



Welcome to the CLU-IN Internet Seminar

CEC Training for OSCs...Oil Spill Response (Part 2)

Sponsored by: EPA Office of Superfund Remediation and Technology Innovation

Delivered: November 7, 2013, 1:00 PM - 4:00 PM, EST (18:00-21:00 GMT)

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Moderators:

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Visit the Clean Up Information Network online at www.cluin.org

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Housekeeping

- Entire broadcast offered live via Adobe Connect
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 - *Some materials may be available to download in advance, you are **recommended to participate live via the online broadcast***
- Audio is streamed online through by default
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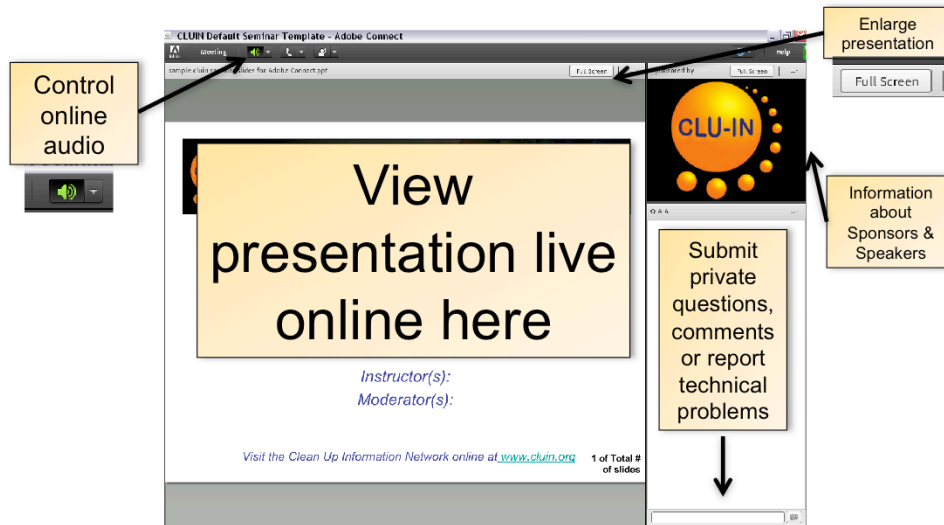
Although I'm sure that some of you have these rules memorized from previous CLU-IN events, let's run through them quickly for our new participants.

Please mute your phone lines during the seminar to minimize disruption and background noise. If you do not have a mute button, press *6 to mute #6 to unmute your lines at anytime. Also, please do NOT put this call on hold as this may bring delightful, but unwanted background music over the lines and interrupt the seminar.

You should note that throughout the seminar, we will ask for your feedback. You do not need to wait for Q&A breaks to ask questions or provide comments. To submit comments/questions and report technical problems, please use the ? Icon at the top of your screen. You can move forward/backward in the slides by using the single arrow buttons (left moves back 1 slide, right moves advances 1 slide). The double arrowed buttons will take you to 1st and last slides respectively. You may also advance to any slide using the numbered links that appear on the left side of your screen. The button with a house icon will take you back to main seminar page which displays our agenda, speaker information, links to the slides and additional resources. Lastly, the button with a computer disc can be used to download and save today's presentation materials.

With that, please move to slide 3.

New online broadcast screenshot





DISCLAIMER

The purpose of this presentation is to stimulate thought and discussion.

Nothing in this presentation is intended to supersede or contravene Federal Statutes, Regulations, or Official EPA Policies.



Instructors

- ◆ Earl Liverman is an EPA On-Scene Coordinator located in the Region 10 Coeur d'Alene, Idaho, field office. Earl has been with EPA since 1991 working in the Remedial and Emergency Response and Removal programs.
- ◆ Greg Weigel is an EPA On-Scene Coordinator in Region 10. Greg is located in a field office in Boise, Idaho, where he has served as an OSC for the past 18 years.
- ◆ Doug Kodama is a Section Chief in EPA Region 2, serving New York, New Jersey, Puerto Rico and the US Virgin Islands. Doug has been with EPA since 1986 working in the Emergency Response and Oil Spill preparedness and prevention programs.
- ◆ Jim Mullins works part time for TetraTech, a support contractor to EPA. Jim retired from the EPA Region 6 Dallas TX office after working 25 years in oil spill and hazardous waste response programs.



Oil Spill Response - II

Earl Liverman, Doug Kodama, Greg Weigel,
and Jim Mullins



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Introductions

- ◆ Instructors
 - ◆ Names
 - ◆ Work Experience
- ◆ Participants
(provided by instructors)



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- This course is intended to provide only a broad overview of many, but not all, concerns/issues potentially associated with the vast field of oil spill response



Course Overview

- ◆ Better understand the statutory and regulatory authority for responding to an oil spill
- ◆ Gain an awareness of the Oil Spill Liability Trust Fund
- ◆ Better understand the definition of oil and the fate and behavior of oil in the environment
- ◆ Gain an awareness of the effect of oil spills on human health, environment, and wildlife
- ◆ Gain an awareness of the environmental and human factors affecting cleanup decisions



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Course Overview . . .

