an escorted transit. The fourth person must be immediately available to respond to any mechanical difficulties aboard the escort tug. Immediate response may be assured by an alarm or other signaling device to wake or alert the fourth person to the emergency.

- (A) The Administrator may review the equipment and crew on an escort tug to assure compliance with this provision. The Administrator may require that the fourth person be awake and alert and ready to respond if the tug operator does not provide adequate mechanism to assure that the fourth person is immediately available to respond to a mechanical difficulty.
- (4) Working hours for escort crew members shall be limited to 15 hours in any 24-hour period, not to exceed 36 hours during any 72-hour period except in an emergency or a drill. Working hours shall include any administrative duties associated with the tug whether performed on board the tug or on shore.
- (c) Training requirements for the crew of any escort tug used to comply with the requirements of this subchapter are as follows:
- (1) to qualify for certification as the master or deck hand on an escort tug, an applicant must do all of the following:
    - (A) possess a current and valid U.S. Coast Guard Merchant Mariner's Document;
    - (B) show proof of at least 960 hours on duty of prior service aboard a tug, at least 240 hours of which must have been in the San Francisco Bay region;
    - (C) successfully complete an approved education program which covers the following topics:
      1. basic tugboat seamanship;
      2. line handling skills;
      3. communication systems;
      4. emergency response to the loss of steering or propulsion on an escorted tank vessel and on the escort tug itself.
  - (2) in addition to the requirements of subsection 851.8(c)(1), certification as the master of an escort tug requires that the applicant also do the following:
    - (A) possess a U.S. Coast Guard license appropriate to the escort tug in service; and
    - (B) show proof of an additional 240 hours on duty of service aboard a tug in the San Francisco Bay region (for a total of 480 of the requisite 960 hours of service); and
    - (C) successfully complete an approved education program which covers knowledge of local waters, basic seamanship, and the use of the escort tug in reducing the risk of an escorted vessel's grounding or collision.
  - (3) individuals may be considered to have satisfied certain educational requirements

without attending an education program, if they meet the following criteria:

- (A) an individual with a U.S. Coast Guard rating of Able Seaman Special (OSV) is considered to have met the educational requirements in subsection 851.8(c)(1)(C) 1 and 2;
  - (B) an individual with any Coast Guard license appropriate for the escort tug in service is considered to have met the educational requirements in subsections 851.8(c)(1)(C).
- (4) the Administrator shall review and approve the educational programs for masters and deck hands of escort tugs, and shall establish and maintain a list of all such approved programs:
- (A) an educational program shall be approved if it provides the coursework required by this section, and can adequately train students in the requisite skills;
  - (B) a request for approval of a program shall be submitted to the Administrator in writing and shall include the following:
    - 1. a description of the course content and materials;
    - 2. the qualifications of the instructors;
    - 3. the estimated cost of the program to the students;
    - 4. a description of the site(s) where the course will be held, both classroom and field locations.
  - (C) the Administrator shall notify the applicant of approval or denial within 30 days of the submittal of the application;
    - 1. if the educational program is denied, the applicant will be notified of the reasons for denial and may resubmit the program for review after the deficiencies have been remedied;
    - 2. once approved, the educational program must be submitted for re-evaluation at least once every 5 years or when a significant change occurs in the course content or materials. The 5-year re-submittal shall include an updated description of course content, materials, cost, and instructor qualifications, as well as copies of student evaluations from classes conducted during the previous year;
    - 3. the Administrator may audit the course at any time to assure compliance with the requirements of this section.

(5) The Administrator shall assure compliance with tug crew training and qualification requirements. Compliance with crew training and qualification requirements shall be verified as follows:

- (A) tug owner/operators shall establish and maintain adequate documentation to verify the training and qualifications of individual crew members, and shall make this information available to the Administrator upon request;
- (B) the Administrator may review the owner/operator's documentation annually to assure compliance with this section;
- (C) the Administrator may request this documentation at any time.

(d) The following equipment must be onboard an escort tug and in operable condition during all escorted transits;

- (1) a line-throwing gun for use in Zone 1, with 300 feet of tag line. The tag line shall be of suitable strength and size for deploying the tow line;
- (2) power line-handling equipment fore or aft for rapid, mechanically assisted deployment of lines. The primary line-handling equipment shall be in the position (fore or aft) best suited for the design of the particular tug in escort service;
- (3) tow line with a breaking strength that is 2.5 times the certified braking force of the escort tug;
- (4) a quick release device to be used when an escort tug is in a tethered mode;
- (5) one working radar;
- (6) fendering appropriate to absorb impact in skin-to-skin operations, and located at both the bow and stern to act as pivot points when pulling away from the tank vessel. In addition, the fendering must be sufficient to assure that there are no exposed corners, large holes or metal parts which could inflict damage on the escorted vessel, and must cover sufficient surface area to minimize sliding when working at an angle to the tank vessel.

(e) Annual inspection of the escort tug's equipment:

- (1) the owner/operator shall assure that the required equipment is on board and operable during all escorted transits;
- (2) the Administrator shall verify that the required equipment is on board each escort tug, and in operable condition. This verification may be obtained by an annual inspection which may be announced or unannounced. In conducting such inspections, the Administrator shall be guided by the standards established by the American Waterways Operators (AWO) in their Responsible Carrier Program, Sections III and IV, dated 2/21/95.

- (f) Stability requirements for all escort tugs that operate westward of the Golden Gate Bridge are as follows:
- (1) an escort tug shall have a load-line certificate; or
  - (2) an escort tug shall have a letter verifying stability issued by the American Bureau of Shipping or any member in the International Association of Classification Societies. The letter shall establish that the escort tug complies with the stability requirements outlined in federal Load Line Regulations at 46 CFR, Sections 42.09-10(a), 42.09-15(a), (b), and (c) except subparagraphs (1) and (2), and 42.09-25 (a) and (b) except for the portion of the last line of (b) that reads "...and meeting applicable requirements in this subchapter"; and 46 CFR Sections 173.090, 173.095 and 174.145. A copy of this letter shall be kept on file with the Clearing House.
- (g) Stationing requirements for escort tugs:
- (1) an escort tug shall not simultaneously engage in the escort of more than one tank vessel;
  - (2) escort tugs shall maintain a station-keeping distance of no more than 1000 feet ahead or aside, or 500 feet astern of the tank vessel while engaged in escort activity;
  - (3) escort tugs shall standby as the tank vessel transits Zones 3 and/or 5, as follows:
    - (A) the escort tug(s) shall standby in Zone 2 or 6 as the tank vessel transits Zone 5; and
    - (B) the escort tug(s) shall standby in Zone 2 or 4 as the tank vessel transits Zone 3; or
    - (C) the escort tug(s) may accompany the escorted tank vessel through Zone 3 and/or 5 in lieu of standing by.
  - (4) in Zone 1, the escort tug(s) shall be stationed as follows:
    - (A) on an inbound transit, the escort tug shall be in Zone 1 prior to the tank vessel's arrival to the area bounded by an arc eight nautical miles seaward of and centered on Mile Rocks Light; and
    - (B) on an outbound transit, the escort tug shall remain in Zone 1 until the tank vessel leaves the area bounded by an arc eight nautical miles seaward of and centered on Mile Rocks Light.
- (h) Escort transit log:
- (1) escort tug masters shall keep a record in the ship's log of every escorted transit;
  - (2) the record of the escorted transit in the ship's log shall include information regarding the sequence of events during the transit, the crew assignments, any casualties that may occur, and any drills conducted.

