



# Advances in Marine Firefighting: Cases Studies and Lessons Learned



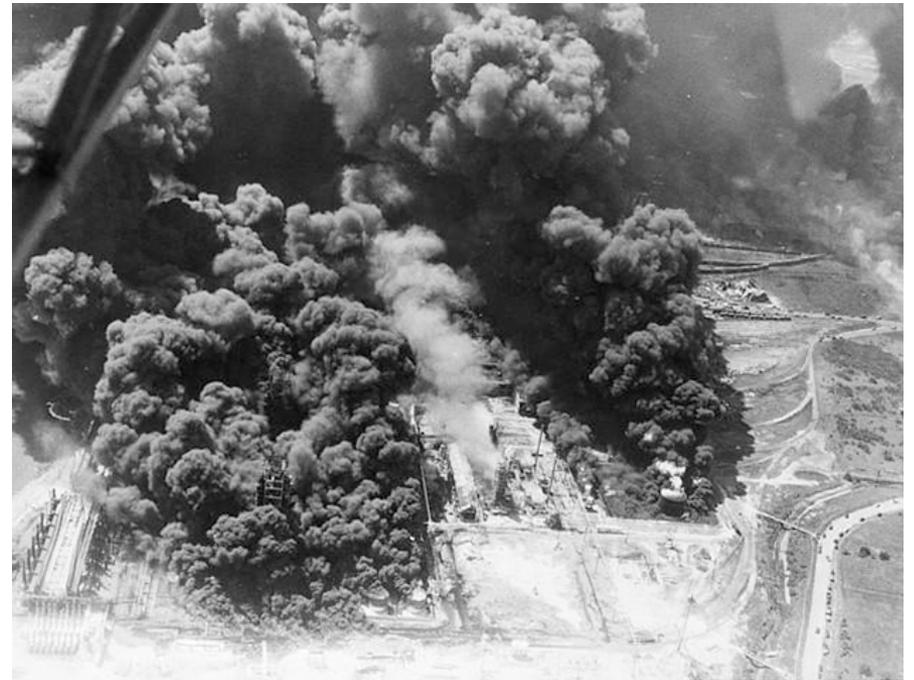
# Agenda

- Background
- Historical Case Studies
- National and Area Contingency Plans
- Overview of Salvage and Marine Firefighting (SMFF) Regulations
- SMFF Personnel and Marine Firefighting Equipment
- Recent Case Studies
- Recommendations





# Texas City Disaster April 1947

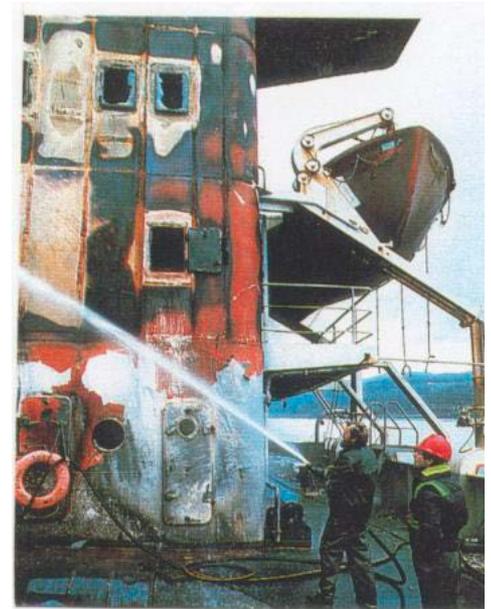




SS Sansinena  
Port of Los Angeles



# M/V Protector Alpha





# T/V MEGA BORG

## Gulf of Mexico



# OCEAN 255

## Tampa Bay



# M/V Ecstasy

## Miami



# M/V Ever Decent North Sea



# DSV Balmoral Sea New Orleans



# Deepwater Horizon



# Oil Pollution Act of 1990

- Implemented in February 1993
- Required Vessel Response Plans for Tank Vessels
- The following are named in each response plan:
  - Oil Spill Response Organization
  - Salvors
  - Firefighters





# Response Priorities

“Safety of human life must be given the top priority during every response action.”