- ◆ Better understand the main tasks an OSC is responsible for during an oil spill response
- ◆ Better understand the statutory and regulatory thresholds for Response to Oil Spills
- ◆ Gain an awareness of oil spill response techniques
- ◆ Better understand how to dispose of oil and oily debris



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AGENDA – Day 1

Wednesday, 6 November 2013

- ◆ Course Overview
- ◆ I. Statutory and Regulatory Authority
- ◆ II. Oil Spill Liability Trust Fund
- ◆ III. What is Oil
- ◆ IV. Fate and Behavior of Oil in the Environment
- ◆ V. Factors Affecting Response and Cleanup Decisions





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- Go fast . . . ask students to read . . . 20 seconds . . . red font is where we are now

AGENDA – Day 2

Thursday, 7 November 2012

- VI. Statutory and Regulatory Authority
Thresholds for Response to Oil Spills
- VII. Oil Spill Management
- VIII. Oil Spill Response Techniques
- IX. Disposal of Oil and Oily Debris
- X. Summary Statement







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VI. Statutory and Regulatory Thresholds for Response to Oil Spills



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- Comment regarding the trilogy of courses v. a stand alone course and the need to address the “basics”

Statutory and Regulatory Authority

- ◆ Clean Water Act Section 311 (c)
- ◆ Executive Order 12777
- ◆ National Response Framework
- ◆ National Oil and Hazardous Substances Pollution Contingency Plan
 - ◆ Subparts B and D
 - ◆ Appendix E to Subpart D



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• **No. 1:** Addresses pollution from oil discharges and hazardous substance releases; authorizes FOSCs to:

- **Remove or arrange for the removal** of a discharge and to **mitigate or prevent a substantial threat** of a discharge
- **Direct or monitor** all Federal, State, and private actions
- Remove and, if necessary, destroy a vessel that is discharging or threatening to discharge
- **Consult** with affected trustees
- Determine when the removal is **complete**

• **No. 2:** Delegated the responsibility vested in the President by CWA/OPA to various agencies. Specified actions to be followed in the event of an accidental discharge or release of oil or a hazardous substance.

• **No. 3:** Guide to how the Nation conducts all-hazards response:

- Engaged partnership
- Tiered response
- Scalable, flexible, and adaptable operational capabilities
- Unity of effort through unified command
- Readiness to act balanced with an understanding of risk

• **No. 4:** Provides the federal government with a blueprint for responding to discharges of oil and releases of hazardous substances

Decision to Initiate Action

- ◆ Federal Removal Authority:

- ◆ Is the substance involved an oil?
CWA § 311(a)(1)
- ◆ Is there a discharge or substantial threat of a discharge?
CWA § 311(c)(1)
- ◆ Is the discharge or substantial threat of discharge into navigable waters or adjoining shorelines?
- ◆ Are removal actions consistent with the NCP?
CWA § 311(c)(3):



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- **No. 1:** CWA § 311(a)(1); OPA § 1001; SPCC 40 CFR § 112.2; NCP § 300.5
- **No. 2:** NCP § 300.5. Substantial threat: 33 CFR § 154.1020; SPCC 40 CFR § 112.1
- **No. 3:** Current definition CWA § 402 & 404; EPA and USACE published Guidance to Identify Waters Protected by CWA in Federal Register; comments received, undergoing internal review
- **No. 4:** NCP § 300.310. Actions shall be taken to prevent, minimize, or mitigate threats(s) to the public health or welfare of the US or the environment, and may include but are not limited to:
 - Analyzing water samples to determine the source and spread of the oil
 - Controlling the source of discharge
 - Measuring and sampling
 - Source and spread control or salvage operations
 - Placement of physical barriers to deter the spread of the oil and to protect natural resources and sensitive ecosystems
 - Control of the water discharged from upstream impoundment
 - Use of chemicals and other materials in accordance with subpart J to restrain the spread of the oil and mitigate its effects

Summary of Waters of the U.S.

- ◆ Traditional navigable waters
- ◆ Wetlands adjacent to traditional navigable waters
- ◆ Non-navigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow year-round or have continuous flow at least seasonally
- ◆ Wetlands that directly abut such tributaries



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Summary of Waters of the U.S. . . .

- ◆ The following waters based on a fact-specific analysis to determine whether they have a significant nexus with a traditional navigable water:
 - ◆ Non-navigable tributaries that are not relatively permanent
 - ◆ Wetlands adjacent to non-navigable tributaries that are not relatively permanent
 - ◆ Wetlands adjacent to but that do not directly abut a relatively permanent non-navigable tributary

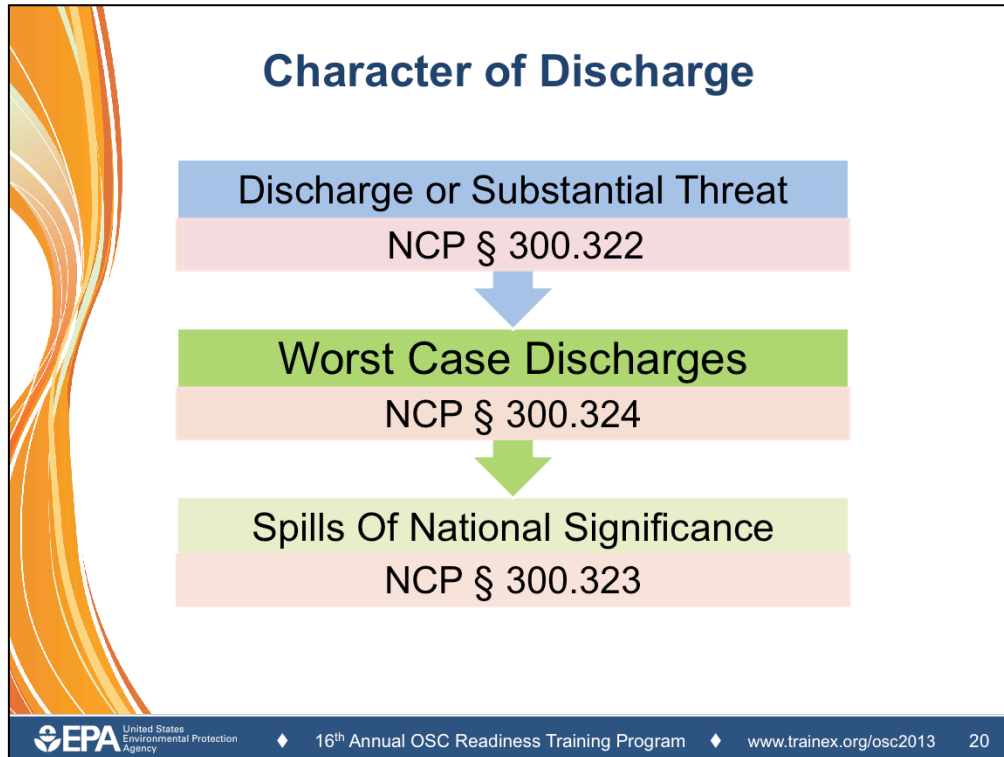


Summary of Waters of the U.S. . . .

