Nearshore and Inland Use of Various Applied Response Technologies (ARTs)

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Objectives for Presentation

- Briefly: Types of ART and OSCAs
- Why consider ART?
- Briefly: Who reviews and approves their use?
- Briefly: Overview of shoreline and inland OSCAs, and in-situ burning considerations
- Where to find more information

Definition of ART

"Response technologies, other than mechanical cleanup, that can be employed to address an oil spill".

- Oil Spill Cleanup Agents (OSCAs)
  - Dispersants
  - Surface washing agents
  - Herding agents
  - Emulsifiers & de-emulsifiers
  - Gelling and solidifying agents
  - Bioremediants
  - Sorbents
- In-situ burning (ISB)

Why Even Consider ARTs?

- Our goal is to have <u>all available tools</u> ready to use in an emergency situation.

Response tools can include:

- Containment and skimmers
- Sorbent boom
- In-Situ burning
- Dispersants and other OSCAs

Can sometimes use more than one at a time, as each option has inherent limits.

Realities, continued

- All decisions associated with spill response have inherent trade-offs.
- We evaluate short-term vs. long-term impacts to habitats and species at risk.
- When possible, the greatest impacts will be strategically shifted to the least sensitive or more resilient parts of the environment.

Our goal as trustee and response agencies?

Understand our resources at risk well enough that we can reduce the environmental damage, to the greatest degree possible.

ART Use in California

Federal

- The federal Regional Response Team (RRT IX) must approve the use of all ARTs to address an oil spill within Federal jurisdiction. Approval only goes go a FOSC.
- Federal EPA manages listing of OSCAs on NCP Product Schedule.

State

- The OSPR Administrator has the State's authority over all response technologies to address an oil spill on state lands or waters. OSPR conducts state reviews of OSCAs for licensing or exemption.

OSCAs used by FOSC must of those listed on NCP Product Schedule.

To be used on spills on, near or threatening California state waters, OSCA must also be licensed (or exempted) based on OSPR review.

Dispersants

Most likely uses are in marine/estuarine spill response, if:

- On surface waters that are > 60’ deep & well-mixed
- On a dispersible oil with good operational parameters (which excludes most CA-produced oils)
- On a large volume and/or distant offshore spill that mechanical assets cannot fully address
- No exclusion zones per se, but RRT IX approval unlikely for other dispersant uses (e.g., water < 60’ deep, bays, freshwater, mechanically recoverable spills) because harder to demonstrate an environmental benefit.

Dispersants, continued

RRT IX Policy for CA marine use:

- No use on sheens or thin slicks
- No use on spills of light-end fuels
- No expected use for subsea spills
- ★ **No** use where will not provide overall environmental benefit

If authorized for use, limit spraying:

- Near aggregated marine mammals and sea turtles
- Within 1000 feet of aggregated birds
- Within 1 mile of anadromous river mouths
- Within marbled murrelet habitat 3-5 miles offshore during breeding season
- Over schooling fish or jellyfish near surface, or over large and well-defined larval retention areas.

Dispersants, continued

CA State regulations:

- **No use on shorelines, rivers, streams**
- Use in a freshwater lake that is a drinking water supply requires additional approval from SWRCB.

Other notes:

- No anticipated requests for use on freshwater lakes, because:
  - Freshwater sheens and spills of light end fuels (e.g., diesel) will be the most common, but these not appropriate for dispersant use; spill of a heavier yet dispersible oil from rail or pipeline into a freshwater lake might be an exception, but …
  - No dispersants currently formulated or licensed for freshwater use.

Surface Washing Agents (SWA)
(aka Shoreline Cleaning Agents, Beach Cleaners)

- Usually have a surfactant base similar to dispersants
- Will "lift and float" oil, not disperse it into water column
- Can be used alone or in combination with warm-water wash
- Re-floated oil can be collected from contained area
- Good for ship hull, rip rap, other hard-surface cleaning
- May also be used to clean sand, marsh areas and plants
- Two products licensed in CA : Cytosol, Accell Clean SWA
- Method of use and type of cleaner is substrate-dependent

Surface Washing Agents (SWAs) continued

- Truck-based sand cleaning systems an option.
- In-sediment (flooding, percolation) cleaning approach an option
- Products are safely used in agriculture and dairy industries and may be milder than common household detergents
- Approvals needed for use in-situ use in/near state waters
- Approvals not needed for use ex-situ
- Ex-situ use not limited to licensed OSCAs
- Use on dry soils may not need approvals

