SAN FRANCISCO, SAN PABLO AND SUISUN BAYS HARBOR SAFETY PLAN

Year 2000

Pursuant to the
California Oil Spill and Prevention Act of 1990

Submitted by the
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TABLE OF CONTENTS

TABLE OF MAPS viii

TABLE OF APPENDICES viii

INTRODUCTION AND MEMBERSHIP OF THE HARBOR SAFETY COMMITTEE ..... ix-xv

EXECUTIVE SUMMARY ..... xvi-xxiii

I. GEOGRAPHICAL BOUNDARIES ..... I - 1

II. GENERAL WEATHER, TIDES AND CURRENTS ..... II - 1

III. AIDS TO NAVIGATION ..... III - 1

IV. ANCHORAGES ..... IV - 1

V. HARBOR DEPTHS, CHANNEL DESIGN, AND DREDGING ..... V - 1

VI. CONTINGENCY ROUTING ..... VI - 1

VII. VESSEL TRAFFIC PATTERNS ..... VII - 1

- SHIP TRAFFIC ..... VII - 1
- HISTORY AND TYPES OF ACCIDENTS AND NEAR ACCIDENTS ..... VII - 2

VIII. COMMUNICATION ..... VIII -1

IX. BRIDGES ..... IX - 1

X. SMALL VESSELS ..... X -1

XI. VESSEL TRAFFIC SERVICE ..... XI -1

XII. TUG ESCORT / ASSIST FOR TANK VESSELS ..... XII - 1

XIII. PILOTAGE ..... XIII - 1

XIV. UNDERKEEL CLEARANCE AND REDUCED VISIBILITY ..... XIV - 1

XV. ECONOMIC AND ENVIRONMENTAL IMPACTS ..... XV - 1

XVI. PLAN ENFORCEMENT ..... XVI - 1

XVII. OTHER: SUBSTANDARD VESSEL EXAMINATION PROGRAM ..... XVII - 1

XVIII. HUMAN FACTORS WORK GROUP AND
PREVENTION THROUGH PEOPLE WORK GROUP ..... XVIII - 1

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) Instruments that Measure Currents, Tides, Meteorological Data and Salinity

APPENDIX B: Clearing House List of Tanker Movements and Total Vessel Movements in 1997 in San Francisco Bay

APPENDIX C: Coast Guard Marine Safety Office Casualty Data (CASRISK) for Loss of Control, Accidental Groundings, Collision, Allision, Injuries and Deaths of Freight Ships, Tank Ships, Passenger Ships, Fishing Vessels and Tugs and Barges in San Francisco Bay for 2000.

APPENDIX D: VTS Report on Near Misses for 2000.

APPENDIX E: Clearing House List of Certified Tug Escort Boats.

APPENDIX F: Clearing House Report on Escorted Vessel Movements for 2000

APPENDIX G: Amended Tug Escort Regulations Effective October 4, 2001

APPENDIX H: Underwater Rocks Near Alcatraz Island: Location, Isometric Profile and Summary of Rock Removal Alternatives and Costs

APPENDIX I: Vehicular Bridge Inventory

APPENDIX J: Vessel Traffic Service (VTS) Users Manual

APPENDIX K: Coast Guard Marine Safety Office Bay Pollution Statistics through 2000.

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 it's 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.

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June 2001

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Tug Escort Working Group

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EXECUTIVE SUMMARY

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. Recommendations which have been implemented are noted by an asterisk (*).

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.

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. *

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

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

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.

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 form 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. *

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 board sailors 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

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

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.

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

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

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, 31st Ed., 1997*. 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.

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.)

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'' National Ocean Service headquarters in Siler 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. Funding for the system is assured until

July 1, 1999. 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.sfmx.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. In the February, 1994 issue of *Professional Mariner*, an article entitled *"Fog: Making Life Murky for Mariners"* stated that 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 Southern 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 Southern 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).

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*, 31st Edition, 1997, lists the area's anchorages and limitations.

Within the Anchorage 9 area, where lightering of tankers and bunkering of vessels occurs, few marine casualties and near-misses have been reported. Most incidents involved mechanical failure, and groundings.

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 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. 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 creates main channel depths ranging between 49 and 55 feet. According to the U.S. Army Corps of Engineers, there are no current plans to change the entrance channel 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 topped 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 a project depth of 45 feet, extends through San Pablo Bay to Carquinez Strait. The Suisun Bay Channel in the Carquinez Strait has a project depth from 30 to 40 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 (due to localized shoaling). The hydrodynamics of the Bay estuary change because of 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 shift shoals in more narrow channels. Recent observations have indicated that manmade channels may be influencing tidal currents to a greater degree

than anticipated with consequent effect on silting. There are additional indications that not as much dredge spoil 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 spoils initially deposited at the Alcatraz dumpsite, which is southwest of the island.

Navigational Issues Associated with Channel Design and Dredging. Harding, Arch, and Shag rocks are large submerged rocks located approximately one to one and a quarter miles northwest of Alcatraz Island. The tops of the rocks are 33 feet and 36 feet respectively below the surface of the water. 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 — contrary to the published traffic lane— in order to maintain safe depths in the deeper waters within this area and to avoid an area congested with small boat traffic. Harding, Arch, and Shag 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.

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. 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.

STATUS. 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, and Shag Rocks rise to within approximately 35 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), tanker companies, dry cargo operators, 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, refined costs, construction alternatives, funding sources and possibly recommending a prioritized list of lowering the rocks according to risk and benefit.

- **Navigation Safety Issues.** Commander Dennis Sobeck, VTS and Captain James Shanower, San Francisco Bar Pilots, prepared a report entitled *San Francisco Central Bay Rock Removal Navigation Safety Issues, April 1996,* which outlines the potential navigational benefits of lowering each rock with the pros and cons of alternate scenarios. Five alternatives were presented and discussed. (See Appendix H for a summary of the alternatives). The San Francisco Bar Pilots and SeaRiver Maritime, Inc. polled their members as to which alternative would best enhance navigational safety. Alternative 3 and 5 appeared to offer the greatest benefits in reducing the risk of vessel accidents.

  The Underwater Work Group did not make a recommendation as to which alternative would best enhance navigational safety. Upon the recommendation of the Work Group, the Harbor Safety Committee requested that the Corps of Engineers refine previous cost estimates of lowering the rocks by evaluating various engineering scenarios, obtaining better information about the material composition of the rocks and shoals, evaluating removal of rock fragments versus leaving the material in the Bay as habitat, and re-assessing the Corps' policy to consider the risk of an oil spill when determining the benefit of a project. When the Corps Feasibility Study is completed, the Work Group intends to make a recommendation on a preferred alternative for rock removal.

- **Construction Alternatives.** Several alternative methods of lowering the rocks were discussed, some of which may be more environmentally sensitive than others. A powerful marine excavator, described as an 'underwater backhoe,' could possibly be used. Drilling into hard rock is another potential as well as using explosives, which could be placed at various intervals, possibly in small grid patterns. The type of construction method will depend in part

upon the relative hardness of the rocks which are described as sandstone. Additional information on the composition of the rocks must be gathered by the Corps in order to decide how the rocks might be lowered.

- **Environmental Issues.** The Underwater Rocks Work Group invited representatives of federal and state environmental agencies to identify environmental issues that might be raised by lowering the Alcatraz rocks. Biologists from the California Department of Fish and Game, National Marine Fisheries, the Golden Gate Recreation Area, and the San Francisco Bay Conservation and Development Commission expressed their viewpoints at a work group meeting. The following concerns were identified:

    - the rocks are a popular fishing spot for sports fishermen;
    - the fish serve as food for extensive bird colonies on Alcatraz Island;
    - the potential risk of a spill should be examined in relation to the short and long term environmental impacts of lowering the rocks and the effects of an oil spill;
    - fish migration in the Central Bay must be taken into consideration.

- Should the project be considered in the future, an extensive Environmental Impact Study (EIS) must be prepared, examining these concerns.

- In addition, the Work Group noted that permits would be needed from most of the following agencies: US Army Corps of Engineers; San Francisco Bay Conservation and Development Commission (BCDC); California Department of Fish and Game; and the Regional Water Quality Control Board.

- **Funding Sources.** 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, lead 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 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 which is also dependent upon local matching funds. The described match could be local and/or state funds. Federal funds have not yet been allocated for the feasibility and engineering study or construction and mitigation.

Congressman Miller's office requested that the Work Group help identify potential sources of local matching funds for the project. The Work Group discussed what group or groups might benefit from lowering the rocks off of Alcatraz. It was estimated by the Captain of the Port that a sizable spill at this location would result in closure of the Central Bay to all vessels for five to seven days. Vessels that would be impacted include tankers and cargo vessels, passenger ships, ferryboats, tourist boats, fishermen, recreational boaters and board sailors, and government vessels. Potential on-shore impacts would be adverse environmental damage to marshes, water birds, marine mammals and fish; cost of the clean-up of beaches, marinas, piers and rip-rap; possible closure of refineries; and loss of tourist business. After discussing these potential impacts, the Work Group concluded that lowering the rocks is of benefit to the public as a whole and not to any single group or groups. Since the impacts would be wide-spread, the Work Group recommended that the Harbor safety Committee support a state appropriation as the local match since 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.

- **Army Corps of Engineers Reconnaissance Study.** In 1998, the Army Corps of Engineers began their twelve-month Reconnaissance Study of the Alcatraz rocks and shoal to determine the potential public benefits of lowering the rocks. The BaySAFE law now allows the Corps to consider the cost benefits of preventing an oil spill in their economic analysis of the project. This change could allow this project to qualify for Corps funding.

  The Corps published an Analysis Report in November 1998 that found sufficient interest to proceed to the next phase of the Feasibility Study, which will include an Environmental Impact Report. In December 1999, the Corps published the Project Study Plan, which sets out the parameters for conducting the Feasibility Study. Projected costs for this study are $3.76 million, 50% federally funded and 50% locally funded. A Feasibility Cost Sharing Agreement between the Corps and the California State Lands Commission was signed in March 2000

- **Army Corps of Engineers Feasibility Study.** In July 2000, the Army Corps of Engineers began the three-year Feasibility Study to further study the means and effects of lowering the rocks. The Feasibility Study is the second phase of the Corps' planning process that fully evaluates all reasonable solutions to the problems identified during the Reconnaissance Study.

  The results of the Study will be a Feasibility Report documenting the Study and that includes all

further planning, engineering, design and real estate activities required to provide a basis for a decision on Federal participation in the construction of the Project. An Environmental Impact Statement/Report, a Design Memorandum, and Plans and Specifications will be prepared as a part of the Study.

Recommendation

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 Benecia-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 Benecia-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 in is 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. Floatsam 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 watchstander 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 drawspan 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

Government and Naval Transits for 2000

Naval vessel transits……..……..73

Public vessel transits……..……..2436

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 ass 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
SAN FRANCISCO BAY COMMON FREQUENCY USAGE	
06	Intership safety. Also often used for non-distress traffic between USCG and other vessels.
10	San Francisco Bar Pilots Pilot Boats Agents San Francisco Marine Exchange
12	Vessel Traffic System 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 System 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, 18A, 19A	Common tug working frequencies
79A, 80A, 88A	Commonly used by fishing vessels
7A, 8, 9, 11, 18A, 19A	Port Operations — Commercial intership and ship to shore working channels. Commercial vessel business and operational needs.
9, 68, 69, 71, 72, 78A	Port Operations — Non-commercial; supplies repairs, berthing, yacht harbors/marinas.

CHANNEL	USE
TUG COMPANY CHANNELS	
7A	Chevron Shipping
9	Westar Marine Services
10	Crowley Maritime SeaRiver Maritime
18A	American Navigation Bay & Delta Towing Brusco Tug & Barge Oscar Niemeth Towing Sacramento Tugboat Company Sanders Towboat Seaway Towing Company 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. The one located at the primary site on Yerba Buena Island is manned and has an emergency generator in the event of commercial power outage. The second site is located at Point Bonita in the Marin headlands area. This site is remotely controlled at the Vessel Traffic Center via a Spread Spectrum T1 microwave circuit between Point Bonita and Yerba Buena Island. This site has an emergency generator in the event of a commercial power outage. The other two remote sites are located at Mount Tamalpais in Marin County and Bay Point near Concord. Currently, both of these sites are remotely controlled at the Vessel Traffic Center via the Bay Area Communications System (BACS) digital microwave network. The Mount Tamalpais site has an emergency generator maintained by the Army Corps of Engineers in the event of a commercial power outage. Since the Bay Point site has no commercial electric power, it obtains power from a solar power system and a wind-powered generator, which charge the existing batteries at the site. In the event

the batteries lose their charge, the Vessel Traffic Center notifies an on-call electronics service provider who will respond to the outage and provide power via a portable generator. The following are more detailed descriptions of the type of equipment provided at these sites:

1) Each of the above sites has two 25-watt Motorola Quantar VHF-FM transceivers and two Motorola Quantar VHF-FM guard receivers. VTS operators using a Zetron communications control system in the Traffic Center remotely control these transceivers and receivers.

2) The Yerba Buena Island, Point Bonita, and Mount Tamalpais sites have diesel fueled automatic starting emergency generators. The Yerba Buena Island emergency generator has an output of 100 kilowatts and the Point Bonita emergency generator has an output of 11.5 kilowatts; the Coast Guard maintains both generators. The Mount Tamalpais site has a 130-kilowatt emergency generator and is maintained by the Army Corps of Engineers.

3) Two Motorola MCX-1000 25-watt VHF-FM transceivers are installed at Yerba Buena Island and are available for usage.

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 **Drake** has a DGPS receiver. The **California**, **San Francisco**, 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) and wireless Ricochet modern technology.

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 and several other Bay Area shipping companies.

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.

VIII.2. Back-Up Power Systems. The Harbor safety Committee recommends the acquisition of adequate back-up power supplies for the San Francisco Bar Pilots and the 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.

STATUS. The San Francisco Bar Pilots have back-up power generators on their pilot boats which can serve as an auxiliary power source in case of power outages at the communications headquarters on the dock and an emergency generator onsite with back-up capabilities to run the entire pilot station operation.

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 deepdraft 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 in clude 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.

- **Boadsailors.** 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.

	Subjects
U.S. Power Squadrons	Boating Safety Rules of the Road, Basic Rescue (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 form 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. Board Sailors. 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 board sailors 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 about 300 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 gives 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 • Mission and philosophy of operation • Federal and local rules and regulations	80
• Delegation of authority • In-depth VTS area geography	80
Using the Vessel Traffic Service System (extensive off-the-air practice) • Surveillance (traffic management) computer system operation • Traffic Management concepts and procedures • Communications procedures	80
On-the-job training (live, on-the-air) • One-on-one coached proficiency training in the VTS operations center	300
On-the-job training (live,on-the-air) • Closely supervised but un-coached performance assessment	48
• Oral Examination Board chaired by the Commanding Officer	

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 will continue 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 spent 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 Shipride Program. All VTS personnel are required to conduct approximately 10 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.

5. **New Traffic Separation Scheme.** In July of 2000, the United States implemented new traffic separation schemes off the coast of San Francisco and in the Santa Barbara Channel to reroute traffic away from the environmentally sensitive areas such as the Monterey Bay Marine Sanctuary. The southern approach of the San Francisco offshore vessel traffic separation scheme was shifted to the west and reoriented on a north/south axis. Through an extensive outreach program and assisted by the Marine Exchange, VTS contacted the various shipping agents that operate in the Bay to ensure that they were aware of the change to the southern traffic lane. Working in concert with the San Francisco Bar Pilots, the masters of vessels entering and departing the Bay received packages of information illustrating the change to the lane. This program ensured that masters were prepared to comply with the new routing procedures when they went into effect in mid-July.

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 and forty-five 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 engaged in intra- and interstate commerce along the coast of the United States. Only a few federal pilots operate within the Bay. One shipping company employs masters to pilot their own vessels who have federal pilot licenses.

Inland Pilots. An inland pilot is required to have both a state license and a federal license to advise vessels solely inside of the Golden Gate. The state has not authorized any new inland pilots since 1985. Two pilots continue to operate as inland pilots. 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 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 funding is necessary for the National Oceanic and Atmospheric Administration (NOAA) to conduct adequate surveys.

- **Depths and surveys.** 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.

- **Channel Design and Dredging.** 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.

- **Vehicular Bridge Management.** Install energy absorbing fendering systems, bridge clearance gauges where needed, water level gauges at bridge approach points, racons on the Golden Gate and Bay Bridges, and shield bridge floodlights to reduce the glare for ships. Costs would be borne by 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).

- **Radio Communications.** Acquire emergency backup communications power for the Marine Exchange and the San Francisco Bar Pilots. Costs would be borne by private industry.

- **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. The Marine Exchange records showed that 1,129 regulated ships and 512 regulated barges were required to use in tug escort in 2000. This compares to 1,303 ships and 444 barges in 1999. Based on the best information available, it is estimated that the average cost for a tug escort was approximately $7,100 for a regulated ship and $2,500 for a regulated barge. Based on these figures, the cost of tug escorts in 2000 for the 1,129 regulated ships and 512 barges would be about $9,295,900.

- **Pilotage.** Future recommendations for pilotage may have cost implications.

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 emergency power sources) or significant 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, Caltrans, the Golden Gate Bridge District, 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, namely: 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

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, particularly to sensitive marshland habitat and shorebirds. San Francisco Bay is part of the Pacific Flyway; in the winter months by many thousands of birds migrate to the area which could be severely impacted by a sizeable 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, 1997

Enforcement personnel from the Office of Spill Prevention and Response (OSPR) investigated twenty-nine suspected tug escort violations during the 1997 calendar year. Three of the investigations revealed that no violation was committed. Twenty-five incidents involved the regulated vessel failing to make the notification to the Clearing House prior to movement of the vessel. Eleven of these violations occurred in the first quarter of 1997 when the more stringent reporting requirements went into effect. The last investigation involves an escort tug with insufficient bollard pull for the escort assignment.

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 WORK GROUP AND PREVENTION THROUGH PEOPLE WORK GROUP

1. Human Factors Work Group

XVIII.1 In Y2000, the Human Factors Work 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.

Preformed 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 Work 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 Work 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 Work Group, (hereafter PTP), was appointed by the Harbor Safety Committee of the San Francisco Bay Region on October 16, 1997.

The PTP Work Group consists of the following members:

Margot J. Brown, Chair…….National Boating Federation

Scott Merritt……...Foss Maritime Company

Captain Margaret Reasoner……...Crowley Maritime

Gunnar Lundeberg……..Sailors' Union of the Pacific

Captain Larry Teague……San Francisco Bar Pilots

Active *ex-officio* participants:

Captain Larry Hereth, COTP…….USCG Marine Safety Office

CDR David Kranking…….USCG Vessel Traffic Service

Ted Mar……..California State Lands Commission

The Work Group held its first meeting on December 2, 1997. Its members have adopted the following mission statement:

> "The PTP Work Group of the San Francisco Area Harbor Safety Committee works to reduce the risk of incidents influenced by or due to human and organizational elements which could result in oil spills."

The following areas of interest for the Work Group were expressed as follows:

- Compilation of various rules and standards by those agencies that regulate maritime and fueling procedures;
- Licensing requirements for fueling personnel;
- Training and licensing of crews, recreational boaters, fishermen, and all towing vessels; and
- Foreign vessels: Radio communication and tests for English language proficiency; training and manning requirements vs. U.S. crews.

Status. The PTP Work Group remains active through 2000 meeting at least once a month, usually at the offices of the California State Lands Commission, Northern California Field Office, Hercules, California.

Members of the Work Group include representatives from the U. S. Coast Guard Marine Safety Office, The U. S. Coast Guard Vessel Traffic Service, The Marine Division of the State Lands Commission, the San Francisco Bar Pilots, the Secretariat of the Harbor Safety Committee and a representative from the recreational boaters on the Harbor safety Committee.

The PTP Work Group designed a brochure entitled *Your Guide to Recreational Vessel Marine Communications,* which features a self-adhesive, high-visibility sticker entitled "Emergency Radio Call Procedure." (See Appendix L)

A grant application has been made to the United States Fish and Wildlife Foundation to fund extensive printing and distribution of the brochure. (See Appendix L)

The PTP Work Group continues to encourage dialog, and mutual respect and understanding between all users of the waters of the San Francisco Bay Region.

San Francisco Bay Harbor Safety Plan

GEOGRAPHIC LIMITS OF THE HARBOR SAFETY PLAN

VESSEL TRAFFIC LANE/
SHIP CHANNEL

123° 122° 121°

38°

YOLO

PORT OF SACRAMENTO

SACRAMENTO

Sacramento Deep Water Channel

SACRAMENTO

River

NAPA

SOLANO

SONOMA

Suisun City

Petaluma River

Napa River

PETALUMA RIVER BRIDGE

NAPA RIVER BRIDGE

Vallejo

RIO VISTA BRIDGE

MARIN

San Pablo Bay

Carquinez Strait

PORT OF BENICIA

Suisun Bay

Sacramento River

San Joaquin River

SAN

CARQUINEZ BRIDGE

BENICIA–MARTINEZ BRIDGE

Pittsburg

Martinez

ANTIOCH BRIDGE

Stockton Deep Water Channel

Pt. Reyes

San Rafael

RICHMOND–SAN RAFAEL BRIDGE

Pt. San Pedro

Explosives Anchorage

Anchorage 5

PORT OF RICHMOND

Richmond

Stockton

PORT OF STOCKTON

CONTRA COSTA

JOAQUIN

GOLDEN GATE BRIDGE

Ft. Baker

Ft. Point

SF–OAKLAND BAY BRIDGE

Ft. Bonita

PORT OF OAKLAND

Oakland

PORT OF SAN FRANCISCO

ENCINAL TERMINALS

LIGHTED HORN BUOY

SAN FRANCISCO

Anchorage 7

Anchorage 8

Farallon Is.

Explosives Anchorage

SAN

SAN MATEO BRIDGE

ALAMEDA

San Mateo

MATEO

DUMBARTON BRIDGE

PORT OF REDWOOD CITY

Redwood City

Moffett Field

SANTA CLARA

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.

Scale 1:500,000
1 inch equals approximately 8 miles
0 25 Mi
0 25 Km

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

JAC 404 5/98

MAP 1

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

Base Map Source: Map of the North Half of California, Scale 1:500,000, USGS, 1970

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.

123° 122° 121°

38°

YOLO

SACRAMENTO

SACRAMENTO

NAPA

SOLANO

SONOMA

MARIN

SAN

CONTRA COSTA

ALAMEDA

SAN MATEO

SANTA CLARA

JOAQUIN

PORT OF SACRAMENTO

Sacramento Deep Water Channel

Sacramento River

Sulsun City

Ryer Island Ferry Terminal

RIO VISTA BRIDGE

Petaluma River

PETALUMA RIVER BRIDGE

Napa River

NAPA RIVER BRIDGE

Vallejo

San Pablo Bay

Carquinez Strait

PORT OF BENICIA

Huntway

Exxon

Avon

Wickland

Amorco

Shell

DFSP OZOL

Wickland

Tosco

Martinez

Pacific Refining

PG&E Pittsburg

Pittsburg

ANTIOCH BRIDGE

San Joaquin River

Stockton Deep Water Channel

Stockton

PORT OF STOCKTON

Pt. Reyes

San Rafael

RICHMOND–SAN RAFAEL BRIDGE

Paktank

Point Molate

PORT OF RICHMOND

Arco, Time Oil, Castrol, IMTT, Unocal

Richmond

Chevron Long Wharf

Explosives Anchorage

Anchorage 5

GOLDEN GATE BRIDGE

Ft. Bonita

SF–OAKLAND BAY BRIDGE

PORT OF OAKLAND

Oakland

ENCINAL TERMINALS

PORT OF SAN FRANCISCO

PG&E Potrero Pt.

Inbound

Outbound

LIGHTED HORN BUOY

SAN FRANCISCO

Offshore Pilot Station

Farallon Is.

SAN MATEO BRIDGE

San Mateo

Pilot Oil

DUMBARTON BRIDGE

PORT OF REDWOOD CITY*

Redwood City

Moffett Field

Scale 1:500,000

1 inch equals approximately 8 miles

0 25 Mi

0 25 Km

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

JIS 407 5/88

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. " "	Tosco Amorco
6. " "	Wickland
7. " "	Tosco Avon
8. Point Molate/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 Pittsburgh	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

Base Map Source: Map of the North Half of California, Scale 1:500,000, USGS, 1970

San Francisco Bay Harbor Safety Plan

VESSEL TRAFFIC SYSTEM
SAN FRANCISCO SERVICE AREA

Scale 1:500,000
1 inch equals approximately 8 miles

0 — 25 MI
0 — 25 Km

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

123° 122° 121°
38°

YOLO
SACRAMENTO
SACRAMENTO
NAPA
SOLANO
SONOMA
MARIN
CONTRA COSTA
SAN JOAQUIN
SAN MATEO
ALAMEDA
SANTA CLARA

PORT OF SACRAMENTO
Sacramento Deep Water Channel
Sacramento River
RIO VISTA BRIDGE
Suisun City
Napa River
Petaluma River
PETALUMA RIVER BRIDGE
NAPA RIVER BRIDGE
Vallejo
San Pablo Bay
Carquinez Strait
CARQUINEZ BRIDGE
PORT OF BENICIA
Suisun Bay
BENICIA–MARTINEZ BRIDGE
Martinez
Pittsburg
ANTIOCH BRIDGE
San Joaquin River
Stockton Deep Water Channel
Stockton
PORT OF STOCKTON
San Rafael
RICHMOND–SAN RAFAEL BRIDGE
Pt. Richmond
PORT OF RICHMOND
Richmond
Anchorage 5
Pt. Reyes
SEE NOTE 1
OFFSHORE VESSEL MOVEMENT REPORTING SYSTEM
SEE NOTE 2
GOLDEN GATE BRIDGE
Pt. Bonita
SF–OAKLAND BAY BRIDGE
COLREGS LINE
PORT OF OAKLAND
Oakland
PORT OF SAN FRANCISCO
ENCINAL TERMINALS
LIGHTED HORN BUOY
OFFSHORE PILOT STATION
SAN FRANCISCO
Farallon Is.
Anchorage
Precautionary Area
SAN MATEO BRIDGE
San Mateo
DUMBARTON BRIDGE
PORT OF REDWOOD CITY
Redwood City
Moffett Field

- 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; Radio 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 sites effective November 1, 1996.

MAP 3

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

JHC, ACH 5/98

San Francisco Bay Harbor Safety Plan

TUG ESCORT ZONES

TUG ZONE BOUNDARY

② ④ ⑥ TUG ESCORT REQUIRED

① STANDBY TUG REQUIRED

VESSEL TRAFFIC LANE/ SHIP CHANNEL

123° 122° 121° 38°

PACIFIC OCEAN

SONOMA NAPA SOLANO YOLO SACRAMENTO MARIN CONTRA COSTA SAN JOAQUIN SAN MATEO ALAMEDA SANTA CLARA

Petaluma River · Petaluma River · PETALUMA RIVER BRIDGE · Napa River · NAPA RIVER BRIDGE · Vallejo · Suisun City · Suisun Bay · Carquinez Strait · San Pablo Bay · PORT OF BENICIA · CARQUINEZ BRIDGE · BENICIA–MARTINEZ BRIDGE · Martinez · Pittsburg · ANTIOCH BRIDGE · River Island Ferry Terminal · RIO VISTA BRIDGE · Sacramento Deep Water Channel · PORT OF SACRAMENTO · SACRAMENTO · Sacramento River · San Joaquin River · Stockton Deep Water Channel · Stockton · PORT OF STOCKTON

Pt. Reyes · San Rafael · RICHMOND–SAN RAFAEL BRIDGE · Explosives Anchorage · Anchorage 5 · PORT OF RICHMOND · Richmond · GOLDEN GATE BRIDGE · Pt. Bonita · COLREGS LINE · LIGHTED HORN BUOY · OCEANIC HDO STATION · SF–OAKLAND BAY BRIDGE · PORT OF OAKLAND · Oakland · PORT OF SAN FRANCISCO · ENCINAL TERMINALS · Anchorage 9 · Anchorage 8 · Explosives Anchorage · SAN FRANCISCO · Farallon Is. · SAN MATEO BRIDGE · San Mateo · DUMBARTON BRIDGE · PORT OF REDWOOD CITY · Redwood City · Moffett Field

Scale 1:500,000

1 inch equals approximately 8 miles

0 25 Mi

0 25 Km

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

JMC ACH 5/99

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".

