NOAA's Role in Emergency Response

(Charlie Henry, NOAA Scientific Support Coordinator)

Origins of NOAA HAZMAT Program…

– 1976
Argo Merchant oil spill, Nantucket, Massachusetts
The tanker broke into two pieces Dec. 21, 1976, after running aground six days earlier on its way to Salem with a load of 7.3 million gal. of heavy fuel oil.

Spilled Oil Research (SOR) Team established

– Nov 16, 1977 *Scientific Support Team* established for emergency spill response assistance to the U.S. Coast Guard and EPA

AGENCY MISSION STATEMENT

The NOAA Office of Response and Restoration is guided by three goals in carrying out its stewardship responsibilities:

- Reducing threats to coastal resources and human health through planning and response.
- Protecting coastal resources and human health by recommending and implementing appropriate response actions.
- Restoring injured trust resources.

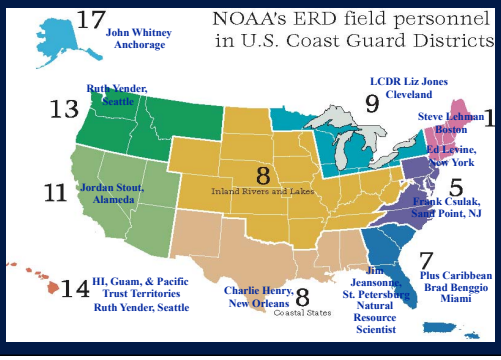
Other than just another NOAA Scientist…

…what is a Scientific Support Coordinator (SSC)?

…see IMH, p15-22

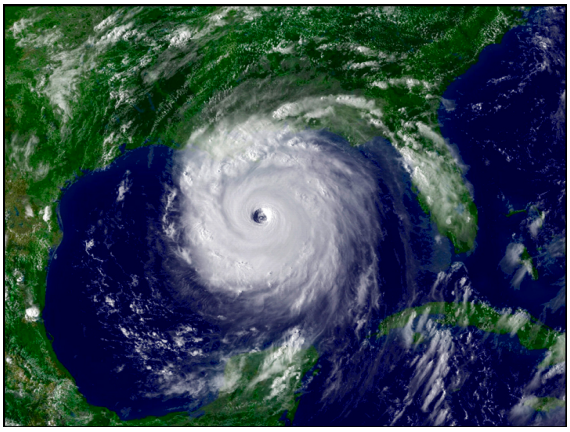
…total of 9 SSCs

DISTRIBUTION OF NOAA SSCs



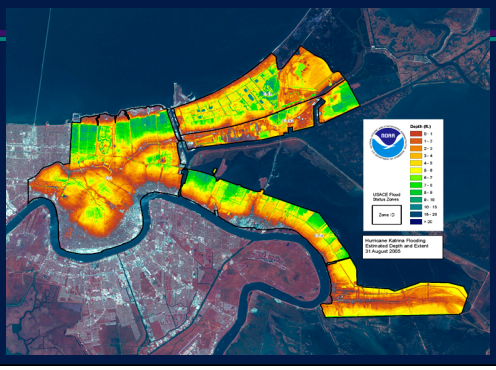
Scientific Support Coordinator (SSC):

- SSCs provide the Federal On Scene Coordinator (FOSC) with scientific advice with regard to the best course of action during a spill response.
  - FOSC is most often the USCG COTP or an EPA OSC
  - SSC's do not restrict support to only the USCG and EPA
- The SSCs are essentially scientific-technical consultants to the FOSC for oil and hazardous material incidents. SSCs may be requested to respond to any emergency (all hazards).
- One of the identified Special Forces (just like the USCG Strike teams…)



NOAA's First Satellite Map On-the-Wall

NOAA Estimation of Floodwater Depth



USCG GOAL IS "BEST RESPONSE"

The SSC's job (or any responders job) is to help affect the spill response such that the net result meets the requirements of a "best response."

(IMH 15-4)

NOAA Scientific Support Includes:

- *Weather Forecast*
- *Tides and Currents*
- *Hazard Characterization*
- *Tactical Trajectory*
- *Natural Resources at Risk (RAR)*
- *Overflight Obs.*
- *SCAT*
- *Environmental issues and trade-offs*
- *Consultation*

Science Team Composition

(the guys and gals who make the SSC look good)

- SSC's often manage a team of scientist:
  - Oceanographers
  - Modelers
  - Biologists
  - Chemists
  - Weather Forecasters
  - Info. Management Specialists

- Each spill is unique and the team composition highly variable to meet the needs and demands of the FOSC.

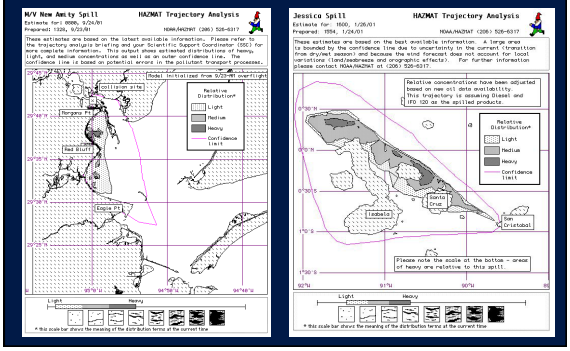
(30 years of corporate knowledge)