Ways to Enhance the Action of Shoreline Cleaning Agents

Passive flooding

Low-Pressure Washing

High-Pressure Washing

Some Use Examples: Surface Washing Agents

Cytosol

Ship hull

Shoreline

Binned sand

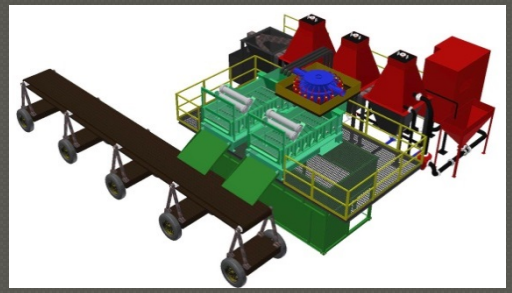
Marsh

Accell Clean SWA

Ex-situ cobble cleaning test, Refugio

Tank cleaning

Medium size sand-cleaning truck



Land-based sand cleaning system

Creating Better Opportunities for SWA Use

- Consider use earlier in response when oil is still relatively fresh
- Consider use in flushing buried oil (e.g., dry creek beds)
- Consider pre-approval for certain uses (e.g., wipe-on/wipe-off)
- Clarify whether some uses require RRT and/or OSPR Administrator approvals
- Explore options for use in wildlife cleaning as alternative to harsher detergents

Elasticity Modifiers
(e.g., gelling agents, solidifiers)

- Products bond with oil to form a semi-solid or solid mass
- Oil will not re-sheen
- Available in either liquid or dry/granular/particulate form
- Liquid form limited to use where no leaking to state waters (e.g., tanks)
- Granular forms in boom, sock, pillow constructions
- Use for oil spill cleanup and other water quality, produced water, contaminants (pesticides, metals) cleanup

Elasticity Modifiers, continued

- Better than typical sorbents in most cases, especially for spills of diesel and for sheens
- Pillow constructions good for upper water column oil capture
- Good for low energy environments (harbors, around pier pilings, marsh and mudflat)
- Better re-use and re-cycle potential
- More expensive initially but also better efficiencies, less waste
- State pre-approval for use in self-contained form
- Working on the companion RRT IX pre-approval.

Some solidifier examples …

ClAgent

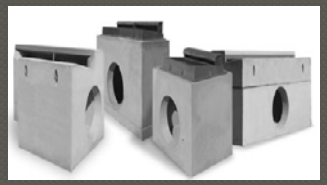
and self-contained products

Loose particulate within a contained area

ClearTec Rubberizer

Boom available in a variety of diameters. Solidifies to core of boom. Can be used on water surface, or buried in sediment.

Rubberizer mat. With float and lead lines, could be suspended in water column, (e.g., marsh and harbors). Also consider for mud flats and shoreline where more surface area contact needed.



Rubberizer stormwater vault (could be modified for use in creek beds or sandy beach for recovery of buried oil?)

Conventional Sorbents
(CA Licensed rather than Exempted)

Absorbent W

Web site shows most product being used loose, but also says available in boom and pads. Could not find pictures of the boom and pad. There is a video of boom use on their web site: http://www.socksandpads.com/Absorbent_W_product_page.html

Oclansorb

Sphag Sorb

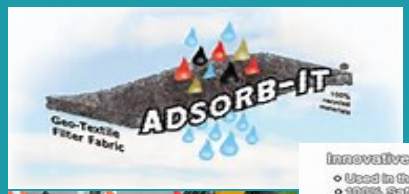
XSORB Select

Can use these as would any sorbent, but:

- Mind the pH (use in well-flushed areas, or areas where no flow to water)
- Use in self-contained form does not require RRT approval
- Use in any form requires OSPR Administrator approval if used on or near state waters. Use in self-contained form preferred.

Conventional Sorbents, continued
(CA Exempted)

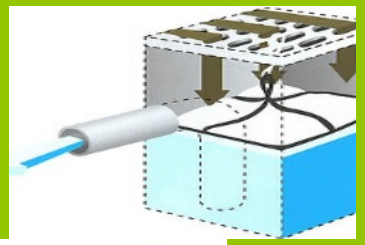
AdSorb-It



Coco Absorb

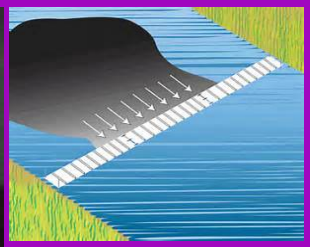
Opflex

Smart Sponge



Smart Foam

Sheen Guard



Monarch Green

Bioremediants

- Use of microbes (native or added), nutrient supplementation, and/or oxygen supplementation to enhance natural biodegradation of oil
- Often not necessary if native microbes, nutrients and oxygen are available
- Slow action time, so typically considered as final step to remove residual oil in sensitive or inaccessible areas, and after danger of re-oiling has passed
- Land-farming approach requires ability to access and till
- Limited ability to use in some settings (e.g., dry creek beds, shorelines, when in-situ treatment not desired)
- Extensively planned for, but not used, during DWH