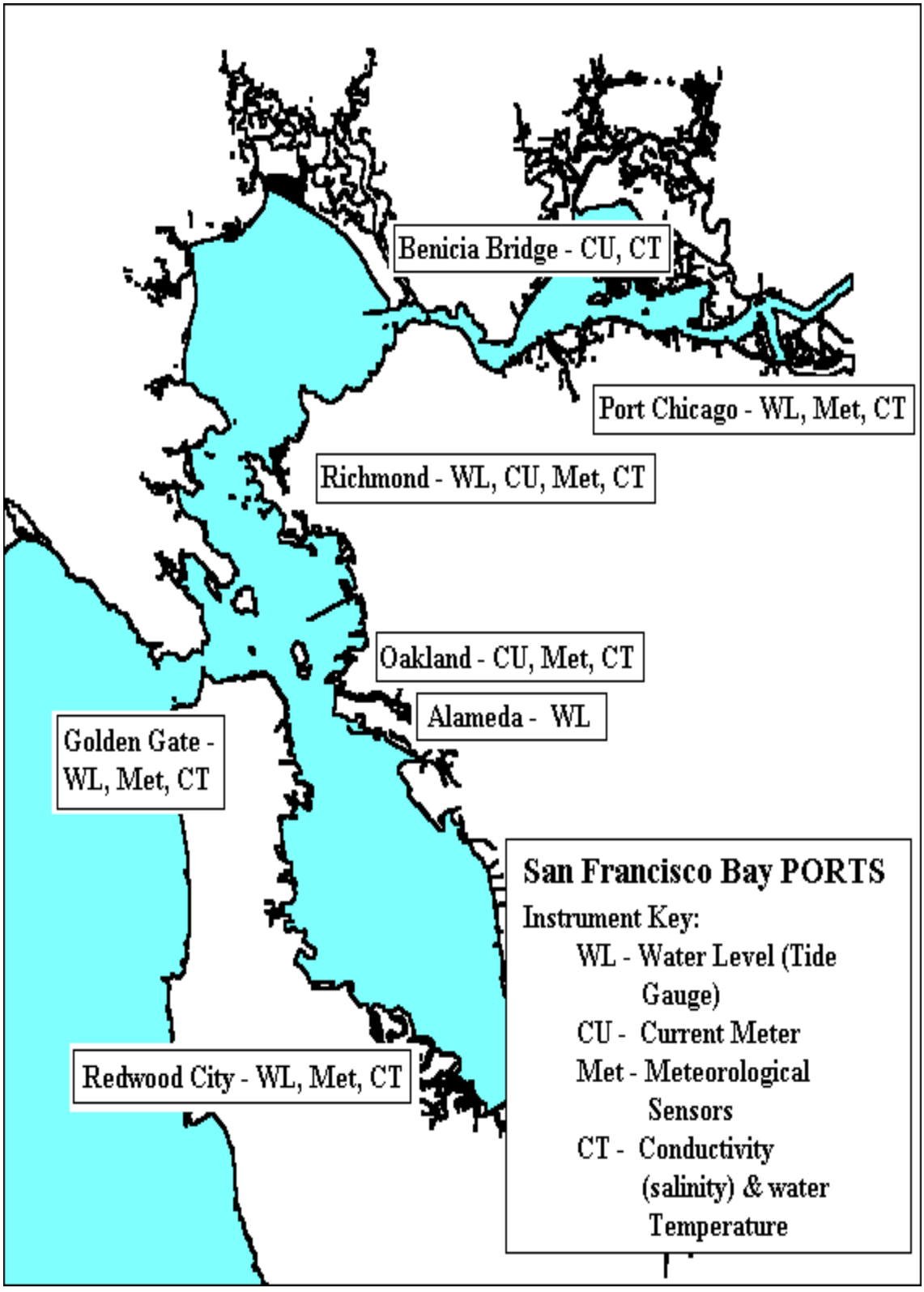
⑥ From Light Buoy "15", through the Carquinez Strait, north on the Sacramento Ship Channel to one mile beyond the River Island Ferry Terminal and east on the San Joaquin River to one mile beyond the Antioch Bridge.

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

Base Map Source: Map of the North Half of California, Scale 1:500,000, USGS, 1970


Benicia Bridge - CU, CT
Port Chicago - WL, Met, CT
Richmond - WL, CU, Met, CT
Oakland - CU, Met, CT
Alameda - WL
Golden Gate - WL, Met, CT
Redwood City - WL, Met, CT
San Francisco Bay PORTS
Instrument Key:
WL - Water Level (Tide Gauge)
CU - Current Meter
Met - Meteorological Sensors
CT - Conductivity (salinity) & water Temperature

OSPR
Oil Spill Prevention and Response

Comparative Vessel Movement Totals

	1999	2000	Change
Total vessel arrivals	3,199	3,186	0%
Total vessel interbay shifts	1,687	1,706	1%
Total tanker arrivals	771	707	-9%
Total tanker interbay shifts	1,025	1,050	2%

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 2000 in the San Francisco Bay Region

Vessel	Flag	Length	Deadweight	Number of Arrivals
ACOAXET	BHS	180	35,607	16
AGAMEMNON	GRC	270	140,905	1
AGAWAM	BHS	179	35,589	1
AGILITY	PAN	172	41,476	1
AKADEMIK SEMENOV	CYP	151	17,485	4
ALDEBARAN	PAN	115	9,268	1
ALFIOS I	LBR	228	63,105	1
ALIOTH	LBR	149	17,533	1
ALKAIOS	BHS	225	66,234	2
ALKMAN	BHS	225	18,524	1
ALLEGIANCE	USA	187	34,397	1
ALLIANCE SPIRIT	BHS	247	97,087	1
ALPHA EXPRESS	PAN	172	45,858	1
AMERICAN PROGRESS	USA	183	46,095	3
ANGELO D'AMATO	ITA	242	89,999	1
ANTIPOLIS	GRC	229	60,525	1
ARAFURA SEA	PAN	243	99,500	1
ARAMIS	CYP	217	600,906	1
ARBAT	LBR	183	47,083	1
ASTYPALEA	MLT	171	29,990	2
ATLANTIC SWAN	DN	135	10,501	2
B.T.ALASKA	USA	290	188,099	2
BERTHEA	NIS	213	59,999	2
BLUE RIDGE	USA	201	42,268	4
BLUE SAPPHIRE	LBR	176	40,153	1

Vessel	Flag	Length	Deadweight	Number of Arrivals
BOW CHEETAH	GRC	171	40,257	1
BOW FIGHTER	NIS	174	34,928	2
BOW HERON	NIS	174	35,210	2
BOW PANTHER	NIS	170	40,263	1
BOW PETROS	NIS	169	39,726	2
BOW POWER	GRC	176	45,655	1
BOW TRIBUTE	PAN	180	41,109	2
BOW TRIGGER	PAN	171	41,354	1
BOW TRIUMPH	LBR	180	39,845	1
BRO ALEXANDRE	FRA	183	46,801	1
BRO CHARLOTTE	FRA	180	44,970	1
BRUCE SMART	LBR	275	155,150	2
BUM DONG	KO	136	17,303	3
BUM JU	KO	136	17,248	5
CAPE BENAT	LBR	179	29,133	1
CAPTAIN H.A.DOWNING	USA	207	39,385	10
CHALEUR BAY	MLT	228	71,345	1
CHEMBULK CASABLANCA	BHS	141	19,399	1
CHEMBULK SINGAPORE	LBR	132	13,681	1
CHEMBULK TRADER	LBR	156	22,305	1
CHEMTRANS BELOCEAN	LBR	243	75,568	2
CHERRY GALAXY	PAN	24	18,700	2
CHESAPEAKE	USA	224	50,826	1
CHEVRON ATLANTIC	BHS	269	149,748	3
CHEVRON COLORADO	USA	198	39,842	40
CHEVRON EMPLOYEE PRIDE	BHS	275	156,447	12
CHEVRON MARINER	LBR	261	156,380	20

Vessel	Flag	Length	Deadweight	Number of Arrivals
CHEVRON MISSISSIPPI	USA	247	71,336	6
CHEVRON WASHINGTON	USA	199	39,795	24
CHIMBORAZO (TTA)	ECU	228	66,138	2
COAST RANGE	USA	201	40,631	7
CONDOLEEZZA RICE	BHS	246	135,829	1
COTOPAXI	ECU	219	65,000	2
DA QING 92	PAN	225	68,600	2
DARTAGNAN	CYP	224	61,762	3
DENALI	USA	290	191,117	2
DIGNITY	PAN	172	41,461	1
DION	CYP	176	40,321	1
DONG TING HU	LBR	228	61,938	1
DYNAMIC EXPRESS	PAN	171	42,253	1
DZINTARI	LBR	151	16,344	1
EAST SIBERIAN SEA	LBR	183	47,385	1
EGRET	PAN	228	60,678	1
ELEANORA	LBR	218	62,094	2
ELLI	LBR	220	94,284	2
EVROTAS	LBR	209	53,534	1
FAITH IV	SGP	229	63,765	2
FALCON	GRC	199	54,054	2
FORMOSA EIGHT	LBR	175	35,621	2
FORMOSA ELEVEN	LBR	175	33,200	2
FORMOSA NINE	LBR	175	36,230	2
FORMOSA ONE	LBR	177	31,378	1
FORMOSA SEVEN	LBR	167	35,657	1
FORMOSA SIX	LBR	167	35,622	3

Vessel	Flag	Length	Deadweight	Number of Arrivals
FORMOSA TEN	LBR	175	36,233	1
FOUR SCHOONER	CY	219	72,500	2
FREDERICKSBURG	USA	199	40,006	13
FUJIGAWA	PAN	149	17,845	3
GARNET RIVER	PAN	172	45,696	1
GAS COLUMBIA	PAN	162	22,700	2
GAZ HUDSON	PAN	150	15,044	17
GAZ KANDLA	PAN	184	21,380	1
GENT	LUX	155	26,820	1
GEORGE SHULTZ	LBR	259	136,055	3
GINGA EAGLE	PAN	154	19,999	1
GINGA FALCON	PAN	152	19,998	3
GIOVANNA I	CYP	241	96,117	1
GOLDEN ELIZABETH	PAN	138	15,500	2
GOLDEN GATE	USA	223	63,141	2
GOLDEN GION	PAN	117	11,676	1
GOLDEN JANE	PAN	unknown	16,450	1
GOLDEN TIFFANY	PAN	149	16,465	1
GOLDEN TOMO	PAN	132	17,000	1
GREAT PROMISE	LBR	171	370,405	1
HAROLD K.HUDNER	BHS	178	35,731	1
HARRIER	LBR	218	60,963	1
HATAKAZE	PAN	150	17,548	1
HEREFORDSHIRE	PAN	123	12,721	1
HESIOD	BHS	178	23,719	1
HIGH WIND	LBR	183	46,473	1
HMI BRENTON REEF	USA	188	46,500	3

Vessel	Flag	Length	Deadweight	Number of Arrivals
HMI CAPE LOOKOUT SHOALS	USA	183	46,094	1
HMI DEFENDER	USA	201	38,460	1
HMI DYNACHEM	USA	192	49,530	1
HOBBY	LBR	228	63,910	1
IRINA 2	MLT	159	24,593	1
ISOLA AMARANTO	ITA	126	9,887	1
ISOLA GIALLA	ITA	unknown	36,457	1
IVER EXAMPLE	NLD	182	45,970	1
IVER EXPORTER	MH	174	45,000	1
IVER GEMINI	CYP	179	28,840	2
IVER PRIDE	NLD	179	28,840	1
JIWANAT QATAR	QAT	182	41,448	1
JO BREVIK	NIS	183	33,490	1
JO LIND	NLD	182	33,532	1
JO SPRUCE	NLD	182	36,778	1
JO SYPRESS	NLD	182	36,752	1
JOHN YOUNG	LBR	275	155,547	2
KAEDE	JAP	156	21,481	1
KAMOGAWA	PAN	149	17,712	2
KANATA SPIRIT	BHS	249	113,022	2
KAPITAN KOROTAYEV	CYP	151	17,639	3
KAREELA SPIRIT	BHS	249	113,143	2
KENAI	USA	265	125,089	6
KENNETH E.HILL	BHS	232	81,274	2
KENNETH T.DERR	BHS	179	35,026	1
KENWOOD PARK	LBR	174	38,892	1
KILCHEM MEDITERRANEAN	SGP	114	7,340	1

Vessel	Flag	Length	Deadweight	Number of Arrivals
KINUGAWA	PAN	160	24,743	2
KISOGAWA	PAN	140	17,740	3
KITE (LBR)	LBR	219	62,278	1
KYEEMA SPIRIT	BHS	253	113,396	2
KYUSHU SPIRIT	BHS	233	95,562	2
LAND ANGEL	PAN	217	62,226	4
LANNER	LBR	229	60,489	2
LENI	MLT	160	19,999	1
LEOPARD	SGP	172	46,100	2
LUCY	MH	230	66,183	1
MAASSTAD L.	GRC	172	38,039	1
MAASSTROOM L.	GRC	172	38,039	3
MAGELLAN SPIRIT	LBR	246	95,007	1
MAGPIE	PAN	235	64,818	1
MAPLE GALAXY	PAN	147	21,860	3
MARINE CHEMIST	USA	205	36,526	8
MARINE COLUMBIA	USA	271	124,999	4
MATSUKAZE	PAN	150	17,676	4
MEKHANIK KHMELEVSKIY	MLT	170	29,990	2
MINERVA	PAN	176	29,997	2
MINERVA JULIE	MLT	182	46,100	1
MOON SAPPHIRE	LBR	174	33,270	2
MORMACSTAR	USA	210	39,861	1
MORMACSUN	USA	210	39,861	1
MOSKALVO	CYP	183	46,269	2
NAMSAN SPIRIT	LBR	244	104,984	1
NAPO	ECU	177	31,543	1

Vessel	Flag	Length	Deadweight	Number of Arrivals
NEAPOLIS	GRC	229	60,525	2
NEPTUNE DORADO	SGP	249	84,711	2
NEW AMBER	LBR	244	89,558	1
NEW CONCORD	MH	175	38,960	1
NICOPOLIS	GRC	229	60,525	3
NILE	LBR	220	65,755	3
NORCA	PAN	181	45,720	1
NORDIC LAURITA	NIS	235	68,139	2
OVERSEAS BOSTON	USA	261	123,692	2
OVERSEAS CHICAGO	USA	273	92,091	4
OVERSEAS NEW ORLEANS	USA	201	43,643	1
OVERSEAS NEW YORK	USA	273	91,843	2
OVERSEAS OHIO	USA	273	92,017	3
OVERSEAS PHILADELPHIA	USA	201	43,648	2
OVERSEAS WASHINGTON	USA	273	91,967	6
PACIFIC CHALLENGER	LBR	182	41,570	1
PACIFIC SPIRIT	LBR	244	104,984	2
PAEAN	GRC	207	53,700	1
PALMSTAR ORCHID	BHS	245	100,047	2
PALMSTAR THISTLE	BHS	245	100,047	4
PANAM FLOTA	PAN	117	11,642	1
PANTHER	SGP	172	46,100	2
PARAPOLA	GRC	228	68,232	1
PAROS	MLT	170	30,328	1
PASTAZA	ECU	177	31,543	1
PATRIOT	USA	217	35,663	3
PAUL BUCK	USA	187	30,127	6

Vessel	Flag	Length	Deadweight	Number of Arrivals
PEREGRINE	LBR	224	63,098	2
PETROBULK CHALLENGER	SGP	181	41,570	1
PETROBULK POWER	BHS	186	40,000	1
PIONEER SPIRIT	BHS	244	106,671	1
PLATRES	PAN	241	96,121	1
POLAR ALASKA	USA	290	191,459	5
POLAR CALIFORNIA	USA	29038	127,003	2
POLAR TEXAS	USA	274	91,393	2
POLAR TRADER	USA	201	50,057	1
POLYS	CYP	226	68,623	1
PORT CATHERINE	FRA	180	44,923	2
PORTHOS	CYP	228	65,779	1
PORTOFINO	PAN	170	29,956	1
POTI	MLT	154	22,259	1
PRINCE WILLIAM SOUND	USA	268	122,941	4
PROBO BANGOR	NIS	182	47,980	1
PROGRESS	NIS	247	81,279	5
PROTANK ORINOCO	LBR	229	69,131	1
RAVEN	PAN	225	60,959	1
RAYMOND E.GALVIN	LBR	179	35,596	16
RICHARD G.MATTHIESEN	USA	187	32,572	2
S/R BAYTOWN	USA	238	58,643	6
S/R BENICIA	USA	276	152,298	16
S/R GALVESTON	USA	168	27,726	2
S/R LONG BEACH	USA	301	214,862	15
S/R NORTH SLOPE	USA	276	175,305	16
SAAMIS ADVENTURER	PAN	175	30,938	1

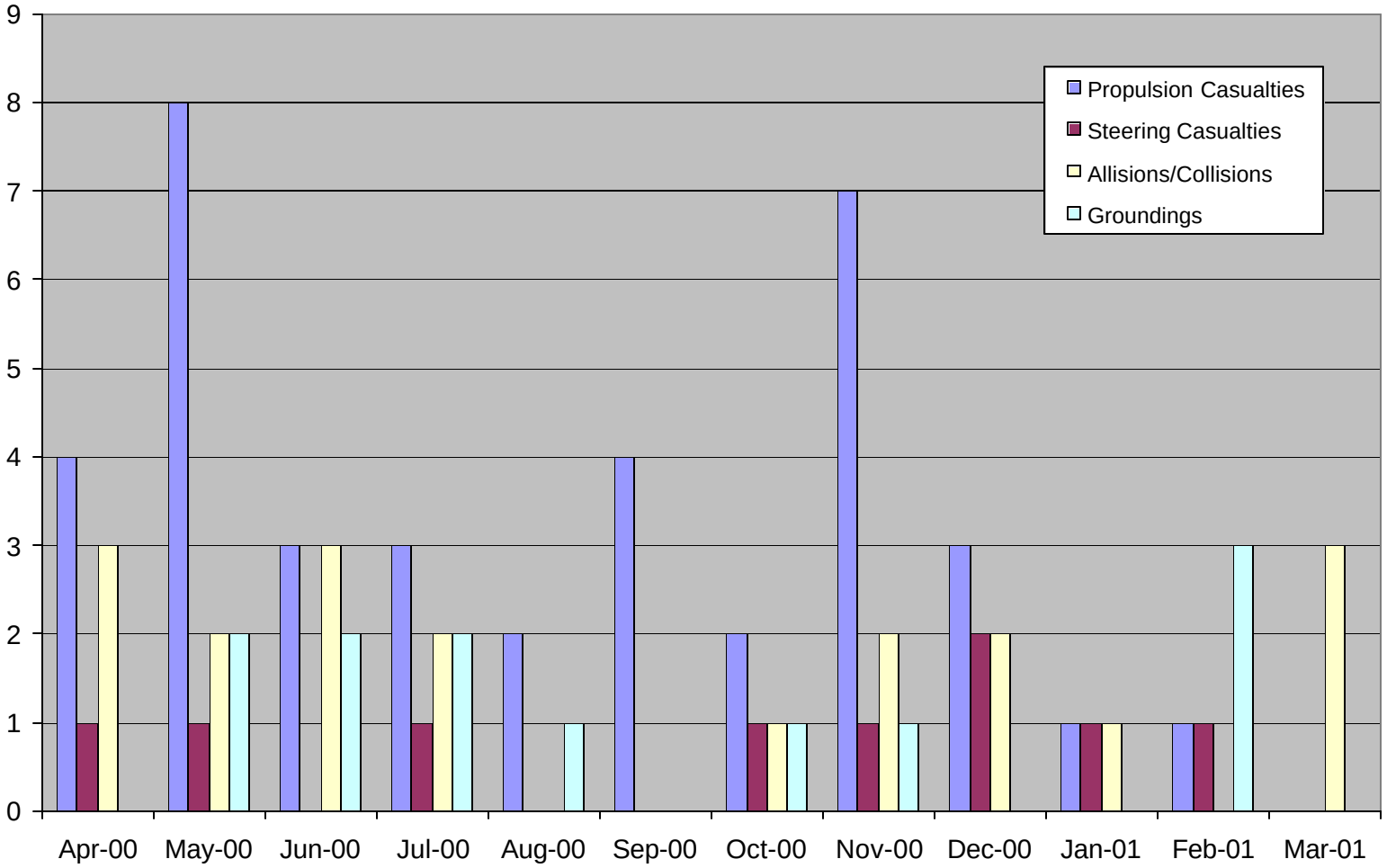
Vessel	Flag	Length	Deadweight	Number of Arrivals
SAG RIVER	USA	246	70,215	1
SAKURA	PAN	156	22,553	1
SAMUEL GINN	BHS	274	156,835	29
SAMUEL L.COBB	USA	187	33,122	12
SANKO HERON	PAN	236	61,540	3
SANTA MARIA	GRC	171	40,091	1
SCARLET TRADER	PAN	163	32,389	1
SCARLET TRADER (TCH)	NIS	171	32,397	1
SEA PRINCESS	GBR	107	6,589	1
SEAMUSIC III	MLT	217	70,914	4
SEISHIN	PAN	143	15,000	5
SELENDANG KENCANA	MY	182	45,974	1
SELENDANG MUTIARA	MY	183	45,974	2
SELENDANG PERMATA	MY	183	45,974	1
SELENDANG RATNA	MY	182	45,363	1
SELENDANG SARI	MY	182	45,354	1
SEMAKAU SPIRIT	LBR	246	98,731	1
SERIFOS	GRC	183	46,700	1
SETOKAZE	BHS	151	18,253	4
SHILLA SPIRIT	LBR	244	105,000	2
SILVER IRIS	PAN	248	88,349	3
SPRING LEO	PAN	139	15,389	2
SPRING LYRA	PAN	138	15,200	2
SPRING ORION	PAN	138	15,426	2
SPRING URSA	PAN	131	15,265	3
SPRING VIRGO	PAN	138	15,247	2
ST.KATHARINEN	HK	182	43,760	3

Vessel	Flag	Length	Deadweight	Number of Arrivals
ST.MICHAELIS	GRC	183	45,574	1
ST.PETRI (SGP)	SGP	182	47,228	1
STAR SAPPHIRE	LBR	176	40,159	1
STOLT CAPABILITY	LBR	176	37,042	1
STOLT GUARDIAN	LBR	175	39,723	2
STOLT LOYALTY	LBR	177	31,459	1
STOLT NTABA	PAN	132	13,946	1
STOLT PRIDE	LBR	177	31,438	1
STOLT PROTECTOR	LBR	174	39,782	1
STOLT SPAN	LBR	170	23,127	1
STOLT TENACITY	LBR	176	32,093	1
SUN RIVER (TTA)	LBR	219	62,348	1
TBILISI	MLT	165	29,632	1
TEAM ANEMONIA	CYP	176	40,296	1
TEAM MARS	NIS	184	42,010	1
TEAM SATURN	NIS	186	45,831	2
TEAM TELLUS	NIS	183	33,230	1
TONEGAWA	PAN	149	17,722	3
TONSINA	USA	265	124,751	3
TRADEWIND DRAGON	PAN	111	7,595	1
TURMOIL	SGP	186	39,872	1
ULSAN SPIRIT	LBR	244	106,679	1
UNITED SUNRISE	NIS	207	54,995	1
UZNADZE	MLT	151	16,231	1
VINCITA	NIS	161	25,300	1
WILLIAM E.CRAIN	LBR	275	155,127	3
YODOGAWA	PAN	155	24,090	1
Grand Total				707

Port Safety Statistics April 1, 2000 to March 31, 2001

	Apr-00	May-00	Jun-00	Jul-00	Aug-00	Sep-00	Oct-00	Nov-00	Dec-00	Jan-01	Feb-01	Mar-01	Ave/Mo	Total
Propulsion Casualties	4	8	3	3	2	4	2	7	3	1	1	0	3.2	38
Steering Casualties	1	1	0	1	0	0	1	1	2	1	1	0	0.8	9
Allisions/Collisions	3	2	3	2	0	0	1	2	2	1	0	3	1.6	19
Groundings	0	2	2	2	1	0	1	1	0	0	3	0	1.0	12

Vessel Casualties April 1, 2000 - March 31, 2001

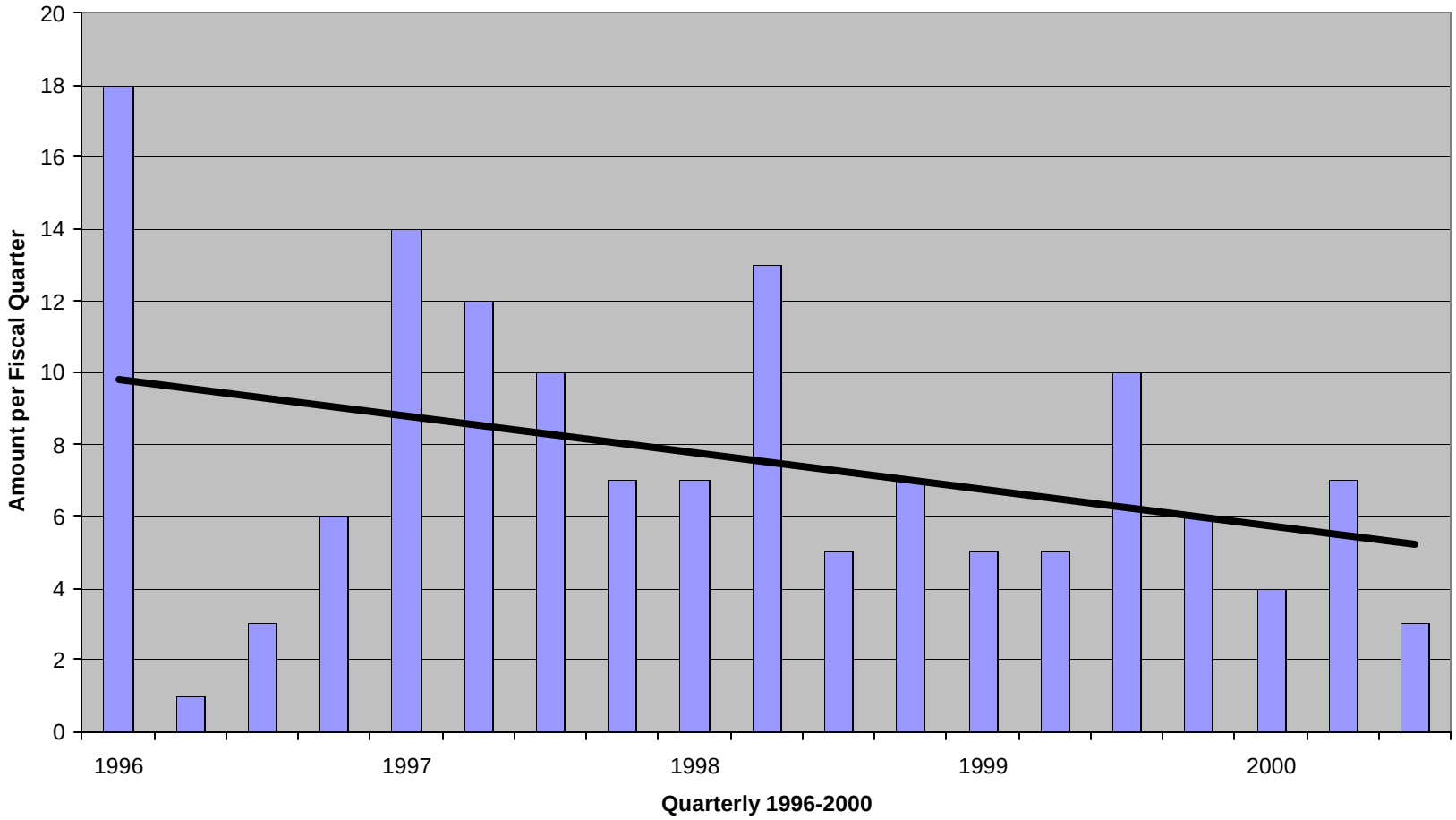


Collisions, Allisions & Groundings

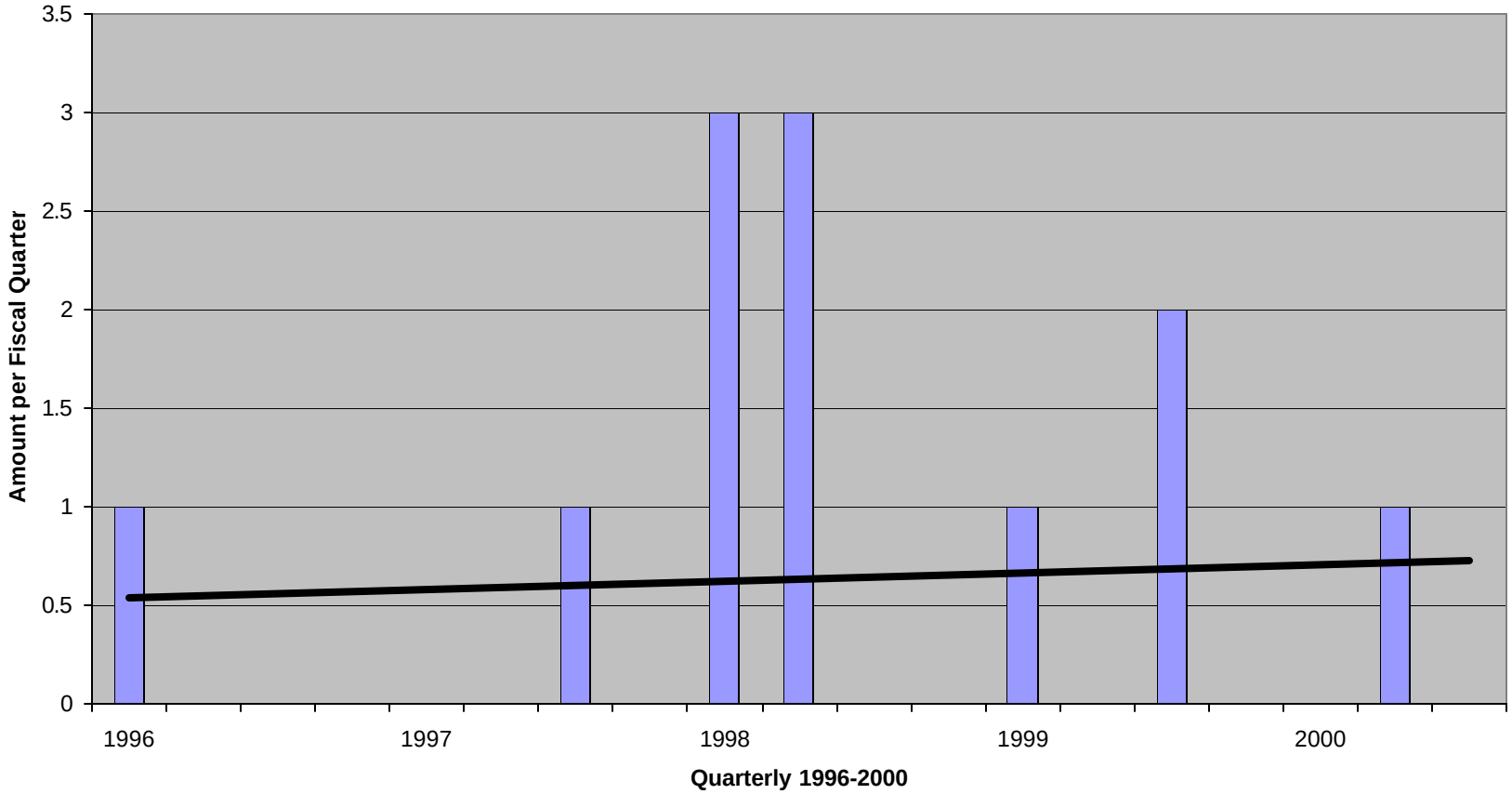
	1996				1997				1998				1999				2000		
Fiscal Quarter	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd
Vessel Class																			
Barge	1	0	0	1	2	2	0	1	0	0	0	3	1	2	1	4	0	2	1
Fishing	2	0	0	0	5	3	0	0	0	0	0	0	1	0	0	0	0	0	0
Freight	3	1	2	0	3	6	2	1	0	2	2	1	1	0	2	1	2	0	1
Other	3	0	0	1	2	0	1	1	2	2	0	0	0	0	1	0	0	1	1
Passenger	4	0	0	3	1	1	2	2	0	3	3	1	0	2	2	0	2	1	0
Tank	1	0	0	0	0	0	1	0	3	3	0	0	1	0	2	0	0	1	0
Towing	4	0	1	1	1	0	3	2	2	3	0	2	1	1	2	1	0	2	0
TOTAL	18	1	3	6	14	12	10	7	7	13	5	7	5	5	10	6	4	7	3