Pollutant Transport/Weathering Modeling

- Interpretive Oil Trajectories (Forecasts)
  - Verbal Forecast
  - Written Forecast
- Modeling Products
  - ALOHA
  - OSSM
  - GNOME
  - ADIOS2

surface transport drivers include wind, currents, and tides

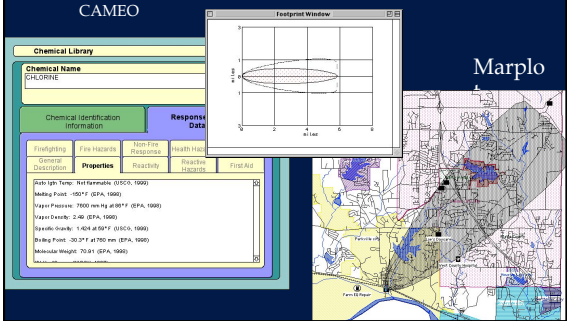
Tactical Planning - Trajectory Analysis



HAZMAT Chemical Products

Aloha

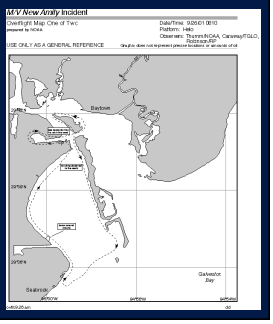
CAMEO



Marplo

Overflights

Oil Spill Tracking and Documentation

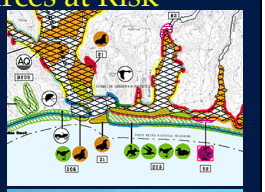


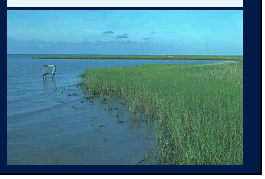
SCAT…

Natural Resources at Risk

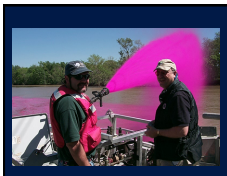
- ESIs
- ESI Maps
- RARs
- Endangered Species
- Manager Consultations
  - Planning
  - Spill Response
  - Post-Incident
  - Ecological Risk Assessments

NOAA Trust Resources

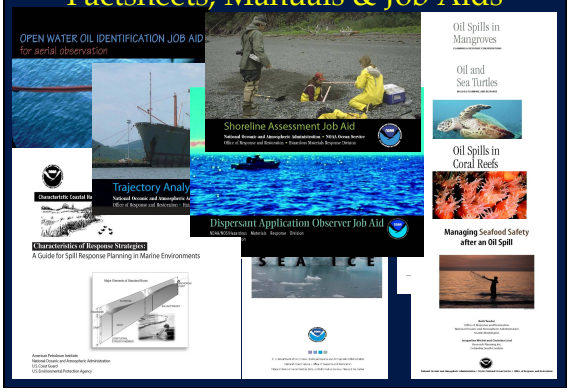




Research Efforts



Factsheets, Manuals & Job Aids



National Oceanic and Atmospheric Administration
Stewards of the Nation's Coastal Environment

Trustee Role

WHAT ARE **NOAA** TRUST RESOURCES?

- Commercial and recreational fishery resources
- Anadromous species (such as the Gulf Sturgeon)
- Endangered and threatened marine species and their habitats (sea turtles)
- Marine mammals including whales, dolphins, and seals
- Marshes, mangroves, seagrass beds, coral reefs
- Resources associated with National Marine Sanctuaries and National Estuarine Resource Reserves

"I have never been to the same oil spill twice."
Jacqui Michel

Contacting your NOAA SSC

- There are only nine NOAA SSCs for all the US and US Territories.
- For support call:

(206) 526-4911

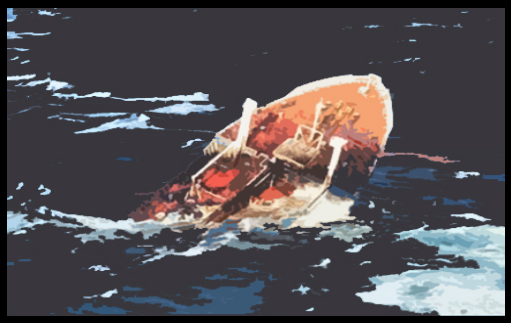
- For Information (Website):

http://response.restoration.noaa.gov/

Preliminary Assessment & Actions Continued…

Role of NOAA
Scientific Support Coordinator

When things go bump in the night…



Thought process… asking the right questions.

- What got spilled? -
- Where's it going? -
- Who's going to get hit? -
- How will it hurt? -
- What can be done? -

Preliminary Assessment & Actions

2.1 Plot an oil spill trajectory based on a recent pollution response.

- What Information Drives a Good Oil Spill Trajectory?
  - Spill Source and Pollution (Surface Slick) Observations
    - Point Source Location (Lat./Long.)
    - Slick Position and Heading
    - Slick Distribution and Weathering Observations
    - On-Scene Weather Observations (Wind Direction, Sea State)
    - Multiple Observations (Time Sequence)
  - Pollution Type (Oil Type and Characterization)
    - Density (API Gravity)
    - Persistence (API Gravity, Sim. Distillation Curve)
  - Understanding of Pollution Transport
    - Marine Currents
    - Tidal Currents
    - Wind (for Surface Oil)
    - Bathometry (Conversion Zones, Coastal Currents, etc.)

Trajectory Analysis

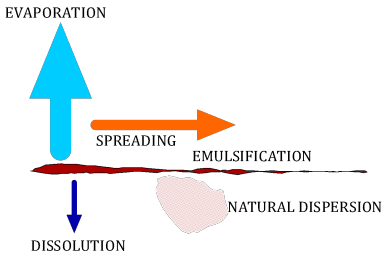
"If I were to guess, I would guess that the oil slick went that way."

(More Than Just a Guess)
Pollutant Transport and Oil Weathering Modeling

- Interpretive Oil Trajectories (Mental Model-Verbal Trajectory)
  - Verbal Forecast
  - Written Forecast
- Modeling Products
  - OSSM
  - GNOME
  - ADIOS2

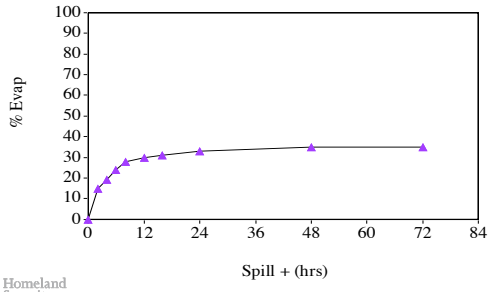
surface transport drivers include wind, currents, and tides

Spilled Crude Oil on Water



ADIOS2: Evaporation

(API 28.1 Furrial Crude Oil, Venezuela)



