

**A experiência da Agência de
Proteção Ambiental dos EUA
em acidentes de grandes proporções
envolvendo derrames de óleo**

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da Agência de Proteção Ambiental dos EUA**

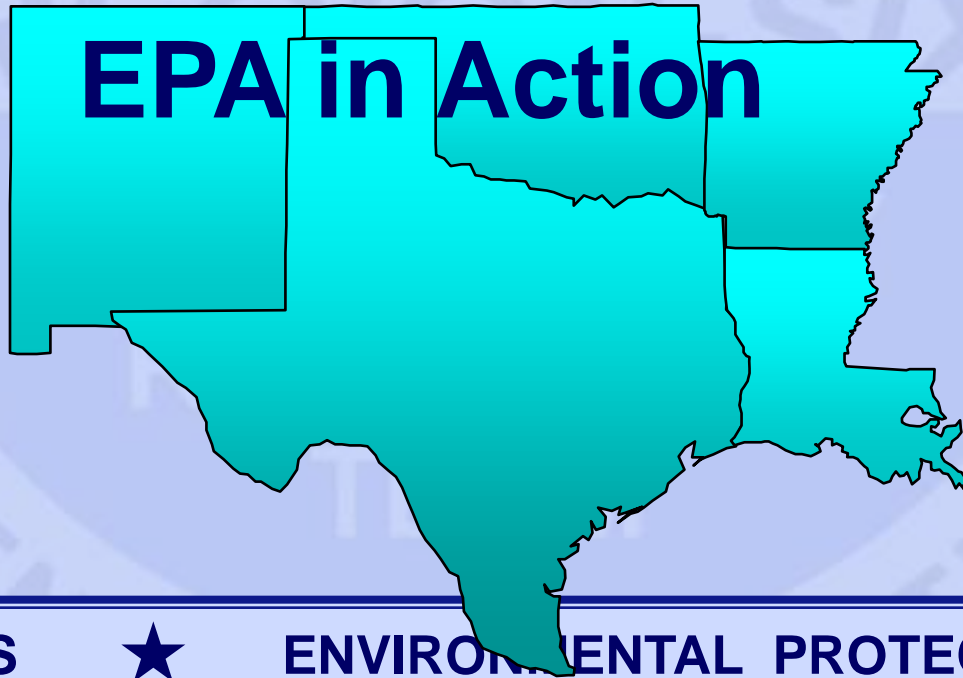


US.Environmental Protection Agency Region 6 Dallas, Texas



Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 66 Tribes

EPA in Action



UNITED STATES



ENVIRONMENTAL PROTECTION AGENCY

EPA: Emergency Responses



Oil Spills



EPA: Emergency Responses



EUNICE, LOUISIANA



EPA: Emergency Responses



SAN ANTONIO, TEXAS



EPA: Emergency Responses



EL DORADO, ARKANSAS



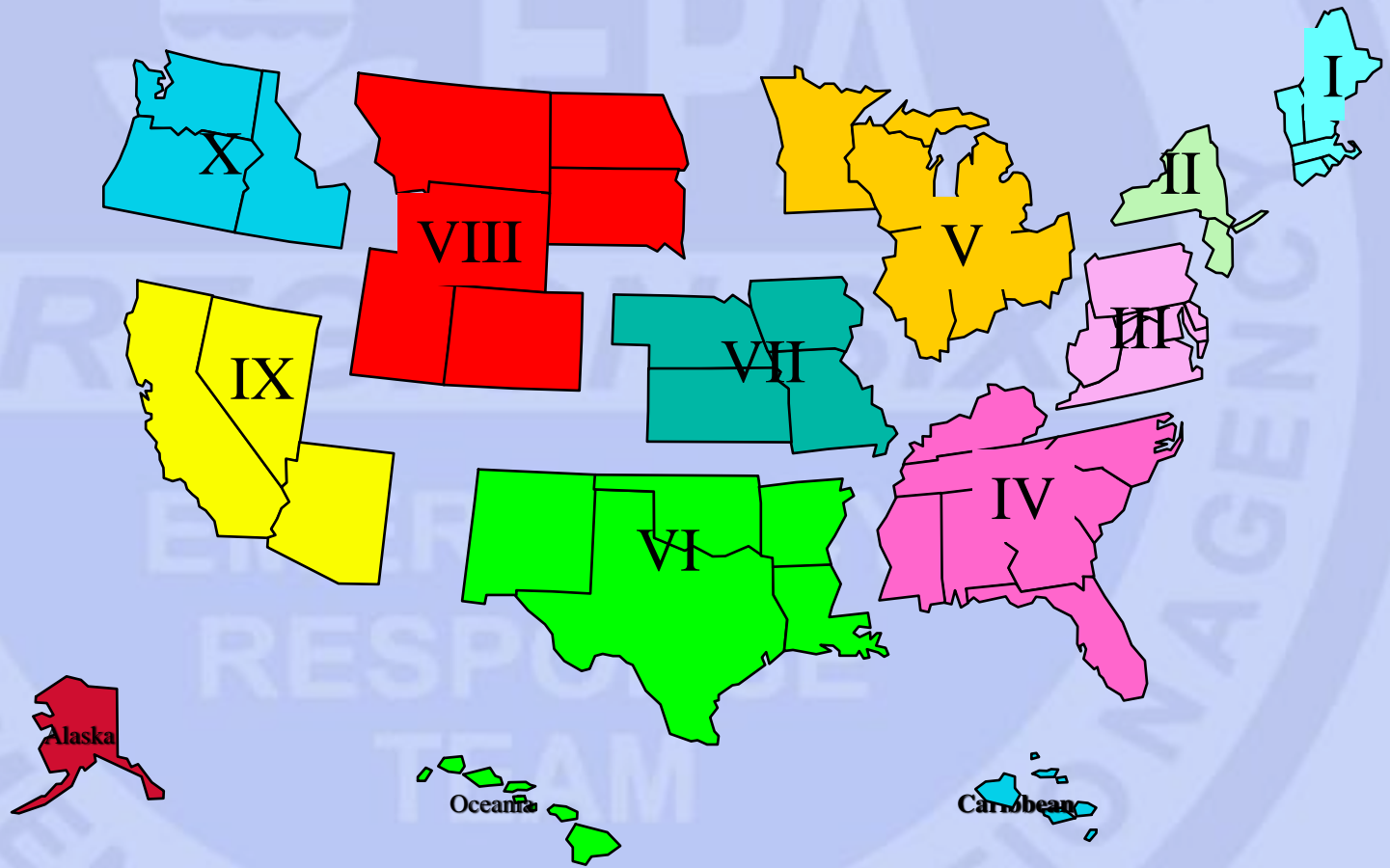
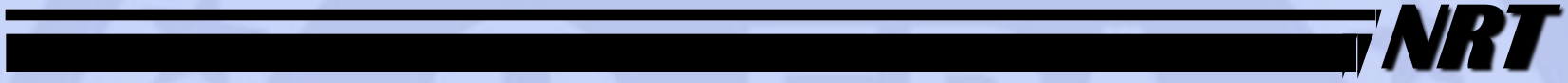
EPA: Emergency Responses



HOUSTON, TEXAS



NATIONAL RESPONSE SYSTEM AN OVERVIEW



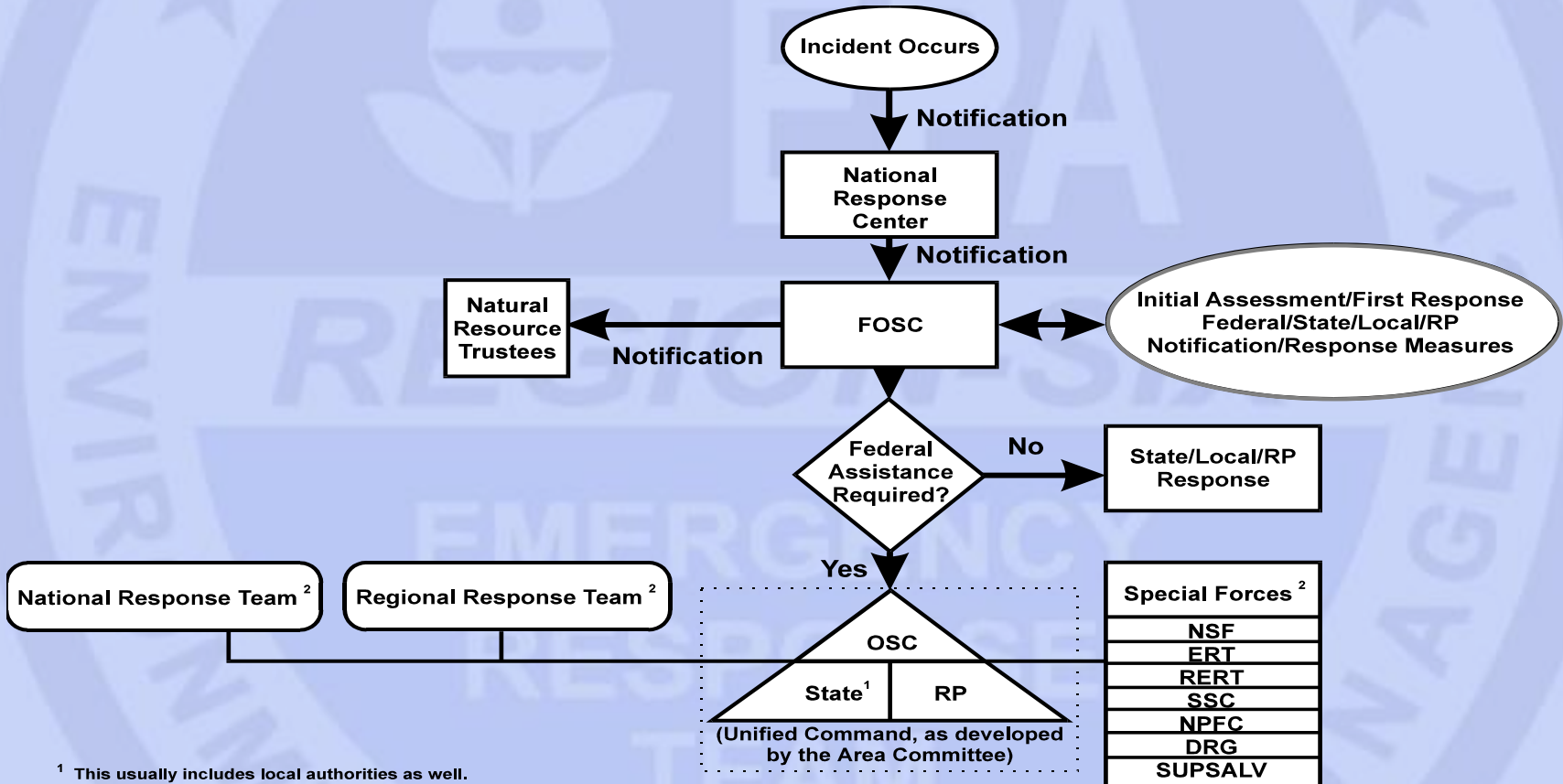
UNITED STATES



ENVIRONMENTAL PROTECTION AGENCY



NRS Concepts of Response



¹ This usually includes local authorities as well.

² Resources available to support the FOSC upon request.