Total Collisions, Allisions & Groundings

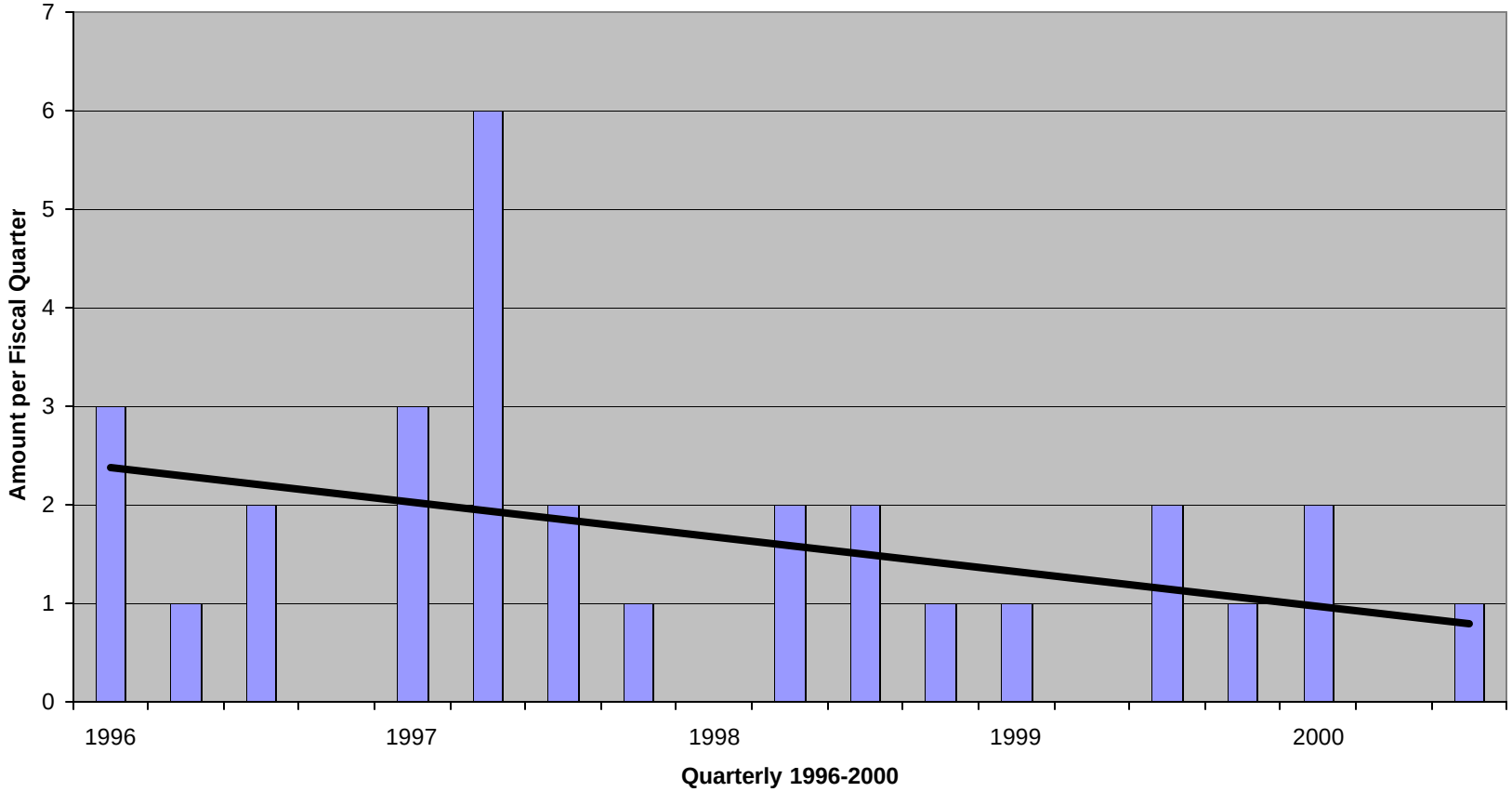
San Francisco Bay



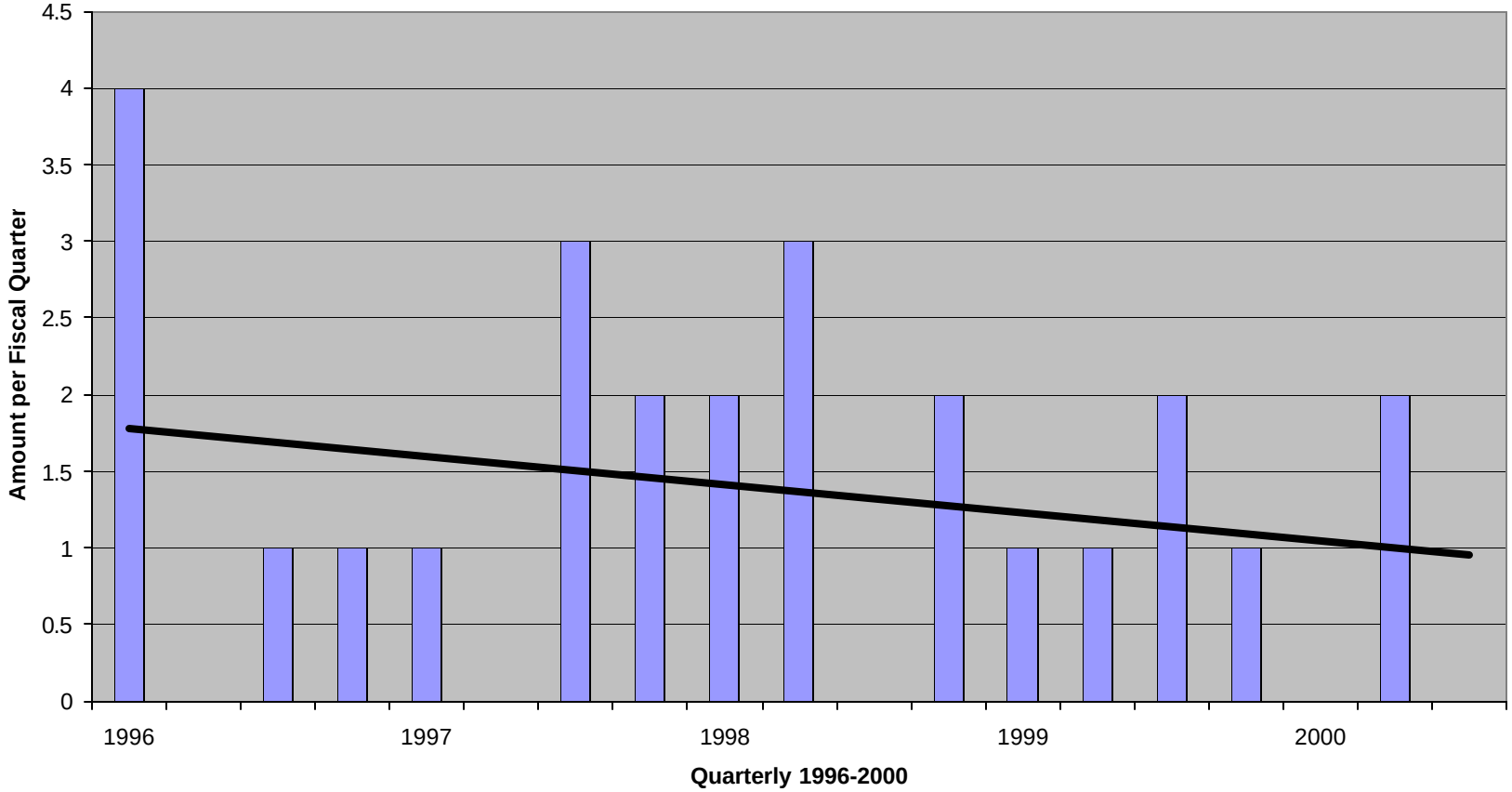
Tank Ship
Collisions, Allisions & Groundings
San Francisco Bay



Freight Ship
Collisions, Allisions & Groundings
San Francisco Bay

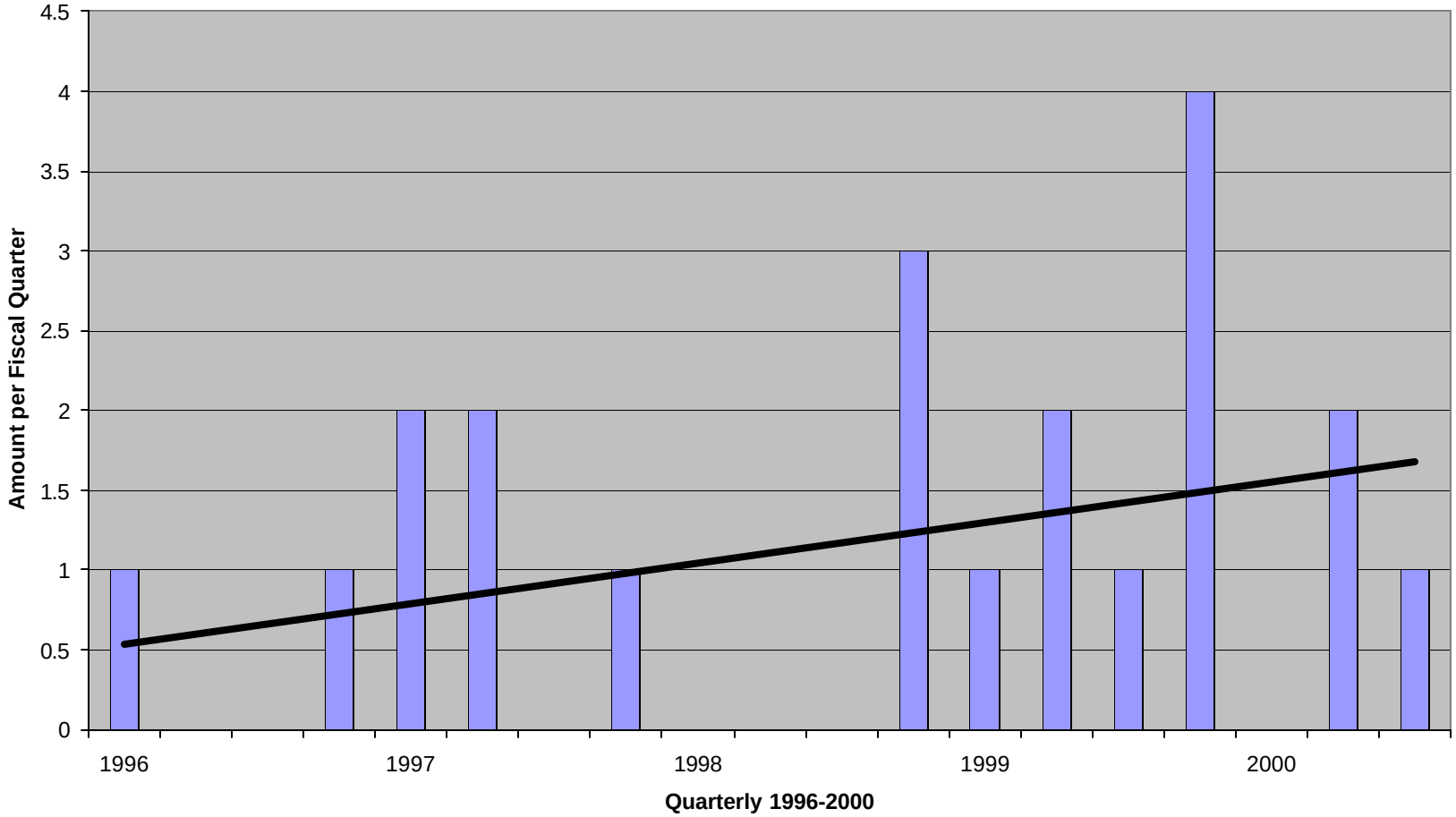


Towing Vessel
Collisions, Allisions & Groundings
San Francisco Bay

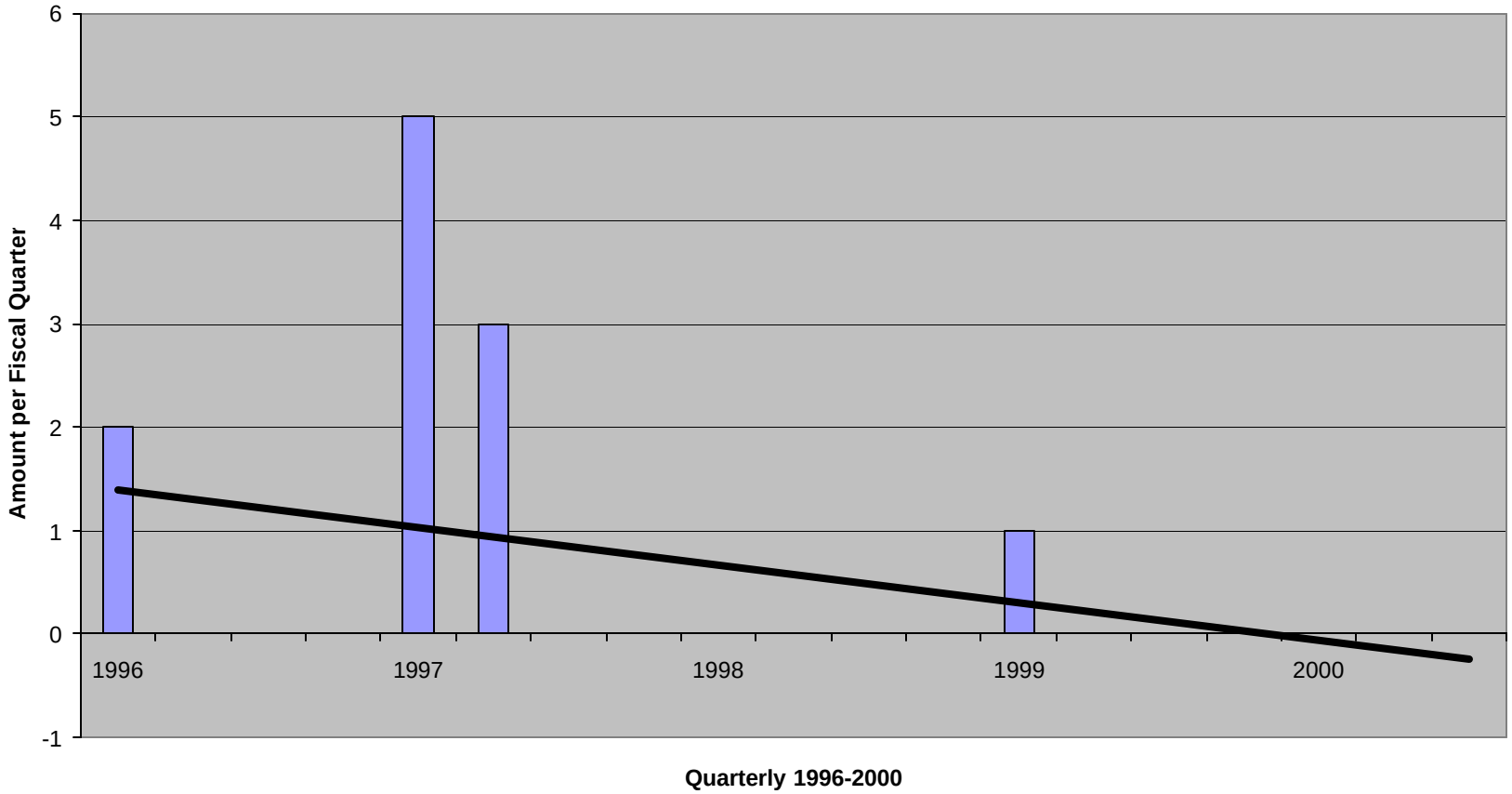


Barge Collisions, Allisions & Groundings

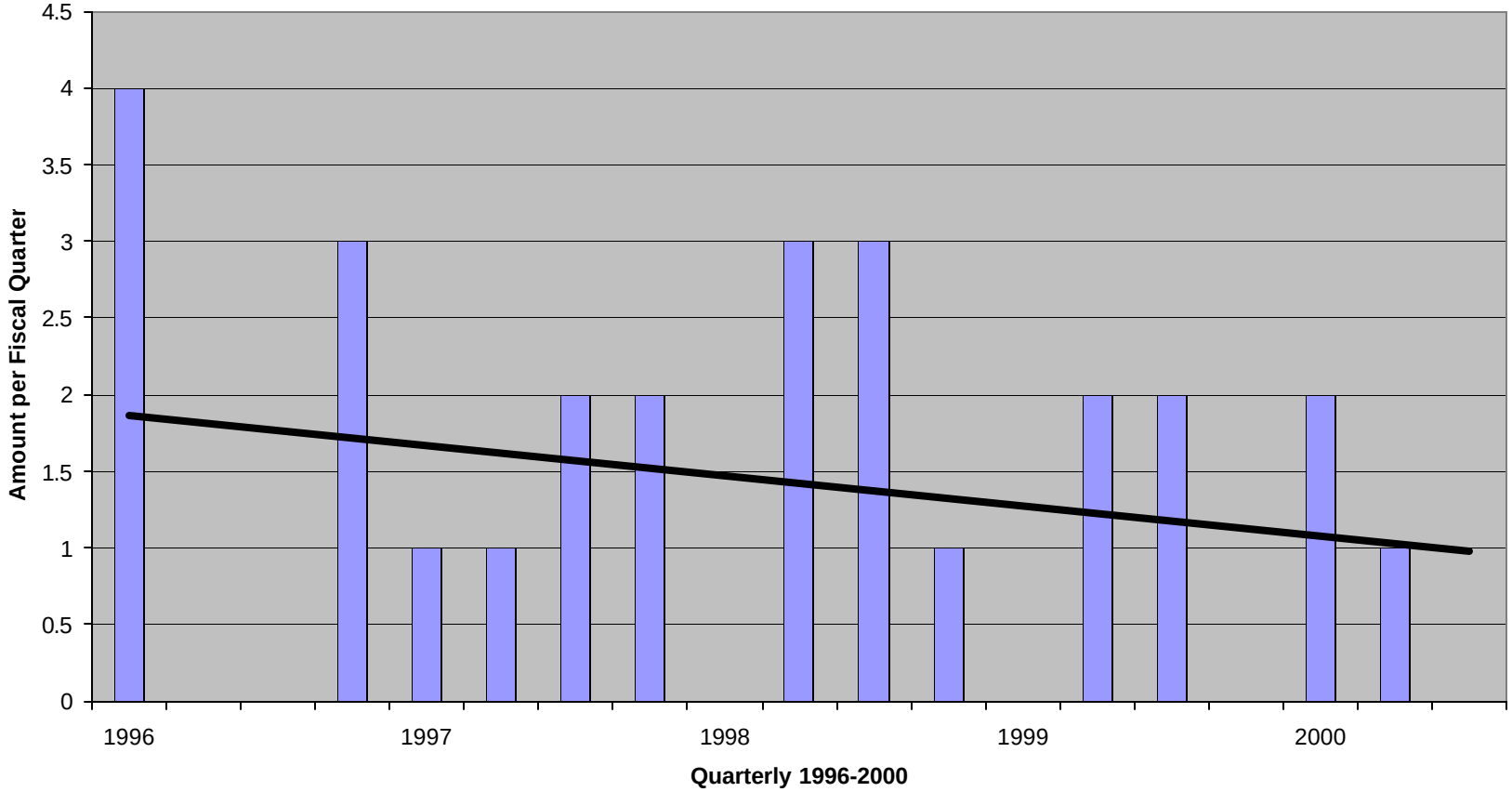
San Francisco Bay

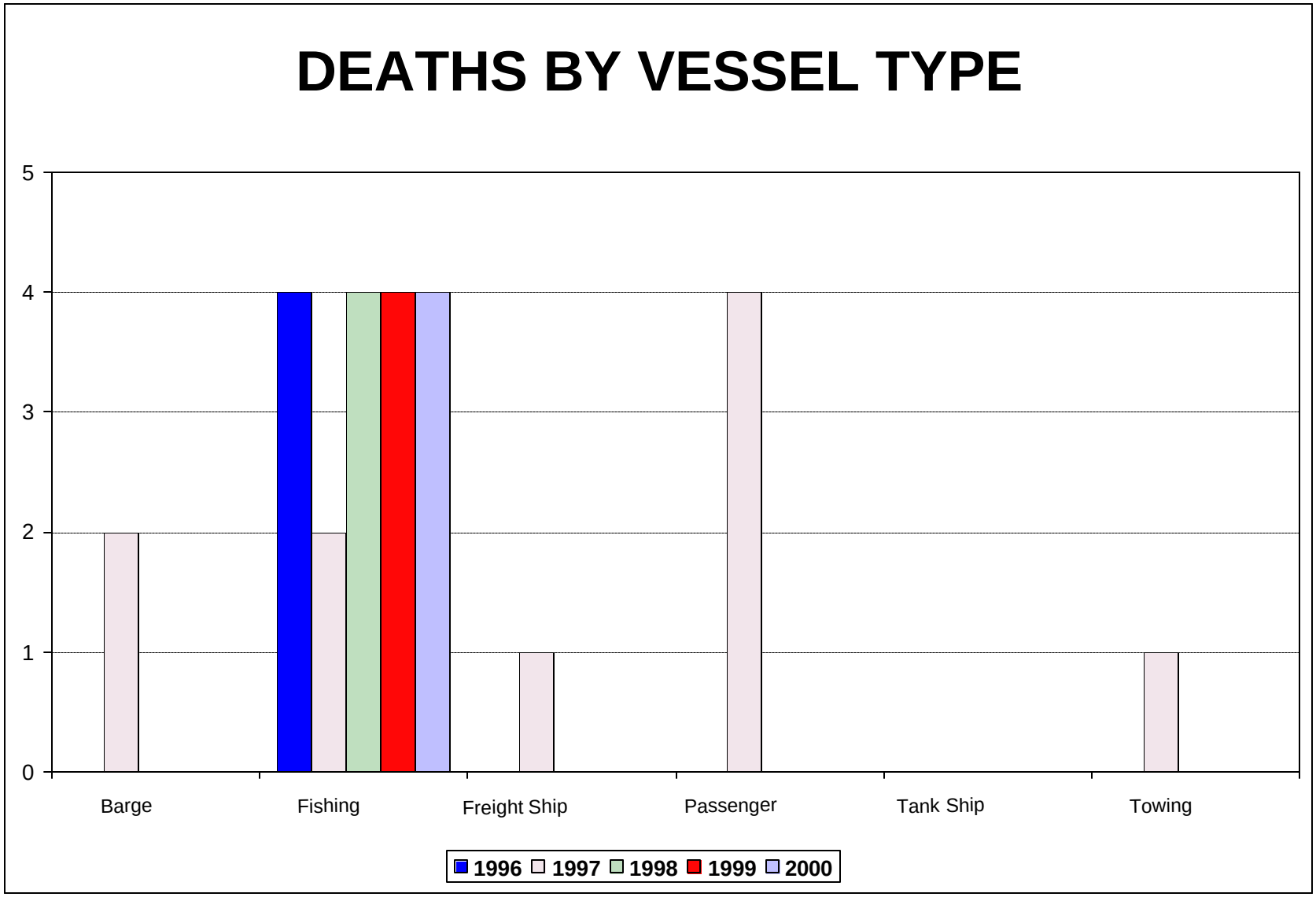


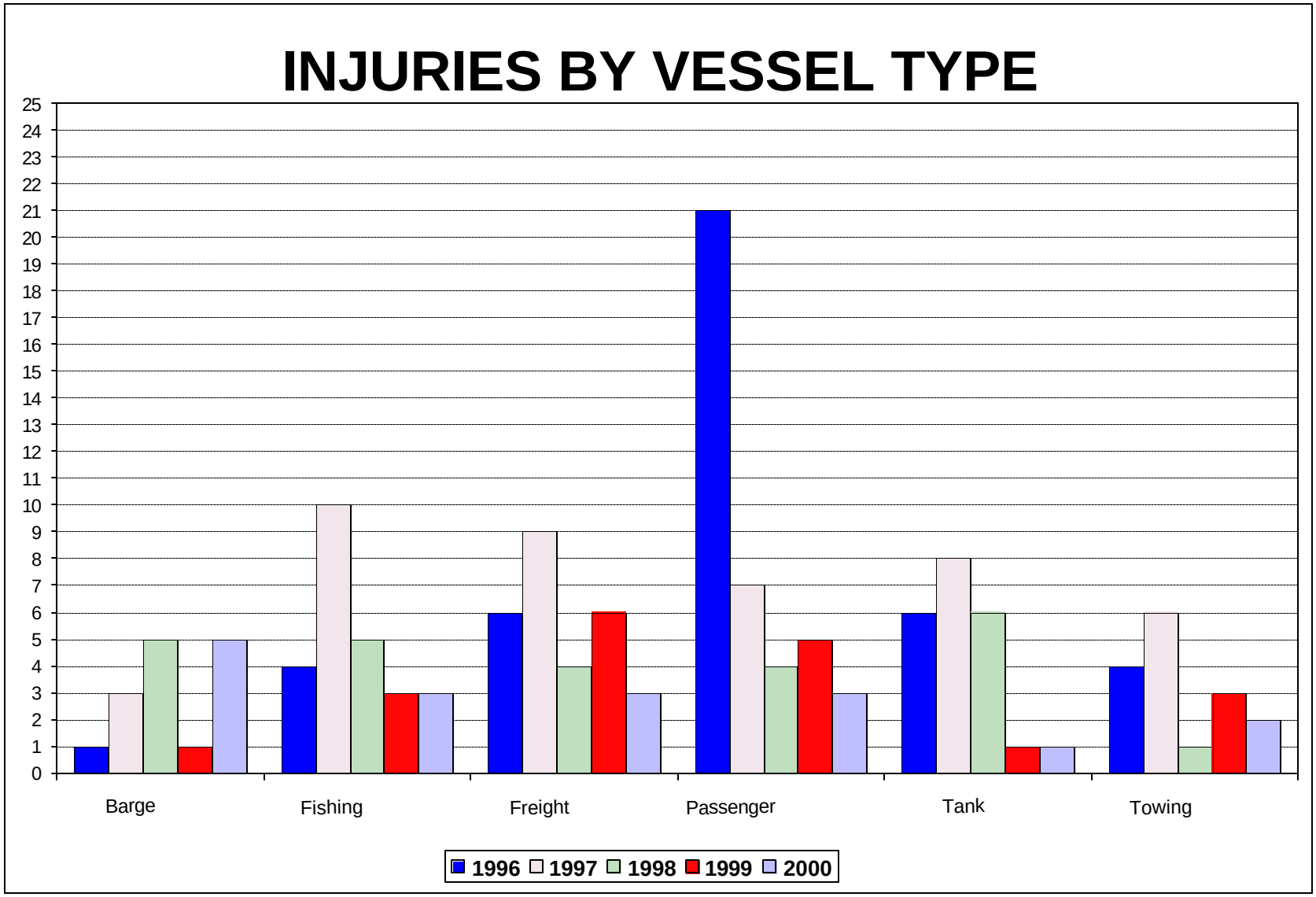
Fishing Vessel
Collisions, Allisions & Groundings
San Francisco Bay



Passenger Vessel
Collisions, Allisions & Groundings
San Francisco Bay




DEATHS BY VESSEL TYPE
5
4
3
2
1
0
Barge
Fishing
Freight Ship
Passenger
Tank Ship
Towing
1996
1997
1998
1999
2000


INJURIES BY VESSEL TYPE
25
24
23
22
21
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
Barge
Fishing
Freight
Passenger
Tank
Towing
1996
1997
1998
1999
2000

VTS San Francisco
Reports of Maritime Incidents 2000

Type of incident	Total
Allision	4
Anchor Dragging	2
Grounding	2
Lift Bridge Problem	2
Mechanical Failure	27
Medical Emergency	2
Pollution	1
Rule Nine	4
Operational Notice Problem	1
Total	45

Allision

December 30, 2000

A tug operator reported to VTS that the rig on his barge had struck the Union Pacific Railroad Bridge. VTS notified the Marine Safety Office and the bridge tender. The tug subsequently reported that he had freed his rig from the bridge structure. The bridge tender reported that the lift mechanism of the bridge was not damaged. A train was crossing the bridge at the time of the incident and had to be stopped and then cleared from the bridge.

November 14, 2000

A pilot transiting from anchorage 23 to Shore Terminal Martinez reported to VTS that the vessel had scraped the Union Pacific Bridge and damaged a portion of its mast. The Marine Safety Office and District Bridge Officer were informed by VTS. The bridge tender confirmed that the bridge had been at a full lift when the vessel passed beneath it.

May 10, 2000

A pilot reported a loss of propulsion as he was making an approach on the Union Pacific Railroad Bridge. The pilot attempted to use anchors to stop the ship. The ship allided with the bridge. Tugs were brought to assist and the ship was pulled off of the bridge and towed to anchorage twenty-three until repairs could be made.

May 05, 2000

VTS received a report from a pilot that strong winds had blown him onto the dock in the Oakland Inner Harbor, causing some minor damage to the ship. The Marine Safety Office was informed, determined the damage to be minor, and allowed the ship to proceed.

Anchor Dragging

October 25, 2000

A vessel was anchored in anchorage eight, with a pilot aboard, awaiting tides so that the vessel could proceed into Oakland. VTS noted that the vessel appeared to be dragging anchor. After tracking the vessel for a few minutes, VTS operators determined that the vessel was drifting at a rate of 2 knots towards the east. The pilot was notified, confirmed his vessel was dragging anchor, and with the help of his assist tugs re-anchored the vessel.

February 20, 2000

VTS operators observed that a vessel was dragging anchor in anchorage nine. The vessel was conducting engine repairs and was unable to reposition herself. VTS coordinated tug services and a pilot to re-anchor the ship.

Grounding

November 01, 2000

VTS received a report from a pilot that his vessel had run aground in Bull's Head Channel just east of the Union Pacific Railroad Bridge. The pilot indicated that there was no pollution in the water and no injured persons. Marine Safety Office was apprised of the situation. VTS then directed the vessel to sound their tanks to ensure that there was no hull breech. A Coast Guard small boat was dispatched to verify the position of the vessel and take soundings. Lightering operations were conducted in an attempt to refloat the vessel. On the morning of November 02 the vessel was refloated and safely moored.