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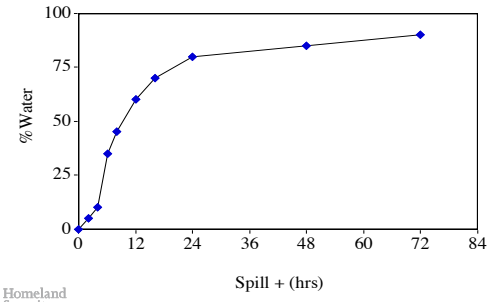
ADIOS2: Water-in-Oil Emulsification

(API 28.1 Furrial Crude Oil, Venezuela)



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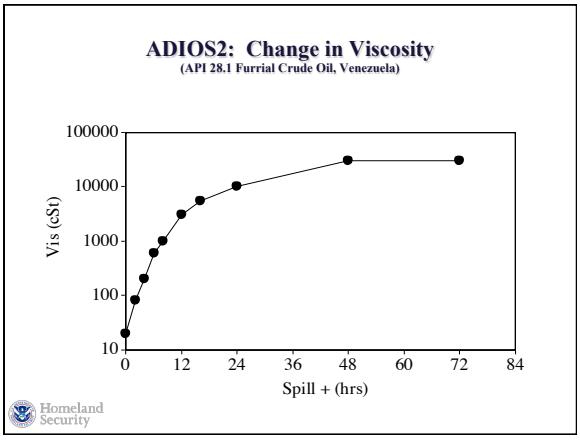
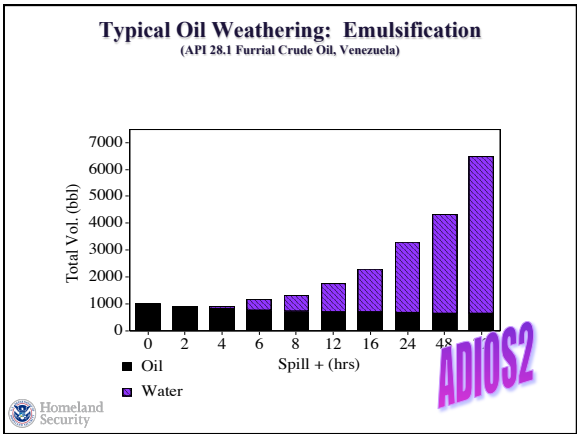
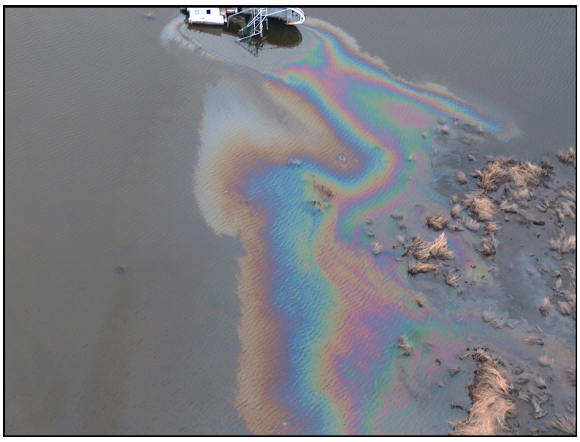
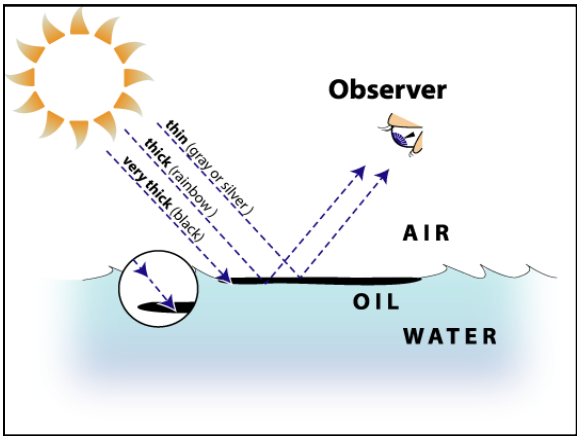

ADIOS2: Change in Viscosity
(API 28.1 Furrial Crude Oil, Venezuela)
Vis (cSt)
100000
10000
1000
100
10
0
12
24
36
48
60
72
84
Spill + (hrs)
Homeland Security

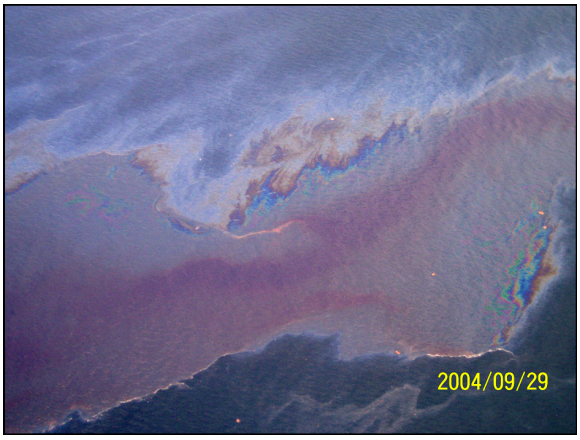

Typical Oil Weathering: Emulsification
(API 28.1 Furrial Crude Oil, Venezuela)
Total Vol. (bbl)
7000
6000
5000
4000
3000
2000
1000
0
0
2
4
6
8
12
16
24
48
Spill + (hrs)
Oil
Water
ADIOS2
Homeland Security



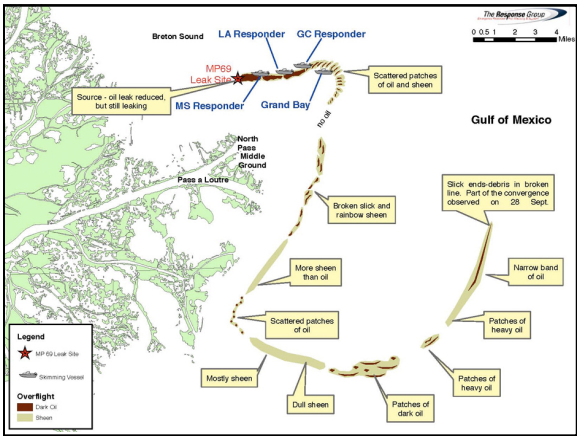
Some thoughts...