Source: Federal Register, Sep. 15, 1994, Vol. 59, No. 178, p. 47425 (NCP Final Rule)





Authorities

- National Contingency Plan 40 CFR 300
- Clean Water Act
 - Oil Pollution Act of 1990 (amended CWA)
- CERCLA aka Superfund
 - Emergency Planning and Community Right-to-Know Act (amended CERCLA)
- Resource Conservation and Recovery Act
 - Controlling hazardous wastes
 - Underground Storage Tanks



Organization and Components

Federal OSCs



- Coordinate all federal containment, removal, and disposal efforts and resources during an incident, per the NCP or Federal Response Plan
- Ensure proper notification
 - Conduct Emergency Response Evaluation
 - Recommendation/Decision
- Direct/coordinate, and/or provide technical assistance to all response efforts at site
- Maintain decision-making authority
- Ensure access to information



Organization and Components

Federal OSCs (cont'd)



- Typical types of response actions carried out under the NRS/NCP include:
 - Site safety plan development (response planning)
 - Sample collection and analysis (air/water monitoring)
 - Alternative water supply provisions (potable water)
 - Source control and stabilization (berms, booms, dikes, plugging release points)
 - On-site treatment (neutralization, thermal destruction, solidification, detonation)
 - Temporary relocation
 - Off-site disposal or treatment



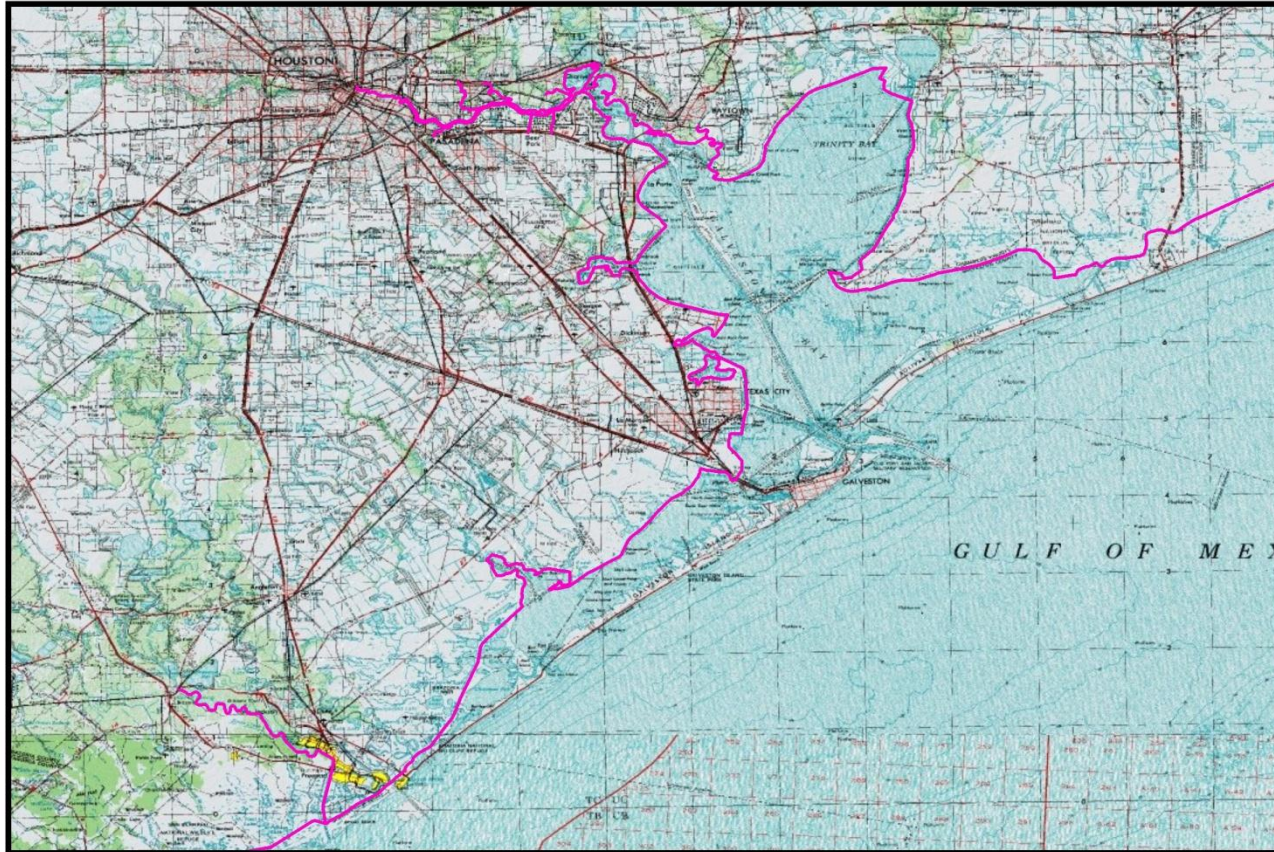
FOSC Response Assets



- Enforcement authorities to ensure that the responsible party (RP) cleans up the spill or release;
- Immediate access to technical assistance and cleanup contractors if the RP cannot adequately handle the problem;
- Immediate access to SUPERFUND and OIL SPILL LIABILITY TRUST FUND;
- Technical expertise from special federal teams; and
- Special equipment.



EPA / USCG Boundary



— EPA/USCG Boundary

EPA/USCG Jurisdiction Boundary
Galveston, Texas Area

0 5 10 20 30 40
Miles





Special Teams - EPA Environmental Response Team

- Sampling and Analysis
- Hazard Assessment
- Cleanup Techniques
- Specialized Technical Support
- Training and Education



Special Teams - NOAA & EPA Scientific Support Coordinators



- Environmental Chemistry
- Oil Slick Tracking
- Pollutant Transport Modeling
- Natural Resources at Risk
- Environmental Trade-off of Countermeasures and Cleanup
- Information Management
- Liaison to Scientific Community



Special Teams - USCG National Strike Force



- USCG National Strike Force (NSF)
 - National Strike Teams - Atlantic, Gulf, and Pacific
 - National Strike Force Coordination Center (NSFCC)
 - USCG Public Information Assist Team (PIAT)



Special Teams - Navy Supervisor of Salvage



- n Salvage/Search and Recovery
- n Shipboard Damage Control
- n Diving





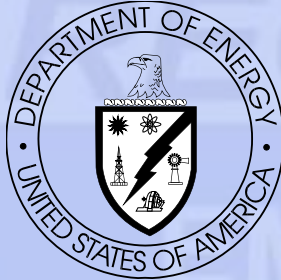
Special Teams - EPA Radiological ERTs

- Radiation Monitoring
- Radionuclide Analysis
- Radiation Health Physics
- Risk Assessment
- Mobile and Fixed Laboratories

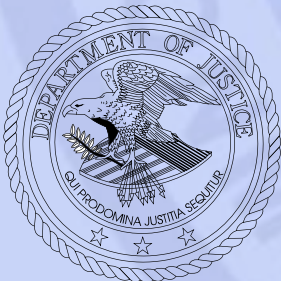
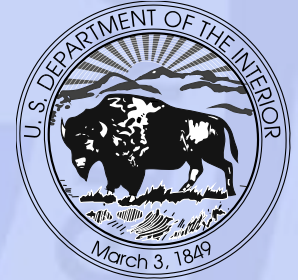
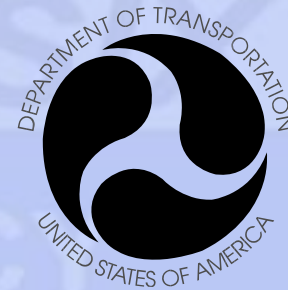
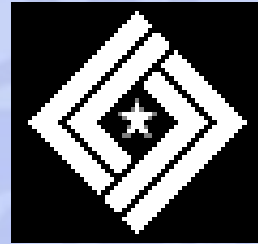




NRT/RRTs Member Agencies



United States
Department of
Agriculture



NRS Funding Mechanisms

Oil Spills

- OPA 90
 - Oil Spill Liability Trust Fund (OSLTF)



Hazardous Substances

- The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), a.k.a., Superfund



Access to the NRS



- National level - Contact the National Response Center at:
1-800-424-8802



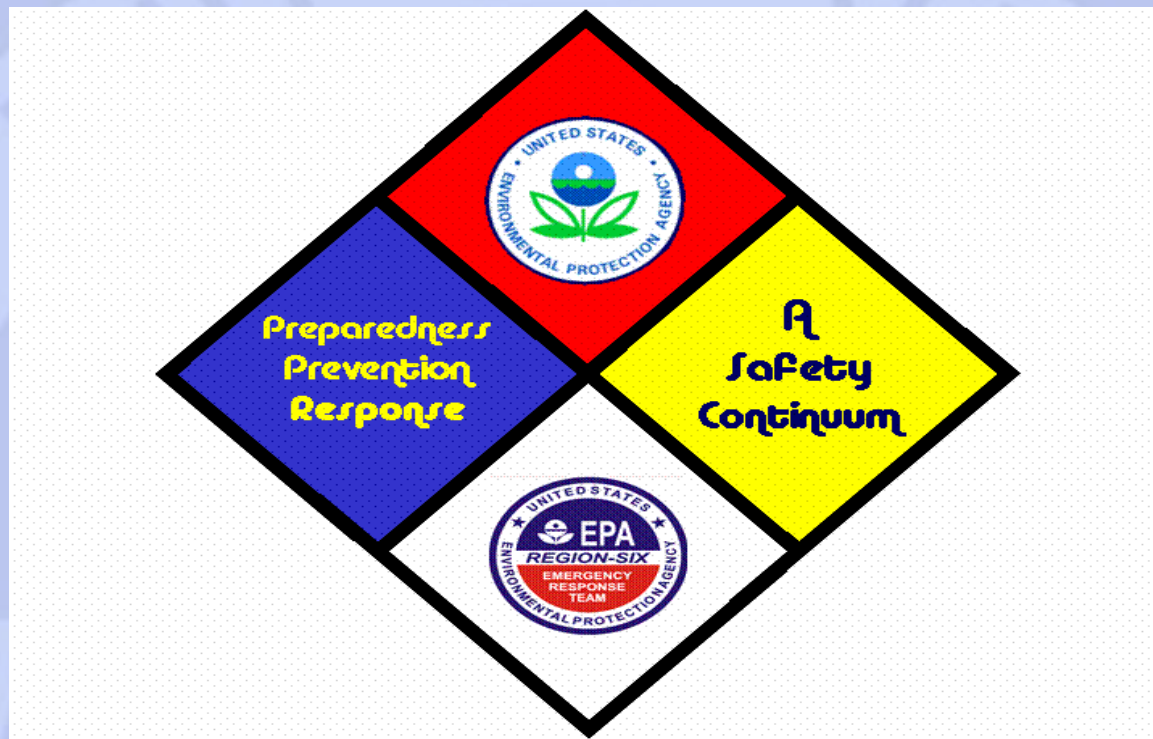
- Regional level - Contact the appropriate USCG or EPA RRT Co-Chair



In Summary: Key Components of the NRS

- National Contingency Plan
- National Response Center
- Federal On-Scene Coordinators
- Regional and National Response Teams
- Superfund and the OSLTF

