PROCEEDINGS

APEC WORKSHOP ON
OIL SPILL RESPONSE AND PLANNING

Singapore

March 25-26, 2004

ASIA-PACIFIC ECONOMIC COOPERATION

MARINE RESOURCE CONSERVATION WORKING GROUP

Sponsored by:

Department of State
United States of America

Organized by:

Minerals Management Service
United States of America

Maritime and Port Authority
Singapore

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PREFACE

APEC WORKSHOP ON OIL SPILL RESPONSE AND PLANNING

SINGAPORE

MARCH 25-26, 2004

Recalling that in 1996 the APEC Leaders affirmed "the central role of the business sector in the APEC Process" and the Marine Resources Conservation (MRC) Working Group adopted an Action Plan for the Sustainability of the Marine Environment that identifies three central tools to meet its objectives: research, exchange of information, technology and expertise; capacity building, training and education; public and private sector participation and partnership.

Recognizing that this APEC Workshop in Singapore was approved by the APEC Marine Resources Conservation Working Group at its May 2001 meeting in Hong Kong;

Recalling the recommendation of the APEC Workshop on Assessing and Maintaining the Integrity of Existing Offshore Oil and Gas Facilities, held in Beijing, China, in 2000 to consider a workshop that addresses the state of the art technologies and methodologies available worldwide for rapid response to oil spills from ship accidents as well as from offshore oil production facilities; and

Noting that the APEC Workshop provided for an exchange of views among APEC economies on oil spill response and planning.

The APEC Workshop identified issues and made recommendations for improvements within each participating Economy.

AGENDA

ASIA-PACIFIC ECONOMIC COOPERATION WORKSHOP

Oil Spill Response and Planning

March 25-26, 2004

Singapore

Thursday, March 25, 2004

8:15 REGISTRATION

9:00 Welcome Remarks - RADM (NS) Lui Tuck Yew, Chief Executive, Maritime and Port Authority (MPA) of Singapore

9:10 Welcome Remarks - Mr. Frank L. Lavin, Ambassador of the United States to the Republic of Singapore

9:20 Panel Discussion on Cooperation between Government and Industry - Chair, Ms. Kathy Bentley, U.S. Department of State (DOS) - Representatives from MPA, East Asia Response Ltd. (EARL), Minerals Management Service (MMS), U.S. Coast Guard (USCG), Marine Spill Response Corporation (MSRC), Exxon-Mobil

10:40 Tea Break

11:00 Recent U.S. oil spill response research results – Joseph Mullin, MMS

11:30 Presentation on current testing, training and research at OHMSETT, the U.S. National Oil Spill Response Test Facility – James Lane, MMS

12:00 Lunch – Hosted by the United States

2:00 Current State of the Art in Oil Spill Response Technology and Recent Research Results - Alternative Response Measures in the Pacific Region, Ho Yew Weng, EARL

2:30 Current State of the Art in Oil Spill Response Research Results - Alternative Response Measures in the United States Offshore, MSRC.

3:00 Tea Break

3:20 Panel discussion on Assessment of Current State of Practive in Spill Response, Existing Plans to Upgrade Response Capability, and Recommendations - Chair, Mr. Joseph Mullin, MMS - Representatives from Australia, Indonesia, Korea, Papua New Guinea, United States

4:50 Conclusions and Summary - Ms. Kathy Bentley, DOS

5:00 Closing Remarks - Chua Lian Ho, Director (Training), MPA

5:10 Closing Remarks - Mr. Ralph Ainger, Chief, Office of External Affairs, MMS

5:20 Closing Remarks - Ms. Kathy Bentley, International Relations Officer for Pacific Oceans Affairs, DOS

5:30 Reception - Hosted by the MPA

Friday, March 26, 2004

8:20 Assemble in lobby of Shangri-La Hotel

9:15 Site visit at the EARL facility

11:30 Site visit at the Integrated Simulator Centre (ISC)

12:45 Depart ISC for Shangri-La Hotel

ANNEX I

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ANNEX II

REPORT OF THE APEC WORKSHOP ON OIL SPILL RESPONSE

MARCH 25-26, 2004

SINGAPORE

The APEC workshop on Oil Spill Response and Planning was held in Singapore. Participants attending the meeting are shown in Annex I.

The workshop was the product of the APEC Marine Resources Conservation Working Group. It supports the APEC Action Plan on Sustainability of the Marine Environment, drawn up by APEC economy members, which calls for developing integrated approaches to coastal management; prevention, reduction and control of marine pollution and sustainable management of marine resources.

The workshop was sponsored by the U.S. Department of State (DOS) and organized by the U.S. Minerals Management Service and the Maritime and Port Authority (MPA) of Singapore. The workshop was designed to improve oil spill response capabilities in the Pacific Region by improving standards in response planning, equipment, methods, operations and training. Participants identified state-of-the-art technologies and methodologies available worldwide and were encouraged to increase cooperation among the APEC Economies.

The workshop was scheduled to immediately follow the International Chemical and Oil Pollution Conference and Exhibition (ICOPCE) organized by the MPA. of Singapore. The ICOPCE 04 Conference was held on March 22 and 23 and the Singapore Maritime Exhibition on March 24. The ICOPCE conference addressed issues concerning conventions and regulations affecting the oil and chemical industries, pollution prevention, liability and compensation and recovery. Participants who attended both events were offered the broad overview provided by an international conference and the focussed discussions of a workshop.

The APEC Workshop participants were welcomed to Singapore by RAdm. Lui Tuck Yew, Chief Executive of the MPA and by Mr. Frank Lavin, Ambassador of the United States to the Republic of Singapore.

Following the welcome remarks, Ms. Kathy Bentley, International Relations Office for Pacific Oceans Affairs, DOS, chaired a panel discussion on cooperation between government and industry. Panel members included Capt. Muhammad Segar, MPA, Mr. Richard Tatner, Oil Spill Response Limited Global Alliance, Capt. Scott Hartley, U.S. Coast Guard (USCG), Mr. James Lane, MMS, Mr. Douglas O'Donovan, Marine Spill Response Corporation (MSRC), and Mr. Roger Krueger, Exxon Mobil.

Each member briefly described the responsibilities of his organization and the spill response program in place in his country. Discussion covered established models, regulations, responsibility for spills, mystery spills, funding of cleanup, and certification of response companies. The overall consensus was that responders must have a plan and they must be prepared before a spill occurs. It was also agreed that preparedness requires a collaborative effort with all stakeholders.

The morning session include a presentation by Mr. Joseph Mullin, Physical Scientist, MMS, on recent U.S. oil spill response research results. He was followed by Mr. James Lane, Physical Scientist, MMS who presented a paper on current testing, training and research at the Oil and Hazardous Materials Simulated Environmental Test Tank (OHMSETT).

Following lunch, Mr. Ho Yew Weng, Operations Manager, East Asia Response Limited (EARL), discussed the current state of the art in oil spill response technology and recent research results in Singapore. Mr. Douglas O'Donovan, Technical Services Manager, Marine Spill Response Corporation, then presented a paper on current state of the art and recent research results in the United States.

After the break, Mr. Joseph Mullin chaired a panel discussion on assessment of current state of practice in spill response, existing plans to upgrade response capability and recommendations. Panel members included Mr. David Baird, General Manager of Emergency Response of Australia; Mrs. Eka Sukmawati, Assistant Director of Guard and Rescue of Indonesia; Mr. Uk Kim, Manager of Response Team of Korea; Ms. Kalsom Abdul Ghani, Director, Department of Environment Selangor of Malaysia; Mr. Gedisa

Kone, Environmental Officer of Papua New Guinea; and Captain Scott Hartley, Commander of the National Strike Team, United States Coast Guard. Copies of their presentations are provided in these Proceedings.

Ms. Kathy Bentley, DOS provided a summary and conclusions noting that participants in the workshop have a wide array of expertise and experience in oil spill response and planning and that by working together to share information and to improve their response capabilities, they can further the goals of the APEC Action Plan. All participants stressed the need to cooperate on a regional and international level. Some APEC members already have formal regional agreements to work together in combating oil spills and some have adopted international conventions and guidelines.

Closing remarks were delivered by Mr. Chua Lian Ho, Director of the Training Division of MPA, Mr. Ralph Ainger, Chief of the External Affairs Office of MMS, and Ms. Kathy Bentley of DOS.

WELCOME REMARKS BY RADM(NS) LUI TUCK YEW, CHIEF EXECUTIVE, MARITIME AND PORT AUTHORITY OF SINGAPORE (MPA), AT THE APEC WORKSHOP ON OIL SPILL RESPONSE AND PLANNING ON 25 MARCH 2004 AT THE SHANGRI-LA, SINGAPORE

Your Excellency, Mr Frank Lavin, United States Ambassador to Singapore, distinguished guests, ladies and gentlemen, a very good morning to all of you.

It is a great pleasure for me to join you this morning at the Workshop on Oil Spill Response and Planning jointly organised by the United States Minerals Management Service and the Maritime and Port Authority of Singapore. Allow me to first extend a warm welcome to all participants who are here today, especially those who have come from abroad and to wish you a pleasant and enjoyable stay in Singapore.

We are pleased to be able to jointly organise this workshop with the United States' Minerals Management Service. This workshop will update us on the latest approaches and technologies adopted by maritime nations in preventing and combating oil spills. It is a subject to which we, in Singapore, attach great importance, and I trust that the discussions and sharing of knowledge and techniques at this workshop will be meaningful and rewarding.

Last year, we recorded some 135,000 vessel calls in Singapore, totalling 986 million gross tons. The narrow waters of the Singapore Strait in the midst of one of the busiest shipping lanes in the world dictate that we must be especially vigilant since a major maritime accident in this vicinity could significantly disrupt shipping traffic resulting in serious repercussions for the world's economy. Hence, we view the potential of maritime incidents seriously and have put in place comprehensive

measures to enhance security and navigational safety as well as well-tested procedures to clean up oil and chemical spills should they occur.

I will leave the topic of maritime security to another occasion. On measures to enhance safety of navigation in the narrow and busy straits of Malacca and Singapore and in our port waters, we have introduced several measures. To enhance the coverage and effectiveness of the state-of-the-art radar-based Vessel Traffic Information System (VTIS), which has been in place since 1990, we have added 2 more radars to the existing network of 9 radars. 3 more Automatic Identification System (AIS) base stations will also be added by July 2004 to the existing 2 AIS base stations to help enhance the safety of navigation. The integration of the AIS transponder system with the VTIS, and the use of the Differential Global Positioning System enable MPA to identify and track ships for all AIS-equipped ships calling at Singapore.

Quality training is also an important feature to enhance navigational safety. Our Integrated Simulation Centre established in 2002, and run on a not for profit basis, is now widely used by the maritime community for high-end individual and team training. It has contributed immensely to equip mariners with the right mindset and skill set to respond to contingencies. Such training is an on-going aspect of the aviation industry and a key contributor to aviation safety. Pilots are put through stringent tests on a regular basis and the renewal of their flying licence depends in part on how well they perform in such examinations ashore. Is there something here that we can learn from the aviation industry?

Even with the best preventive measures, accidents happen with some resulting in pollution. MPA takes a co-ordinated approach towards combating pollution. MPA has developed a Marine Emergency Action Procedure to deal with various types of marine emergencies such as collisions, groundings and oil and chemical pollutions. Depending on the severity of the marine emergencies, a host of public and private sector organisations such as the Singapore Civil Defence Force, oil companies and the local oil spill response companies such as East Asia Response Private Limited (EARL) and the Singapore Oil Spill Response Centre (SOSRC) will be called upon to assist MPA in dealing with the marine emergencies. To enhance our readiness to combat oil and chemical spills, we carry out yearly exercises on our Oil Spill Contingency Plan and the Chemical Contingency Plan.

The use of MPA's Oil Spill Model is another important factor for MPA to successfully combat oil spill operations. Using a sophisticated and proven model to provide hourly updates on wind direction, tidal currents, and other aerial and ground inputs to track the movement of oil, we are able to accurately predict the movement of spilled oil, thereby allowing us to effectively deploy anti-pollution craft and equipment to expedite clean up operations.

The regular exercises and the Oil Spill Model helped us to manage two major oil spill clean-up operations. The EVOIKOS (in 15 Oct 1997) and NATUNA SEA (in 3 Oct 2000) oil spills were successfully cleaned up by the MPA with assistance from the entire community. The "EVOIKOS" spilled some 28,500 tonnes of marine fuel oil after colliding with another supertanker. This is a significant volume, especially so given the close proximity to shore. These accidents happened despite advance

warnings from the Singapore Vessel Traffic Information Service. During both these incidents, the shipping traffic was unaffected and the tourist resorts and the shore marine facilities remained open for business. The total clean-up cost and damages were of the order of $15 million.

Another key component in the prevention and combat of oil spill is the use of legislation. Singapore has acceded to the IMO's Oil Pollution Preparedness, Response and Co-operation Convention in March 1990. We have also acceded to the Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances in October 2003. This OPRC-HNS Protocol aims to facilitate international co-operation and mutual assistance in preparing for and responding to HNS pollution incidents and to encourage states to develop and maintain adequate capabilities to deal with HNS pollution emergencies. To give effect to the OPRC-HNS Protocol in Singapore, a new set of regulations will be introduced in April 2004 although the protocol has yet to come into force worldwide.

Ensuring that Singapore remains one of the world’s busiest port and a major hub port is critical in MPA’s continuing drive to develop Singapore as an International Maritime Centre. Although we have done well in the area of oil spill response and planning, we cannot sit back and rest on our laurels. MPA can count on an experienced and tested team. We must however continue to improve on our preparedness and response to ensure the safety of navigation, the prevention of oil pollution and effectively manage and combat any future oil spill incidents to avert a major catastrophe.

On this note, I wish all of you will have a fruitful and interesting day ahead.

Thank you.

OPENING REMARKS

AMBASSADOR FRANK LAVIN

Thanks for that introduction Kathy. And thank you Rear Admiral Lui for Singapore's hosting and co-sponsoring this workshop with the United States.

It is good to see so many representatives here today from APEC economies and from the petroleum industry. For this is a true transnational issue, and it is a public-private issue as well. It is these two themes - cross-border and cross-sector -- that I would like to leave with you today.

As to the transnational point, the business of transporting petroleum and chemicals is about as globalized as you can get. I am reminded of the vessel Prestige, which sank off the coast of Spain in November 2002. Here was a Liberian tanker, registered in the Bahamas, managed in Greece, and chartered by a company in Switzerland. The oil spilled affected primarily the Spanish coast, but the effects on bird populations went beyond Spain. One of the sad lessons of this episode was that a ship in distress was turned away by authorities in Spain and Portugal because it represented a risk. As a result the ship broke apart on the high seas, resulting in a far greater environmental disaster. The Prestige could go on leaking its remaining cargo of 20 million gallons - approximately twice what the Exxon Valdez spilled in Alaska - until the year 2006 or beyond.

The public-private point is worth reflecting on as well. Regulators need to work with industry, which often has useful ideas and procedures in place. Industry realizes that spills represent an economic loss. By keeping in regular discussion with industry, regulators can devise approaches that are realistic and respect commercial logic.

For its part, industry also needs to work with the regulators. All of our citizens want a safe and clean environment. If industry does not respond to this fundamental law of human nature, they put their operations in jeopardy. What country can host a company that puts the environment at risk?

The point is that good prevention and response strategies can cut down on the costs of an oil spill. But no one country working alone, nor governments nor the private sector by themselves, can mount effective prevention and response efforts. In the case of the Prestige, lack of accountability turned a manageable bad situation into an unmanageable catastrophe.

This workshop has an important role to play in bringing authorities and the private sector together to identify best practices that we can then shape into our own local prevention and response strategies. We are all here to share ideas because we understand that there is no competitive advantage to keeping response measures secret.

APEC members include some of the leading oil refiners, shippers, and processors as well as the world's largest fleets and most vital sea lanes. There is no more appropriate gathering of talent and necessity to tackle this issue. Ladies and gentlemen, the United States is glad to join Singapore in co-sponsoring this conference. I wish you every success in your mission.

Thank you.

SUMMARY OF PANEL DISCUSSION
ON COOPERATION BETWEEN GOVERNMENT AND INDUSTRY

Ms. Kathy Bentley, International Relations Office for Pacific Oceans Affairs, U.S. Department of State, chaired a panel discussion on cooperation between government and industry. Panel members included Capt. Muhammad Segar, Maritime and Port Authority of Singapore (MPA), Mr. Richard Tatner, Oil Spill Response Limited Global Alliance, Capt. Scott Hartley, United States Coast Guard (USCG), Mr. James Lane, Minerals Management Service (MMS), Mr. Douglas O'Donovan, Marine Spill Response Corporation (MSRC), and Mr. Roger Krueger, Exxon Mobil.

Each member briefly described the responsibilities of his organization and the spill response program in place in his country. Most countries have established models indicating industry responsibility and government oversight.

Audience questions spurred discussion of regulations, responsibility for spills, mystery spills, funding of cleanup, certification of response companies, and problems with customs laws regarding movement of equipment. The overall consensus was that responders must have a plan (both national and company) and they must be prepared before a spill occurs. It was suggested that regional responders participate in each other's drills. Singapore and Indonesia already have a formal agreement to cooperate on oil spill response. Australia and has similar agreements. All agreed that preparedness requires a collaborative effort and that all stakeholders must be included in planning.

PANEL DISCUSSION ON

COOPERATION BETWEEN GOVERNMENT AND INDUSTRY

PRESENTATION BY

JAMES LANE

U.S. MINERALS MANAGEMENT SERVICE

MMS National OCS Oil Spill Program

- Prevention
  - Regulations
  - Inspections
- Planning
  - Spill Plans
  - Organization
  - Equipment
- Preparedness
  - Training
  - Drills
  - Inspections
- Response

Emergency Response – RP Identification and Coordination

- Location Databases
- Attribute Databases
- Mapping Capabilities
- Spill Abatement
- FOSC Coordination

Emergency Response – Event Management

- ICS Integration
- Risk Minimization
- Pollution Prevention
- Repair Procedures
- Operational Status

RECENT U.S. OIL SPILL RESPONSE

RESEARCH RESULTS

PRESENTATION OF

JOSEPH MULLIN

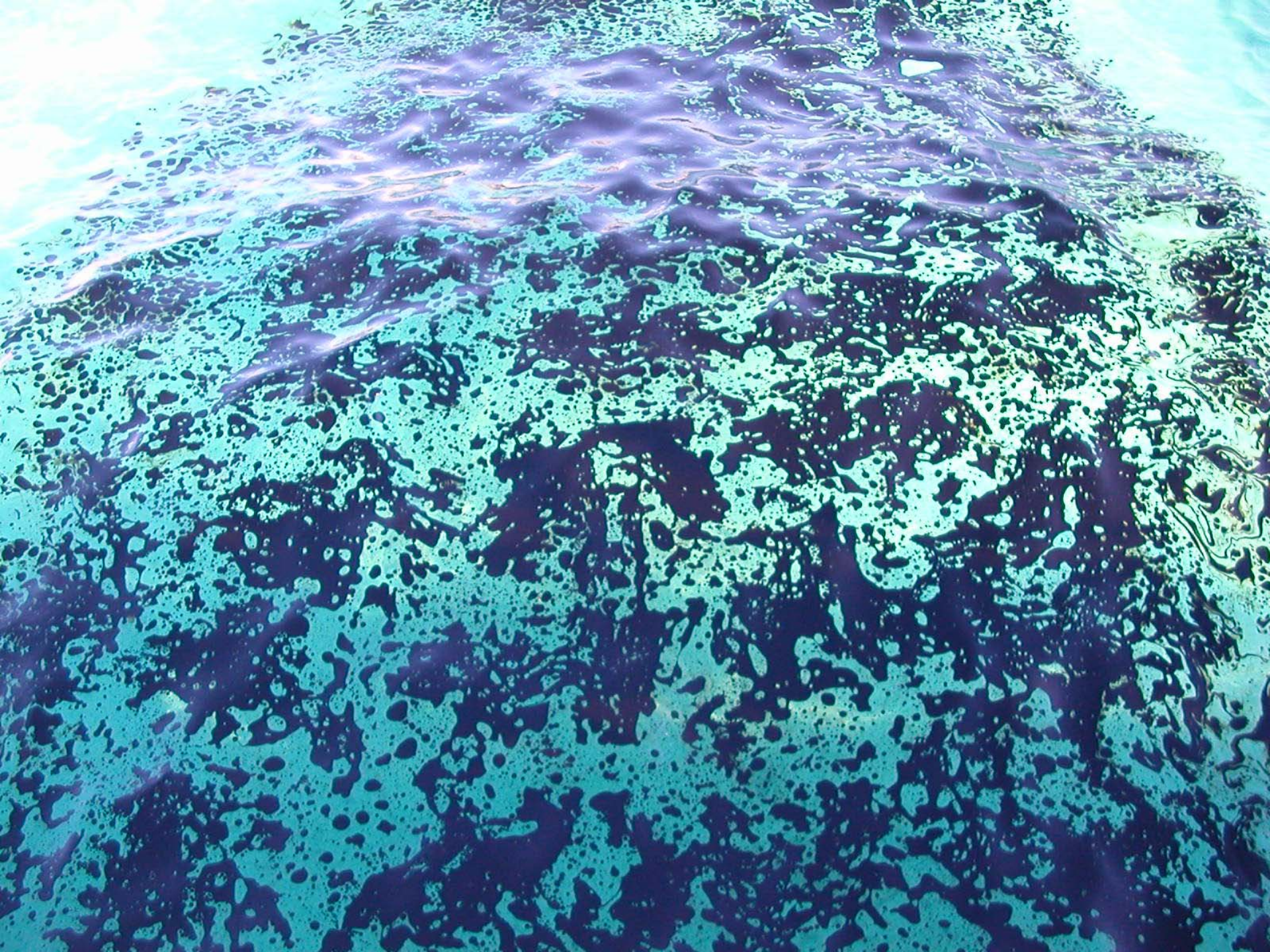
U.S. MINERALS MANAGEMENT SERVICE

Recent Results From Oil Spill Response Research

Joseph V. Mullin
Program Manager, Oil Spill Response Research
U.S. Minerals Management Service

Dispersant Effectiveness Research

MMS




U.S. COAST GUARD
U.S.
COAST
GUARD

In Situ Burning of Spilled Oil

Topics

- Research Burns
- Testing of Fire Resistant Boom
- In Situ Burning in Marsh Environments

MMS


12 14:43


ALBERT E. WATTS

In Situ Burning Research Results

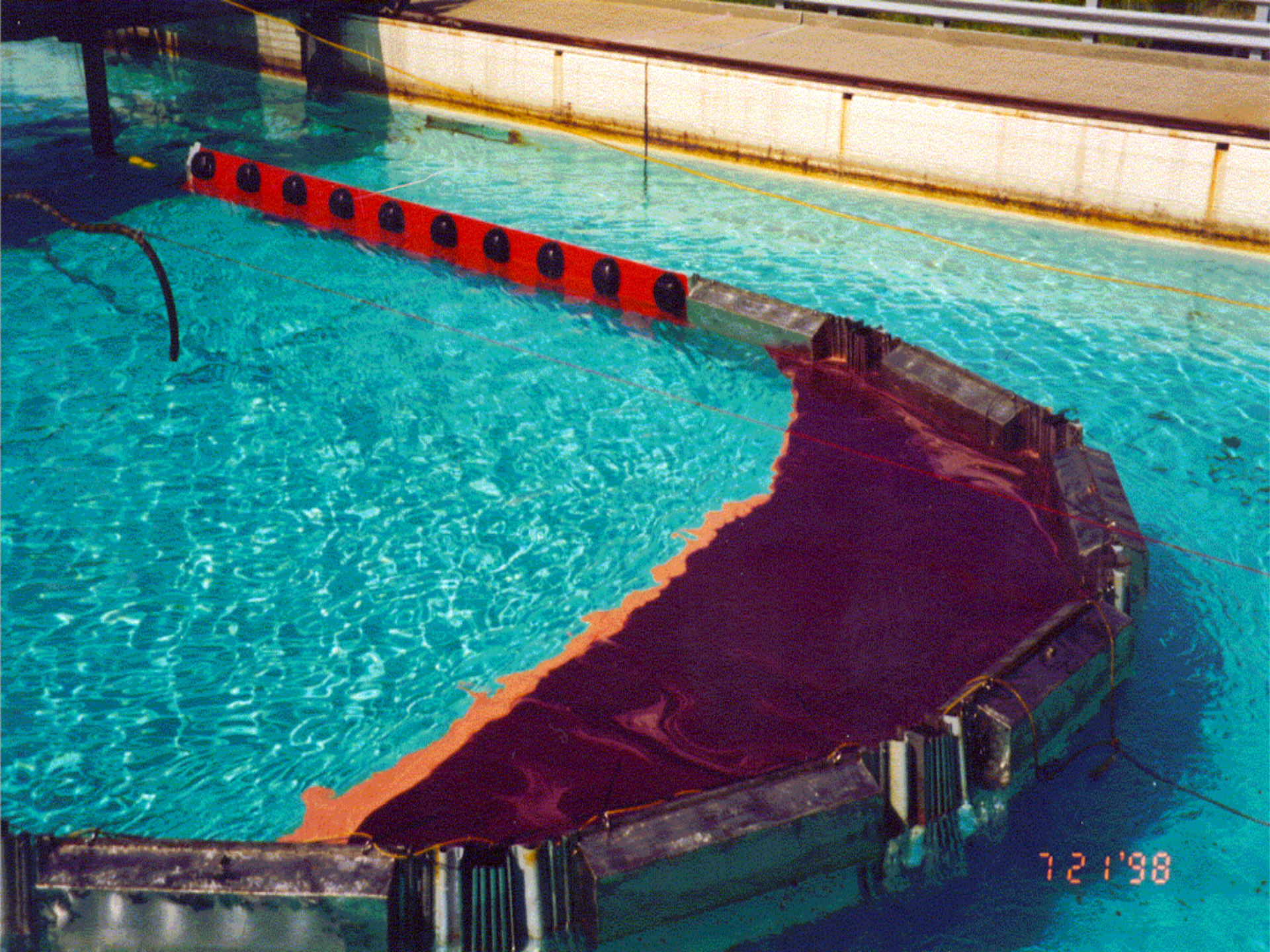
- Thickness is crucial.
- Efficiency depends on thickness
- Burning starts at 2-3mm.
- Burning rate is 3mm/min or 5,000 L per m^2 per day

MMS

In Situ Burning Research Results

- Winds less than 20 knots, Waves less than 1.2 m
- Water-in-oil emulsions detrimental
- Air emissions not a serious concern
- No aquatic toxicity

MMS

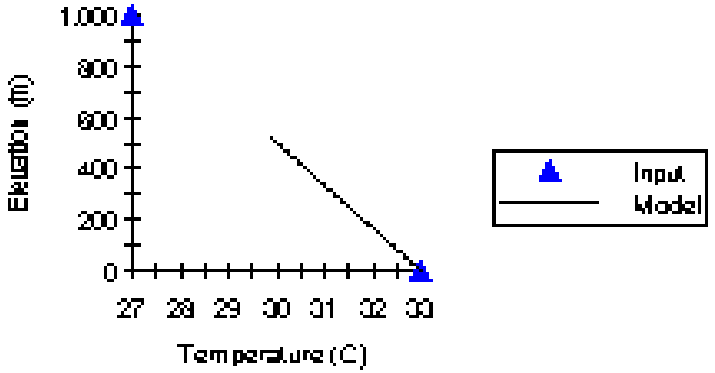

7 21 '98

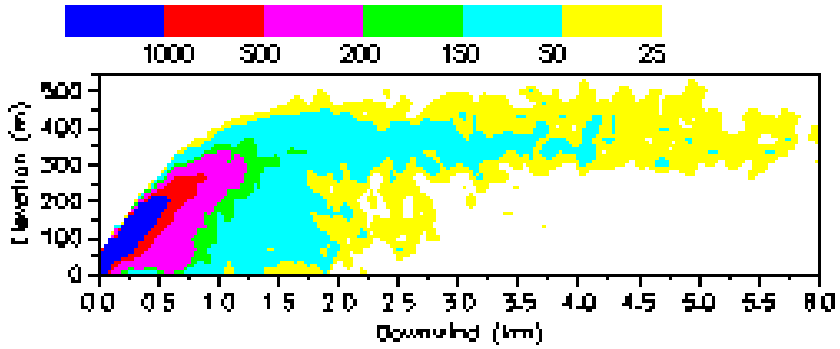
ALOFT-FT 3.04: D:\aloft\data\Test1.adf - Summary

Print | Contour Style | Contour Concentrations | Axis Ranges | Combustion Products

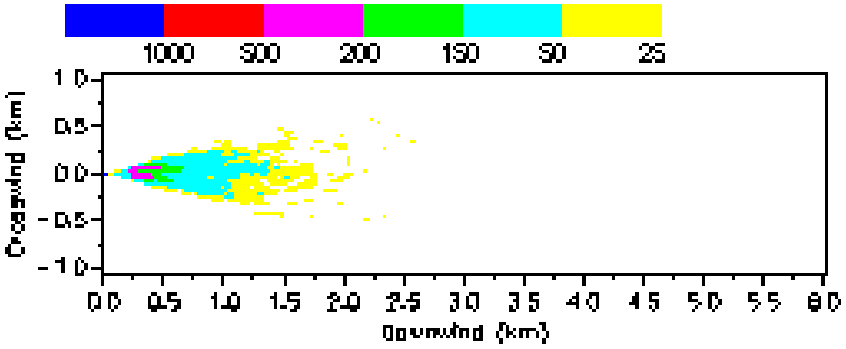
ALOFT-FT 3.04
test case 1
Alaska North Slope Crude
HRR - 1.750 (MW/m^2) BR - 0.05100(kg/s-m^2)
Wind - 5.0 (m/s) S Theta - 20.0 (deg) S Phi - 20.0 (deg)

Fire	Area (m^2)
1	33.0





Smoke Particulate PM10 Concentration (micrograms/cubic meter - one hr avg) Vertical Plane. 0 km Crosswind



Smoke Particulate PM10 Concentration (micrograms/cubic meter - one hr avg) Horizontal Plane. 0 m Elevation

Position

Downwind: 2.1551 km

Crosswind: 0 km

Vertical: 333.69 m

Product Concentration

one hour average

Smoke Particulate PM10: 60.5729

micrograms/cubic meter

In Situ Burning of Oil Spills
2 CD – Set

- Comprehensive collection of scientific information on in situ burning as a response tool.