Note: Authority: Sections 8670.17.2(a) & 8670.23.1(d), Government Code.  
 Reference: Section 8670.23.1(e)(1), Government Code, and 46 CFR Sections 173.090, 173.095 and 174.145.

"851.9 Tanker and Tug Matching Criteria, and Tanker Crew and Equipment Requirements"

(a) Default Matrix Option for Matching Tugs to Tankers: The tug or tugs used for an escorted transit shall be able to provide sufficient braking force to stop the escorted tanker from a speed of 5 knots through the water. The braking force of the tug(s) shall match the tanker's displacement, as indicated in the following matrix:

| Assisting Current | Zones 1 and 2                                 |             |       |              |       | Zones 4 and 6 |             |       |              |       |
|-------------------|---|-------------|-------|--------------|-------|---------------|-------------|-------|--------------|-------|
|                   | slack   | <u>1 kt</u> | 2 kts | <u>3 kts</u> | 4 kts | slack         | <u>1 kt</u> | 2 kts | <u>3 kts</u> | 4 kts |
| Displacement*     | Braking Force in kips (1,000 pounds of force) |             |       |              |       |               |             |       |              |       |
| 0 to < 20         | 20  | <u>20</u>   | 30    | <u>40</u>    | 40    | 40            | <u>50</u>   | 70    | <u>90</u>    | 110   |
| 20 to < 30        | 20  | <u>30</u>   | 40    | <u>50</u>    | 60    | 50            | <u>70</u>   | 90    | <u>120</u>   | 160   |
| 30 to < 40        | 30  | <u>40</u>   | 50    | <u>60</u>    | 70    | 60            | <u>90</u>   | 120   | <u>160</u>   | 210   |
| 40 to < 50        | 30  | <u>40</u>   | 60    | <u>70</u>    | 90    | 70            | <u>110</u>  | 150   | <u>200</u>   | 250   |
| 50 to < 60        | 40  | <u>60</u>   | 70    | <u>90</u>    | 110   | 100           | <u>140</u>  | 190   | <u>250</u>   | 320   |
| 60 to < 80        | 50  | <u>70</u>   | 90    | <u>120</u>   | 140   | 120           | <u>180</u>  | 250   | <u>330</u>   | 420   |
| 80 to < 100       | 60  | <u>80</u>   | 110   | <u>140</u>   | 180   | 150           | <u>220</u>  | 300   | <u>400</u>   | 520   |
| 100 to < 120      | 70  | <u>100</u>  | 130   | <u>170</u>   | 210   | 180           | <u>270</u>  | 370   | <u>500</u>   | 650   |
| 120 to < 140      | 80  | <u>110</u>  | 150   | <u>190</u>   | 240   | 210           | <u>310</u>  | 430   | <u>580</u>   | 760   |
| 140 to < 160      | 90  | <u>140</u>  | 190   | <u>240</u>   | 310   | 240           | <u>350</u>  | 490   | <u>660</u>   | 860   |
| 160 to < 180      | 100   | <u>150</u>  | 210   | <u>270</u>   | 350   | 260           | <u>390</u>  | 550   | <u>740</u>   | 970   |
| 180 to < 200      | 110   | <u>170</u>  | 230   | <u>300</u>   | 390   | **            | **<br>—     | **    | **<br>—      | **    |
| 200 to < 220      | 120   | <u>180</u>  | 250   | <u>330</u>   | 420   | **            | **<br>—     | **    | **<br>—      | **    |

\* 1,000 long tons

\*\* The channel depths in zones 4 and 6 limit vessels that may use the channel to those drawing less than 35 feet. This table does not address vessels in zones 4 and 6 with a displacement greater than 180,000 long tons because such vessels would draw more than 35 feet and would thus not be allowed into these zones.

(1) Applicable current velocity: The current velocities shall be determined using the published tide and current tables developed and maintained by NOAA, and used by the pilots. The current velocity used shall be the one published for the estimated time of arrival at the

points noted below. The estimated time of arrival shall include a window of 30 minutes before and after the scheduled arrival to account for possible delays or changes. Tank vessel operators are responsible for adjusting the estimated arrival time when it appears that it will fall outside of the originally estimated one hour window.

(2) Location of current readings: The specific current velocity to be used in conjunction with the matrix shall be the published readings for the following locations:

(A) The Golden Gate Bridge - the predicted current velocity at the Golden Gate Bridge shall apply to vessels in zones 1 and 2 that are west of a north-south line drawn through the eastern tip of Alcatraz Island and terminating at Angel Island or to vessels in zones 1 and 2 that are west of the eastern entrance to Racoon Strait.

(B) The Bay Bridge; west of Yerba Buena Island - the predicted current velocity at the Bay Bridge shall apply to vessels in zone 2 that are south of an arc drawn from Alcatraz Island east to Treasure Island and east of the north-south line drawn through Alcatraz Island.

(C) 1.25 miles north of Point Chauncey - The predicted current velocity at 1.25 miles north of Pt. Chauncey shall apply to vessels in zone 2 that are north of an arc with a radius of 2.7 nautical miles centered at the intersection of the Bay Bridge and the San Francisco Peninsula drawn from Alcatraz Island east to Treasure Island and east of the north-south line drawn through the eastern tip of Alcatraz Island.

(D) The San Mateo Bridge The predicted current velocity at the San Mateo Bridge shall apply to vessels while in zone 4.

(E) The Carquinez Bridge - the predicted current velocity in Carquinez Strait shall apply to vessels in zone 6.

How to use the Default Matrix Option for Matching Tugs to Tankers: The matrix provides current velocities for slack water, 1, 2, 3, and 4 knots. The slack water column shall be used only when the water is truly slack. The 1 knot column shall be used for any velocity above 0 and equal to 1. The 2 knot column shall be used for any velocity above 1 and equal to 2, and so on up to the 4 knot maximum.

In those situations where the current velocity is above 4 knots, such as may occur at the Golden Gate, the tank vessel requiring an escort tug shall reschedule the transit to a time when the current velocity drops to 4 knots or below.

(b) Alternative To The Default Matrix for Matching Tugs to Tankers: Measurement methodologies other than those used to establish the Default Matrix may be used instead of, or in addition to, the Matrix as follows;

(1) Alternate Compliance Model for Escort Tugs: Tug owner/operators may propose an alternate method for measuring the braking force of any tug (in kips). Such alternate method may be used to demonstrate that the tug can provide higher steering or braking forces (in kips) than the simple bollard pull measurement would indicate. An alternate

measurement may only be submitted once in any 12 month period and shall comply with the following:

- (A) the owner/operator shall assure that the following are included when developing a methodology for calculating an alternate braking force for a given escort tug:
1. the alternate measurement is conducted from a starting speed of 10 knots for zones 1 and 2, and 8 knots for zones 4 and 6;
  2. the escort tug is not required to exceed the limits of its ability to generate the forces, and in no instance submerges the deck edge to achieve the alternate measurement;
  3. the escort tug operates all its equipment at or below the manufacturer's recommended guidelines for the safe working load of the tug;
  4. unless demonstrated otherwise by full scale testing, all machinery shall be assumed to operate at or below performance levels published by the manufacturer;
  5. any current bollard pull values registered with the Clearing House shall be utilized where appropriate in any formulas or models;
  6. any known condition that would impair the escort tug's ability to perform shall be included in the calculation.
- (B) the measurement must be conducted by a marine architect or engineer approved by the Administrator;
1. the tug owner/operator shall submit the name of the marine architect or engineer to the Administrator for approval prior to having that individual or his/her company conduct an alternate measurement.
  2. the Administrator shall approve a marine architect or engineer if that person has demonstrated the education, knowledge and experience necessary to conduct the testing and modeling of tug capabilities and braking force.
- (C) the alternate model and the resultant measurements shall be approved by the Administrator before the alternate model may be used to match a tanker to a tug or tugs. The Administrator shall approve the alternate model if it provides both of the following:
1. a higher force (in kips) than the simple bollard pull measurement would indicate; and
  2. at least the same level of protection as the braking forces established in the default matrix.