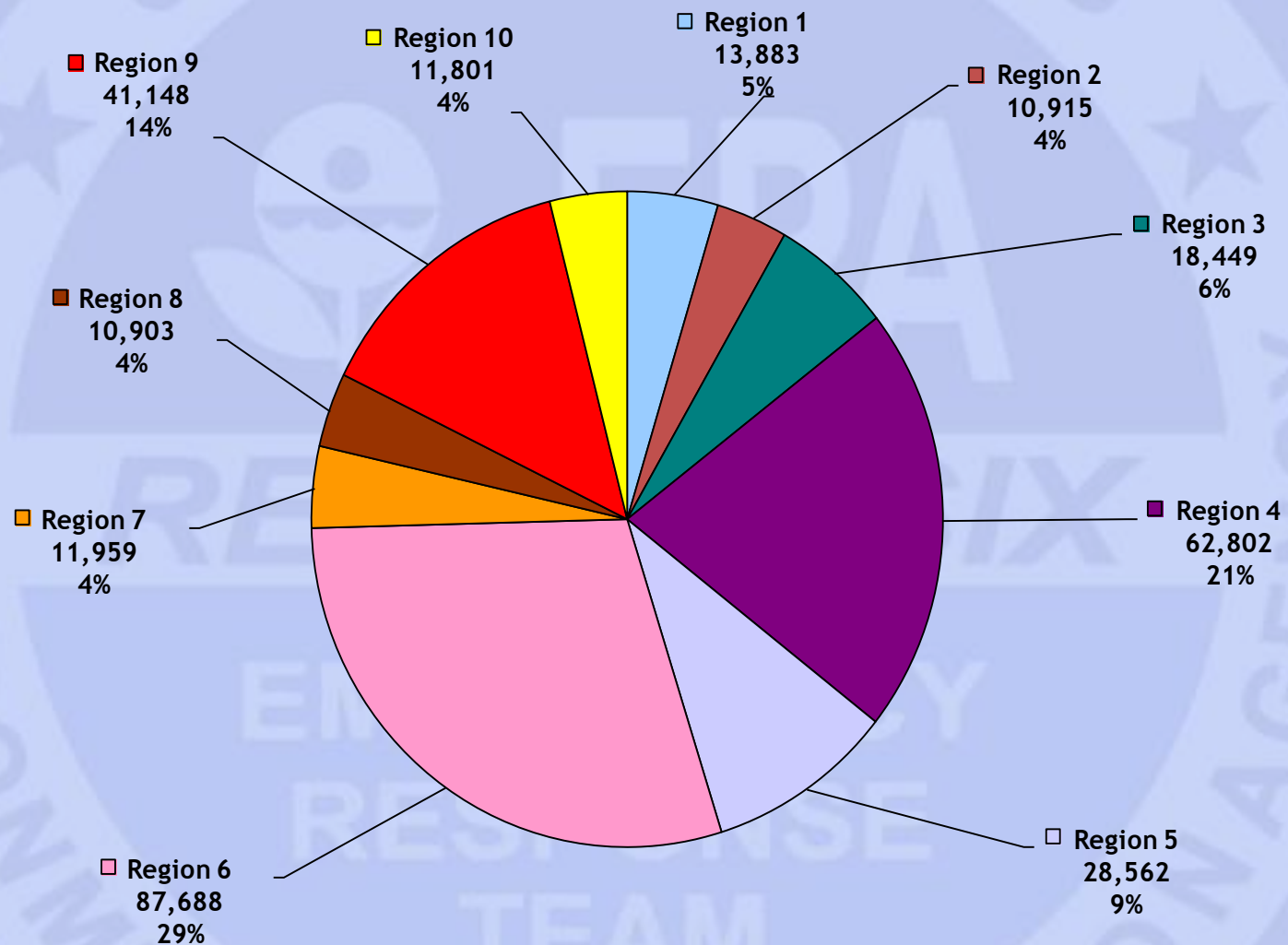




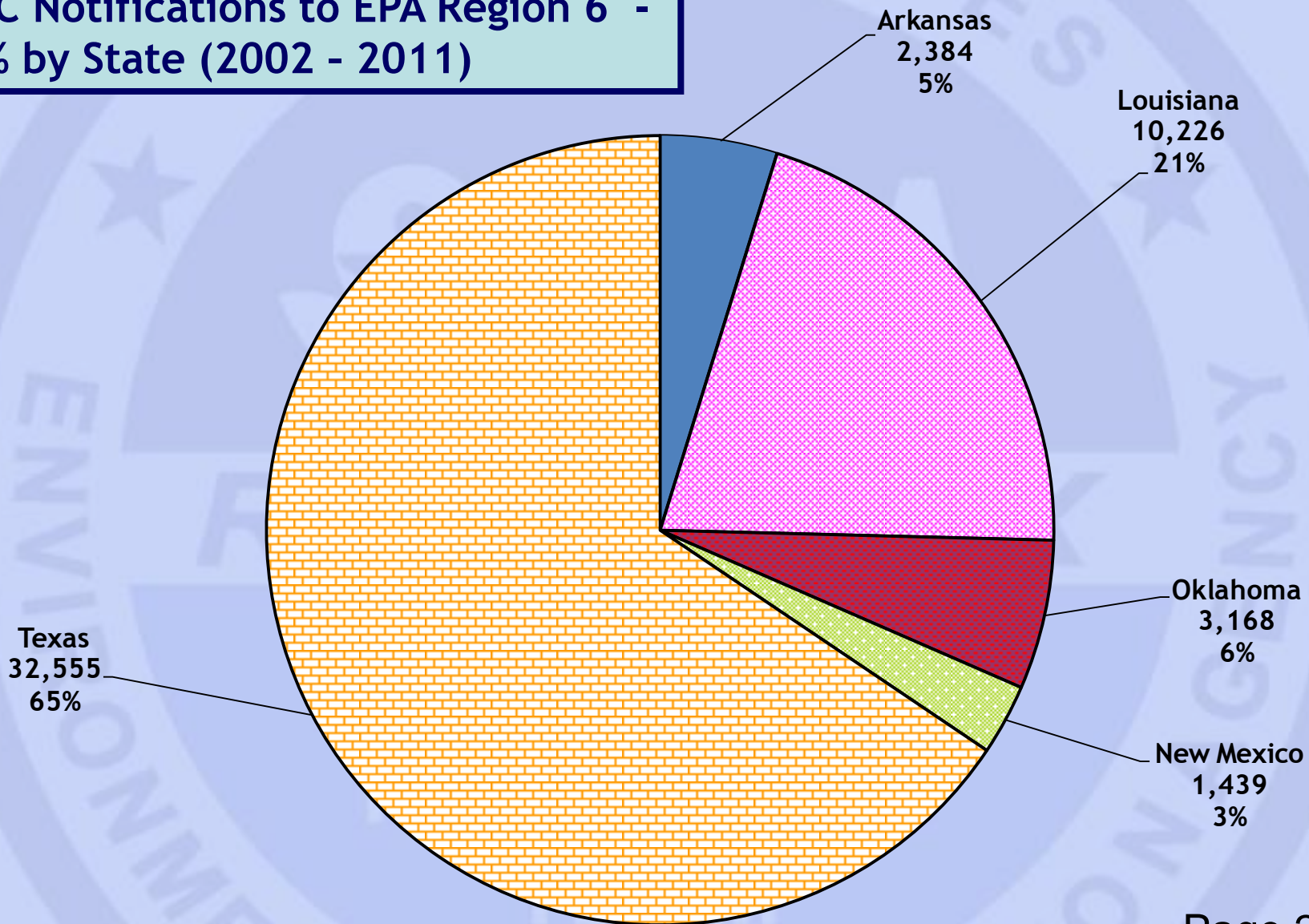
EPA Region 6 Accidental Release Information : 2001 - 2011



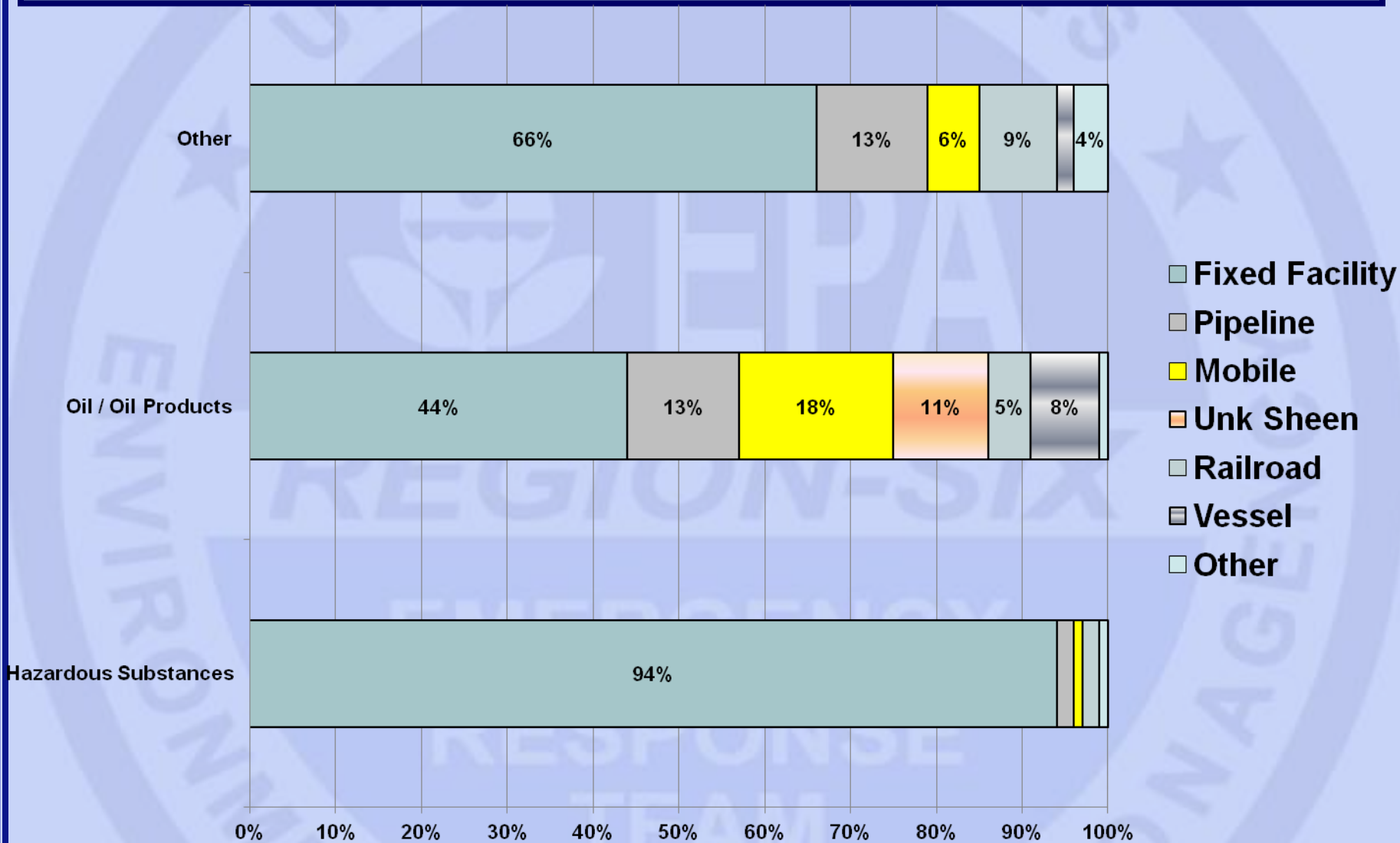
EPA Notifications to NRC per Region (2002 - 2011)



**NRC Notifications to EPA Region 6 -
- % by State (2002 - 2011)**



NRC Notifications to EPA Region 6 -- Source of Release (2002 - 2011)

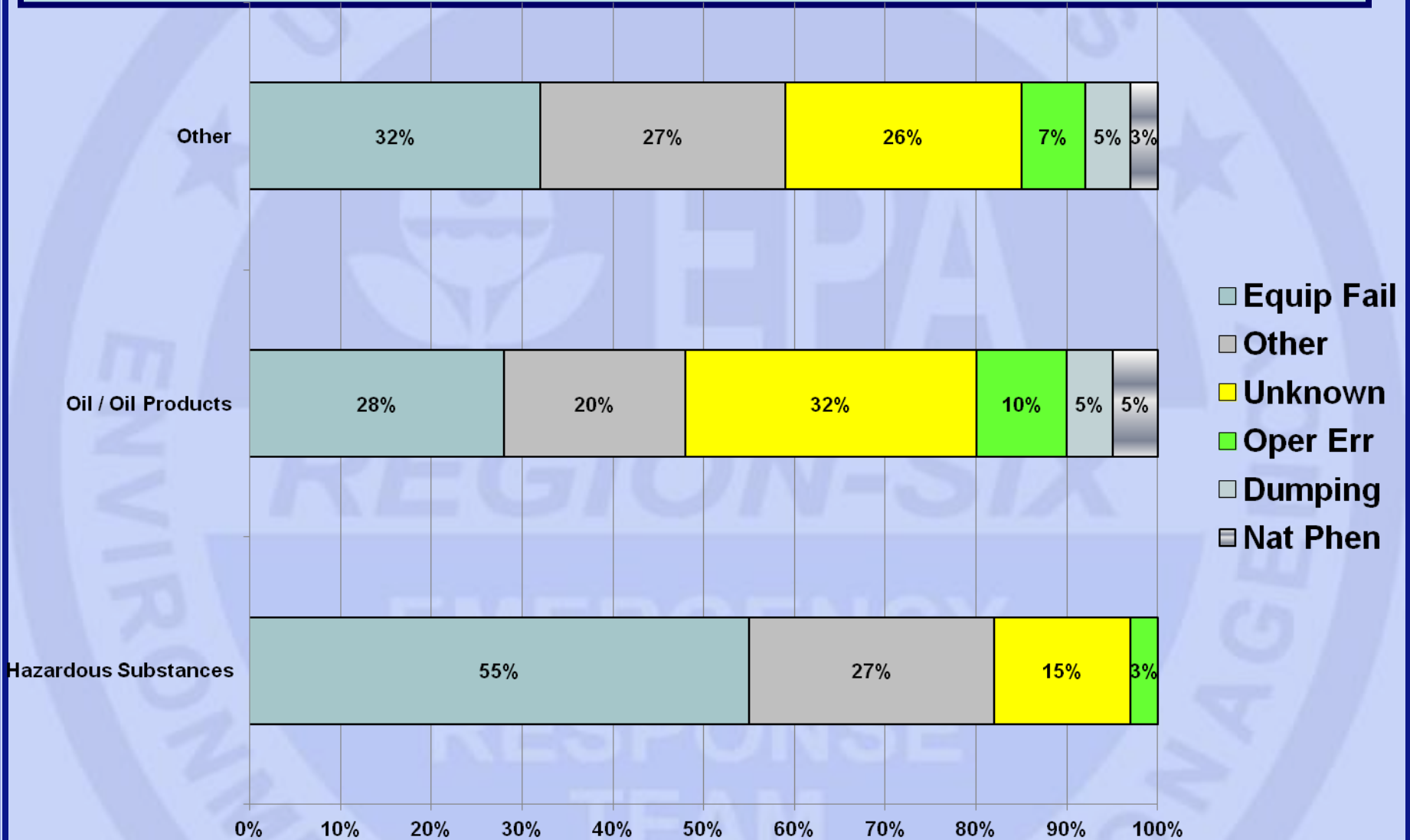


- Fixed Facility
- Pipeline
- Mobile
- Unk Sheen
- Railroad
- Vessel
- Other

Other Sources may include: aircraft, continuous, platform, terrorist



NRC Notifications to EPA Region 6 -- Cause of Release (2002 - 2011)



Other Causes may include: aircraft crash, continuous, terrorist



Factoid

Since 2001, approximately 4.0 % of all release reports have led to a significant event (death, injury, community evacuation, shelter-in-place)

Deaths, injuries, and evacuations may not be directly due to exposure, but as a consequence of the accident resulting in the release

Since 2002, statistically there is a shelter-in-place or evacuation of a community (whole or part) due to a hazardous substance, oil, or other material incident somewhere in Region 6, on a weekly basis