- Contains 350 technical documents and one hour of video

- All operational aspects of burning are covered in detail.

- Human health, safety and potential environmental impacts are addressed

- MMS distributes this 2-CD set without charge

PRESENTATION ON

CURRENT TESTING, TRAINING AND RESEARCH

AT THE

OIL AND HAZARDOUS MATERIALS

SIMULATED ENVIRONMENTAL TEST TANK (OHMSETT)

JAMES LANE

U.S. MINERALS MANAGEMENT SERVICE

Ohmsett

The National Oil Spill Response Test Facility

James Lane

APEC Workshop

Oil Spill Response & Planning

Singapore

March 25, 2004


NEW YORK
NEW JERSEY
New York City
Newark
LaGuardia
JFK
Ohmsett

Ohmsett:

The National Oil Spill Response Test Facility

Tank dimensions

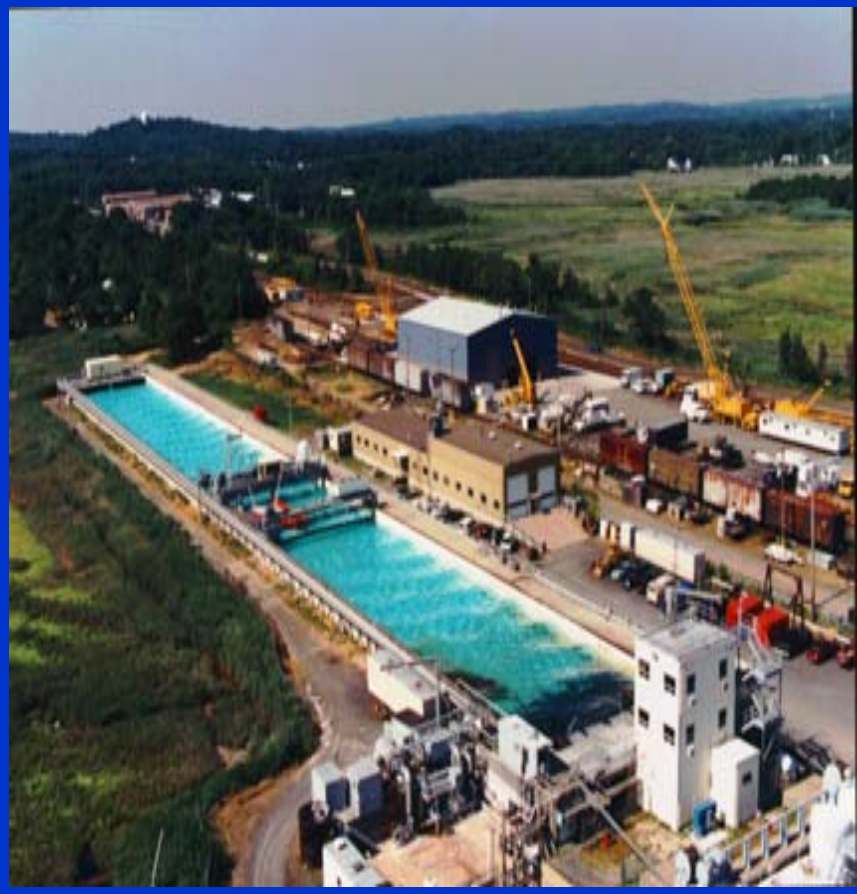
- 203 meters long
- about 20 meters wide
- about 2.4 meters deep

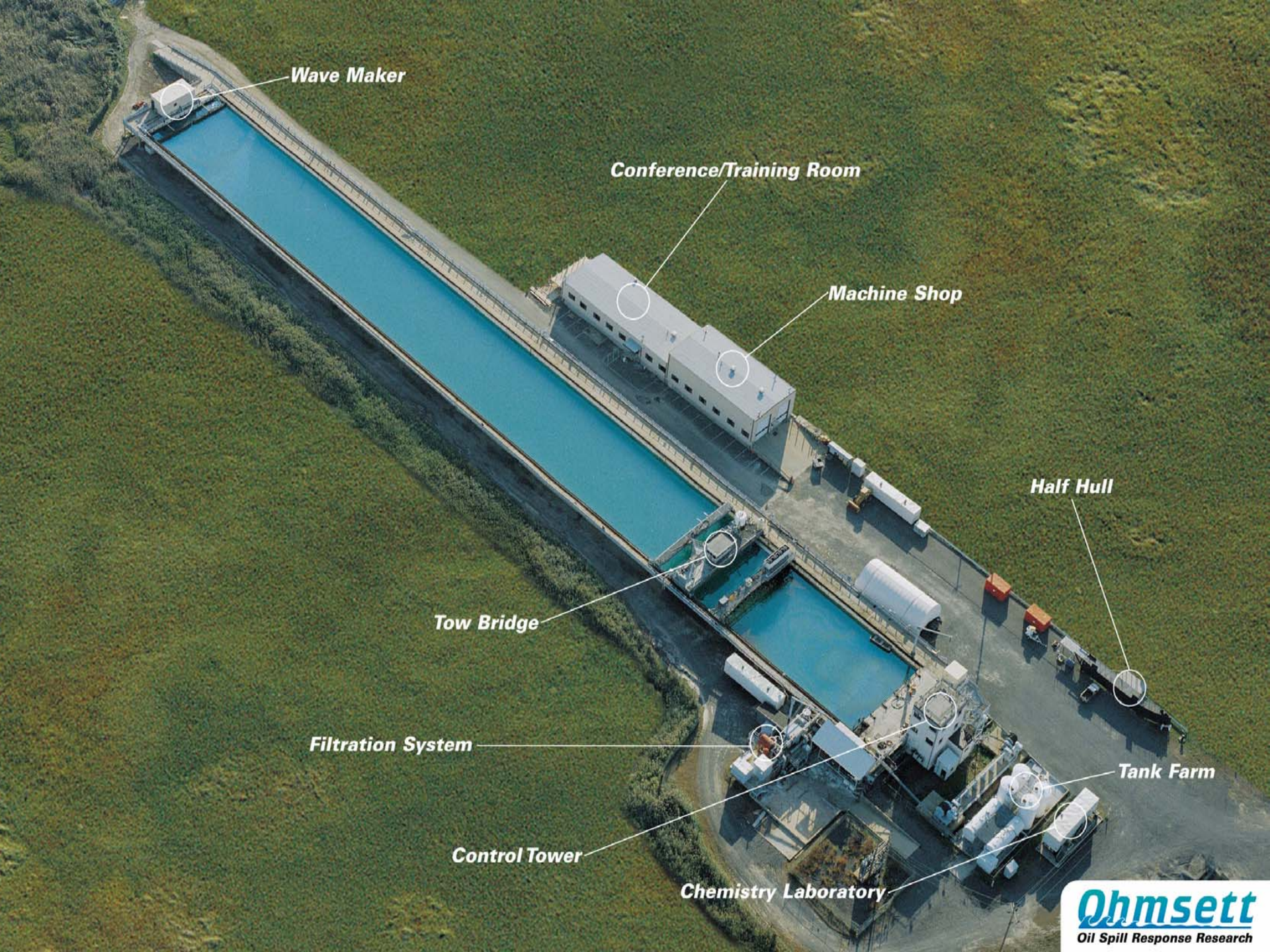
Holds 9.8 million liters of water

Tow bridge capable of speeds up to 6.5 knots

Wave generator produces 3 wave types up to a meter high

Test full sized equipment and train with oil - up to 5,700 liters per run





Ohmsett
Oil Spill Response Research

Ohmsett History

- EPA built and operated from 1974 – 1989
- Returned to U.S. Navy in 1989
- Exxon Valdez spill occurred March 1989
- Passage as OPA of 1990
- MMS assigned management responsibility
- Renovation and Re-Opening in 1992

Background

- Ohmsett is the technology demonstration test bed for the TAR Oil Spill Response Research Program (OSRR).

- Funds to conduct MMS's OSRR Program and to operate Ohmsett are appropriated from the Oil Spill Liability Trust Fund, i.e. potential polluters pay to fund research and Ohmsett (5 cent/bbl tax).

- Supports MMS objective of protecting marine environment by:
  - improving oil spill response technology and equipment
  - increasing responder effectiveness through realistic training

- Supports MMS approval process for oil spill contingency plans by providing independent testing and evaluation data on equipment.

Ohmsett

Oil Spill Response Research

Types of Testing

- Containment Boom
- Skimmers
- Sorbents
- Research & Development
- Emulsions and other oil properties
- Viscous Oil Pumping
- In-situ Burning
- MORICE
- Dispersant Testing
- Remote Sensing


35
NOFI Current Buster 600
22 9:26AM


24 10:46AM

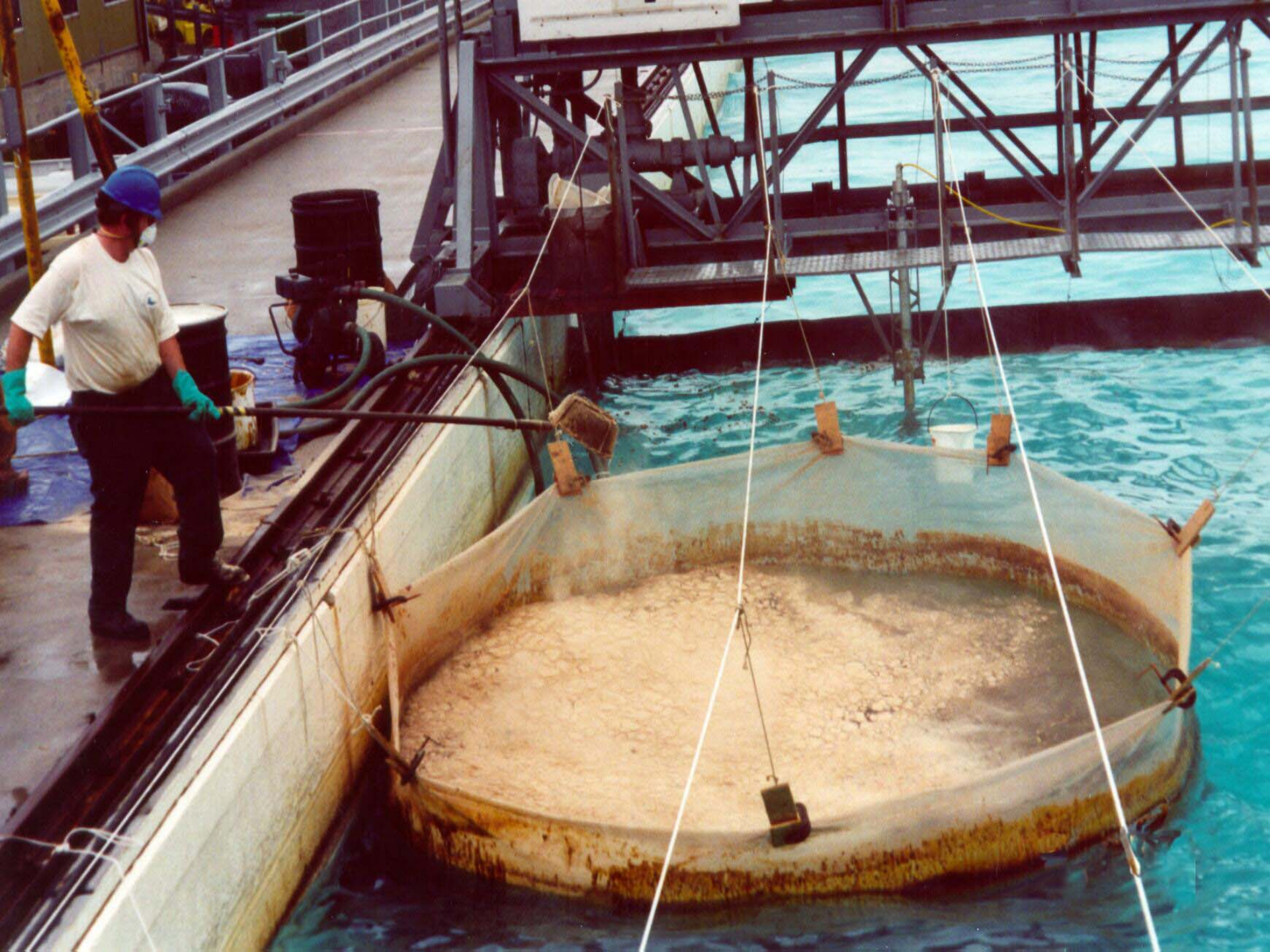

1 2 3 4 5 6 7 8
9
USN 01
NAVY
SUPSALV
14 9:32AM

Improvements in Mechanical Containment & Recovery

- Increase in tow speeds for oil spill containment booms
- High speed skimming systems (>3 knots)

- About 90% of independent test data on oil containment booms and skimmers was collected at Ohmsett
- First article testing of mechanical equipment

MMS

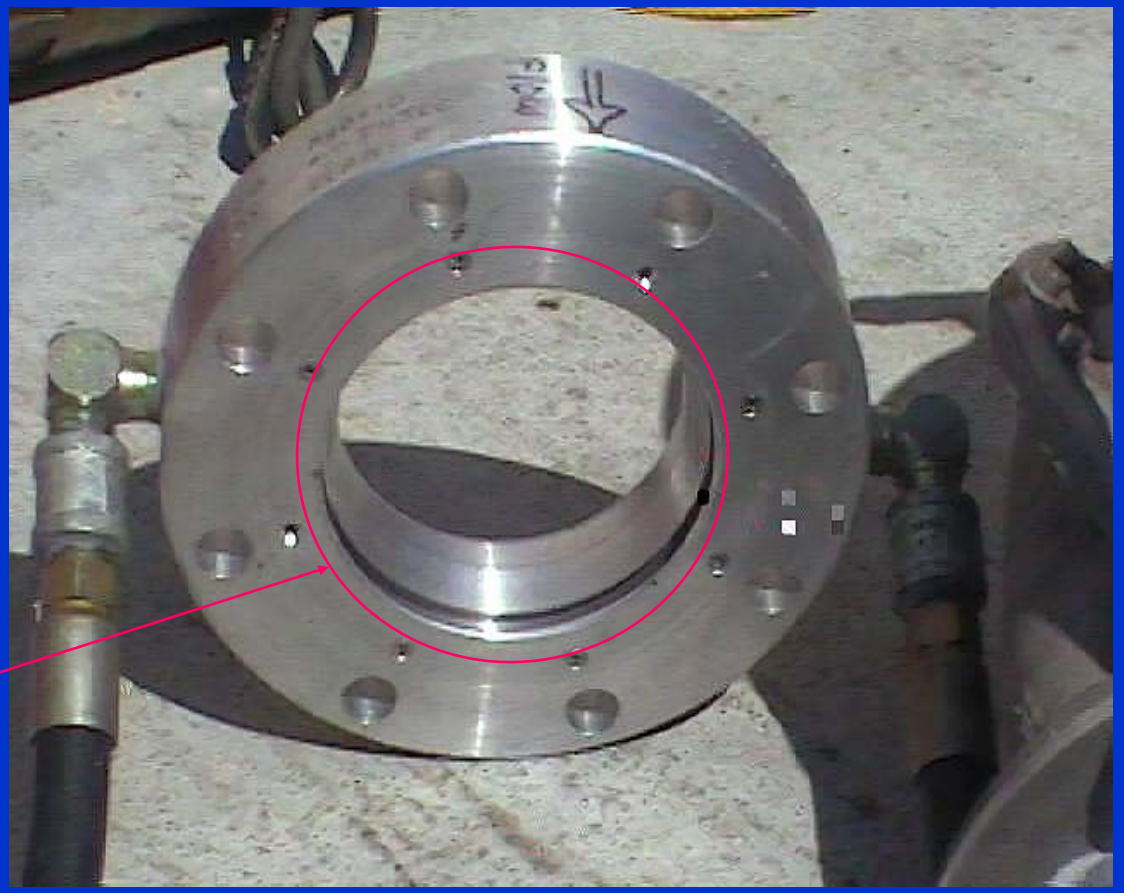


Oil Emulsification Study

Viscous Oil Pumping System Tests

VOPS Components

Water Injection Flange



Removable Ring for easy Cleaning


3M
6%
AFFF

Fire Boom Testing with Propane

In-situ Burns

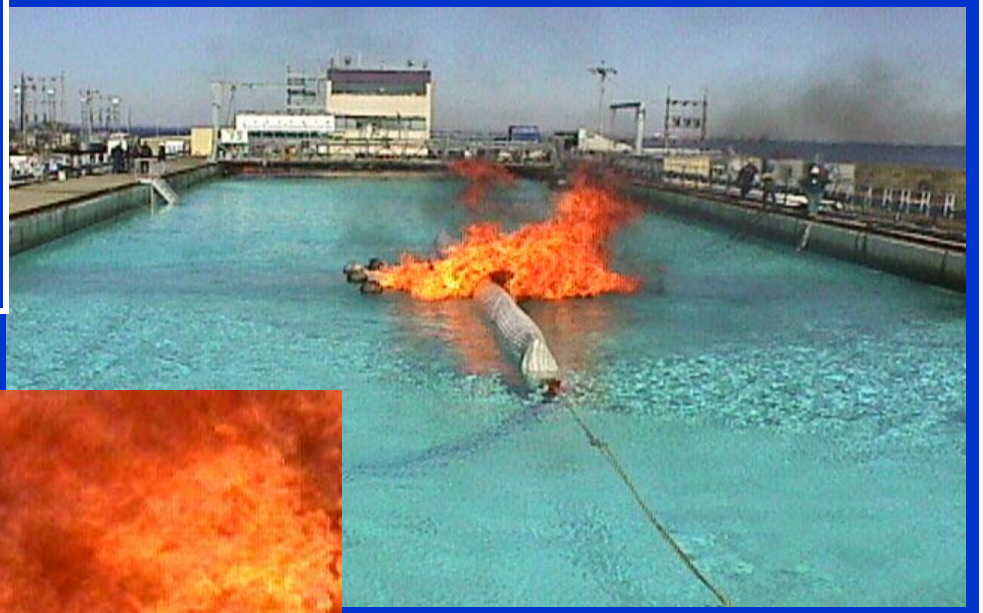
- ✔ Near full scale screening tests for the ***effectiveness*** & ***durability*** of fire resistant oil containment booms
- ✔ Ability of boom exposed to fire to ***contain thick, hot oil*** & ***survive extended exposure to wave action***
- ✔ Propane flames produce a ***total heat flux*** to the surface in the range of ***110-130 kW/m^2*** and ***flame temperatures near*** **900 C°**
- ✔ Underwater bubbler has a propane ***flow rate of 1500 kg/hr*** over a ***water surface area of ~10m2***, yielding a ***heat release rate of 2 MW/m^2***
- ✔ Compressed ***air injected*** near the base of the flame ***at a rate of 2900 kg/hr*** to enhance the combustion process and increase total heat fluxes and flame temperatures

PROPANE BUBBLER SYSTEM

FLOATATION DEVICES

TEST SETUP

Propane Supply Tankers



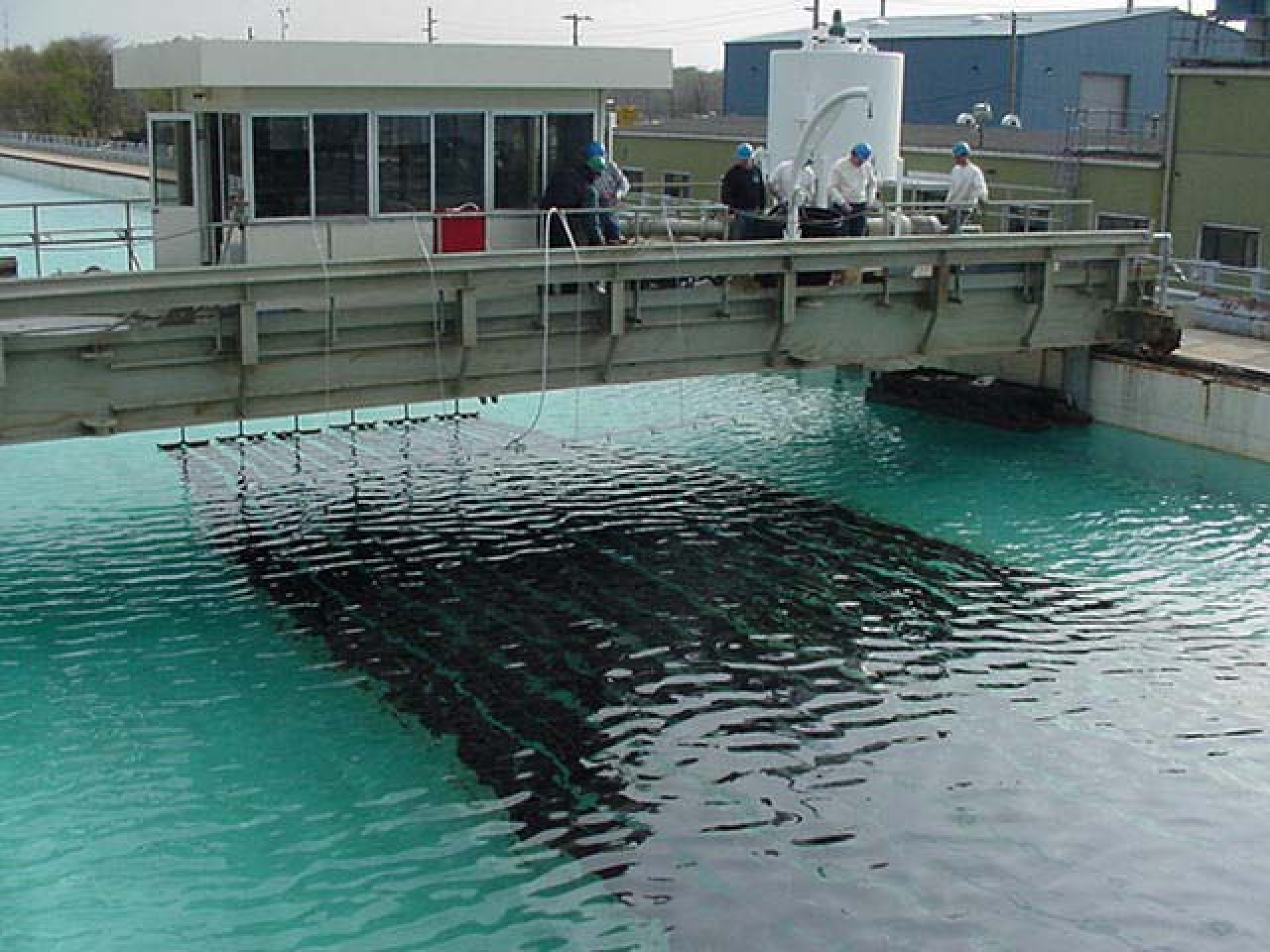
Test of Oil Stop Blanket

MORICE Testing Program
January 14-25 2002


14 9:59AM

Oil has been added along the entire length of the ice field prior to test initiation.

Dispersant Testing



Oil Evaporation Setup

Evaporated or “weathered” oil generated by bubbling air through heated drums of oil

Weight of oil was monitored during air sparging using a weight scale and a drum lift

Elastic-American Marine
Neat Sweep Test

Training at Ohmsett

Benefits of Training at ***Ohmsett***

- Emphasis on practical hands-on use of response equipment with oil and waves.

- Students review their performance
  - Through video recording of each training session
  - Using oil recovery effectiveness measurements

- *Typically students improve their oil recovery effectiveness by <u>80%</u>*

- Cost is $995 dollars US per student for a 5-day introductory, management oriented class. Advanced class emphasizing hands on exercises in tank and a visit to a local spill cooperative is $1,300 US.

- USCG and BP Alaska training site of choice.

WWW.OHMSETT.COM

CURRENT STATE OF THE ART IN OIL SPILL RESPONSE TECHNOLOGY AND RECENT RESEARCH RESULTS - ALTERNATIVE RESPONSE MEASURES IN THE PACIFIC REGION

PRESENTATION OF

HO YEW WENG

EAST ASIA RESPONSE LIMITED (EARL)

SINGAPORE

Ho Yew Weng
Operations Manager

OSRL EARL Alliance

State of the art of technical response to oil spills

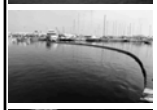
- Good news
  - the problems are not changing
- Bad news
  - neither are the strategic solutions
- But technical developments are taking place

Response Strategies

Monitor and evaluate

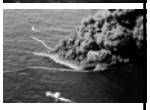
Dispersants

Containment and Recovery



Shoreline Protection

In-situ Burning

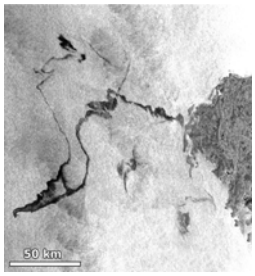


Shoreline Clean-up

Surveillance and monitoring

- Still most important facet of response
- Equipment
  - Satellite imagery
    - deterrent
    - weather
    - real time ability
    - interpretation
  - SLAR
    - search system
  - IR/ UV
    - tactical response tool
  - Mk 1 eyeball
    - training

Satellite imagery



- Ideal deterrent
  - prosecution difficult
  - identifying source
- Footprint/ frequency of passes
- Time to receive image
- Impact of weather
- Interpretation

Dispersant systems

- Large Aircraft
  - Nimbus
- Small aircraft
  - Cessna 406
  - Bandeirante

Nimbus

- Modular spray system
  - 12 ton capacity
  - Rapid mobilisation
  - Simplified operation

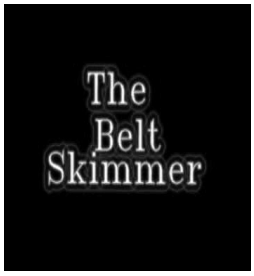
Small aircraft system #1

- Cessna 406
- 1.2 ton payload
  - based in UK North Sea
- 200 knots

Small aircraft system # 2

- Embraer Bandeirante EMB 100 P2
- 2 ton payload
  - based in West Africa
- 200 knots

Containment and recovery



- Heavy oil recovery
  - major problem
- Systems under development to deal with material
- Mechanical in operation
- Pumping of material is a major issue

Pumping of materials

- Conducted by USCG/ MMS
- 1,000,000 Cst oil
- Range of pumps tested
- Water injection
- Steam injection

Waste management

- Still major hurdle
  - Storage
  - Segregation
  - transfer
  - treatment
  - disposal
- Limits recovery operations
- High costs

Conclusions

- Technology can solve technical problems
- Developments are being made
- Equipment is being developed to deal with specific problems

BUT……..