- (D) after an alternate model is approved, the Administrator shall provide the Clearing House with the new braking force measurements for the subject tug(s). The new measurements shall be used with the Default Matrix established in this section.
- (2) Alternate Compliance Model for Tankers: Tanker owner/operators may develop a model for the vessels in their fleet relative to the steering and braking demands of the vessels, and the braking capabilities of tugs. The steering and braking demands established by the alternate model may be used instead of the Default Matrix to match escort tugs to the tankers. An alternate compliance model may only be submitted once in any 12-month period and shall comply with the following:
- (A) the measurement must be conducted by a marine architect or engineer approved by the Administrator. The tanker owner/operator shall submit the name of the marine architect or engineer to the Administrator for approval prior to having that individual or his/her company conduct an alternate model;
1. the Administrator shall approve a marine architect or engineer if that person has demonstrated the education, knowledge and experience necessary to conduct the testing and modeling of tug capabilities and braking force.
- (B) the alternate model and the resultant measurements shall be approved by the Administrator before the alternate model may be used to match a tanker to a tug or tugs. The Administrator shall approve the alternate model if the following conditions are met:
1. under the alternate model the tanker can complete a safe transit, staying within the 95th percentile of constraint as established in "The San Francisco Bay Tanker Escort Study", dated 7/95, prepared by Glosten Associates; and
  2. the alternate model provides at least the same level of protection as the braking forces established in the Default Matrix, and can be achieved using no more than three tugs as required in subsection 851.9(ed).
- (C) After an alternate model is approved, the Administrator shall provide the Clearing House with the tanker demand in kips which corresponds to the tanker's displacement and speed under the approved alternate model.
- (c) The Administrator may allow deviations from compliance for the matching of tugs to laden tankers when these vessels make short transits from berth to berth within a zone and are assisted by docking tugs and transiting at speeds less than 8 knots.
- (1) The tanker master or owner/operator shall make a request for such deviations to the Administrator through the Clearing House at least 24 hours prior to the desired shift.
  - (2) The Administrator shall approve or deny the deviation request by verbally notifying the Clearing House within 12 hours of the request. A written confirmation shall follow within 24 hours.

- (d) Maximum number of tugs to be used during an escorted transit:
- (1) the tanker must be accompanied by a sufficient number, but no more than three tugs to provide the braking forces specified in this section;
- (e) Speed limits for tankers are as follows:
- (1) tankers that use the Default Matrix as provided in this section, shall not proceed at a speed in excess of 10 knots through the water in Zones 1, 2, 3 and 5, nor more than 8 knots through the water in Zones 4 and 6, with the following qualifications:
    - (A) the speed or speeds selected by the tanker for the transit must permit stationing the escort tug(s) to allow the tug(s) to effectively influence the tanker's movement in the event of a casualty;
    - (B) the tanker shall proceed at a safe speed. The determination of a safe speed shall include, but not be limited to:
      1. environmental factors such as the depth of the water, visibility, wind conditions, and the speed of the tidal currents; and
      2. proximity of other vessel traffic and any other vessels at anchor.
    - (C) Tankers shall in any case have their engines ready for immediate maneuver and shall not operate in any control modes or with fuels that prevent an immediate response to an engine order.
  - (2) tank vessels may be exempt from the speed limits specified in subsection 851.9(e)(1) if they establish and use an approved alternate compliance model for determining the steering and braking demands of their vessels, as provided in this section. In such cases, the speed limit will be that used to establish the alternate compliance model, and must be specified in the Escort Plan, or on the Checklist.
- (f) Crew requirements:
- (1) a tanker shall have sufficient and qualified line-handling-capable crew members standing by and available to immediately receive lines from each escort tug. These crew shall be stationed proximate to the lines, and shall not be assigned duties that would interfere with their ability to immediately respond to an emergency situation;
  - (2) the tanker shall comply with all applicable federal regulations relating to anchor readiness;
  - (3) tankers shall have sufficient and qualified supervisors to provide direct supervision of line-handling crew operations. Supervisors shall have direct radio communication capability with the bridge of the tanker.
- (g) Equipment requirements:

- (1) each tanker shall have deck chocks and bitts that are of sufficient size, strength, and number to accommodate the anticipated braking force of the escort tug(s);
- (2) the tanker owner/operator shall indicate the location and strength of the bitts and chocks in the Escort Plan for each vessel.

Note: Authority: Sections 8670.17.2(a) & 8670.23.1(d), Government Code.  
Reference: Section 8670.23.1(e)(1), Government Code

#### "851.9.1 Barge and Tug Matching Criteria, and Barge Crew and Equipment Requirements"

- (a) A barge must be accompanied by a sufficient number, but no more than three tugs to provide the braking force specified in this section;
  - (1) the line-haul tug which provides the power to push or tow a barge shall not become an escort tug during the course of a transit unless the line-haul tug has been relieved of its duties as the primary towing vessel, and replaced with another tug that serves as primary towing vessel.
  - (2) any line-haul tug that does become the escort tug after being relieved of all line-haul duties, must meet all the requirements for escort tugs as specified in this subchapter.
- (b) The tug or tugs used to escort a barge must be able to provide sufficient braking force to stop the barge, measured as follows:
  - (1) the braking force shall be measured as the escort tug's astern static bollard pull;
  - (2) the escort tug shall have total astern static bollard pull in pounds equal to, not less than, the barge's deadweight tonnage;
- (c) A barge shall not exceed 8 knots through the water during an escorted transit.
- (d) Crew Requirements:
  - (1) A barge shall have sufficient and qualified line-handling-capable deck hands onboard the barge, standing by and available to receive lines from each escort tug;
    - (A) the deck hands for the barge shall be made available from the line-haul tug;
    - (B) in the interest of crew safety, when entering or leaving Zone 2 bound to or from the sea (Golden Gate Bridge), crew transfers to or from the barge may be made in the vicinity of Alcatraz Island;
    - (C) when a barge is fitted with an emergency tow wire, or comparable mechanical device of sufficient strength and handling characteristics to control the barge, or the escort tug is made fast to the barge, deck hands shall not be required on board the

barge.

(2) Barges shall have sufficient and qualified supervisors to provide direct supervision of line-handling crew operations. Supervisors shall have direct radio communication capability with the bridge of the tug that is towing the barge.

(e) Equipment requirements:

- (1) each barge shall have deck chocks and bits that are of sufficient size, strength and number to accommodate the anticipated braking force of the escort tug(s);
- (2) the barge owner/operator shall indicate the location and strength of the bits and chocks in the

Note: Authority: Sections 8670.17.2(a) & 8670.23.1(d), Government Code.  
Reference: Section 8670.23.1(e)(1), Government Code

#### "851.10 Penalties

Any person who knowingly, intentionally or negligently violates any provision of this subchapter shall be subject to criminal, civil, and/or administrative civil actions as prescribed in Article 9, Government Code, beginning with Section 8670.57.