June 02, 2000

A pilot reported to VTS that his vessel was aground at light 23 in the Stockton Deep Water Channel. No pollution was evident. The Marine Safety Office was apprised of the situation and a Coast Guard small boat was dispatched to survey the scene. Several hours later the pilot reported that the vessel was underway. It proceeded to Stockton without further incident.

Lift Bridge Problem

May 27, 2000

A pilot reported to VTS that he had to make a round turn at the Union Pacific Railroad Bridge. The bridge lift operator was unable to lift the bridge in time for the vessel to make a safe passage through the bridge. After completing his round turn the bridge was raised and the vessel proceeded to Sacramento.

January 12, 2000

The Union Pacific Railroad Bridge lift operator reported to VTS that the bridge was locked in the down position and would be unable to perform the requested lift for a vessel upbound in Suisun Bay. The vessel anchored in the channel until a full lift could be achieved. VTS notified the Marine Safety Office.

Mechanical Failure

December 01, 2000

While transiting through Pinole Shoal Channel, a pilot reported to the VTS that the vessel he was piloting had lost steering. The escort tug was along side and prevented the vessel from drifting into shoal water. VTS notified the Marine Safety Office. The vessel was able to correct the steering casualty and proceeded into Tosco Rodeo with a two tug escort.

December 13, 2000

A pilot reported to VTS that his vessel had lost his propulsion while maneuvering in the Oakland Outer Harbor. Using tugs and his anchors the pilot moored the vessel at Berth 23.

December 14, 2000

While transiting from Oakland out to sea, a pilot reported to VTS that his vessel had experienced a steering casualty. The pilot indicated that he had control of the vessel and intended to anchor. VTS apprised the Marine Safety Office of the situation. The vessel anchored in anchorage nine.

November 03, 2000

VTS received a report from a pilot that the vessel he was piloting was having engine problems. The vessel was alongside the dock at Posco/US Steel Pittsburg. The pilot returned the vessel to the dock and informed VTS that the problem appeared to be a leaking fuel line. The Marine Safety Office placed a hold on the vessel until the problem was corrected.

November 17, 2000

A pilot was anchoring a vessel in anchorage eight when he reported to VTS that the ship's backing bell was not functioning. The pilot indicated that he would use an ahead bell and the rudder to set the anchor. The pilot inspected the vessel's bell log and noted that there was no log entry indicating that the vessel had performed the required propulsion tests prior to entering the San Francisco Bay. VTS notified the Marine Safety Office.

November 30, 2000

A vessel was departing Alameda Naval Air Station and intended to conduct sea trials in the bay prior to proceeding out to sea. The pilot informed VTS that the vessel had an engine casualty, his tugs were onscene and he would turn the vessel towards anchorage eight. VTS instructed the vessel to anchor and perform repairs as directed by the Marine Safety Office. A few hours later repairs were completed and the Marine Safety Office gave the vessel authorization to proceed out to sea. While in the Deep Water Traffic Lane the vessel experienced another engine casualty. The pilot brought the vessel about and anchored the vessel in anchorage eight. The Marine Safety Office indicated that the vessel would not be allowed to depart without the approval of the Captain of the Port. The next morning the vessel was cleared to depart and proceeded to sea without further incident.

October 21, 2000

The master of a vessel located approximately one nautical mile west of the San Francisco Sea Buoy reported to VTS that his vessel had an air compressor casualty. The master indicated that the ship was maneuvering to pick up their pilot. VTS notified the Marine Safety Office and asked the pilot once he boarded if he could confirm if this was a start or control air problem. The pilot verified that it was a start air problem and he intended to anchor the vessel rather than take it to the dock. The Marine Safety Office ordered that the vessel have a tug escort prior to entering port.

September 02, 2000

A motor vessel was transiting the Sacramento Deep Water Ship Channel bound for sea. The pilot informed VTS that he anchored near light 58 due to an engine failure. After inspecting the engine, it was determined that a closed exhaust valve had caused the failure. VTS informed the Marine Safety Office who requested the vessel proceed with a tug escort. The vessel continued its transit without further problems and the Marine Safety Office lifted the escort requirement, allowing the vessel to depart the port unaided.

September 03, 2000

The VTS watch supervisor received a call from Group San Francisco indicating that they had received a cellular phone call from a passenger on a ferry with rudder problems. VTS ascertained the identity of the vessel and then located it on the camera, drifting just off of Pier 48 San Francisco. The operator of the ferry contacted VTS and reported that they had an engine failure. VTS observed on camera that two crew boats were alongside the ferry. The vessel continued on to the Ferry Building, once moored the operator informed VTS that the failure was with the rudder system. VTS requested the operator contact the Marine Safety Office.

September 17, 2000

A ferry on a bay cruise reported to VTS that the vessel had lost propulsion and the operator intended to anchor the vessel near Blossom Rock. Five minutes later the operator reported that the vessel was anchored off Pier 39. The vessel started to drag anchor, so the operator ordered two tugs to assist. The ferry regained propulsion and proceeded to Pier 39, escorted by the two assist tugs.

September 29, 2000

A pilot reported to VTS that the vessel he was piloting had lost propulsion and using his tugs he was proceeding to anchorage nine. The Marine Safety Office was informed. Several hours later the pilot indicated that the failure had been caused by a computer software problem and the engines were now online. The pilot heaved anchor and was preparing to depart the anchorage when the vessel experienced another software problem. The pilot anchored the vessel. Ten hours later, another pilot attempted to take the vessel out to sea. The pilot indicated that he was anchoring in anchorage eight due to some steering problems. The Marine Safety Office directed the vessel to complete repairs and that they were not authorized to leave port until an inspection of their system had been conducted. The following day another pilot, using tugs, brought the vessel to Pier 96.

August 17, 2000

A ferry operator reported an automatic engine shutdown due to low lube oil pressure to VTS. The vessel returned to Vallejo on one engine without incident.

August 30, 2000

A pilot reported to VTS that he was anchoring his vessel north of the Main Ship Bar Channel due to engine difficulties. The pilot informed VTS that the vessel would be changing an exhaust valve and should be completed with repairs in four hours. The Marine Safety Office placed a hold on the vessel pending a class society inspection. The following day the Marine Safety Office rescinded the hold due to the unavailability of a class society inspector. The vessel was directed to complete the inspection at its next port of call.

July 18, 2000

A tank vessel was in the precautionary area preparing to enter port. The pilot informed VTS that the vessel had no propulsion astern. VTS informed the pilot not to enter port until the Marine Safety Office authorized the vessel to proceed. The Marine Safety Office required that the vessel have a tug escort for entry into port. The vessel continued to Richmond in an escort condition.

June 01, 2000

A pilot on a vessel bound for Pier 80 San Francisco, reported a loss of propulsion while making an approach to the dock. Two tugs were already on scene. The Pilot requested to proceed with docking under tug power. The ship safely moored.

June 06, 2000

A pilot making an approach to the wharf at Equilon Martinez reported to VTS that he was unable to use the astern bell. After docking the vessel, the pilot contacted VTS to report that the vessel failed to respond to an ahead bell when alongside the dock. The problem was a broken air line which was repaired.

June 27, 2000

VTS operators overhead a series of transmissions between two tugs on the radio. One tug was pushing two rock barges from Mare Island to the Naval Supply Center, Oakland. The tug had lost her engines and the second tug operator had sent his assist tug to the other vessel. The operator reported that the casualty, due to sediment in the fuel system, was repaired. The operator transferred his two barges to another vessel and proceeded to Oakland where the vessel remained awaiting an inspection.

May 05, 2000

The pilot of a tanker reported to VTS that the vessel had lost a cylinder in the vicinity of Harding Rock and was proceeding to anchorage nine with two tugs in escort. The cylinder was recovered enroute to the anchorage and the ship anchored without incident.

May 08, 2000

A pilot reported that his vessel experienced an engine malfunction in the vicinity of Harding Rock and was proceeding to anchorage seven to await the arrival of assist tugs. The malfunction was corrected and the vessel continued on to Richmond with a tug escort.

May 26, 2000

The master of a vessel reported to VTS that he had lost propulsion in the vicinity of Yerba Buena Island and was requesting Coast Guard assistance. Before a tow could be established, propulsion was regained and the vessel proceeded to Marina Village without incident.

April 24, 2000

The VTS operators overhead the transmission between two tugs where one indicated that it had lost steering just east of the Brothers. The tug had three rock barges in tow. VTS contacted the tug and the operator confirmed that they had lost steering due to a hydraulic pump failure. The operator indicated that he intended to repair the casualty and did not require assistance. The tug anchored and conducted repairs.

April 24, 2000

The operator of a tug pushing a sand barge reported to VTS that his vessel had a steering casualty and was unable to maneuver one-quarter of a mile north of Southampton Shoal Channel. A pilot dispatched his assist tug to help push the other tug out of the channel. The tug anchored in anchorage five and conducted repairs. The vessel continued on to Pacific Dry-dock in Alameda without incident. The Marine Safety Office was informed of the incident.

April 24, 2000

A ferry was underway in the Alameda estuary, when VTS operators overhead a transmission between the ferry and another vessel. The ferry indicated that they had an equipment failure. VTS contacted the operator of the ferry and confirmed that the starboard engine had failed and the port engine was overheating. The operator indicated that he was enroute to anchorage eight where he would investigate the situation. The Marine Safety Office was notified. Assist vessels transported spare parts to the ferry. The ferry completed repairs and departed that anchorage.

April 27, 2000

A pilot reported to VTS that the tank vessel he was piloting had lost propulsion while passing under the lift span of the Union Pacific Railroad Bridge. Two tugs were on scene acting as his escort vessels. A few minutes passed and the pilot reported that he had regained propulsion and was continuing on to Shore Terminals Martinez. A ship's generator dropping off line caused the malfunction. The second generator was unable to maintain the load resulting in its failure and a loss of propulsion. The Marine Safety Office was apprised of the situation.

March 01, 2000

A vessel was approaching the San Francisco Main Ship Bar Channel when the pilot reported to VTS that the vessel had a propulsion casualty. VTS directed the pilot not to enter the bay until the cause of the casualty was determined, at which time the pilot reported a complete loss of propulsion and proceeded to anchor the vessel south of the channel. The Marine Safety Office was apprised of the situation and granted permission for the vessel to enter the port under tow. Three tugs towed the vessel to Pier 30 without incident.

March 20, 2000

A pilot reported that his vessel had lost propulsion as it was approaching the San Francisco Oakland Bay Bridge. Using his assist tugs, the pilot maneuvered the vessel into anchorage nine until the vessel regained propulsion. The master determined that an air pocket in the fuel supply had caused the failure. The Marine Safety Office was advised and allowed the vessel to proceed to dock.

January 15, 2000

A pilot reported a loss of propulsion as the vessel passed buoys three and four of the Main Ship Bar Channel. A few minutes later the vessel regained propulsion and continued out to sea.

Medical Emergency

July 22, 2000

A pilot reported that a crew member onboard the vessel he was piloting had slipped off a platform and was seriously injured. VTS informed Group San Francisco. The Group coordinated efforts to MEDEVAC the injured crewman.

March 29, 2000

A naval vessel reported to VTS that they had a possible man overboard in the offshore precautionary area. All personnel were reported accounted for but 5 persons did require a MEDEVAC. VTS operators monitored the situation and provided information broadcasts to VTS users until all MEDEVACs were completed.

Pollution

October 13, 2000

While a vessel was anchoring in anchorage nine, the VTS operators overhead the pilot request assistance from a nearby oil recovery vessel. VTS contacted the pilot who stated that a small amount of oil might have been in the vessel's chain locker and when the anchor was let go it was discharged into the bay. The pilot was heaving in the anchor and would anchor with the vessel's port anchor. MSO was notified, requested that the master contact the NRC and OES, and issued a hold on the vessel.

Rule Nine

July 06, 2000

A pilot reported that a sailing vessel had crossed the bow of his vessel at close range. Using cameras, VTS was able to locate the vessel, obtain a description of the vessel, and direct a Coast Guard boarding team to the vessel.

June 03, 2000

A pilot reported to VTS that he had to abort his approach to the DE span of the Bay Bridge because a sailing vessel would not give way. He passed the CF number to VTS who relayed this information to the Marine Safety Office.

June 19, 2000

A pilot reported to VTS that a small vessel had crossed his bow and caused him to maneuver evasively while he was making his approach to the DE span of the Bay Bridge. With the assistance of a ferry boat, VTS was able to identify the small vessel. Group San Francisco dispatched a boarding team who issued a citation to the vessel.

June 27, 2000

A pilot inquired if VTS had seen the small vessel that crossed his bow. VTS had the vessel on radar, however, due to fog was unable to use cameras to identify the vessel. The pilot stated that the vessel had placed his vessel "in extremis" and provided a description of the vessel to VTS. Group San Francisco dispatched a boarding team who issued a citation to the vessel.

Operational Notice Problem

August 21, 2000

A pilot contacted VTS to inform the watch supervisor that he had attempted to contact the contractors working at the Carquinez Bridge several times without success. The pilot was attempting to determine if there were scaffolds in the navigation channel that would reduce the vertical clearance of the bridge. The watch supervisors determined there were no scaffolds in the channel and passed this information to the pilot. At 2044, using a camera, a VTS operator noticed a scaffold being moved into the navigational span of the bridge. The information was immediately relayed to the pilot who was able to make a last minute course adjustment and avoid the obstruction.

Clearing House List of Escort Boat Data

Tug Company & Boat Name	Zones 1 & 2	Zones 4 & 6	Certification Expires
AmNav Maritime Services			
AVENGER	28.32	28.32	03/22/04
ENTERPRISE	59.81	59.81	10/27/03
KELLEY ANNE	12.52	12.52	03/22/04
SARAH	26.86	26.86	06/14/03
TITAN	35.56	35.56	03/22/04
Bay and Delta Towing			
DELTA CAREY	188.00	171.00	02/28/04
DELTA DEANNA	188.00	171.00	06/22/02
DELTA LINDA	188.00	171.00	04/20/02
Foss Maritime			
ANDREW FOSS	188.00	153.00	09/27/03
ANNA FOSS	16.62	16.62	09/27/03
BRYNN FOSS	140.00	134.00	10/26/03
CLAUDIA FOSS	27.18	27.18	11/30/03
DEAN FOSS	14.28	14.28	10/26/03
DANIEL FOSS	86.00	86.00	09/20/02
KEEGAN FOSS	72.47	72.47	09/27/03
RICHARD FOSS	51.00	51.00	12/22/02
Oscar Niemeth Towing			
AMERICAN EAGLE	55.95	55.95	05/03/04
SEA EAGLE	26.59	26.59	12/11/03
Pacific Workboat Co.			
CAPT REINO	11.04	11.04	01/27/03
SeaRiver Maritime			
S/R CALIFORNIA	170.00	150.00	12/13/03
S/R CARQUINEZ	64.28	64.28	12/13/03
S/R MARE ISLAND	188.00	171.00	01/22/04
Seaway Towing Company			
POLARIS	18.61	18.61	03/10/03
SOUTHERN CROSS	24.65	24.65	03/10/03
MARIN SUNSHINE	30.53	30.53	03/10/03

Tug Company & Boat Name	Zones 1 &2	Zones 4 &6	Certification Expires
Westar Marine Services			
BEARCAT	13.61	13.61	12/05/03
BETTY L.	13.12	13.12	12/06/03
KITSAP	15.25	15.25	12/06/03
ORION	49.97	49.97	12/29/03
SAGITTARIAN	30.42	30.42	12/06/03
SOLANO	26.80	26.80	12/05/03
WILDCAT	15.17	15.17	12/06/03

San Francisco Bay Region Totals

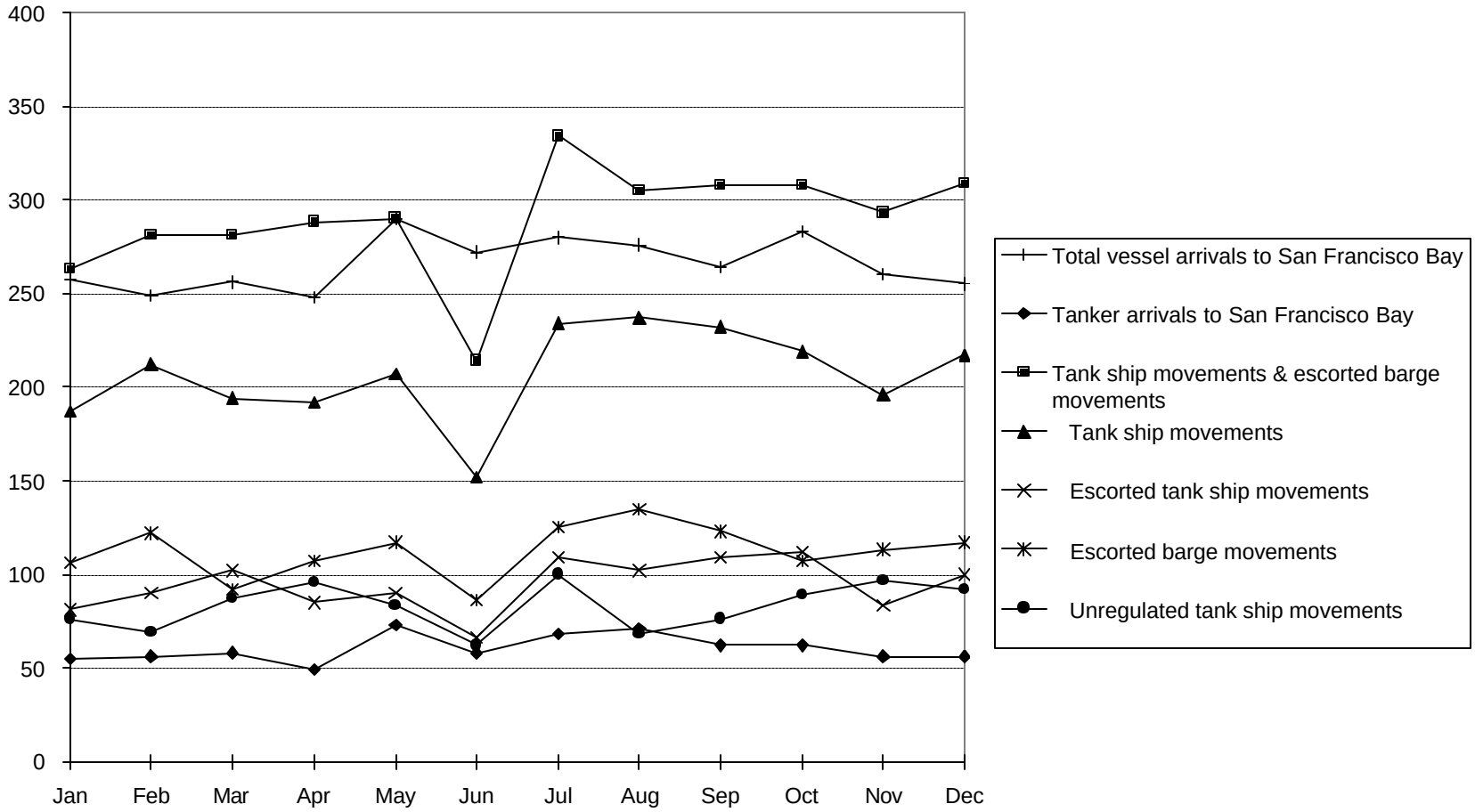
			1999
Tanker arrivals to San Francisco Bay	724		684
Tank ship movements & escorted barge movements	3,474		3,173
Tank ship movements	2,479	71.36%	2,338
Escorted tank ship movements	1,129	32.50%	1,146
Unescorted tank ship movements	1,350	38.86%	1,192
Tank barge movements	995	28.64%	835
Escorted tank barge movements	512	14.74%	398
Unescorted tank barge movements	483	13.90%	437

Percentages above are percent of total tank ship movements & escorted barge movements for each item.

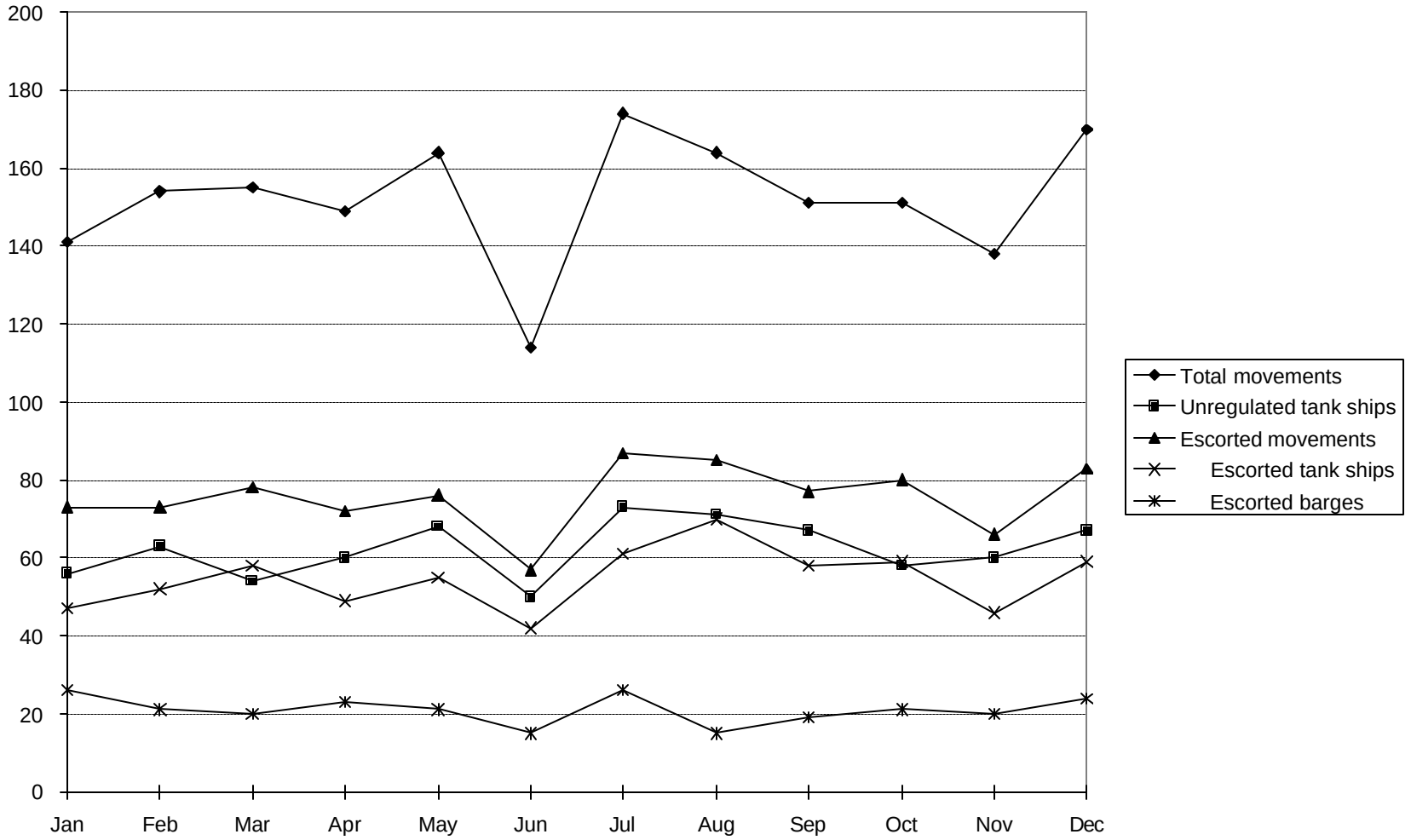
Escorts reported to OSPR	5						12			
Movements by Zone	**Zone 1**	**%**	**Zone 2**	**%**	**Zone 4**	**%**	**Zone 6**	**%**	**Total**	**%**
Total movements	1,825		3,239		0		1,617		6,681	
Unescorted movements	918	50.30%	1,715	52.95%	0	0.00%	835	51.64%	3,468	51.91%
Tank ships	747	40.93%	1,298	40.07%	0	0.00%	582	35.99%	2,627	39.32%
Tank barges	171	9.37%	417	12.87%	0	0.00%	253	15.65%	841	12.59%
Escorted movements	907	49.70%	1,524	47.05%	0	0.00%	782	48.36%	3,213	48.09%
Tank ships	656	35.95%	1,077	33.25%	0	0.00%	487	30.12%	2,220	33.23%
Tank barges	251	13.75%	447	13.80%	0	0.00%	295	18.24%	993	14.86%

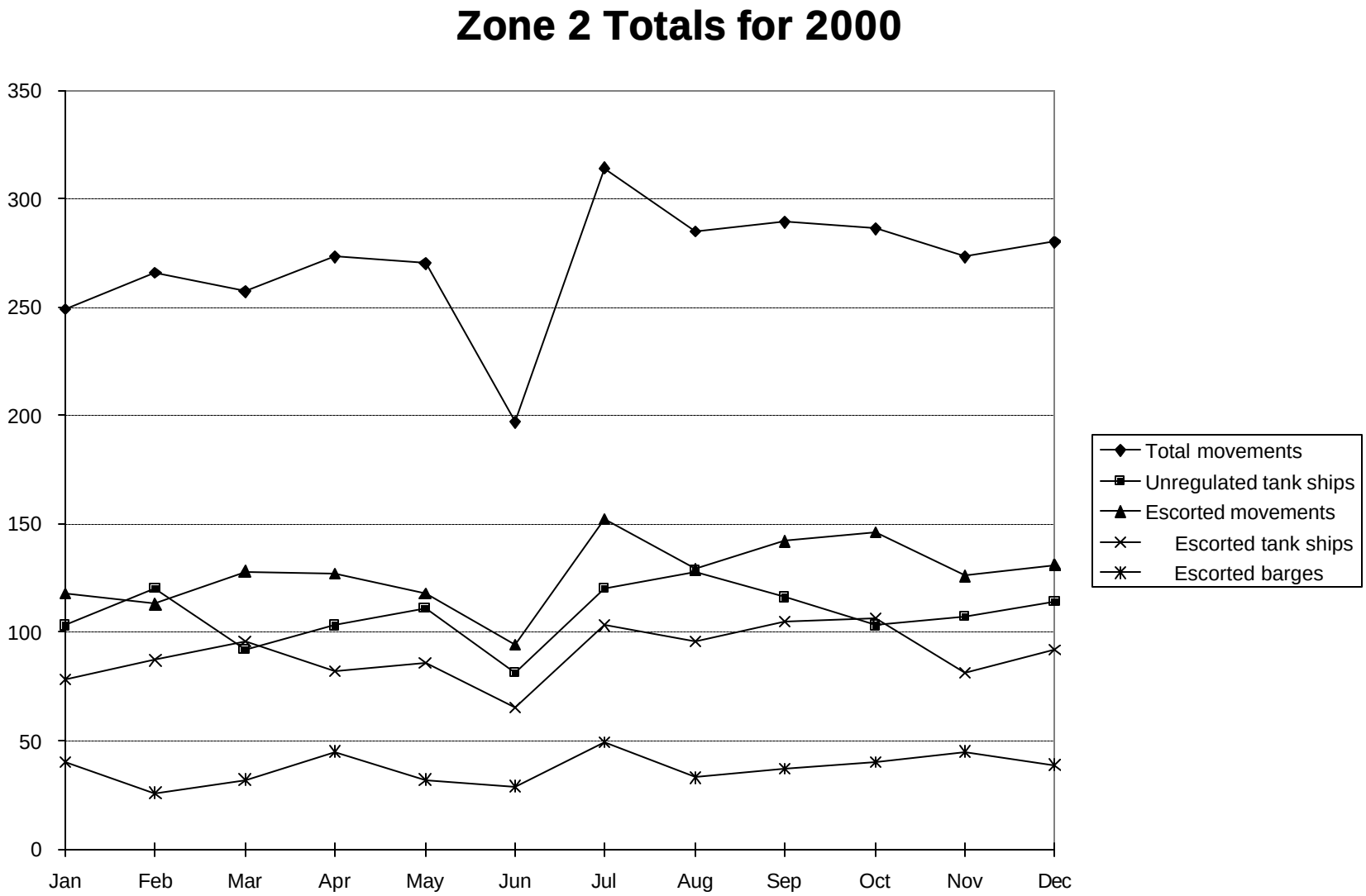
Notes:
1. Information is only noted for zones where escorts are required.
2. All percentages are percent of total movements for the zone.
3. Every movement is counted in each zone transited during the movement.
4. Total movements is the total of all unescorted movements and all escorted movements.