Conclusions

Prevention **Management**

Training **Technology alone is not enough** **Planning**

Communication **Exercising**

Co-operation

Thank you

CURRENT STATE OF THE ART IN OIL SPILL RESPONSE TECHNOLOGY AND RECENT RESEARCH RESULTS - ALTERNATIVE RESPONSE MEASURES IN THE UNITED STATES OFFSHORE

PRESENTATION OF

DOUGLAS O'DONOVAN

MARINE SPILL RESPONSE CORPORATION

UNITED STATES OF AMERICA

ASIA-PACIFIC ECONOMIC COOPERATION (APEC)

WORKSHOP ON OIL SPILL RESPONSE AND PLANNING

Singapore

March 25, 2004

Presentation

"*Current State of the Art in Oil Spill Response Technology and Recent Research Results - Alternative Response Measures in the United States Offshore*"

Douglas C. O'Donovan
Marine Spill Response Corporation
Technical Services Manager

United States Spill Response Philosophy

- Based on Oil Pollution Act 1990
- The private sector is responsible for response and clean-up
- National Planning and response system
  - A response plan shall identify, and **ensure by contract or other means approved by the President the availability of private personnel and equipment** necessary to remove to the maximum extent practicable a worst case discharge and to mitigate or prevent a substantial threat of such a discharge.
- In some parts of the world, Governments are the lead response and clean-up agency.

U.S Spill Response Options

Containment &
Recovery

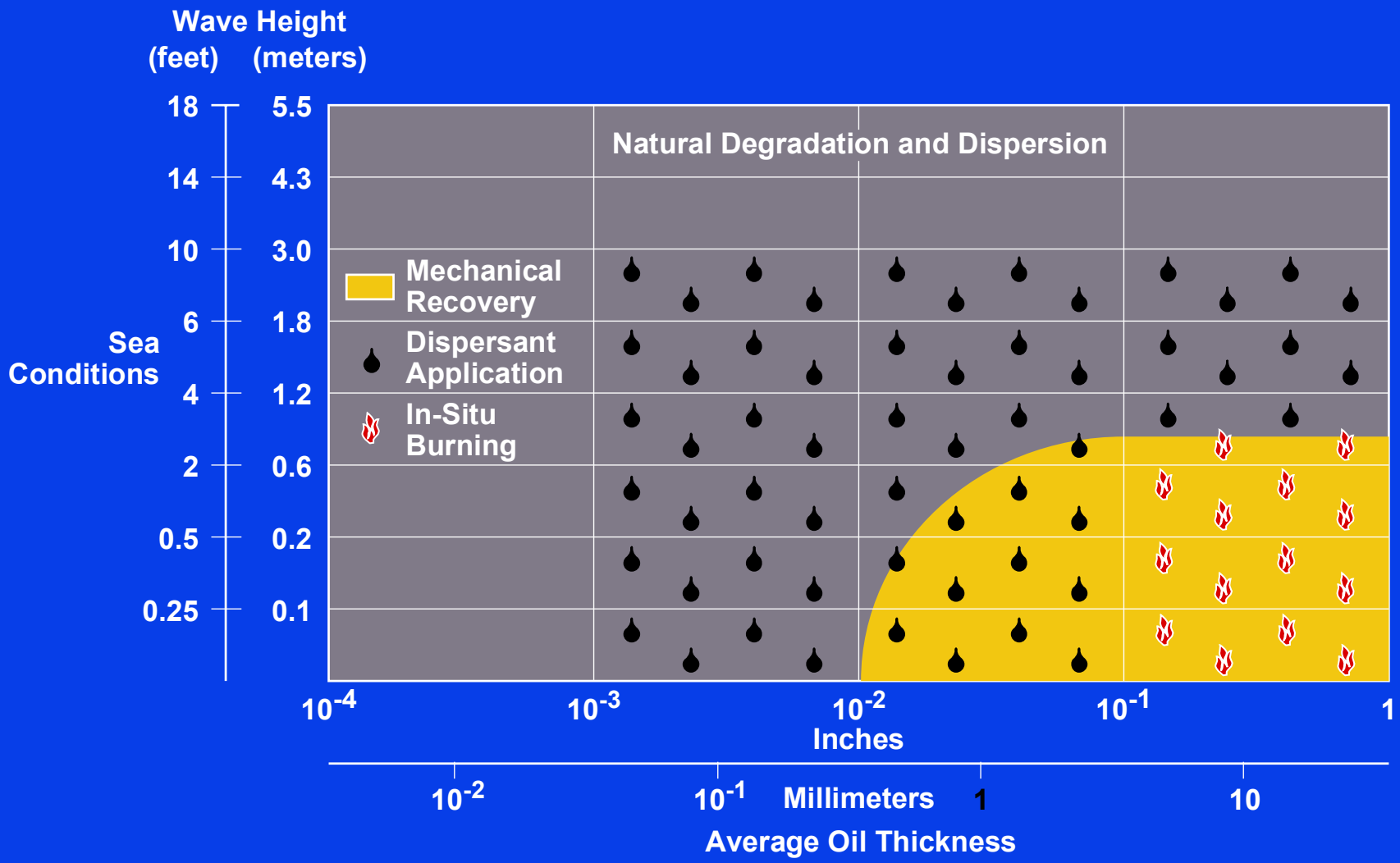
Dispersants

In-Situ Burning

Shoreline protection

Shoreline Clean-up

Windows of Opportunity



Courtesy of A. Alen

Shoreline Impact - What you Hope to Minimize!

Shoreline Clean-Up - A Major Effort

Shoreline Water-washing

Note the Wearing of Proper Personal Protection Equipment (PPE)

Things to Remember

- Various response tools are available
- Tools may be used in combination during a spill
- Each tool presents a variety of challenges

CHALLENGES TO OIL SPILL RESPONSE

- Weather
  - Recovery Difficult In Rough Seas or High Winds
  - Unsafe In Very High Seas
- Thousands of Different Crude Oils
  - Wide Range of Properties
- Crude Properties Constantly Changing
  - Weathering Effect
- Remote Locations
  - No Immediate Logistical Support
- Wide Range of Impacted Habitats
  - Rocky Beaches to Sensitive Marshes
- Very Little Daylight During Winter

MECHANICAL CONTAINMENT & RECOVERY

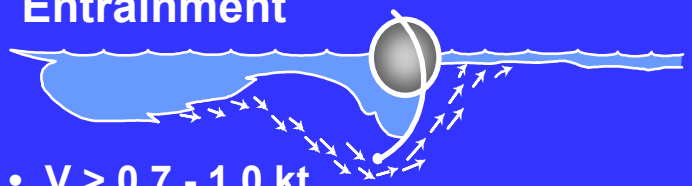
- Three Primary Components
  - Containment Boom
  - Skimming/Recovery
  - Temporary Storage

Considerations for Booming and Boom Selection

- Operating Constraints
  - Wave height and wave steepness
  - Current or towing speed
  - Surface current strength
  - Winds
  - Visibility and darkness
  - Water depth (inshore)

Boom Limitations

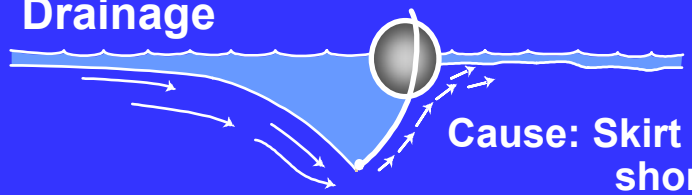
1. Entrainment



- V > 0.7 - 1.0 kt

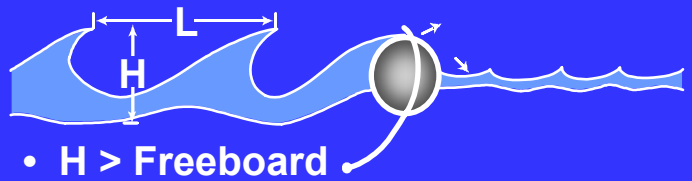
Cause: Current too fast

2. Drainage



Cause: Skirt too short for oil amount

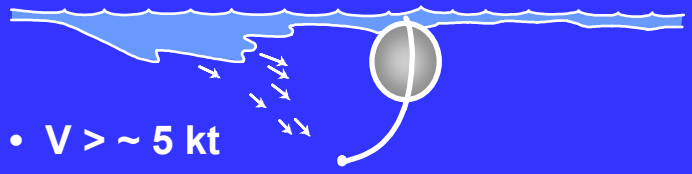
3. Splashover



- H > Freeboard
- H/L > ~1/10

Cause: Waves too high

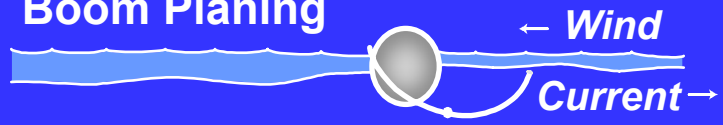
4. Boom Submergence



- V > ~ 5 kt

Cause: Currents too high

5. Boom Planing

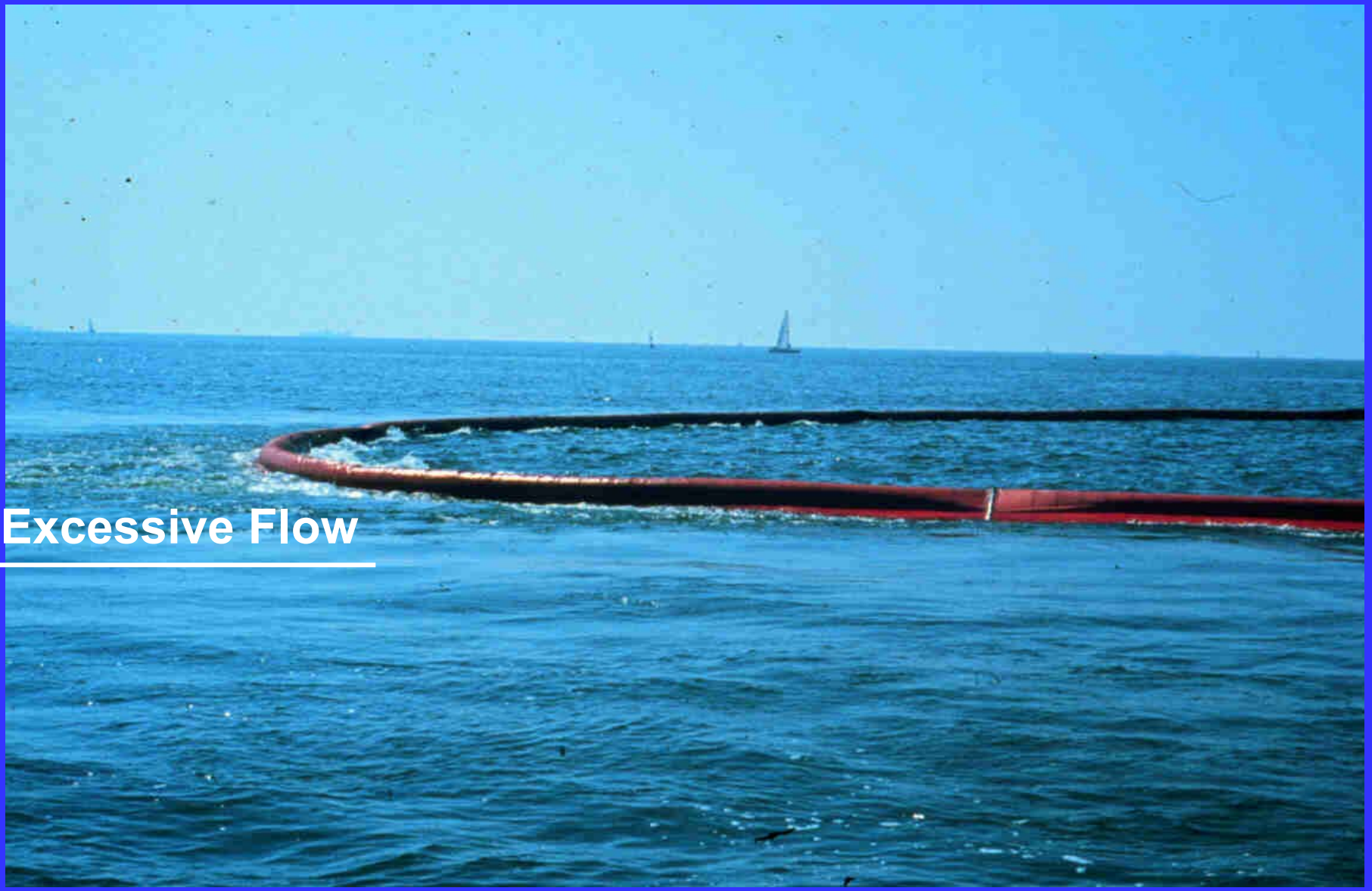


Cause: High wind and current velocity

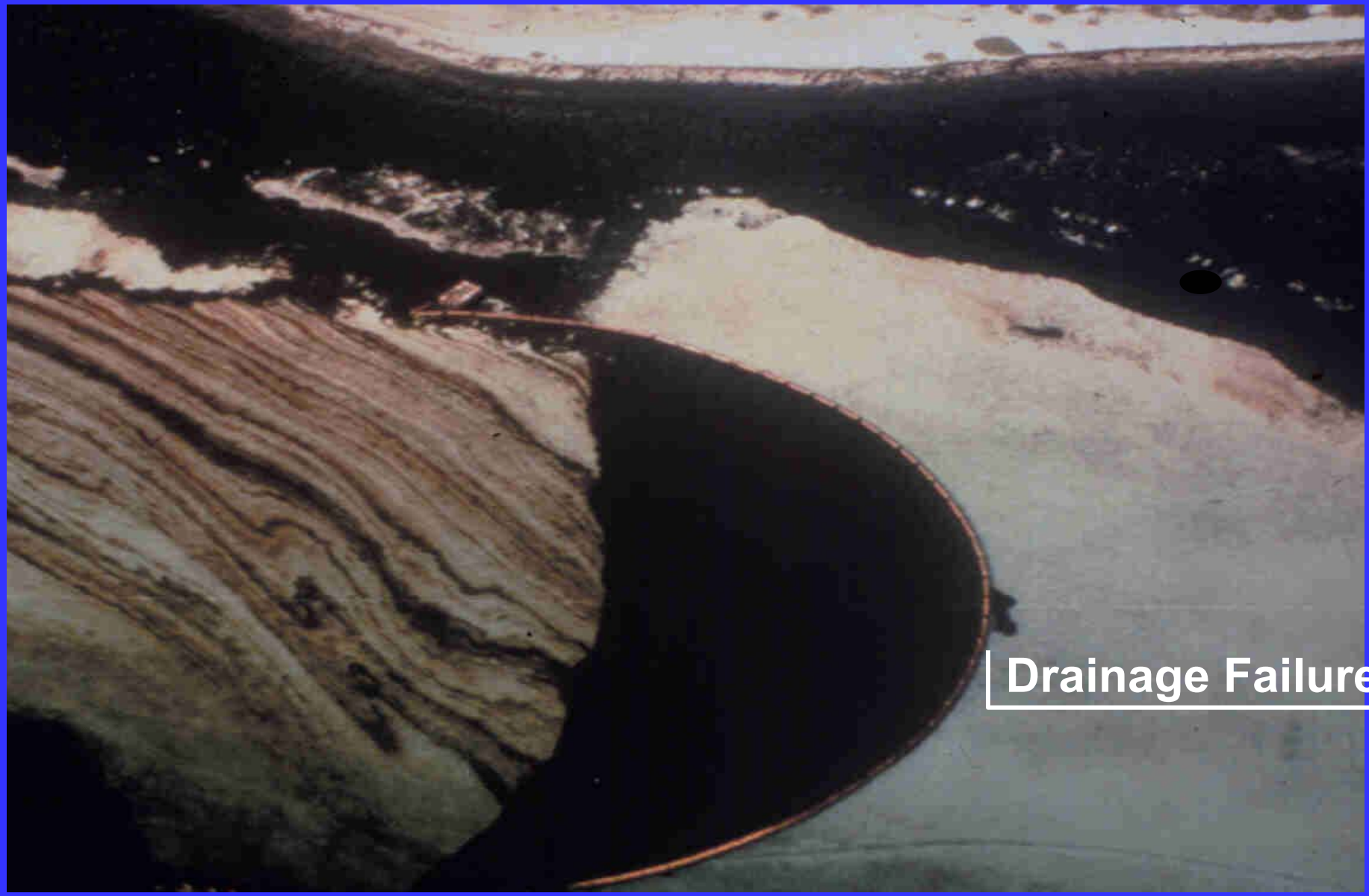
Wind and current direction opposed

Tension line near waterline

Oil Loss due to Excessive Flow

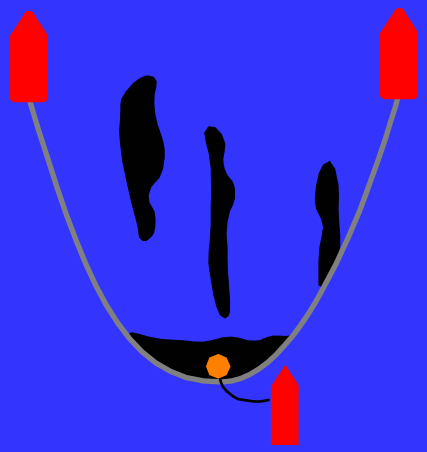


Oil Loss due to Drainage Failure

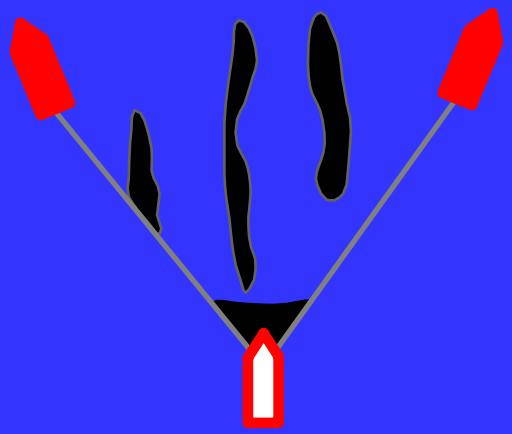


Containment at Source - Reduces Spreading of Oil

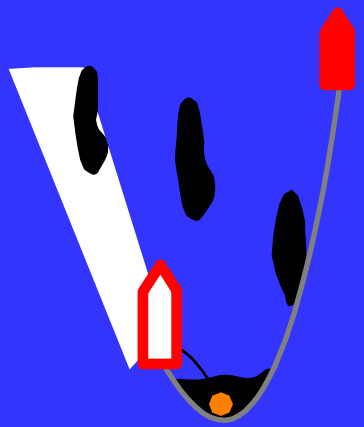
Ocean Booming Techniques



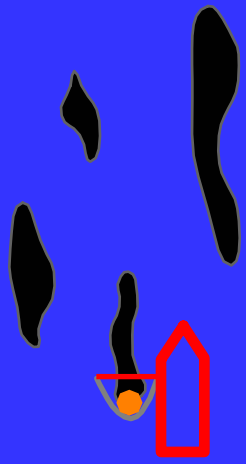
U configuration



V configuration



J configuration



Single ship system

Skimming/Recovery

Skimming Vessels

- Skimming vessels
  - Oil Spill Recovery Vessels – larger vessels designed for on-water /open ocean recovery
  - Shallow Water Barges – smaller vessels designed for in-shore and near-shore recovery
  - Vessel of Opportunity Skimming Systems (VOSS) – vessels modified to carry a skimmer and some temporary storage to the response scene

Oil Spill Response Vessel (OSRV)

Design Characteristics

- Transrec skimmer
- Oil-water separators for continuous operations (15 ppm)
- Dedicated full-time navigation crew of six, berthing for 38

Inflating Containment Boom

Transrec - 350 Open Ocean Skimmer Ready for Deployment

Skimmer in Apex of J-Boom Configuration

Skimming Limitations

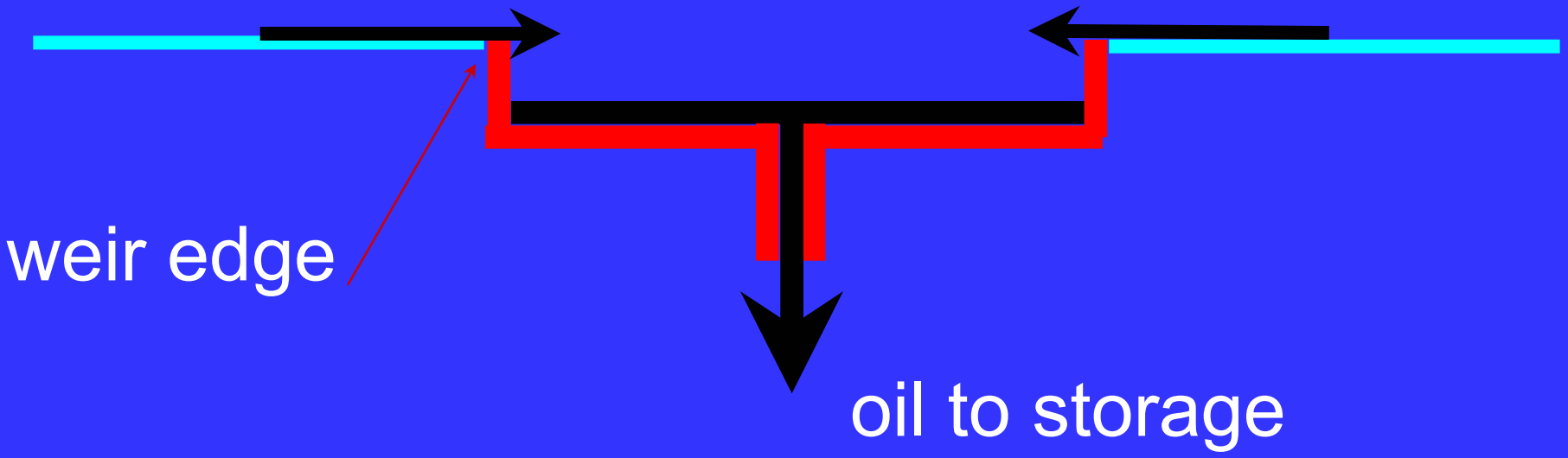
- Depending on the equipment used, mechanical containment and recovery become hampered when:
  - current exceeds 0.75-1 knot,
  - the wind is stronger than 20-25 knots,
  - and/or wind-induced waves are higher than 4 to 6 ft.

- Some skimmers and transfer pumps are not designed to handle viscous oils or products; different skimmers are often needed for oils with different viscosity.

Main Skimmer Types

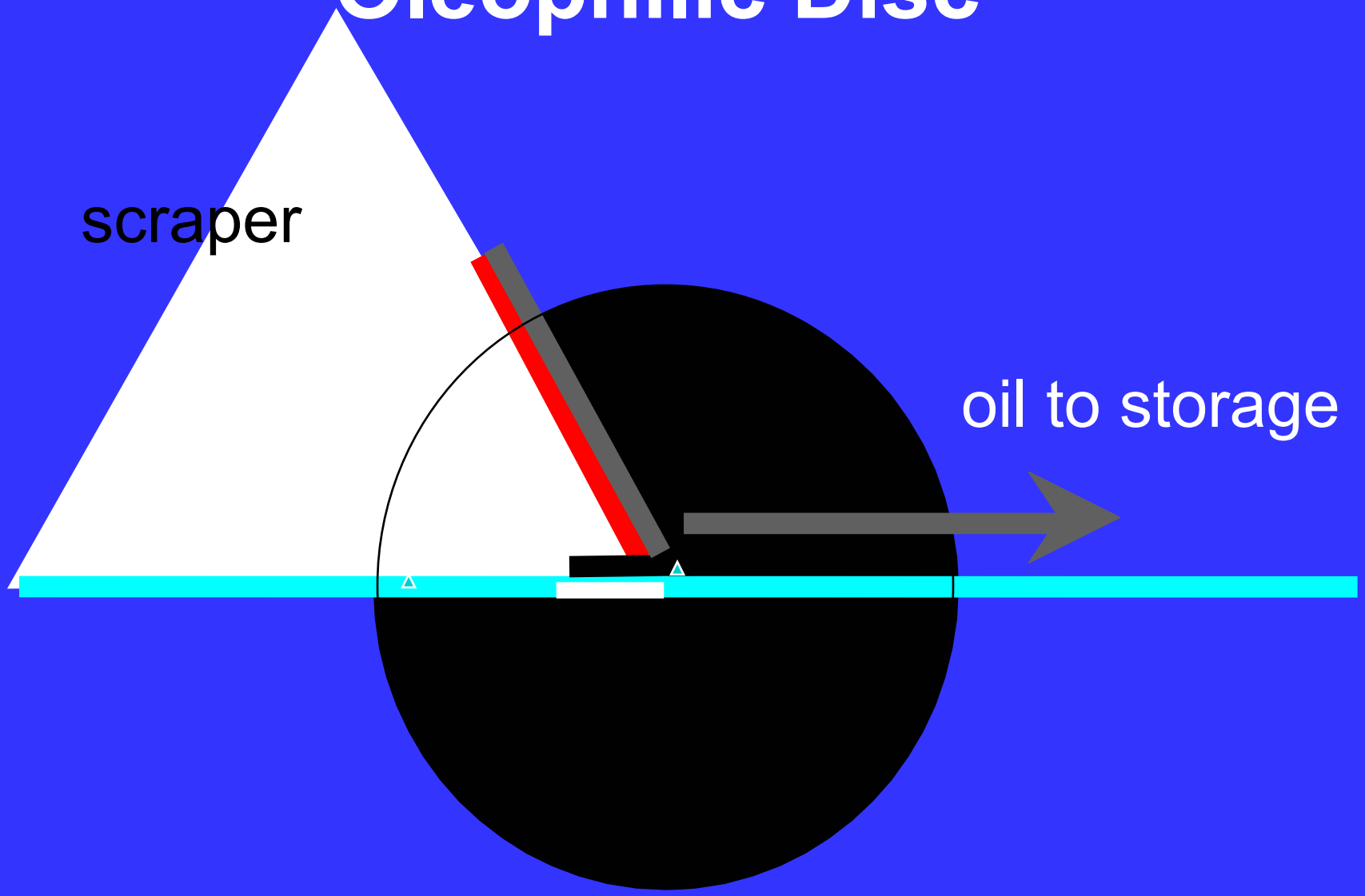
- Weir
- Oleophilic
- Vacuum
- Mechanical

