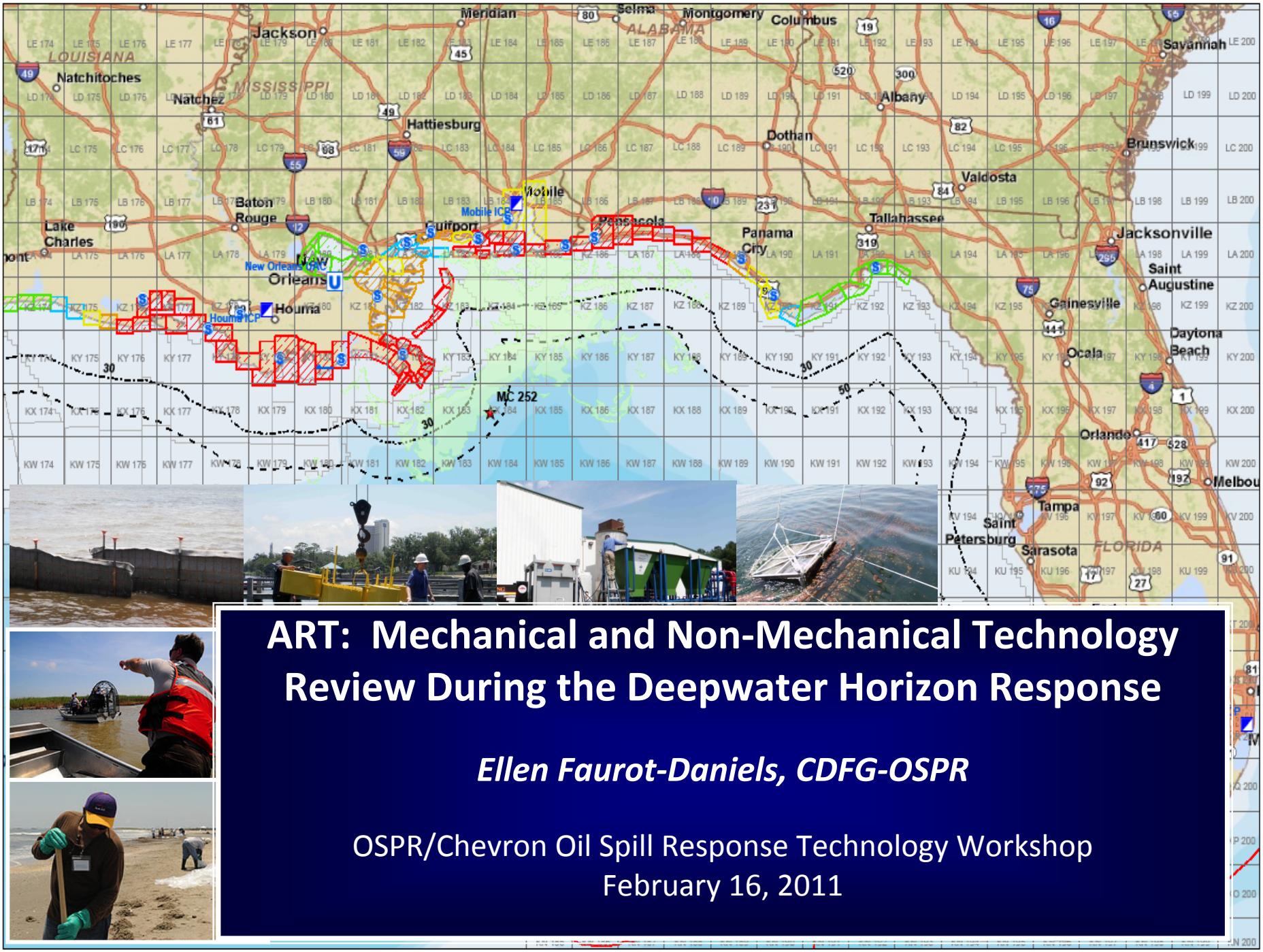

ART: Mechanical and Non-Mechanical Technology Review During the Deepwater Horizon Response

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OSPR/Chevron Oil Spill Response Technology Workshop
February 16, 2011

Definitions

ARTES: **A**lternative **R**esponse **T**echnology **E**valuation **S**ystem (a NOAA evaluation tool)

ART: **A**lternative **R**esponse **T**echnology traditionally means response technologies, other than mechanical cleanup methods, that can be employed to address an oil spill.

- Dispersants & other chemical countermeasures (OSCAs)
- In-situ, or “controlled” burning

During the Deepwater Horizon response, the volume and variety of innovations generated by responders, vendors, and the general public was initially modeled on the NOAA ARTES system. The technology review team was referred to as either ARTES or ARTs.