- ✓ Record time and lat./long.
- ✓ Use common terminology for describing oil sightings.
- ✓ Record direction of slick (heading).
- ✓ Beware of false positives.
- ✓ Avoid making volume estimates based on slick color.
- ✓ Always have the sun at your back when taking photographs.

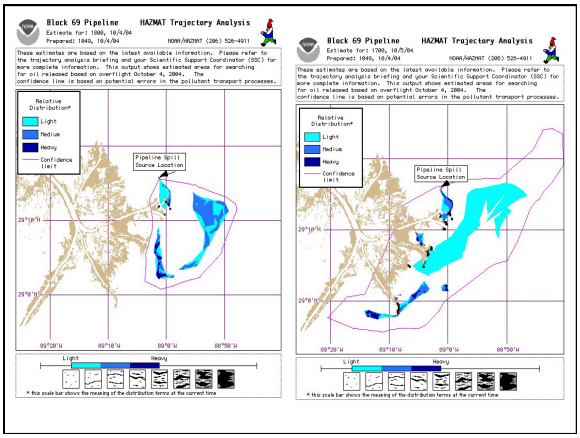



2004/09/29


THIS IS NOT A DRILL


The Response Group
0 0.5 1 2 3 4 Miles
Breton Sound
LA Responder
GC Responder
MP69 Leak Site
Source - oil leak reduced, but still leaking
MS Responder
Grand Bay
Scattered patches of oil and sheen
Gulf of Mexico
North Pass Middle Ground
Pass a Loutre
Broken slick and rainbow sheen
Slick ends-debris in broken line. Part of the convergence observed on 28 Sept.
Narrow band of oil
More sheen than oil
Scattered patches of oil
Patches of heavy oil
Mostly sheen
Dull sheen
Patches of heavy oil
Patches of dark oil
Legend
MP 69 Leak Site
Skimming Vessel
Overflight
Dark Oil
Sheen


2004/09/29


Block 69 Pipeline HAZMAT Trajectory Analysis
Estimate for: 1800, 10/4/04
Prepared: 1845, 10/4/04
NOAA/HAZMAT (206) 526-4911
These estimates are based on the latest available information. Please refer to the trajectory analysis briefing and your Scientific Support Coordinator (SSC) for more complete information. This output shows estimated areas for searching for oil released based on overflight October 4, 2004. The confidence line is based on potential errors in the pollutant transport processes.
Relative Distribution*
Light
Medium
Heavy
Confidence Limit
Pipeline Spill Source Location
29°10'N
29°0'N
89°20'W
89°10'W
89°0'W
88°50'W
Light
Heavy
* this scale bar shows the meaning of the distribution terms at the current time
Block 69 Pipeline HAZMAT Trajectory Analysis
Estimate for: 1700, 10/5/04
Prepared: 1845, 10/4/04
NOAA/HAZMAT (206) 526-4911
These estimates are based on the latest available information. Please refer to the trajectory analysis briefing and your Scientific Support Coordinator (SSC) for more complete information. This output shows estimated areas for searching for oil released based on overflight October 4, 2004. The confidence line is based on potential errors in the pollutant transport processes.
Relative Distribution*
Light
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Heavy
Confidence Limit
Pipeline Spill Source Location
29°10'N
29°0'N
89°20'W
89°10'W
89°0'W
88°50'W
Light
Heavy
* this scale bar shows the meaning of the distribution terms at the current time

Preliminary Assessment & Actions

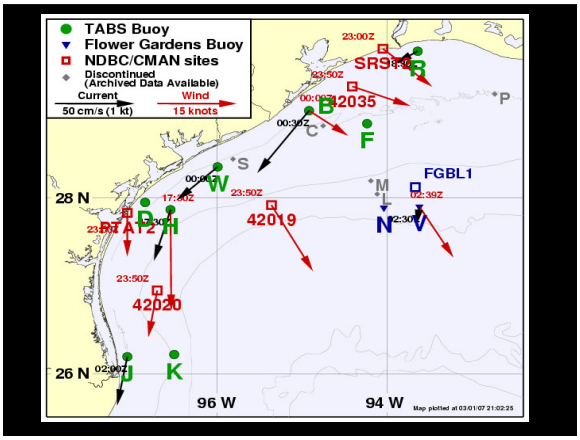
2.1 Plot an oil spill trajectory based on a recent pollution response.

"Good field intel and observations set up the trajectory analysis, but what moves the oil onshore?"

2D On-Water, Surface Transport Drivers:

- Winds (Weather Information from NOAA Marine Forecaster)
- Ocean Currents (TABS, Earth Observing Systems, Observations)
- Tidal Currents (NOAA Tide Predictions, Real-Time Monitoring)

- Oil generally moves at 2.5 to 3.5% (3%) of the wind speed and at 100% of the current speed.
- To put oil onshore, you generally need an on-shore wind and slack or flooding tides.
- Remember: "Winds are the direction from… currents are the direction of movement."



Exercise

Preliminary Assessment & Actions

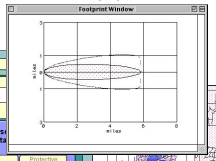
2.3 Create an air plume model for a Hazardous Substance in your AOR.