Factoid

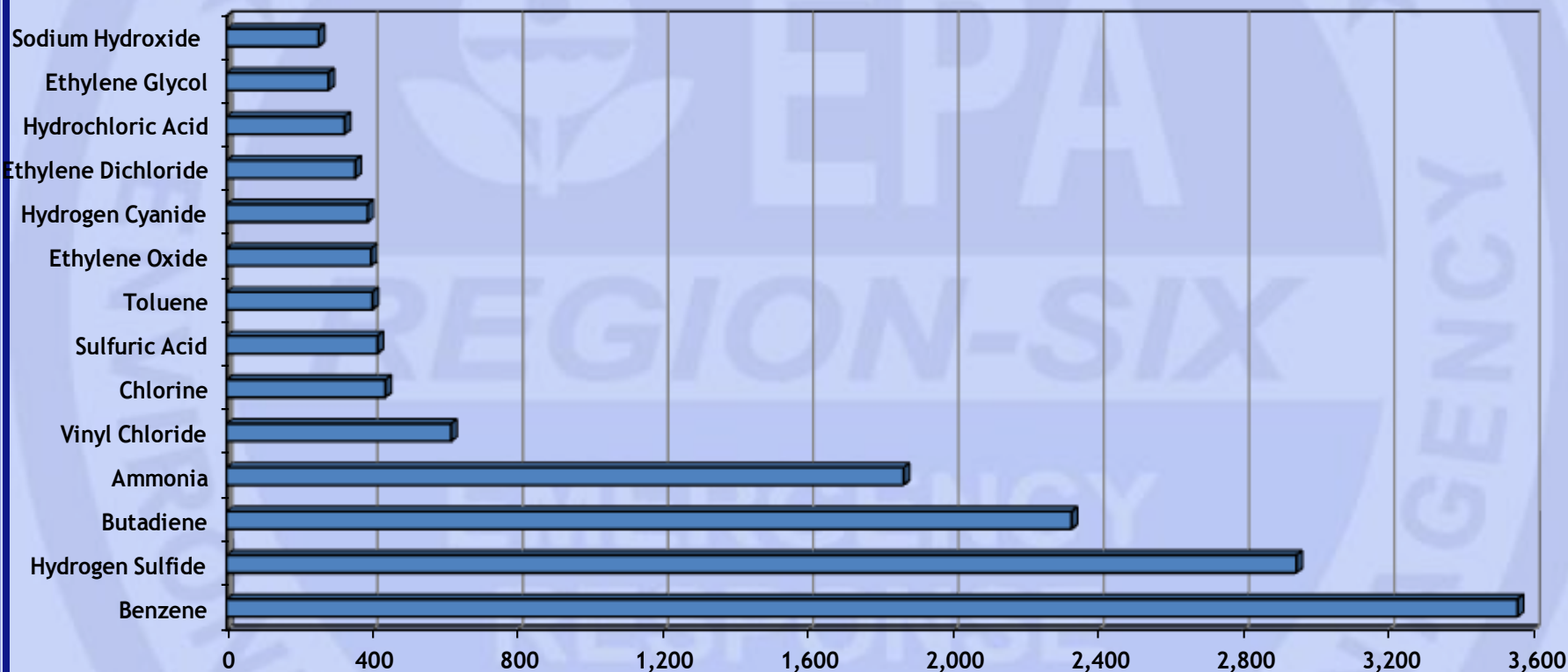
Since 2006, more release reports to EPA through the National Response Center have originated from Harris County (Greater Houston), Texas, than 47 States

It is truly the center of the Chemical Universe !



NRC Notifications to EPA Region 6 -- Top Hazardous Materials Released (2002 - 2011)

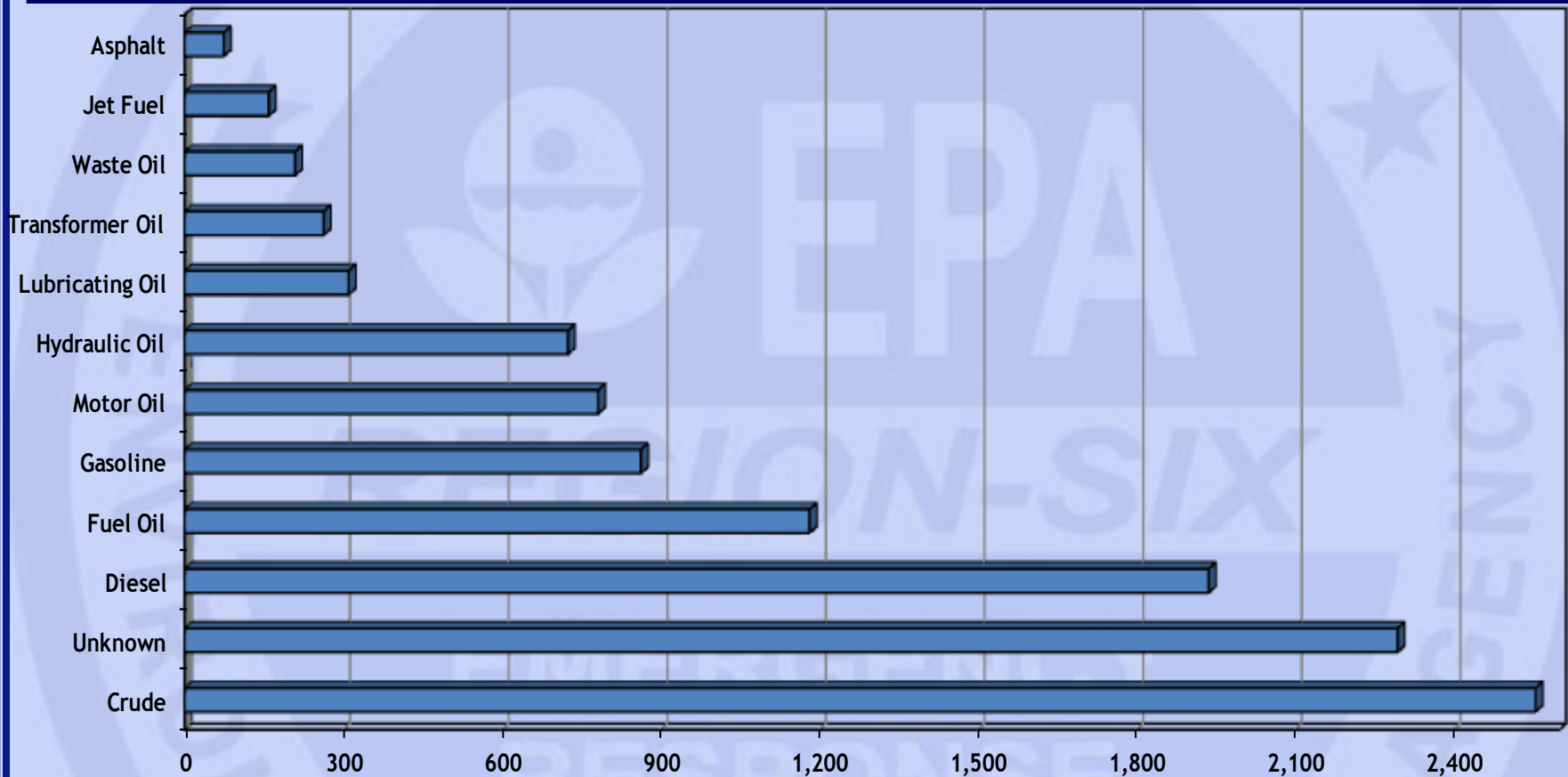
The 15 materials listed above account for 88 % of all hazardous material releases within Region 6 since 2002



Nitrogen Oxides, Dioxides, Tetroxides, NOX account for 16,306 reports



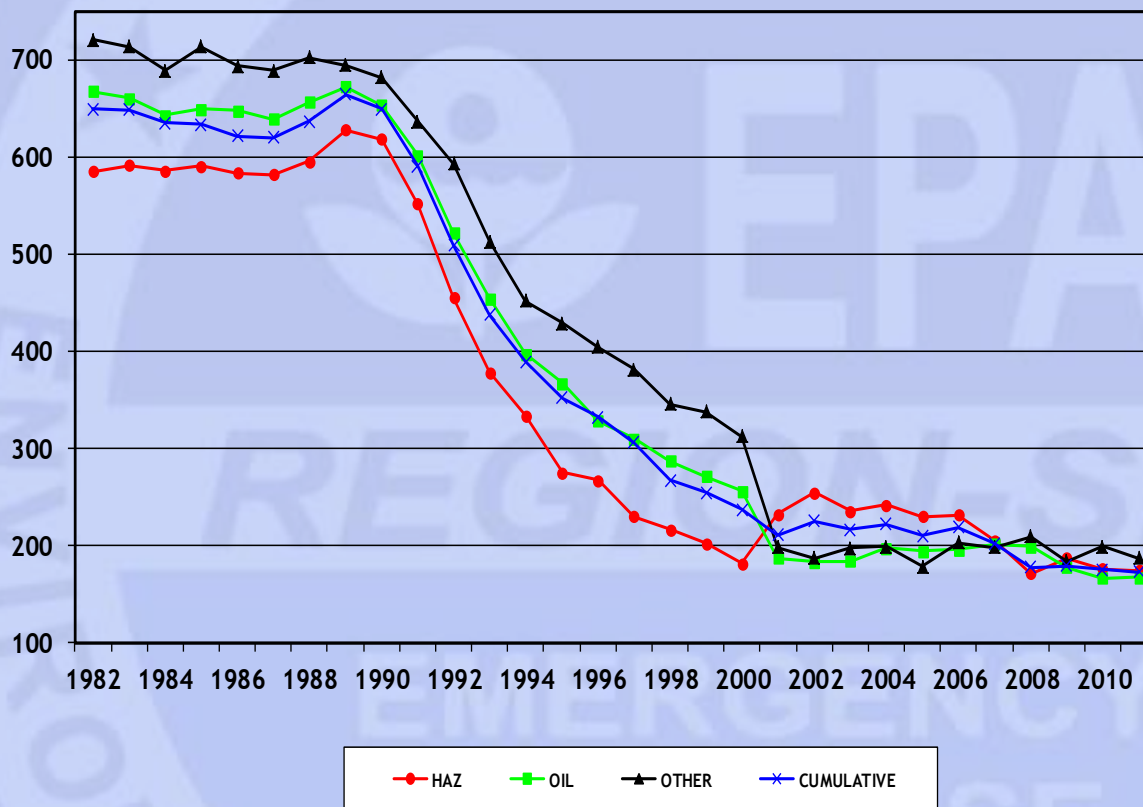
NRC Notifications to EPA Region 6 -- Top Oil / Oil Products Released (2002 - 2011)



The oil / oil products listed above account for 89 % of all oil / oil product releases within Region 6 since 2001



NRC Notifications to EPA Region 6 -- Time from Release to Reported to NRC -- by Year (1982 - 2011)



Hazardous Substances: 585 to 176 minutes - **Other/Unknown: 721 to 199 minutes**
Oil / Oil Products: 668 to 166 minutes - **Cumulative: 650 to 175 minutes**

This above indicated decrease over the years can be associated with an aggressive and extensive outreach program under CERCLA, EPCRA, and OPA, as well as a strong Regional enforcement program

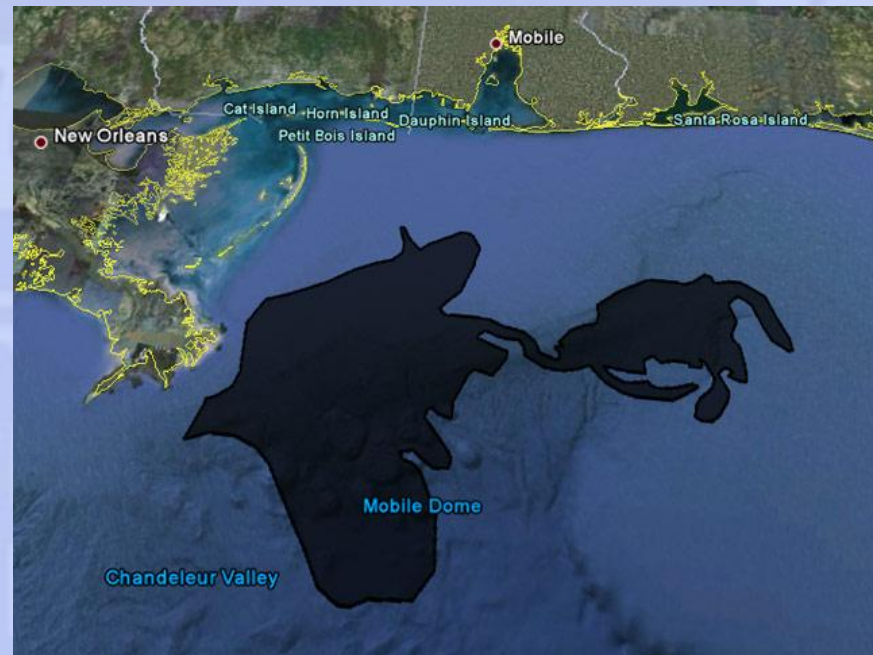
The Deepwater Horizon: NRS/EPA Roles and Activities