Weir

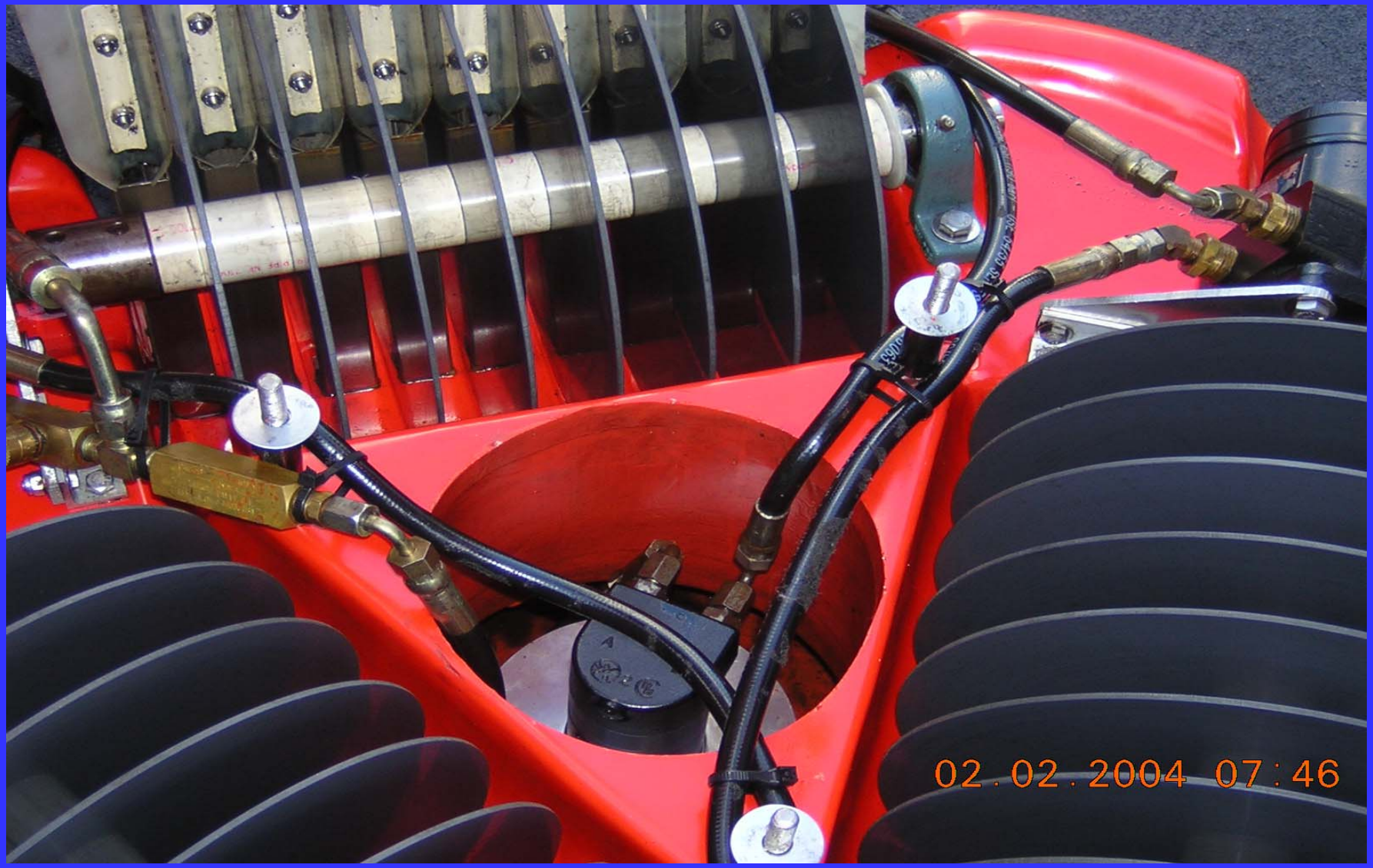


Desmi 250 Weir Skimmer

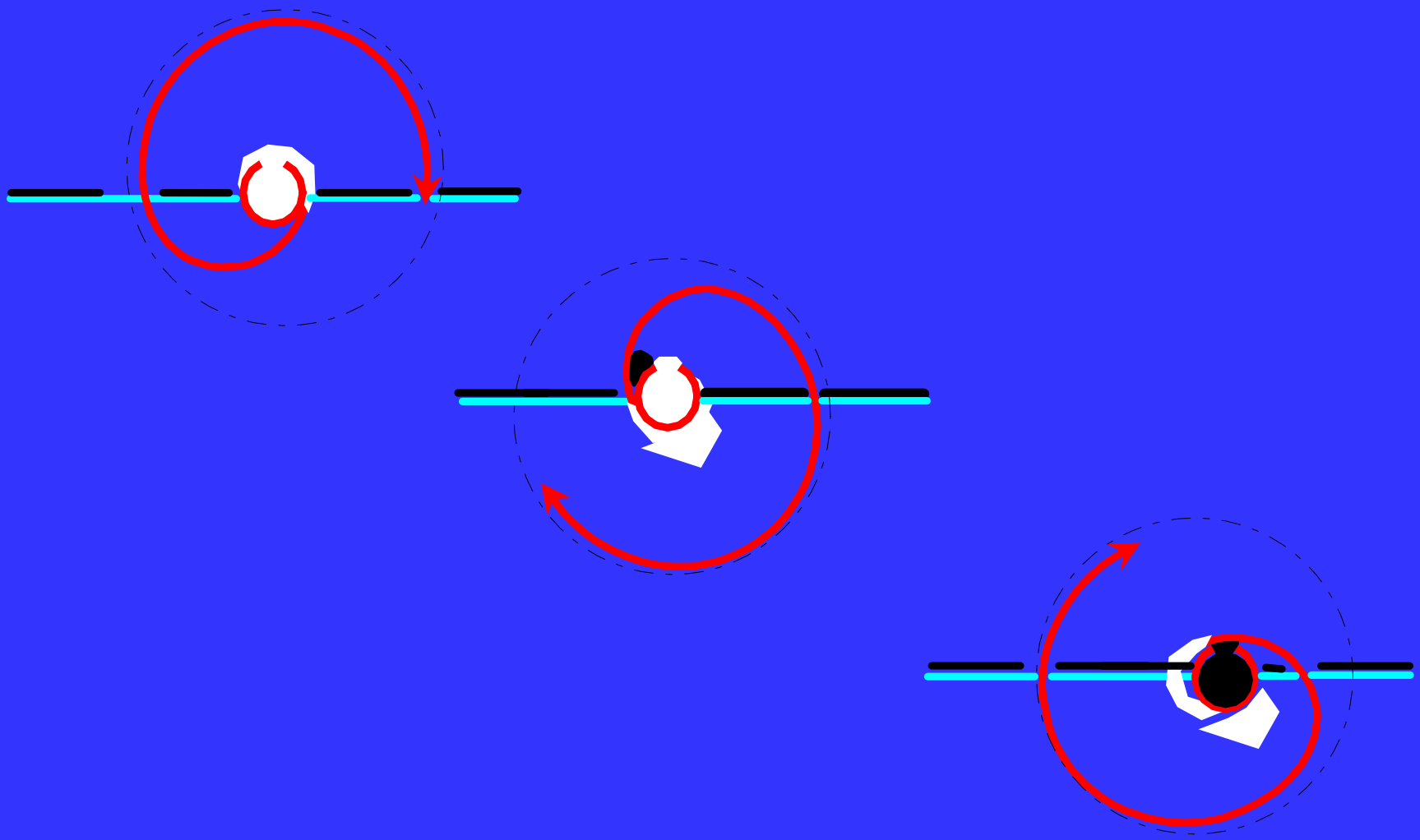
Oleophilic Disc



Oleophilic Disc Skimmer



Drum Skimmer



Oleophilic Drum Skimmer

Oleophilic Brush Skimmer

Temporary Storage

Types of Temporary Storage Devices

- Barges
  - Tank barges (large and small)
  - Deck barges with deck tanks
  - Hopper barges
  - Supply boats with deck tanks
- Towable tanks
  - Towable Storage Bladders
  - Open tank “barges”
  - Flat tanks
- Stationary tanks
  - Purpose-built
    - Open, frame-based pools, i.e., fast tank
    - Open, inflatable pools
  - General purpose
    - 55-gal oil drums
    - Pick-up or dump truck
    - Plastic trash bags
    - Pits (lined)

Oil Spill Response Barge

- Storage is key constraint on spill recovery
- Avoids relying on commercial barges

Shallow Water Barge

- Ready-transportable on trailers or in-water
- Skimming, booming operations, hard-to-get-at areas
- 3 foot draft when fully laden
- 400 bbl storage

Mechanical Equipment Research

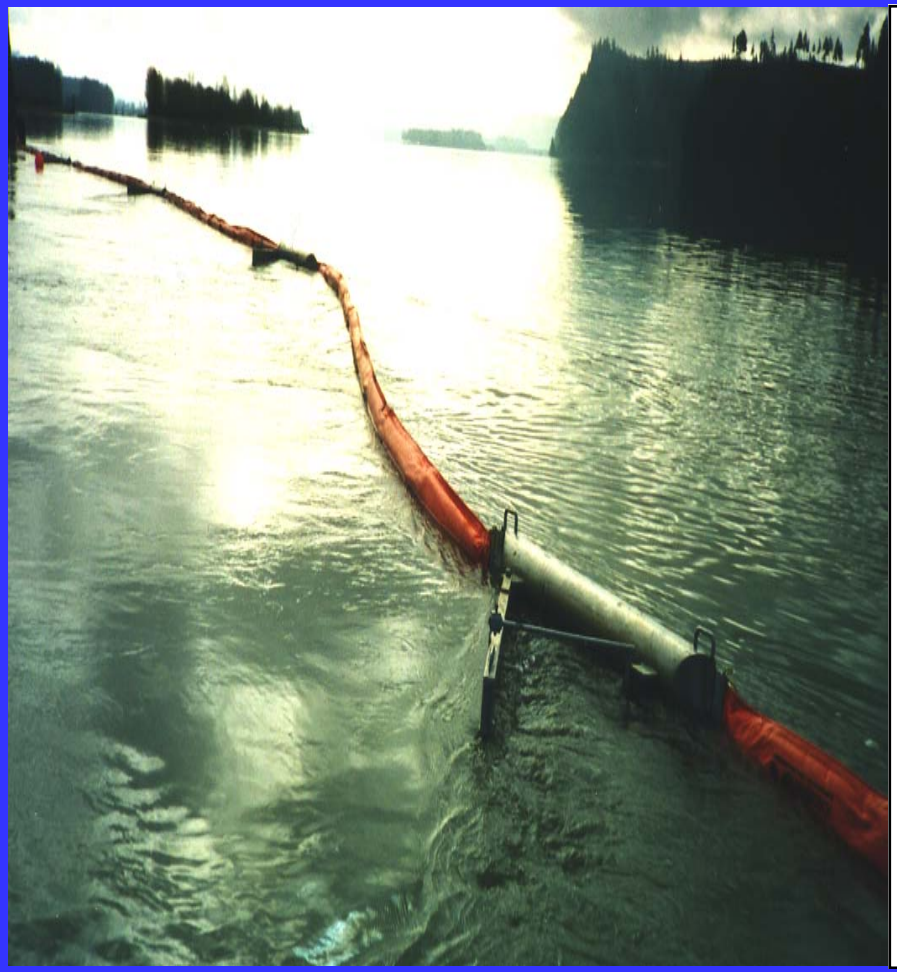
- Boom Deflectors
- Boom vane systems
- Fast water skimming systems

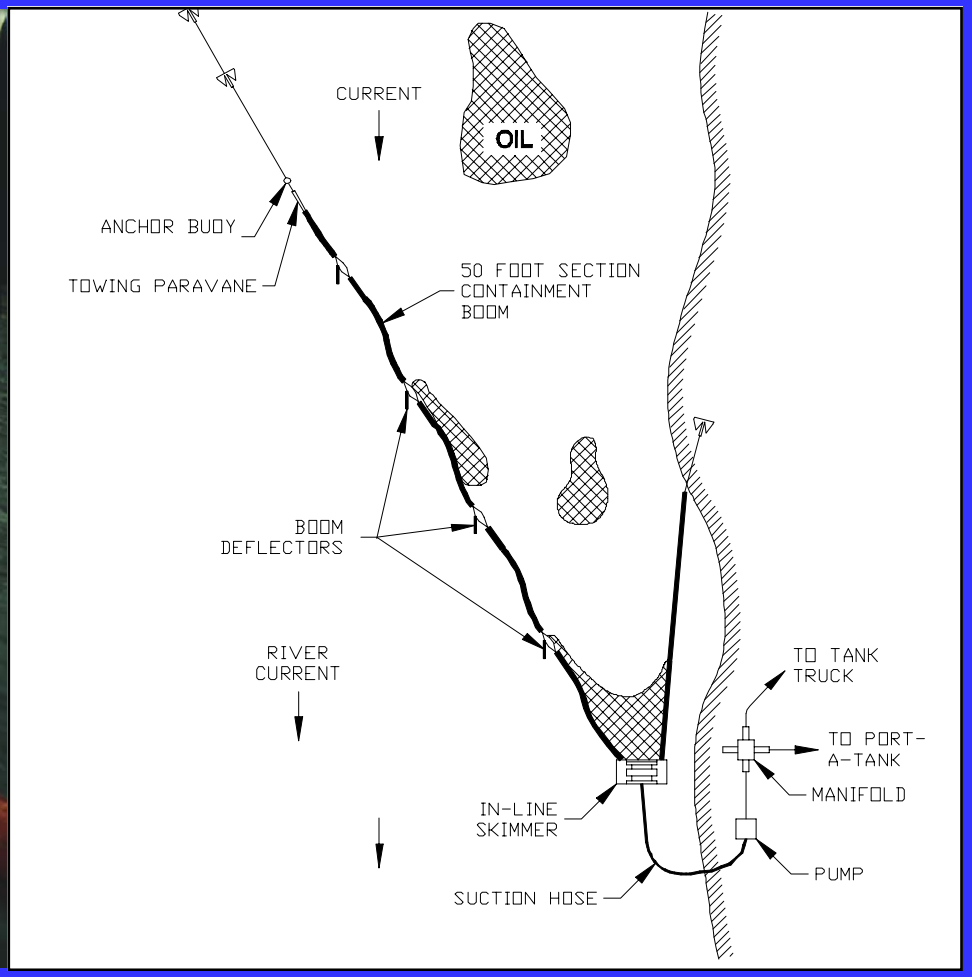
Boom Deflector Systems

- A deflector is placed between each section of boom and uses the force of the water to push the boom out into the current and the shape of the boom is maintained as long as a steady current continues.

- These devices deflect boom into the current at an average angle of about 15 degrees at current speeds of 0.5-1.5 meters/second (1-3 knots).

Boom Deflectors



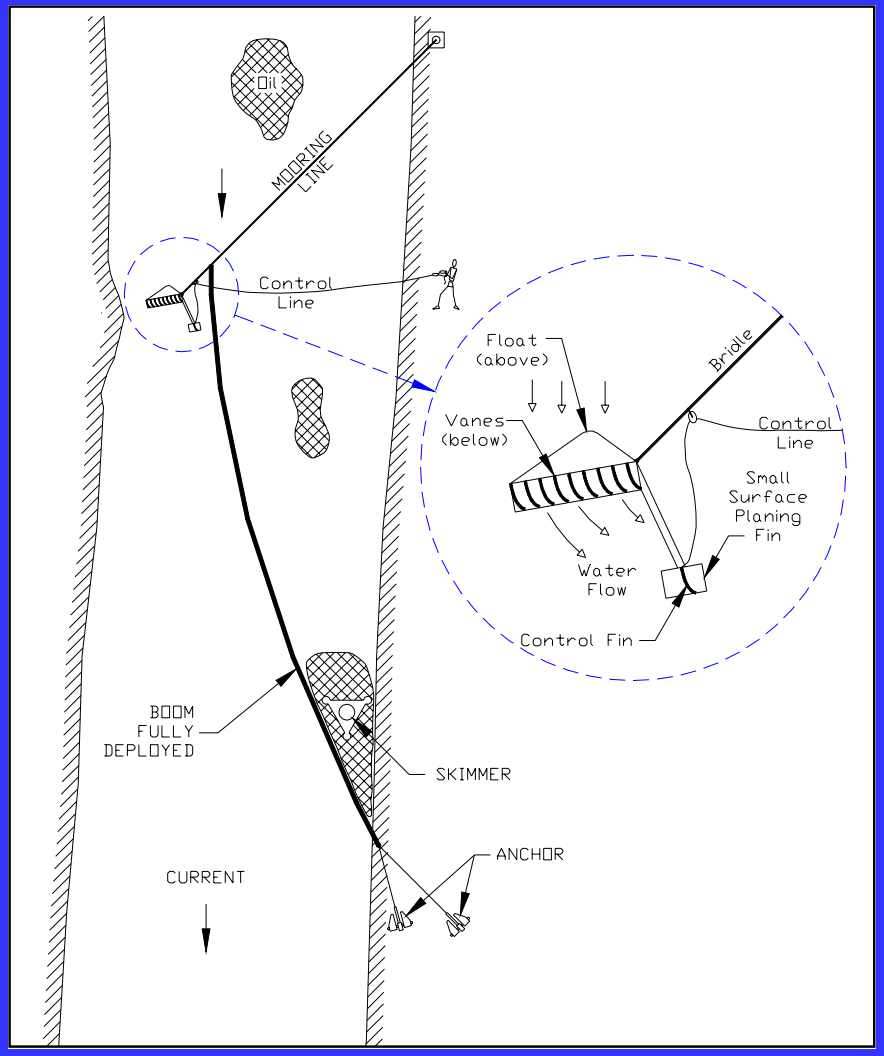


Boom Vane Systems

- Developed in Sweden based on the trawl doors that fishermen use.

- The vane uses the hydrodynamic force of the passing current to pull the boom away from the shore.

Boom Vane

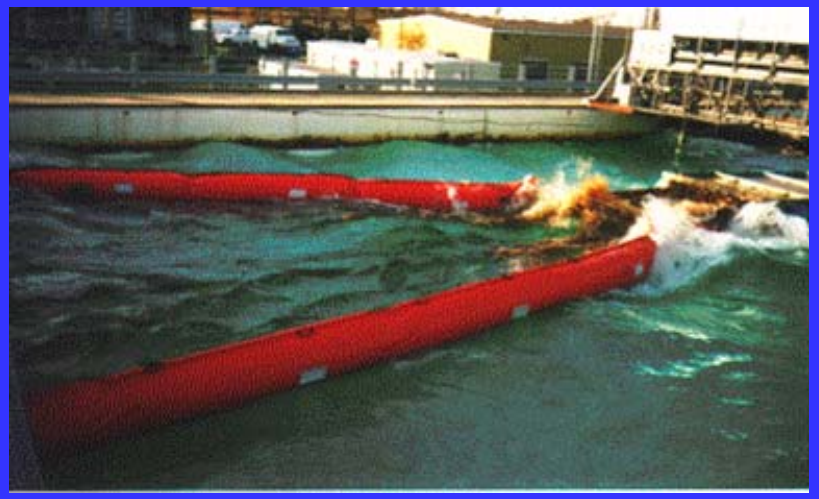

Oil
MOORING LINE
Control Line
Float (above)
Bridle
Vanes (below)
Control Line
Small Surface Planing Fin
Water Flow
Control Fin
BOOM FULLY DEPLOYED
SKIMMER
ANCHOR
CURRENT

Fast Water Skimmers

- Current Buster (from NOFI, Norway)
- During tests the Current Buster recovered over 80% of the oil at speeds up to 3.5 knots.

Fast Water Skimmers

(Some units can recover oil at 5 knots)

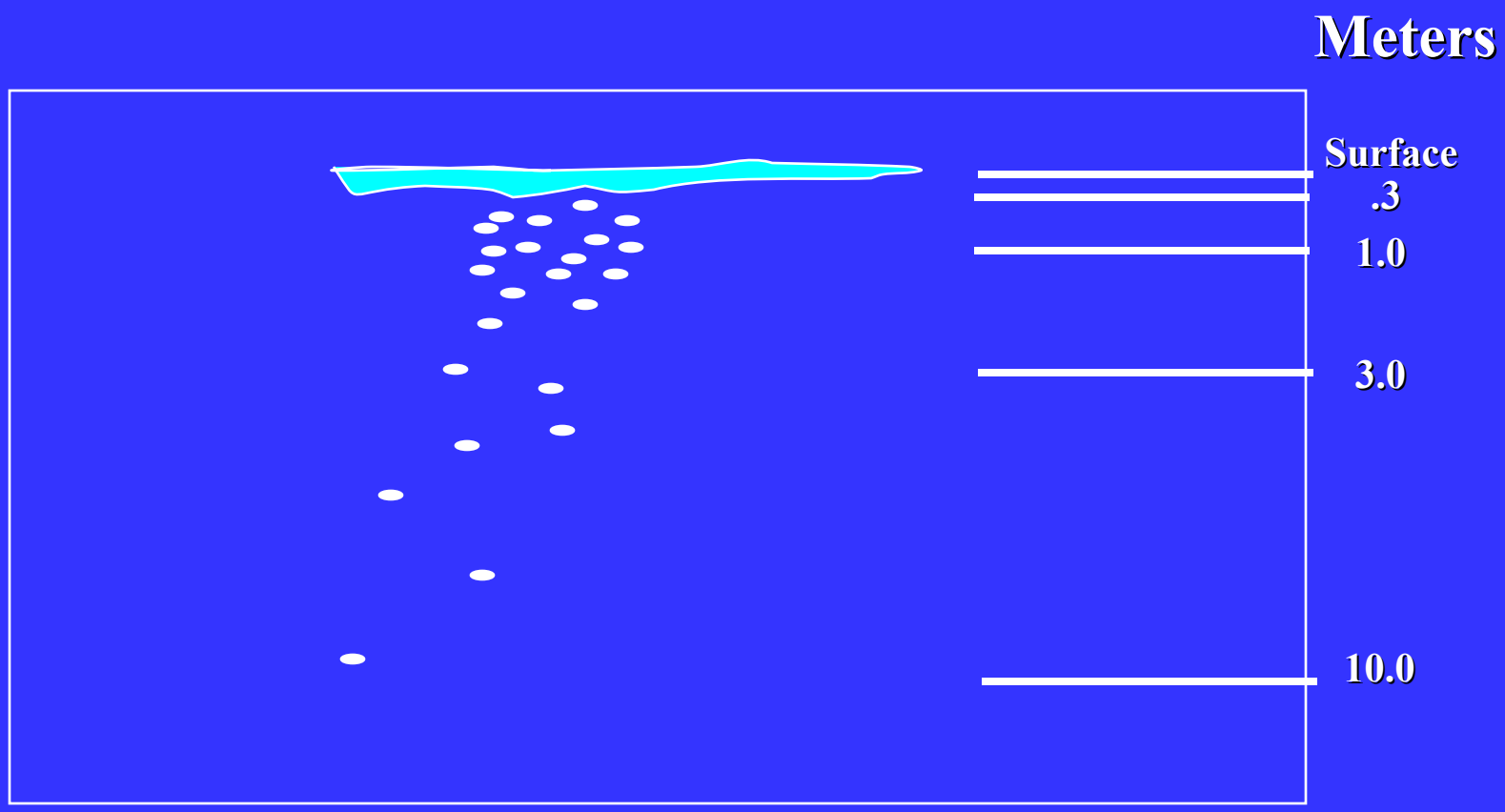


Dispersants

Dispersants

- What is a dispersant?
  - Solvents - The solvent enables the surfactants (active ingredients) to be applied and helps get them through the oil film to the water interface.
  - Surfactants - At the interface the surfactants reduce the surface tension allowing the oil to enter the water as tiny droplets that are degraded by natural bacteria.
- What does it do?
  - Enhances natural dispersion by reducing the oil-water ‘interfacial tension’
  - Redistributes oil into the water

Dispersant Dilution Action



Dispersant Application Techniques

Current U.S. Dispersant Aircraft Platforms

DC-4
2,000 gallon payload

C-130 w/ADDS PAC
5,000 gallon payload

AT-802
800 gallon payload

OSRL Hercules with ADDS PAC

U.S.Air Force C-130 with MASS Kit

Helicopter Bucket Sprayer

General Dispersant Limitations

Time:	Within 24-72 Hours*
Material Spilled:	Viscosity less than 20,000 cs*
Sea State:	>1 Beaufort and < 6 Beaufort
Water Depths:	> 10 meters*
Distance Offshore:	> 3 nautical miles*
Dispersant:	On National Approved List
Dispersant Plan:	Government Approvals

Advantages

- Rapid response over large distances and areas is possible
- Applicable in relatively rough weather
- Reduces the risk of contamination of birds and shorelines
- May ‘break’ or inhibit the formation of emulsions
- Reduces recoverable waste
- Minimize Shoreline Stranding of Oil
- Minimize Contamination of Marshes, Mangroves

Disadvantages

- Oil is not removed, but re-distributed
- Can adversely affect sensitive resources
  - farmed fish, shellfish and coral reefs
  - industrial water intakes
- “Window of Opportunity” for effective use
- Generally inappropriate in shallow water

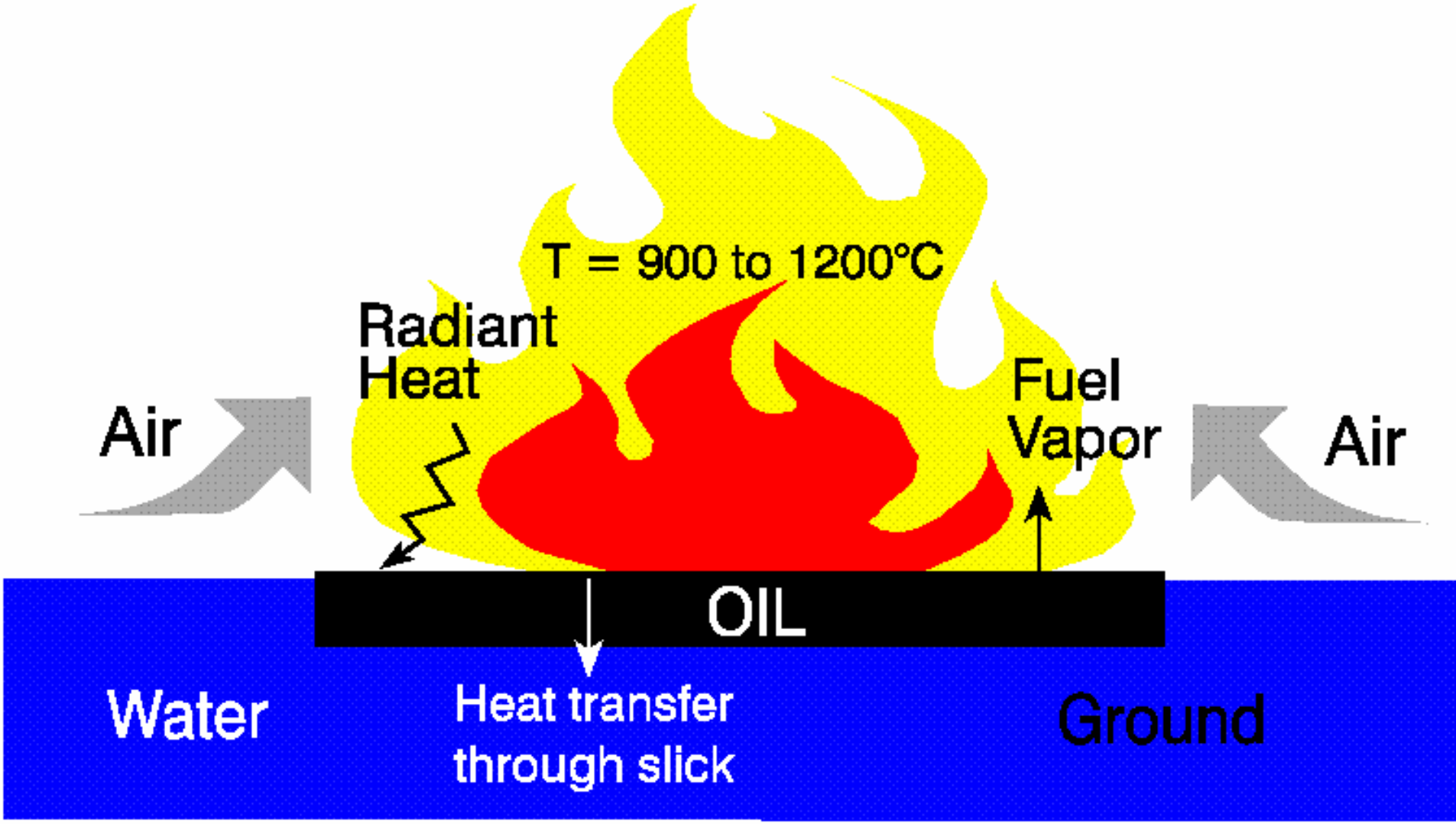
Current Dispersant Research

- Dispersant effectiveness tests have been conducted to provide qualitative assessment of the dispersibility of heavy fuel oils using different dispersants and a range of dispersant to oil (DOR) ratios
- Cold water dispersant research, particularly in Arctic region.
- Developing standards for shipboard dispersing monitor application system.
- Jet aircraft application
- Evaluating use of dispersants in shallow water

Testing Dispersants in Heavy Fuel Oil

In-Situ Burning

BASIC PROCESS



Required Equipment

- Containment
  - Specialized fire booms and boom towing vessels
  - Helicopter directing
- Ignition
  - Helitorch or hand-held igniters
  - Helicopter for aerial ignition
- Monitoring
  - May be necessary to monitor smoke plume

Operational Constraints

- Oil thickness is crucial. Minimum oil thickness (~3mm) Burning starts at 2-3mm. Ends at 1-2mm
- Efficiency depends on thickness
- Winds < 20 knots, waves < 132 cm (4.3 feet)
- Presence of natural gas from blowout detrimental
- Daylight

Types of Fire-Boom

- Stainless steel
- Fire-resistant fabrics; often these systems can not be reused.
- New methodology using an active water-cooling systems; these systems are designed to be reused.
- All In-Situ Burn boom is rigorously tested under approved protocols and operational conditions.