- **What Information Drives a Good Plume Trajectory?**
  - **First, Are You Asking the Right Question?**
  - **Release Source Information and Field Observations**
    - **Point Source Location (Lat./Long.)**
    - **Source Strength (Release Rate, Pool Area, Etc)**
    - **Plume Observations and Heading**
    - **"Is this an actual release or are we planning for possible release?"**
    - **On-Scene Weather Observations (Wind Direction, Ceiling)**
    - **Released on land, water, into the air…**
  - **Pollution Type (Chemical Type and Characterization)**
    - **Density (Heavy Gas or Vapor)**
    - **Vapor Pressure**
    - **Reactivity**
  - **Understanding of Pollution Transport**
    - **Wind (Dispersion)**
    - **Humidity (Reactivity)**
    - **Stability Factors**
    - **Topography** **(ALOHA Doesn't Include Topography)**

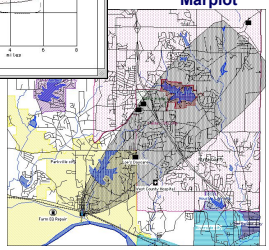
HAZMAT Chemical Products

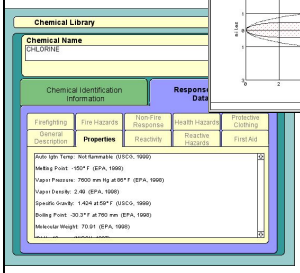
CAMEO

Aloha

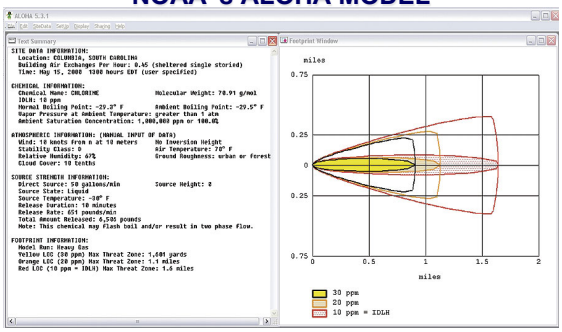


Marplot





NOAA's ALOHA MODEL



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Fundamentals…

- Plume Dispersion

Plume Dispersion Models are driven by the physical properties of the chemical, the release scenario, and the current or predicted weather. Of these, weather can be the most unpredictable. Uncertainty in forecasts grows the farther out you attempt to forecast. NOAA's Plume Model is limited to only a few hours duration and a 6-mile distance from the source.

Simple vs. Complex

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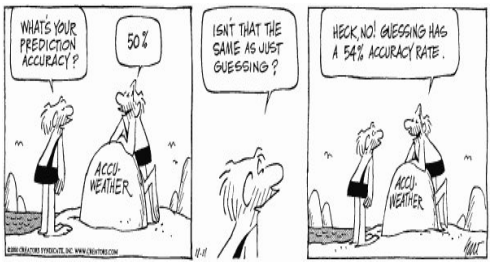
Weather forecast for tonight: dark. Continued dark overnight, with widely scattered light by morning.
George Carlin (1937 –)

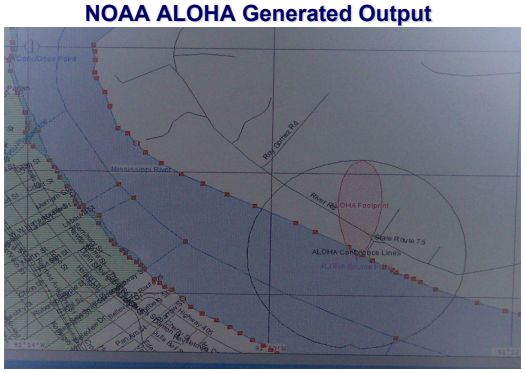


Hydrogen Sulfide Release
(Barge FT-22)

USCG Strike Team Deployment

Homeland Security

NOAA ALOHA Generated Output



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Preliminary Assessment & Actions

2.4 Identify the agency or agencies that may assist in determining the fate of an oil spill/hazardous substance release in your AOR.

- **(NOAA)**

Break Anyone?

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Coordinate Oil Removal

5.3 Describe the advantages and disadvantages of pressure washing shoreline oil contamination using high and low pressures and high and low temperatures.

- **Philosophy for Shoreline Washing**
  - Lowest pressure required at ambient temperature best.
  - Increase temperature and pressure as required.
    - (increased environmental damage… cost, logistics, etc.)
  - Chemical shoreline cleaning agents are last choice.

Shoreline Cleaning: The Driving Factor

"Just how clean does it have to be."

before - - - - - - - hot water high pressure - - - - - - - after

Shoreline Cleaning:

Low-Pressure Ambient-Water Flushing

Shoreline Cleaning:

High Pressure Flushing (Ambient or Hot Water)

Homeland Security

Shoreline Cleaning:

Low-Pressure Hot-Water Flushing (Omni Boom)

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Shoreline Cleaning:

Steam Cleaning

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Coordinate Oil Removal

5.3 Describe the advantages and disadvantages of pressure washing shoreline oil contamination using high and low pressures and high and low temperatures.

- **Advantages**
- **Disadvantages**
- **Alternatives**

ESI-06B Oiled Riprap

(M/V Westchester Spill)


Ambient Water Flushing:

Big Bertha (Westchester Oil Spill, Mississippi River)

Oil liberated during flushing…

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Coordinate Oil Removal

(5.4 - 5.6 Alternative Countermeasures for Oil Spill Response.)

- **5.4 Explain** the conditions and criteria necessary for implementing the following removal methods:
  - **In-situ burning**
  - **Bioremediation**
  - **Dispersion**

Homeland Security Federal On-Scene Coordinator Representative Training

Coordinate Oil Removal

(5.4 - 5.6 Alternative Countermeasures for Oil Spill Response.)

- **5.5 Explain** when the following removal methods should be used:
  - **In-situ burning**
  - **Bioremediation**
  - **Dispersion**

Homeland Security Federal On-Scene Coordinator Representative Training

Coordinate Oil Removal

(5.4 - 5.6 Alternative Countermeasures for Oil Spill Response.)

- **5.6 Contact** the appropriate agencies when the following the removal methods are used:
  - **In-situ burning**
  - **Bioremediation**
  - **Dispersion**

Coordinate Oil Removal

(5.4 - 5.6 Alternative Countermeasures for Oil Spill Response.)

DISPERSANTS

What are the Function of Dispersants?

- **The function of dispersants is to greatly enhance the transfer of oil from the water surface into the water column to mitigate oil spill impacts.**
- **The use of dispersants for oil spill response is often a** trade-off**: increased short-term injury to water column resources to minimize injury to surface water and shoreline resources.**

Why the bad reputation for dispersants?
The *Torrey Canyon* maybe?

At 17 knots, the *Torrey Canyon* hits Pollard's Rock in the Seven Stones Reef, and rips open 6 tanks… the year is 1967.