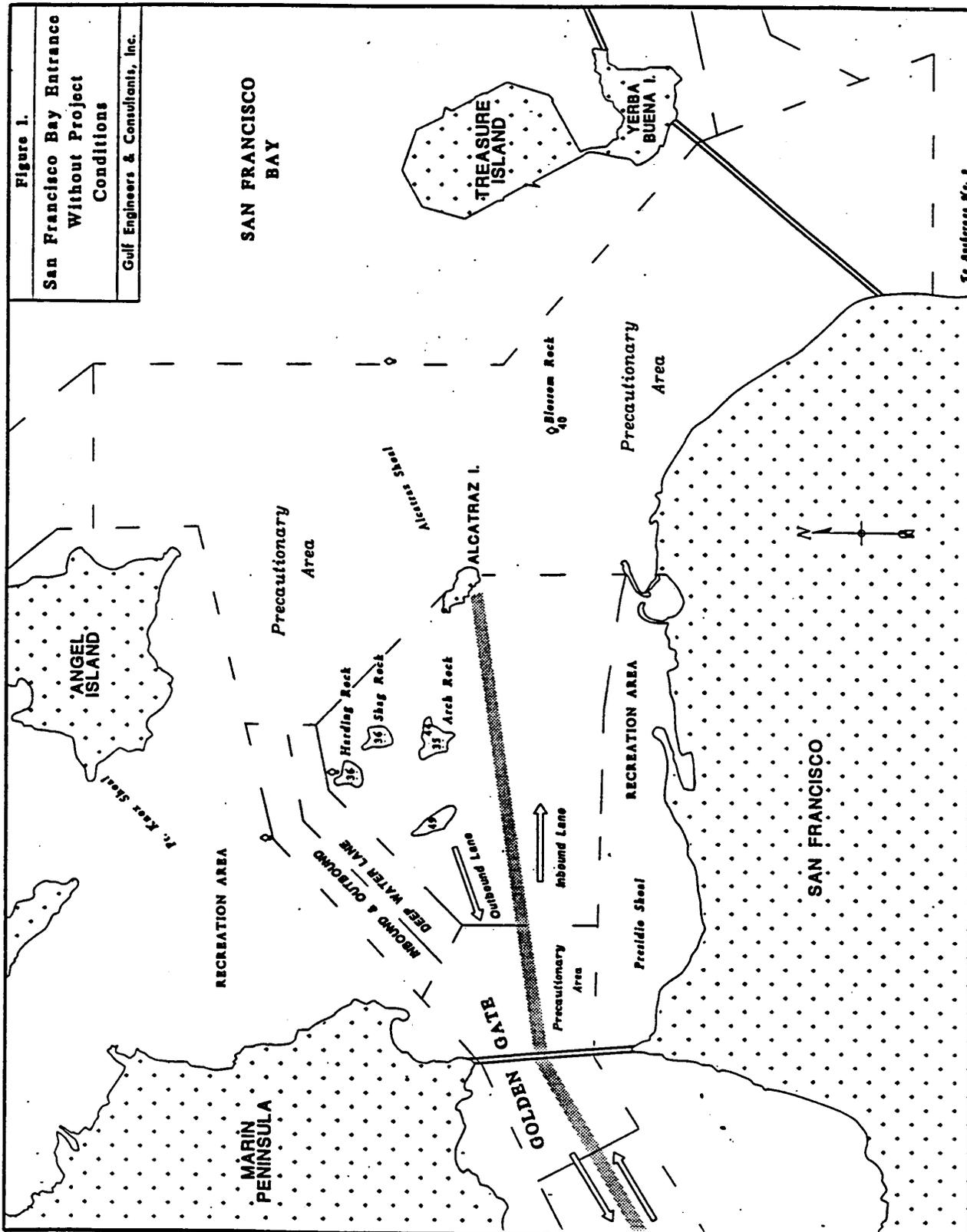
Note: Authority: Sections 8670.17.2(a) & 8670.23.1(d), Government Code.  
Reference: Sections 8670.23.1(e)(1) & Article 9, Sections 8670.57 through 8670.69.6, Government Code.

#### "851.10.1 Requests for Redetermination"

The owner/operator of a tank vessel or an escort tug may request redetermination of an action taken relative to an inadequacy decision or conditional approval of an Escort Plan or Checklist, denial or revocation of approval of an educational program, or application for use of an alternative compliance model. A request for redetermination must be submitted in writing and shall be processed as follows:

- (a) the request must be submitted to the Administrator within 15 calendar days from the date of the decision being disputed;
- (a) the request must contain the basis for the redetermination and, if available, provide evidence which rebuts the basis for the decision;
- (a) within 15 calendar days following the receipt of the request for redetermination, a notice shall be sent indicating that the Administrator shall adhere to the earlier decision or that the decision has been modified or rescinded.

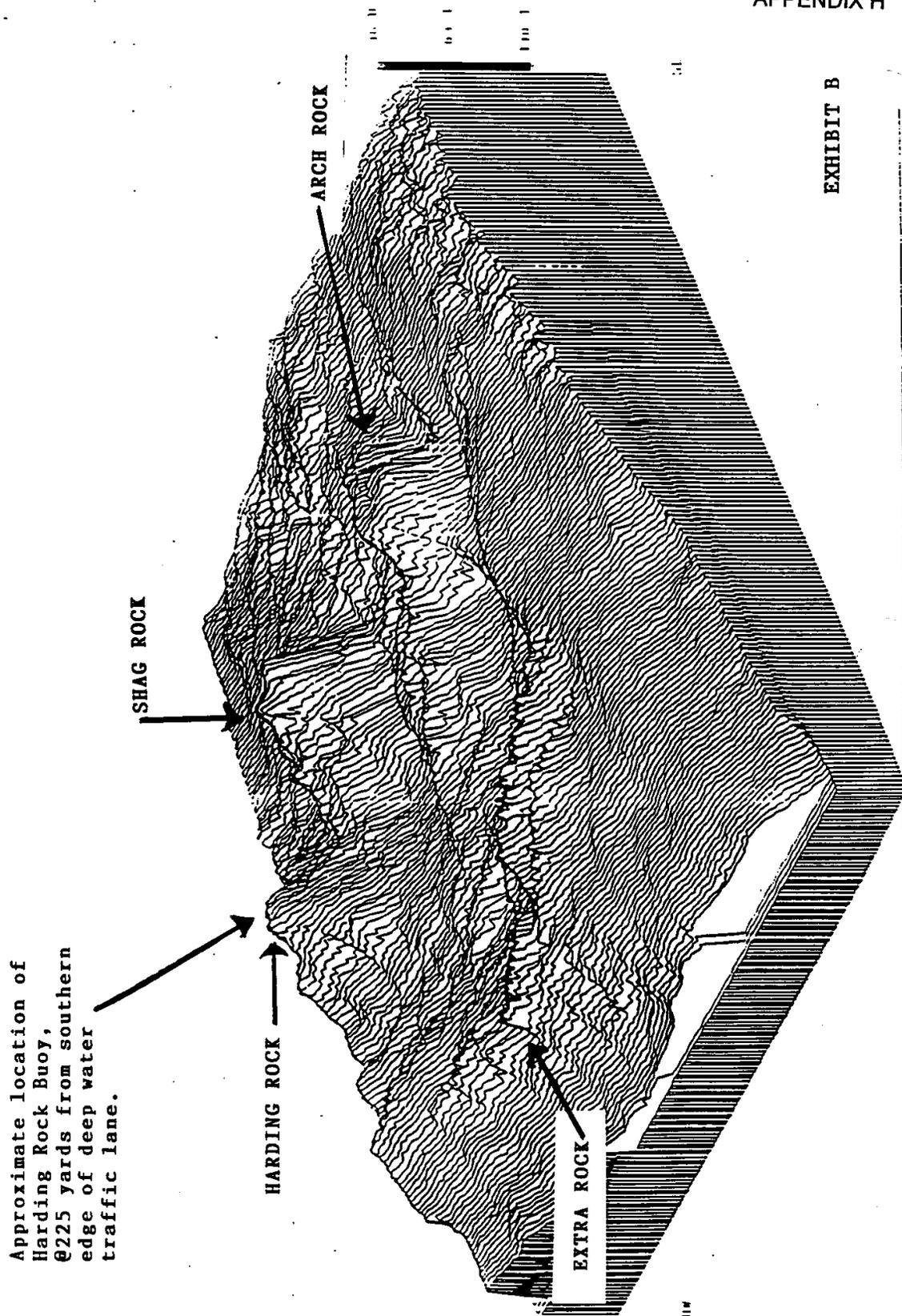
Note: Authority: Sections 8670.17.2(a) and 8670.23.1(d), Government Code.  
Reference: Sections 8670.23.1(e)(1) and Article 9, Sections 8670.57 through 8670.69.6, Government Code.