Quantity of Oil Released

- 4.9 million barrels oil
- 205,800,000 gallons oil

First U.S Spill of National Significance (SONS)



NRS Roles and Responsibility

- US Coast Guard:
 - Provide FOSC
 - Overall Incident Command
- US EPA
 - Assist in Environmental Unit of ICS
 - Environmental monitoring
 - Concur with FOSC decisions regarding dispersant application
 - Environmental Data Management

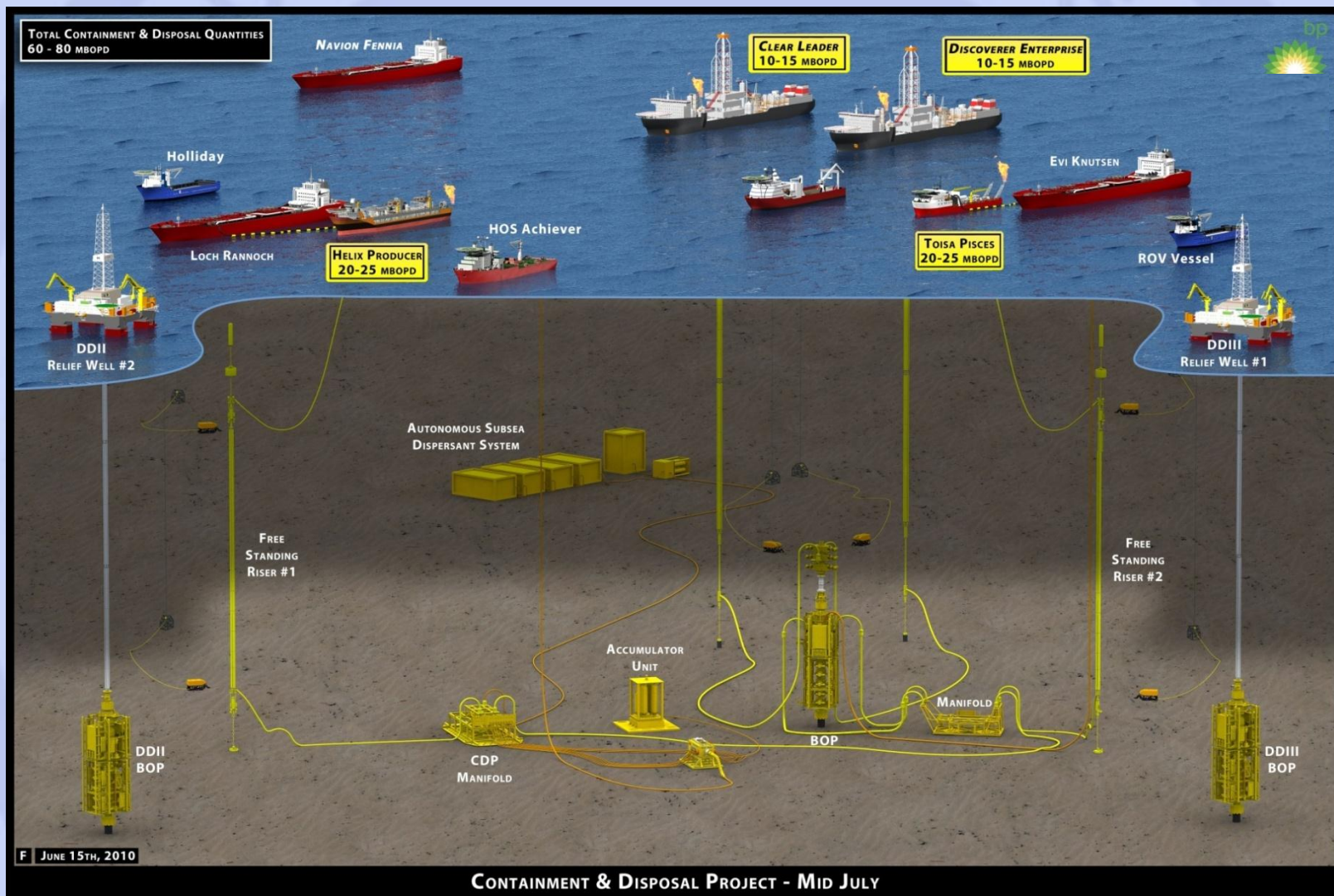


Response Objectives

- Objectives:
 - Secure the source
 - Fight oil as far off shore as possible
 - Protect resources and set conditions for recovery
 - Ensure unity of effort



Subsurface Activity



Offshore Operations



- Skimming
- Dispersants
- In-Situ Burning



UNCLASSIFIED



Nearshore Operations



- Skimmers
- Vessels of Opportunity



UNCLASSIFIED



Bays/Beaches/Marshes Operations



Booms laid to protect coastline - Venice_4-29_6059.jpg



- Skimmers
- Booming & Barrier Establishment
- Shore-line Cleanup Assessment Teams
- Clean-up Personnel
- Wildlife Recovery Personnel

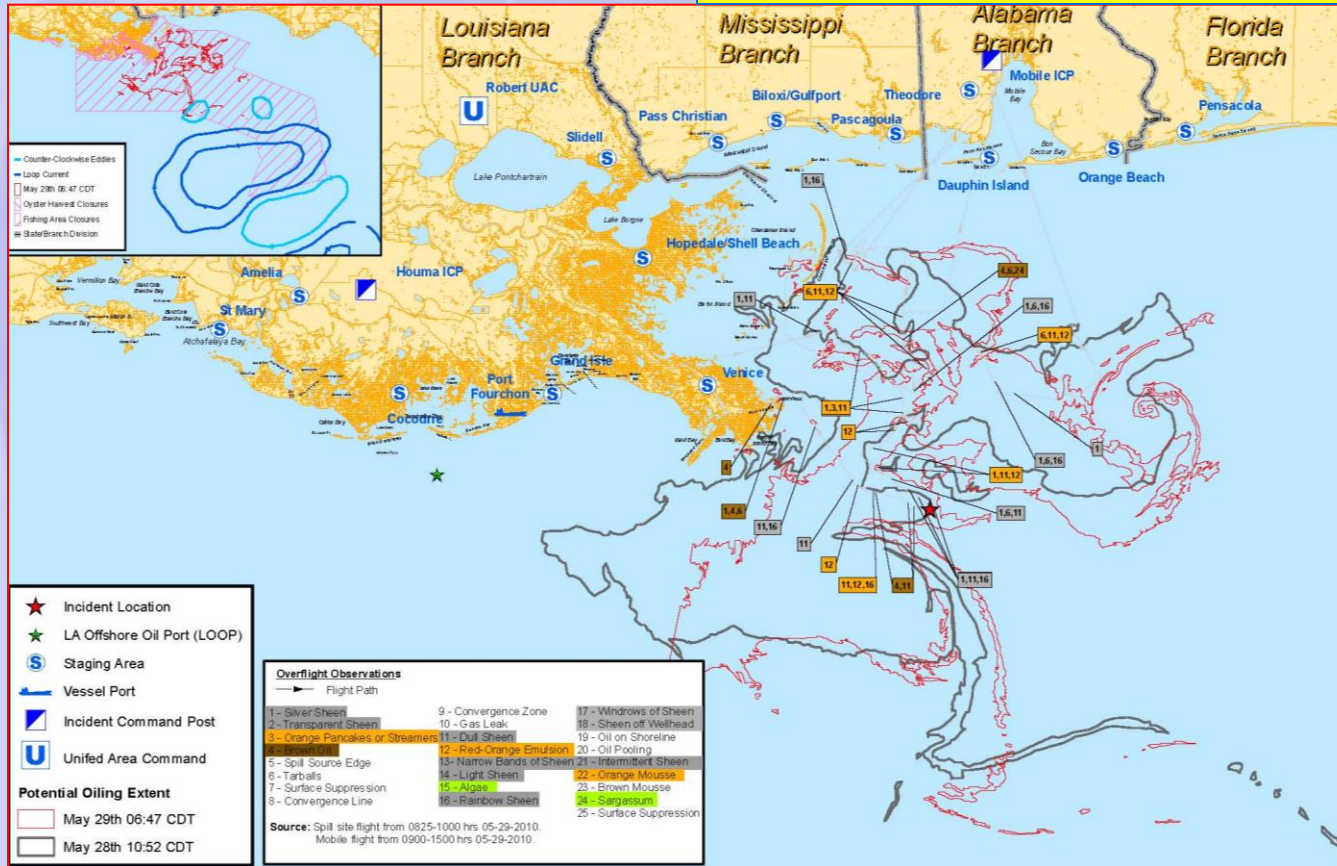


UNCLASSIFIED



Snapshot of Response

- 47,849 personnel (maximum number)
- Vessels/Equipment in theater:
 - 6,050 offshore vessels
 - 835 skimmers
 - 102 aircraft



Snapshot of Response

- Boom deployed:
 - 3.795 million feet containment
 - 9.664 million feet sorbent
- Total: over 13 million feet



Snapshot of Response



- **Controlled burns conducted: 411**
 - **Total bbls burned: 265,450 bbls.**



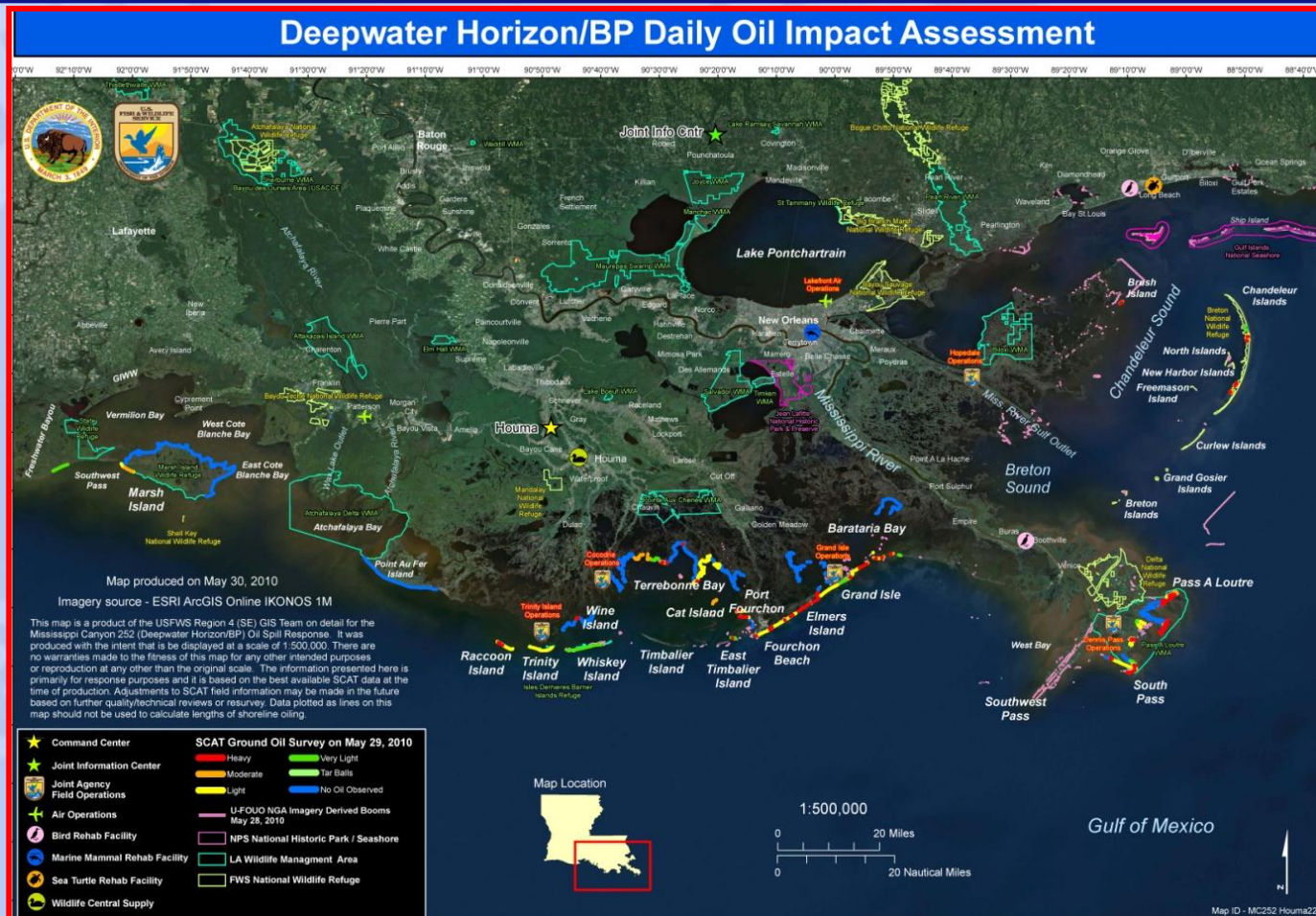
Snapshot of Response



- Oil recovered:
 - 827,251 bbls (oily liquid recovered)



Snapshot of Response



- Impacted Areas
 - 109.5 miles heavy to moderate oiled shoreline
 - 485.3 light to trace oiled shoreline

Snapshot of Response



Wildlife impacted

- 4,787 visibly oiled
- 3,992 no visibly oiled



As of Sept. 20

Summary of EPA Sampling / Monitoring Activities



- **Over 3,600 water, air, and sediment samples collected**
 - **Water 1,107**
 - **Sediment 294**
 - **Oil / mousse 56**
 - **Waste 69**
 - **Air 2,224**
 - **All sample results posted to EPA website**



Additional Monitoring / Sampling (just some of them)

BP (CTEH)	Air, Water, Sediment
NOAA	Water
USCG	Water
CDC	Air, Water, Sediment
OSHA	Air / Personal
USGS	Water



Unique Aspects of DWH Environmental Response

- Unprecedented continuous deep sea oil discharge
- Unprecedented subsurface use of dispersants
- Unprecedented geographic scope
- Continuous surface and subsurface use of dispersants



Typical Dispersant Authorization Process

- National Contingency Plan, Subpart J
 - Pre-Authorization for dispersant use provided to FOSC by RRT
 - Incident specific authorization provided by RRT
 - Concurrence of EPA, DOI, and State representatives to the RRT



Incident Specific DWH Dispersant Protocols

- Involvement of “cabinet level” senior officials
- Subsea – Directive and Addenda (EPA and USCG)
- Surface – Daily approval process



Specific Requirements Developed during the DWH spill response

- Dispersant Monitoring and Assessment Directive – May 9, 2010
 - Proof of concept (subsea dispersant injection)
 - Characterization plan
 - Operational shutdown criteria
 - Dissolved oxygen below 2 ppm
 - Rototox toxicity deemed excessive by EPA and NOAA.
 - Note: Actual shutdown decision to be advised by RRT.