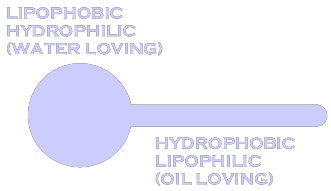
"That was then..."

Dispersant applications in U.S.A. GOM since the 1989 *Exxon Valdez* Oil Spill:

- T/V Mega Borg 1990 **(Dispersant Test Only)**
- (Passage of OPA90)
- West Cameron Block 168 Oil Spill 1995
- High Island Pipeline System Spill 1998
- T/V Red Seagull 1998
- BP-Chevron Pipeline 1999
- Blue Master 1999
- Poseidon Pipeline 2000
- Main Pass 69 Oil Spill 2004
- Deep Water Horizon Disaster 2010

Dispersants are Chemical Agents

- **- mixtures of solvents and surfactants**



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"…just Like Dawn™ Detergent (?)"

- **Dispersants, like detergents, are simply surfactants. Surfactants reduce the interfacial tension between water and oil, permitting the oil to break into tiny droplets. The function of the solvent is to reduce the viscosity of the surfactants. The solvent may also aid in surfactant-oil interaction.**
- **Dispersants enhance a natural process.**
- **The ultimate fate of oil spilled in the marine environment is biodegradation. Dispersion enhances the rate of natural biodegradation by increasing the surface area of the spilled oil.**

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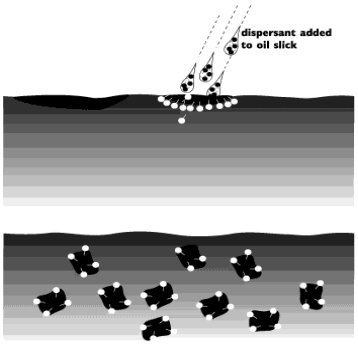
How Do Dispersants Work?



One end of each dispersant molecule 'chain' attaches to water molecules while the other end of the 'chain' attaches to the oil droplets.

A little energy from wind and waves breaks the oil slick into smaller oil droplets surrounded by dispersant molecules as shown.

2D vs. 3D Transport

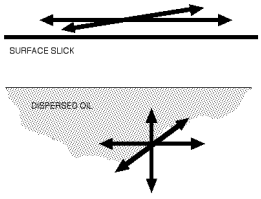
(the KP Prospective)

The undispersed surface slick spreads in only two dimensions.

- Spreading is controlled by viscosity.
- Drift is controlled by 3% of wind speed and direction and 100% of surface current.
- Oil is concentrated at the surface.

The dispersed oil slick spreads in three dimensions.

- Oil concentration is reduced.



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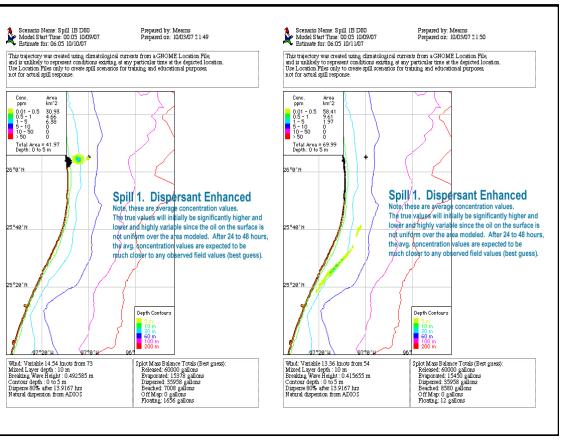
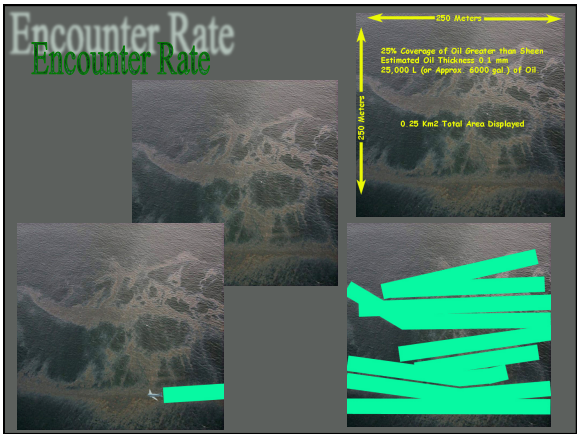
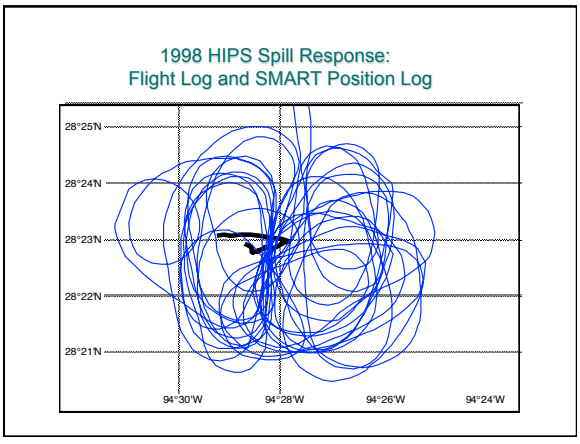
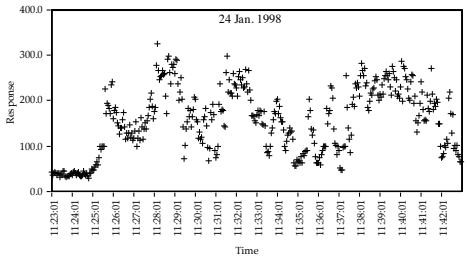



Encounter Rate
Encounter Rate
250 Meters
250 Meters
25% Coverage of Oil Greater than Sheen
Estimated Oil Thickness 0.3 mm
25,000 L (or Approx. 6000 gal) of Oil
0.25 Km2 Total Area Displayed


1998 HIPS Spill Response:
Flight Log and SMART Position Log
28°25'N
28°24'N
28°23'N
28°22'N
28°21'N
94°30'W
94°28'W
94°26'W
94°24'W

Tier II SMART Data: HIPS



Note the "patchy" nature of a dispersed oil plume.

Again, why consider using dispersants?