Total Escort Movements in San Francisco Bay for 2000

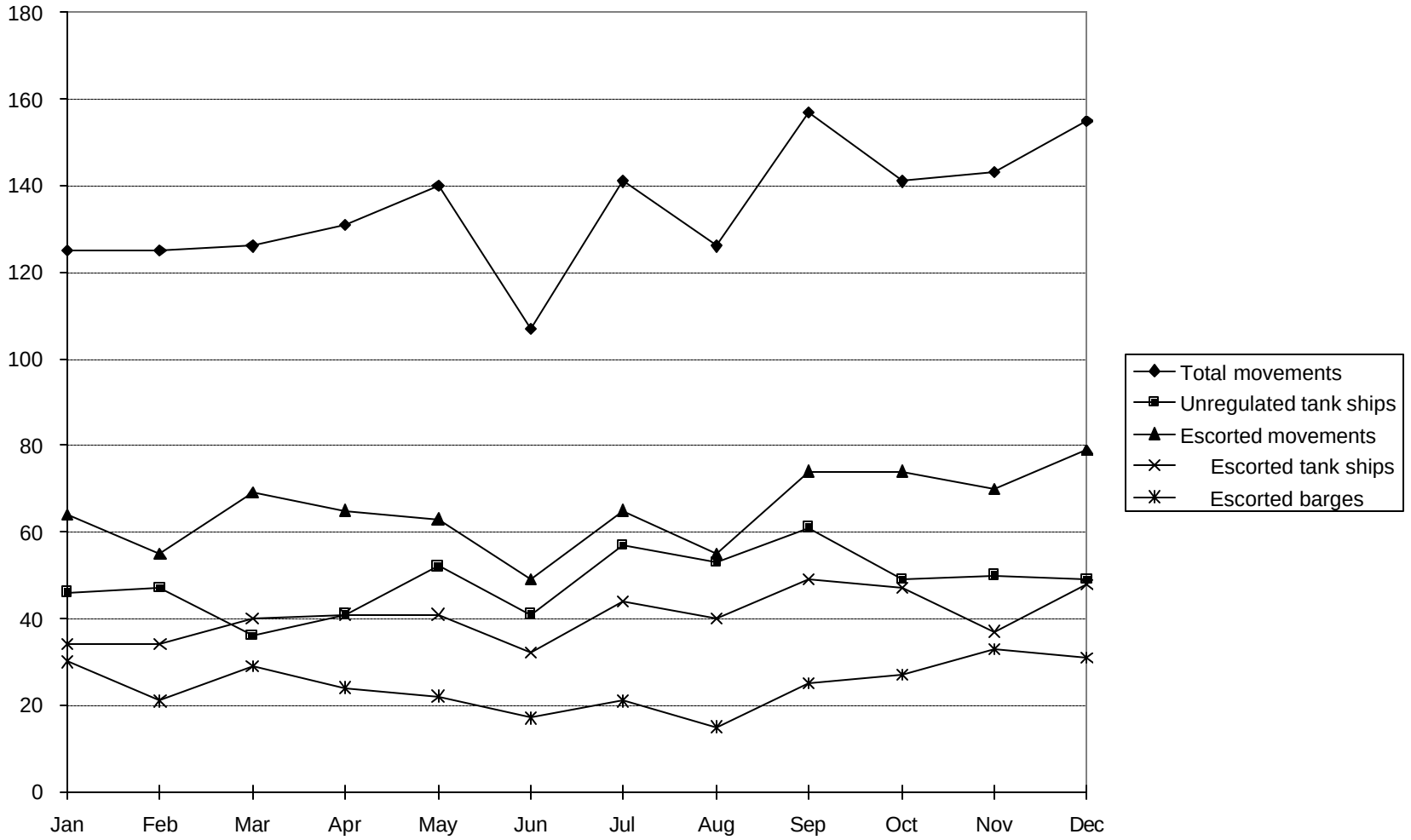


Zone 1 Totals for 2000




Zone 2 Totals for 2000
350
300
250
200
150
100
50
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Total movements
Unregulated tank ships
Escorted movements
Escorted tank ships
Escorted barges

Zone 6 Totals for 2000



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

<u>(1) Fully redundant steering and propulsion systems to include:</u>

<u>(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</u>

<u>(B) two independent rudders each with separate steering systems; and</u>

(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:

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

* 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(~~c~~d).

(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 bitts 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 bitts and chocks I n th

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"

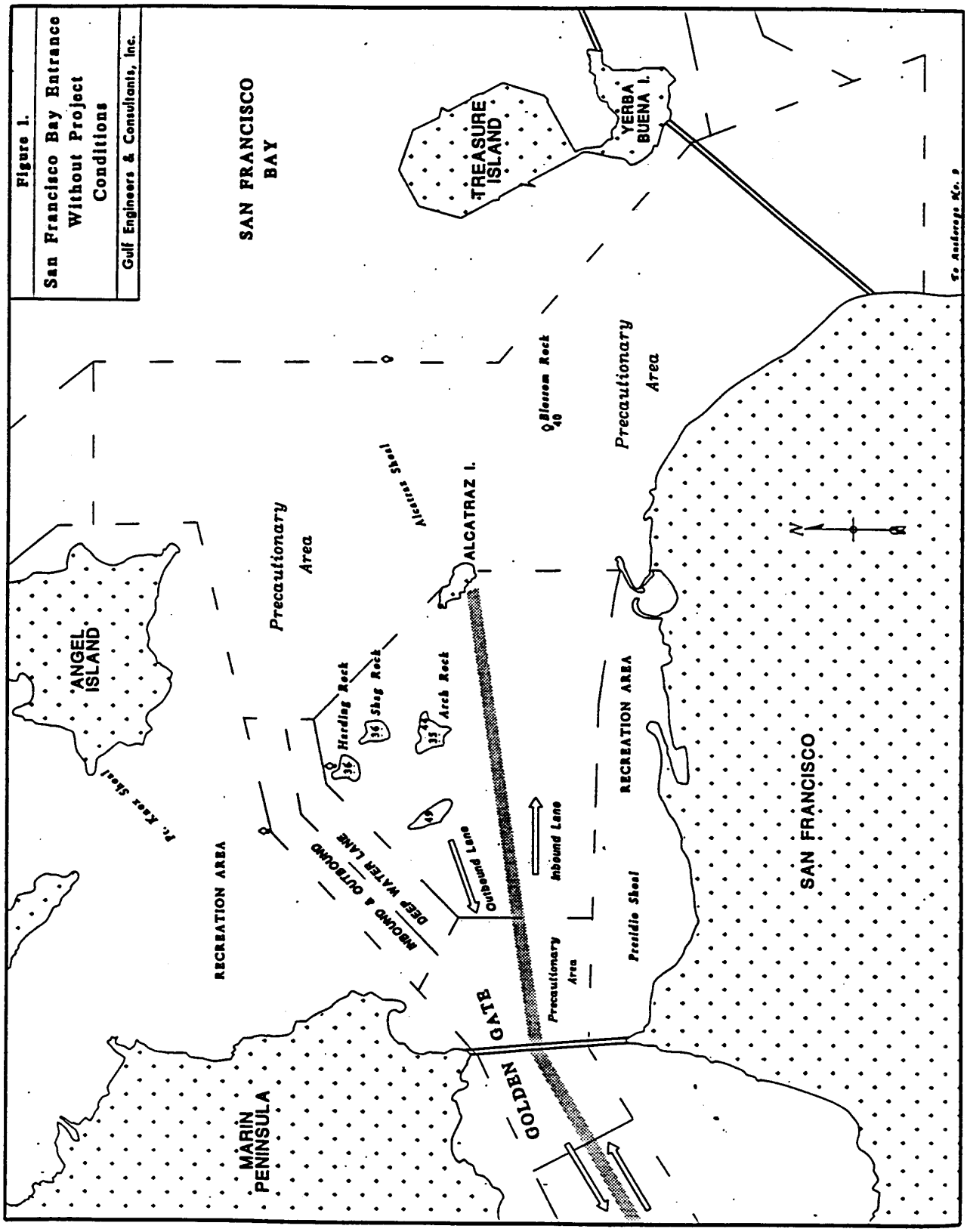
The owner/operator of a tank vessel or an escort tug may request redetermination of an action taken relative to an inadequacy decision or conditional approval of an Escort Plan or Checklist, denial or revocation of approval of an educational program, or application for use of an alternative compliance 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.

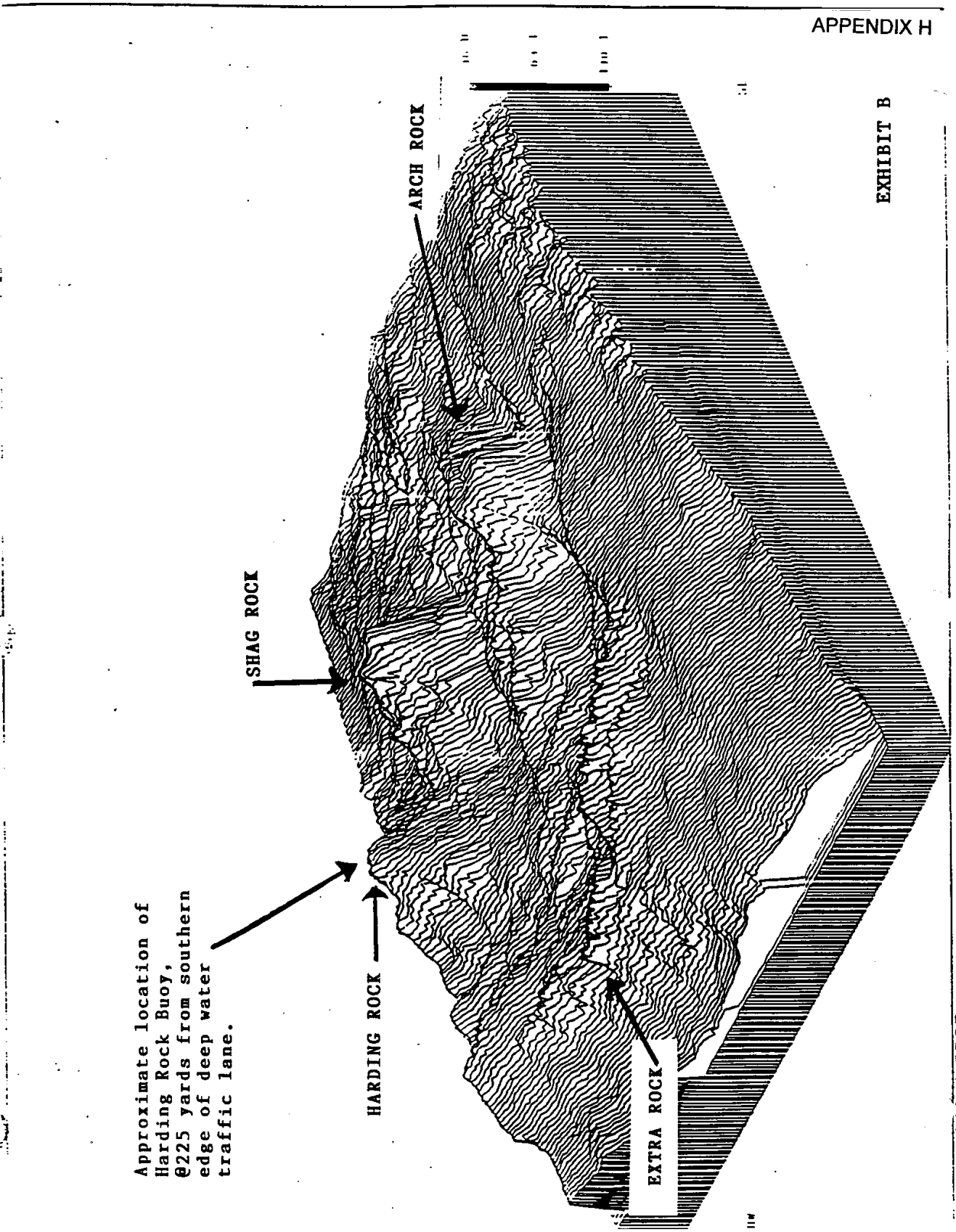
Note: Authority: Sections 8670.17.2(a) and 8670.23.1(d), Government Code.
Reference: Sections 8670.23.1(e)(1) and Article 9, Sections 8670.57 through 8670.69.6, Government Code.



U.S. Army Corps of Engineers

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

APPENDIX H



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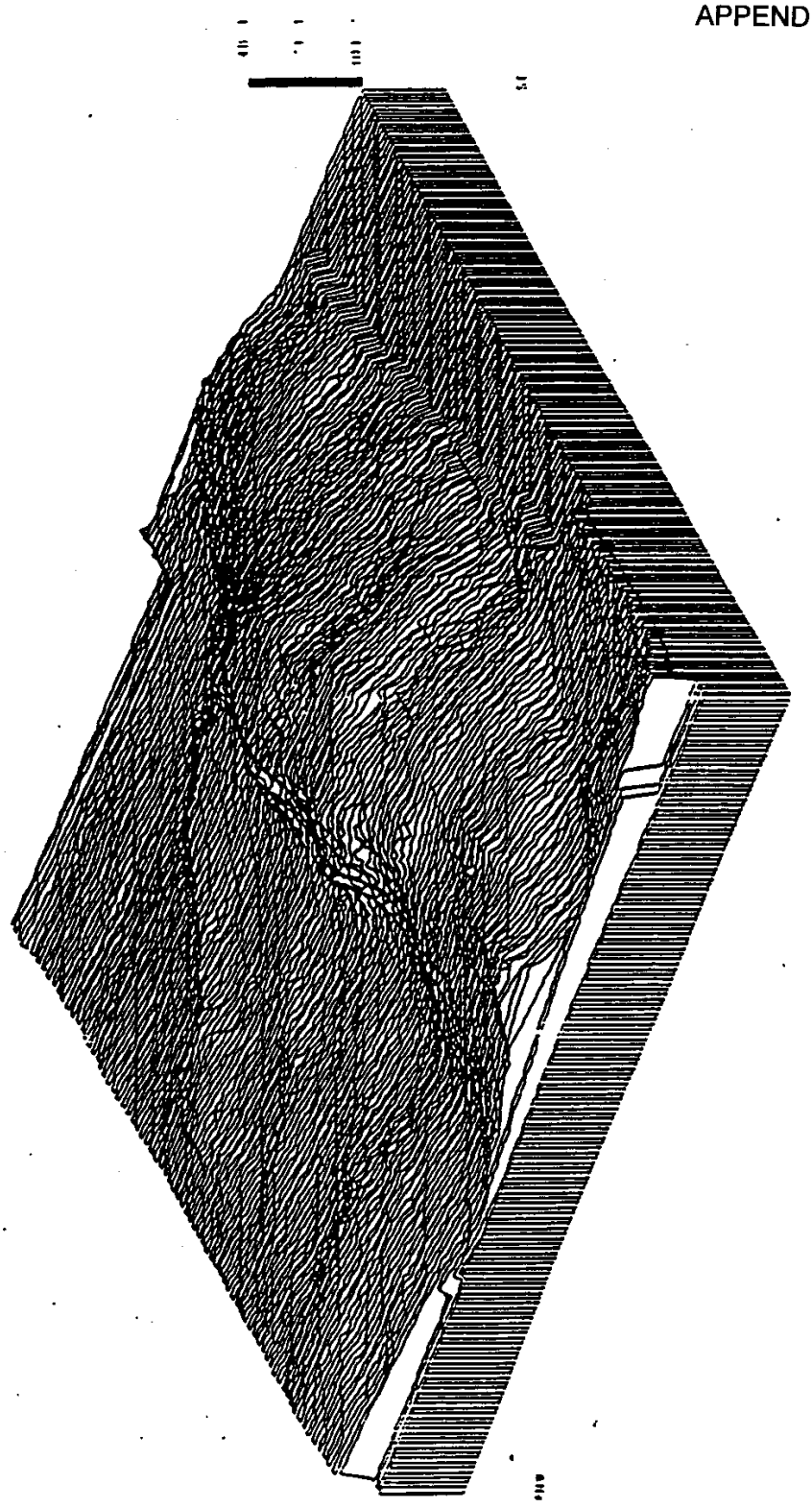
APPENDIX H



BLOSSOM ROCK - ISOMETRIC

LIST OF ALTERNATIVES

	Dredge & Disposal Material in CuYds	Cost Item Estimate
Alternative 1: Status Quo:	No Change N/A	N/A
Alternative 2:	896,554	$ 24,727,274

Remove Harding and Blossom Rock, and lower a portion of East Alcatraz Shoal to -55 feet MLLW.

No change made to current traffic routing patterns or regulations.

Alternative 3:	Greater Than 896,554*	$ 41,653,572*

Remove Harding Rock, Blossom Rod, arid Alcatraz Dump Site* and lower [a] portion of East Alcatraz Shoal to -55 feet MLLW

One-Way inbound and outbound traffic lanes are established and are extended to join the one-way traffic lanes located to the "west of the Golden Gate Bridge. Inbound vessels would transit south of Alcatraz; Outbound vessels would utilize the existing but renamed Deep Water (two-way) traffic Regulated Navigation Area regulations would change.

*Estimates to remove the Alcatraz Dump Site are not available. Since the Alcatraz Dump Site is similar in size to the East Alcatraz. Shoal, the East Alcatraz Shoal estimate was used to represent the removal of the Alcatraz Dump Site.

Alternative 4:	955,813	$ 27,521,576

Remove Harding Rock, Blossom Rock, Shag Rock, Unnamed Shoal, and lower a portion of East Alcatraz Shoal to -55 feet MLLW.

One-Way inbound and outbound traffic lanes are established and are extended to join the one-way traffic lanes to the west of the Golden Gate Bridge. The traffic lanes are located north of Arch Rock and Alcatraz Island. The presidio Shoal Recreational Area is expanded to the southern limit of the inbound traffic lane. Regulated Navigation Area regulations would change.

Alternative 5:	1,155,240	$ 42,939,907

Remove Harding Rock, Blossom Rock, Shag Rock, Arch Rock, Unnamed Shoal, and lower a portion of East Alcatraz Shoal to 55 feet MLLW.

Similar to Alternative 4 except that Arch Rock is removed and the One-Way traffic lanes are wider. Regulated Navigation. Area regulations would change.

VEHICULAR BRIDGE INVENTORY

VEHICULAR BRIDGE MANAGEMENT

BRIDGES ENCOUNTERED BY OCEAN GOING VESSELS

BRIDGE NAME AND LOCATION		TYPE	CLEARANCES Horz/Vert MLLW-MHW
1. **Golden Gate Bridge**		SUS	4028/238-232
San Francisco Bay			
2. **San Francisco-Oakland**		SUS	
San Francisco Bay, Westerly Reach			
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. **Richmond-San Rafael**		F	
San Francisco Bay			
Main Channel,	Center Span		1000/190-185
	Left and Right Span		480/173-168
East Channel,	Center Span		970/140-135
4. **Carquinez**		F	
Carquinez Strait, Vallejo			
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. **Martinez, Highway Bridge**		F	
Martinez/Benicia			440/141-135
6. **Martinez, Union Pacific RR Bridge**		V/L	
Martinez/Benicia,		Raised	291/140-135
		Lowered	291/75-70
7. **Antioch**		F	
Antioch, CA – San Joaquin River			400/142-138

User's Manual, Online Edition
January, 1999

Home | Contacts | Communications Guide | Fact Sheet
User's Manual | RNA Guide | Links | VTS Area

Table of Contents:
Introduction
San Francisco Vessel Traffic Service Operations
* Concept of Operations
Inshore Sector Procedures
* Inshore Sector Reporting Points
* Providing Route Intentions
* Regulated Navigation Areas
* San Francisco Bay RNA
* Southampton Shoal/Richmond Harbor RNA
* Oakland Harbor RNA
* Pinole Shoal Channel RNA
* Southern Pacific Railroad Bridge RNA
Offshore Sector Procedures
* Offshore Vessel Traffic Advisories
Captain of the Port Advisories
* Enforcement of Navigation Rules in San Francisco Bay
* Pollution Prevention Regulations
* Anchorages
Federal Regulations
* Part 1 - General Provisions
* Part 26 - Vessel Bridge-to-Bridge Radiotelephone Regulations
* Part 160 - Ports and Waterways Safety: General
* Part 161 [amended] - Vessel Traffic Services General Rules
* Part 162 [amended] - Inland Waterways Navigation Regulations
* Part 164 - Navigation Safety Regulations
* Part 165 - Regulated Navigation Areas and Limited Access Areas

INTRODUCTION

The Online Edition of the VTS San Francisco User's Manual is provided on the U. S. Coast Guard's World Wide Web server so that users may access the document easily. The content is exactly the same as the printed edition of the same date. Only the layout is different.

This edition of the San Francisco Vessel Traffic Service (VTS) User's Manual reflects significant changes in VTS operations and in other navigational procedures for the San Francisco VTS area. Primary among these changes is the fact that Congress has made participation in all Vessel Traffic Services (VTSs) mandatory as of 13 October 1994. Further,

effective 3 May 1995 the Coast Guard has established Regulated Navigation Areas (RNAs) in the San Francisco VTS area so as to reduce vessel congestion where maneuvering room is limited.
But the primary mission of San Francisco Vessel Traffic Service remains the same: to coordinate the safe and efficient transit of vessels in San Francisco Bay in an effort to prevent accidents and the associated loss of life and damage to property and the environment.

To carry out this mission and the secondary mission of assisting Coast Guard units and other public agencies, VTS uses radar, closed-circuit television (CCTV), and VHF-FM radiotelephone to gather and disseminate vessel traffic information. The VTS personnel who staff the Vessel Traffic Center 24 hours a day, seven days a week receive reports from mariners and correlate those reports with radar and CCTV pictures to get an accurate picture of vessel movements. Thus the accuracy of information that VTS provides depends largely on mariners' participation-VTS traffic summaries can be no more accurate than the reports given to VTS and the ability of VTS equipment to verify those reports. Note that at any time unreported hazards of which VTS personnel are unaware may confront mariners in the San Francisco VTS area.
All mariners are encouraged to read this manual prior to participating in the San Francisco VTS. In accordance with the National VTS regulations mariners must keep a copy of this manual readily available when operating in the VTS area. VTS asks for mariners' cooperation and welcomes suggestions as to how to improve this manual or the San Francisco VTS.
Send suggestions and/or comments to:
Commanding Officer
U. S. Coast Guard Vessel Traffic Service
Yerba Buena Island
San Francisco, California 94130-5078
(415) 556-2950 Fax:(415) 556-6851

SAN FRANCISCO VESSEL TRAFFIC SERVICE OPERATIONS

Concept of Operations

A. The primary function of VTS San Francisco is to instill good order and predictability on a waterway. This is accomplished by coordinating vessel movements through the collection, verification, organization, and dissemination of information. To accomplish this, VTS San Francisco uses the concept of a "continuum of control". This continuum consists of the following levels of control: Monitor, Inform, Recommend, and Direct.
(1) Monitor: Using radar, CCTV, and radiotelephone equipment, we monitor vessel traffic in the VTS Area. VTS also receives information from

various sources on predicted vessel movements, hazards to navigation, aids to navigation discrepancies, and other information of interest to VTS users. Monitoring vessel traffic allows us to ensure that vessels are being navigated safely and efficiently in accordance with applicable regulations and navigation rules.

(2) Inform: We analyze the information we have gathered and then use that analysis to inform our participants. This is done at the user's request, when it appears necessary to the VTS personnel, or at regular intervals. The purpose of informing participants is to give them timely information to allow them to make decisions concerning the navigation of their vessels.

(3) Recommend: Almost all of VTS San Francisco operations are conducted at the monitor and inform levels. However, at certain times the VTS will recommend action be taken by a participant to prevent a potentially dangerous situation. Such recommendations are offered to assist the participant in avoiding hazardous situations early on. Recommendations are made on the premise that there is information available to VTS of which the participant may not be aware.

(4) Direct: On very rare occasions VTS will direct movement or actions of a participant. Direction would be given in cases when the VTC observes obvious violations of regulations or an obvious and immediately dangerous condition of which the participant is not or does not seem to be aware.

B. The ultimate responsibility for safe navigation of a vessel remains with the master or person in charge. When performing the functions discussed here, VTS is not relieving the master or person in charge of his or her responsibility to control vessel movement. At no time is that person relieved by the VTS of responsibilities assigned by the applicable Navigation Rules and other pertinent laws or regulations, or of the neglect of any precaution which may be required by the ordinary seaman, or by special circumstances of the case.

C. Fishing vessels and recreational vessels, although generally not required to participate in the VTS, are encouraged to monitor the VTS radio channels, as needed, to gather traffic movement information.

INSHORE SECTOR PROCEDURES

A. VTS maintains a continuous radiotelephone watch on VHF-FM channels 12 (156.60 MHz), 13 (156.65 MHz), 14 (156.70 MHz) and 16 (156.80 MHz). The call sign is "SAN FRANCISCO TRAFFIC." Once communications are established, the abbreviated call sign "TRAFFIC" may be used. If communications on ch. 12, ch. 13 or ch. 14 are lost, call TRAFFIC on ch. 16 and be prepared to shift to another frequency. All reports should be in English and use the 24 hour clock system.

B. The VTS Area is separated into two sectors with a separate dedicated operating frequency for each sector. The Inshore Sector uses channel 14

and the Offshore Sector uses channel 12. Participation procedures for each of these sectors are outlined in the Inshore Sector Reporting Procedures and the Offshore Sector Reporting Procedures of this Users Manual.

C. In addition to monitoring the VTS dedicated frequency for the sector in which the vessel is operating, vessels that are required to participate in the Vessel Traffic Service must maintain a listening watch on channel 13. A listening watch on channel 16 is not required on vessels subject to the Vessel Bridge-to-Bridge Radiotelephone Act and participating in a Vessel Traffic Service system when the watch is maintained on both the vessel bridge-to-bridge frequency and a designated VTS frequency.

D. Nothing in these procedures contravenes or modifies the Vessel Bridge-to-Bridge Radiotelephone Regulations.

E. The Inshore Sector consists of the waters of the San Francisco Offshore Precautionary Area eastward to San Francisco Bay and its tributaries extending inland to the ports of Stockton, Sacramento, and Redwood City. Participation procedures for vessels in the Inshore Area are as follows.

1. Sailing Plan. A vessel shall provide a sailing plan to the VTS on channel 14 VHF-FM 15 minutes prior to getting underway from a berth or anchorage in the Inshore Sector. The Sailing Plan should contain the following information.

a. For power-driven vessels 40+ Meters (approx 131 ft) in length or when operating instructions require participation:

* Pilot
* Vessel name
* Position
* Destination
* Route (see pg 5)
* Draft
* Tug frequency

b. For a towing vessel 8 meters (approx 26 ft) or more in length if towing astern, towing alongside, or pushing ahead:

* Vessel name
* Position
* Destination
* Route (see pg 5)
* Towing astern or Pushing ahead
* Empty or Loaded, (barge type)
* Tug frequency

c. For a vessel certificated to carry 50 or more passengers for hire, engaged in trade report: (Call 5 minutes before entering the VTS area):

* Vessel name
* Position

* Destination
* Route

The passenger vessel may also request or decline a traffic report. If a request or decline of the report is not stated the VTS controller will provide a traffic report.
d. For a Marine Event comprised of committee boat, race deck, or an event organizer:
* Committee boat name
* Event name & permit number
* Number & type of vessels
* Event location
* Start & stop time
* Radio guard channel
2. Position Reports shall be made:
* Once a vessel is actually underway or upon entry into a VTS area;
* When passing a reporting point;
* After pilot change, departure of pilot, or other change in person directing the movement of the vessel.
* Ferry and tour boats please call at least every 30 minutes.
3. Sailing Plan Deviation Report. A vessel must report:
* When ETA to a destination varies significantly from a previously reported ETA;
* Any emergency situation, as soon as practicable;
* Any hazard to navigation (see 33 CFRß161.12(c));
* Any intention to deviate from a VTS measure (see 33 CFR ß161.1 1) or regulated navigational area (see 33 CFR ß165.1114[6]); or
* Any significant deviation from previously reported information.
4. Final Report. Upon docking, anchoring, mooring or departing the VTS Area, report the place to the VTC.

Inshore Sector Reporting Points
Reporting points are locations where VMRS Users are directed to contact VTS. Additional reporting points may be required due to vessel impairments, meteorological conditions, or if VTS radar is inoperative.
* Pilot Area/Point of Entry into VTS Area
* San Mateo Bridge
* Redwood Creek Entrance Light 2
* Dumbarton Bridge
* Richmond-San Rafael Bridge
* 'E' Buoy San Pablo Strait Channel
* Petaluma Channel Daybeacons 1 and 2
* Petaluma Channel Daybeacon 19
* Mare Island Strait Light 1 (when Inbound/Outbound Mare Island Strait)
* Mare Island Causeway Bridge

* Carquinez Bridge
* Southern Pacific Railroad Bridge
* Naval Weapons Station Concord (Port Chicago)
* New York Point
* Antioch Bridge
* Prisoners Point
* Rio Vista Bridge
* Sacramento Deep Water Channel light 51 & light 65
* At destination or upon departing the VTS Area.

Providing Route Intentions

A. All vessels shall be aware of and follow the San Francisco Bay traffic routing system. This system consists of a Traffic Separation Scheme (TSS) offshore and Regulated Navigational Areas (RNAs) in the Inshore Sector (see pages 7 & 8). Any decision to deviate from the TSS or RNA must be made by the master or person in charge of the vessel. You shall notify the VTS prior to deviating from the TSS or RNA. Excursion boats, ferries, and tour boats should comply with the traffic lanes as closely as their routes allow.

1. The traffic lanes radiating seaward from the offshore precautionary area centered on the San Francisco Sea Buoy constitute a Traffic Separation Scheme (TSS) adopted by the International Maritime Organization (IMO). COLREGS Rule 10 applies to vessels in or near this TSS.
2. The geographical constraints of San Francisco Bay make implementation of a TSS impractical and unnecessarily restrictive on recreational and harbor tour boats. Instead, traffic flow within the Bay is guided by a series of RNAs.

B. Participants unable to follow the traffic lanes or procedures due to an emergency should maneuver as required to minimize the emergency and notify the VTS as soon as possible.

C. The recreational boating public have a legitimate expectation that ships will adhere to the traffic routing system. Therefore, particularly in central San Francisco Bay (where many boats are often present), the hazards of deviating from the routing system are very pronounced. VTS will recommend adherence to the RNAs whenever a proposal to deviate from the RNAs is based only on convenience. When a deviation does occur, VTS may make a safety broadcast on channels 14 and 16 VHF-FM to warn the boating public.

D. Charted recreation areas within the VTS Area shall be avoided by commercial vessels.

Vessels are required to file a Sailing Plan in accordance with 33 CFR ß161.19. Included in the Sailing Plan is the intended route. In the San

Francisco VTS area there are often several traffic lane or bridge span choices along a route to a given destination. Therefore, it is often difficult to specify an exact route upon initial check-in. Vessels required to use the traffic lanes shall normally provide traffic lane or bridge span intentions along the route as follows.

Offshore Traffic Separation Scheme

Provide intentions when outbound prior to passing Point Bonita. The usual outbound options are (see figure 6, pg 9):

* The Northern Traffic Lane,
* Western Traffic Lane,
* Southern Traffic Lane, or
* Bonita Channel.

Central Bay Traffic Lanes

There are three lane options: The Deep Water Traffic Lane; Westbound Lane (south of Harding rock); Eastbound Lane (or south of Alcatraz). Provide intentions when approaching these lanes prior to passing the following points: Golden Gate Bridge, Point Blunt, or Blossom Rock buoy.

Oakland Bay Bridge
(West of Yerba Buena Island)

When approaching from the North, provide bridge span intentions prior to passing Blossom Rock buoy. When approaching from the south, provide span intentions prior to entering the precautionary area.

There are situations when a vessel will require more time to determine the best lane or span selection due to other vessels navigating in the area. In these cases, the vessel shall state that more time is required and then, as soon as practicable, provide intentions.

Regulated Navigation Areas

The Coast Guard has established Regulated Navigation Areas (RNAs) within the San Francisco Bay Region to reduce vessel congestion where maneuvering room is limited. These RNAs increase navigational safety by organizing traffic flow patterns; reducing meeting, crossing, and overtaking situations between large vessels in constricted channels; and limiting vessel speed.