Requirements Developed during the DWH spill response (cont)

- Dispersant Monitoring and Assessment Directive – Addendum 1, May 14, 2010
 - Continuous implementation of monitoring
 - EPA/NOAA scientist participation
 - LISST Particle Size Analysis
 - Daily data reporting
- Addenda 2 – 4
 - Dispersant alternatives / reduction
 - DO probe calibration via Winkler titrations



Requirements Developed during the DWH spill response (cont)

- Dispersant Monitoring and Assessment Directive – Addendum 1, May 14, 2010
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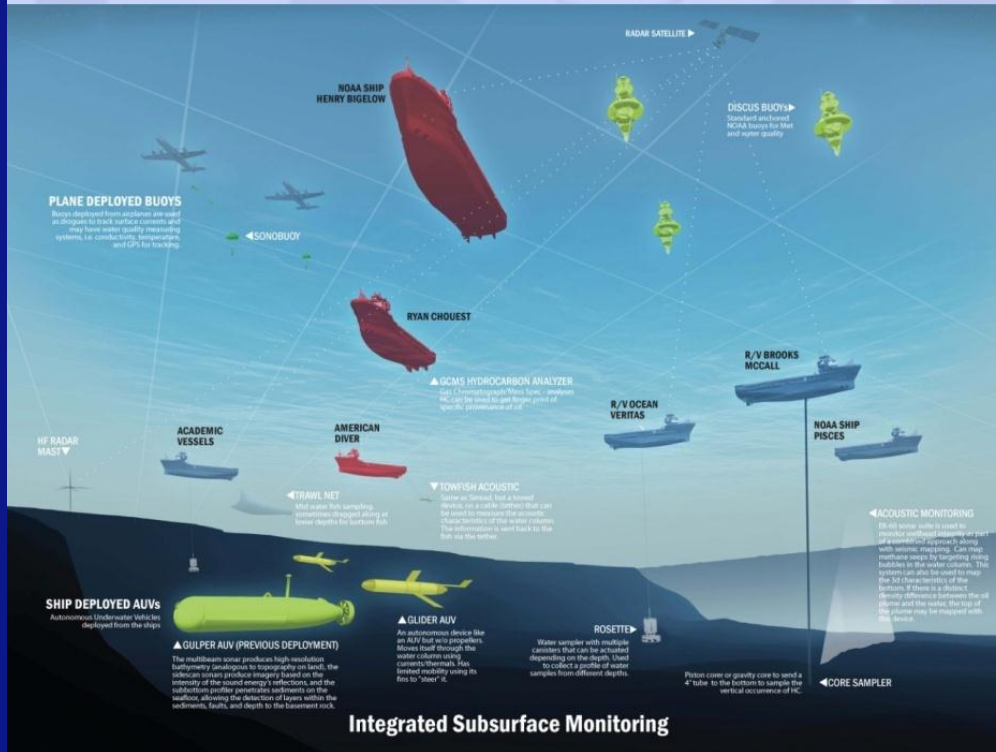
Dispersant Usage

- Dispersants applied:
 - 976,237 gallons (aerial)
 - 96,277 gallons (surface)
 - 771,272 gallons (subsea)
- Total:
 - 1,843,786 gallons



Environmental Monitoring Surface, Subsurface, and Shoreline

Subsurface Monitoring Unit (SMU)



v. 8/2006

SPECIAL MONITORING of APPLIED RESPONSE TECHNOLOGIES

Developed by:

U.S. Coast Guard
National Oceanic and Atmospheric Administration
U.S. Environmental Protection Agency
Centers for Disease Control and Prevention
Minerals Management Service



Smoke rising from the New Carlisle, February 1998. Photo by USCG



Goals

Determine the efficacy of dispersants sprayed from aircraft or injected directly into the oil from the riser

Determine the vertical and lateral extent of any Subsurface oil plumes encountered

Monitor for attainment of Dissolved Oxygen and toxicity “Shut Off” criteria

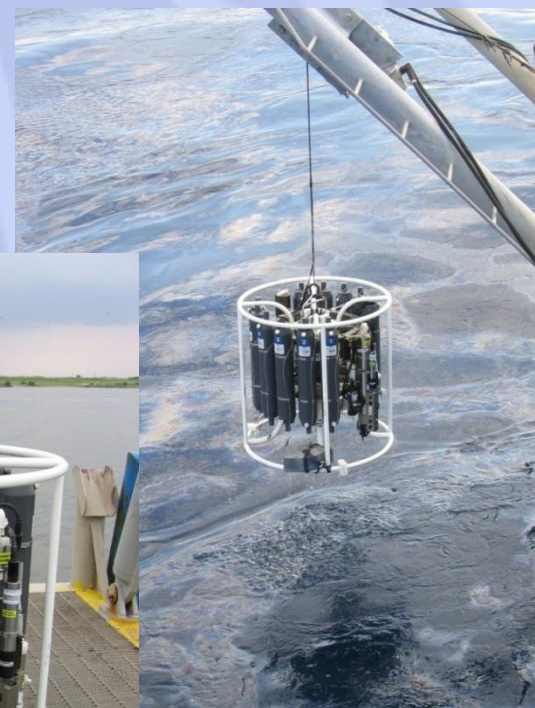


Deep Water Horizon

Subsurface Dispersant Monitoring

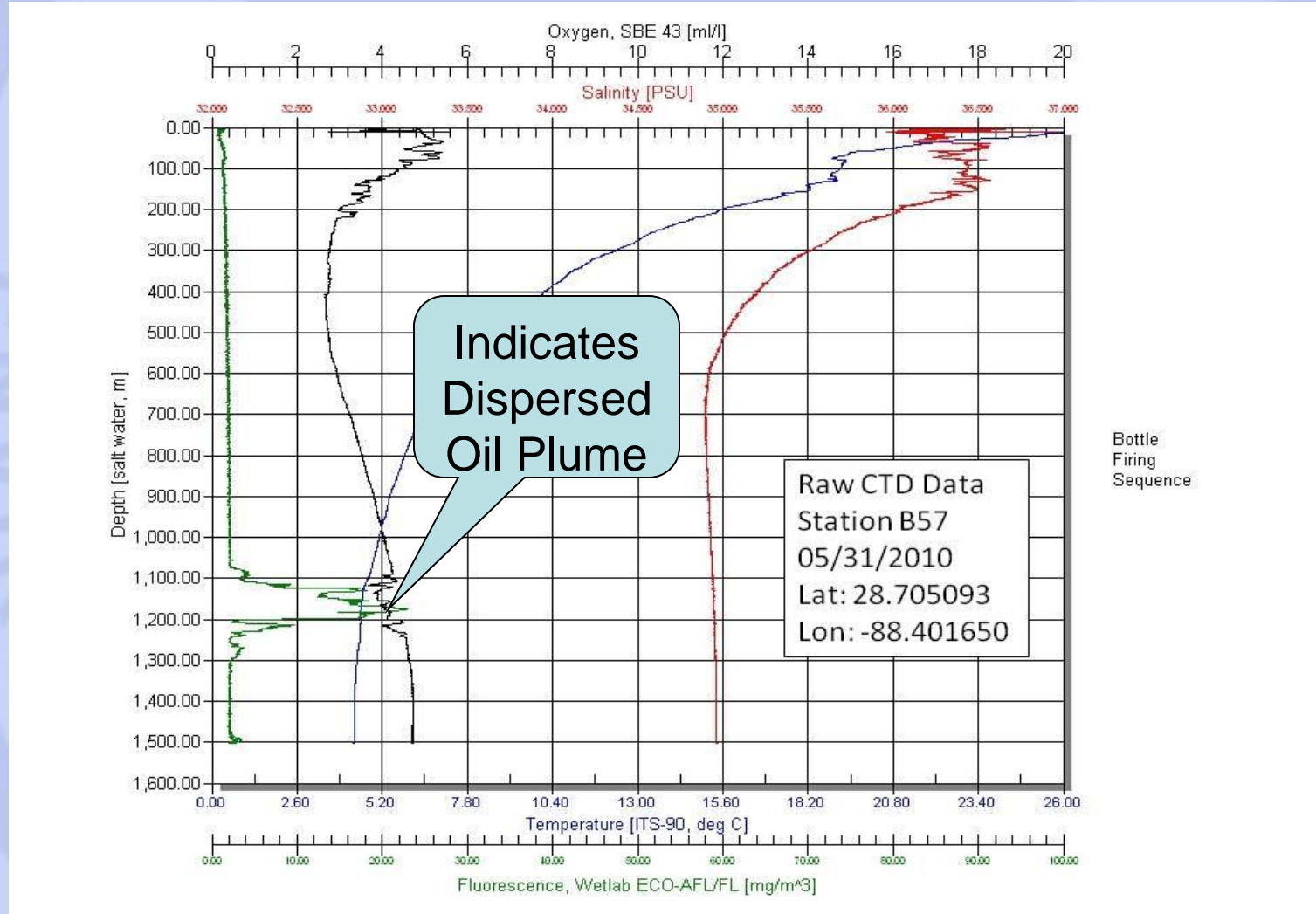
Methods and Analytical Parameters:

- CTD probe results
- Dissolved Oxygen
- Rototox Toxicity
- TPH
- TPAH
- VOA
- LISST Particle analysis
- Dual wavelength
Fluorescence
- Microbial Analysis