Rock Removal Interim Report,  
 Initial Appraisal

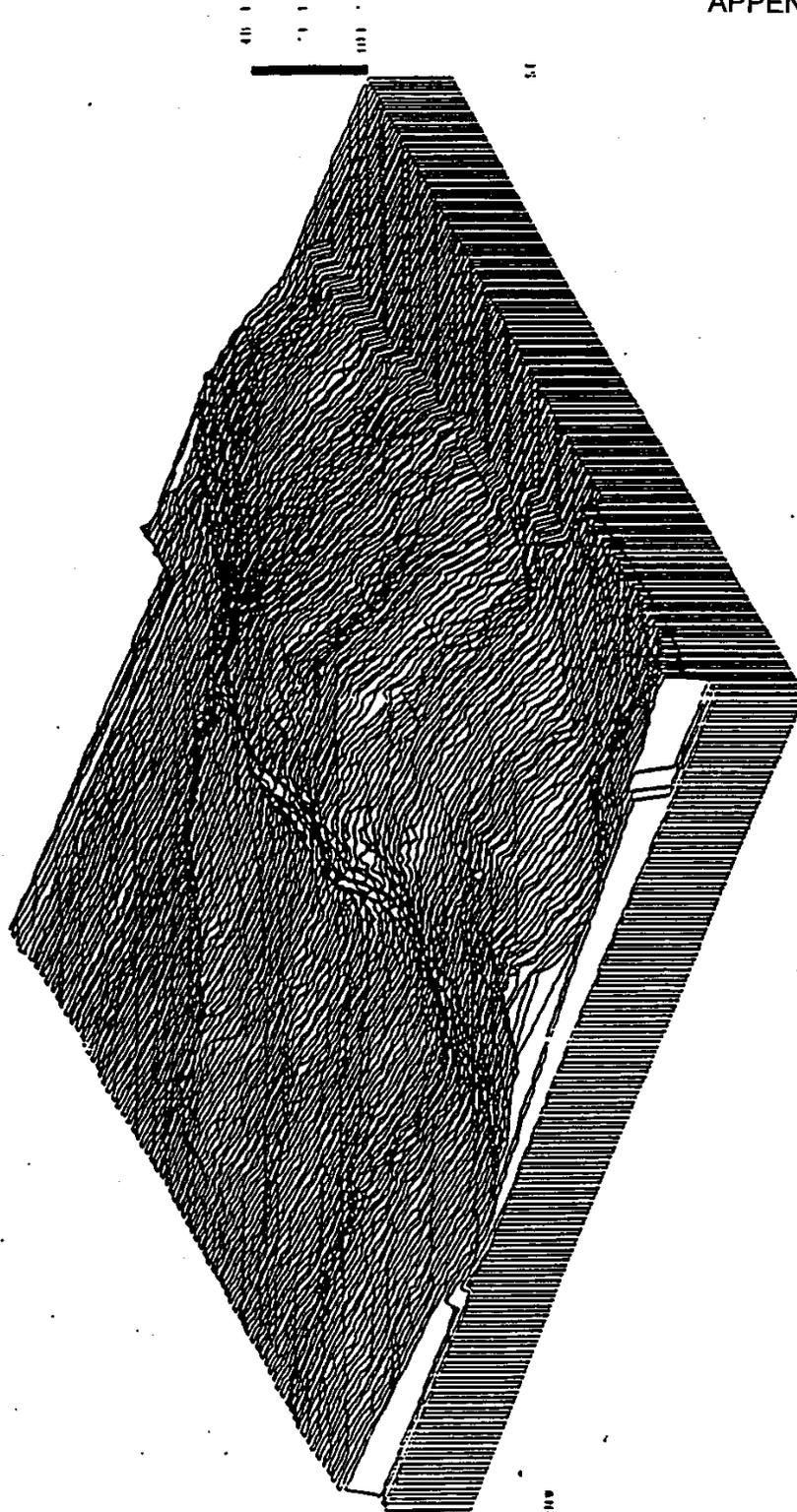
U.S. Army Corps of Engineers

APPENDIX H



Rock Removal Interim Report, Initial Appraisal, U.S. Army Corps of Engineers, April, 1994.

APPENDIX H



BLOSSOM ROCK - ISOMETRIC

## VEHICULAR BRIDGE INVENTORY

VEHICULAR BRIDGE MANAGEMENT

## BRIDGES ENCOUNTERED BY OCEAN GOING VESSELS

| <u>BRIDGE NAME AND LOCATION</u>                                      | <u>TYPE</u>              | <u>CLEARANCES</u>         |  |
|--|--------------------------|---------------------------|--|
|  |                          | <u>Horz/Vert MLLW-MHW</u> |  |
| 1. <b>Golden Gate Bridge</b><br>San Francisco Bay                    | SUS                      | 4028/238-232              |  |
| 2. <b>San Francisco-Oakland</b><br>San Francisco Bay, Westerly Reach | SUS                      |                           |  |
| Span A-B, Pier A   |                          | 2229/180-174              |  |
| Pier B   |                          | 229/223-217               |  |
| Span B-C, Pier B   |                          | 1072/224-218              |  |
| Pier C   |                          | 1072/227-221              |  |
| Span C-D, Pier C   |                          | 1079/226-220              |  |
| Pier D   |                          | 1079/224-218              |  |
| Span D-E, Pier D   |                          | 2210/224-218              |  |
| Pier E   |                          | 2210/181-175              |  |
| Span E-YB Isl, Pier E  | F                        | 870/176-170               |  |
| 3. <b>Richmond-San Rafael</b><br>San Francisco Bay                   | F                        |                           |  |
| Main Channel, Center Span  |                          | 1000/190-185              |  |
| Left and Right Span  |                          | 480/173-168               |  |
| East Channel, Center Span  |                          | 970/140-135               |  |
| 4. <b>Carquinez</b><br>Carquinez Strait, Vallejo                     | F                        |                           |  |
| Upstream Bridge:   |                          |                           |  |
| South (left) Span, South Pier  |                          | 998/141-135               |  |
| South (left) Span, North Pier  |                          | 998/151-145               |  |
| North (right) Span, South Pier                                       |                          | 1000/152-146              |  |
| North (right) Span, North Pier                                       |                          | 1000/157-151              |  |
| Downstream Bridge:   |                          |                           |  |
| South (left) Span, South Pier  |                          | 1030/140-134              |  |
| South (left) Span, North Pier  |                          | 1030/150-144              |  |
| North (right) Span, South Pier                                       |                          | 1030/153-147              |  |
| North (right) Span, North Pier                                       |                          | 1030/158-152              |  |
| 5. <b>Martinez, Highway Bridge</b><br>Martinez/Benicia               | F                        | 440/141-135               |  |
| 6. <b>Martinez, Union Pacific RR Bridge</b><br>Martinez/Benicia,     | V/L<br>Raised<br>Lowered | 291/140-135<br>291/75-70  |  |
| 7. <b>Antioch</b><br>Antioch, CA – San Joaquin River                 | F                        | 400/142-138               |  |