The RNAs generally apply to LARGE VESSELS (i.e. power-driven vessels of 1600 or more gross tons, or tugs with a tow of 1600 or more gross tons). When navigating within the RNAs, LARGE VESSELS shall:

* Not exceed a speed of 15 knots through the water;
* Have engine(s) ready for immediate maneuver and operate engine(s) in a control mode and on fuel that allows for an immediate response to any engine order.

All vessels operating within these RNA's are reminded of their

responsibility to comply with Rule 9 of the Inland Navigation Rules.

San Francisco Bay RNA
LARGE VESSELS shall use the indicated direction of travel within a given lane. Eastbound travel is permitted in the Eastbound Lane (EL), westbound travel is permitted in the Westbound Lane (WL), and east or westbound travel is permitted in the Deep Water (two-way) Traffic Lane (DWTL).
LARGE VESSELS shall use the DWTL if eastbound with a draft of 45 feet or greater or westbound with a draft of 28 feet or greater.
A LARGE VESSEL shall not meet, cross, or overtake another LARGE VESSEL within the DWTL when either vessel is a tank vessel in ballast, carrying certain dangerous cargoes, or bulk petroleum products (see 33 CFR ß160.203).
Southampton Shoal/Richmond Harbor RNA
A LARGE VESSEL shall not meet, cross, or overtake another LARGE VESSEL within this RNA.
Oakland Harbor RNA
A LARGE VESSEL shall not meet, cross, or overtake another LARGE VESSEL within this RNA.
Pinole Shoal Channel RNA

The Pinole Shoal Channel RNA is reserved for navigation of vessels with a draft greater than 20 feet or tugs with tows drawing more than 20 feet. Vessels drawing less than 20 feet are not permitted within this RNA. A LARGE VESSEL shall not enter Pinole Shoal Channel RNA, if such entry would result in meeting, crossing, or overtaking another LARGE VESSEL, when either vessel is a tank vessel in ballast, carrying certain dangerous cargoes, or bulk petroleum products.
Southern Pacific Railroad Bridge RNA
(This RNA applies during periods of reduced visibility)

Eastbound
Eastbound LARGE VESSELS shall not transit through this RNA when visibility is less than 1,000 yards.
Westbound
Westbound LARGE VESSELS shall check visibility conditions within the RNA immediately prior to passing New York Point, and not proceed past Mallard Island until visibility improves to greater than 1,000 yards within the RNA. If the visibility drops below 1,000 yards during the transit, the vessel may proceed but must obtain permission to deviate from this RNA. Visibility is considered to be 1,000 yards or greater

when both the Port of Benicia Pier and the Shell Martinez Pier can be seen from the Southern Pacific Railroad Bridge.

OFFSHORE SECTOR PROCEDURES

The Offshore Sector area is formally defined as the ocean waters within a 38 nautical-mile radius of Mount Tamalpais (which is at 37deg 55.8min N 122deg 34.6min W) excluding the San Francisco Offshore Precautionary Area. (The San Francisco Offshore Precautionary Area is the area within a six-mile radius of the San Francisco Sea Buoy [SFSB].)

This translates roughly to an arc crossing the shoreline near Bodega Head, crossing Cordell Bank, then curving southward to pass about 30 nautical miles west of the San Francisco Sea Buoy, and curving eastward to cross the shoreline near Pescadero Point. This arc is shown on charts 18640 and 18680.

The shoreward boundary of the Offshore Sector is a line from Duxbury Point 180 degrees to the boundary of the San Francisco Offshore Precautionary Area, then following the boundary of the Precautionary Area past the "N," "W" and "S" buoys, and then from the boundary of the San Francisco Offshore Precautionary Area 090 degrees to Mussel Rock.

When your vessel is inbound, 15 minutes from the outermost reporting point (sector boundary) on your route, call VTS on channel 12 and report your sailing plan.

Sailing Plan

Give the following information in your sailing plan.

* Vessel name
* Vessel type
* Position (bearing and range from the SFSB)
* Vessel's course and speed
* ETA (estimated time of arrival) at next reporting point.
* ETA at the SFSB (if you are inbound), or at the outermost reporting point on your route (if you are outbound or if you are transiting across the Offshore Sector [see next page]).

Sailing Plan Amplification Reports

When your vessel is at the next reporting point, call VTS. Give the following information.

* Vessel name and position (that is, the Offshore reporting point you are passing)
* Vessel's course and speed
* ETA at the SFSB (if you are inbound) or at the outermost reporting point (if you are outbound).

Position Report

Inbound. When your vessel is at the "N," "W," or "S" buoy or abeam Duxbury Reef, call VTS on channel 12 and report: vessel name and

position.
Outbound. When your vessel is at the outermost reporting point on your route, call VTS on channel 12 and report: vessel name and position.
Other Reports
If your vessel is conducting research, engaged in naval exercises, or doing other special operations in the Offshore Sector, you should report your Sailing Plan to VTS and include the nature of your operation. If you have an emergency on board your vessel or if you become aware of an emergency involving another vessel, report it to VTS.
When you are engaged in fishing you may report this fact to VTS. However, you are not required to do so unless your vessel fits into one of the categories described in 33 CFR ß161.2.
Transiting Across the Offshore Sector
When you are transiting across the Offshore Sector and will not enter the San Francisco Offshore Precautionary Area, call VTS on channel 12 and report your Sailing Plan when you reach the first Offshore sector reporting point on your route.

Offshore Vessel Traffic Advisories
VTS broadcasts the positions, courses, speeds, and estimated times of passing reporting points of all VTS Users who have reported to VTS in the Offshore Sector. VTS makes these advisories at minute 15 and minute 45 each hour. VTS strongly recommends that vessels in the area of the Offshore Sector listen to these broadcasts.
OFFSHORE Reporting Points
North
* Bodega Head or Cordell Bank;
* Point Reyes (or entering the Traffic Separation Scheme);
* "N" Buoy or Duxbury Reef Buoy.
West
* Approximately 30 nautical miles west of the SFSB or at longitude 123' 20'W;
* Southeast Farallon Island (entering the TSS);
* "W" Buoy.
South
* Pescadero Point or approximately 30 nautical miles from the SFSB or at latitude 37deg 15min N;
* Pillar Point (entering the TSS);
* "S" Buoy.
NOTE: When you are between the West and South areas, consider the outer limit of the Offshore Sector to be when your vessel is 30 nautical miles from the SFSB.

CAPTAIN OF THE PORT ADVISORIES
Enforcement of Navigation Rules in San Francisco Bay

This advisory provides a listing of the major deep draft channels in San Francisco Bay and adjacent waters which the Captain of the Port considers to be "narrow channels or fairways" within the meaning of the International and Inland Rules of the Road.

Rule 9, in both the International and Inland Rules of the Road, provides requirements for vessels navigating in the vicinity of narrow channels or fairways. Vessels and powerboats less than 20 meters (approximately 65 feet), all sailboats, and vessels engaged in fishing shall not impede the passage of a vessel that can safely navigate only within a narrow channel or fairway. Additionally, a vessel shall not cross a narrow channel or fairway if such crossing impedes the passage of a vessel which can safely navigate only within that channel or fairway. The term "shall not impede" means a small craft must keep well clear and not hinder or interfere with the transit of larger vessels. Small craft and fishing vessels shall not anchor or fish in narrow channels if large vessels or barges being towed are transiting.

Coast Guard enforcement efforts, combined with a public education and information program, are further intended to draw public attention to the serious hazards created when large vessels are impeded by smaller vessels. This effort should result in an improved level of navigational safety and reduce the risk of collisions, groundings and their potential consequences.

The Captain of the Port considers the following areas to be "narrow channels or fairways" for the purpose of enforcing the International and Inland Rules of the Road. This list is not all-inclusive, but identifies areas where deep draft commercial and public vessels routinely operate. Included in this list and marked by an asterisk (*) are the Regulated Navigation Areas (RNAs) in San Francisco Bay which were recently designated in amendments to 33 CFR 162 and 165.

a. All traffic lanes and precautionary areas in the San Francisco Bay eastward of the San Francisco Approach Lighted Horn Buoy SF (LLNR 360) to the San Francisco - Oakland Bay Bridge and the Richmond - San Rafael Bridge, to include:

* *1. Golden Gate Traffic Lanes, which include the Westbound and Eastbound Lanes west of the Golden Gate Precautionary Area.
* *2. Golden Gate Precautionary Area.
* *3. Central Bay Traffic Lanes, which include the Deep Water Traffic Lane, the Eastbound Lane (south of Alcatraz Island), and the Westbound Lane (south of Harding Rock).
* *4. Central Bay Precautionary Area.
* *5. North Ship Channel, between North Channel Lighted Buoy "A" and the Richmond - San Rafael Bridge.
* *6. Southampton Shoal Channel, including the Richmond Long Wharf maneuvering area.
* *7. Richmond Harbor Entrance Channel and the Point Potrero Reach,

ending at Point Potrero Turn and including the Turning Basin at Point Richmond.
* 8. Point Potrero Turn.
* 9. Richmond Harbor Channel in its entirety.
* 10. Santa Fe Channel in its entirety.
* *b. Oakland Harbor Bar Channel including the Outer Harbor Entrance Channel and the Inner Harbor Entrance Channel.
c. Oakland Outer Harbor.
d. Oakland Inner Harbor from Inner Harbor Channel Light "5" (LLNR 4670) to, and including, the Brooklyn Basin South Channel.
e. Alameda Naval Air Station Channel in its entirety.
f. South San Francisco Bay Channels between the Central Bay Precautionary Area and Redwood Creek Entrance Light "2" (LLNR 5180).
g. Redwood Creek between Redwood Creek Entrance Light "2" (LLNR 5180) and Redwood Creek Daybeacon "21" (LLNR 5265).
*h. San Pablo Straight Channel from the Richmond-San Rafael Bridge to San Pablo Bay Channel Light "7" (LLNR 5900).
*i. Pinole Shoal Channel in San Pablo Bay between San Pablo Bay Channel Light "7" (LLNR 5900) and San Pablo Bay Channel Light "14" (LLNR 5935).
j. Carquinez Strait between San Pablo Bay Channel Light "14" (LLNR 5935) and the Benicia-Martinez Highway Bridge.
k. Mare Island Strait between Mare Island Strait Light "2" (LLNR 6095) and Mare Island Causeway Bridge.
l. Suisun Bay Channels between the Benicia-Martinez Highway Bridge and Suisun Bay Light "34" (LLNR 6655).
m. New York Slough between Suisun Bay Light "30" (LLNR 6585) and San Joaquin River Light "2" (LLNR 6670).
n. Sacramento River Deep Water Ship Channel from Suisun Bay Light "34" (LLNR 6655) to the Port of Sacramento.
o. San Joaquin River from San Joaquin River Light "2" (LLNR 6670) to the port of Stockton.
Rules of the Road Enforcement: Timely reporting and enforcement of Rules of the Road infractions promotes safer navigation. Vessel masters, pilots and operators are encouraged to report incidents which merit investigation. Reports will be fully investigated and may result in license suspension or revocation proceedings or the assessment of civil penalties.

Pollution Prevention Regulations
This notice further clarifies the requirements under the Pollution Prevention Regulations of Title 33 Code of Federal Regulations Parts 154, 155, 156 and the Oil Pollution Act of 1990 (OPA-90) for vessels operating in the COTP San Francisco Bay Zone.
The Pollution Prevention Regulations contained in 33 CFR parts 154, 155, 156 and OPA 90 apply to facilities and vessels that conduct bulk oil or

hazardous material transfers. Sections of 33 CFR give the Captain of the Port discretionary authority to impose additional requirements. Also, OPA 90 has instituted new regulations concerning the interpretations and requirements for the Captain of the Port San Francisco Zone. The Captain of the Port convened a working group to discuss the best implementation means of 33 CFR concerning bulk oil transfer operations. This COTP Notice is a summation of results from this working group. Questions or concerns relating to this notice may be addressed to the Captain of the Port in writing or directly through the Port Operations Department at (510) 437-3073.

a. ADVANCE NOTICE OF OIL AND HAZARDOUS MATERIAL TRANSFER [33 CFR 156.118]

The COTP San Francisco requires at least four hours notice prior to the time the barge or truck delivering the product to be transferred arrives at the transfer site. This applies to any mobile facility transfer (between tank truck and vessels) and any lightering or bunkering (vessel to vessel transfer). This four hour advance notice shall include: the time of the transfer, the duration and location of the transfer, the amount and type of product to be transferred. If the time of transfer changes by one hour or more, or if the transfer is canceled, the person in charge of the truck/vessel from which the product is being transferred shall immediately notify the COTP. Notification may be made either by phoning the 24-hour duty desk at (510) 437-3073 or by faxing the information to (510) 437-3072.

The COTP recognizes that at certain times transfers may need to be conducted prior to the necessary 4 hour advance notice. For these "emergency" type situations contact the Port Operations Office and request permission to conduct the transfer. Exceptions will be made on a case-by-case basis.

b. "LOADING OVER THE TOP" [33 CFR 156.120(g)]

Occasionally, vessels transfer cargo oil into deep tanks or remove settled petroleum products from contaminated cargo tanks through an open hatch. Due to the static electricity combustion hazards and the amount of hazardous fumes generated by free-falling petroleum products, vessels that regularly conduct these types of transfers shall comply with the fixed connection requirements of 33 CFR 156.120 (g). For those unusual situations where a vessel cannot comply with the fixed connection requirements of 33 CFR 156.120(g), the COTP may grant an alternative under 33 CFR 156.107 to allow the use of a "portable transfer system". The vessel operator must notify the COTP at least 24 hours in advance of the scheduled transfer. Alternative for portable transfer systems will only be granted for the transfer of Grade D and E cargoes.

The "portable transfer system" should consist of the following:

1. Hose piping which meets the requirements of 33 CFR 154.500 or portable piping which meets the requirements of 46 CFR 56.

2. Connections which meet the requirements of 33 CFR 156.130.
3. A closure, such as a manhole cover, Butterworth plate, flange, or deepwell pump stack that forms a vapor tight seal over the opening in the tank top through which the cargo is transferred. This closure shall be bolted in place and the hose and drop line should be connected to it.

4. A metallic drop line that must be not higher above the bottom of the cargo tank or sump than 10 cm (approx. 4 in.) or the radius of the filling line, whichever is greater (not necessary for Grade E, edible vegetable or animal oils).
5. Portable containment with * barrel capacity at every connection on the weather deck or ashore.
6. A shut off at or near the point of entry into the tank.

Do not commence the transfer until a representative of the COTP examines the transfer arrangement and determines that adequate containment measures, which could include booming the vessel, have been undertaken.

c. PLUGGING DRAINS AND SCUPPERS PRIOR TO TRANSFER [33 CFR 156.120 (o)]

Part 156.120(o) requires tank vessels and barges to close all scuppers and drains within the containment by suitable mechanical means prior to any transfer operations. Wooden or other like plugs may be used provided cement is applied uniformly around the plug in such a manner that spilled oil will not leak through. Do not use rags or other easily permeated materials.

d. PERSON-IN-CHARGE OF TRANSFER OPERATION [33 CFR 155.700, 155.710, 156.120(t)(1)]

Regulations require that the Person-in-Charge (PIC) of an oil or HAZMAT transfer be present at the site of transfer and immediately available to the transfer personnel during all evolutions.

"Present at the Site" is defined as the PIC being (1) within line of sight of the actual transfer operation; and (2) be in constant communication with the vessel PIC.

Tankermen may:

(1) conduct brief business in the barge / vessel house such as short log entries, recording ullages, etc., but not preventive maintenance, receipt writing, or any activities that will keep the PIC from continuously monitoring the operation.
(2) make brief rounds of the vessel's engine-room if on a tank barge.

When Coast Guard Boarding Officers board a barge and do not see persons on deck they will wait for three (3) minutes. If the PIC is not seen within that timeframe the PIC will be deemed not present at the site of the transfer operation. In such a case, the operation may be shutdown or a Report of Violation may be processed. The PIC must be on-deck and fully aware of all aspects of the transfer operation from start to finish.

OPA-90 requires a Qualified Individual be designated for every vessel

which carries oil as cargo. The PIC may be the Qualified Individual (Ql) but if the PIC and Ql are not one and the same, only the PIC is required to be at the site of the transfer operation.

e. BUNKERING OF VESSELS AT ANCHORAGE

Bunkering of vessels at anchorage within the Bay, will only be conducted in Anchorage Nine. Numerous environmentally sensitive areas in San Francisco Bay, necessitates that bunkering be conducted in an area that affords the best opportunity for containment, and the recovery of oil released into the water.

f. LIGHTERING ZONES AND ADVANCE NOTICE OF LIGHTERING [33 CFR 156.215 AND OPA-90]

Part 156.215 requires the master, owner or agent of the vessel to be lightered to give at least 24 hours notice to the COTP prior to arrival in the lightering zone. The notice must include:

1. The vessel's name, call sign or official number and registry;
2. The cargo type (if oil) or shipping name (if hazardous material) and the approximate amount on board;
3. The number of transfers expected;
4. The lightering location to be used;
5. The estimated time of arrival in the lightering location;
6. The estimated duration of transfer operations;
7. The name and destination of service vessel(s) ; and
8. The name and phone number of the Qualified Individual.

Due to the numerous environmentally sensitive areas within the Bay, lightering will only be allowed in Anchorage Nine. Lightering in other Anchorages will be considered on a case by case basis. Each case requested must be submitted to the Captain of the Port in writing, no later than 24 hours prior to the estimated start time.

If a barge needs to conduct an "immediate" lightering because of unforeseen reasons (change in schedule, etc.) the barge operator should contact the Chief, Port Operations and request permission to conduct the lightering. Approval will be granted on a case-by-case basis.

g. THE DECLARATION OF INSPECTION [33 CFR 156.120 and 156.150]

If it is impracticable to inspect equipment on another PIC's vessel, each PIC shall verbally discuss each item on the DOI. The intent of the double signature on a DOI is that each party has, at the very least, discussed and confirmed that all the requirements on the DOI have been met.

If an item cannot reasonably be inspected by the barge PIC, a mark of N/A should be placed vice a signature on a DOI form which includes two columns (one for the deliverer and one for the receiver). If the DOI is a form which requires only check marks in appropriate boxes and a signature of both PICs at the bottom, both PICs should sign and not use "N/A".

4. Summary: Compliance with the Pollution Prevention Regulations

contained in 33 CFR 154, 155, 156, OPA-90 and this COTP Public Advisory should reduce the possibilities of a pollution incident and decrease the potential damage to the environment should one occur.

Anchorages

A. VTS San Francisco administers the anchorages in the VTS area for the COTP. Anchorage regulations for the service area are found in Title 33 CFR ß110.224. These regulations describe the boundaries of designated anchorage areas, impose certain restrictions on anchoring, and require various reports from vessels anchoring both in and outside of the designated anchorages. Vessels which have notified the VTC of their actions will be considered in compliance with the reporting requirements of 33 CFR ß110.224.

B. VTS administration of the anchorages includes ensuring proper separation of anchored vessels to prevent their swinging or dragging into each other. The COTP has established a mandatory separation of 750 yards around anchored vessels over 300 gross tons. Vessels anchoring within 750 yards, or which "settle out" within 750 yards of another vessel will be directed by the VTS to re-anchor at a greater distance. The vessel which was the last to arrive will normally be the one required to move.

C. A vessel anchoring outside an established anchorage area for reason of imminent peril or heavy fog should be positioned outside the vessel traffic lanes or ship channel insofar as practicable. If necessary to anchor within a traffic lane or channel, the vessel should be positioned as near the edge of the lane or channel as practicable. Vessels anchoring outside of established anchorages should notify the VTC as soon as possible.

D. When the wind is above 25 knots all vessels over 300 gross tons anchored in San Francisco Bay must maintain a continuous radiotelephone watch on VHF-FM ch. 13 and ch. 14.

E. Vessels anchoring in any anchorage are required to reserve the deeper portions of the anchorage for vessels of deeper draft. This becomes particularly important in Anchorage 9 since tankers with drafts up to 50 feet often anchor there to conduct lightering. Therefore, the VTC advises vessels anchoring in Anchorage 9 to anchor as far east or south as safety will allow. This will ensure that the deeper western side of the anchorage will be available for those deep draft vessels needing it. Shallow-draft vessels may be required to move if the area in which they are anchored is needed by a vessel of deeper draft.

Federal Regulations

DEPARTMENT OF
TRANSPORTATION
Coast Guard 33CFR Parts 1, 26, 160, 161, 162, 164, and 165

Portions omitted are not applicable to VTS San Francisco

PART 1 - GENERAL PROVISIONS

ß1.01-30 Captains of the Port. * * * * *

(a) Captains of the Port and their representatives enforce within their respective areas port safety and security and marine environmental protection regulations, including, without limitation, regulations for the protection and security of vessels, harbor, and waterfront facilities; anchorages; security of vessels; waterfront facilities; security zones; safety zones; regulated navigation areas; deepwater ports; water pollution, and ports and waterways safety.

(b) Subject to the supervision of the cognizant Captain of the Port and District Commander, Commanding Officers, Vessel Traffic Services, are delegated authority under the Ports and Waterways Safety Act to discharge the duties of the Captain of the Port that involve directing the operation, movement, and anchoring of vessels within a Vessel Traffic Service area, including management of vessel traffic within anchorages, regulated navigation areas and safety zones, and to enforce Vessel Traffic Service and ports and waterways safety regulations. This authority may be redelegated.

(c) Under authority conferred by 14 U.S.C. 89, any commissioned, warrant or petty officer of the United States Coast Guard may assist in discharging the duties of the captain of the port in any port or adjacent navigable waters of the United States. They will do so under the supervision of the cognizant captain of the port, or representative of the captain of the port, if there be one for the locality involved.

PART 26 - VESSEL BRIDGE-to-BRIDGE RADIOTELEPHONE REGULATIONS

ß26.01 Purpose

(a) The purpose of this part is to implement the provisions of the Vessel Bridge-to-Bridge Radio Telephone Act. This part:

(1) requires the use of the vessel bridge-to-bridge radiotelephone;

(2) provides the Coast Guard's interpretation of the meaning of important terms in the ACT;

(3) Prescribes the procedures for applying for an exemption from the Act and the regulations issued under the Act and a listing of exemptions .

(b) Nothing in this part relieves any person from the obligation of complying with the Rules of the Road and the applicable pilot rules.

ß26.02 Definitions.

For the purposes of this part and interpreting the Act:

Secretary means the Secretary of the Department in which the Coast Guard is operating;

Act means the "Vessel Bridge-to-Bridge Radiotelephone Act", 33 U.S.C. sections 1201-1208;

Length is measured from end to end over the deck excluding sheer;

Power-driven vessel means any vessel propelled by machinery;

Towing vessel means any commercial vessel engaged in towing another

vessel astern, alongside, or by pushing ahead;
Vessel Traffic Services (VTS) means a service implemented under Part 161 of this chapter by the United States Coast Guard designed to improve the safety and efficiency of vessel traffic and to protect the environment. The VTS has the capability to interact with marine traffic and respond to traffic situations developing in the VTS area.
Vessel Traffic Service Area or VTS Area means the geographical area encompassing a specific VTS area of service as described in Part 161 of this chapter. This area of service may be subdivided into sectors for the purpose of allocating responsibility to individual Vessel Traffic Centers or to identify different operating requirements.
NOTE: Although regulatory jurisdiction is limited to the navigable waters of the United States, certain vessels will be encouraged or may be required, as a condition of port entry, to report beyond this area to facilitate traffic management within the VTS area.
ß26.03 Radiotelephone required. * * * * *
(a) Unless an exemption is granted under 26.09 and except as provided in paragraph (a) (4) of this section, this part applies to:
(1) Every power-driven vessel of 20 meters or over in length while navigating;
(2) Every vessel of 100 gross tons and upward carrying one or more passengers for hire while navigating;
(3) Every towing vessel of 26 feet or over in length while navigating; and
(4) Every dredge and floating plant engaged in or near a channel or fairway in operations likely to restrict or affect navigation of other vessels except for an unmanned or intermittently manned floating plant under the control of the dredge.
(b) Every vessel, dredge, or floating plant described in paragraph (a) of this section must have a radiotelephone on board capable of operation from its navigational bridge, or in the case of a dredge, from its main control station, and capable of transmitting and receiving on the frequency or frequencies within the 156-162 megahertz band using the classes of emissions designated by the Federal Communications Commission for the exchange of navigation information.
(c) The radiotelephone required by paragraph (b) of this section must be carried on board the described vessels, dredges, and floating plants upon the navigable waters of the United States.
(d) The radiotelephone required by paragraph (b) of this section must be capable of transmitting and receiving on VHF-FM channel 22A (157.1 MHz).

(e)**********
(f) In addition to the radiotelephone required by paragraph (b) of this section, each vessel described in paragraph (a) of this section while transiting any waters within a Vessel Traffic Service Area, must have on

board a radiotelephone capable of transmitting and receiving on the VTS designated frequency in Table 26.03(f) (VTS Call Signs, Designated Frequencies, and Monitoring Areas).
NOTE: A single VHF-FM radio capable of scanning or sequential monitoring (often referred to as "dual watch" capability) will not meet the requirements for two radios.

Table 26.03(f) - Vessel Traffic Service (VTS) Call Signs, Designated Frequencies, and Monitoring Areas
Vessel Traffic Service (VTS) Call Sign: San Francisco Traffic
Designated Frequencies: Monitoring Area for each frequency
156.600 MHz (Ch. 12) Offshore Sector: The offshore waters within a 38 nautical mile radius from Mount Tamalpais (37deg 55.8min N, 122deg 34.6min W) excluding the San Francisco Offshore Precautionary Area.
156.700 MHz (Ch. 14) Inshore Sector: The waters of the San Francisco Offshore Precautionary Area eastward to San Francisco Bay including its tributaries extending to the ports of Stockton, Sacramento and Redwood City.
Note: (1) In the event of a communications failure either by the vessel traffic center or the vessel or radio congestion on a designated VTS frequency communications may be established on an alternative VTS frequency. The bridge-to-bridge navigational frequency, 156.650 MHz (Channel 13), is monitored in each VTS area; and it may be used as an alternate frequency, however, only to the extent that doing so provides a level of safety beyond that provided by other means.
(2) Designated frequency monitoring is required within U.S. navigable waters. In areas which are outside the U.S. navigable waters, designated frequency monitoring is voluntary. However, prospective VTS Users are encouraged to monitor the designated frequency.

ß26.04 Use of the designated frequency
(a) No person may use the frequency designated by the Federal Communications Commission under section 8 of the Act, 33 USC 1207 (a), to transmit any information other than information necessary for the safe navigation of vessels or necessary tests.
(b) Each person who is required to maintain a listening watch under section 5 of this Act shall, when necessary, transmit and confirm, on the designated frequency, the intentions of this vessel and other information necessary for the safe navigation of vessels.
(c) Nothing in these regulations may be construed as prohibiting the use of the designated frequency to communicate with shore stations to obtain or furnish information necessary for the safe navigation of vessels.
(d) On the navigable waters of the United States, channel 13 (156.65 MHz) is the designated frequency required to be monitored in accordance with ß26.05.

(e) On those navigable waters of the United States within a VTS area, the designated VTS frequency is an additional designated frequency required to be monitored in accordance with ß26.05.

NOTE: As stated in 47 CFR 80.148(b), a VHF watch on Channel 16 (156.800 MHz) is not required on vessels subject to the Vessel Bridge-to-Bridge Radiotelephone Act and participating in a Vessel Traffic Service (VTS) system when the watch is maintained on both the vessel bridge-to-bridge frequency and a designated VTS frequency.

ß26.05 Use of radiotelephone

Section 5 of the Act states:

(a) The radiotelephone required by this Act is for the exclusive use of the master or person in charge of the vessel, or the person designated by the master or person in charge to pilot or direct the movement of the vessel, who shall maintain a listening watch on the designated frequency. Nothing contained herein shall be interpreted as precluding the use of portable radiotelephone equipment to satisfy the requirements of the act.

ß26.06 Maintenance of radiotelephone; failure of radiotelephone

Section 6 of the Act states:

(a) Whenever radiotelephone capability is required by this Act, a vessel's radiotelephone equipment shall be maintained in effective operating condition. If the radiotelephone equipment carried aboard a vessel ceases to operate the master shall exercise due diligence to restore it or cause it to be restored to effective operating condition at the earliest practicable time. The failure of a vessel's radiotelephone equipment shall not, in itself, constitute a violation of this Act, nor shall it obligate the master of any vessel to moor or anchor his vessel; however, the loss of radiotelephone capability shall be given consideration in the navigation of the vessel.

ß26.07 Communications.

No person may use the services of, and no person may serve as, a person required to maintain a listening watch under section 5 of the Act, 33 U.S.C. 1204, unless the person can communicate in the English language.