Deploying Water-Cooled Fire Boom

Testing Fire Boom

Failed Fire-Boom Test

Ignition Sources

- The ignition source is used to provide sufficient heat to vaporize some of the oil to sustain burning.
  - Helitorch - an incendiary device deployed from a helicopter and drops a burning gelled gasoline substance onto the area to be burned. A trained flight crew is required.
  - Other simple devices can also be used by trained personnel.
  - Oil-soaked rags or other sorbent material
  - Road flares

Helitorch Igniter

Helitorch with Streaming Gel

Hand Igniters

Simplified Burn Procedure

- Two vessels contain a patch of oil in fire-resistant boom. Rule of thumb is to fill about 1/3 of the area inside the boom.
- The contained oil is towed away from the main body of oil.
- Ignite the oil inside the boom. It is best to tow into the wind to help contain the oil and keep the smoke plume astern of the towing vessels.
- The size of the burn can be controlled by the speed of the tow. Slowing down or releasing one end of the boom will reduce the thickness of the oil, allowing the burning to stop.
- This procedure can be repeated as often as necessary.

At Sea In-Situ Burn

Vessel In-Situ Burn

Monitoring - The SMART Process

- The smoke plume may contain particulates which might have an impact on the general public.
- In the U.S. there is a monitoring process in place called Special Monitoring of Applied Response Technologies (SMART).
- This SMART monitoring is required if the particulates in the smoke plume could reach the ground and impact populated areas.

Burning Trade-offs

Advantages

- Remove oil from surface
- Reduce temporary storage
- Relatively simple
- Fast
- Efficient
- Good areial coverage

Disadvantages

- Smoke plume
- Secondary fires
- Residue
- Permits

Current In-Situ Burn Research

- Application in cold water and broken ice, particularly in Arctic region.

Testing in Ice

Waste Management

Waste Generated from a Spill

- Recovered oil, emulsion, and oily water
- Oiled sand, gravel, soils
- Oiled debris, driftwood
- Oiled wildlife carcasses
- Oiled kelp, seaweed, etc.

Other Wastes Generated from Cleanup

- Oiled sorbents, plastic bags, protective clothing
- Rainwater runoff from waste storage areas
- Wash water - boat, boom, equipment, and gear cleaning
- Chemical drum cleaning water
- Decontamination site - wash waters / rinse waters
- Chemicals - lab, wildlife
- Anti-freeze, solvents, containers
- Used engine oils, hydraulic fluids, batteries

Generating Waste

Proper Disposal of Waste is Essential

Responder Safety

- Health and safety, for both the general public and responders, is of utmost importance. People and the environment must be protected from the effects of an oil spill, not harmed by one. General topics which must be considered include:
    - Management and communications
    - Risk assessment
    - Oil and Response chemical safety issues
    - The working environment and safety during operations
    - Personal protective equipment (PPE)
    - Management of Volunteers

Reference Material

- American Petroleum Industry (API) Publications
  - api-ep.api.org/filelibrary/ACF1B6.pdf
    - Pollution Prevention
    - Surface Water Research
- IPIECA Oil Spill Report Series
  - www.ipieca.org/publications/oilspill.html
- World Catalog of Oil Spill Response Products
  - Technical data and guidelines on selection for all types of response equipment
  - Summaries of field and tank trials
  - For information: SL Ross Environmental Research WorldCatalog@SLRoss.com

PAPERS PRESENTED AT

PANEL DISCUSSION ON ASSESSMENT OF

CURRENT STATE OF PRACTICE IN SPILL RESPONSE,

EXISTING PLANS TO UPGRADE RESPONSE CAPABILITY AND

RECOMMENDATIONS

Chair: Joseph Mullin, MMS

Papers by:

David Baird, Australia
Eka Sukmawati, Indonesia
Uk Kim, Korea
Gedisa Kone, Papua New Guinea
Scott Hartley, United States of America
Kalsom Abdul Ghani, Malaysia

Current State of Practice in Spill Response – Australia

APEC Workshop on Oil Spill Response
Singapore
25 March 2004

David Baird
General Manager
Emergency Response
Australian Maritime Safety Authority

Evolution

Australia's National Plan to Combat Pollution of the Sea by Oil and Other Noxious and Hazardous Substances (the National Plan) commenced operation in 1973. The National Plan is an integrated Government and industry organisational framework enabling effective response to marine pollution incidents. The Australian Maritime Safety Authority (AMSA) manages the National Plan, working with State/Northern Territory (NT) governments and the shipping, oil, exploration and chemical industries, emergency services and fire brigades to maximise Australia's marine pollution response capability.

Since its inception, the National Plan has proven to be a robust and reliable arrangement. When called into action, the National Plan has worked well and provided both timely and effective response to pollution incidents, including significant clean up operations following major spills such as *Iron Baron* (1995) and *Laura D'Amato* (1999).

Major reviews of the management of the National Plan were conducted in 1978, 1993 and 2000; other reviews, post-incident and post-exercise, are also undertaken with a view to improving future responses.

International Framework

Australia was one of the first countries to adopt the International Convention on Oil Pollution Preparedness, Response and Co-operation 1990 (OPRC). A primary purpose of the Convention is to focus the world's response capability on the problem so all nations will benefit.

The National Plan implements many of Australia's obligations as a signatory to the Convention. For a major oil spill Australia may need to call upon overseas assistance from international stockpiles at Singapore or Southampton (UK). Provision is made for the speedy entry of equipment and personnel from overseas.

Australia is a signatory to the International Convention relating to Intervention on the High Seas in cases of Oil Pollution Casualties 1969, as amended, and considers this convention to be particularly important in any major incident. The broad powers provided by the Convention have been delegated to AMSA, with the exception of the power to sink or destroy a ship, which remains with the Minister for Transport and Regional Services.

Australia is also a signatory to the International Convention on Salvage 1989, and has recently developed National Maritime Place of Refuge Risk Assessment Guidelines. These Guidelines reflect guidelines recently adopted by the IMO Assembly and were developed to assist Australian maritime administrations, ship Masters and the maritime industry in identifying:

- places of refuge in circumstances where an emergency cannot be dealt with at sea; and
- the appropriate procedures to access a place of refuge.

Division of Responsibility

The Inter-Governmental Agreement provides that agencies responsible for responding to marine spills in Australia are:

- at oil or chemical terminals, oil exploration rigs, platforms and pipelines - the relevant oil or chemical company, with assistance from Government agencies, as required;

- in ports (other than terminals) and within the three nautical mile coastal waters limit - the responsible State/NT authority through the National Plan State Committee, with assistance from AMSA as required;

- beyond the three nautical mile coastal waters limit - the Commonwealth through AMSA, except in incidents when oil is likely to come ashore. In such circumstances, the State/NT, through the National Plan State Committee, will be the combat authority for protecting the coastline, while AMSA assumes responsibility for ship operational matters such as salvage; and

- in the Great Barrier Reef - the Queensland government through the National Plan State Committee, with assistance from AMSA as required.

Inter-Governmental Agreement

Responsible Commonwealth and State Transport Ministers have signed Inter-Governmental Agreement (IGA) on the National Plan to Combat Pollution of the Sea by Oil and Other Noxious and Hazardous Substances.

The Inter-Governmental Agreement ensures that the national approach to preparedness and response to oil and chemical spills in the marine environment is continued and strengthened, provides a mechanism to ensure decision making under the National Plan is co-operative and ensures that the obligations of all parties are met.

AMSA/AIP Oil Spill Agreement

To complement the National Plan IGA, a Memorandum of Understanding (MOU) on Oil Pollution Preparedness and Response is also in place between AMSA and the key representative body of Australia's petroleum industry, the Australian Institute of Petroleum (AIP).

The MOU formalises the intention of AMSA and AIP to co-operate to ensure that the National Plan operates effectively and wherever possible is enhanced, and reflects the industry's commitment to maintain the Australian Marine Oil Spill Centre (AMOSC) as the major National Plan equipment stockpile for Australian waters. AMOSC is a subsidiary of the Australian Institute of Petroleum based in Geelong, Victoria, and is an integral part of the National Plan. In an oil spill response AMOSC has, in addition to its own staff, access to personnel from the major oil companies. AMOSC also coordinates the industry's mutual aid arrangements.

Funding

Funding of Commonwealth responsibilities under the National Plan is based on the potential-polluter-pays principle. To achieve this, a levy is imposed on commercial shipping using Australian ports. This levy provides funds for ongoing development, maintenance and administration of the National Plan, including the acquisition, storage and maintenance of the equipment and training programs. The levy also provides contingency funds to cover costs incurred in responding to incidents where the polluter cannot be identified and costs cannot be recovered.

Management Structure

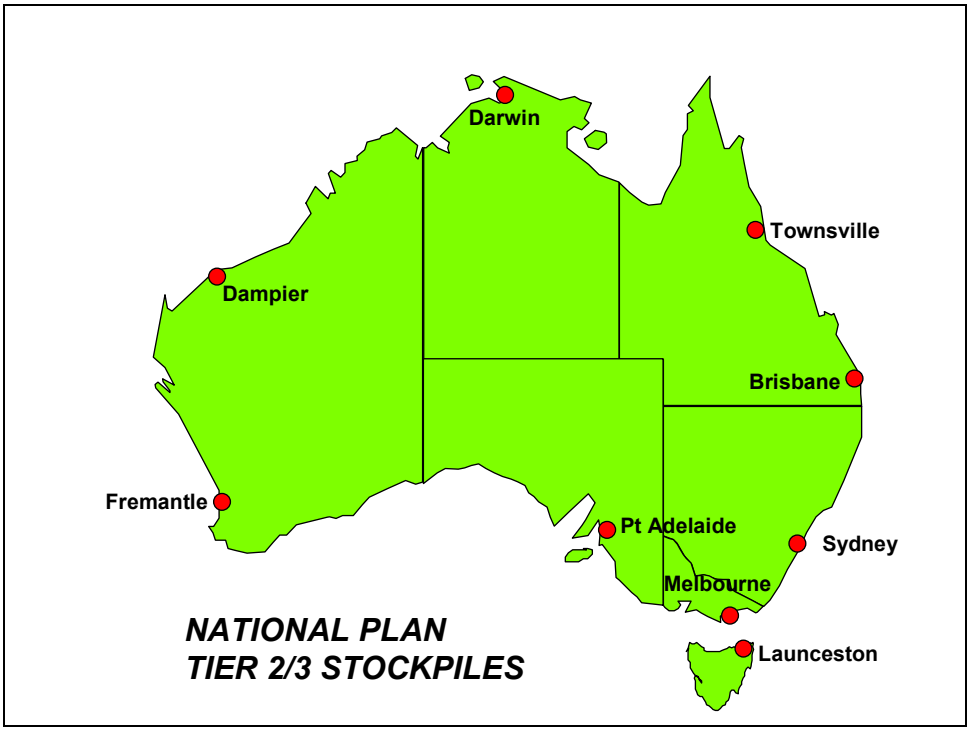
The National Plan Management Committee (NPMC) provides advice to Ministers on the strategic, policymaking and funding direction for the National Plan. NPMC is supported by the National Plan Operations Group (NPOG), which considers the ongoing operational aspects of the Plan for both oil and chemicals. The Group is chaired by AMSA, with membership incorporating the key operational stakeholders. NPOG has established three Working Groups to assist in carrying out these functions, dealing respectively with oil spill response, chemical spill response and environmental issues.

It is important to note that States/NT, industry and ports also provide funding, both direct and indirect, to carry out National Plan functions.

Equipment

The National Plan holds a wide range of response equipment at all major ports. Equipment provided by AMSA is generally targeted at larger spills (Tier 2 and 3). This is complemented by equipment held by port authorities for Tier 1 spills, individual oil and chemical companies and by the Australian Marine Oil Spill Centre stockpile in Geelong. Equipment can be rapidly deployed to the scene of a spill.

Types of equipment include oil spill control booms of varying types and sizes, self-propelled oil recovery vessels, static oil recovery devices and sorbents. A range of storage devices including free standing tanks and towable storage bladders and bags complement recovery devices.



Equipment used for chemical spills depends on the type of chemical. Chemical substances have properties that vary widely and can damage or cause failure to some types of equipment. Appropriate chemical response and clean up equipment is identified by the chemical industry and fire authorities. Suitable oil response equipment may be used in a chemical spill.

Support systems

A computer-based Oil Spill Trajectory Model (OSTM) is used to simulate and predict the movement of oil spills. The information provided assists those making decisions on measures needed to counter the threat to the marine environment.

The National Plan Oil Spill Response Atlas (OSRA) is a computer-based digital mapping system that allows operators to overlay various types of data to identify biological, cultural, geomorphological and socio-economic resources and how a marine pollution incident may impact these resources.

To assist in predicting, modelling and preventing chemical spills, the National Plan also has access to a range of chemical spill and emergency decision support tools. These tools provide information on bulk chemicals and packaged goods transported by sea, chemical toxicity and properties, atmospheric plume dispersion and safety emergency procedures.

Training

Regular training programs and exercise are conducted for personnel likely to be involved in a spill response. Training courses are run by AMSA, the States/NT and industry, and assistance with training is regularly provided in the region as part of programmes undertaken by IMO and/or the South Pacific Regional Environment Programme (SPREP). Overseas participants are also welcome to attend courses run in Australia.

Oil spill training is conducted on three levels:

Senior Management – for senior government and industry management personnel responsible for high level decision-making

Middle Management – for middle management personnel responsible for managing operational responses, their deputies, and environment and scientific coordinators.

Operator – for supervisors appointed as site managers and personnel responsible for undertaking on-site clean up and support operations.

Australian Maritime Safety Authority
March 2004

INDONESIA OIL SPILL RESPONSE

by

EKA SUKMAWATI, SH, LLM.

DIRECTORATE GUARD AND RESCUE

DIRECTORATE GENERAL OF SEA COMMUNICATION

Presented on APEC Workshop on Oil Spill Response and Planning

Singapore, 25 March 2004

INDONESIA OIL SPILL RESPONSE

PRESENTED BY:
EKA SUKMAWATI
DIRECTORATE GENERAL OF SEA COMMUNICATION
(DGSC)
REPUBLIC OF INDONESIA

INTRODUCTION

Marine environment of Indonesia contains great potentials for enhancing people prosperity and welfare, besides having the function for defense and security porpuse. Therefore the conservation of marine environment should be well observed in order it remains sufficient as the living resources and support for the people of Indonesia as well as other living creatures.

Oil transportation traffic by VLCC and ULCC through the straits of Malacca and Singapore, the Straits of Lombok and Makassar has made the Indonesian waters become more vurnerable to oil pollution hazard, for examples are the MT.Showa Maru accident took place in the Straits of Malacca in 1975 which spilled more 3.600 tones of oil into the sea. Therefore, the government of Indonesia has ratified and adopted the relevant international conventions and adopted into the national laws.

With the present rapid development of marine technology it is likely that the sea would be the life line as well as the future of Indonesia its people, furthermore protection of the vast marine and coastal marine environment is a serious and high priority matter to government of Indonesia.

The risk and transbondary nature of oil pollution itself makes cooperation at regional and global levels necessary. The IMO, UNDP ad donor countries still putting a lot of efforts in this direction

REGIONAL COOPERATION

1. Agreement between Indonesia, Malaysia and Philippine to response oil spill in Sulawesi Sea (MOU Sulawesi Sea Oil Spill Network Response Plan, 1980).
2. SOP for joint Oil Spill Combat in the Straits of Malacca and Singapore, 1987 between Indonesia, Malaysia and Singapore to response oil spill in Malacca Strait and Singapore Strait Agreement between ASEAN countries to help each other in oil spill response (MOU ASEAN Oil Spill Response Action Plan – OSRAP 1992)
3. Agreement between Indonsia and Australia to cooperate in preparedness and response oil spill (MOU Oil Pollution Preparedness and Response, 1996)

THE RESPONSIBLE ORGANIZATION

- The responsible organizations of Directorate General of Sea Communication-DGSC. are formulating policy, rendering guidance and administering licencies in confirmnity with the policy as determined by the Minister of Communication. The duties include the certification of ships including pollution prevention requirement, port state control, law enforcement in seas within national juridiction, combating of oil pollution and management of the oil pollution damage claims process.
- The DGSC is responsible for the implementation of international convention related to marine pollution. Three of DGSCs six Directorates deal with maritime safety, marine environment protection and maritime law enforcement. These are Directorate of Guard and Rescue, Directorate of Shipping and Seafarers and Directorate of Navigation.
- The Directorate of Guard and Rescue are responsible for the preaparing policy and technical guidance of port safety and security, port state control, law enforcement in seas within national juridiction, salvage, underwater work and marine patrol, combating of oil pollution, management of the oil pollution damage claims process as well as.

THE RESPONSE OIL SPILL ORGANIZATION

1. The DGSC is responsible as the **lead agency** for the national and regional plans in in charge of operational command and control of oil spill response in Indonesia.
2. Pertamina-state owned oil company, as the **supporting agency** in oil spill response operation, which have the equipment and human resources in oil spill handling
3. The Ministry of Environment as a focal point which analysed the assesment of natural damages and socio-economic losses and rehabilitation.
4. The other agency participate in addressing marine pollution, among them, the Local Government, Ministry of national Mines and Energy, Justice, Internal Affairs, Fishery, Forestry, Public Health and the Agency for the Assesment and Apilication of Technology-BPPT, have support roles in operation and advisory.
5. The Administrator Port Authorithy as the **on-scene commander** which incident occurred in port public area, while out-side of port responsible by head of guard and rescue base. There are 5 bases on different islands.
6. National Operation Center for Oil Pollution –NOCOP is located in Headquaters DGSC-Jalan Merdeka Barat Jakarta, it operates 24 hours daily.The Nocop headed by Director General of Sea Communication.

TIERED RESPONSE CATEGORIES IN INDONESIA

The oil spill large scale may not be possible to be controlled independently by the DGSC with optimal results. Tiered Response Concept implemented in Indonesia based on the area responsibility, as the categories as follows:

Tier 1 - Independent combating

Carried out by oil company with respective plan. In case the oil spill incident takes place within their responsible areas.

Tier 2 - Local Combating

In case the oil spill can not be handled by independent unit, joint combating operation between oil company and relevant agencies under coordination and command of Port Authorithy will be activated.

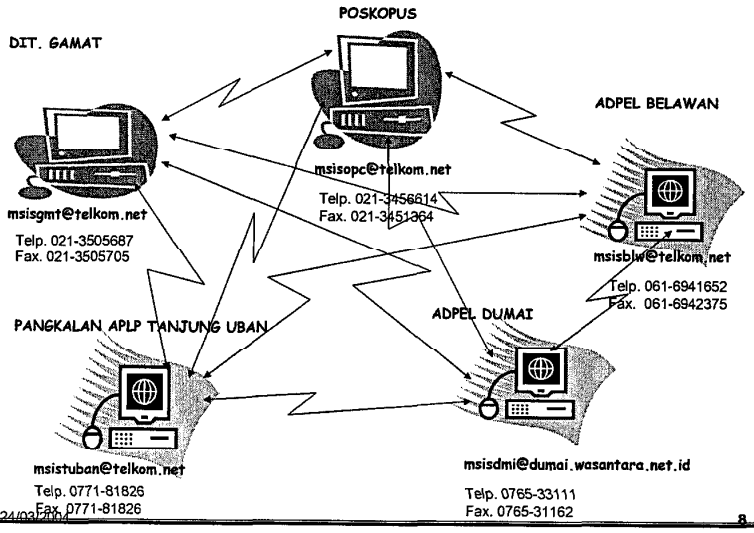
Tier 3 - National Combating

When the Port Authorithy not capable to handled the incident, then DGSC headquaters will be take-over responsible for coordinating and commanding response operation.

THE COMMUNICATION SYSTEM OF THE OIL SPILL RESPONSE

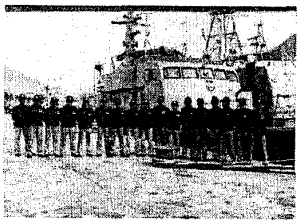
- DGSC has a Command Control, Communication and Information-C3I System for guard and rescue operation established in 1992. The communication system of the National Oil Spill Contingency Plan is integrated with the Communication System.
- The communications between NOCOP is carried by the guard and rescue command and control system, consist of Central Command Post-NOCOP, 9 region Command Posts, 3 sub Region Command Post located at strategic location covering the whole of Indonesian water.
- The dedicated telecommunication network also has link to the Rescue Coordinating Centers of the National SAR Agency, it also has dedicated lines to the Head Office of Meteorology and Geofisical Agency at Jakarta.

E-MAIL MSIS NETWORK



TRAINING AND EXERCISE

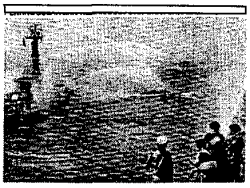
- **Training**
  The DGSC, Pertamina, PCs have had qualified personnel of sufficient number in operator levels and their capability and qualifications will be upgraded continuesly by educations and training held in Indonesia or abroad.
- **Exercise**
  National level exercise is joint between the DGSC and the private oil companies as well as with other relevant agencies, such as Ministry of Environment, Navy, Marine Police and Local Authorithy.



REGIONAL JOINT EXERCISE

The regularly regional joint exercise cooperation with neighboring countries which have been held are

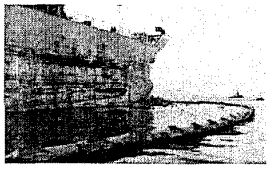
1. Joint exercise among the government of Indonesia, Malaysia and Singapore in the Straits of Sambu in 1986;
2. Joint exercise among the Government of Indonesia and Philliphine, in the teritorial water of Philiphines: Davao-1986 and 1990, Zamboanga-1988,Cebu-1992 and 1995, Batangas-1999, Subic-2003 as well as in teritorial water of Indonesia: Bitung 1989 and 1991, Ujung Pandang-1997, Bali-2001.



MARINE POLLUTION EXERCISE – DGSC

NO	YEAR	LOCATION	TYPE OF EXERCISE	EXPLAINATION
1	1986	Davao Philippine	Regional exercise	Philippine, Indonesia
2	1987	Bitung Indonesia	Regional exercise	Indonesia, Philippine
3	1988	Sambuanga Philippine	Regional exercise	Philippine, Indonesia
4	1989	Bitung Indonesia	Regional exercise	Indonesia, Philippine
5	1990	Davao Philippine	Regional exercise	Philippine, Indonesia
6	1991	Bitung Indonesia	Regional exercise	Indonesia, Philippine
7	1992	Davao Philippine	Regional exercise	Philippine, Indonesia
8	1993	Balikpapan Indonesia	Regional exercise	Indonesia, Philippine
9	1994	Balikpapan Indonesia	Regional exercise	Indonesia
10	1995	Cebu Philippine	Regional exercise	Philippine, Indonesia, Japan
11	1996	Batam Indonesia	National exercise	Indonesia
12	1997	Ujung Pandang Indonesia	Regional exercise	Indonesia, Philippine, Japan
13	1998	Tanjung Priok Indonesia	National exercise	Indonesia
14	1998	Batam Indonesia	Regional exercise	RFC (Indonesia, Singapore, Malaysia & Japan)
15	1999	Batangas Philippine	Regional exercise	Philippine, Indonesia, Japan
16	2000	Balikpapan Indonesia	National exercise	Indonesia
17	2001	Beno-Bali Indonesia	Regional exercise	Indonesia, Philippine, Jepang
18	2002	Belawan-Sumut	National exercise	Indonesia
19	2003	Subic-Philippine	Regional exercise	Indonesia, Philippine, Jepang

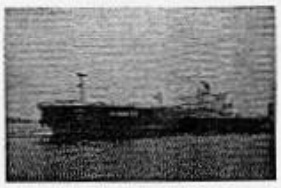
OIL SPILL EQUIPMENT



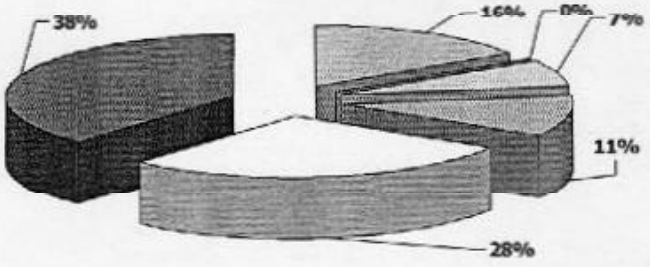
- Most of oil spill equipment in Indonesia belongs to Pertamina and its production sharing company, located at each of their marine oil facilities.
- DGSC has one set of equipment, consisting of oil booms, skimmer, dispersant spray and fast tank for training purpose and for real incidents.
- The Government of Japan within the framework of their OSPAR-Oil Spill Preparedness and Response Project provide oil spill equipments for stock file at Balikpapan-Straits of Makassar

HIGH RISK AREA OF OIL SPILL INCIDENT AT INDONESIA WATER

AREA	LOCATION	SCOPE OF AREA
A	MALACCA STRAIT	1,5°N, 104,5°E – 3°N, 102°E
B	SOUTH COAST OF JAVA	40°N, 116°E – 60°S.106°E
C	LOMBOK STRAIT	8°S, 116°E
D	MAKASSAR STRAIT	2°N, 119°E - 4°S,117°E



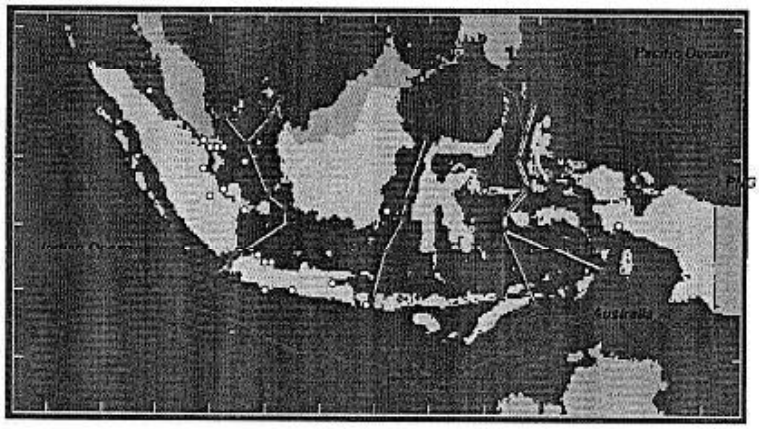
OIL SPILL RISK IN INDONESIAN WATERS



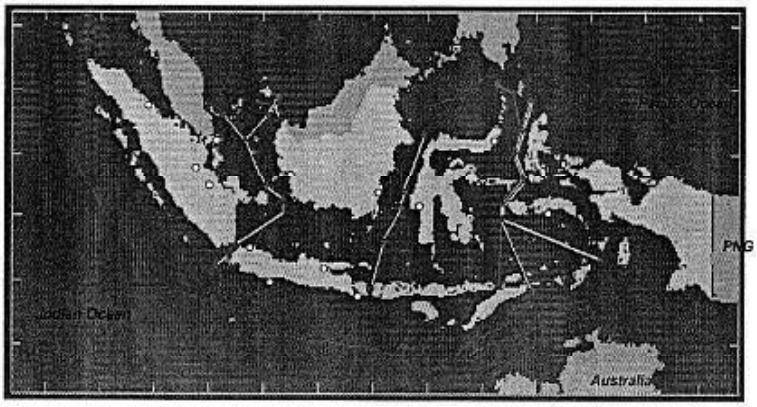
OIL SPILL INCIDENT IN INDONESIA (2000-2004)