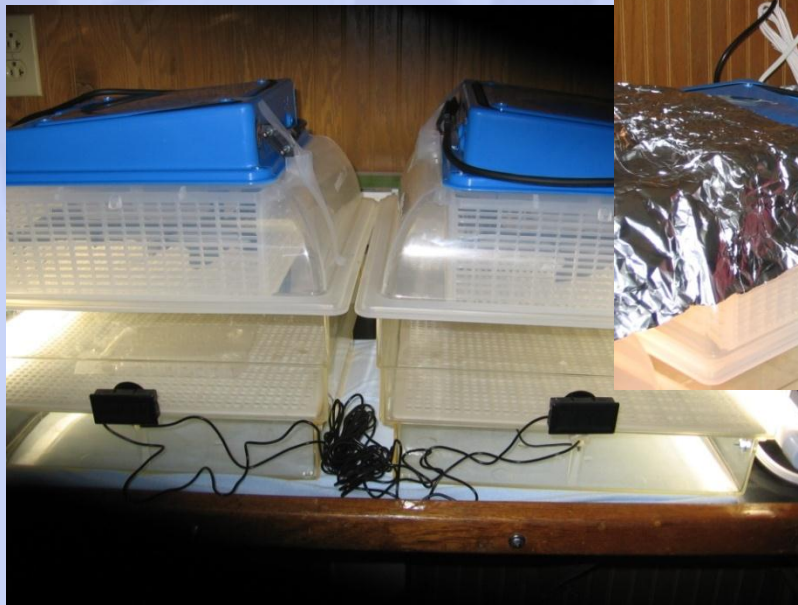
Deep Water Horizon

Integrated Subsurface Dispersant Monitoring Program



Deep Water Horizon Subsurface Dispersant Monitoring

Rototox Toxicity Test



Rotifer Toxicity Summary

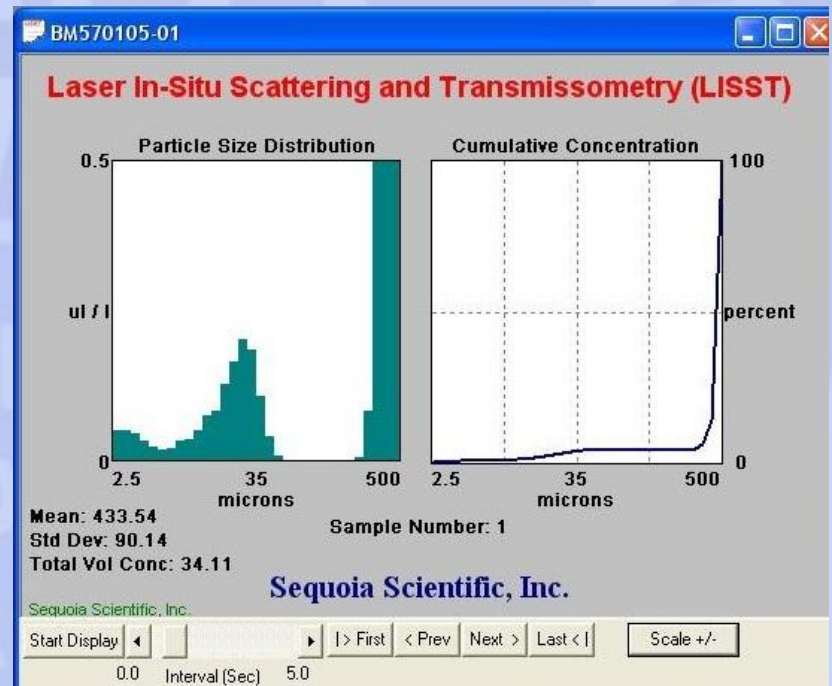
- Rotifers are small aquatic organisms that are added to water sample treatments, and their survival over 24 hours is evaluated.
- Based on the ASTM method and performance standards for the rotifer test procedures, high survival (>90%) of control and sample treatments are classified as “not toxic.”
- For DWH water samples collected during the emergency response, 89% of the samples were not toxic.
- There were limited observations of toxicity across the samples:
 - 10% showed MARGINAL toxicity (survival range <90% to ≥75%)
 - 1% showed OVERT toxicity (survival <75%)



Deep Water Horizon

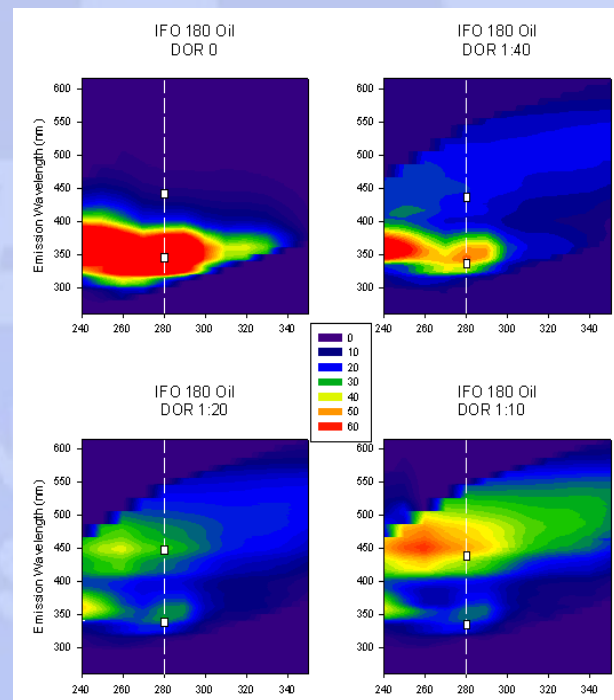
Subsurface Dispersant Monitoring Program

LISST Particle Size Analysis:



Deep Water Horizon Subsurface Dispersant Monitoring Program

Fluorescence Intensity Ratio Analysis



Worker Safety & Health - OSHA

- Act as technical safety and health advisor to the Safety Section of Unified Command
- OSHA to assure workers protected and working safely
 - Coordinate on all BP training provided
 - Over 16,000 workers provided health & safety training
 - Audit classes for quality control
- Review, coordinate, and provide suggestions to BP and USCG on-shore and off-shore sampling methods and procedures including Vessels of Opportunity





EPA Air Monitoring/Sampling Deepwater Horizon



Operational Overview of EPA Air Monitoring Efforts

- **Mobile Air Monitoring Assets**
 - ASPECT: Aerial Spectral Photometric Environmental Collection Technology
 - TAGA: Trace Atmospheric Gas Analyzer
 - Odor Complaints
- **Fixed Air Stations**





ASPECT

*Aerial Spectral Photometric
Environmental Collection
Technology*

- **Aerial Spectral Photometric Environmental Collection Technology (Flying Lab)**
 - Detect chemicals
 - Thermal imaging
 - High quality photographs
 - Could stay in the air a long time



TAGA

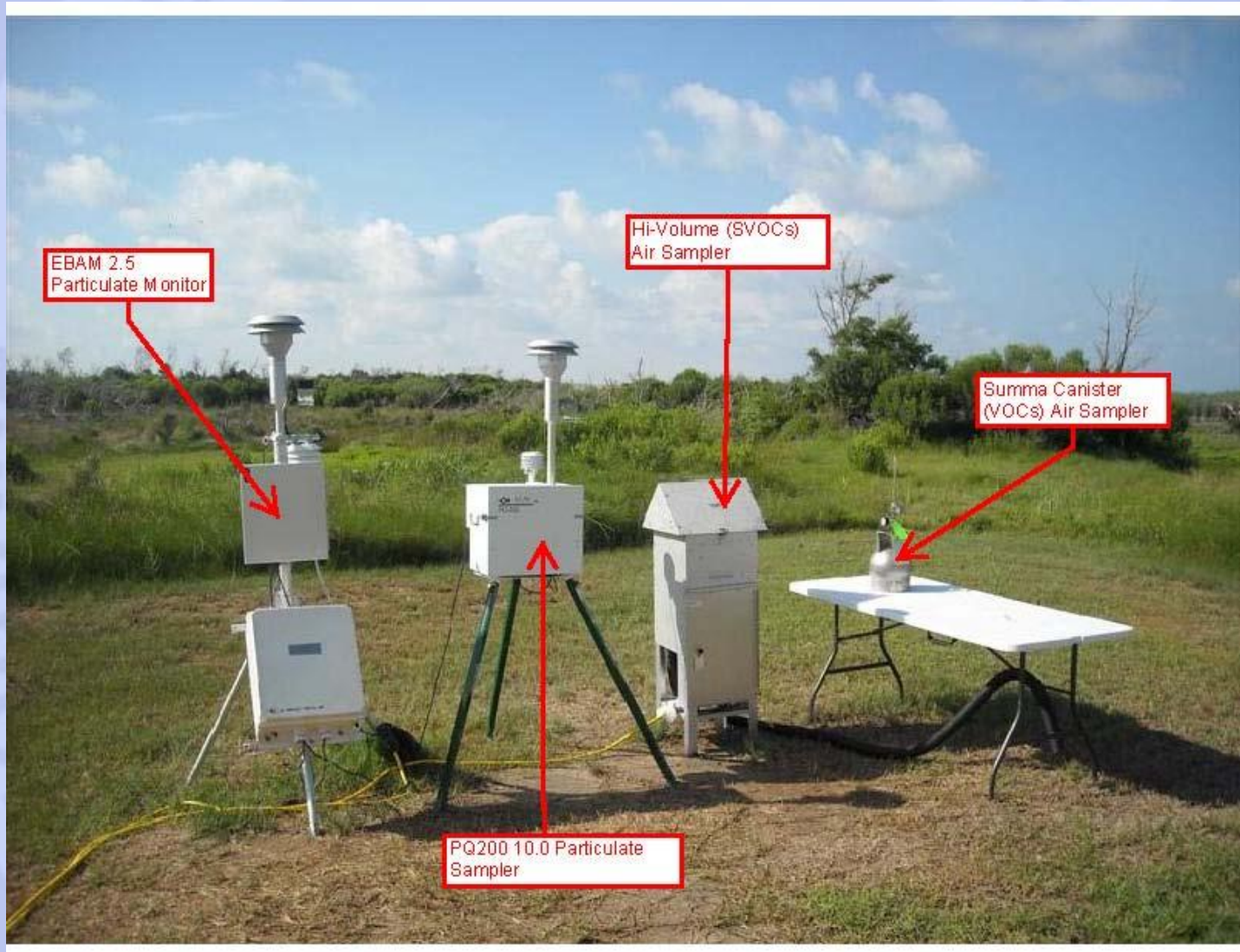
Trace Atmospheric Gas Analyzer



- Trace Atmospheric Gas Analyzer (Rolling lab)
 - Capable of collecting and analyzing samples while moving
 - Low detection limits
 - Real time data reporting



Fixed Station



EPA R5 H₂S



R5 Mobile Monitoring Trailer - note mast and inlet






H₂S pulsed fluorescence equipment and gas tanks



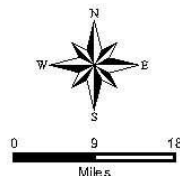
Note: No GPS boat track for Venice Division due to equipment malfunction.

Legend

Samples Collected

-  Air
-  Surface Water
-  Sediment

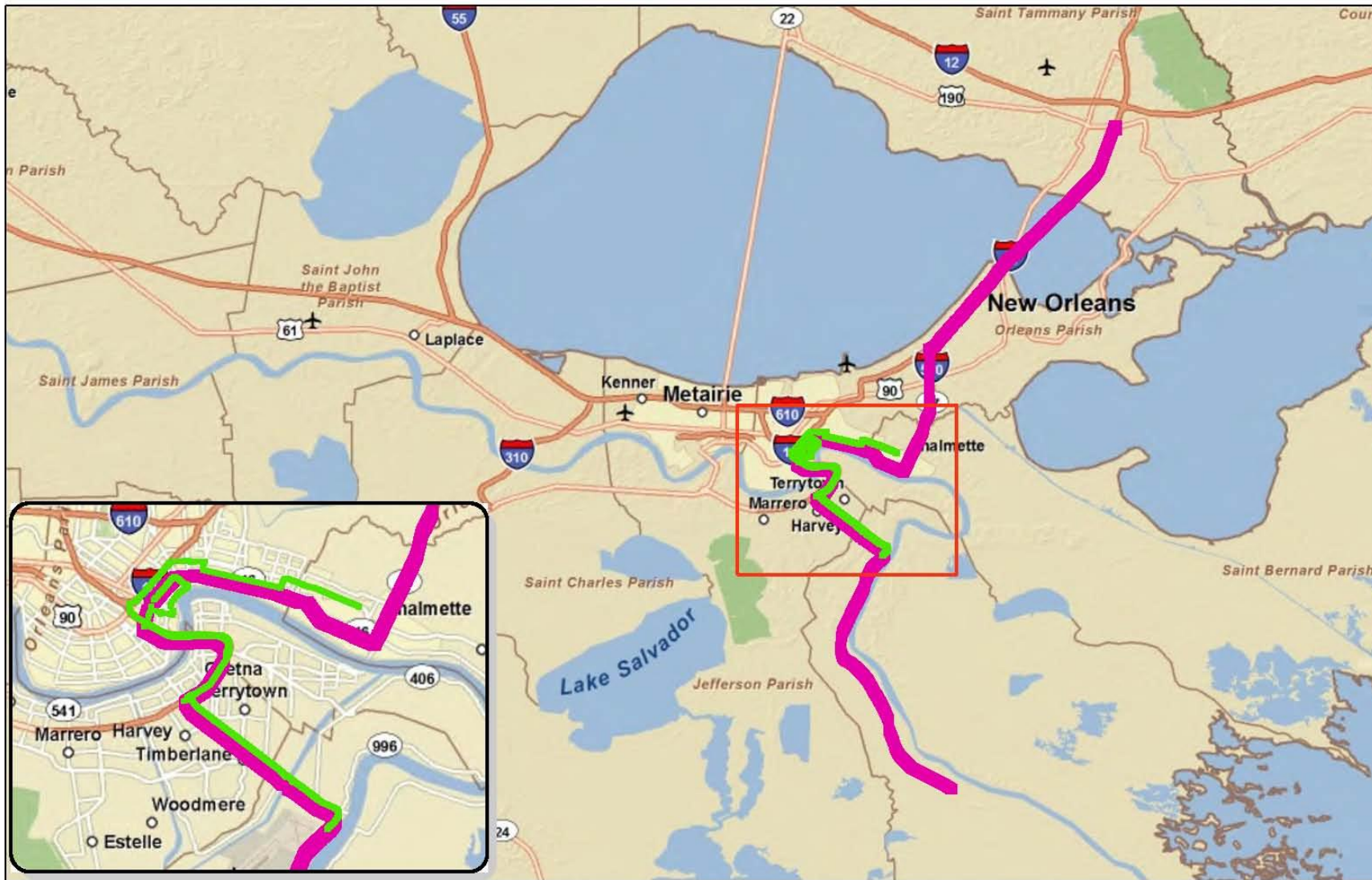
-  Cocodrie Division
-  Grand Isle Division
-  ASPECT Flight Path