ß26.08 Exemption procedures

(a) Any person may petition for an exemption from any provision of the Act or this part;

(b) Each petition must be submitted in writing to U.S. Coast Guard, Office of Navigation Safety and Waterway Services, 2100 Second Street SW, Washington, DC 20593-0001, and must state;

(1) The provisions of the Act or this part from which an exemption is requested; and

(2) The reasons why marine navigation will not be adversely affected if the exemption is granted and if the exemption relates to a local communications system how that system would fully comply with the intent of the concept of the Act but would not conform in detail if the

exemption is granted.
ß26.09 List of exemptions.
****
ß26.10 Penalties
Section 9 of the Act states:
(a) Whoever, being the master or person in charge of a vessel subject to the Act, fails to enforce or comply with the Act or the regulation hereunder; or whoever, being designated by the master or person in charge of a vessel subject to the Act to pilot or direct the movement of a vessel fails to enforce or comply with the Act or the regulation s hereunder - is liable to a civil penalty of not more than $500 to be assessed by the Secretary.
(b) Every vessel navigated in violation of the Act or the regulations hereunder is liable to a civil penalty of not more then $500 to be assessed by the Secretary, for which the vessel may be proceeded against in any District Court of the United States having jurisdiction;.
(c) Any penalty assessed under this section may be remitted or mitigated by the Secretary, upon such terms as he may deem proper.
PART 160 - PORTS AND WATERWAYS SAFETY: GENERAL
ß160.3 Definitions.
For the purposes of this subchapter:
Bulk means material in any quantity that is shipped, stored, or handled without the benefit of package, label, mark or count and carried in integral or fixed independent tanks.
Captain of the Port means the Coast Guard officer designated by the Commandant to command a Captain of the Port Zone as described in part 3 of this chapter.
Commandant means the Commandant of the United States Coast Guard.
Commanding Officer, Vessel Traffic Services means the Coast Guard officer designated by the Commandant to command a Vessel Traffic Service (VTS) as described in part 161 of this chapter.
Deviation means any departure from any rule in this subchapter.
District Commander means the Coast Guard officer designated by the Commandant to command a Coast Guard District as described in part 3 of this chapter.
ETA means estimated time of arrival.
Length of Tow means, when towing with a hawser, the length in feet from the stern of the towing vessel to the stern of the last vessel in tow.
When pushing ahead or towing alongside, length of tow means the tandem length in feet of the vessels in tow excluding the length of the towing vessel.
Person means an individual, firm, corporation, association, partnership, or governmental entity.
State means each of the several States of the United States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American

Samoa, the United States Virgin Islands, the Trust Territories of the Pacific Islands, the Commonwealth of the Northern Marianas Islands, and any other commonwealth, territory, or possession of the United States.
Tanker means a self-propelled tank vessel constructed or adapted primarily to carry oil or hazardous materials in bulk in the cargo spaces.
Tank Vessel means a vessel that is constructed or adapted to carry, or that carries, oil or hazardous material in bulk as cargo or cargo residue.
Vehicle means every type of conveyance capable of being used as a means of transportation on land. Vessel means every description of watercraft or other artificial contrivance used, or capable of being used, as a means of transportation on water.
Vessel Traffic Services (VTS) means a service implemented under Part 161 of this chapter by the United States Coast Guard designed to improve the safety and efficiency of vessel traffic and to protect the environment. The VTS has the capability to interact with marine traffic and respond to traffic situations developing in the VTS area.
Vessel Traffic Service Area or VTS Area means the geographical area encompassing a specific VTS area of service as described in Part 161 of this chapter. This area of service may be subdivided into sectors for the purpose of allocating responsibility to individual Vessel Traffic Centers or to identify different operating requirements.
NOTE: Although regulatory jurisdiction is limited to the navigable waters of the United States, certain vessels will be encouraged or may be required, as a condition of port entry, to report beyond this area to facilitate traffic management within the VTS area.
VTS Special Area means a waterway within a VTS area in which special operating requirements apply.
ß160.5 Delegations.
* * * * *
(d) Subject to the supervision of the cognizant Captain of the Port and District Commander, Commanding Officers, Vessel Traffic Services are delegated authority under 33 CFR 1.01-30 to discharge the duties of the Captain of the Port that involve directing the operation, movement, and anchorage of vessels within a Vessel Traffic Service area including management of vessel traffic within anchorages, regulated navigation areas and safety zones, and to enforce Vessel Traffic Service and ports and waterways safety regulations. This authority may be exercised by Vessel Traffic Center personnel. The Vessel Traffic Center may, within the Vessel Traffic Service area, provide information, make recommendations, or, to a vessel required under Part 161 of this chapter to participate in a Vessel Traffic Service, issue an order, including an order to operate or anchor as directed; require the vessel to comply with orders issued; specify times of entry, movement or departure;

restrict operations as necessary for safe operation under the circumstances; or take other action necessary for control of the vessel and the safety of the port or of the marine environment.

PART 161 - VESSEL TRAFFIC SERVICES GENERAL RULES

ß161.1 Purpose and Intent.

(a) The purpose of this part is to promulgate regulations implementing and enforcing certain sections of the Ports and Waterways Safety Act (PWSA) setting up a national system of Vessel Traffic Services that will enhance navigation, vessel safety, and marine environmental protection, and promote safe vessel movement by reducing the potential for collisions, rammings, and groundings, and the loss of lives and property associated with these incidents within VTS areas established hereunder.

(b) Vessel Traffic Services provide the mariner with information related to the safe navigation of a waterway. This information, coupled with the mariner's compliance with the provisions set forth in this part, enhances the safe routing of vessels through congested waterways or waterways of particular hazard. Under certain circumstances, a VTS may issue directions to control the movement of vessels in order to minimize the risk of collision between vessels, or damage to property or the environment.

(c) The owner, operator, charterer, master, or person directing the movement of a vessel remains at all times responsible for the manner in which the vessel is operated and maneuvered, and is responsible for the safe navigation of the vessel under all circumstances. Compliance with these rules or with a direction of the VTS is at all times contingent upon the exigencies of safe navigation.

(d) Nothing in this part is intended to relieve any vessel, owner, operator, charterer, master, or person directing the movement of a vessel from the consequences of any neglect to comply with this part or any other applicable law or regulation (e.g., the International Regulations for Prevention of Collisions at Sea, 1972 (72 COLREGS) or the Inland Navigation Rules) or of the neglect of any precaution which may be required by the ordinary practice of seamen, or by the special circumstances of the case.

ß161.2 Definitions.

For the purposes of this part:

Cooperative Vessel Traffic Services(CVTS) means the system of vessel traffic management established and jointly operated by the United States and Canada within adjoining waters. In addition, CVTS facilitates traffic movement and anchorages, avoids jurisdictional disputes, and renders assistance in emergencies in adjoining United States and Canadian waters.

Hazardous Vessel Operating Condition means any condition related to a vessel's ability to safely navigate or maneuver, and includes, but is not limited to:

(a) The absence or malfunction of vessel operating equipment, such as propulsion machinery, steering gear, radar system, gyro compass, depth sounding device, automatic radar plotting aid (ARPA), radiotelephone, automated dependent surveillance equipment, navigational lighting, sound signaling devices or similar equipment.
(b) Any condition on board the vessel likely to impair navigation, such as lack of current nautical charts and publications, personnel shortage, or similar condition.
(c) Vessel characteristics that affect or restrict maneuverability, such as cargo arrangement, trim, loaded condition, under keel clearance, speed, or similar characteristics.
Precautionary Area means a routing measure comprising an area within defined limits where vessels must navigate with particular caution and within which the direction of traffic may be recommended.
Towing Vessel means any commercial vessel engaged in towing another vessel astern, alongside, or by pushing ahead.
Vessel Movement Reporting System (VMRS) is a system used to manage and track vessel movements within a VTS area. This is accomplished by a vessel providing information under established procedures as set forth in this part, or as directed by the VTS.
Vessel Movement Reporting System (VMRS) User means a vessel, or an owner, operator, charterer, master, or person directing the movement of a vessel, that is required to participate in a VMRS within a VTS area. VMRS participation is required for:
(a) every power-driven vessel of 40 meters (approximately 131 feet) or more in length, while navigating;
(b) every towing vessel of 8 meters (approximately 26 feet) or more in length, while navigating; or
(c) every vessel certificated to carry 50 or more passengers for hire, when engaged in trade.
Vessel Traffic Center (VTC) means the shorebased facility that operates the vessel traffic service for the Vessel Traffic Service area or sector within such an area.
Vessel Traffic Services (VTS) means a service implemented by the United States Coast Guard designed to improve the safety and efficiency of vessel traffic and to protect the environment. The VTS has the capability to interact with marine traffic and respond to traffic situations developing in the VTS area.
Vessel Traffic Service Area or VTS Area means the geographical area encompassing a specific VTS area of service. This area of service may be subdivided into sectors for the purpose of allocating responsibility to individual Vessel Traffic Centers or to identify different operating requirements.
NOTE: Although regulatory jurisdiction is limited to the navigable waters of the United States, certain vessels will be encouraged or may

be required, as a condition of port entry, to report beyond this area to facilitate traffic management within the VTS area.

VTS Special Area means a waterway within a VTS area in which special operating requirements apply.

VTS User means a vessel, or an owner, operator, charterer, master, or person directing the movement of a vessel, that is:

(a) subject to the Vessel Bridge-to-Bridge Radiotelephone Act; or

(b) required to participate in a VMRS within a VTS area (VMRS User).

VTS User's Manual means the manual established and distributed by the VTS to provide the mariner with a description of the services offered and rules in force for that VTS. Additionally, the manual may include chartlets showing the area and sector boundaries, general navigational information about the area, and procedures, radio frequencies, reporting provisions and other information which may assist the mariner while in the VTS area.

ß161.3 Applicability.

The provisions of this subpart shall apply to each VTS User and may also apply to any vessel while underway or at anchor on the navigable waters of the United States within a VTS area, to the extent the VTS considers necessary.

ß161.4 Requirement to carry the rules.

Each VTS User shall carry on board and maintain for ready reference a copy of these rules.

NOTE: These rules are contained in the applicable U.S. Coast Pilot, the VTS User's Manual which may be obtained by contacting the appropriate VTS, and periodically published in the Local Notice to Mariners. The VTS User's Manual and the World VTS Guide, an International Maritime Organization (IMO) recognized publication, contain additional information which may assist the prudent mariner while in the appropriate VTS area.

ß161.5 Deviations from the rules.

(a) Requests to deviate from any provision in this part, either for an extended period of time or if anticipated before the start of a transit, must be submitted in writing to the appropriate District Commander. Upon receipt of the written request, the District Commander may authorize a deviation if it is determined that such a deviation provides a level of safety equivalent to that provided by the required measure or is a maneuver considered necessary for safe navigation under the circumstances. An application for an authorized deviation must state the need and fully describe the proposed alternative to the required measure.

(b) Requests to deviate from any provision in this part due to circumstances that develop during a transit or immediately proceeding a transit, may be made verbally to the appropriate VTS Commanding Officer. Requests to deviate shall be made as far in advance as practicable. Upon

receipt of the request, the VTS Commanding Officer may authorize a deviation if it is determined that, based on vessel handling characteristics, traffic density, radar contacts, environmental conditions and other relevant information, such a deviation provides a level of safety equivalent to that provided by the required measure or is a maneuver considered necessary for safe navigation under the circumstances.

Services, VTS Measures, and Operating Requirements

ß161.10 Services.

To enhance navigation and vessel safety, and to protect the marine environment, a VTS may issue advisories, or respond to vessel requests for information, on reported conditions within the VTS area, such as:

(a) Hazardous conditions or circumstances;

(b) Vessel congestion;

(c) Traffic density;

(d) Environmental conditions;

(e) Aids to navigation status;

(f) Anticipated vessel encounters;

(g) Another vessel's name, type, position, hazardous vessel operating conditions, if applicable, and intended navigation movements, as reported;

(h) Temporary measures in effect;

(i) A description of local harbor operations and conditions, such as ferry routes, dredging, and so forth;

(j) Anchorage availability; or

(k) Other information or special circumstances.

ß161.11 VTS Measures.

(a) A VTS may issue measures or directions to enhance navigation and vessel safety and to protect the marine environment, such as, but not limited to:

(1) Designating temporary reporting points and procedures;

(2) Imposing vessel operating requirements; or

(3) Establishing vessel traffic routing schemes.

(b) During conditions of vessel congestion, restricted visibility, adverse weather, or other hazardous circumstances, a VTS may control, supervise, or otherwise manage traffic, by specifying times of entry, movement, or departure to, from, or within a VTS area.

ß161.12 Vessel Operating Requirements.

(a) Subject to the exigencies of safe navigation, a VTS User shall comply with all measures established or directions issued by a VTS.

(1) If, in a specific circumstance, a VTS User is unable to safely comply with a measure or direction issued by the VTS, the VTS User may deviate only to the extent necessary to avoid endangering persons, property or the environment. The deviation shall be reported to the VTS as soon as is practicable.

(b) When not exchanging communications, a VTS User must maintain a listening watch as required by 26.04(e) of this chapter on the VTS frequency designated in Table 161.12(b) (VTS Call Signs, Designated Frequencies, and Monitoring Areas). In addition, the VTS User must respond promptly when hailed and communicate in the English language.
NOTE: As stated in 47 CFR 80.148(b), a VHF watch on Channel 16 (156.800 MHz) is not required on vessels subject to the Vessel Bridge-to-Bridge Radiotelephone Act and participating in a Vessel Traffic Service (VTS) system when the watch is maintained on both the vessel bridge-to-bridge frequency and a designated VTS frequency.
(c) As soon as is practicable, a VTS User shall notify the VTS of any of the following:
(1) A marine casualty as defined in 47 CFR 4.05-1;
(2) Involvement in the ramming of a fixed or floating object;
(3) A pollution incident as defined in ß151.15 of this chapter;
(4) A defect or discrepancy in an aid to navigation;
(5) A hazardous condition as defined in ß160.203 of this chapter;
(6) Improper operation of vessel equipment required by Part 164 of this chapter;
(7) A situation involving hazardous materials for which a report is required by 49 CFR 176.48; and
(8) A hazardous vessel operating condition as defined in ß161.2.
ß161.13. VTS Special Area Operating Requirements.
The following operating requirements apply within a VTS Special Area:
(a) A VTS User shall, if towing astern, do so with as short a hawser as safety and good seamanship permits.
(b) A VMRS User shall:
(1) Not enter or get underway in the area without prior approval of the VTS;
(2) Not enter a VTS Special Area if a hazardous vessel operating condition or circumstance exists;
(3) Not meet, cross, or overtake any other VMRS User in the area without prior approval of the VTS; and
(4) Before meeting, crossing, or overtaking any other VMRS User in the area, communicate on the designated vessel bridge-to-bridge radiotelephone frequency, intended navigation movements, and any other information necessary in order to make safe passing arrangements. This requirement does not relieve a vessel of any duty prescribed by the International Regulations for Prevention of Collisions at Sea, 1972 (72 COLREGS) or the Inland Navigation Rules.
Subpart B Vessel Movement Reporting System
ß161.15 Purpose and Intent.
(a) A Vessel Movement Reporting System (VMRS) is a system used to manage and track vessel movements within a VTS area. This is accomplished by requiring that vessels provide information under established procedures

as set forth in this part, or as directed by the VTS.
(b) To avoid imposing an undue reporting burden or unduly congesting radiotelephone frequencies, reports shall be limited to information which is essential to achieve the objectives of the VMRS. These reports are consolidated into four reports (sailing plan, position, sailing plan deviation and final).
ß161.16 Applicability
The provisions of this subpart shall apply to the following VMRS Users:
(a) Every power-driven vessel of 40 meters (approximately 131 feet) or more in length, while navigating;
(b) Every towing vessel of 8 meters (approximately 26 feet) or more in length, while navigating; or
(c) Every vessel certificated to carry 50 or more passengers for hire, when engaged in trade.
ß161.17 Definitions.
As used in this subpart: Published means available in a widely-distributed and publicly available medium (e.g., VTS User's Manual, ferry schedule, Notice to Mariners).
ß161.18 Reporting Requirements.
(a) A VTS may:
(1) Direct a vessel to provide any of the information set forth in Table 161.18(a) (IMO Standard Ship Reporting System) (below);
(2) Establish other means of reporting for those vessels unable to report on the designated frequency; or
(3) Require reports from a vessel in sufficient time to allow advance vessel traffic planning.
(b) All reports required by this part shall be made as soon as is practicable on the frequency designated in Table 161.12(b) (VTS Call Signs, Designated Frequencies, and Monitoring Areas).
(c) When not exchanging communications, a VMRS User must maintain a listening watch as described in 26.04(e) of this chapter on the frequency designated in Table 161.12(b) (VTS Call Signs. Designated Frequencies, and Monitoring Areas). In addition, the VMRS User must respond promptly when hailed and communicate in the English language.
NOTE: As stated in 47 CFR 80.148(b), a VHF watch on Channel 16 (156.800 MHz) is not required on vessels subject to the Vessel Bridge-to-Bridge Radiotelephone Act and participating in a Vessel Traffic Service (VTS) system when the watch is maintained on hot h the vessel bridge-to-bridge frequency and a designated VTS frequency.
(d) When reports required by this part include time information, such information shall be given using the local time zone in effect and the 24-hour military clock system.

TABLE 161.18(a) - THE IMO STANDARD SHIP REPORTING SYSTEM
Code Short Meaning Long Meaning

ALPHA Ship Name, call sign or ship station identity, and flag <>

Transfer interrupted! Date and time of event A 6 digit group giving day of month (first two digits), hours and minutes (last four digits). If other than UTC state time zone use
CHARLIE Position A 4 digit group giving latitude in degrees and minutes suffixed with N (north) or S(south) and a 5 digit group giving longitude in degrees and minutes suffixed with E teas t) or W (west); or

DELTA Position True bearing (first 3 digits) and distance (state distance) in nautical miles from a clearly identified landmark (state landmark)
ECHO True course A 3 digit group
FOXTROT Speed in knots and tenths of knots A 3 digit group tenths of knots
GOLF Port of Departure Name of last port of call
HOTEL Date, time and point of entry into system Entry time expressed as in (B) and into the entry position expressed as in (C) or (D)
INDIA Destination and expected time of arrival Name of port and date time time of arrival group expressed as in (B)
JULIET Pilot State whether a deep sea or local pilot is on board
KILO Date, time and point of exit from system Exit time expressed as in (B) and exit position expressed as in (C) or (D)
LIMA Route information Intended track
MIKE Radio State in full names of communications stations/frequencies guarded
TABLE 161.18(a) - THE IMO STANDARD SHIP REPORTING SYSTEM (continued)
Code Short Meaning Long Meaning
NOVEMBER Time of next report Date time group expressed as in (B)
OSCAR Maximum present static draught in meters 4 digit group giving meters and centimeters
PAPA Cargo on board Cargo and brief details of any dangerous cargoes as well as harmful substances and gases that could endanger persons or the environment
QUEBEC Defects, damage deficiencies or limitations Brief detail of defects, damage, deficiencies or other limitations
ROMEO Description of pollution dangerous goods lost Brief details of type of pollution (oil, chemicals, etc) or dangerous goods lost overboard; position expressed as overboard in (C) or (D)
SIERRA Weather conditions Brief details of weather and sea conditions prevailing
TANGO Ship's representative and/or owner Details of name and particulars of ship's representative and/or owner for provision of information
UNIFORM Ship size and type Details of length, breadth, tonnage, and

type, etc., as required
VICTOR Medical personnel Doctor, physician's assistant, nurse, no medic
WHISKEY Total number of persons on board State number
XRAY Miscellaneous Any other information as appropriate. [i.e., a detailed description of a planned operation, which may include: its duration; effective area; any restrictions to navigation; notification procedures for approaching vessels; in addition, for a towing operation: configuration, length of the tow, available horsepower, etc.; for a dredge or floating plant: configurat ion of pipeline, mooring configuration, number of assist vessels, etc.

ß161.19 Sailing Plan (SP).
Unless otherwise stated, at least 15 minutes before navigating a VTS area, a vessel must report the:
(a) Vessel name and type;
(b) Position;
(c) Destination and ETA;
(d) Intended route;
(e) Time and point of entry; and
(f) Dangerous cargo on board or in its tow, as defined in ß160.203 of this chapter, and other required information as set out in ß160.211 and ß160.213 of this chapter, if applicable.
ß161.20 Position Report (PR).
(a) A vessel must report its name and position:
(1) Upon point of entry into a VTS area;
(2) At designated reporting points as set forth in subpart C; or
(3) When directed by the VTC.
NOTE: Notice of temporary reporting points, if established, may be published via Local Notices to Mariners, general broadcast or the VTS User's Manual.
ß161.21 Sailing Plan Deviation Report (DR).
A vessel must report:
(a) When its ETA to a destination varies significantly from a previously reported ETA;
(b) Any intention to deviate from a VTS issued measure or vessel traffic routing system; or
(c) Any significant deviation from previously reported information.
ß161.22 Final Report (FR).
A vessel must report its name and position:
(a) On arrival at its destination; or
(b) When leaving a VTS area.
ß161.23 Reporting Exemptions.
(a) Unless otherwise directed, the following vessels are exempted from providing Position and Final Reports due to the nature of their

operation:
(1) Vessels on a published schedule and route;
(2) Vessels operating within an area of a radius of three nautical miles or less; or
(3) Vessels escorting another vessel or assisting another vessel in maneuvering procedures.
(b) A vessel described in paragraph (a) of this section must:
(1) Provide a Sailing Plan at least 5 minutes but not more than 15 minutes before navigating within the VTS area; and
(2) If it departs from its promulgated schedule by more than 15 minutes or changes its limited operating area, make the established VMRS reports, or report as directed.
(c) In those VTS areas capable of receiving automated position reports from Automated Dependent Surveillance Shipborne Equipment (ADSSE) as required by ß164.43 of this chapter and where ADSSE is required, vessels equipped with an operating ADSSE are not required to make voice radio position reports at designated reporting points as required by ß161.20(a)(2) of this part, unless otherwise directed by the VTC.
(1) Whenever an ADSSE becomes nonoperational as defined in ß164.43(c) of this chapter, before entering or while underway in a VTS area, a vessel must:
(i) Notify the VTC;
(ii) Make voice radio position reports at designated reporting points as required by ß161.20(a)(2) of this part;
(iii) Make other voice radio reports as directed; and
(iv) Restore the ADSSE to operating condition as soon as possible.
(2) Whenever an ADSSE becomes nonoperational due to a loss of position correction information (i.e. the U.S. Coast Guard differential global positioning system (DGPS) cannot provide the required error correction messages) a vessel must:
(i) Make required voice radio position reports at designated reporting points required by ß161.20(a)(2) of this part; and
(ii) Make other voice radio reports as directed.
NOTE: Regulations pertaining to ADSSE required capabilities are set forth in ß164.43 of this chapter.
ß161.50 Vessel Traffic Service San Francisco.
(a) The VTS area consists of all the navigable waters of San Francisco Bay Region south of the Mare Island Causeway Bridge and the Petaluma River Entrance Channel DayBeacon "19" and Petaluma River Entrance Light "20" and north of the Dunbarton Bridge; its seaward approaches within a 38 nautical mile radius of Mount Tamalpais (37deg 55.8min N., 122deg 34.6min W.); and its navigable tributaries as far east as the port of Stockton on the San Joaquin River, as far north as the port of Sacramento on the Sacramento River.
PART 164 - NAVIGATION SAFETY REGULATIONS

ß164.03 Incorporation by Reference.
(a)* * *
(b) The materials approved for incorporation by reference in this part and the sections affected are: Radio Technical Commission For Maritime Services (RTCM), 655 Fifteenth St., N.W., Suite 300, Washington, D.C. 20005 Minimum Performance Standards (MPS) Marine Loran C Receiving Equipment, RTCM Paper 12-78/DO-100, 1977 164.41.
RTCM Recommended Standards for Differential NAVSTAR GPS Service, Version 2.0, RTCM Paper 134-89/SC 104-68, 1990-164.43.
* * * * *
ß164.43 Automated Dependent Surveillance Shipborne Equipment.
(a) Each vessel required to provide automated position reports to a Vessel Traffic Service (VTS) must do so by an installed Automated Dependent Surveillance Shipborne Equipment (ADSSE) system consisting of a:
(1) Twelve-channel all-in-view Differential Global Positioning System (DGPS) receiver;
(2) Marine band Non-Directional Beacon receiver capable of receiving DGPS error correction messages;
(3) VHF-FM transceiver capable of Digital Selective Calling (DSC) on the designated DSC frequency; and
(4) Control unit.
(b) An ADSSE must have the following capabilities:
(1) Use DGPS to sense the position of the vessel and determine the time of the position using Universal Coordinated Time (UTC);
(2) Fully use the broadcast type 1, 2, 3, 5, 6, 7, 9, and 16 messages, as specified in RTCM Recommended Standards for Differential NAVSTAR GPS Service in determining the required information;
(3) Achieve a position error which is less than ten meters (32.8 feet) 2 distance root mean square (2 drms) from the true North American Datum of 1983 (NAD 83) in the position information transmitted to a VTS;
(4) Achieve a course error of less than 0.5 degrees from true course over ground in the course information transmitted to a VTS;
(5) Achieve a speed error of less than 0.05 knots from true speed over ground in the speed information transmitted to a VTS;
(6) Receive and comply with commands broadcast from a VTS as DSC messages on the designated DSC frequency;
(7) Receive and comply with RTCM messages broadcast as minimum shift keying modulated medium frequency signals in the marine radio beacon band, and supply the messages to the DGPS receiver;
(8) Transmit the vessel's position, tagged with the UTC at position solution, course over ground, speed over ground, and Lloyd's identification number to a VTS;
(9) Display a visual alarm to indicate to shipboard personnel when a failure to receive or utilize the RTCM messages occurs;

(10) Display a separate visual alarm which is triggered by a VTS utilizing a DSC message to indicate to shipboard personnel that the U.S. Coast Guard DGPS system cannot provide the required error correction messages; and
(11) Display two RTCM type 16 messages, one of which must display the position error in the position error broadcast.
(c) An ADSSE is considered non-operational if it fails to meet the requirements of paragraph (b) of this section.
NOTE: Vessel Traffic Service (VTS) areas and operating procedures are set forth in Part 161 of this chapter.
Regulated Navigation Area
San Francisco Bay Region, CA
DEPARTMENT OF
TRANSPORTATION
Coast Guard 33 CFR Parts 162 and 165
Background and Purpose.
In 1972, the Coast Guard, with input from various members of the San Francisco Bay maritime community, established voluntary vessel traffic routing measures for the San Francisco Bay region that consisted of traffic lanes in the Golden Gate and the Central Bay extending to Pinole Shoal Channel; separation zones; a precautionary area east of Alcatraz Island; and an Oakland Harbor Limited Traffic Area. Compliance with these routing measures was voluntary and intended for use by vessels 300 gross tons or greater.
In 1991, the precautionary area east of Alcatraz Island was expanded to include the water area between the San Francisco waterfront and Treasure Island, replacing the traffic lanes in that area. A deep water route was established north of Harding Rock.
In 1993, the Coast Guard, with input from the Harbor Safety Committee of the San Francisco Bay Region, modified the voluntary traffic routing measures to better conform to International Maritime Organization (IMO) traffic routing standards. The 1993 modification added a Golden Gate precautionary area, a deep water traffic lane separation zone north of Harding Rock and an expanded Central Bay precautionary area. It eliminated the traffic lanes in the North Ship Channel and San Pablo Strait.
The presence of numerous recreational boats, windsurfers, and commercial fishing boats that transit the proposed RNAs poses a navigational hazard for vessels of 1600 or more gross tons which are constrained by their draft and maneuvering capabilities. By limiting or requiring the use of established traffic lanes, this rule will relieve congestion and promote safer transiting of the RNAs by vessels with restricted maneuverability. The rule makes the present voluntary traffic measures mandatory and requires vessels 1600 gross tons or more, or tugs with a tow of 1600 gross tons or more, to follow traffic measures similar to those

currently used on a voluntary basis. The regulation also defines precautionary areas and establishes overtaking, meeting, crossing and speed restrictions for certain vessels transiting specific channels within the RNAs.

The RNAs, which lie within the San Francisco VTS area (33 CFR 161.50), are as follows: San Francisco Bay RNA, North Ship Channel RNA, San Pablo Strait Channel RNA, Pinole Shoal Channel RNA, Southern Pacific Railroad Bridge RNA, Southampton Shoal / Richmond Harbor RNA, and Oakland Harbor RNA.

General requirements for all RNAs.

The depth of the water and geography of the San Francisco Bay Region, and the density of vessel traffic, which includes numerous ferries and recreational boats, severely constrain the ability of a vessel to maneuver in the event of an emergency. This regulation limits the maximum speed within the RNAs to 15 knots through the water for vessels 1600 gross tons or greater, or a tug with a tow of 1600 gross tons or greater, and requires those vessels to operate their engine(s) in a control mode and on fuel that will allow for an immediate response to any engine order, ahead or astern, including stopping its engine(s) for an extended period of time. Limiting vessel speeds to 15 knots or less through the water within the prescribed RNAs will reduce the risk of serious maritime accidents.

There may be situations where vessels would be unable to safely comply with the requirements of this regulation. In such cases, the Captain of the Port, or the Commanding Officer, VTS San Francisco, acting as a representative of the Captain of the Port, may allow a vessel to deviate from this regulation.

The RNAs defined in this rule are each considered to constitute a narrow channel or fairway. Therefore, Rule 9 of the Inland Navigation Rules (INRs) (33 U.S.C. 2009), in conjunction with the provisions of the associated INRs, is specifically made applicable within the defined RNAs and will be enforced.

Specific requirements for individual proposed RNAs.

The geographic descriptions and proposed requirements specific to each RNA are as follows:

San Francisco Bay RNA.

The San Francisco Bay RNA consists of the water area in the Golden Gate east of the COLREGS Demarcation Line (33 CFR 80.1142), the Central Bay including Raccoon Strait, and the existing charted precautionary area east of Alcatraz Island.

Because of the large number of vessels entering and departing San Francisco Bay, traffic lanes are established in the Golden Gate and the Central Bay to separate opposing traffic and reduce vessel congestion. The lanes are located where voluntary traffic lanes previously existed. Use of these lanes and adherence to the indicated direction of travel is

required for vessels of 1600 or more gross tons, or tugs with a tow of 1600 or more gross tons, and recommended for all other vessels.

Due to the presence of shoals and rocks in the Central Bay, the Central Bay Two-way Deep Water Traffic Lane (DWTL), located north of Harding Rock, provides the best water depth safety margin for inbound vessels with a draft of 45 feet or greater, and for outbound vessels with a draft of 28 feet or greater. These deep draft vessels are required to use the DWTL. It is recommended that all other vessels use the Central Bay Traffic Lanes so that vessel traffic in the DWTL is kept to a minimum.

The DWTL is sufficiently narrow that meeting, crossing, and overtaking restrictions are necessary to reduce the likelihood of collision. The regulation provides that a power-driven vessel of 1600 or more gross tons, or a tug with a tow of 1600 or more gross tons, shall not enter the DWTL when another power-driven vessel of 1600 or more gross tons, or tug with a tow of 1600 or more gross tons, is navigating therein when either vessel is carrying certain dangerous cargo (as defined in 33 CFR 160.203), or bulk petroleum products, or is a tank vessel in ballast, if such entry could result in meeting, crossing, or overtaking the other vessel.

Since vessels are converging or crossing in such a manner that one-way traffic flow patterns, although desired, cannot be established, two precautionary areas are established in this RNA. They are: (1) the Golden Gate Precautionary Area, which encompasses the waters around the Golden Gate Bridge between the Golden Gate and the Central Traffic Lanes; and (2) the Central Bay Precautionary Area, which encompasses the large portion of the Central Bay and part of the Lower Bay. It is recommended that all vessels navigating in these precautionary areas be aware of the joining traffic lanes and DWTL so as to anticipate the movements of other vessels.