“Stabilizing the situation to preclude the event from worsening is the next priority. All efforts must be focused on saving a vessel that has been involved in a grounding, collision, **fire**, or explosion, so that it does not compound the problem.”

“Defensive actions shall begin as soon as possible to prevent, minimize, or mitigate threat(s) to public health or welfare or the environment.”



# U.S. Coast Guard

## Marine Firefighting Contingency Plan

- Coordination of Marine Firefighting Response Activities
  - Unified Command
  - Potential Place(s) of Refuge (PPOR)
- Response Sequence
  - **Phase I:** Discovery and Notification
  - **Phase II:** Evaluation and Initiation of Action
  - **Phase III:** Assessment of the Situation
    - *Rescue » Exposure » Confinement »*  
*Extinguishment » Overhaul (RECEO)*  
*Ventilation – Stability – Dewatering*
  - **Phase IV:** Demobilization
  - **Phase V:** Documentation and Cost Recovery



# Salvage and Marine Firefighting Requirement for Vessel Response Plans

- The Oil Pollution Act of 1990 mandated that tank vessel owners ensure the availability of adequate response resources to respond to a vessel's worst-case discharge, including fire and explosion.
- The Vessel Response Plan regulations were not specific for salvage and marine firefighting requirements.
- Following a long history of public meetings, and regulatory postponements, on December 31, 2008, the Coast Guard issued the final Salvage and Marine Firefighting Regulation for tank vessels.



# Salvage and Marine Firefighting Requirements



## FOCUS ON RESOURCE AVAILABILITY

- ❖ Defines salvage and marine firefighting services and resources.
- ❖ Establishes planning timeframes for response.
- ❖ Provides criteria for determining resource provider adequacy.



# Salvage and Marine Firefighting Requirements

## SALVAGE AND MARINE FIREFIGHTING SERVICES:

### SALVAGE

- Assessment and Survey
- Stabilization
- Specialized Salvage Operations

### MARINE FIREFIGHTING

- Assessment and Planning
- Fire Suppression





# Salvage and Marine Firefighting Requirements

## Salvage and Marine Firefighting Service Timeframes:

Salvage:	NEAR (HOURS)	OFFSHORE (HOURS)
• Assessment and Survey		
– REMOTE ASSESSMENT AND CONSULTATION	1	1
– BEGIN ASSESSMENT OF STRUCTURAL STABILITY	3	3
– ON-SITE SALVAGE ASSESSMENT	6	12
– ASSESSMENT OF STRUCTURAL STABILITY	12	18
– HULL AND BOTTOM SURVEY	12	16



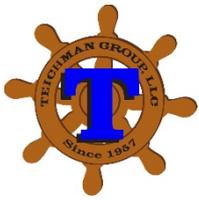
# Salvage and Marine Firefighting Requirements

Salvage:	NEAR (HOURS)	OFFSHORE (HOURS)
• Stabilization		
– EMERGENCY TOWING	12	18
– SALVAGE PLAN	16	22
– EXTERNAL EMERGENCY TRANSFER	18	24
– EMERGENCY LIGHTERING	18	24
– OTHER REFLOATING METHODS	18	24
– MAKING TEMPORARY REPAIRS	18	24
– DIVING SERVICES SUPPORT	18	24



# Salvage and Marine Firefighting Requirements

Salvage:	NEAR	OFFSHORE
•Specialized Salvage Operations	(HOURS)	(HOURS)
– SPECIAL SALVAGE OPERATIONS PLAN	18	24
– SUBSURFACE PRODUCT REMOVAL	72	84
– HEAVY LIFT	ESTIMATED	ESTIMATED