- ◆ The following features are not generally considered:

- ◆ Swales or erosional features
- ◆ Ditches excavated wholly in and draining only uplands and that do not carry a relatively permanent flow





- **No. 1:** Officially classify the size of discharge – minor, medium, major
- **No. 2:** In case of off-shore facility or on-shore facility, means largest foreseeable discharge in adverse weather conditions; in case of a vessel, a discharge in adverse weather conditions of its entire cargo
- **No. 3:** Some discharges that are classified as a substantial threat to public health or welfare of the US may be further classified as a spill of national significance

Substantial Threat Determination

- ◆ FOSC makes the determination of substantial threat [NCP § 300.322(a)]
- ◆ Removal authority is not discretionary (i.e., NCP re “shall”)
- ◆ Must document decisions



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- Sackett Decision re administrative record

Substantial Threat Determination . . .

💧 33 CFR 154.1020:

Substantial threat of a discharge means any incident or condition involving a facility that may create a risk of discharge of oil. Such incidents include, but are not limited to storage tank or piping failures, above ground or underground leaks, fires, explosions, flooding, spills contained within the facility, or other similar occurrences



Substantial Threat Determination . . .

- ◆ **40 CFR 112.1 General applicability.**

. . . which due to its location, could reasonably be expected to discharge oil in quantities that may be harmful, as described in part 110 of this chapter, into or upon the navigable waters of the United States or adjoining shorelines, or into or upon the waters of the contiguous zone







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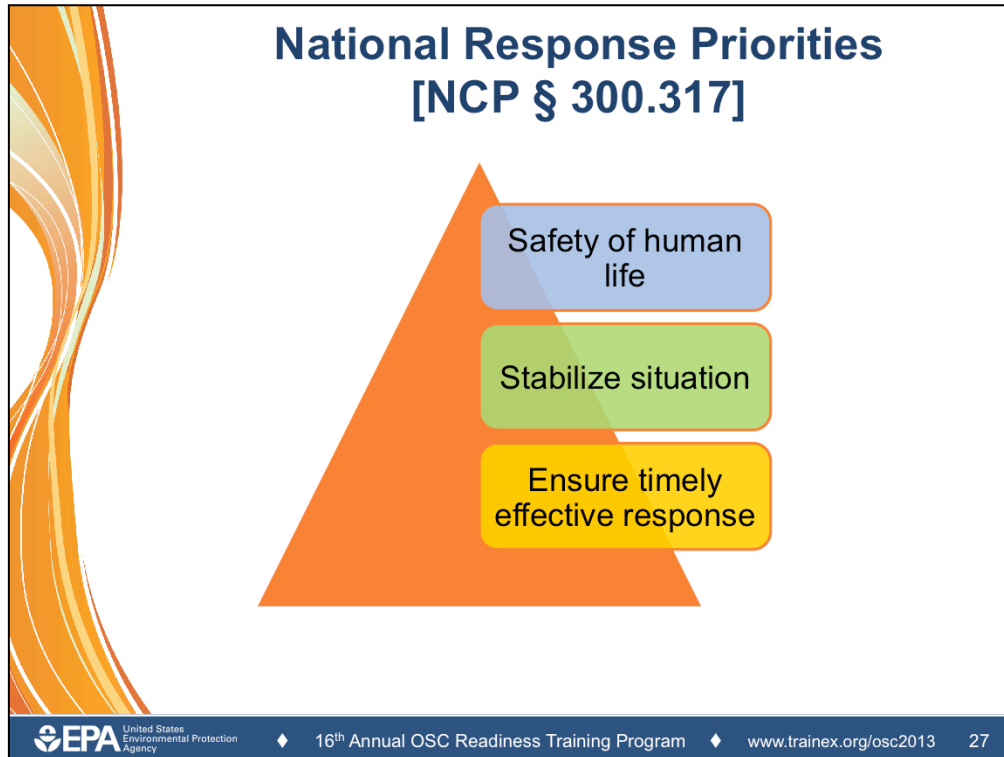
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- ◆ VI. Statutory and Regulatory Authority Thresholds for Response to Oil Spills
- ◆ VII. Oil Spill Management
- ◆ VIII. Oil Spill Response Techniques
- ◆ IX. Disposal of Oil and Oily Debris
- ◆ X. Summary Statement



VII. Oil Spill Management





→ Not sure what to list on ICS Form 202 (Incident Objectives)?

- **No. 1:** Safety of human life, including any search and rescue efforts in the general proximity of the discharge and safety of response personnel
- **No. 2:** Stabilize the situation to prevent the event from worsening
- **No. 3:** Use all necessary containment and removal tactics in a coordinated manner to ensure a timely, effective response that minimizes adverse impact to the environment
- **No. 4:** Other priorities on a site-specific basis

General Pattern of Response [NCP § 300.320]



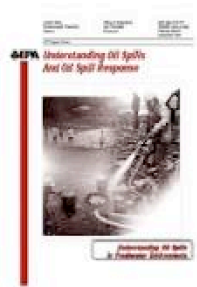
- ◆ OSCs are responsible for directing response actions and coordinating all other efforts at the scene of a discharge or spill
- ◆ OSCs work in partnership with other federal, state, local, and private response agencies, as well as Tribes
- ◆ OSCs main tasks include assessment, determining response management framework, operational administration, monitoring, determining need for response assistance, determining when response is complete, and documenting and reporting