- ✓ **Aerial application of dispersants can mitigate large amounts of oil if treated promptly.**
  - ✓ Mitigate -- reduce the overall impact of an oil spill to the environment as a whole.
  - ✓ Clearly, dispersant use is a trade-off: increased risked to the water column to reduce injury to surface water and shoreline resources.
- ✓ **Principal biological benefit of dispersant use is the reduction of oil impact on sensitive shorelines habitat and near shore resources.**

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Other reasons to consider dispersant use:

- ✓ **Reduces potential damage to birds, marine mammals, and other natural resources that could be impacted by oil on the water surface.**
- ✓ **Provides a response option when other techniques are not available (such as remote locations, sea state too great for effective skimming).**
- ✓ **Enhances microbial degradation.**
- ✓ **Reduces formation of tar balls and mousse.**

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Dispersion Effectiveness Factors

- **Oil Properties**
  - Initial oil composition (viscosity, etc.)
  - Changes due to oil weathering
  - Slick thickness
- **Operational Factors***
  - Dispersant selection and application concentration
- **Environmental Factors**
  - Surface wave energy
  - Surface water salinity
  - Temperature

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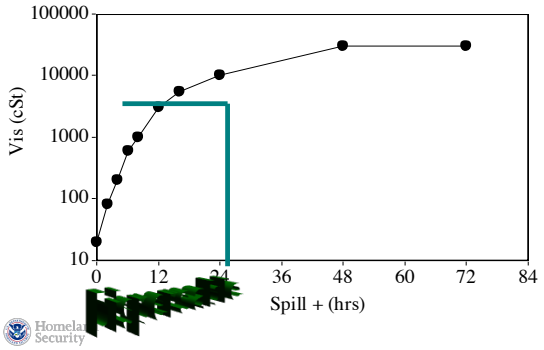
Typical Oil Weathering: Change in Viscosity

(API 28.1 Furrial Crude Oil, Venezuela)



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Why were dispersants not used?

- ✗ Season - **environmental balance against dispersant use.**
- ✗ Oil type - **nondispersable oil.**
- ✗ Trajectory - **low potential for land or other environmental impact.**
- ✗ Weather - **winds >25 knots.**
- ✗ Logistics - **no application system.**
- ✗ Other - **unable to reach a consensus with RRT and trustees that there was an environmental benefit for dispersant use.**

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CASE STUDY: Poseidon Pipeline 2000

Incident Overview: Poseidon Pipeline Oil Spill

- The discharge source was determined to be a 24" pipeline which transports approximately 500,000 barrels of crude oil per day for numerous production companies.
- Despite quick actions by the RP, approximately 2000 barrels of a medium API crude oil were discharged into the Gulf of Mexico.
- The cause of the incident was later determined to be an 8.8 metric ton anchor which dragged across and imbedded under the pipeline. The flukes of the anchor slid under the pipeline, dragging it approximately 670 feet from its original position. This shift caused the pipeline to leak at three separate discharge points; two of the discharge points were located on the riser and the third at the anchor impact point.
- Over flights provided by three different airborne platforms provided excellent, timely intelligence to the incident command. As a result, tactical decision making and command and control over all field operations were highly successful.

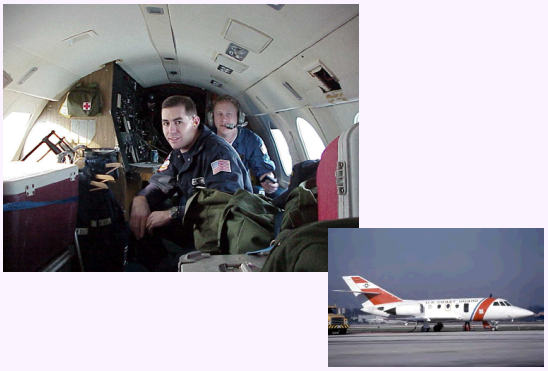
Oil Slick Originating From Near Platform on the Afternoon of 21 Jan. 2000
(Photo credit-PO Pipe, MSO Morgan City)

Oil slick on the Afternoon of 21 Jan. 2000
(Photo credit-PO Pipe, MSO Morgan City)

Dispersant Application on the Afternoon of 21 Jan. 2000
(Photo credit-PO Pipo, MSO Morgan City)

DC-3 Dispersant Aircraft During Poseidon Pipeline Spill Response
(Photo credit-PO Flood USCG GST, photos taken by SMART On-water Team)

Aircraft owned and operated by Airborne Support, Houma, LA



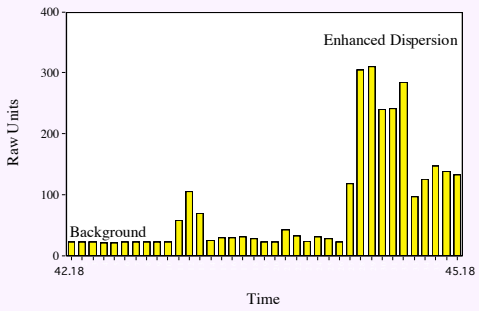
USCG GST SMART Team Deploying at the Request of MSO Morgan City
(Photo credits: PO Flood, USCG GST and USCG Web Site)

Partially Treated Slick on the Afternoon of 21 Jan. 2000
(Photo credit-PO Pipe, MSO Morgan City)

USCG GST Setting up the On-water SMART Monitoring Equipment
(Photo credit-PO Flood, USCG GST)

Post-dispersant Application Showing Changes in Surface Slick and Dispersion
(Photo credit-PO Flood, USCG GST)

SMART On-Water (Tier II) Fluorometry Data from Day-2



Overview of Dispersant Operations

- This response should be considered highly successful. The dispersant operations were very effective as documented by observation and scientific measurement. In fact, some estimates by field observers concluded that only an estimated five barrels of oil (mostly light sheen and small streamers of emulsified oil) remained on the surface following Day-2 dispersant operations.
- It should be noted; however, that it is virtually impossible to accurately determine the overall effectiveness and volume of the remaining emulsified oil.