# Salvage and Marine Firefighting Requirements

## Marine Firefighting:

- Assessment and Planning

- REMOTE ASSESSMENT & CONSULTATION
- ON-SITE FIRE ASSESSMENT

PIER (HOURS)	NEAR (HOURS)	OFFSHORE (HOURS)
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1	1	1
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1	1	1
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1	1	1
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2	6	12
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2	6	12
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2	6	12
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- Fire Suppression

- EXTERNAL FIREFIGHTING TEAMS
- EXTERNAL FIREFIGHTING SYSTEMS

4	8	12
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4	8	12
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4	8	12
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4	12	18
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4	12	18
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# Salvage and Marine Firefighting Provider Selection Criteria



1. Currently working in response service needed
2. Has documented history of participation in successful salvage and/or marine firefighting operations, including equipment deployment
3. Owns or has contracts for equipment needed to perform response services
4. Has personnel with documented training certification and degree experience
5. Has 24-hour availability of personnel and equipment and history of response times compatible with the regulation



# Salvage and Marine Firefighting Provider Selection Criteria



6. Has on-going continuous training program
7. Has successful record of participation in drills and exercises
8. Has salvage and marine firefighting plans used and approved during real incidents
9. Has membership in relevant national and/or international organizations
10. Has insurance that covers the salvage and/or marine firefighting services which they intend to provide



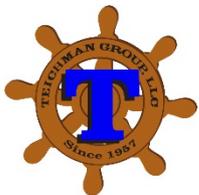
# Salvage and Marine Firefighting Provider Selection Criteria



11. Has sufficient up front capital to support an operation
12. Has equipment and experience to work in the specific regional geographic environments where the vessel operates
13. Has the logistical and transportation support capability required to sustain operations
14. Has the capability to implement the necessary engineering, administrative and personal protective equipment controls to safeguard the health and safety of their workers
15. Has familiarity with the salvage and marine firefighting protocol contained in the local ACPs for each COTP area for which they are contracted

# Marine Firefighting

1. Marine firefighting pre-fire plans must be included in the Vessel Specific Appendices.
2. Marine firefighting pre-fire plan distribution.
3. Statement that marine firefighting pre-fire plans have been provided to all firefighting resource providers listed.
4. Statement that certifications of marine firefighting pre-fire plan acceptability have been obtained from firefighting service resource providers.
5. Additional Vessel Specific Appendix Information.



# Marine Firefighting – In Perspective

1. Approximately 70% of firefighters in the United States are volunteers.
2. Less than 4% of U.S. firefighters are trained in marine firefighting techniques.
3. Very few consent agreements have been signed between municipal firefighters and marine firefighting service providers.
4. The USCG Captain of the Port is the Incident Commander for any fire aboard a vessel that is at anchor or underway.





## VRP Activation

“The resource providers identified in a VRP should be immediately notified and, as appropriate, activated when a discharge of oil, or a substantial threat of such a discharge of oil, exists.

## Chaffee Amendment

An owner or operator may deviate from the applicable response plan if the President or the Federal On-Scene Coordinator determines that deviation from the response plan would provide for a more expeditious or effective response to the spill or mitigation of its environmental effects.”