The Other ART – In-Situ Burning

On Water

On Land

In-Situ Burning, continued

- Removal of oil from the environment by burning it in-place.
- Advantages over other response methods:
  - Quickly removes large quantities of spilled oil
  - Only small amounts of residue are left to clean up
  - Volatile organics are destroyed; removes much of the toxic threat
  - Combustion products readily dispersed within 500 meters of burn (for burns over water)

In-Situ Burning, continued

- Major health concern of burning is the particulate matter concentration in soot plume, which physically impact the lungs (the actual toxins are burned off).
  - Can cause significant health risk if inhaled
  - PM 2.5 (particulate matter of 2.5 micrometer diameter) levels may exceed state standards in soot plume for several miles beyond the burn site.
- If oil not burned, it presents health risk from volatile light-ends.
  - BTEX components (benzene, toluene, ethylbenzene, xylene), known carcinogens & teratogens

In-Situ Burning, continued

- In-situ burning is limited by:
  - Oil thickness
  - Weathering of oil
  - Emulsion formation
  - Oceanographic or other oil-collection conditions
  - Available and permissible igniters
  - Availability of specialized fire-retardant containment boom (1000 ft of fire boom in Long Beach, CA; more available from out of state within about 24 hrs)
  - Consider other natural or constructed features to “boom” for inland burns

Mechanics of Burning

- Whether on land or at sea, need to first contain the oil to maintain a minimum burn thickness of about 2-5 mm.
- Need to be able to control the burn and stop it if necessary.
- Can do this on ocean by having boom boats pull forward faster on the boom, which “drowns” the fire, or by dousing if a wetland or land-based burn.
- When burn is done, need to clean-up oil residue.

California In-Situ Burn Policy

- On water: Required permissions depend on how far offshore the burn is, but could include RRT IX, OSPR Administrator, Air District.
- On land but near water (e.g., marsh): Requires RRT IX, OSPR Administrator, and Air District approvals.
- On dry land but not near water: Air District & affected trustee agencies.
- Accelerants (e.g., gelled gasoline) may need RRT or OSPR Administrator approval; simple igniters may not. Revised Product Schedule will address.

- Air Districts will want EPA waiver from attainment thresholds.
- There are no designated prohibition zones, but many limits and conditions for use would apply (*e.g.*, no burning in wetlands at low tide).

Key Points

- It is important that all tools be in the tool box at the time of an oil spill incident.
- All response options have inherent trade-offs associated with their use.
- For shoreline and inland spills: All OSCAs must be federally listed and state licensed to gain approval for use during response. Fewer (or no) restrictions if spill is not of oil, or the spill and spill response is not going to affect water.
- ART and OSCA approvals are gained by request of the FOSC (CG or EPA), and through approval of the Administrator of the OSPR and the RRT.

Key Points, continued

- The OSPR Art Lead Technical Specialist and the NOAA or EPA Scientific Support Coordinators assist the FOSC with determinations of any environmental benefits to ART or OSCA use.

- We work with the RP on resources and logistics related to ART or OSCA use, but:

★ The RP is **NOT** responsible for making decisions or recommendations related to ART or OSCA environmental benefit or trade-off considerations.

★ ART recommendations are the responsibility of the response and trustee agencies. Approvals rest with the RRT IX and the OSPR Administrator. Implementation of any approval rests solely with the FOSC.

Products not in OSRO inventories can be called into incident-specific use via Operations Section and/or by request of the agencies.

- This helps us assure we are identifying and employing Best Achievable Technologies, even if some approaches or products are not company standard or required through OSRO regulation.

Where to Find Additional Information

- Talk to me, before or during an incident, about OSCA licensing and permissions involved in using various products:
  ellen.faurot-daniels@wildlife.ca.gov
  831-649-2888 (office), 831-233-0723 (cell)

- Refer to the Job Aid that will be on OSPR website following this workshop (some handouts available on table).

- Refer to OSPR website for current lists of California licensed or exempted products:
  https://www.wildlife.ca.gov/OSPR/OSRO/Oil-Spill-Cleanup- Agents

- Refer to ART BAT report on OSPR website (same web link as above, look for pdf file mid-page).

Questions?

"Perhaps I've said too much."

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