OIL SPILL SIMULANTS MATERIALS

WORKSHOP PROCEEDINGS

May 2013 FINAL

Developed by Nuka Research & Planning Group, LLC.

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Executive Summary

In March 2013 the Prince William Sound Regional Citizens' Advisory Council (PWSRCAC), the Oil Spill Recovery Institute (OSRI) and the Spill Control Association of America (SCCA) hosted a high-level workshop of national experts to address key questions regarding the potential permitting and use of oil simulants in US waters to improve oil spill response planning and operations. Being prepared to respond effectively to an oil spill requires testing equipment and tactics and training personnel in the most realistic conditions possible. Intentional discharge of oil or oil simulants may require a permit under federal and state statutes. As with oil, any oil simulant can pose environmental risks.

Participants at the workshop discussed the need for suitable oil spill simulants, criteria for selecting appropriate simulants, applicable regulations, and permitting procedures and options.

The group agreed to the following consensus item:

- There is a need to improve on-water oil spill response technologies and tactics in the US, and simulants provide an avenue to increase response proficiency.
- There is a need for clearly defined process to allow for simulants (including experimental oil spills) to further oil spill response capabilities and preparedness.
- Oil spill simulants, should be built into the framework of national spill response policy. The process of increasing the use of simulants needs to be addressed through a broad, inclusive process that includes industry, stakeholders, and regulators.
    - The National Response Team (NRT) should address this issue.
    - The rationale and need for simulant use needs to be clearly communicated to stakeholders and the public.
    - The process should be inclusive of all stakeholders.
    - There should be incentives to use simulants rather than petroleum or vegetable oils to improve response capacity.
    - Once a national policy is in place, states or regions should have the opportunity to build on or refine their own local requirements.
- There may be tradeoffs involved in using simulants.
    - Potential for toxicity and wildlife impacts.
    - A systematized approach such as net environmental benefit analysis or ecological risk assessment could be used to assess potential impacts and benefits.
    - Thresholds should be established.

   - Opportunities for improving response preparedness, both in terms of responder experience and cost-effectiveness, are lost when simulants are not incorporated into drills, exercises, and equipment trials.

- The potential liability exposure for using simulants must be established before the use of simulants is acceptable to response organizations.
- Liquid and particle-based simulants differ in purpose and will likely require different permitting efforts. Before simulants can be incorporated into oil spill training and exercises, there must be a clear path for permitting approval.
- The type of simulant used should be linked to the exercise/training/research objectives, the operating environment, the equipment and tactics being tested, and the environmental sensitivities. The principle of *causing the least harm commensurate with meeting the objectives of simulant use* should guide the selection of the correct simulant for each application.
- There are major knowledge gaps regarding past and present use of oil simulants in field exercises. There is a need for a state-of-knowledge review and lessons learned or knowledge-management system.

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Introduction

Background

The Prince William Sound Regional Citizens' Advisory Council[1] (PWSRCAC) initiated the Oil Simulants Project to develop consensus regarding the use of simulant materials in Alaska waters. PWSRCAC recognized that countries such as Norway, which allow the occasional experimental release of oil into the environment to test spill response equipment and tactics, are also recognized as the source of some of the most advanced on-water oil spill response technologies.[2] By contrast, the regulatory and permitting requirements for using oil simulants or experimental spills in US waters are somewhat unclear. There has not been a permitted experimental release of oil in the US since 1994.[3]

Simulants may afford better training opportunities for responders and allow for the testing of technologies and tactics used for tracking, containing, and recovering oil in the environment, and at a larger scale than test tanks. By establishing agreed-upon criteria to identify preferred simulants that are permissible under international, federal, and select state and local regulatory regimes around the country, this project seeks to provide responders better training opportunities with existing equipment as well as facilitate the sharing and comparing of exercise results conducted in support of new technological developments.

PWSRCAC initiated an oil simulants project in 2008, beginning with the development of a whitepaper on oil simulants (SAIC, 2008). The whitepaper reviewed simulant materials that had been recently used or considered for use by the oil spill community, and evaluated those simulants based on several criteria. The whitepaper made general recommendations for the selection of oil simulants to evaluate different components of spill response systems.

In 2012, PWSRCAC, the Oil Spill Recovery Institute[4] (OSRI) and the Spill

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[1] http://www.pwsrcac.org/

[2] While intentional discharges/experimental oil spills were discussed extensively during the workshop, PWSRCAC's focus in funding this project was to address the issue of simulant use. PWSRCAC does not have an official policy position on the use of intentional discharges or experimental spills

[3] In 1994, an experimental oil spill was conducted on Fowler Beach, within Delaware Bay, to research the practicality of bioremediation for marine oil spills (Venosa et al., 1996). The intentional discharge was permitted through the Clean Water Act, and according to the EPA, represents the most recent instance that a permit application has been filed for an intentional discharge of oil.

[4] http://www.pws-osri.org/

Control Association of America[5] (SCCA) convened a high-level workshop of national experts to address several key questions regarding the potential permitting and use of oil simulants or experimental releases in US waters to improve oil spill response planning and operations. Nuka Research and Planning Group, LLC (Nuka Research) was contracted to organize and facilitate the workgroup, which gathered in 2013 for the workshop discussed in this report.