North Ship Channel RNA and San Pablo Strait Channel RNA.

The North Ship Channel and San Pablo Strait Channel RNAs consist of the existing charted channels and delineate the only areas where the depths of water are sufficient to allow the safe transit of vessels of 1600 or more gross tons, or a tug with a tow of 1600 or more gross tons. The existence of strong tidal currents in these channels severely restrict the ability of vessels of 1600 or more gross tons, or a tug with a tow of 1600 or more gross tons, to safely maneuver to avoid smaller vessels. These conditions create the need to apply the general regulations to these areas.

Implementation of special regulations in these RNAs would have only a minimal impact on safety and is not justified at this time.

Pinole Shoal Channel RNA.

The Pinole Shoal Channel RNA is a constricted waterway the use of which is currently restricted to vessels with a draft greater than 20 feet, or

towboats with tows drawing more than 20 feet. Because of the narrow width of the channel and the draft of vessels using the channel, further meeting, crossing, and overtaking restrictions are necessary to reduce the likelihood of collision. This regulation provides that a power-driven vessel of 1600 or more gross tons, or a tug with a tow of 1600 or more gross tons, shall not enter the Pinole Shoal Channel RNA, which extends from approximately Light 7 to Light 13 of the Pinole Shoal Channel, when another power-driven vessel of 1600 or more gross tons, or tug with a tow of 1600 or more gross tons, is navigating therein and when either vessel is carrying certain dangerous cargo (as defined in 33 CFR 160.203) or bulk petroleum products, or is a tank vessel in ballast, if such entry would result in meeting, crossing, or overtaking the other vessel.

Southern Pacific Railroad Bridge RNA.

The Southern Pacific Railroad Bridge RNA consists of a small circular area, 200 yards in radius, centered on the middle of the channel under the Southern Pacific Railroad Bridge. The limited horizontal clearance results in a greater chance of vessel allisions with the bridge. This risk of allision is significantly increased when poor visibility conditions exist. The regulation precludes a power-driven vessel of 1600 or more gross tons, or a tug with a tow of 1600 or more gross tons, from transiting the Southern Pacific Railroad Bridge RNA when visibility is less than 1000 yards.

Southampton Shoal/Richmond Harbor RNA.

The Southampton Shoal / Richmond Harbor RNA encompasses Southampton Shoal Channel, the Richmond Long Wharf Maneuvering Area, the Richmond Harbor Entrance Channel and Point Potrero Reach. These are dredged channels and areas within which maneuvering room is severely limited. Close-quarters situations between deep-draft vessels in these channels need to be eliminated to reduce the risk of groundings and collisions. In addition, the Southampton Shoal Channel is transited by a high number of laden tank vessels and vessels carrying certain dangerous cargo (as defined in 33 CFR 160.203), or bulk petroleum. Because of the potential for loss of life or serious environmental consequences in a collision involving one or more of these vessels, control of traffic flow is necessary. The Richmond Long Wharf Maneuvering Area, between the Richmond Harbor Entrance Channel and Southampton Shoal Channel, often has vessels operating at low speeds where maneuverability is restricted. The regulation precludes vessels of 1600 or more gross tons, or tugs with a tow of 1600 or more gross tons, from entering the RNA if meeting, crossing, or overtaking another vessel of 1600 or more gross tons, or a tug with a tow of 1600 or more gross tons, could result.

Oakland Harbor RNA.

The Oakland Harbor RNA encompasses the Oakland Bar Channel, Oakland Outer Harbor Entrance, Middle Harbor and Inner Harbor Entrance Channels.

The charted Limited Traffic Area (LTA), which recommends that vessels of 300 or more gross tons transit one at a time to avoid crossing or meeting situations, is replaced by the Oakland Harbor RNA. The northern boundary of the Oakland Harbor RNA differs slightly from the LTA in that it follows the northern boundary of the Oakland Bar and Outer Harbor Entrance channels and extends to the "E" tower of the San Francisco-Oakland Bay Bridge. This regulation restricts vessels of 1600 or more gross tons or tugs with a tow of 1600 or more gross tons: from entering the RNA if meeting, crossing, or overtaking another vessel of 1600 or more gross tons, or a tug with a tow of 1600 or more gross tons, could result.

Regulations: In consideration of the foregoing, the Coast Guard is amending Parts 162 and 165 of Title 33, Code of Federal Regulations, as follows:

PART 162 - INLAND WATERWAYS NAVIGATION REGULATIONS

PART 165 - REGULATED NAVIGATION AREAS AND LIMITED ACCESS AREAS

ß165.1114 San Francisco Bay Region, California - Regulated Navigation Area.

(a) Applicability.

This section applies to all vessels unless otherwise specified.

(b) Deviations.

The Captain of the Port, San Francisco Bay, or the Commanding Officer, Vessel Traffic Service San Francisco, as a representative of the Captain of the Port, may authorize a deviation from the requirements of this regulation when it is deemed necessary in the interests of safety.

(c) Regulated Navigation Areas.

(1) San Francisco Bay RNA.

(i) The following is a regulated navigation area -- the waters bounded by a line connecting the following points, beginning at:

Latitude	Longitude
37deg 47min 18sec N	122deg 30min 22sec W; thence to
37deg 48min 55sec N	122deg 31min 41sec W; thence to
37deg 50min 38sec N	122deg 28min 37sec W; thence to
37deg 50min 59sec N	122deg 28min 00sec W; thence to
37deg 51min 45sec N	122deg 27min 28sec W; thence to
37deg 52min 58sec N	122deg 26min 06sec W; thence to
37deg 51min 53sec N	122deg 24min 58sec W; thence to
37deg 51min 53sec N	122deg 24min 00sec W; thence to
37deg 51min 40sec N	122deg 23min 48sec W; thence to
37deg 49min 22sec N	122deg 23min 48sec W; thence to
37deg 48min 20sec N	122deg 22min 12sec W; thence to
37deg 47min 02sec N	122deg 21min 33sec W; thence to
37deg 47min 02sec N	122deg 23min 04sec W; thence

along the shoreline to the point of beginning.

DATUM: NAD 83

(ii)The San Francisco Bay RNA consists of the following defined sub-areas:

(A) Golden Gate Traffic Lanes.

(1) Westbound Traffic Lane:

Bounded by the Golden Gate precautionary area and the COLREGS Demarcation Line (33 CFR 80.1142), between the separation zone and a line connecting the following points:

Latitude	Longitude	
37deg 48min 30sec N	122deg 31min 22sec W;	thence to
37deg 49min 03sec N	122deg 29min 52sec W.	

DATUM: NAD 83

(2) Eastbound Traffic Lane.

Bounded by the COLREGS Demarcation Line (33 CFR 80.1142) and the Golden Gate precautionary area, between the separation zone and a line connecting the following points:

Latitude	Longitude	
37deg 47min 50sec N	122deg 30min 48sec W;	thence to
37deg 48min 30sec N	122deg 29min 29sec W.	

DATUM: NAD 83

(3) Golden Gate Separation Zone:

The area 75 yards each side of a line connecting the following points:

Latitude	Longitude	
37deg 48min 08sec N	122deg 31min 05sec W;	thence to
37deg 48min 46sec N	122deg 29min 40sec W.	

DATUM: NAD 83

(B) Golden Gate Precautionary Area:

An area bounded by a line connecting the following points, beginning at:

Latitude	Longitude	
37deg 48min 30sec N	122deg 29min 29sec W;	thence to
37deg 48min 52sec N	122deg 28min 41sec W;	thence to
37deg 48min 52sec N	122deg 27min 49sec W;	thence to
37deg 49min 36sec N	122deg 27min 46sec W;	thence to
37deg 49min 55sec N	122deg 28min 09sec W;	thence to
37deg 49min 28sec N	122deg 28min 45sec W;	thence to
37deg 49min 03sec N	122deg 29min 52sec W;	thence

returning to the point of beginning.

DATUM: NAD 83

(c) Central Bay Traffic Lanes.

(1) Westbound Traffic Lane:

Bounded by the Central Bay precautionary area and the Golden Gate precautionary area, between the Central Bay and the Deep Water Traffic Lane separation zones.

(2) Eastbound Traffic Lane:

Bounded by the Golden Gate precautionary area and the Central Bay

precautionary area, between the Central Bay Separation Zone and a line connecting the following points, beginning at:

Latitude	Longitude	
37deg 48min 41sec N	122deg 25min 17sec W;	thence to
37deg 48min 50sec N	122deg 26min 14sec W;	thence to
37sec 48min 52sec N	122deg 27min 49sec W.	

DATUM: NAD 83

(3) Deep Water (two-way) Traffic Lane:

Bounded by the Central Bay precautionary area and the Golden Gate precautionary area, between the Deep Water Traffic Lane and a line connecting the following points, beginning at:

Latitude	Longitude	
37deg 49min 55sec N	122deg 28min 09sec W;	thence to
37deg 50min 36sec N	122deg 27min 12sec W;	thence to
37deg 50min 47sec N	122deg 26min 26sec W.	

DATUM: NAD 83

(D) Central Bay Separation Zone:

The area 75 yards each side of a line connecting the following points, beginning at:

Latitude	Longitude	
37deg 49min 17sec N	122deg 27min 47sec W;	thence to
37deg 49min 35sec N	122deg 25min 25sec W.	

DATUM: NAD 83

(E) Deep Water Traffic Lane Separation Zone:

The area 75 yards each side of a line connecting the following points, beginning at:

Latitude	Longitude	
37deg 49min 36sec N	122deg 27min 46sec W;	thence to
37deg 50min 22sec N	122deg 26min 49sec W;	thence to
37deg 50min 25sec N	122deg 26min 22sec W.	

DATUM: NAD 83

(F) Central Bay Precautionary Area:

An area bounded by a line connecting the following points, beginning at:

Latitude	Longitude	
37deg 48min 41sec N	122deg 25min 17sec W;	thence to
37deg 49min 32sec N	122deg 25min 13sec W;	thence to
37deg 50min 25sec N	122deg 26min 22sec W;	thence to
37deg 50min 47sec N	122deg 26min 26sec W;	thence to
37deg 51min 04sec N	122deg 24min 58sec W;	thence to
37deg 51min 53sec N	122deg 24min 58sec W;	thence to
37deg 51min 53sec N	122deg 24min 00sec W;	thence to
37deg 51min 40sec N	122deg 23min 48sec W;	thence to
37deg 49min 22sec N	122deg 23min 48sec W;	thence to
37deg 48min 20sec N	122deg 22min 12sec W;	thence to

37deg 47min 02sec N 122deg 21min 33sec W; thence to
37deg 47min 02sec N 122deg 23min 04sec W; thence
returning along the shoreline to the point of beginning.
DATUM: NAD 83
(2) North Ship Channel RNA.
The following is a regulated navigation area --the waters bounded by a line connecting the following points, beginning at:
Latitude Longitude
37deg 51min 53sec N 122deg 24min 58sec W; thence to
37deg 54min 15sec N 122deg 27min 27sec W; thence to
37deg 56min 06sec N 122deg 26min 49sec W; thence to
37deg 56min 06sec N 122deg 26min 34sec W; thence to
37deg 54min 48sec N 122deg 26min 42sec W; thence to
37deg 54min 02sec N 122deg 26min 10sec W; thence to
37deg 51min 53sec N 122deg 24min 00sec W; thence
returning to the point of beginning.
DATUM: NAD 83
(3) San Pablo Strait Channel RNA.
The following is a regulated navigation area --the waters bounded by a line connecting the following points, beginning at:
Latitude Longitude
37deg 56min 06sec N 122deg 26min 49sec W; thence to
37deg 57min 26sec N 122deg 27min 21sec W; thence to
38deg 00min 48sec N 122deg 24min 45sec W; thence to
38deg 01min 54sec N 122deg 22min 24sec W; thence to
38deg 01min 44sec N 122deg 22min 18sec W; thence to
37deg 57min 37sec N 122deg 26min 23sec W; thence to
37deg 56min 06sec N 122deg 26min 34sec W; thence
returning to the point of beginning.
DATUM: NAD 83
(4) Pinole Shoal Channel RNA.
The following is a regulated navigation area --the waters bounded by a line connecting the following points, beginning at:
Latitude Longitude
38deg 01min 54sec N 122deg 22min 25sec W; thence to
38deg 03min 13sec N 122deg 19min 50sec W; thence to
38deg 03min 23sec N 122deg 18min 31sec W; thence to
38deg 03min 13sec N 122deg 18min 29sec W; thence to
38deg 03min 05sec N 122deg 19min 28sec W; thence to
38deg 01min 44sec N 122deg 22min 18sec W; thence
returning to the point of beginning.
DATUM: NAD 83
(5) Southern Pacific Railroad Bridge RNA.
The following is a regulated navigation area -- the water area contained within a circle with a radius of 200 yards, centered on 38deg 02min

18sec N, 122deg 07min 17sec W.
DATUM: NAD 83
(6) Southampton Shoal Channel/Richmond Harbor RNA:
The following, consisting of two distinct areas, is a regulated navigation area --
(i) The waters bounded by a line connecting the following points, beginning at:

Latitude	Longitude	
37deg 54min 17sec N	122deg 22min 00sec W;	thence to
37deg 54min 08sec N	122deg 22min 00sec W;	thence to
37deg 54min 15sec N	122deg 23min 12sec W;	thence to
37deg 54min 30sec N	122deg 23min 09sec W;	thence

along the shoreline to the point of beginning.
DATUM: NAD 83
(ii)The waters bounded by a line connecting the following points, beginning at:

Latitude	Longitude	
37deg 54min 28sec N	122deg 23min 36sec W;	thence to
37deg 54min 20sec N	122deg 23min 38sec W;	thence to
37deg 54min 23sec N	122deg 24min 02sec W;	thence to
37deg 54min 57sec N	122deg 24min 51sec W;	thence to
37deg 55min 05sec N	122deg 25min 02sec W;	thence to
37deg 54min 57sec N	122deg 25min 22sec W;	thence to
37deg 54min 00sec N	122deg 25min 13sec W;	thence to
37deg 53min 59sec N	122deg 25min 22sec W;	thence to
37deg 55min 30sec N	122deg 25min 35sec W;	thence to
37deg 55min 40sec N	122deg 25min 10sec W;	thence to
37deg 54min 54sec N	122deg 24min 30sec W;	thence to
37deg 54min 30sec N	122deg 24min 00sec W;	thence

returning to the point of beginning.
DATUM: NAD 83
(7) Oakland Harbor RNA.
The following is a regulated navigation area -- the waters bounded by a line connecting the following points, beginning at:

Latitude	Longitude	
37deg 48min 40sec N	122deg 19min 58sec W;	thence to
37deg 48min 50sec N	122deg 20min 02sec W;	thence to
37deg 48min 20sec N	122deg 21min 00sec W;	thence to
37deg 48min 15sec N	122deg 21min 30sec W;	thence to
37deg 48min 20sec N	122deg 22min 12sec W;	thence to
37deg 47min 26sec N	122deg 21min 45sec W;	thence to
37deg 47min 55sec N	122deg 21min 26sec W;	thence to
37deg 48min 03sec N	122deg 21min 00sec W;	thence to
37deg 47min 48sec N	122deg 19min 46sec W;	thence to
37deg 47min 55sec N	122deg 19min 43sec W;	thence

returning along the shoreline to the point of the beginning.
DATUM: NAD 83
(d) General Regulations.
(1) A power-driven vessel of 1600 or more gross tons, or a tug with a tow of 1600 or more gross tons, navigating within the RNAs defined in subparagraph (c) of this section, shall not exceed a speed of 15 knots through the water.
(2) A power-driven vessel of 1600 or more gross tons, or a tug with a tow of 1600 or more gross tons, navigating within the RNAs defined in subparagraph (c) of this section, shall have its engine(s) ready for immediate maneuver and shall operate its engine(s) in a control mode and on fuel that will allow for an immediate response to any engine order, ahead or astern, including stopping its engine(s) for an extended period of time.
(3) The master, pilot or person directing the movement of a vessel within the RNAs defined in subparagraph (c) of this regulation shall comply with Rule 9 of the Inland Navigation Rules (INRs) (33 U.S.C. 2009) in conjunction with the provisions of the associated INRS.
(e) Specific Regulations.
(1) San Francisco Bay RNA:
(i) A vessel shall navigate with particular caution in a precautionary area, or in areas near the terminations of traffic lanes or channels, as described in this regulation.
(ii) A power-driven vessel of 1600 or more gross tons, or a tug with a tow of 1600 or more gross tons, shall:
(A) use the appropriate traffic lane and proceed in the general direction of traffic flow for that lane;
(B) use the Central Bay Deep Water Traffic Lane if eastbound with a draft of 45 feet or greater or westbound with a draft of 28 feet or greater;
(C) not enter the Central Bay Deep Water Traffic Lane when another power-driven vessel of 1600 or more gross tons or tug with a tow of 1600 or more gross tons is navigating therein when either vessel is:
(1) carrying certain dangerous cargoes (as denoted in section 160.203 of this subchapter);
(2) carrying bulk petroleum products; or
(3) a tank vessel in ballast if such entry would result in meeting, crossing, or overtaking the other vessel;
(D) normally join or leave a traffic lane at the termination of the lane, but when joining or leaving from either side, shall do so at as small an angle to the general direction of traffic flow as practicable;
(E) so far as practicable keep clear of the Central Bay Separation Zone and the Deep Water Traffic Lane Separation Zone;
(F) not cross a traffic lane separation zone unless crossing, joining, or leaving a traffic lane.

(2) Pinole Shoal Channel RNA:
(i) The use of Pinole Shoal Channel RNA is reserved for navigation of vessels with a draft greater than 20 feet or tugs with tows drawing more than 20 feet. Vessels drawing less than 20 feet are not permitted within this RNA and are prohibited from crossing it at any point.
(ii) A power-driven vessel of 1600 or more gross tons or a tug with a tow of 1600 or more gross tons shall not enter Pinole Shoal Channel RNA when another power-driven vessel of 1600 or more gross tons or tug with a tow of 1600 or more gross tons is navigating therein when either vessel is:
(A) carrying certain dangerous cargoes (as denoted in section 160.203 of this subchapter);
(B) carrying bulk petroleum products; or
(C) a tank vessel in ballast if such entry would result in meeting, crossing, or overtaking the other vessel.
(iii) Vessels permitted to use this channel shall proceed at a reasonable speed so as not to endanger other vessels or interfere with any work which may become necessary in maintaining, surveying, or buoying the channel, and they shall not anchor in the channel except in case of a deviation authorized under paragraph (b) of this section.
(iv) This paragraph shall not be construed as prohibiting any necessary use of the channel by any public vessels while engaged in official duties, or in emergencies by pilot boats.
(3) Southern Pacific Railroad Bridge RNA:
(i) When visibility is less than 1000 yards within the Southern Pacific Railroad Bridge RNA, a power-driven vessel of 1600 or more gross tons, or a tug with a tow of 1600 or more gross tons:
(A) When eastbound, shall not transit through the RNA.
(B) When westbound:
(1) During periods of reduced visibility and immediately prior to passing New York Point, the master, pilot, or person directing the movement of a vessel shall obtain a report of visibility conditions within the RNA.
(2) If visibility within the RNA is less than 1000 yards, the vessel shall not transit the RNA. Vessels prevented from transiting due to low visibility shall not proceed past Mallard Island until visibility improves to greater than 1000 yards within the RNA.
(3) If a transit between New York Point and the Southern Pacific Railroad Bridge has commenced, and the visibility subsequently should become less than 1000 yards, the master, pilot, or person directing the movement of a vessel shall comply with subparagraph (b) of this section and may proceed, taking all further appropriate actions in the interest of safety.
(ii) Visibility is considered to be 1000 yards or greater when both the following geographical points can be seen from the Southern Pacific

Railroad Bridge:
(A) The Port of Benicia Pier, and
(B) The Shell Martinez Pier.
(4) Southampton Shoal/Richmond Harbor RNA:
A power-driven vessel of 1600 or more gross tons, or a tug with a tow of 1600 or more gross tons, shall not enter Southampton Shoal/ Richmond Harbor RNA when another power-driven vessel of 1600 or more gross tons, or a tug with a tow of 1600 or more gross tons, is navigating therein, if such entry would result in meeting, crossing, or overtaking the other vessel.
(5) Oakland Harbor RNA:
A power-driven vessel of 1600 or more gross tons or a tug with a tow of 1600 or more gross tons shall not enter the Oakland Harbor RNA when another power-driven vessel of 1600 or more gross tons, or a tug with a tow of 1600 or more gross tons, is navigating therein, if such entry would result in meeting, crossing, or overtaking the other vessel.

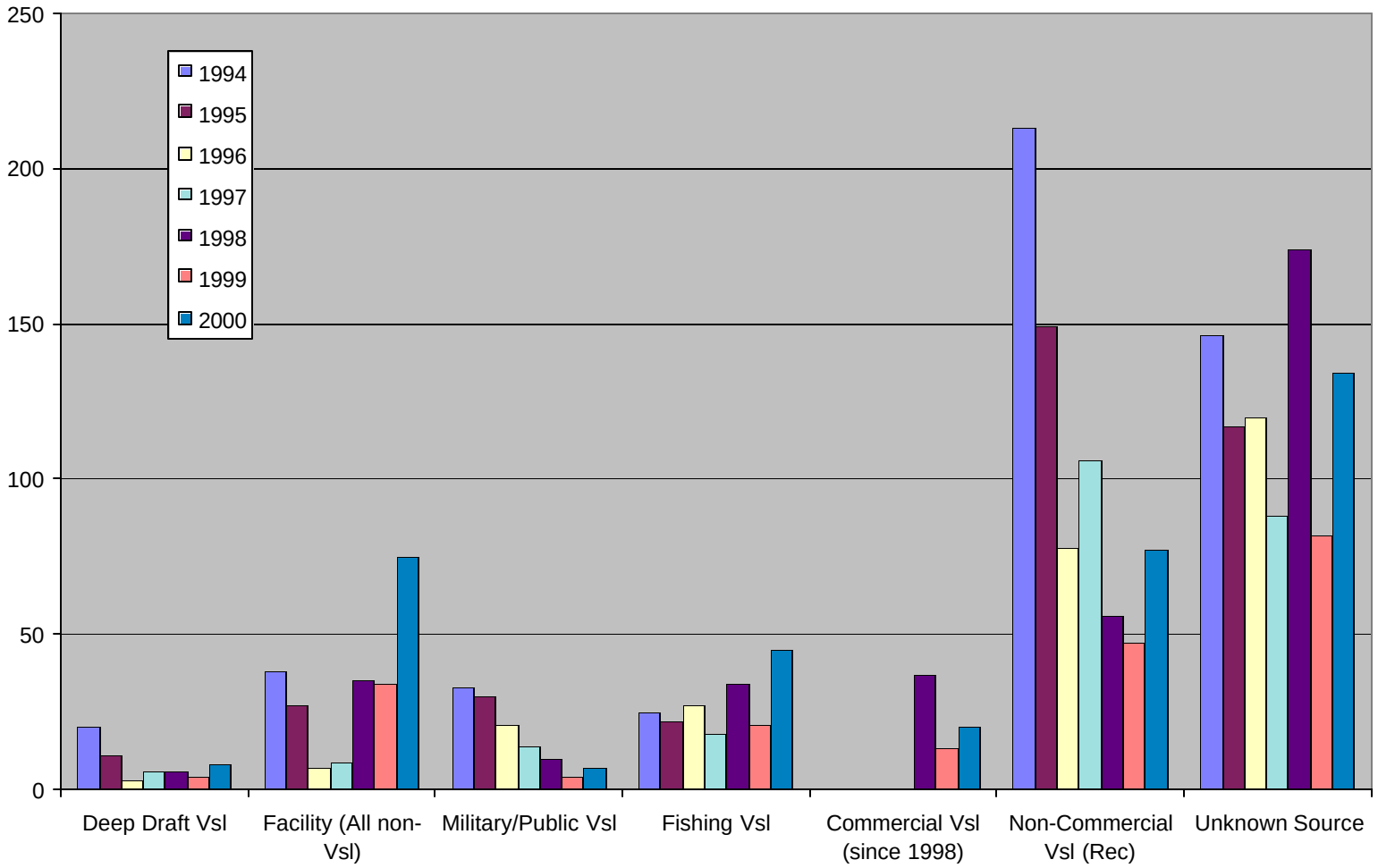
MSO San Francisco Bay Pollution Statistics April 1, 2000 to March 31, 2001

	Apr-00	May-00	Jun-00	Jul-00	Aug-00	Sep-00	Oct-00	Nov-00	Dec-00	Jan-01	Feb-01	Mar-01	Ave/Mo	Total
Total Reported														
Oil Pollution Incidents	28	36	23	27	27	30	21	28	29	42	36	26	29.42	353
MSO	15	19	11	15	20	15	14	12	17	22	22	15	16.42	197
MSFO	4	10	8	8	4	12	6	7	7	8	6	7	7.25	87
Eureka Detachment	9	7	4	4	3	3	1	9	5	12	8	4	5.75	69
Penalty Action:														
Civil Penalty (MV)	2	2	0	0	0	2	0	1	2	1	0	1	0.92	11
Civil Penalty (TK)	3	0	0	0	2	2	4	3	3	1	0	1	1.58	19
Letter of Warning	4	12	7	7	7	11	4	2	5	9	4	9	6.75	81
No Action Required	19	22	16	20	18	15	13	22	19	31	32	15	20.17	242
Source Type:														
Deep Draft Vsl	1	1	0	0	1	1	2	0	0	0	1	0	0.58	7
Facility (All non-Vsl)	8	3	6	2	4	4	3	6	12	15	10	8	6.75	81
Military/Public Vsl	0	1	0	0	2	0	1	1	0	1	0	0	0.50	6
Fishing Vsl	3	8	2	5	4	5	3	2	1	5	0	2	3.33	40
Commercial Vsl	1	2	1	0	1	6	2	1	2	0	0	1	1.42	17
Non-Commercial Vsl	4	8	6	11	9	8	3	7	7	9	8	7	7.25	87
Unknown Source	11	13	8	9	6	9	7	11	7	12	17	8	9.83	118
Other Info:														
OSTLF/CERCLA Cases	0	3	1	2	1	0	1	1	1	1	1	2	1.17	14
HAZMAT	2	1	0	0	1	0	0	0	1	0	0	0	0.42	5
POLREP Cases	2	4	3	5	4	3	2	0	3	1	1	2	2.50	30
Cleanup Required	4	6	7	0	4	13	9	6	9	6	5	4	6.08	73

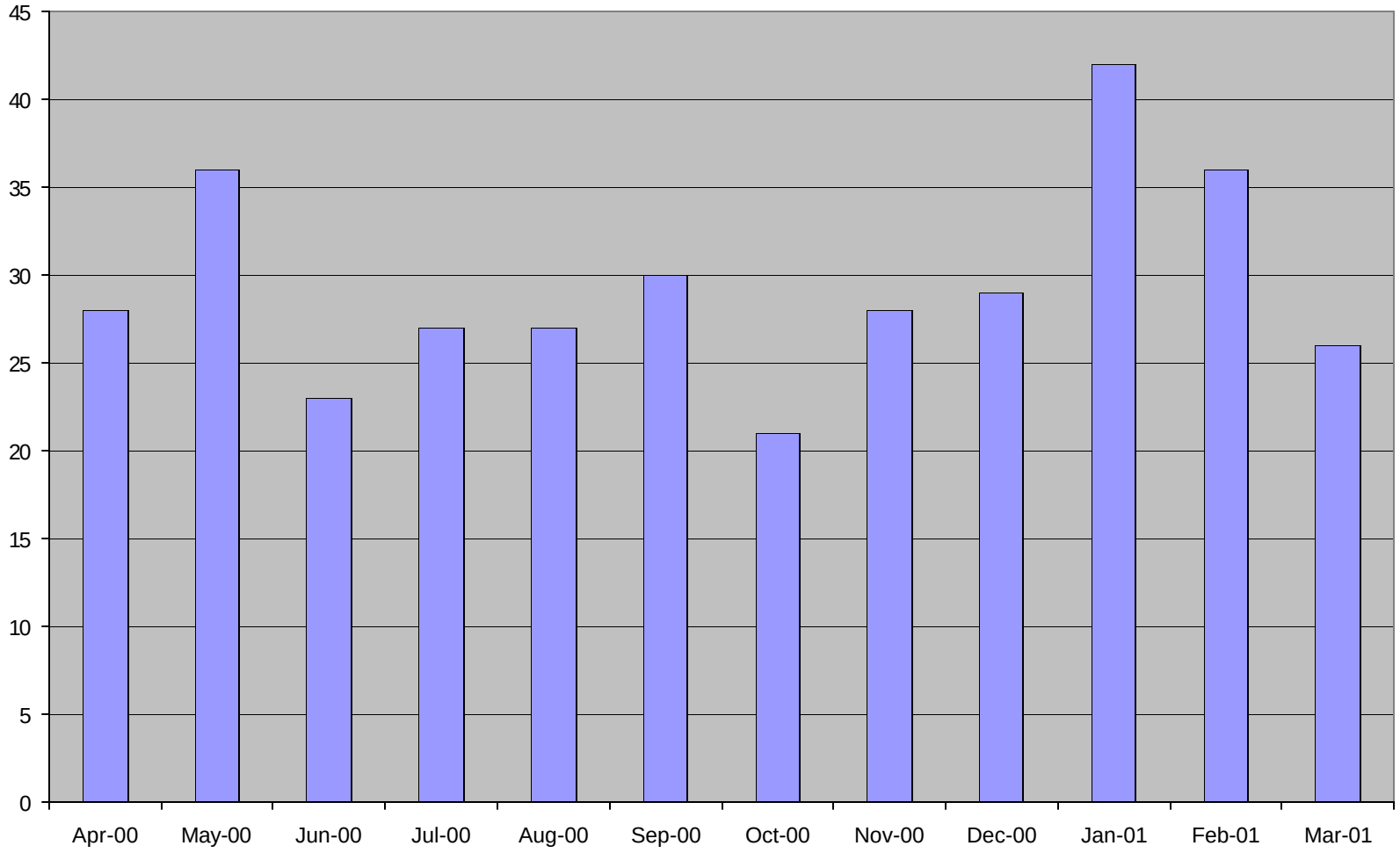
MSO San Francisco Bay Pollutions Statistics 1994-2000

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