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- **No. 1:** Emphasize directing response actions and coordinating all other efforts
- **No. 2:** Emphasize partnership
- **No. 3:** Emphasize broad diversity of tasks

Phases of Response

- ◆ Four phases of response:
 - ◆ Discovery or Notification [NCP § 300.300]
 - ◆ Preliminary Assessment [NCP § 300.305]
 - ◆ Containment, countermeasures, cleanup, and disposal [NCP § 300.310]
 - ◆ Documentation and Cost Recovery [NCP § 300.315]
- ◆ In addition to running the incident, FOSC also has other significant responsibilities such as:
 - ◆ Keeping the EPA chain-of-command informed
 - ◆ Coordinate efforts with other agencies and third parties [NCP 300.155(a)]
 - ◆ Public Information and Community Relations [NCP § 300.155(b)]
 - ◆ Worker Health and Safety [NCP § 300.150, .185(c), .317]



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• NCP delineates four phases of response for oil spill operations which may run sequentially or concurrently depending on the magnitude or complexity of the incident

• The following discussion breaks down these four phases into greater detail

Assessment

- Evaluate the size and nature of spill and potential hazards [NCP § 300.305 & § 300.320]
- Determine the need for personnel, equipment, and other resources to promptly and effectively respond to the spill



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- **No. 1:** Environmental considerations include:

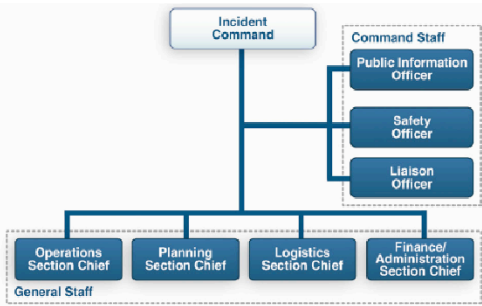
- Is type of oil spilled a lighter oil or is it a heavier oil? (API gravity less than 10 or greater than 10?)
- Is type of oil spilled a lighter oil or is it a heavier oil?
- Is the water standing or slow-moving or is it a fast flowing?
- Is the habitat freshwater or marine?
- What is the type and sensitivity of biological communities?

- **No. 2:** Operational considerations include:

- Has a potentially responsible party been identified and can the PRP handle the incident?
- Are there other local, state, and/or tribal authorities that can manage the incident?
- Has discharge been stopped?

Response Management Framework

- ◆ NRF mandates the use of ICS for responses to all hazards including response to oil spills.
- ◆ Establishing an effective response management strategy early and using the ICS planning process is pivotal to a unified and effective response
- ◆ Determine the framework for the response management structure [NCP § 300.305(c)]