ART Program Organization and Objectives

Sponsored by Unified Area Command (UAC) in New Orleans

Objective: **Evaluate and use new, improved and emerging technologies to address operational needs.**

- ✓ Establish a system to gather and categorize new ideas
- ✓ Evaluate and rank technologies within specific categories
- ✓ Prioritize technologies to address operational needs
- ✓ Conduct tests and provide feedback to Command
- ✓ Coordinate with federal **I**nteragency **A**lternative **T**echnology **A**ssessment **P**rogram (IATAP)

ART Program Organization and Objectives

ART Houston

Management, database, support and overall coordination

ARTES and High Interest Technology Test (HITT) Team

Evaluated and field tested the technologies, provided recommendations, liaised with Regional Response Teams (RRTs) and trustee agencies regarding policies related to technology use

Liaison/Coordination positions at Houma and Mobile ICPs, UAC, and with IATAP

Team experts supporting above roles:

BP, USCG, OSPR (via NOAA), Washington state (via NOAA), EPA, consultants and professional responders

Idea and Project Sources

- ✓ ARTES database – direct submissions & BP call center
- ✓ Operations & field-derived
- ✓ VIP submissions – inputs received at Unified Area Command and Incident Commanders
- ✓ Louisiana Business Emergency Operations Center
- ✓ Public Information Emergency Response (PIER) System (used before ART database stood up)
- ✓ "Open House" meetings held at parishes

All ideas were directly or indirectly submitted to ARTES database for tracking and scoring

ART Program Organization and Objectives

Review and testing success measures

Material: Will it make a real difference in terms of capability or result?

Scalable: Can it be used across the response effort?

Timely: Can it be used now?

Viable: If it is only conceptual or prototype now, what are development and delivery times to make it available for this response?

Four Stage Triage Process

Stage 1: Primary Evaluation

✓Classify (or reclassify) each idea based on feasibility, and determine if the idea should move forward

✓Email response to correspondent

Stage 2: Classify each technology idea by type

✓Dispersant, sorbent, mechanical, skimming, biorestoration

Stage 3: Technical review, by classification (using modified CARVER system)

✓Further determine how feasible each technology is, and if it is already proven

✓Prioritize the ideas that should move forward

✓Email response to correspondent

Stage 4: Technical review by Operations

✓HITT and/or ARTES desktop evaluation and/or field test

✓Closing response to correspondent

Modified CARVER scoring system for ARTs technologies

Projects scored in 12 categories:

Mission Critical

Accessibility

Uniqueness

Habitat Vulnerability

Ease of Deployment

Efficiency/Output

Decontamination

Availability for Testing

Availability for Use

Waste

Regulatory Concerns

Health/Safety

Modified CARVER scoring system for ARTs technologies

Some scoring examples

Mission Critical

Definition: Operations has requested this item or identified a gap.

Scoring:

4)	High operational or short-range need
3)	Operational need or medium-range need
2)	Long range need
0)	Not yet identified

Modified CARVER scoring system for ARTs technologies

Habitat Vulnerability

Definition: High score awarded for equipment that is deployable and serves a critical need for operations in sensitive area that require a low-impact approach.

Scoring:

3) May be used or designed for extremely sensitive areas or with endangered/threatened species

2) May be used or designed for moderately sensitive areas or with endangered/threatened species

0) Usable only in areas without particularly sensitive areas or species

Modified CARVER scoring system for ARTs technologies

Regulatory Concerns

Definition: High scores awarded for applications that do not introduce regulatory/policy concerns or trigger regulatory/policy thresholds that may not easily be addressed or mitigated. Lower scores involve applications that introduce regulatory or policy challenges. Example considerations: ESA, RRT guidance, local, state or federal trustees, landowners.

Scoring:

2) No or low challenges, may be used within current guidance and regulations.

1) Some challenges, but within current guidance and regulations.

0) Significant challenges, conflict with current guidance or regulations.

How many ideas were submitted?

Total	123,000
Source (well head) control:	80,000
Spill control (surface, plume and stranded oil):	43,000
Spill control ideas worth considering:	470
Remediation	*170*
Booming, skimming, sand cleaning, sorbents, etc.	*300*
Evaluated/tested:	100
Received significant use:	**~30**

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For existing and established capabilities, a separate PSE (Product, Services and Equipment) database containing ~57,000 entries was created.

What technologies were the focus of the Houma ARTs Team review?

(Mostly) mechanical technologies for surface and stranded oil collection and removal

- ✓ containment boom (including rigid pipe), sorbent and solidifier boom
- ✓ filter fence
- ✓ skimmers and skimming systems
- ✓ oil-water separators
- ✓ boom retrieval, washing and compression systems
- ✓ fluorometers and spectrometers
- ✓ oil thickness meters, submerged (in beach) oil detection systems
- ✓ marsh treatment equipment
- ✓ tar ball collection and sifting systems, oiled sand treatment systems

But also handled…

- **Questions related to use of loose sorbents and solidifiers**
  - Two RRTs cover the spill area, and they had different policies
  - SCAT also explored some marsh treatments options

- **Organized sand treatment options review**
  - Sand sifters, sand washing (warm water), sand cleaning (chemicals used), surf washing

- **Organized procurement and testing of experimental sorbent and solidifier self-contained products**