Incident		Vessel name	The caused
Date	Location		
24 Feb 2000	Tanjung Prick	TB. Waisan	Fire
1 April 2000	Cilacap water	MT. King Fisher	Grounding
11 August 2000	Makassar strait	MT. Glory I	Sink
3 Oct 2000	Karang Batu Berhanti water	MT. Natuna Sea	Grounding
31 Oct 2000	PAL Surabaya quay	KM. Vanida 19	
2000	Cilacap	KM HHC	Sink
18 Feb 2001	Batam	TK. Bina Tunggal	Sink
11 Feb 2001	Tegal	MT. Steart East & MV. Viking	Grounding
27 March 2001	Sambu island	CMA.CGM Normandie	Grounding
9 July 2001	South of Yogya water	MT. Bumi Sarana Eks. Towa Sea	Sink
24 Des 2002	Bengkalis Riau	Tkg. Buminda	Grounding
27 July 2003	South East of Suar Harborg	MV. Spring Box vs LPG Gas Roman	Collision
7 July 2003	Gerong river Plaju	MV. An Giang vs TB. PLTU I	Collision
14 Feb 2004	Wringgar water/Semng	Tkg. OSCO 10 / TB. Barge 001	Capsize

OIL SPILL LOCATION 1995-2003

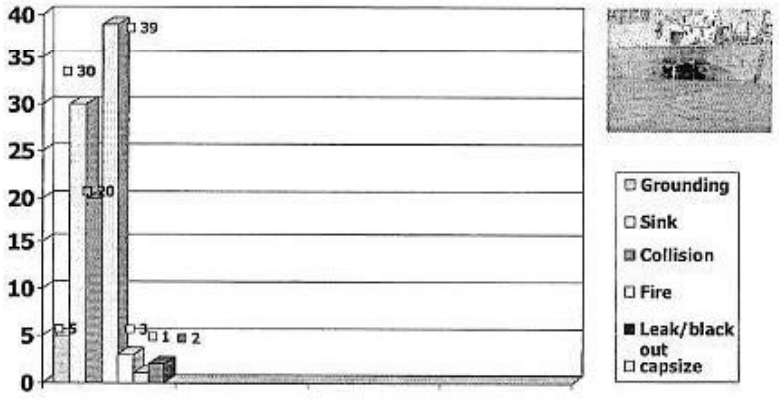


OIL SPILL EQUIPMENT LOCATION

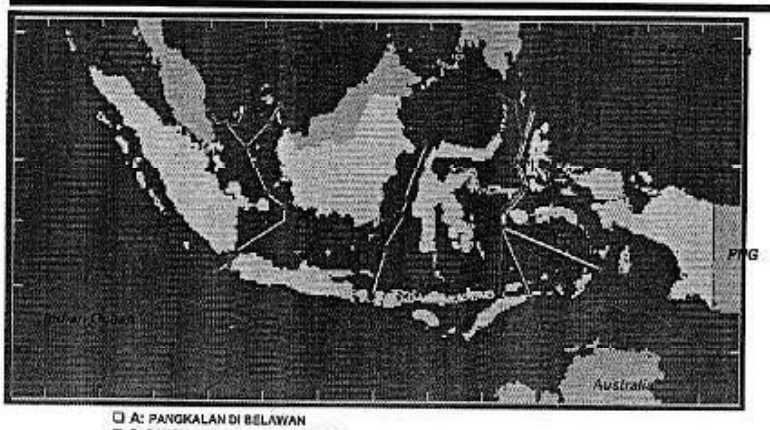


I: COAST FUARD BASE TG PRIOK
II: COAST GUARD BASE TG PERAK
III: COAST GUARD BASE BITUNG
IV: COAST GUARD BASE TG UBAN
TERMINAL AMBON
TERMINAL BALIKPAPAN
TERMINAL BELAWAN
TERMINAL BENOA
TERMINAL CILACAP
TERMINAL DUMAI
TERMINAL PALEMBANG
TERMINAL SAMARINDA
TERMINALTG.PERAK
TERMINAL TG. PRIOK
TERMINAL MAKASSAR

CAUSED OF SHIP ACCIDENT



OPERATION AREA OF PATROL VESSEL OF DGSC



- A: PANGKALAN DI BELAWAN
- B: PANGKALAN DI TANJUNG UBAN
- C: PANGKALAN DI TANJUNG PRIOK
- D: PANGKALAN DI SURABAYA
- E: PANGKALAN DI UJUNG PANDANG
- F: PANGKALAN DI BITUNG
- G: PANGKALAN DI AMBON

EXISTING PLANS TO UPGRADE RESPONSE CAPABILITY

1. DEVELOP LOCAL/PORT CONTINGENCY PLAN AT EACH PORT(BASED ON NCP CONCEPT);
2. DEVELOP COMMUNICATION SYSTEM OF POLLUTION RESPONSE (i.e INSTAL AIS ON MAIN PORT);
3. DEVELOP TSS AND VTS AT LOMBOK STRAIT AND MAKASSAR STRAIT;
4. CONDUCT OIL SPILL RESPONSE TRAINING AND JOINT EXERCISE AT NATIONAL LEVEL AND REGIONAL LEVEL
5. CONDUCT DEVELOP EQUIPMENT IN INDONESIA OIL SPILL RESPONSE AUTHORITY-IOSRA (GUARD AND RESCUE BASE);
6. ESTABLISHED INDONESIA OIL SPILL RESPONSE ORGANIZATION-INDOSRO;
7. DEVELOP RECEPTION FACILITIES THROUGH ECO PORT PROGRAM AND INVITE PRIVATE SECTOR TO INVEST IN DEVELOPMENT OF RECEPTION FACILITIES


THANK YOU VERY MUCH
FOR YOUR ATTENTION

CURRENT STATE OF PRACTICE IN SPILL RESPONSE - KOREA

APEC Workshop on Oil Spill Response
Singapore
25 March 2004

Uk Kim
Response Team Manager
Korea Marine Pollution Response Corporation

Oil Spill Response Scheme in Korea

Kim, Uk
Response Team Manager

Korea Marine Pollution Response Corporation
KMPRC

1. Introduction

The oil tanker Sea Prince Incident which occurred in the South Coast of the Republic of Korea in July 1995 was one of the biggest oil pollution incident that we have experienced, so far. The vessel was carrying a cargo of 260,000tons of Saudi Arabian crude oil when it was grounded in a small island near Yeo-su port during a typhoon. This incident resulted in an oil spill of approximately 5,000 tons of cargo and fuel oil and spilt oil was spread fifteen miles away from Sori Island to 127 miles along coasts of Geo-je, Pusan, Ulsan and Po-hang, and thin oil was even discovered 20 miles away from the West Coast of Tsushima Island in Japan.

Due to the incident, the Government came to recognize the seriousness to oil pollution impacted on marine environment. Thus, we started to develop our response system such as in the improvement of national regimes, enhancement of national oil recovery capability, etc. in order to prepare for similar mass oil pollution incidents. Being difficult for an individual State to response effectively in an event of a mass oil pollution incident, we also came to recognize the necessity of international cooperation establishment.

2. National Response Scheme after Sea Prince Incident

2.1 Planning and Response System

2.1.2 National Contingency Plan(NCP)

In accordance to the necessity of a synthetic plan establishment for preparedness and response to disaster by mass oil pollution nation-wide since the Sea Prince Incident and requirement of establishment of National Contingency Plan in ratifying the OPRC Convention, the Republic of Korea began to establish the Plan in 1998 and which was deliberated and settled at the Cabinet Meeting on 11 January 2000.

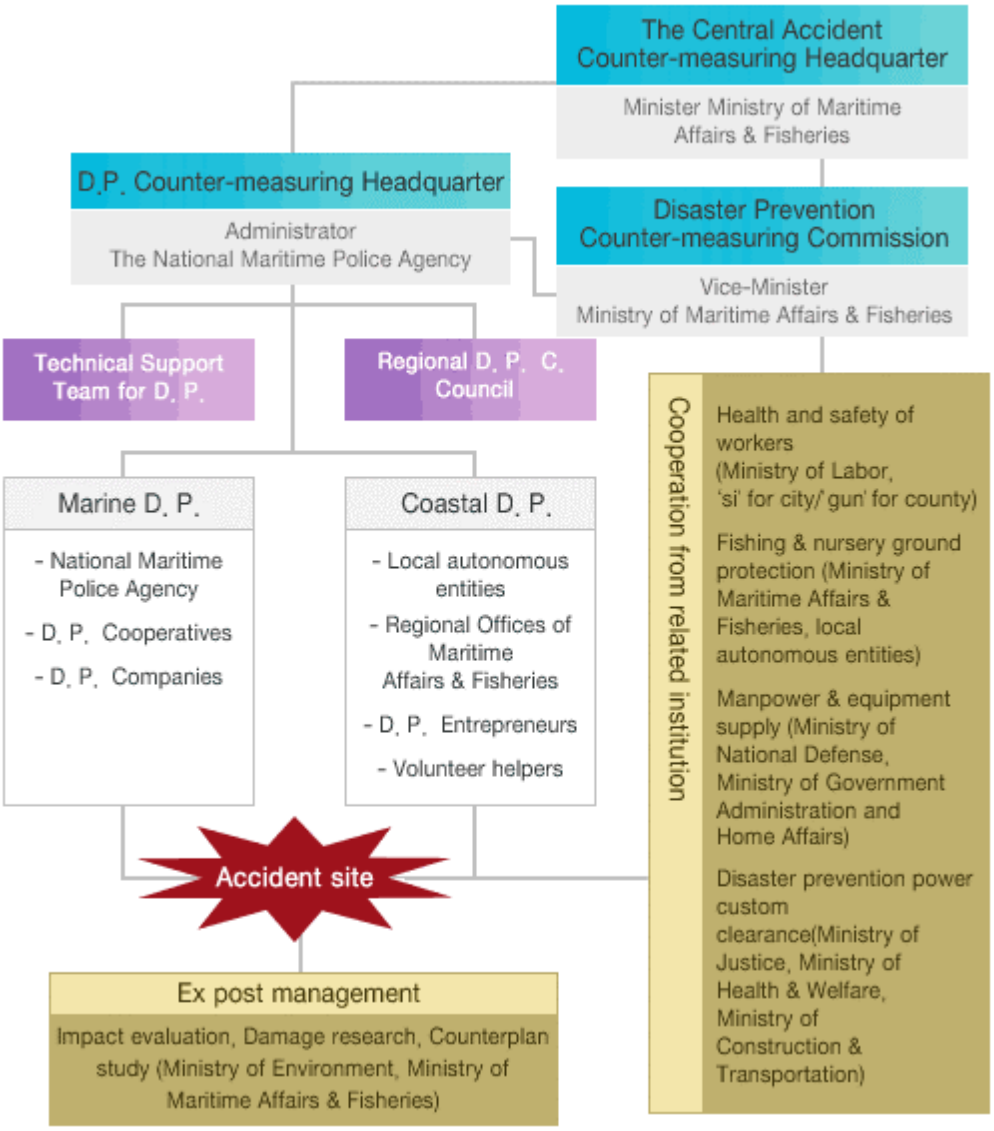
2.1.2 Regional Contingency Plan(RCP) fitted to Characters of each Sea Area

Regional Contingency Plan for counter-measuring in common per region covering 12 sea areas segmented in accordance with the National Contingency Plan have been established the period of 1999 to 2002 through a professionally specialized service engineering institution in order to regionally prepare and respond to marine pollution, which defines organization and procedures of response, works to be prepared, etc. including ESI map.

2.1.3 Unifying Response Command System

The Government unified the related works with response of oil spill into Korea National Maritime Police Agency (KNMPA), which were divided into several authorities, and prepared legal basis on establishment of the Response Countermeasure Head-Quarter (RCHQ) which the Commissioner of KNMPA become Chairman of RCHQ, so that he can overall command the mobilized personnel and equipment at response scene.

Figure 1. Chart for counter-measuring System against Pollution Accidents



2.1.4 Support System by Response Experts

The Scientific Support Unit (SSU) for advice of response technique and research of scientific response method in response actions was established in 1997 according to the revised Marine Pollution Prevention Law. The members of SSU is nominated by the Commissioner of KNMPA, and SSU is composed of twenty-eight experts from nine Research Institutes at present and advise works are divided into six fields.

2.2 Reinforcement of National Response Capability

2.2.1 Response Equipment

Since the Sea Prince Incident, we have been reinforcing National Response Capability(NRC) targeting 20,000 tons in oil recovery capability, allocating as Government 10,000tons(KNMPA), KMPRC 5,000tons and private companies 5,000 tons. KNMPA had planned a Five Years Plan for reinforcement of response equipment and has been proceeding with the Plan. Consequently, response power were remarkably reinforced than previous.

Table.1 Status of National Response Capability (Jan. 2004)

	Oil Recovery Vessel	Oil Skimmer (set)	Oil Boom (km)	Response Capability(ton)
Total	117	262	250	14,600
KNMPA	19	93	23	5,800
KMPRC	62	127	47	6,200
Others	36	42	180	2,600

2.2.2 Korea Marine Pollution Response Corporation (KMPRC)

In order to strengthen the capability of the private sector to respond to marine pollution, the KMPRC was established in 1997 by the joint investment of Korean government and five major oil refinery companies. According to the Marine Pollution Prevention Law, oil storage facilities with a capacity of more than 10,000 tons, tanker shipping companies operating more than 500 tons gross tonnage, and cargo shipping companies operating more than 10,000 tons gross tonnage may be members of the corporation and 100 members are entered now.

The KMPRC consists of a headquarter, 11 branches in major ports and 13 offices operating port reception facilities and major functions of the KMPRC are as follows:

- control of discharged wastes including oil.
- arrangement of oil recovery boats or equipment
- stockpile or lending of equipment and materials
- management of oil deposits and disposal facilities
- training and education of clean-up operations

- activities entrusted by the government

2.3 Strengthening of Training and Exercise

According to NCP, KMPRC is providing response personnel with various training programs such as operational level courses for first responders, administrative level courses for on-scene commanders and managers, oversea training courses, etc.

Also, KMPRC has been raising adaptation capabilities to the NCP and the RCP through the joint exercises by government, local authorities and industries, and has been continuously improving problems generated through such exercises.

2.4 Promotion of Response Technology Development

Concerns to technology development in field of response has been magnified and it has been actively proceeding many researches and developments such as the Response Supporting System (RSS) of oil spill incident and the Oil Spill Prediction Model to oil spill incident in Research Institutes, many kinds of absorbent and dispersant in private companies, etc.

2.5 International Response Cooperation System

2.5.1 Accession to OPRC Convention

The Republic of Korea, in order to accede to the OPRC Convention, improved response regimes and established NCP with proceeding procedures required, and acceded to the Convention on 9 November 1999. The Convention in Republic of Korea entered into force on 9 February 2000.

2.5.2. Active Participation in NOWPAP Projects

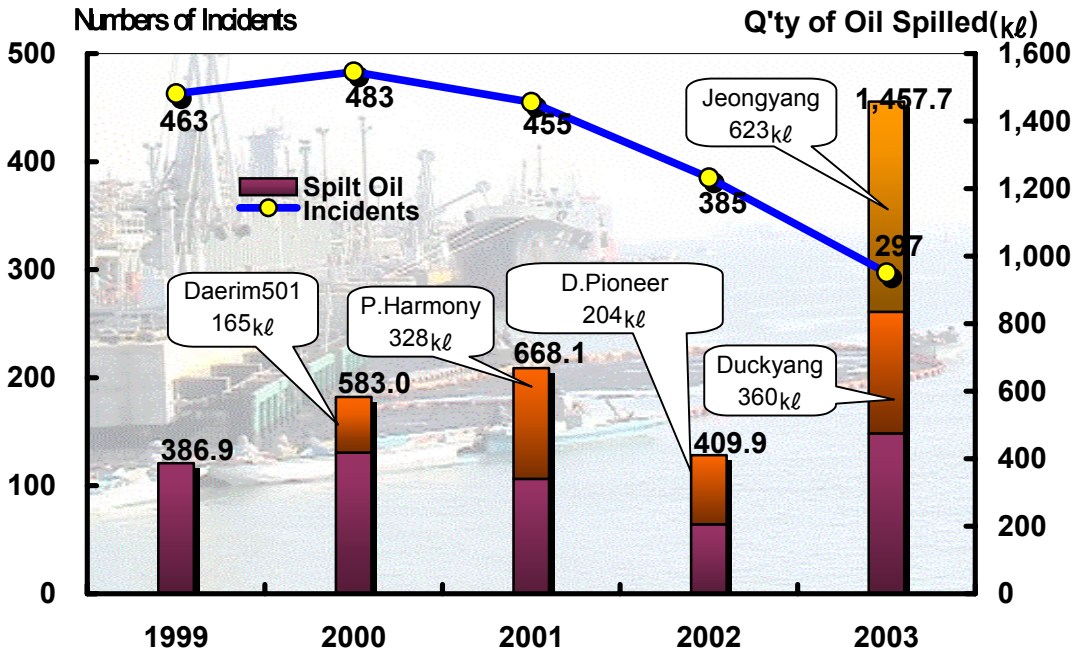
According to the recommendation of the United Nations Environment Programme (UNEP), Northwest Pacific Action Plan(NOWPAP) for protection, management and development of the marine and coastal environment of Northwest Pacific Region, which was agreed by five Member States, was launched by holding the First Intergovernmental Meeting on September 1994, in Seoul, Republic of Korea.

In order to effectively proceed with this Plan, the priority projects of six areas were designated and inter-alia the NOWPAP/4 Project for development of effective measures for regional cooperation in marine pollution preparedness and response is being most actively.

3. State of oil spill incidents

The number of oil spill incidents has been reduced continuously due to the combined efforts of the shipping industry and government to improve safety and pollution prevention.

However, because oil spill incidents tend to be huge lately, early preparedness and upgrade in response know-how is required.



< Table 1> Stats of Oil Spill Incidents in KOREA, 1999-2003

4. Recommendation

Presently, the Republic of Korea is in the midst of planning the development of oil prevention policy through experience and lessons learned from oil pollution incidents, and continuous feedback acquired from the results of oil pollution prevention exercises. On one hand, the government together with industry and response organization collaborate with each other in forming a cooperation in preparedness of oil pollution incidents and also plan to form an international cooperation with neighboring countries.

Lastly, in preparedness of huge oil pollution incidents, we need to give more priority in improving the following subjects.

- **Preparedness**
  - Update Contingency Plan
  - Training and Education
  - R&D for Response Scheme, technique, equipment, etc.
- **Response**
  - Development of operational procedure
  - Coordination & Communication between related parties
  - Develop Global Co-operation System
  -

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Biography.

Kim, Uk is a manager of response team working in planning and development of response system. He holds B.S from Korea Maritime University.

CURRENT STATE OF PRACTICE IN SPILL RESPONSE -

PAPUA NEW GUINEA

APEC Workshop on Oil Spill Response
Singapore
25 March 2004

Gedisa Kone
Environmental Officer
Department of Petroleum and Energy

CURRENT STATE OF PRACTICES IN SPILL RESPONSE IN PAPUA NEW GUINEA

Gedisa Kone Department of Petroleum & Energy, Papua New Guinea

ABSTRACT

Spill Contingency Planning and Response practices in Papua New Guinea is covered by the National Marine Oil Spill Contingency Plan, established in 1981.The Plan operates on a three tiered response concept which utilizes both national and international response assistance, based on the level of response required. The plan also provides a framework for cooperation between industries and government agencies in oil spill combat and shares spill response resources located in all major ports of the country. The PNG Maritime Transport Division is the leading agency delegated with the legal responsibility of commanding all spill responses within the country. It has the backing of other established national agencies and the oil industries in the country.

1.0 INTRODUCTION

Papua New Guinea in recognition of the need for global and regional environmental protection from increasing threat of marine pollution incident, established its first Oil Pollution Plan in 1981.This was revised again in 1990, with the assistance from International Maritime Organization's Regional Spill Advisor. The Major Oil Industries operating in the country have also established their Oil Spill Contingency Plan in 1997, which collaborates with PNG's National Plan.

Discussion on spill responses in Papua New Guinea will cover the practices outlined in the National Marine Oil Spill Contingency Plan and the Marine Oil Spill Plan used by oil industry in PNG.

2.0 THE NATIONAL SPILL RESPONSE PLAN

2.1 Legislative Framework For Spill Management In PNG

Papua New Guinea's first Oil Pollution Plan was published in 1981. In 1990, the PNG government in collaboration with the International Maritime Organization's (IMO) Regional Oil Spill Advisor, had a revised plan known as the National Marine Oil Spill Contingency Plan (NATPLAN) which was developed to meet PNG's Obligation under the International Convention on Oil Pollution Preparedness, Response and Cooperation 1990 (OPRC 90) and South Pacific Regional Environmental Program (SPREP) Protocol[1], establish by its convention[2]

The revised plan allows for combined effort by relevant National Departments, the oil industries and coastal ship owners to provide contingency plan to combat ship-sourced oil spills in PNG marine environment.

PNG recently launched a national legislation on marine pollution prevention, specifically to regulate shipping activities.

[1] Protocol Concerning cooperation in combating pollution emergencies in South Pacific Region

[2] South Pacific Regional Environmental Program Convention

2.2 The National Plan

Papua New Guinea' National Oil Spill Contingency Plan covers all forms of spills in marine environment including oil, chemicals and other hazardous substances. Its geographical scope extends to all coastlines and marine waters within the 200 nautical miles Exclusive Economic Zone of Papua New Guinea.

Various national agencies have been delegated legal responsibilities, to ensure response is made to any oil incidents. These lead agencies take initial response to spillages occurring in areas under their jurisdiction.

All spills within the harbour limits, fall under the jurisdiction of Papua New Guinea Harbours Board. Any spills from oil terminals within and outside harbour limits, will be the responsibility of respective terminal operators, while those outside harbour limits fall under the Maritime Transport Division of PNG's jurisdiction.

The Maritime Transport Division through its Office of Transport is the responsible authority for all marine oil spills within Papua New Guinea Waters. It has the operational responsibility for commanding the response to marine spills through a designated Incident Controller

PNG's National Plan is based on three-tiered response concept. Tier one, covers small ships spills normally, less than 10 tons that are within response capability and resources of an individual port or oil terminal and are usually covered by Oil Industry or Port Contingency Plans. Tier Two covers medium spills, between 10 to 1000 tons. The spills that are within national capability and resources are covered by the National Plan. Tier Three, covers major spills in access of 1000 tons that are of magnitude beyond the response capability and resources of the country, including spills that impact or threatened to impact within the jurisdiction of PNG and neighboring countries. Tier Three spills are covered by the National Plan and also require activation of the Regional Plan- the Australia National Plan and Pacific Island Plans.

2.3 Spill Response Structure

An organizational structure known as the Oil Spill Response Incident Control System (OSRICS) has been set for response to any marine spills within Papua New Guinea waters. During any spill incidents, the Lead Agency[3] will organize a Spill Response Team based on the structure.

The structure includes a National Marine Spill Committee, which develops and maintains the National Oil Spill Contingency Plan through policy development, assessment of the effectiveness of spill response exercises and provision of advice to the government on marine pollution issues.

[3] PNG Maritime Transport Division's Office of Transport is the Lead Response Agency

An Incident Controller (IC) is established under the structure. It serves as the primary decision-making authority in relation to spill response activities and its important roles include directing and coordinating all response efforts at the scene.

Four specialized units were established under the structure to provide specialized functions to spill response operations. These specialized units include the Planning Section, the Operations Section, the Logistic Section and the Financial and Administration Section

2.4 Response Actions and Operations

In commanding the response to spills, the Incident Controller delegates relevant tasks to the marine response team using a Spill Response Action Checklist. These actions can be summarized in the Five Phase Reponses Action given below.

1. *Detection Of Spill, Notification and Alert of Authorities*
2. *Evaluation, Situation Analysis and Plan Activation*
3. *Response and Containment of Spill*
4. *Clean up and disposal of Oil/ Chemical Wastes*
5. *Site Rehabilitation, Cost Recovery and Long Term Monitoring*

Among the series of response actions taken during a spill, the highest priority is given to protecting public health and safety, which takes precedence over actions taken to minimize environmental damage.

The second priority action is stabilizing spill source and intervention at sea. It involves attempt to stop the flow of oil or other pollutant from the source so as to prevent the extent and severity of spills. Further more with the accession to United Nations Convention on Law of the Sea (UNCLOS), PNG can intervene on the high seas against the wishes of ships and cargo interest operating within its Territorial Sea, to prevent any danger from pollution threat.

Following the action to stop flow of spill, a Spill Assessment and Reporting is undertaken using a Pollution Report Form (POLREP). This report will be transmitted to the National Marine Pollution Committee and other interested parties including South Pacific Regional Environmental Program (SPREP) and Australian Maritime Safety Organization (AMSA).

Containment and Recovery at Sea is another important and challenging action because of the diverse PNG marine environments and the limitations like nature of spills, the physical conditions, the logistical conditions and availability of equipment. Because of this, the NATPLAN also outlines the techniques to be deployed respectively in each marine environments. This includes use of oil spill dispersants, mechanical equipment and practices involving in-situ burining and bioremediation.

Spill Surveillance and Forecasting is undertaken through direct observation, manual calculation using currents and winds and computer modeling. Computer modeling is requested through AMSA and SPREP, as PNG does not have these systems available.

The Lead agency has set up a 24-hour hotline for spill detection and reporting from the public. It immediately completes a POLREP report, following a spill and transmits it to relevant national and regional agencies. This also includes a Situation Report and a Post-Incident Report.

All post spill activities including response termination, equipment cleaning and restoration and damage assessment and monitoring are done by the Lead Agency. The PNG Department Of Environment and Conservation assist the Lead Agency in environmental restoration and rehabilitation activities.

2.5 External Assistance

The Government of Papua New Guinea and Australia signed a Memorandum of Understanding in 1997 to strengthen maritime relations through mutual cooperation. This allows the two countries to consult together in matters pertinent to maritime issues.
In addition the Australian Maritime Safety Authority (AMSA) and PNG Department of Transport signed an MoU[4], in accordance with IMO Convention on Oil Pollution Preparedness and Response Cooperation 1990, providing for close cooperation between the two organisations in combating oil pollution.
PNG being a member of the South Pacific Regional Environmental Program (SPREP) can requests assistance for major spillages under the Pacific Islands Regional Spill Contingency Plan (PACPLAN). The SPREP Protocol[5] established in 1996, allows Pacific Islands countries to cooperate in marine pollution emergencies.

2.6 Equipment

The national inventory is a joint government / industry arrangement with both parties contributing to and having access to equipment. In general, the oil industry provides equipment necessary to respond to tier one spills, while the government provides the balance of the stockpile. The government stockpile is located all over the country in major ports.

2.7 Spill Training Exercises

The national spill training and drills are conducted annually by the Department of Transport with participants from relevant government agencies. The Oil Spill Response Team also undertakes its training in all aspects of marine oil spill response required in the National Plan.
The Incident Controller and other senior personel receive training on the Incident Control System, which includes classroom and table-top drills and exercises. Such training focuses on major spill incidents requiring, external assistance.

2.8 Existing Plans To Upgrade Response Capability

There is plan to continuously revise the PNG National Oil Spill Contingency Plan to reflect changes and current practices. This includes the need for a detail plan on response

[4] Memorandum of Understanding
[5] SPREP Pollution Protocol concerning cooperation in combating marine pollution emergencies in South Pacific Region

to chemical spills because the current national plan is more focused on oil spills. The Department of Transport is also working on finalizing a detailed plan for oiled wildlife, to be included in that National Plan. This aims to provide response practices for rehabilitation of wildlife affected in spills
Oil Spill Exercise and training is another area, which, PNG is looking at. Particularly regular training and upgrading of skills in oil spill response and management.
The PNG Government has recently launched a legislation on marine pollution as anticipated, which aims to provide a regulatory mechanism for prevention of marine pollution in PNG waters.
There is need to continuously update the national stockpiles of response equipment located around the country. The PNG government is looking at options to replace old equipment when it makes funds available.