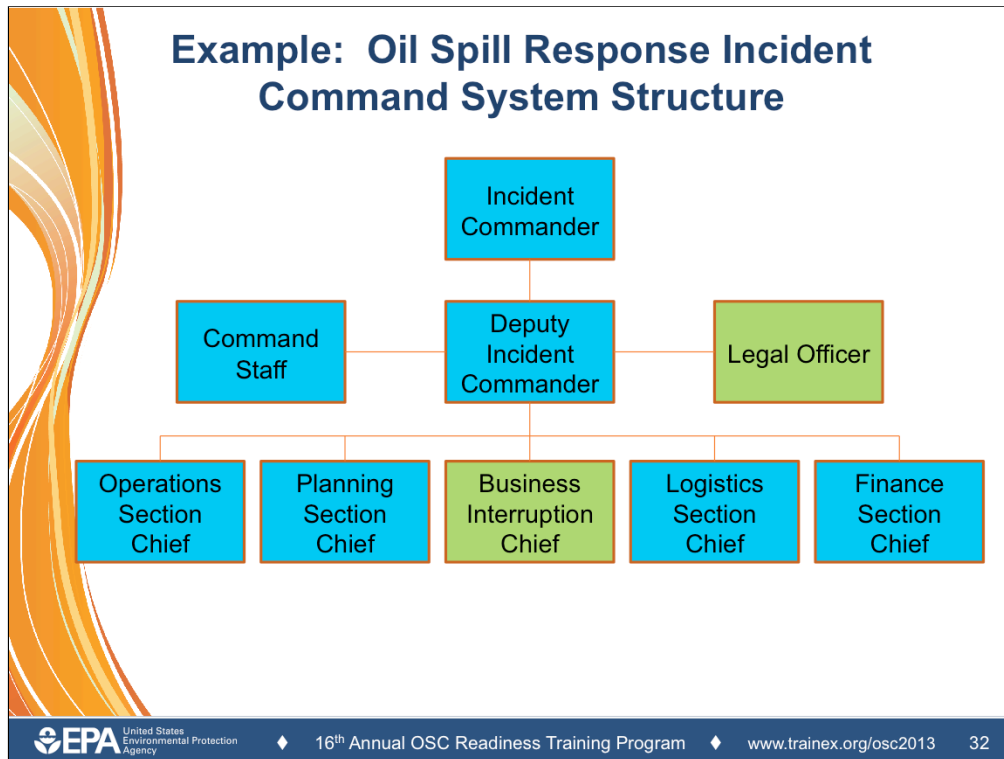
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graph TD
    IC[Incident Command] --- CS[Command Staff]
    IC --- GS[General Staff]
    CS --- PIO[Public Information Officer]
    CS --- SO[Safety Officer]
    CS --- LO[Liaison Officer]
    GS --- OSC[Operations Section Chief]
    GS --- PSC[Planning Section Chief]
    GS --- LSC[Logistics Section Chief]
    GS --- FASC[Finance/Administration Section Chief]
  
```

The diagram illustrates the Incident Command System (ICS) structure. At the top is the Incident Command box. Below it, the Command Staff is shown in a dashed box, containing the Public Information Officer, Safety Officer, and Liaison Officer. Below the Command Staff is the General Staff, also in a dashed box, which includes the Operations Section Chief, Planning Section Chief, Logistics Section Chief, and Finance/Administration Section Chief. All staff are connected to the Incident Command box.

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- **No. 1:** National Incident Management System
 - Is flexible and modular which facilitates scalability
 - Is standardized to improve integration and connectivity
- **No. 2:** Single Incident Commander—unusual circumstance
 - Incident occurs within single jurisdiction; no jurisdictional or functional agency overlap
- **No. 3:** Unified Command—more common circumstance
 - Enables agencies with jurisdictional authority and functional responsibility to jointly provide management direction; each participating agency maintains its authority, responsibility, and accountability
 - Command and General Staff Organization is situationally dependent



- Note potential presence of legal officer and business interruption section chief
- Legal officer: advice and direction on matters such as claims, legal requirements relating to emergency response, investigations, major procurement contracts, insurance coverage, and review of information releases to media, government agencies, public
- Business interruption section chief: identify, contact, and consult with all internal and external groups whose business is impacted by the incident; determine staffing needs for impacted business while continuing to manage daily operations; address and communicate agreements for prior commitments or contracts that are related to the impacted business
- Branches, Divisions/Groups, Single Resource/Strike Teams/Task Forces created on an as needed basis

Operational Administration

- ◆ Identification of Potentially Responsible Party
- ◆ Administrative Orders
 - ◆ CWA § 311(c)
 - ◆ CWA § 311(e)



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- **No. 1:** Must promptly identify Potentially Responsible Parties – recall PRPs can conduct the cleanup action and preserves OSLTF for other activities

- **No. 2:** 311(c) and 311(d) orders are similar, but not identical

- 311(c) → respond to discharges and threatened discharges
- 311(e) → orders protecting public health

Operational Administration . . .

- ◆ Notice of Federal Interest (NOFI)
- ◆ Notice of Federal Assumption (NOFA)
- ◆ Due Process- cost recovery



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- **No. 1:** FOSC is required to inform the responsible party of the U.S. Government's legal requirements when a pollution incident occurs; FOSC role is **primarily oversight** unless RP fails to properly carry out removal action

- **No. 2:** FOSC is required to notify the RP if they are **improperly carrying out the action**; FOSC then **assumes the response activity** and the RP is liable for cost incurred by the federal government

- Notices should contain:

- Location and time of discharge
- Notice that the person is the suspect source
- Reference to the CWA and an explanation of federal government's cleanup role
- Notice of person's possible financial responsibility to federal government if cleanup performed by FOSC
- Identity of OSC

Operational Administration . . .

- ◆ Access
 - ◆ Private
 - ◆ Public (administering agency)
 - ◆ 4th Amendment to Constitution

- ◆ Contracts
 - ◆ START
 - ◆ ERRS
 - ◆ PRFAs





NPS Photo



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•Securing legal Access to private and public property is Constitutional Law. Trespass is serious. This topic is beyond the scope of this class, but you better get it right. Another 4 hr course devoted to this topic.

•Contracts:

- Superfund Technical Assessment & Response Team (START)

- Emergency and Rapid Response Services (ERRS)

- Pollution Removal Funding Authorization - government entity only including federally recognized tribes

- May include RP contractor . . . under what circumstances

Federal Oversight

- ◆ Monitor actions taken to control and cleanup a spill to make sure they are appropriate [NCP § 300.320(a)(2)(iii)]
- ◆ Monitoring can be conducted from the Site when necessary, or from an agency if the situation appears to be under control



Federal Oversight . . .

- ◆ Federal Oversight vs. Federal “Takeover”
 - ◆ Is the Responsible Party taking action that is:
 - ◆ Timely
 - ◆ Technically appropriate
 - ◆ Consistent with Statute and Regulations
 - ◆ Experience and Mentoring



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- § 300.305(d) for a discussion of oversight v. takeover or required

Response Assistance

- ◆ Determine whether federal assistance will be necessary to help control and contain spill
- ◆ If federal resources are required:
 - ◆ Oil Spill Liability Trust Fund [NCP § 300.335]
 - ◆ National & Regional Response Teams [NCP § 300.145]
 - ◆ Special Forces/Teams [NCP § 300.145]
 - ◆ Federal agencies [NCP § 300.175]



Response Assistance . . .

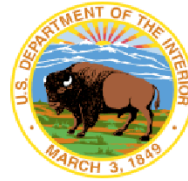
- ◆ State and local participation [NCP § 300.180]