- **Consulted with EU, Operations, and the two RRTs on use of surface washing agents**

- **Consulted with trustee agencies on BMP considerations in testing and use of technologies**

And participated in …

- Many meetings with vendors
- Town Hall meetings
- Public “Expo” events
- Preparation of Fact Sheets
- Bioremediation and Marsh Treatment Task Forces
- Database screening, ranking, rating of technologies for field testing
- Several trips to field or other states to consult with HITT team, observe field trials

A look at some of the technologies …

Boom

Sorbent and Solidifier

Biofilter

Rigid Pipe

More on sorbents and solidifiers…

Some products have good potential utility for California:

Ab Tech Smart Sponge

PetroGuard/Sheenguard

Ground switch grass

pH neutral, no seed, different chop sizes available, for broadcast onto oiled wetland vegetation in wildlife/bird habitat (would require RRT approval)

Rubberizer mesh pillows

More on boom and boom handling

Boom hauling

Boom washing

Boom retrieval from wetlands

Boom compactor

Boom and boom handling …

Concepts worth further pursuit?

✓**Towed bubble boom**

- To bring suspended oil (or dispersed oil) plume oil back up to surface for second containment, concentration and recovery attempt

✓**1-3 m long socks of self-contained solidifier (gaps between each sock), suspended vertically from slowly towed hard boom, attached at bottom to lead line or chain**

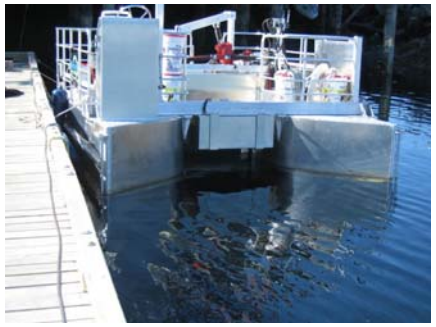
- For capturing at least some of a dispersed oil plume, while leaving escapement gaps for fish

Oil Skimmers

A WHALE

Big Gulp

Bluewave Marine



Racquet Skimmer

Tar Ball Skimmer

Sand Treatment System Review

- After bulk oil removed, sand treatment became a priority
- Balance local resident demands for action with the need to properly evaluate the response technologies for this response
- ARTES took the lead in compiling an inventory of treatment options and helped lead an Area-wide discussion to address the needs of stakeholders and resource trustees

MiSWACO at Grand Isle, LA

MiSWACO

- Closed system, with warm water only, or with deflocculant and surface washing agent (CytoSol) added
- Oiled sand moved by front-end loaders to stockpiles along beach, then again by loaders to MiSWACO, then back out to “clean” stockpiles
- Able to treat up to 500 cubic yards/day
- Entire facility had to be decommissioned for storm warnings
- Not consistently able to treat sand to LA DEQ RECAP standards
- Perceived by many in community as disruptive
- Eventually decommissioned due to community complaints about harm from fumes

Some Lessons Learned During the Deepwater Horizon Response

The ARTs/ARTES team was able to provide:

- ✓ A focus on technology review and interactions with new product vendors
- ✓ A dedicated team with the ability to liaison with all other ICS entities
- ✓ The necessary discipline to enter everything into a single database and tracking system
- ✓ Critical feedback to submitters, earning trust and reducing impact to Operations/Logistics by providing a single point of contact
- ✓ Timely testing via a collaboration between a technical review team and an output-oriented test team

What ARTs/ARTES should continue to provide:

- ✓ ARTES is a new concept; better marketing of this tool within the response will greatly improve effectiveness
- ✓ Important to build on lessons learned via future ICS training and a ready-to-go database solution, pre-spill planning interactions with agencies and RRT

Some Lessons Learned During the Deepwater Horizon Response

ARTs tools and approaches during DWH that we should use again:

- ✓ **Shared database for idea/project input (via web and other sources), idea triage, technology review by type, prioritization for field testing**
- ✓ **SharePoint system for input of technology evaluation results, pictures, etc.**
- ✓ **Frequent conference calls**
- ✓ **Team site visits**

ARTs tools and approaches during DWH that should be further developed:

- ✓ **More structured and consistent approach to testing**
- ✓ **Better and more informative response to idea submitters**
- ✓ **Incorporation of all planning and operational elements within ICS**

Future Efforts

- ✓ Continue to support remaining testing, BioChemical Strike Team (BCST), and sand and marsh cleanup efforts.
- ✓ Debrief and package the ARTES concept for future use in future large spills.
  - ✓ Work with NOAA and other partners to develop free-standing **Response Technology Evaluation** process and tools (building on ARTES tool and DWH experience), and make this tool available for future use to and through ICS.
- ✓ Some projects that were more conceptual may be selected by EPA and USCG for future R & D projects.
- ✓ Solicit selected products and technologies used in DWH for licensing and use in CA responses (e.g., solidifier and sorbent products, sand treatment systems. Work with RRT and individual agencies on use permissions nd/or restrictions.

Questions?

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