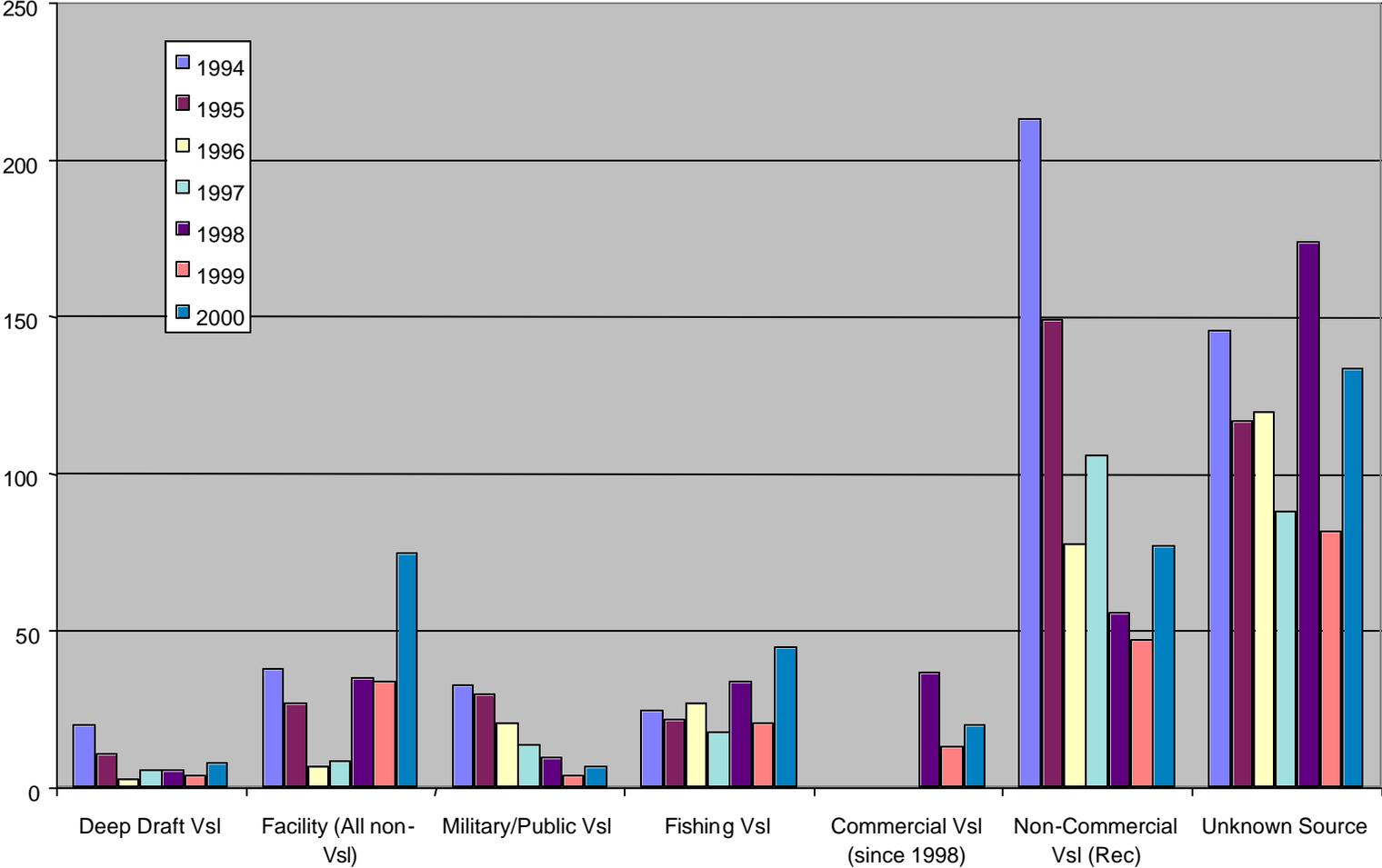
## MSO San Francisco Bay Pollution Statistics April 1, 2001 to March 31, 2002

|                                | Apr-01 | May-01 | Jun-01 | Jul-01 | Aug-01 | Sep-01 | Oct-01 | Nov-01 | Dec-01 | Jan-02 | Feb-02 | Mar-02 | Ave/Mo | Total |
|--------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| <b>Total Reported</b>          |        |        |        |        |        |        |        |        |        |        |        |        |        |       |
| <b>Oil Pollution Incidents</b> | 26     | 26     | 23     | 32     | 21     | 20     | 25     | 19     | 13     | 26     | 12     | 18     | 21.75  | 261   |
|                                |        |        |        |        |        |        |        |        |        |        |        |        |        | 209.0 |
| <b>MSO</b>                     | 12     | 17     | 20     | 28     | 12     | 16     | 20     | 15     | 7      | 25     | 10     | 11     | 16.08  | 8     |
| <b>MSFO</b>                    | 7      | 5      | N/A    |        |       |
| <b>Eureka Detachment</b>       | 7      | 4      | 3      | 4      | 9      | 4      | 5      | 4      | 6      | 1      | 2      | 7      |        |       |
| <b>Penalty Action:</b>         |        |        |        |        |        |        |        |        |        |        |        |        |        |       |
| <b>Civil Penalty (MV)</b>      | 1      | 0      | 3      | 0      | 1      | 2      | 0      | 1      | 0      | 2      | 0      | 0      |        |       |
| <b>Civil Penalty (TK)</b>      | 0      | 1      | 2      | 7      | 1      | 0      | 1      | 2      | 2      | 3      | 2      | 2      |        |       |
| <b>Letter of Warning</b>       | 2      | 6      | 3      | 4      | 0      | 2      | 2      | 2      | 2      | 9      | 2      | 1      |        |       |
| <b>No Action Required</b>      | 23     | 19     | 15     | 17     | 19     | 16     | 22     | 14     | 9      | 12     | 8      | 15     |        |       |
| <b>Source Type:</b>            |        |        |        |        |        |        |        |        |        |        |        |        |        |       |
| <b>Deep Draft Vsl</b>          | 1      | 0      | 0      | 0      | 0      | 0      | 1      | 0      | 1      | 3      | 1      | 0      |        |       |
| <b>Facility (All non-Vsl)</b>  | 3      | 4      | 4      | 7      | 3      | 2      | 8      | 3      | 0      | 2      | 2      | 4      |        |       |
| <b>Military/Public Vsl</b>     | 1      | 0      | 0      | 0      | 1      | 0      | 0      | 0      | 0      | 0      | 2      | 1      |        |       |
| <b>Fishing Vsl</b>             | 1      | 0      | 1      | 3      | 1      | 2      | 1      | 3      | 3      | 0      | 2      | 1      |        |       |
| <b>Commercial Vsl</b>          | 0      | 0      | 1      | 1      | 0      | 1      | 1      | 0      | 1      | 0      | 0      | 0      |        |       |
| <b>Non-Commercial Vsl</b>      | 0      | 5      | 4      | 10     | 2      | 4      | 4      | 4      | 2      | 13     | 2      | 2      |        |       |
| <b>Unknown Source</b>          | 20     | 17     | 13     | 11     | 14     | 11     | 10     | 10     | 6      | 8      | 3      | 10     |        |       |
| <b>Other Info:</b>             |        |        |        |        |        |        |        |        |        |        |        |        |        |       |
| <b>OSTLF/CERCLA Cases</b>      | 1      | 0      | 0      | 0      | 2      | 2      | 1      | 1      | 0      | 1      | 1      | 0      |        |       |
| <b>HAZMAT</b>                  | 1      | 0      | 1      | 1      | 0      | 0      | 1      | 0      | 0      | 0      | 1      | 0      |        |       |
| <b>POLREP Cases</b>            | 4      | 0      | 0      | 0      | 2      | 2      | 1      | 1      | 0      | 1      | 1      | 0      |        |       |
| <b>Cleanup Required</b>        | 4      | 2      | 2      | 0      | 3      | 6      | 1      | 4      | 2      | 4      | 1      | 5      |        |       |