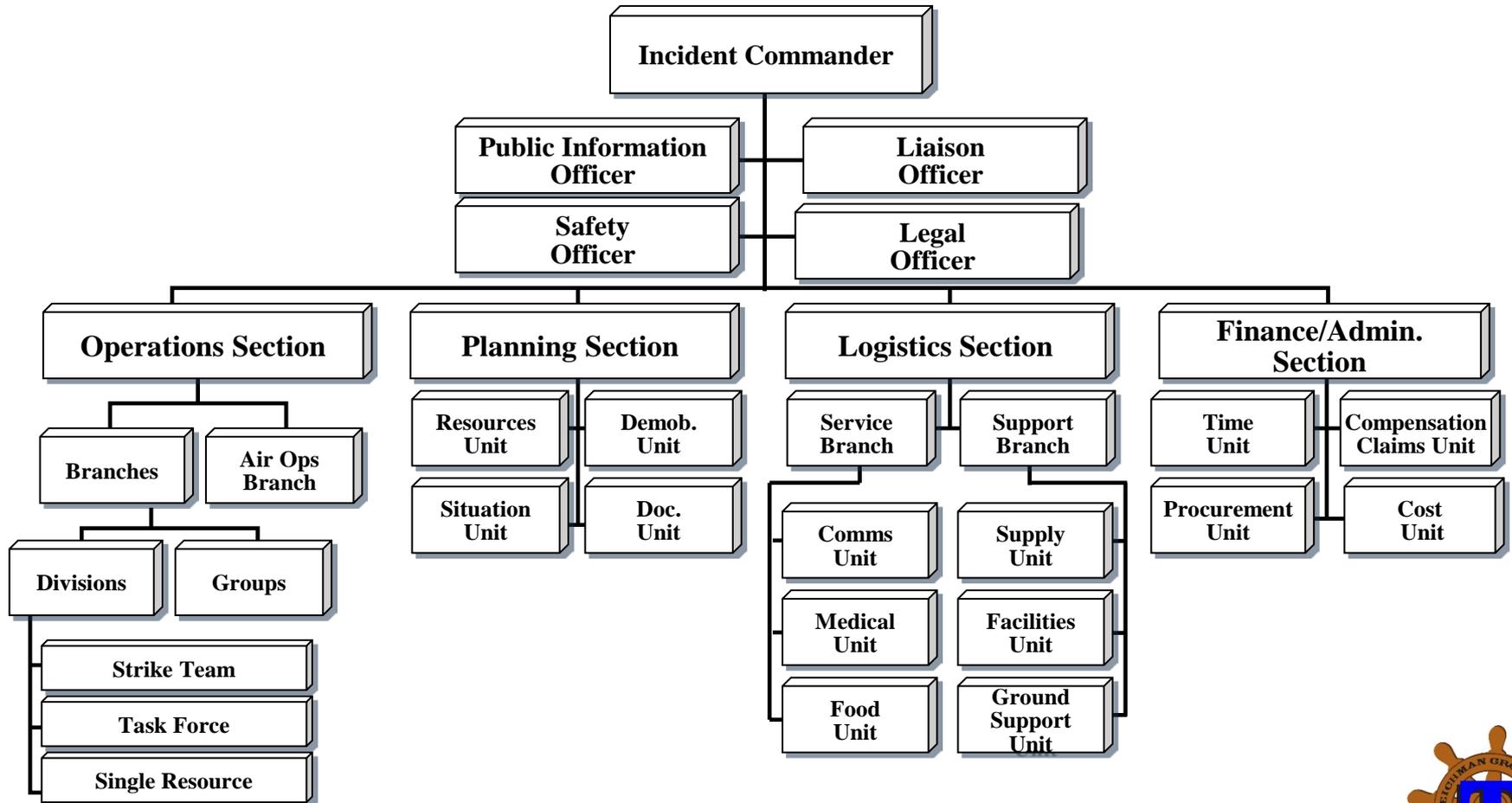


# Salvage and Marine Firefighting Services

- Salvage Master, Salvage Engineer and Fire Officers
- Naval Architecture Support
- Experienced Salvage Technicians
- Dewatering
- Lightering
- Support Vessels
- Logistics
- External Firefighting Teams
- Portable Equipment
- Thermal Imaging



# Incident Command System



# Salvors and the Incident Command System

- Salvors are highly-specialized, contracted resources with valuable expertise during the emergency phase of a response.
- Decisions on salvage operations must be made quickly to mitigate the impact of an incident.
- Unified Command and/or Incident Commander may need direct communications with the salvage master in early stages of the incident.