**US EPA REGION 6
Air Monitoring and Sampling Locations
for 07/27/2010**

Deep Water Horizon Oil Spill
For Official Use Only

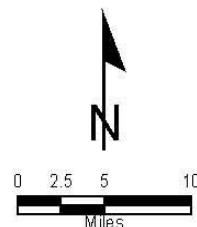




Legend

TAGA

- 4/30/2010
- 5/1/2010



**US EPA REGION 6
START-3**

TAGA Paths 4/30/2010

DATE: 5/2/2010	W.O.#	SCALE: 1 in = 9 miles
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Things to consider

- Location, Location, Location!
 - Power supply
 - Interferences
 - Security
 - Access
- Weather
- Duration
- Duplicate equipment



Oiled Wildlife Response

Department of Interior



Wildlife Hazing Methods



Bird Scare Cannons



Pyrotechnics

Hand launched bird
scare devices



Hurricane Ivan spill pre-emptive hazing



Scare Balloons



Breton National Wildlife Refuge

**June, 2004, during Tropical Storm Arlene
About 15 barrels of crude oil washed
onshore during high tides**





Post-rehab release of sandpipers oiled during Hurricane Ivan Spills

Difficult to reach – 20 miles offshore of Louisiana Mississippi River Delta



Wildlife Rescue Contractors



- Permits
- Oversight
- Three Contractors Available:

Gulf Coast



Oiled Wildlife
Response Team



East Coast



West Coast



IBRRC

International Bird Rescue Research Center





**About 700 Young Birds Died –
They Had Not Grown Their Feathers and Could Not Fly**





**An Entire Rehabilitation Center
was Constructed on the Mainland**





**Flushing the Digestive Tract with Fluids to
Remove Oil that May Have Been
Swallowed While Preening**

Washing a Bird with Detergent



BP Gulf of Mexico Oil Spill, April 2010



**U.S. Fish and Wildlife Service Deployed Personnel
from All Regions of the Country**





National
Geographic

2079 Oiled Birds Were Collected Alive

UNITED STATES



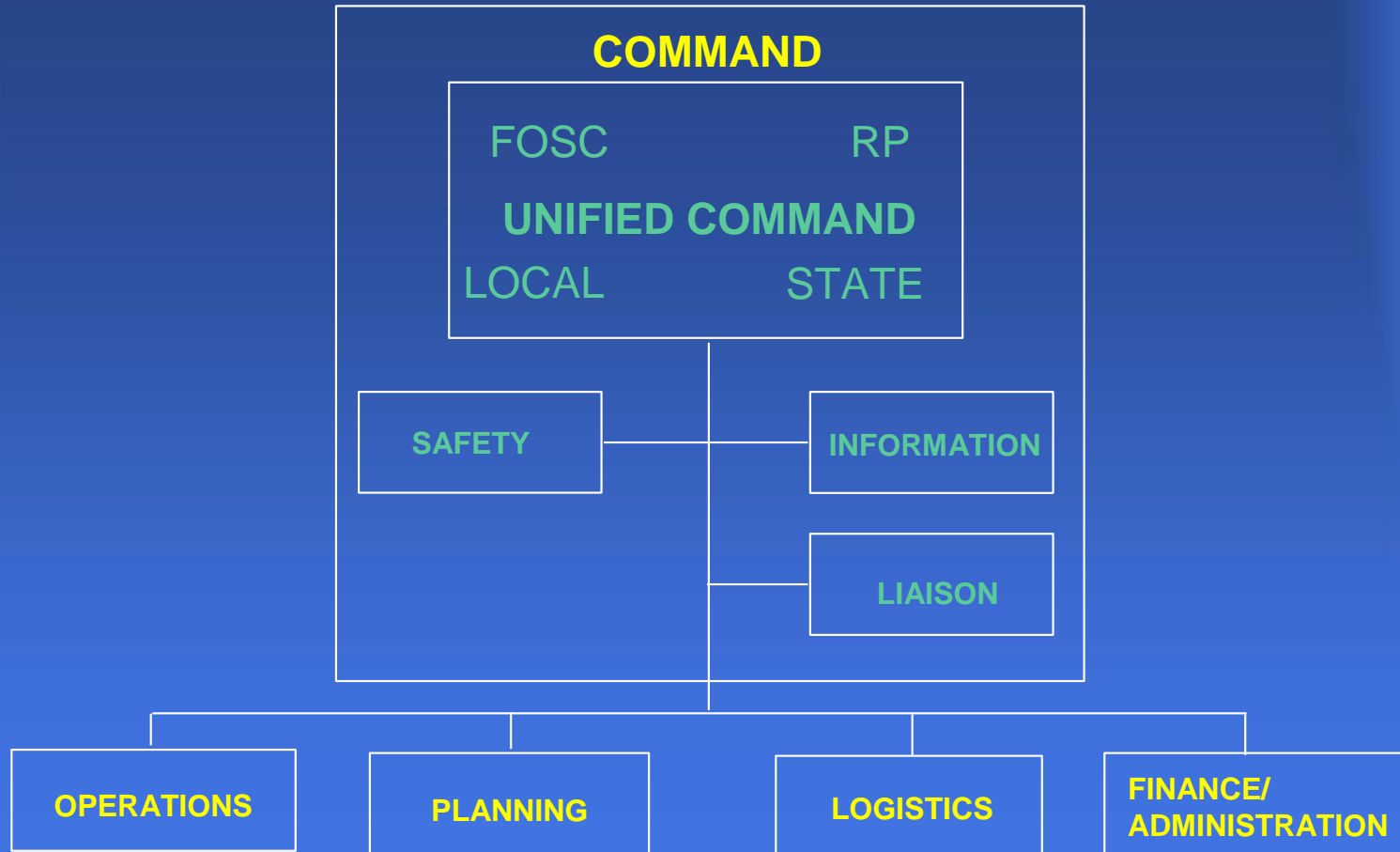
ENVIRONMENTAL PROTECTION AGENCY



**1,246 Birds Were Released Alive After Cleaning
and Rehabilitation**



Incident Command System/ Unified Command



Advantages to UC/ICS

- Scalable to all sizes of events
- Promotes integration of varying agencies
- Standardized nomenclature and forms
- Training readily available
- Familiar to all United States response agencies and organizations



Challenges to use of UC/ICS in large response actions

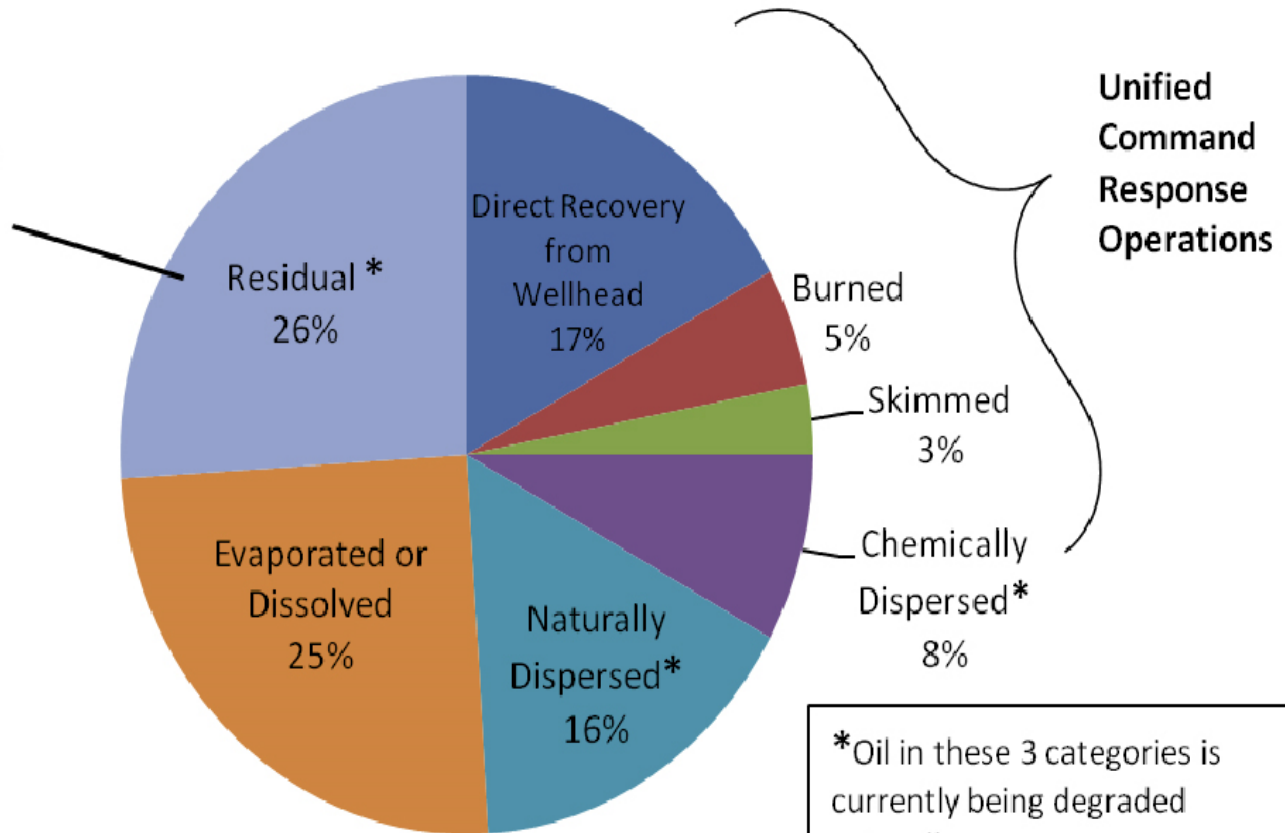
- Involvement of Senior Agency officials who are not familiar with UC/ICS
- Perception that Federal Authorities are “too close” to responsible party
- Conflicts with existing agency organizational structures
- Interagency “stove piping”
- Transitioning to Area Command



Deepwater Horizon Oil Budget

Based on estimated release of 4.9m barrels of oil

Residual includes oil that is on or just below the surface as light sheen and weathered tar balls, has washed ashore or been collected from the shore, or is buried in sand and sediments.



*Oil in these 3 categories is currently being degraded naturally.





Waste Management: Storage and Disposal

Guidelines and Things to Consider



Planning and Preparation

- Identify Regulatory Requirements
 - Regulatory Agency requirements
 - Roles and Responsibilities
- Develop waste characterization sampling plan
 - Number of Samples and Type of Analysis
 - Lab availability
- Identify recycle/reuse, disposal facilities and treatment options
- Develop tracking and reporting plan
 - Elements (type, quantity, location, deposition)
 - Procedures
 - Data management
 - Communication



Implementation

- Establish situational awareness
- Update the plan with specific conditions
 - Types, amounts, locations, H&S
- Develop incident specific strategies
 - Priorities
 - Available options (recycle, reuse, treatment, disposal)



Implementation

- Identify transportation routes
- Notify potential facilities
- Identify staging areas
 - Proximity
 - Socio-economic considerations



Implementation

- Respond, recover and stage waste
- Sample and characterize
- Exercise waste tracking and data management plans
 - Type, quantity, location, deposition
 - Develop database to organize data



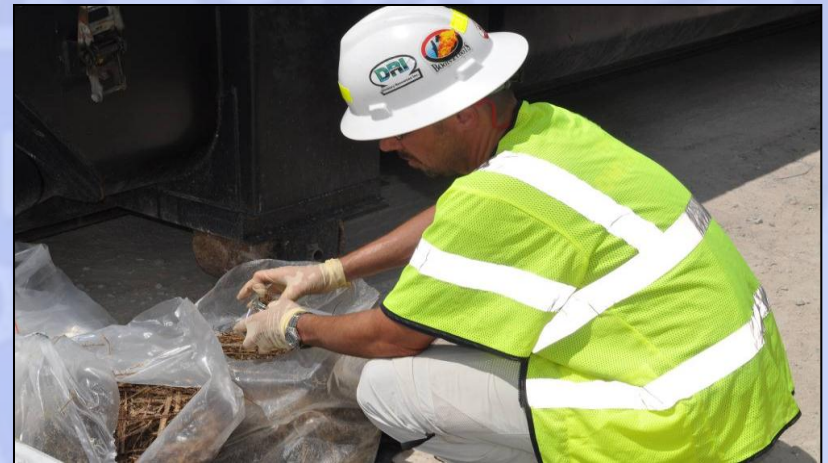
Implementation

- Determine the method
 - Reuse/Recycle
 - Treatment
 - Disposal



Oversight Considerations

- Initial plan review and approval
- Disposal facility compliance history
- Staging area inspections
- Independent tracking
- Duplicate sampling



101



Community Involvement

- Organize and present data
- Understand what it means
- Develop fact sheets
- Host availability sessions and public meetings
- Disseminate the data
- Address public concerns and complaints