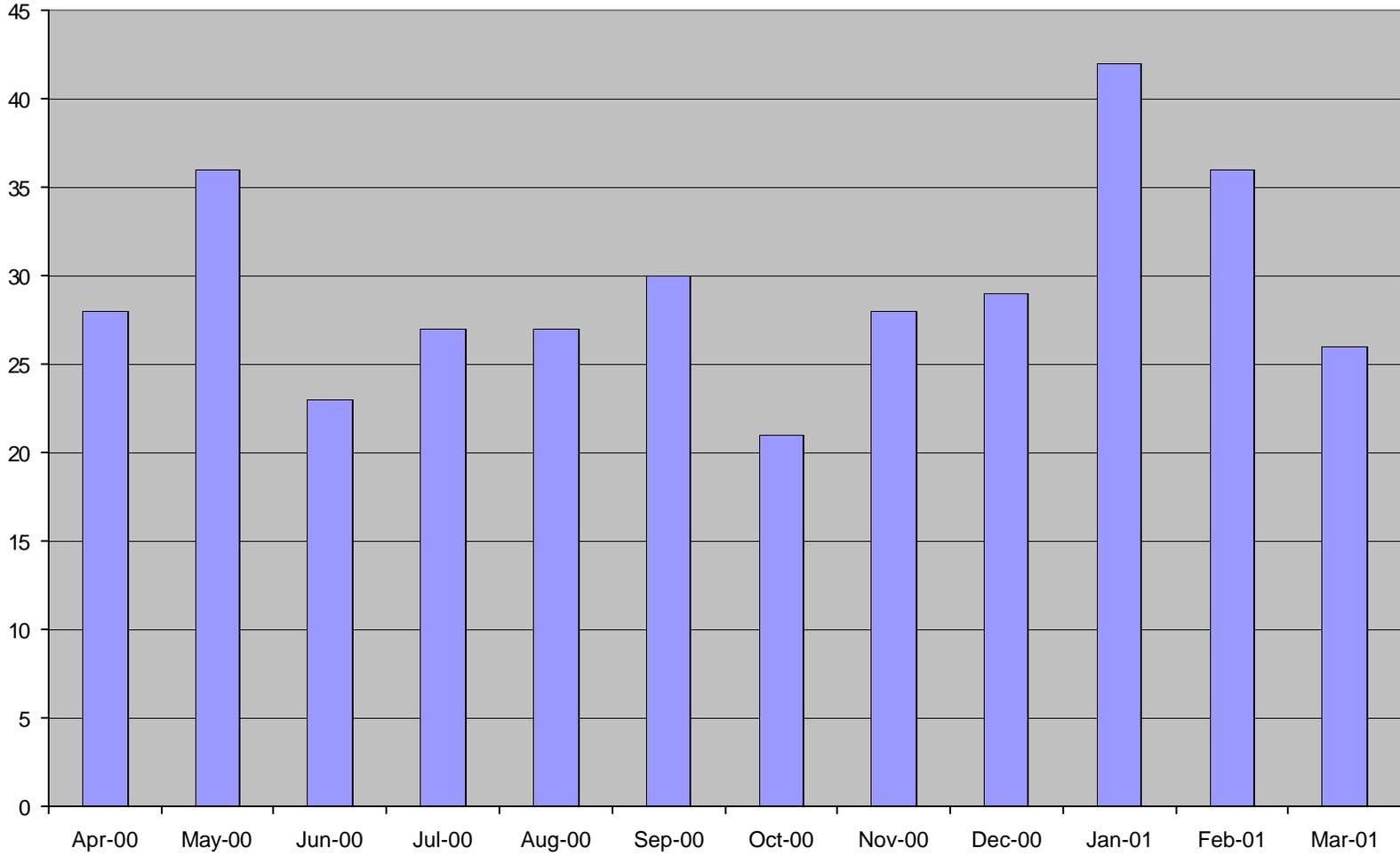
## MSO San Francisco Bay Pollutions Statistics 1994-2000

|   | 1994        | 1995        | 1996        | 1997        | 1998        | 1999        | 2000        | Ave<br>98-00 | Ave/Mo<br>over 3 yrs |
|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|----------------------|
| <b>Total Reported Oil Pollution Incidents</b> | 664         | 553         | 408         | 332         | 352         | 263         | 363         | 327.5        | 27.3                 |
| <b>MSD</b>                                    | 99          | 86          | 58          | 59          | 97          | 102         | 94          | 88.0         | 7.3                  |
| <b>Civil Penalty (MV)</b>                     | 151         | 125         | 110         | 97          | 39          | 17          | 11          | 103.5        | 8.6                  |
| <b>Civil Penalty (TK)</b>                     |             |             |             |             | 26          | 9           | 30          | 21.7         | 1.8                  |
| <b>Letter of Warning</b>                      |             |             |             |             | 24          | 38          | 75          | 45.7         | 3.8                  |
| <b>No Action Required</b>                     |             |             |             |             | 202         | 146         | 247         | 198.3        | 16.5                 |
|   | <b>1994</b> | <b>1995</b> | <b>1996</b> | <b>1997</b> | <b>1998</b> | <b>1999</b> | <b>2000</b> |              |                      |
| <b>Deep Draft Vsl</b>                         | 20          | 11          | 3           | 6           | 6           | 4           | 8           | 6.0          | 0.5                  |
| <b>Facility (All non-Vsl)</b>                 | 38          | 27          | 7           | 9           | 35          | 34          | 75          | 48.0         | 4.0                  |
| <b>Military/Public Vsl</b>                    | 33          | 30          | 21          | 14          | 10          | 4           | 7           | 7.0          | 0.6                  |
| <b>Fishing Vsl</b>                            | 25          | 22          | 27          | 18          | 34          | 21          | 45          | 33.3         | 2.8                  |
| <b>Commercial Vsl (since 1998)</b>            |             |             |             |             | 37          | 13          | 20          | 23           | 1.9                  |
| <b>Non-Commercial Vsl (Rec)</b>               | 213         | 149         | 78          | 106         | 56          | 47          | 77          | 60.0         | 5.0                  |
| <b>Unknown Source</b>                         | 146         | 117         | 120         | 88          | 174         | 82          | 134         | 130.0        | 10.8                 |
| <b>OSTLF/CERCLA Cases</b>                     | 18          | 17          | 10          | 16          | 15          | 13          | 13          | 13.7         | 1.1                  |
| <b>HAZMAT</b>                                 | 44          | 35          | 7           | 8           | 2           | 1           | 6           | 3.0          | 0.3                  |
| <b>POLREP Cases</b>                           |             |             |             |             | 20          | 18          | 29          | 22.3         | 1.9                  |
| <b>Cleanup Required</b>                       |             |             |             |             | 53          | 28          | 90          | 57.0         | 4.8                  |