- ◆ Nongovernmental participation [NCP § 300.185]



- Volunteers

Response Assistance . . .

- ◆ Federal Trustees [NCP § 300.600]
- ◆ State Trustees [NCP § 300.605]
- ◆ Tribal Trustees [NCP § 300.610]



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- Federal Trustees: Agriculture, Commerce, Defense, Energy, Interior
- State Trustees: Can be Governor, Executive Office, Department

Public Information and Community Relations

- ◆ Ensure that all appropriate public and private are kept informed and that their concerns are considered throughout a response [NCP § 300.155(a)]



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- Note widely varying range of contact with public

Worker Health & Safety

- ◆ Safety of human life is paramount during all response efforts at the scene of a discharge as well as the safety of all response personnel
- ◆ FOSC primarily responsible for addressing worker health and safety at a response scene [NCP § 300.150 and 29 CFR 1910.120]
- ◆ FOSC shall restrict volunteers from on-scene operations if dangerous conditions exist [NCP § 300.185(c)]



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Documentation & Reporting

- Must document and report all activities that take place during and after a spill [§ 300.315]
- POLREPS/SITREPS [§ 300.135(m)]



- **No. 1:**

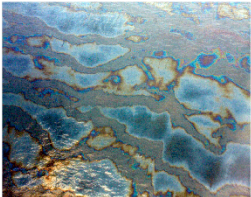
- Comment regarding cost recovery
- Comment regarding accurate historical record
- Comment regarding Sackett decision

- **No. 2:**

- NCP requires OSC to submit pollution reports to the RRT and other appropriate agencies as significant developments occur during response actions
- OSCs prepare POLREPs at initiation and completion of an emergency response (CERCLA or OPA) or removal activity and at regular intervals in between – daily, weekly, monthly, or as the need arises due to changes at the site
- POLREP serves as OSCs record of response actions, notifications, and decisions made to support the response action
- POLREP may be drafted by others (state, contractor), but OSC approves and distributes

Federal Cleanup Standard

- ◆ Discharges of oil that:
 - ◆ Violate applicable water quality standards
 - or*
 - ◆ Cause a film or sheen upon or discoloration of the surface of the water or adjoining shorelines
 - or*
 - ◆ Cause a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines



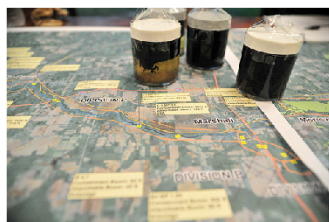
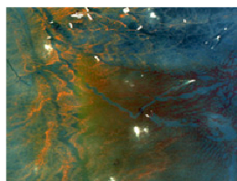
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- The response is complete if the following 40 CFR Part 110.3 (Discharge of Oil) are **NOT** met

- Are these criteria absolute?

Cleanup Endpoints

- Cleanup endpoints can be:
 - Qualitative which are based primarily on visual, olfactory, or tactile observations and do not necessarily require collection of analytical chemistry data
 - Quantitative which rely on measurements or quantitative data, as opposed to qualitative data such as categorical observations (e.g., sheen or no sheen)



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- Image of NASA Deepwater Horizon Spill
- Enbridge Oil Spill samples
- Texas State standard . . . <1% TPH in soils (when “adjacent shoreline” is tenuous); note that biodegradation is generally good when TPH <5% (generalization)

Examples of Qualitative Cleanup Endpoints

- ◆ There is no longer any detectable oil present on the water, adjoining shorelines, or places where it is likely to reach the water again
- ◆ Oil visible but no more than background
- ◆ Oil no longer releases thick rainbow sheen that will affect wildlife, sensitive areas, or human health
- ◆ Further removal operations would cause more environmental harm than the oil to be removed
- ◆ Cleanup measures would be excessively costly in view of their insignificant contribution to minimizing a threat to the public health or welfare, or the environment



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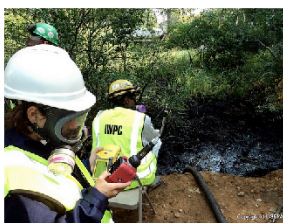
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- This is difficult and requires good judgment and experience

Examples of Quantitative Cleanup Endpoints

- ◆ Oil on surface water, groundwater, soil, or sediment does not exceed background concentrations for the constituents or compounds of concern
- ◆ Oil on surface water, groundwater, soil, or sediment does not exceed predetermined concentrations for the constituents or compounds of concern



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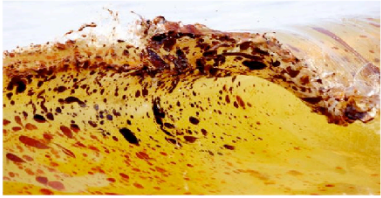


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Issues Affecting the Selection Of Endpoints

- ◆ Type and amount of oil spilled
- ◆ Type of shoreline
- ◆ Value of habitat or use of the segment and the timing of that use
- ◆ Technical and operational feasibility of cleanup activities
- ◆ Anticipated rate of natural attenuation
- ◆ Environmental influences such as weather
- ◆ Perceptions of risk-Regional differences



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- Process of determining appropriate endpoints range from a relatively simple one to one that is difficult and complex and involves several rounds of negotiation

- Often requires a compromise due to the wide range of factors that come into play and the varied interests of national, state, regional, local, and tribal government agencies, political groups, the media, and the local population that live in the affected area

Practical Considerations for Achieving Cleanup

- ◆ Type and amount of oil spilled
- ◆ Environmental sensitivities
- ◆ Consultation
- ◆ Widely varying cleanup standards



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- Decision to bring cleanup operations to a close depends on a wide range of different considerations and often there are conflicting concerns to be resolved and overcome