Dispersant must be on the NCP Product Schedule

- COREXIT 9527
- NEOS AB 3000
- MARE CLEAN 200
- COEXIT 9500
- DISPERSIT SPC 1000
- JD-109
- JD-2000
- NOKOMIS 3-F4
- PETROBIODISPERS
- SEA BRAT #4
- FINASOL OSR 52

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RRT6's Current Dispersant Philosophy

- The trade-offs for offshore dispersant use is generally accepted and preauthorization has been granted to the FOSC.
- Recognizing that there are times that oil spill injury can be reduced by near shore dispersant use, RRT6 has approved an Expedited Decision Process.
- There is no inshore approval process, and the use of dispersants inshore is unlikely.

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Current RRT6 Dispersant Use Guidelines and Contingency Planning

Offshore (>3 miles, >30 feet depth)	Nearshore	Bay/Estuary
Preapproval Granted to FOSC	Expedited Decision Process	None (TX Spill of Op)

Coordinate Oil Removal

(5.4 - 5.6 Alternative Countermeasures for Oil Spill Response.)

BIOREMEDIATION

Coordinate Oil Removal

(5.4 - 5.6 Alternative Countermeasures for Oil Spill Response.)

In-Situ Burning

In-Situ Burning

"So , why can we not just burn the oil?"

Application of In-Situ Burning:

- ***In-Situ* Burning Oil Offshore**
- ***In-Situ* Burning Oil in Coastal Marshes**
- ***In-Situ* Burning Oil Inland**
- ***In-Situ* Burning Oil Debris**

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In-Situ Burning at Sea

Proof of Concept: In-Situ Burning of Oil at Sea

- ***Extensive testing***
  - *oil types*
  - *boom systems*
  - *Ignition systems*
  - *Plume dynamics*
- ***…but, used only twice in US waters and that was during the 1989 Exxon Valdez Oil Spill and Deep Water Horizon.***
- ***RRT Preauthorization Offshore (Conditions Vary)***

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Exxon Valdez, PWS, Alaska (1989)

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Basics of Burning Oil at Sea

- Oil must be several mm thick to support combustion on water.
- Oil must not be emulsified (water in oil) more than 50%.
- Requires mechanical recovery prior to burning.
- Ignition systems maybe hand held or helio-torch (jellied gasoline).
- Plume monitoring may be required.

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Burn Effectiveness

- 90-98% Effective at removing surface oil.
- Some 5% of that removed are incomplete combustion by-products.
- Surface residues may sink.

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Case Study: Vermillion Parish Burn (1997)

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Homeland Security

Case Study: Vermillion Parish Burn (1997)

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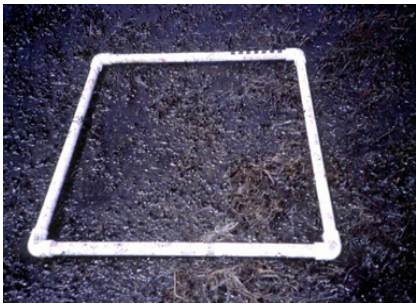
Case Study: Vermillion Parish Burn (Post-Burn)



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Case Study: Vermillion Parish Burn (Recovery?)

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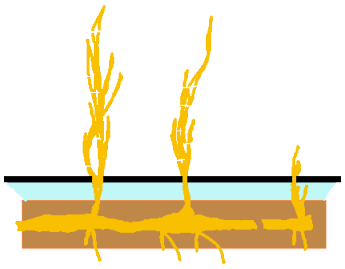
How much water is adequate?

- "about an inch"



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Why Consider *In-Situ* Burning in Wetlands?

- Reduce the potential for spreading
- Prevent or reduce collateral damage from conventional cleanup methods
- Wildlife exclusion
- Cost (not an environmental factor, but a reality in spill response)

"Bottom line: consider *in-situ* burning when conventional containment and oil recover techniques would result in unacceptable environmental injury."

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TRADEOFFS

"Spill response is a series of tradeoffs"

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PROS:

- Removes a large amounts of oil very fast (>2000 bbl/hr)
- "Doesn't require specialized or highly trained personnel or equipment"
- If implemented early, reduces area of impact and injury to marsh
- Provides wildlife exclusion
- Broad window of opportunity (days)
- Has progressed past the "test" stage

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CONS:

- Moves pollution from water to air
- Highly visible plume (public is often alarmed)
- Combustible liquids only (no emulsions)
- Marsh type and season should be considered
- Water level (avoid root or peat burn)
- Risk of uncontrolled fire (fire breaks and back fire should be considered)
- May require monitoring (SMART)
- May require RRT approval

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My *In-Situ* Burn Checklist:

- ✧ Is there adequate water in the marsh?
- ✧ Is there at least 2 mm of oil?
- ✧ Is there a downwind concern? (NIST LOFT)
- ✧ Do I need a monitoring plan? (SMART)
- ✧ Do I have fire containment and control?
- ✧ Have I thought about the oil type?
- ✧ Have I considered oil weathering (emulsions)?
- ✧ Have I thought about a safety plan?
- ✧ Have I really considered all the key ecological factors?

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Review Coordinate Oil Removal

(5.4 - 5.7 Alternative Countermeasures for Oil Spill Response.)

- **5.4 Explain** the conditions and criteria necessary for implementing [alternative] removal methods.
- **5.5 Explain** when the [alternative] removal methods should be used.
- **5.6 Contact** the appropriate agencies when [alternative] removal methods are used.
- **5.7 Identify** involvement of RRT in removal methods.

Coordinate Oil Removal

5.12 Explain on-site decanting procedures and regulations.

- **What is on-site decanting anyway?**
- **Why would we need to decant?**
- **Should we decant? (Engage Environmental Unit)**
- **State Waters (State Regulatory Issues)**
  - In most states, such issue have been delegated to States by EPA relative to Clean Water Act etc.
- **Federal Waters (Less Regulatory Issues)**
  - Also generally deeper water situations with less environmental concerns, but not always.
- **RRT Approval Plans (RRT4 and RRT6)**
  - RRT4 has a plan.
  - RRT6 doesn't.
  - Always case by case… there is no automatic approval for decanting.
  - (Belt and Drum Skimmers)

Questions