3.0 OIL INDUSTRY SPILL RESPONSE PLAN

Three major oil companies operate in Papua New Guinea involving mainly in import and distribution of petroleum products totaling to more than 750 megalitres per annum. These products are transported in variety of vessels around the coastline of PNG, in vessels ranging in size from 600-50000 tonne cargo capacity. There are also local and overseas vessels using both major and minor port facilities in the country.

In recognition of the need for environmental protection from potential oil spill pollution, the oil industry has a Marine Oil Spill Contingency Plan in place. This plan was prepared in 1997, as a supporting document to the National Marine Oil Spill Contingency Plan of PNG.
The Plan provides a Marine Oil Spill Action Plan (MOSAP) for oil companies. Its spill response equipment are located all over the country in major ports and operates under tiered response principle, similar to that of the national plan. The industry has reliable contacts and arrangements for deployment of overseas resources from recognized organizations like, the Australian Maritime Spill Center (AMOSC), East Asia Response Limited (EARL) in Singapore and Oil Spill Service Center (OSSC) in UK, particularly for large spill responses.

Other Oil Companies involving in petroleum exploration and refining in the country have their Oil Spill Contingency Plans. These plans are also submitted as regulatory requirements to relevant government agencies like the PNG Department of Environment and Conservation and the Department Petroleum & Energy.

4.0 CONCLUSION

PNG has a lot of sensitive marine environment, which lies in pathways of major shipping routes presenting great risk from oil pollution. To provide contingency for effective response to this increasing threat and as part of the commitment to global and regional need for cooperation in spill response and planning, PNG has put in place its National Marine Oil Spill Contingency Plan.
This plan provides a framework for cooperation between the government and oil industry in oil spill response within PNG and the Pacific Region.

5.0 RECOMMENDATION

Despite the current efforts by PNG in oil spill response contingency, the following recommendations can be said;

- Continuous updating of the National Plan
- There is need for enhancement in the lead agencies functions through skills upgrading, response training and funding.
- Replacement and boosting of the country's national stockpile
- Public awareness

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OFFSHORE DISPERSANT OPERATIONS - UNITED STATES OF AMERICA

APEC Workshop on Oil Spill Response
Singapore
25 March 2004

Scott Hartley
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United States Coast Guard

Offshore Dispersant Operations In the United States of America

by CDR James Hanzalik and CAPT Scott Hartley

Historically, dispersants have been considered by responders in the U.S. as a secondary response tool and have been given only minimal consideration during oil spills and contingency planning efforts. Dispersants were first used during the *Torrey Canyon* spill in 1967 and have been applied numerous times worldwide since that incident. The original chemical compositions of dispersants included industrial emulsifying agents, which has reasonable dispersing properties but were also highly toxic to the marine environment because of their aromatic content. Following the *Torrey Canyon* spill, improvement in both product development and application tactics have resulted in low toxicity dispersant formulations that can be effectively applied (Calhoun, *et. al.,* 1997).

Since the mid-1990s, dispersant operations have become a more accepted alternative response technology to mitigate the effects of oil spills in the United States. This is especially true in the Gulf of Mexico, where all dispersant application operations have been conducted since 1989. The main reason for this regional difference is that approximately 90% of U.S. oil supplies are transported through the Gulf, which creates more "opportunities" for spills to occur that are likely to be dispersible. This being the case, the Gulf Region has dispersant response resources readily available to carryout these operations. As a model for dispersant operations in the U.S., this will be the exception rather than the rule for the purposes of illustrating this alternative response technology in the U.S. This paper discusses present dispersant operations in the U.S.; specifically, the decision-making processes that are required before an operation is conducted, the resources required to conduct such an operation and monitoring of the operation.

Before a dispersant operation is undertaken, there are many deliberate decisions that are made and required before the dispersant operation is approved. Because of the tradeoffs involved (i.e., relative benefits and potential negative effects), the U.S. National Oil and Hazardous Substances Pollution Contingency Plan (NCP) restricts dispersant use. Dispersants must be on a national list maintained by the Environmental Protection Agency (EPA). Federal and state agency agreements through Regional Response Teams (RRTs) establish areas where rapid decisions on dispersants may be made by the Federal On-Scene Coordinator (FOSC). Use outside these areas requires the approval of additional agencies identified in the NCP. As of December 1998, seven of nine coastal regions have authorized pre-approval for dispersant use in specified areas. This decision making process varies by region which may, in some instances, delay the operation until it is no longer a viable option.

For the purposes of this paper, we will be using Region VI (Louisiana and Texas Gulf Coast and offshore areas.) In this area there is a pre-approval plan for dispersant operations, *RRT-6 Federal on Scene Coordinator (FOSC) Preapproved Dispersant Use Plan*, which the FOSC uses to determine if the use of dispersants is a viable option to mitigate a spill. This plan has been in effect for approximately seven years and has been used with outstanding results. This plan is concise and easy to use. The simple decision–making checklist consists of a yes or no flow chart (Figure 1) often referred to as an expert system. The pre-approval is written for major offshore oil spills, with a six-hour window of opportunity, stating only aerial dispersant resources are authorized. It also limits dispersant operations to offshore waters of Louisiana and Texas that are

no less than ten meters in depth and three nautical miles from shore. The plan also authorizes any dispersant listed on the NCP Product Schedule and requires the maximum spray coverage to 1:10, about twice the recommended ratio of 1:20. The plan outlines specific requirements for notifications, briefing and seeking advice from the RRT throughout the decision-making process. The process, both detailed and comprehensive, ensures that all regulatory agencies both Federal and State are included in the review and approval of pre-authorization plans. The plan as written, overcomes several regulatory requirements including the Endangered Species Act, Coastal Zone Management Act and of course the NCP, making it a rapid decision making tool. In addition, it allows the FOSC to make the decision to use dispersants. Once the FOSC makes the decision, the FOSC or the Unified Command (which consists of the FOSC, representatives of State government, the responsible party, and personnel in charge of the spill response) staffs make logistical arrangements for the actual dispersant operation.

Once the approval for dispersant operations is given, a second hurdle, the logistics, coordination and execution of the dispersant operation has to take place for the mission to be successful. Due to varying weathering properties of oil, the logistical requirements for a dispersant operation need to be met within the first 24-36 hours after notification. Typically, in the Gulf of Mexico, dispersant operations are conducted during daylight hours using aircraft with spraying apparatus as the delivery system. In most instances the aircraft, dispersant and delivery equipment is privately owned and contracted by the Responsible Party (RP) or the "spiller." In addition, a readily available dispersant asset needs to be in place to conduct the operation. This too varies by region where in some areas the logistics of getting the response resources in place could be a "show stopper." In the Gulf, Airborne Support, Inc. (ASI) is currently the only viable contractor able to carry out this operation within the window of opportunity. ASI was developed and supported by a majority of the bulk oil tanker trade [Marine Industry Response Group (MIRG), Clean Gulf membership, and the Louisiana Oil Offshore Platform (LOOP)] to carry out dispersant operations in the LOOP area and the Galveston, Texas lightering zone (Calhoun, *et. al.,* 1997).

The operation is usually managed using the Incident Command System (ICS) which provides great flexibility in size of the operation and unity of command. Operations under ICS, usually consists of a leader, Dispersant Operations Group Supervisor, spotter aircraft or spotter, sprayer aircraft and monitoring aircraft or monitor. These positions are filled by various RP, contractor and government personnel.

The Dispersant Operations Group Supervisor is in charge of a functional group under the operations section of the ICS organization. In the absence of an operations section, which is typical early in an oil spill response, the Dispersant Operations Group Supervisor would report to the Incident Commander (IC) who is the FOSC for oil spill incidents. This position manages the planning and execution (mostly operations, but some planning) for the dispersant operation. His/her responsibilities include, overall safety of the operation, requests restricted airspace, requests resources, arranges logistical support (dispersant, aircraft, fuel, airport arrangements, aircrews), and coordinates the disposal of unused dispersant.

The spotter position, or spotter, is physically located in an aircraft, which spots or guides sprayer aircraft over the spill target. The spotter remains in tactical control of the sprayer aircraft and is in charge of the dispersant operation on scene. This duty includes supervising on-scene airborne activities, coordinates effectiveness monitoring including monitoring aircraft or vessels,

coordinates the use of restricted airspace, and sets communication protocols and limits traffic into the operations area.

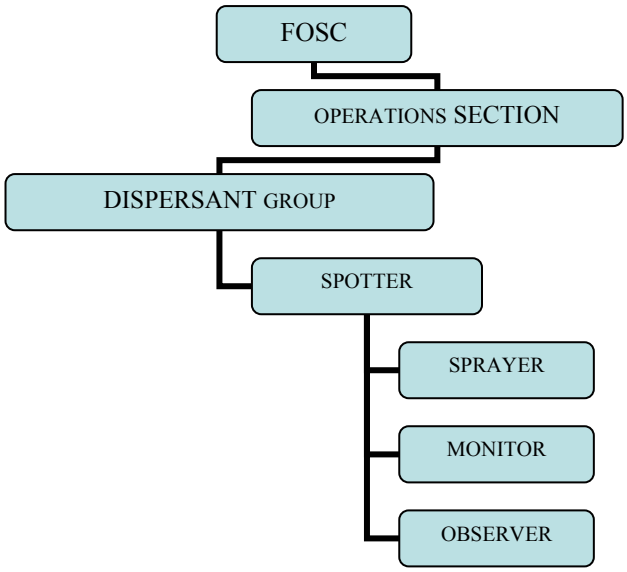
The spray aircraft is the delivery system of the dispersants to the oil spill. The sprayer reports to and receives tasking for the spotter aircraft. Because dispersant operations can be executed in multiple geographic areas due to the spreading and breakup of the slick, multiple sprayer aircraft or vessels may be used.

In addition to getting dispersant resources on scene, it is equally important to get monitoring resources on scene within the narrow window of opportunity. The monitor aircraft or vessel is primarily responsible for monitoring the effectiveness of the dispersant operation. Government personnel may serve onboard this platform to carry out Tier I and/or Tier II responsibilities under Special Monitoring of Applied Response Technologies (SMART), which will be discussed later in this paper.

The observer or observation aircraft or vessels are platforms and persons specifically assigned to observe the dispersant application.

Their observer status should be authorized by the IC/UC on the basis of their position as a stakeholder in the outcome of the operation. Observers may include cooperate officials, government agency representatives, political officials, scientists, trustees and others. In addition, scientific personnel may be on board to observe as a Tier I, SMART observer. An organizational chart, Figure 2, is provided below to illustrate a dispersant operation.

This dispersant model is an accepted industry practice in the Gulf region and has been used a number of times since 1997. Other coastal regions to conduct dispersant operations have since adopted it. It is imperative that monitoring teams and technical advisors are notified of possible dispersant operations as soon as they are considered. In the United States, SMART protocol is a



cooperatively designed monitoring program for in-situ burning and dispersants for Regions I, II, IV and VI. SMART relies on small, highly mobile teams, U.S. Coast Guard Strike Teams, which collect real-time data using portable, rugged, and easy-to-use instruments, flourometers, during dispersant operations. Data collected by these instruments is channeled to the FOSC or Unified Command to address critical questions such as: Is the dispersant effective? Are additional applications necessary? Do mechanical resources need to be mobilized? To monitor the efficacy of dispersant application, the SMART protocol recommends three options, or tiers.

Tier I is a trained observer, flying over the oil slick and using photographic job aids or advanced remote sensing instruments, assesses dispersant efficacy and reports back to the Federal On-Scene Coordinator. The goal of Tier I Monitoring is to identify oil, visually assess efficacy of dispersants applied to oil, and report the observations to the FOSC with recommendations. The recommendations may be to continue, to modify, or to evaluate further monitoring or use because dispersants were not observed to be effective. Personnel can be deployed on a spotter, observer or monitor aircraft.

Tier II is used when dispersant operations effectiveness is difficult to determine by observation alone, Tier II provides real-time data from the treated slick. A sampling team on a boat uses a fluorometer to continuously monitor for dispersed oil one meter under the dispersant-treated slick. The team records and conveys fluorometer data to the National Oceanic and Atmospheric Administration (NOAA) Scientific Support Coordinator and others, which then forwards it with recommendations to the Unified Command or FOSC. Water samples are also taken for later analysis at a laboratory. The monitoring goal for Tier II is the same for Tier II, to continue, to modify, or to evaluate further monitoring or use because dispersants were not observed to be effective.

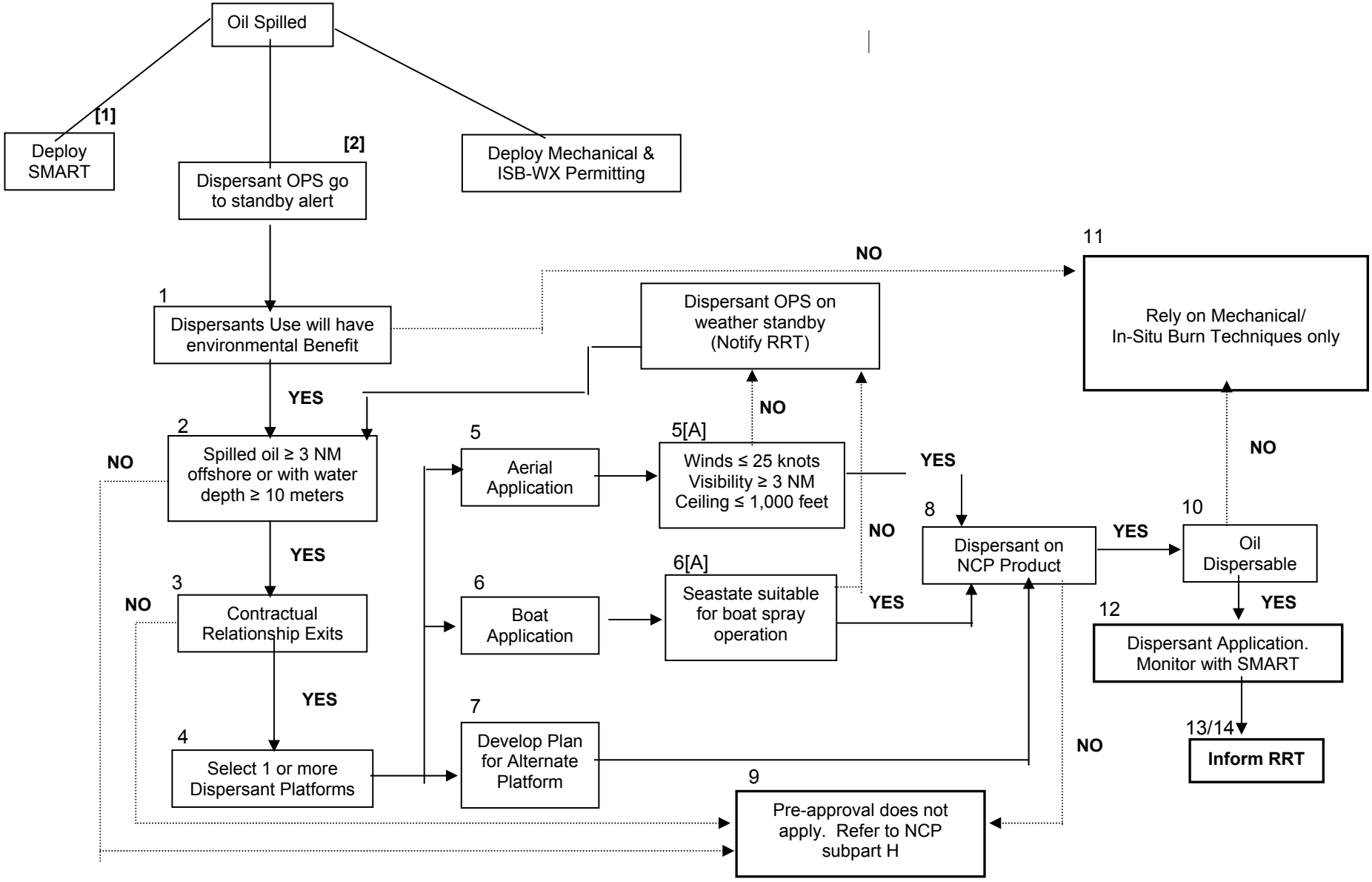
Tier III is used when the FOSC or Unified Command desires additional information on the movement of the dispersed oil plume, monitoring efforts are expanded in several ways. Tier III provides information on where the dispersed oil goes and what happens to it. Two fluorometers are used on the same vessel to monitor at two water depths. Monitoring is conducted in the center of the treated slick at several water depths, from one to ten meters. A portable water laboratory provides data on water temperature, pH, conductivity, dissolved oxygen, and turbidity. The main goal of Tier III is to track the submerged dispersant plume. Tier II and III personnel are normally deployed on the monitor vessel.

In all instances, the monitoring of the dispersant operation is very important, but a dispersant operation is not normally delayed for Tier II and III monitoring. It should be noted that SMART does not monitor the fate, effects or impacts of dispersed oil. At this time, there are no requirements in the U.S. for such monitoring activities.

In summary, after years of research, dispersants use since the mid 1990s has become a viable first response tool for mitigating the effects of oil spills in the Gulf of Mexico and the U.S. With the development of government sanctioned pre-approval of dispersants, standard dispersant operation protocols and SMART to monitor its effects, Regions along the coastal areas of the U.S. have embraced dispersant use. In addition, through the formation of a partnership between Industry and Government, dispersants have low toxicity with high dispersing qualities. Dispersant delivery systems are available and deployable to ensure dispersant operations can be

successfully executed within the required timeframes to be effective. As a result, dispersant use is an acceptable means to mitigate the effects of major oil spills in the United States.

Figure 1. RRT VI FOSC Dispersant Use Flowchart



Offshore Dispersant Operations in the United States of America

Captain Scott Hartley
Commander, Coast Guard
National Strike Force

Historical Dispersant Use

- *Torrey Canyon* Spill 1967
- Many of the chemicals used were degreasing solvents & actually more toxic than the oil itself

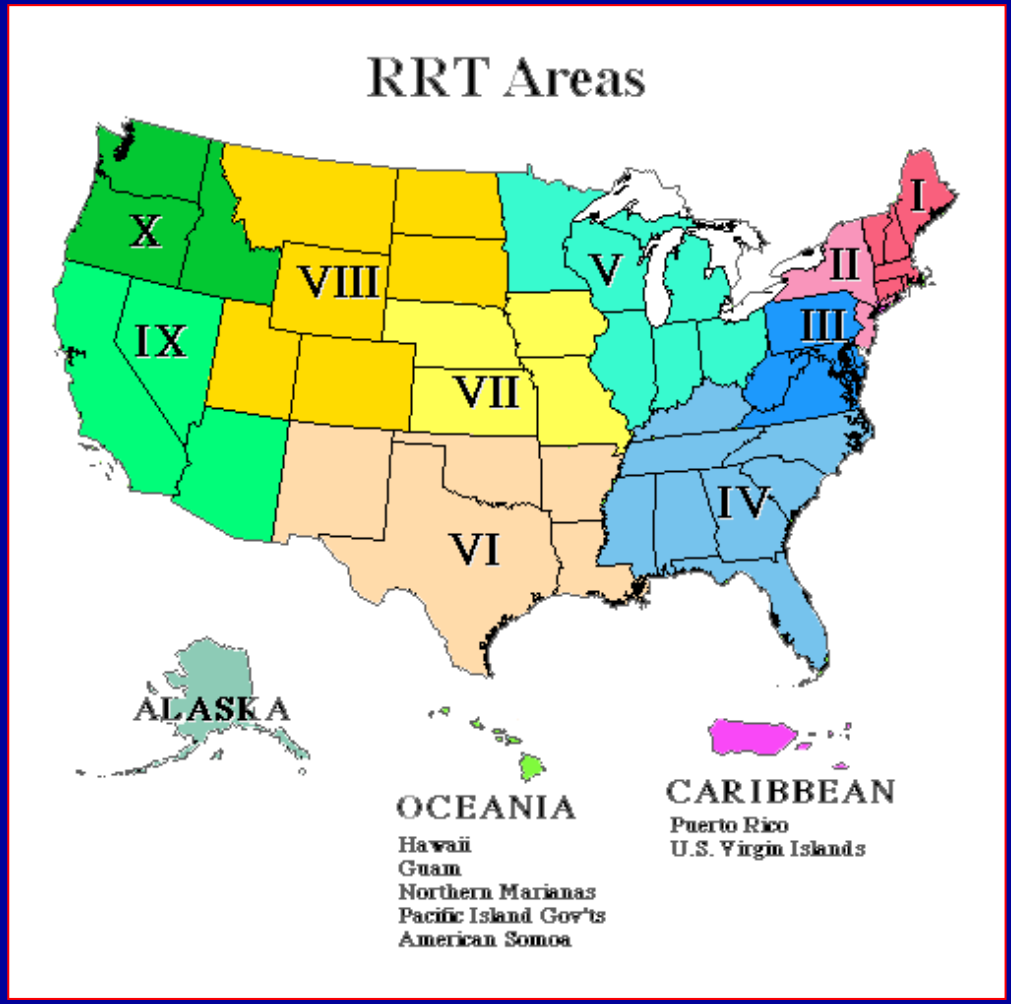
U.S. Dispersant Use Today

- Since mid-1990s dispersants are more accepted alternative
- Gulf of Mexico Region of the U.S. has lead U.S in dispersant use & expertise
- Primarily due volume of oil that moves through the region

Regulatory Considerations

- U.S. National Contingency Plan (NCP) restricts dispersant use
- Dispersants must be identified on national list maintained by U.S. Environmental Protection Agency (EPA)
- Regional Response Teams (RRT) may further restrict dispersant use for certain environmentally sensitive areas

Regulatory Considerations



Regional Response Team VI Pre-Approval Plan

- Pre-Approval Plan for dispersant use for major spills in Western Gulf
- Expert System – flow chart & checklists
- FOSC makes the decision with notification to RRT members
- 10-meter depth restriction

Regional Response Team VI Pre-Approval Plan (cont)

- Geographic restriction of three miles from shore
- Aerial dispersant delivery
- Allows spray coverage to 1:10

Regional Response Team VI Pre-Approval Plan (cont)

- Approved for daylight operations
- Overcomes several regulatory requirements
  - Endangered Species
  - Coastal Zone Management
  - NCP

Operational Considerations

- FOSC approval has to be given before the operation can begin
- Dispersant effectiveness decreases after 24-36 hours
- Requires Responsible Party (RP) to conduct pre-planning

Operational Considerations

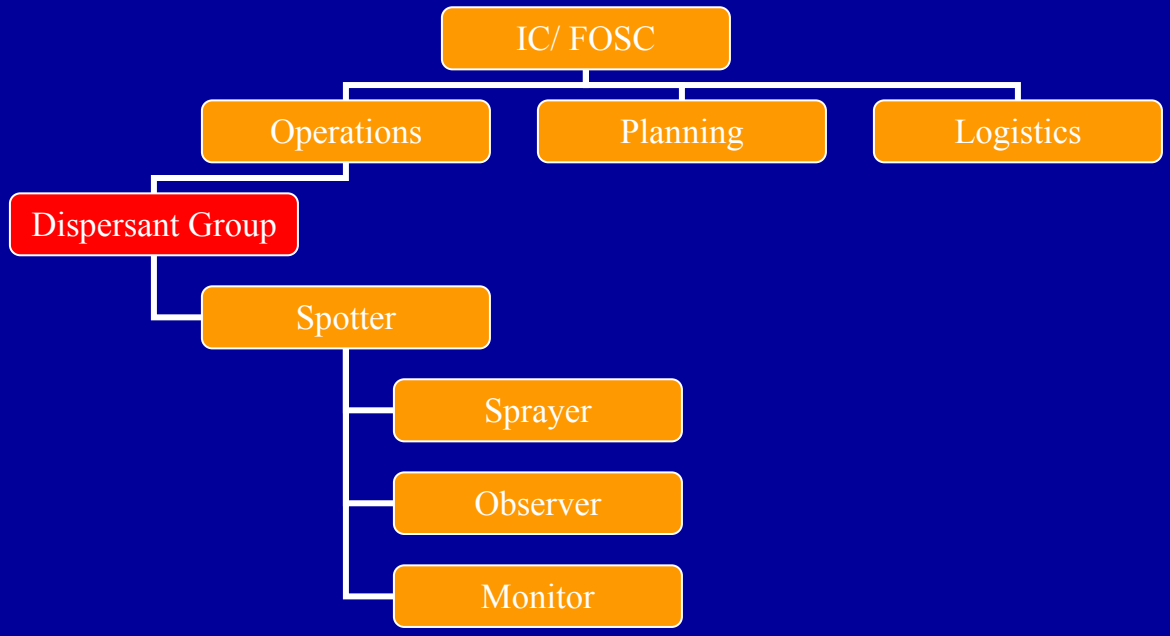
- RP coordinates all logistical needs including:
  - Spray Aircraft
  - Dispersant
  - Monitoring Vessels
  - Observation aircraft
- In areas of U.S., logistics of operation are a “show stopper”

Industry Group Contractor Support

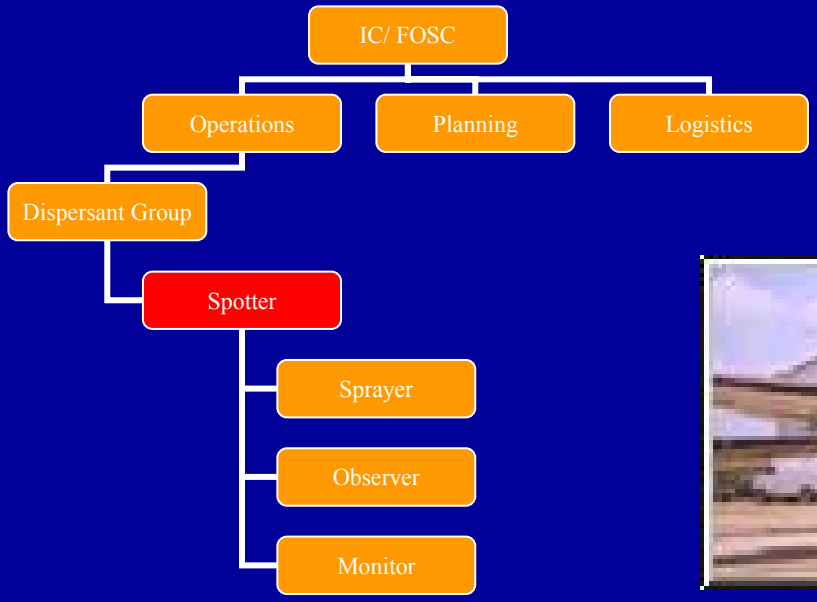
- **Industry groups fund "fire house" dispersant capability**

- **Contractor**
  - Airborne Support, Inc.
  - Provides readily available aircraft & dispersants in Gulf Region