# Portable Marine Firefighting Pumps



# Emergency Lightering



# Portable Inert Gas and Nitrogen Generators



# Infrared Imagery

## Thermal Imaging Infrared (IR) Camera





Water Tight Door-Firefighter pre-entry assesment.

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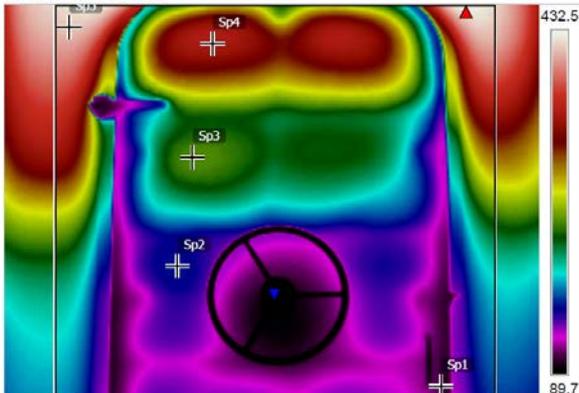
Measurements		°F
Ar1	Max	432.5
	Min	82.3
	Average	227.3
Sp1		114.9
Sp2		186.8
Sp3		277.3
Sp4		369.9
Sp5		420.2

Parameters

Emissivity	0.95
Refl. temp.	78 °F

Geolocation

Compass	NW
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# Tug and Barge



# Tug and Barge



# Tank Barge Explosions

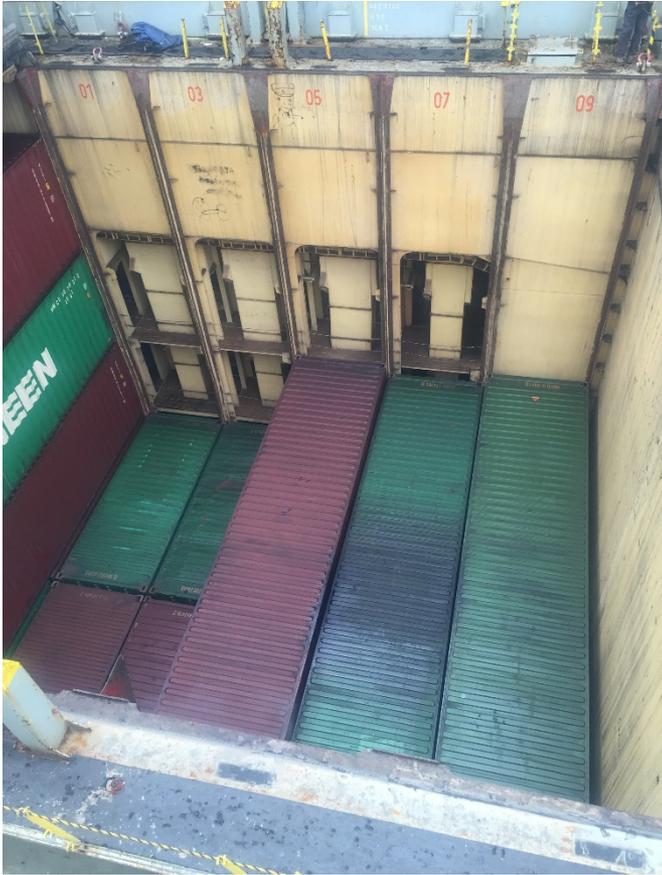