- The most frequently encountered conflict likely arises from a demand to remove every last drop of oil
- Ask → What percent of spilled oil have you recovered (individual experience)?

Practical Considerations for Achieving Cleanup . . .

- ◆ Long-term deployment of absorbent materials
- ◆ Not all spilled oil will be recovered
- ◆ Weather
- ◆ Natural attenuation



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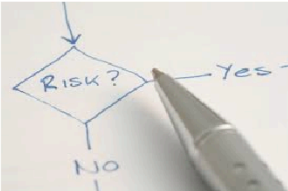


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Practical Considerations for Determining When the Cleanup is Complete When Not All Spilled Oil is Recoverable

- ◆ Technical and operational feasibility of investigation and cleanup
- ◆ Is there a balance between cost in relation to the added degree of protection or reduction of risk afforded by additional cleanup?
- ◆ Is there a state or other entity that has the capability to assume responsibility for the cleanup action?
- ◆ Anticipated rate of natural removal processes



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- **No. 1:** Is it practicable at what cost (cost balancing)
- **No. 2:** Question is more than a technical or logistical issue: potentially has profound social and political dimensions
 - Perceptions of risk can vary depending on whether risk is:
 - Familiar v. unfamiliar
 - Visibility of threat
 - Catastrophic v. non-catastrophic
 - Character of affected resource
 - Equal v. unequal affects

Practical Considerations for Determining When the Cleanup is Complete When Not All Spilled Oil is Recoverable . . .

- ◆ Institutional constraints/pressures
- ◆ Is the remaining oil likely to damage environmentally sensitive resources?
- ◆ Does it interfere with the aesthetic appeal and amenity use of the shoreline?
- ◆ Is the oil detrimental to economic resources or disrupting economic activities?







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- ◆ IX. Disposal of Oil and Oily Debris
- ◆ X. Summary Statement



IX. Oil Spill Response Techniques



Selecting Response Options

- ◆ Benefits and impacts of response options depend upon incident-specific conditions
- ◆ Incident-specific feasibility considerations include
 - ◆ Safety
 - ◆ Type and amount of product released
 - ◆ Access and location of release
 - ◆ When release of product occurred
 - ◆ River/Estuary system
 - ◆ Authorization
- ◆ Specific response options vary based on affected media



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- Insert statement somewhere noting emphasis on surface water v. soil and groundwater



Cleanup Alternatives - Soil

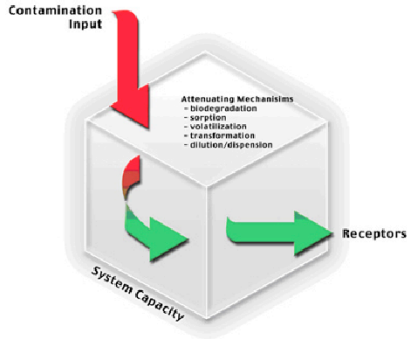
- ◆ Natural Attenuation and Monitoring
- ◆ Bioremediation
- ◆ Bioventing
- ◆ Incineration
- ◆ Land Farming
- ◆ Land Spreading
- ◆ Soil Vapor Extraction
- ◆ Soil Washing

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- **Soil cleanup of oil must endanger water**.....else you have no authority

Cleanup Alternatives - Groundwater

- ◆ Monitored Natural Attenuation
- ◆ Permeable Reactive Barrier
- ◆ Chemical Oxidation
- ◆ Bioremediation
- ◆ Air sparging
- ◆ Pump-and-Treat



The diagram illustrates a groundwater system as a 3D box. A red arrow labeled 'Contamination Input' points into the top of the box. Inside the box, a list of 'Attenuating Mechanisms' is shown: biodegradation, sorption, volatilization, transformation, and dilution/dispersion. A green arrow labeled 'System Capacity' points from the bottom left of the box towards the right. Another green arrow points from the right side of the box to a label 'Receptors'.

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- Figure applies to natural attenuation
- **GW cleanup of petroleum requires that surface water be endangered . . . groundwater supply for drinking water is not material to CWA . . . its all about surface water**

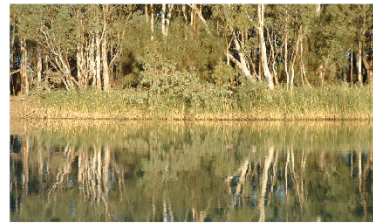


Cleanup Alternatives – Surface Water

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- Make statement regarding emphasis given surface water

Natural Attenuation and Monitoring



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- Basically a “no action” alternative that allows for oil to be removed and degraded by natural means such as
 - Evaporation (removal of lighter-weight components)
 - Photooxidation (sunlight reacts with oil components leading to breakdown of more complex compounds into more simpler compounds)
 - Biodegradation (microorganisms oxidize petroleum hydrocarbons)

Barriers/Berms



Barriers/Berms . . .



Debris Removal



Flooding (deluge)



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- Photo of workers and a small ship spraying multiple streams of water

Flushing (high pressure)



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- Photo of workers spraying water on riprap

Flushing (high pressure, hot-water)



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- Photo of workers spraying heavily oiled rocks with hot water

Flushing (low-pressure)



- Photos of workers spraying water on rocky shore

Manual Oil Removal/Cleaning



Mechanical Oil Removal



Physical Herding



Vacuum



- Photo of worker with vacuum hose sucking up oil from shoreline

Vegetation Cutting/Removal



Containment and Recovery of Oil Following a Spill

- ◆ Containment: Used to restrict the spread of oil and allow for its recovery, removal, or dispersal

- Booms
- Dams
- Fences

- ◆ Recovery: Once an oil spill has been contained, efforts to remove the oil from water can begin

- Booms
- Skimmers
- Sorbents



Containment

- Booms
 - Commercial
 - Improvised
- Dams
 - Under flow
 - Over flow
- Fences



Commercial Booms

- ◆ Internal Flotation
- ◆ Spring Loaded
- ◆ Self Inflatable
- ◆ Fire Boom
- ◆ Shoreline Boom
- ◆ Absorbent