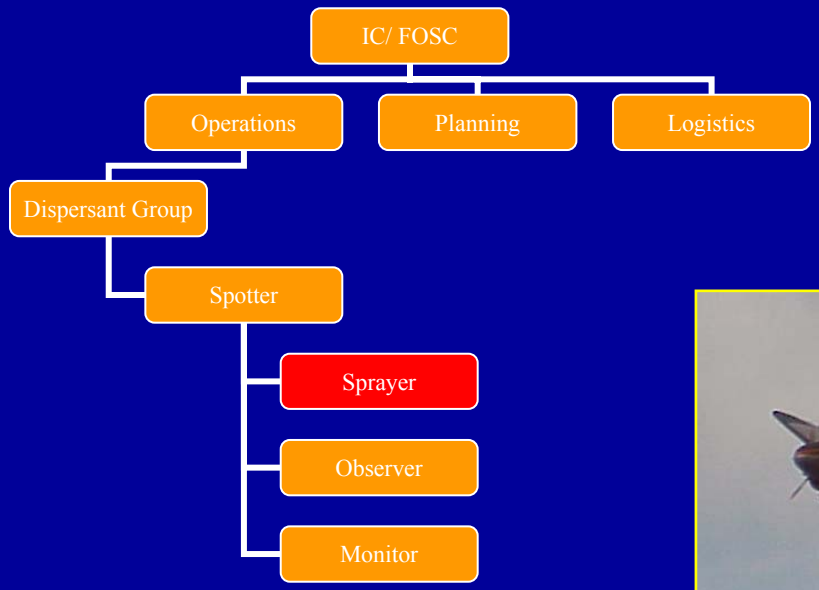
Dispersant Operations



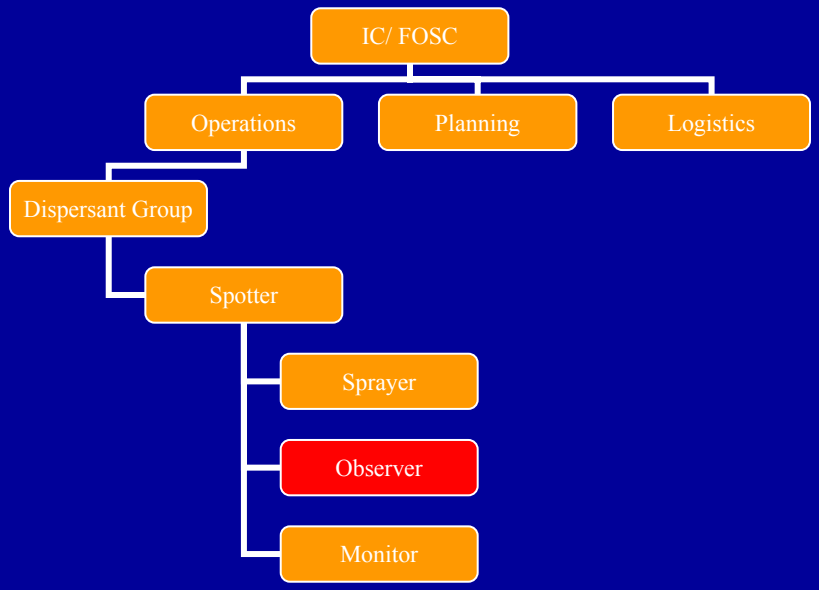
Dispersant Operations



Dispersant Operations



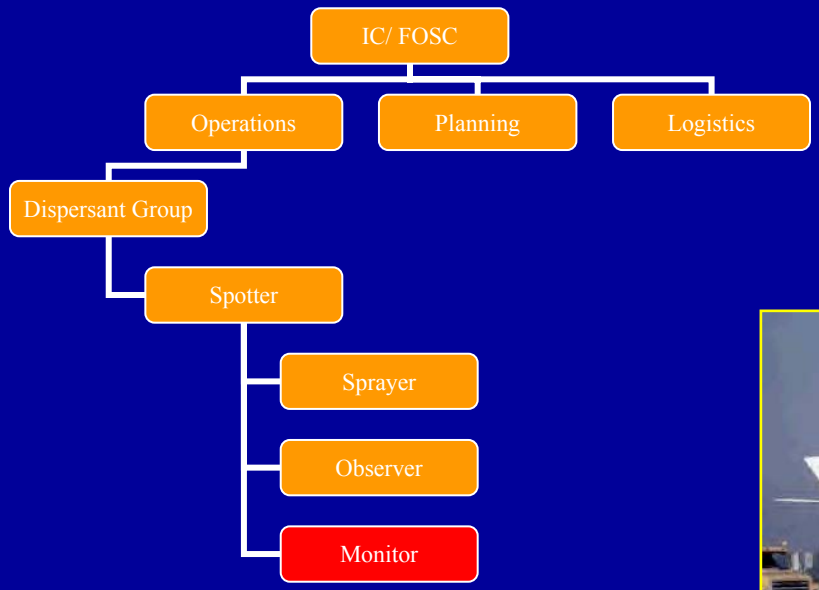
Dispersant Operations



Special Monitoring for Alternative Response Technologies (SMART)

- Relies on small highly mobile teams (NSF Strike Teams)
- Three Tiers
  - Tier 1 -Visually observe
  - Tiers 2 & 3 Collect data

Monitoring Operations (SMART) Tier I



Monitoring Operations (SMART) Tier II

- Provides real-time data from treated slick
- Data is recorded and evaluated by NOAA personnel & other scientists
- Water samples are analyzed

Monitoring Operations (SMART) Tier III

- Goal is to track submerged plume
- Tells where dispersed oil went & what happened to it
- Monitoring is conducted at several depths

Summary

Dispersants are more accepted alternative to mechanical cleanup in the U.S. because:

- Government and industry cooperation to develop pre-approval plans
- Industry has maintained capable dispersant resource
- Government has maintained dispersant monitoring capability

SEMPER PARATUS

"ALWAYS READY"

Questions?

MARITIME CONTINGENCY MANAGEMENT ACTIVITIES IN MALAYSIA

APEC Workshop on Oil Spill Response
Singapore
25 March 2004

Kalsom Abdul Ghani
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MARITIME CONTINGENCY MANAGEMENT ACTIVITIES IN MALAYSIA

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MARITIME CONTINGENCY MANAGEMENT ACTIVITIES IN MALAYSIA

LEGISLATION AND INTERNATIONAL CONVENTIONS

The Director General of Environmental Quality is charged with managing all forms of pollution at sea. In terms of controlling oil spills, from ships or any other sources. The Director General of Environmental Quality will enforce the Environmental Quality Act 1974. The sections involved are section 27, 29, 46, 47 and 48.

The Exclusive Economic Zone Act (1984) – Section 10, 11, 12, 14, 15 and 40 will be used by the Director General of Environmental Quality to protect and preserve the environment within the Exclusive Economic Zone (EEZ).

Other legislation regarding marine pollution includes the following:

i. Merchant Shipping Ordinance 1952, Chapter VA.
ii. Fisheries Act 1958, Section 26.
iii. Continental Shelf Act, 1966.
iv. Petroleum Mining Act, 1966.

International Conventions

Malaysia has implemented four international conventions regarding marine pollution.

i. International Convention for Prevention of Pollution from Ships 1973, as modified by the Protocol of 1978 (MARPOL 73/78)

Annexes I, II and V of the Convention were ratified by Malaysia on May 1, 1997. The Marine Department is the main implementing agency for this Convention.

Annex I of the Convention provides guidelines for managing oil pollution by ships regarding the following:

- The assembly, certification and inspection of merchant ship.
- Procedures for and control of oil disposal at sea.
- Providing oil disposal reception facilities.
- Establishing oil spill management capabilities among merchant ships.
- Coastal structure including providing for contingency and equipment.
- The obligation of all relevant parties with regard to monitoring marine pollution.

ii. International Convention on Oil Pollution Preparedness, Response and Cooperation, 1990 (OPRC)

This Convention established preparatory methods for contingency plan, reporting procedures for oil spill, technical cooperation within the region or internationally, and the promotion of research and development in the area of oil spill management among the state parties. Malaysia ratified this Convention on October 30, 1997, with the Department of Environment as the lead agency, and further supported by the Marine Department.

iii. Civil Liability Convention 1969 and International Oil Pollution Compensation Fund 1971.

The claim for clean-up cost and damages is provided for under Section 47, Environmental Quality Act 1974. In the International regime, the Civil Liability Convention 1969 and International Oil Pollution Compensations Fund 1971 which was ratified by the Malaysian Government on 6 April 195 also incorporate provision for claims. Claims made to the international regimes of Civil Liability Convention 1969 and International Oil Pollution Compensations Fund 1971 must be channeled through the Marine Department of Peninsular Malaysia, who act as coordinating agency.

iv. Basel Convention.

Malaysia ratified the Basel Convention since 8 October 1993. The purpose of this Convention is to control of Transboundary Movements of Hazardous Wastes and their Disposal.

OIL SPILL CONTINGENCY PLAN

In the early seventies, when the threats of oil spills from thousand of oil tankers plying the Straits of Malacca became real, the Department of Environment (DOE) formulated its first oil spill response plan in 1975, then known as The National Oil Spill Contingency Plan for the Straits of Malacca (SOMCP). In response to the changing circumstances, DOE has revised and updated and improved the Plan in-

corporating amongst others the search and rescue elements and information on environmentally sensitive areas. In the intensified activities in the development of Malaysia's offshore petroleum resources and the increasing of tanker traffic in the South China Seas, the Government formulated another Oil Spill Contingency Plan for South China Seas (SCSCP) in 1989. The SOMCP and the SCSCP were integrated and together they constitute a National Oil Spill Contingency Plan (NOSCP). On year 1994 NOSCP was reviewed and once again on year 2000 to strengthened the plan.

SCOPE AND OBJECTIVES

The NOSCP was formulated to cater for oil spill in Malaysian waters including the 200 nautical-mile Exclusive Economic Zone (EEZ) to meet the following objectives:

i. To provide a mechanism for coordinating response systems for effective containment and recovery of oil;
ii. To enhance capability with the existing resources with respect to equipment and manpower as well as training in combating oil spill; and
iii. To alleviate or minimise potential adverse impacts to the environment arising from the spill.

RESPONSE ARRANGEMENT

The NOSCP is activated on a three tiered response concept, based on the location of spill, quantity of spill and the response capability. The First Tier Response is coordinated by local authorities or local oil industry on operational spill either within port limits, oil terminal and depots or oil exploration and production platforms. Usually, the magnitude of the spill is small and a local oil spill contingency plan is activated, utilising the existing manpower and equipment.

As the spilled oil spread beyond the local area response capability, both in terms of resources and mobilization time, the second tiered response is coordinated, activating State Operation Committees, depending on the state of the incident.

The third Tiered Response is coordinated to deal with major oil spills, where all the available government and industry resources are exhausted and where neighboring countries' assistance is needed. This tiered response is also activated when the spilled oil spreads out to the neighbouring countries. A number of regional contingency plans and marine response procedures will be activated depending on the geographical location and magnitude of the spills.

Each of the response level is inter-related to one another, and can be activated simultaneously depending on the resources capability, mobilisation time, quantity and location of spills as mentioned above.

PLAN ORGANISATION

The NOSCP is coordinated by the National Oil Spill Control Committee. The Committee, chaired by the Director-General of Department of Environment, comprises related government agencies and oil industry namely : Department of Environment, Marine Department, Fisheries Department, Meteorological Services Department, Custom and Excise Department, Immigration Department, Royal Malaysian Navy, Royal Malaysian Air Force, Marine and Air Wing Police, Foreign Affairs Ministry, National Security Council, Maritime Enforcement and Coordination Centre, PETRONAS and the Petroleum Industry of Malaysia Mutual Aid Group (PIMMAG).

The Committee has been given a mandate to advise the Area Coordinator and to coordinate the various agencies involved in clean-up operation, air surveillance, procurement and deployment of equipment, movement of personnel and communication. The Committee, through the Foreign Affairs Ministry, also coordinates with other neighbouring countries for assistance to expedite action with minimum red tape.

OTHER OPERATIONAL ASPECTS OF THE NOSCP

The NOSCP also detailed various important operational procedures, amongst others includes: the notification and reporting, spill investigation, security against liability, communication, sample collection, safety, public relations, claim,

environmental and property damages, use of dispersants, salvage and transfer of cargo, temporary disposal of oily waste, training and review of contingency plan.

Recognising the need to make available financial support in an oil spill emergency, the Government established a National Trust Fund for Preservation and Prevention on the Environment. An allocation approximately 1 million Ringgit Malaysia has been put aside for making available emergency clean-up fund against spill of identified or unidentified source.

THE PETROLEUM INDUSTRY OF MALAYSIA MUTUAL AID GROUP (PIMMAG)

Sope

The oil companies, led by PETRONAS in their effort to strengthen the national response capability established a joint service company called the Petroleum Industry of Malaysia Mutual Aid Group (PIMMAG). PIMMAG was incorporated as a non-profit service company limited by guarantee under the Companies Act 1965. The main purpose of PIMMAG is to establish an adequate, coordinated and cost effective joint petroleum industry Tier 2 response capability for potential oil spill emergencies arising from members' activities in Malaysian waters including the EEZ.

Structure and Organisation

PIMMAG is governed by a Board of Directors comprising ordinary members with the overall responsibility for ensuring the objectives of PIMMAG are achieved in an effective and efficient manner. The day to day management of PIMMAG is under-taken by a small group of employees headed by a manager.

The Board of Directors appoints one or more service contractor(s) who act in a service capacity only. The service contractor(s) provides maintenance and a small core of trained manpower as well as specified logistical support to ensure ready deploy ability of PIMMAG equipment where and when required. The service contractor(s) also provides training of PIMMAG members.

Each member of PIMMAG has equal access to PIMMAG equipment in the event of an oil spill and for training. In the event of an oil spill, the spiller shall request PIMMAG OSR assistance directly from the contractor, under the call out procedures. PIMMAG equipment stockpiles will be located and managed at three areas, two in Peninsular Malaysia and one in Sabah and Sarawak.

Liability and indemnity

A spiller is responsible for the management and control of the oil spill response required to combat such a spill. All costs incurred by PIMMAG for such activities over and above the cost necessary to ensure availability of the resources shall be borne by the spiller inclusive of all costs incurred through other parties which provided assistance for the spill response when such assistance is given at the spiller's request. PIMMAG rules include comprehensive liability and indemnity clauses protecting PIMMAG and its members against any and all liabilities that may arise from the actual provision of OSR services.

Planned OSR Capability

In order to effectively respond to a Tier 2 oil spill at any location throughout Malaysia, PIMMAG will have a total OSR Capability of about 150,000 bbls. The planned OSR capability is acquired through pooling of existing OSR resources of members as well as procuring additional resources where necessary. These OSR resources will be mobilised at three stockpile areas as mentioned above. Each stockpile area will enable PIMMAG to mobilise the area resources within 12 to 24 hours. For larger spills which are beyond the designated geographical area's capability, mobilisation of OSR resources of up to 50% from each of the other two locations will be made possible within 24 to 48 hours. PIMMAG will also liaise with other oil spill response organisations.

Integration With NOSCP

PIMMAG augments the national oil spill response capability and represent its members in the National Oil Spill Control Committee (NOSCC). PIMMAG, without

liability to its members, give assistance to the NOSCC by providing necessary OSR resources in NOSCC's effort to combat any oil spill.

REGIONAL ARRANGEMENTS IN OIL SPILL RESPONSE

As environmental problems arising from oil spill rarely affect one nation alone, particularly in coastal areas and the marine environment. In this respect, the needs for regional cooperation to hold down hazards to the marine environment have been recognized by the Government since the early seventies. Amongst the important arrangements are;

i) The Traffic Separation Scheme for the Straits of Malacca;
ii) The Straits of Malacca and Singapore Revolving Fund; and
iii) Regional Oil Spill Contingency Plans.

TRAFFIC SEPARATION SCHEME FOR THE STRAITS OF MALACCA

The Scheme, endorsed by the International Maritime Organization in 1977 adopted by three littoral states namely Indonesia, Malaysia and Singapore is geared for the orderly flow of vessels with an under keel clearance of at least 3.5 meters at all time during the passage through the Straits of Malacca to reduce the risk of collision in congested and converging areas (Tan, 1987). The Scheme which came into force in 1987 also provides for one-way routes for opposing east-bound and west-bound traffic, at a constant speed of twelve knots to prevent in-line collision.

THE STRAITS OF MALACCA AND SINGAPORE OIL SPILL REVOLVING FUND

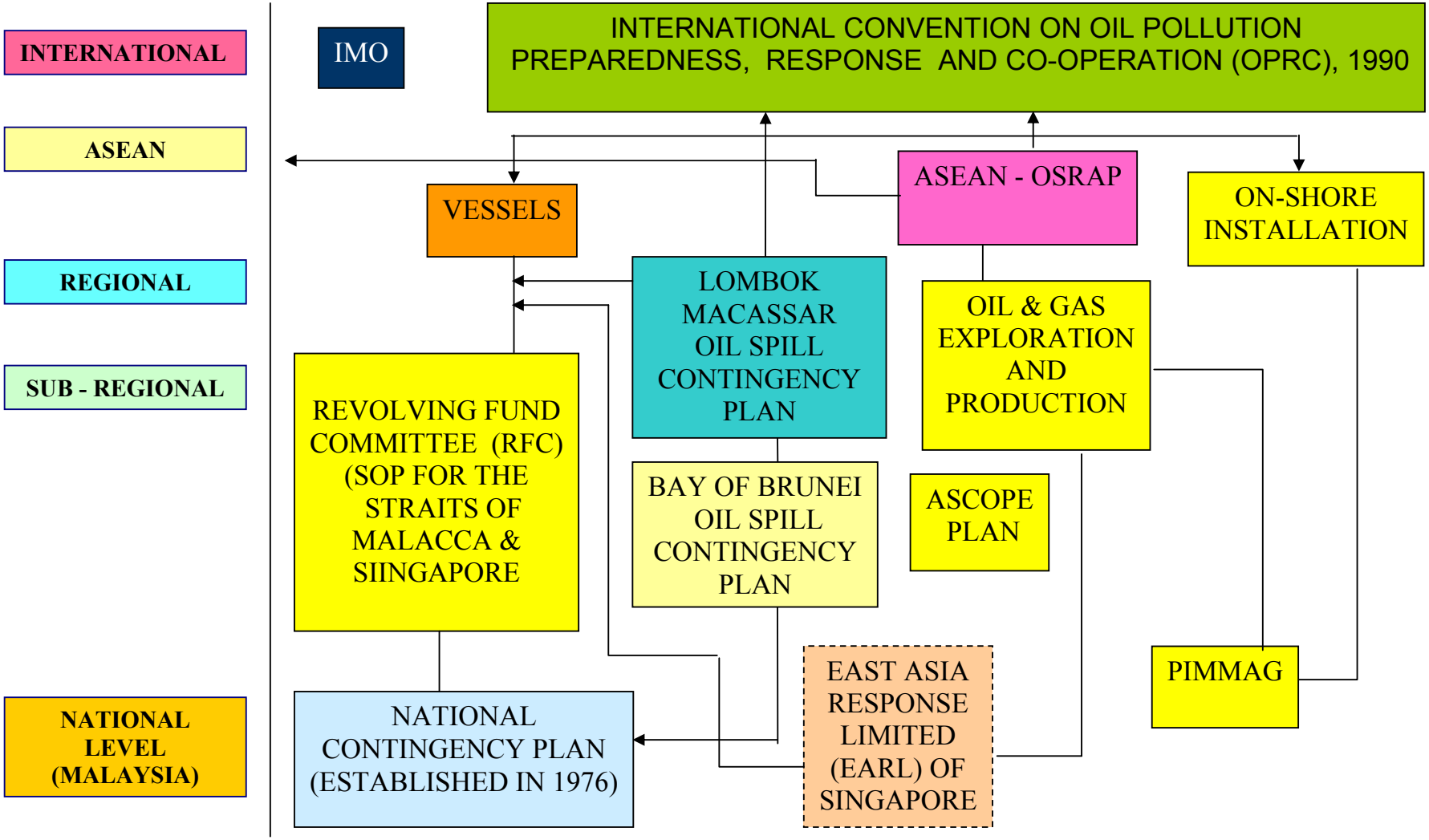
The Memorandum of Understanding was signed in 1981 between the Governments of Indonesia, Malaysia and Singapore on the one part and the Malacca Straits Council for the Japanese Non-Governmental Associations on the other part to established a revolving fund of four hundred million yen. The Fund enables the three littoral coastal states to take immediate action either independently or jointly against any spill caused by ships whether accidental or intentional.

REGIONAL CONTINGENCY PLANS

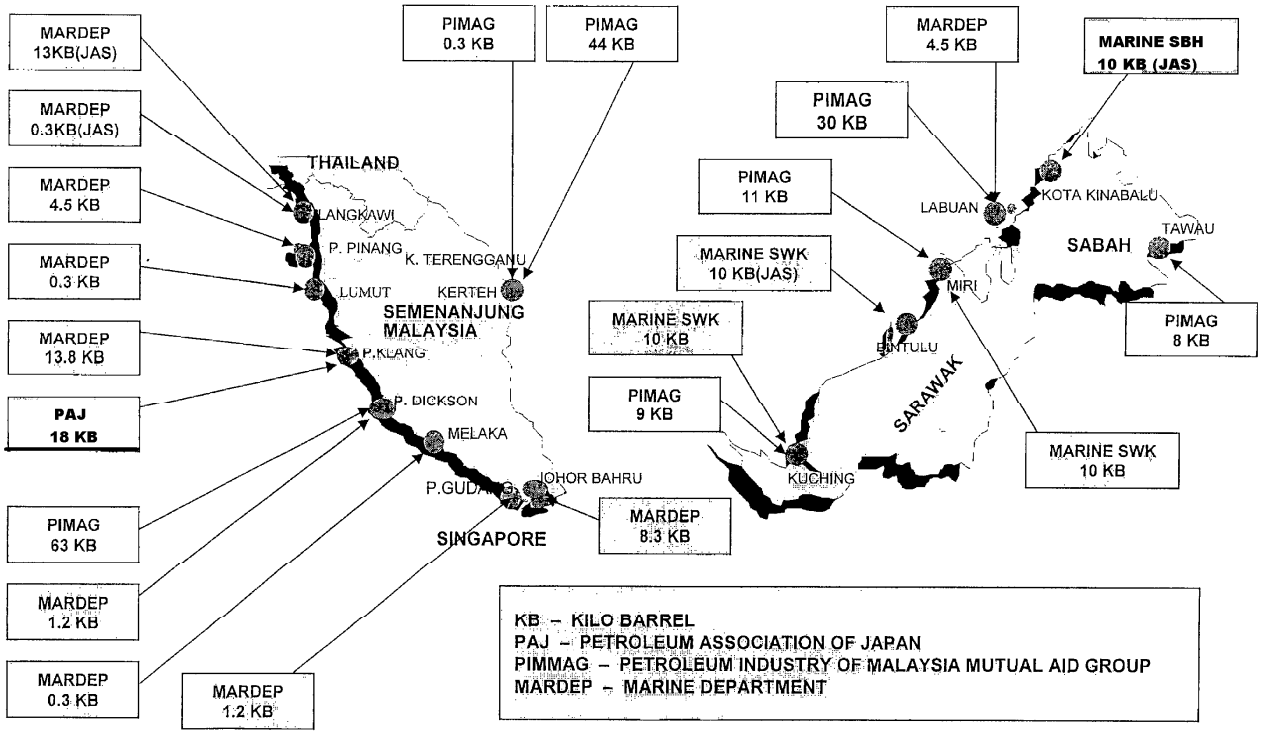
In 1981, Indonesia, Malaysia and Singapore formulated the Standard Operating Procedure (SOP) for Combating Oil Spill in the Straits of Malacca and Straits of Singapore. This SOP was formulated after the establishment of Revolving Fund for the Straits of Malacca and Straits of Singapore. In mid eighties, Indonesia, Malaysia and Philippines formulated the Lombok Macassar Oil Spill plan to mitigate and combat oil spill arising from vessel plying the straits. In early 1994, Malaysia and Brunei Darulsallam also formulated the SOP for the Bay of Brunei. The Plan complements the NOSCP and caters for oil spill in both the Malaysian and Brunei waters.

In our continuing efforts to strengthened the regional capability in mitigating and combating oil spill, in 1993, the six ASEAN countries including Malaysia established the ASEAN Oil Spill Response Action Plan or in short ASEAN-OSRAP. The objective of the Plan is to provide a mutual assistance from Member states in the event of a major spill incident which exceeds the national response capability. Figure. 1 shows the linkages of Malaysia's National Oil Spill Contingency Plan with other regional plans.

Figure 1. LINGKAGES OF MALAYSIA'S NATIONAL OIL SPILL CONTINGENCY PELAN WITH OTHER REGIONAL PLANS



MALAYSIA : LOCATION AND CAPABILITY OF OIL SPILL CONTINGENCY EQUIPMENT IN MALAYSIA



CLOSING REMARKS

APEC Workshop on Oil Spill Response
Singapore
25 March 2004

Chua Lian Ho

Director, Training Division

Maritime and Port Authority of Singapore

(PAPER NOT AVAILABLE)

APEC WORKSHOP ON OIL SPILL RESPONSE AND PLANNING

Closing Statement

Ralph Ainger
Chief, Office of External Affairs
Office of Offshore Minerals Management
Minerals Management Service
United States of America

On behalf of the Minerals Management Service, a regulatory agency of the United States Federal Government, I would like to say that this APEC workshop on oil spill response and planning has been an unqualified success. This topic is extremely important to APEC members as they seek ways to improve their ability to protect the marine environment while developing the offshore oil and gas resources that are critical to the commercial well being of their economies.

The Action Plan on Sustainability of the Marine Environment, drawn up by APEC economy members, calls for developing integrated approaches to coastal management; prevention, reduction and control of marine pollution; and sustainable management of marine resources. We believe these objectives were met here by the APEC members who came together to exchange information and discuss ways to improve their current practices. Participants

identified state-of-art technologies and methodologies available worldwide for improving response to oil spills. They discussed upgrading standards for response planning, equipment, methods and operations as well as possibilities for training in the region. Most importantly, we believe the workshop provided an opportunity to strengthen regional cooperation among th e members of the APEC economies.

It was a pleasure to work with the Singapore Maritime and Port Authority, and we want to thank Mr. Shahul Hameed, Mr. Edwin M. K. Leong and others for helping to make this workshop a success. We also want to thank Mr. Ho Yu Weng of the East Asia Response Limited and officials of the Integrated Simulator Centre for arranging a site visit to their facilities.

We thank our panel members for the open and stimulating discussion regarding the current state of practice in their respective countries and for their recommendations on ways to improve oil spill response throughout the APEC region.

We thank RADM (NS) Lui Tuck Yew and Capt Khong Shen Ping of the Maritime and Port Authority for co-hosting this Workshop. The MPA is recognized worldwide as a leading authority in oil spill response. Many of the participants in this workshop had the opportunity to attend the very successful International Chemical and Oil Pollution Conference and Exhibition which was sponsored by the MPA. The combination of the ICOPCE conference and the APEC workshop provided participants an opportunity to hear expert discussions of many of the issues that face regulators and operators today.

Finally, we thank all of you for coming and for contributing to this success.

APEC Oil Spill Response and Planning Workshop

Closing Remarks of Ms. Kathy Bentley
Office of Ocean Affairs, U.S. Department of State

March 25, 2004

First of all, I would like to thank the government of Singapore, East Asia Response Limited, the Integrated Simulator Center, and the Singapore Maritime and Port Authority for helping make this workshop a success. The goal of this APEC Workshop was to improve oil spill response capabilities in the Pacific Region by improving standards in response planning, equipment, methods, operations and training. To that end, we have identified state-of-the-art technologies and methodologies available worldwide and have encouraged cooperation among the APEC Economies. It is my hope that the recommendations paper and distribution of papers presented at the workshop will lead to the continued development of an APEC directory of specialists on this issue.

Within APEC, our economies are addressing many issues dealing with trade liberalization, including pursuing regional and sub-regional liberalization initiatives. In pursuing these goals, however, APEC is mindful that a large portion of its economics rely upon a marine environment that is clean. So much of APEC is dependent up the sea. Within the APEC Marine Resources Conservation Working Group, we understand the link between viable economies and sustainable development, and we are currently working to update our Action Plan to reflect emerging issues.

I believe this workshop has been a wonderful success. It implements a call by APEC Leaders to improve the range and scope of contacts with the business and private sectors. Representatives from the private and public sectors of APEC economies have come together this week to highlight existing partnerships, and they have paved the way for future initiatives. By combining efforts with the ICOPCE conference and Singapore's Maritime Week, many new contacts have been made, not only during the organized events, but also in the margins of this week's activities. I'd like to add on a personal level, I believe this workshop has strengthened cooperation among the economies. It has put a human face to the overarching goals set forth by APEC Senior Officials, and this is very important. We have indeed acted to implement those goals.

The workshop, once envisioned to be held well over 18 months ago, was postponed due to scheduling conflicts and also because of the SARS epidemic. I believe the decision to wait and hold this workshop until now so it would coincide with Singapore's Maritime Week and the ICOPCE conference was an excellent idea. I think you'll all agree, the synergy of combining this week's events has been well worth the wait.

On behalf of the government of the United States of America, I would like to thank all the participants for coming and contributing to this success. Thank you.