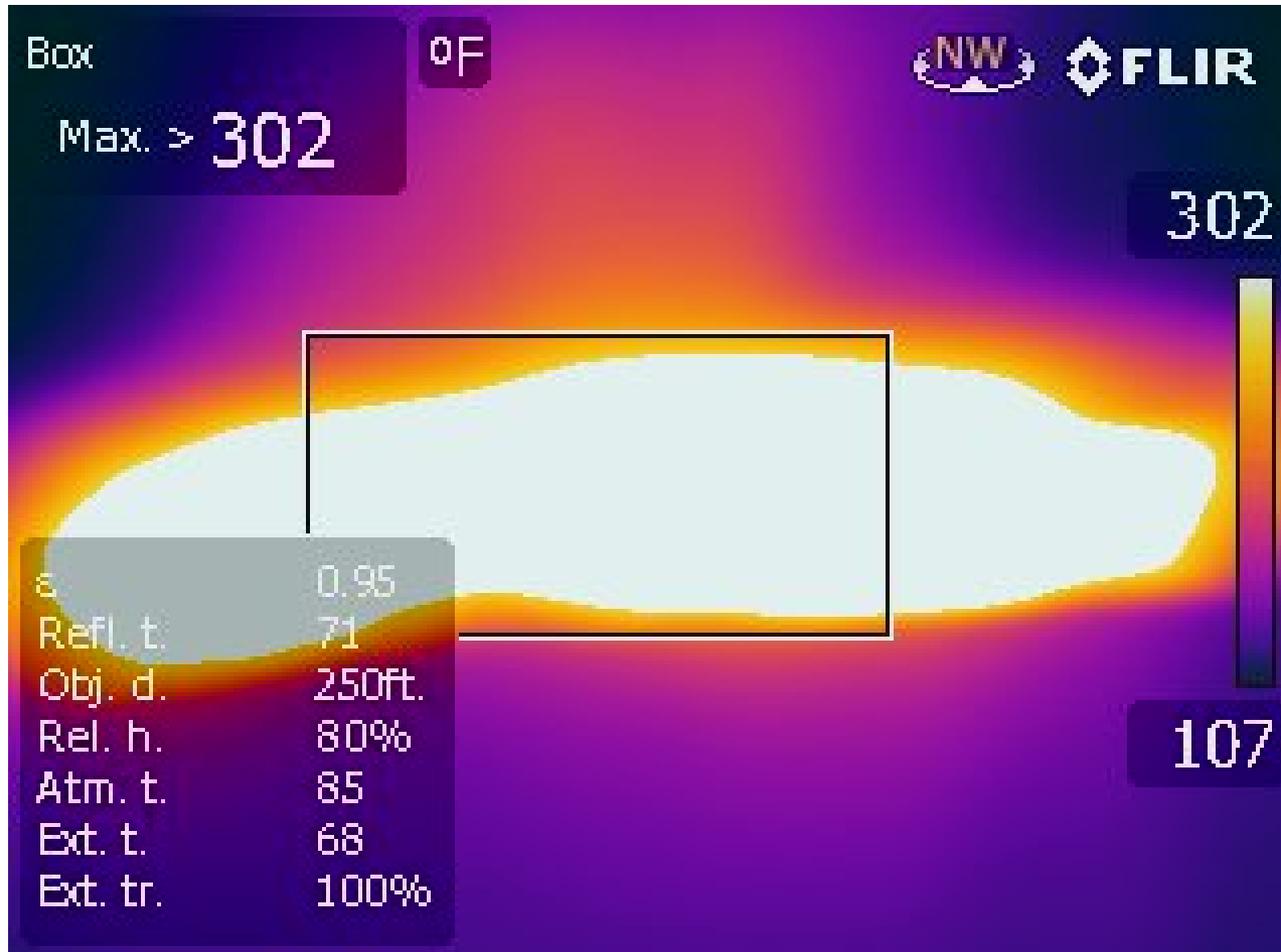
# M/V Conti Daphne



# M/V Conti Daphne



# M/V Conti Daphne



# Recommendations

- Active the Vessel Response Plan
- Integrate Municipal, Industrial and Commercial Firefighting Service Providers
- Formalize Consent Agreements
- Include municipal, industrial and commercial firefighting service providers in drills, exercises and response training
- U.S. Coast Guard should assume a leadership position in integrating forces to achieve National Contingency Plan objectives.



# Advances in Marine Firefighting: Cases Studies and Lessons Learned