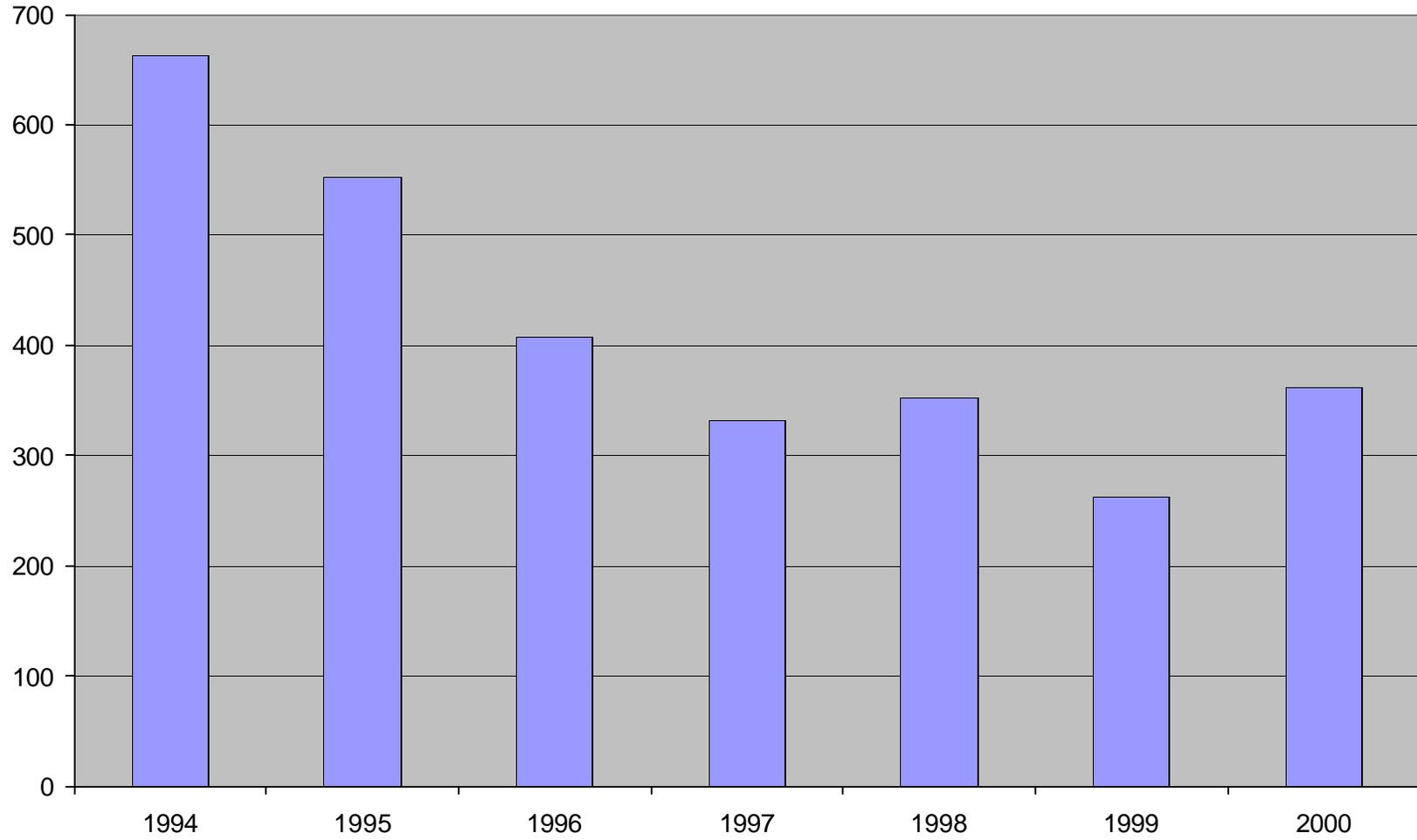
### Number of Pollution Incidents 1994-2000 by Type of Source



### Number of Reported Pollution Incidents by Month



### Total Number of Pollution Incidents 1994-2000



# **Recommendations for conducting Escort Training on San Francisco Bay**

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## **1.0 OVERVIEW**

The members of the San Francisco Harbor Safety Committee recognize that for the Tug Escort System to perform as anticipated, all phases of its operation should be exercised. By training, pilots and tug operators will practice using the escort command language. They will also expand their knowledge of the capabilities and limitations of the various tugs employed in escorting operations, and how best to utilize that tug in an emergency. Further, the user of the service, the ship's crew, will also gain valuable knowledge that they can apply in other ports by observing and participating in these training exercises.

Each organization is encouraged to participate in this training opportunity and to internally document their exercises.

## **2.0 PURPOSE**

To outline and define the process by which pilots, escort tug and ship crews can arrange for and participate in live escort training exercises. This process will enable training to be conducted under agreed upon conditions to promote the safety of all involved. This training process will allow opportunities for demonstration, practice and skill enhancement for emergency response maneuvers. Lessons learned and best practices developed during these training sessions should be shared between the participants.

## **3.0 SCOPE**

These voluntary recommendations are for the use of all pilots and tug crews actively offering their services as escorts in the Bay. By extension, the users of the services, the escorted vessel crews will also be included in the scope of these recommendations.

## **4.0 RESPONSIBILITIES AND AUTHORITIES**

The pilot, tug captain and ship master have the responsibility to evaluate prior to each training session if it is appropriate to conduct training under the current environmental conditions, which maneuvers are to be demonstrated, where the training will be conducted and at what speed. If all three parties cannot agree, the training will not proceed.

## **5.0 SCHEDULING EXERCISES**

It is intended that these training exercises may be conducted when weather conditions and / or vessel scheduling allows. It is expected that the pilot will initiate the request to conduct these exercises, however the shipmaster or escort tug captain may initiate them. Each may decline to participate with no negative consequences should he or she feel that it is inappropriate.

Tug escort captains and / or mates qualified to conduct escort operations are to be pre-authorized by their companies to make the decision on board if requested by the pilot.

Prior to agreeing to conduct the training, the participants should consider weather, sea conditions, the degree of training of the participants, the speed of the escorted vessel and the maneuvers to be executed. Only when all parties agree that it is appropriate will the training proceed. Each party may also halt the training exercise if he or she becomes concerned for any reason.

## **6.0 TRAINING EXERCISES**

When a training exercise is agreed to, the pilot and tug operator should carefully discuss the maneuvers that they want to demonstrate. The tug operator should be the one to specify at what speeds he will be comfortable performing the maneuvers in question based on his personal experience level and training. Escort training sessions should be logged.

## **7.0 ESCORT LANGUAGE**

In order to work towards a stronger bridge team, this training will encourage all participants to use a standardized tug command language.<sup>1</sup>

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<sup>1</sup> The US Coast Guard NAVSAC Committee has endorsed a command language, and it is in use in many ports around the United States.

## **8.0 CROSS DECK TRAINING**

The San Francisco Bar Pilots, the ChevronTexaco Pilots and the independent pilots of the Bay recognize the benefit of understanding how the tug crews operate their vessels during an escort. Towards that end the pilots will be encouraged to ride on board a tug during an escort.

Tug crews are also encouraged to ride on board a tanker during an escort whenever possible. While it may be more difficult to arrange, training exercises should also be open to interested ship crews also.

## **9.0 TRIALS / TRAINING INFORMATION**

The participants recognize that less than perfect performance may occur as part of this training process. Further, as new employees are brought on board this learning-by-doing process will continue into the future.

The participants shall not use the outcome of other organization's exercises as part of their own commercial activities. It will be acceptable to discuss one's own organization's training activities as part of your advertising if desired.