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Commercial Booms . . .

◆ Internal Flotation



Commercial Booms . . .

- Spring Loaded



Commercial Booms . . .

- Self Inflatable



Commercial Booms . . .

🔥 Fire Boom



Commercial Booms . . .

- ◆ Shoreline Boom



Commercial Booms . . .

- ◆ Absorbent



Commercial Boom

Advantage

- ◆ Easy and quick to deploy
- ◆ Good design
- ◆ Reusable



Disadvantage

- ◆ Storage & Transportation
- ◆ High winds, waves, fast current
- ◆ Decontamination Costs
- ◆ Disposal issues



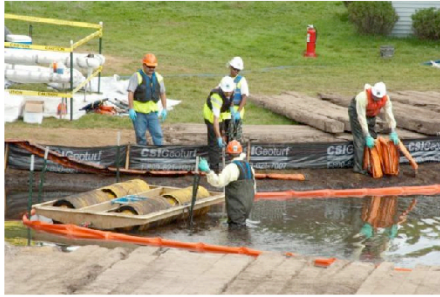
Improvised Boom

- ◆ Plastic Sheeting & fire hose
- ◆ Telephone Poles



Functions of Boom

- ◆ Protection
- ◆ Deflection
- ◆ Containment



Functions of Boom . . .

- ◆ Protection:

- ◆ Shoreline
- ◆ Creeks
- ◆ Wetlands
- ◆ Water intakes



Functions of Boom . . .

- ◆ Deflection
 - ◆ Move oil from one side to the other side
 - ◆ Around an island or object
 - ◆ To a collection point



Functions of Boom . . .

- ◆ Containment:
 - ◆ Catch or hold oil for collection using various techniques



Dams

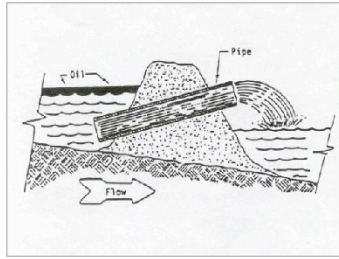
- Under flow
- Weir



Quickrete dam



Under Flow Dams



Under Flow Dam Under Construction

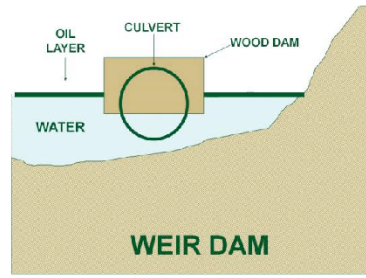
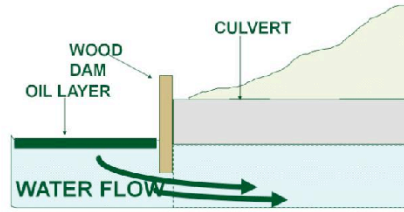


Fixed Under Flow Dam



Weir Dams

SIDE VIEW OF A WEIR DAM



Gate Valves



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Pre existing gates

Weir



Straw Log Containment



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Bales come in large round, small round, small rectangle, large rectangle

Straw Bales



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Straw Bales in Wire



Fences



Other Techniques

Gabion Snare



Screen capture



Recovery of Oil

- ◆ Skimmers
 - ◆ Portable
 - ◆ Boats
- ◆ Sorbent Materials



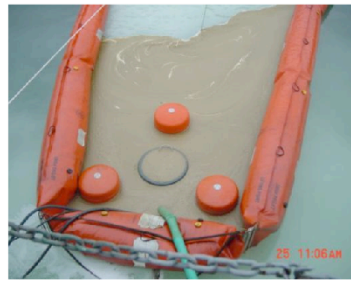
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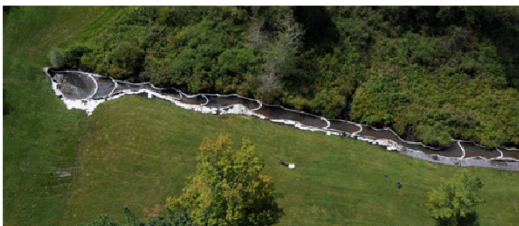
Portable Skimmers



Boat Skimmers



Sorbent Materials



Alternative Countermeasures

- ◆ Chemical Dispersants
- ◆ Biological Agents
- ◆ In-situ Burning



Response Options to Protect Wildlife

- ◆ Keep the oil away from the resource
- ◆ Keep the resource away from the oil
- ◆ Capture and treat oiled wildlife







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IX. Disposal of Oil and Oily Debris



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- Gulf oil soaked debris heading for local landfill.

What types of wastes are collected from response and cleanup activities?

- ◆ From shoreline cleanup:
 - ◆ Oiled debris, oiled solid materials such as sand, wood, and vegetation, used personal protective equipment (PPE), disposal equipment
 - ◆ From oil containment and recovery operations
 - ◆ Oil and oily water, oiled debris and solid materials, oiled sorbent materials, PPE
- ◆ From vessel or other decontamination operations:
 - ◆ Oily water, oiled sorbent materials, PPE







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- Oil spill response and cleanup will generate several types of waste, and key considerations are the types, characteristics, and quantities of waste.
- These factors are largely dependent on the specific cleanup methods employed, which may change as the work progresses.
- Oily water in vac trucks/tanks may be decanted on site and “clean water” discharged back to stream... Regional differences/preferences.
- Oiled debris/vegetation may be open-burned/buried in some States under some circumstances (Katrina-Murphy Oil)..... Regional differences/preferences.



What must be done with wastes resulting from response and cleanup activities?

- ◆ To the extent practicable, water is separated from the oil, treated and reused, or disposed at permitted facilities
- ◆ Recovered oil is sent to facilities that recycle or reprocess the oil
- ◆ Recovered oil that is not suitable for recycling or reprocessing may be disposed of at properly permitted facilities
- ◆ Oil spill response and cleanup activities may generate small quantities of other wastes such as chemical and solvents and wildlife carcasses
- ◆ Oil, oily solids, oiled debris, and other wastes must be handled in accordance with all relevant regulations of local/state/federal health and environmental agencies

Is oiled waste considered hazardous?

- ◆ Petroleum products such as diesel generally do not designate as hazardous waste
 - ◆ If not designated as a hazardous waste they are classified and managed as solid waste
- ◆ Knowledge of the material spilled can be used to classify all of the released material
- ◆ Oily waste that cannot be recycled or reprocessed may need to be analyzed for hazardous characteristics before choosing a treatment or disposal option





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- ◆ X. **Summary Statement**



XI. Summary Statement

YEAH

Summary Statement

- ◆ The purpose of this course is to provide an overview of oil emergency response operations.
- ◆ There is no way to include all possible subjects, references, or guidance for something as complex as incident response in a single course; however it is hoped that this course will assist you when responding to discharges in the inland zone.







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Certificates

- ◆ If you are interested in receiving a certificate for participating in this training, please send an email to Austin Oelschlager, Tetra Tech at austin.oelschlager@tetrattech.com

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- To view a complete list of resources for this seminar, please visit the [Additional Resources](#)
- Please complete the [Feedback Form](#) to help ensure events like this are offered in the future



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