The topic of oil simulant use has significant national implications, and federal laws and regulations apply. Therefore, a national workgroup was identified as the preferred vehicle for addressing these issues. A project website was established to organize information and communicate with participants.[6] A discussion document (Nuka Research, 2013) was distributed to workgroup participants prior to the workshop to provide background information and discussion topics.

Workshop Purpose and Scope

On March 21, 2013, a one-day workshop was convened with oil spill response and marine environment experts from around the US to:

- Determine if there is a national consensus that oil spill simulants and/or experimental releases of oil are needed to improve oil spill response technologies and tactics in the US
- Identify preferred substances for use as simulants in on-water oil spill response exercises and equipment trials.
- Identify state and federal permitting requirements for simulant materials or experimental oil releases to be used in on-water oil spill response exercises and equipment trials.
- Determine whether blanket permits may be issued for simulants or experimental releases to facilitate on-water oil spill response exercises and equipment trials while minimizing harm to the environment.

This report contains the proceedings of the Oil Simulants Workshop. It summarizes discussions, identifies consensus items, and outlines the next steps for the Oil Simulants Project.

Participants

Participation in the workshop was by invitation only. A full list of organizations and individuals invited to participate is provided in Appendix A. Workshop participants attended either in person or through a webinar. Participants are listed in Table 1.

[5] http://www.scaa-spill.org/

[6] http://www.nukaresearch.com/projects/pwsrcacOSSW/index.htm Website is password protected; contact contact@nukaresearch.com for access.

Table 1. Participants in March 21, 2013 Oil Simulants Workshop

ORGANIZATION	INDIVIDUAL(S)
Alaska Department of Environmental Conservation (ADEC)	Crystal Smith, Emergency Response Program* Neil Huddleston, Emergency Response Program* Vince Kelly, Industry Preparedness Program
Association of Petroleum Industry Cooperative Managers (APICOM)	Ernie Quesada, General Manager, Clean Rivers Cooperative Todd Paxton, General Manager, Cook Inlet Spill Prevention and Response, Inc. (CISPRI)
Bureau of Safety and Environmental Enforcement (BSEE)	Christy Bohl, Alaska Oil Spill Program Regional Administrator* Lori Medley, Oil Spill Response Research Coordinator*
Cook Inlet Regional Citizens Advisory Council (CIRCAC)	Steve “Vinnie” Catalano, Director of Operations*
Environmental Protection Agency (EPA)	Craig Matthiessen, Director, Regulation and Policy Development Division, Office of Emergency Management, (RPDD OEM) Nick Nichols, RPDD OEM, NCP Product Schedule*
National Oceanic and Atmospheric Administration (NOAA)**	Dave Westerholm, Director, Office of Response and Restoration Doug Helton, Incident Operations Coordinator Gary Shigenaka, Marine Biologist Glen Watabayashi, Modeler John Tarpley, Operations Branch Chief Robert Jones, Chemist Ruth Yender, Scientific Support Coordinator
Nuka Research and Planning Group, LLC**	Andrew Mattox, Analyst Elise DeCola, Operations Manager Tim Robertson, General Manager
The Pew Charitable Trusts	Melissa Parks, Associate
Oil Spill Recovery Institute (OSRI)**	W. Scott Pegau, Research Program Manager
Prince William Sound Regional Citizens' Advisory Council (PWSRCAC)**	Jeremy Robida, Project Manager* Mark Swanson, Executive Director Roy Robertson, Project Manager/Drill Monitor
Spill Control Association of America (SCAA)**	Brian House, Moran Environmental Recovery
States/British Columbia Task Force	Sarah Brace, Executive Coordinator
United States Coast Guard (USCG)	Kurt Hansen, Research & Development Center* Rhianna Macon, Office of Marine Environmental Response Policy*
University of New Hampshire Coastal Response Research Center (CRRC)	Kathy Mandsager, Program Coordinator*
Washington Department of Ecology	Elin Storey, Preparedness Section Drill Coordinator
*Participation via webinar. **Sponsoring or organizing entity.	

Proceedings

The workshop was organized around two panel discussions, in addition to introductory remarks and group introductions (see Agenda in Appendix B).

Opening Remarks

Mark Swanson, PWSRCAC Executive Director, welcomed the participants on behalf of his organization and the workshop co-sponsors, OSRI and SCAA. He acknowledged NOAA for hosting the workshop at their Sand Point Campus and Nuka Research for planning and facilitating. Mr. Swanson initiated a round of introductions, where all participants (see Table 1) identified themselves by name and organization and provided a brief summary of their experience with oil spill response and their interest in oil simulants. Mr. Swanson provided a brief history of the PWSRCAC's interest in the use of oil simulants, and then passed the microphone around the room. All participants (in the room and on webinar) provided brief introductions.

Mr. Robertson presented several slides to introduce and organize the discussion. A copy of this and all other presentations are included on the project website.[7]

Based on earlier meetings and discussions, the scope of the workshop discussions was designed to include both liquid and particle-based simulants. Since there are no know liquid simulants that are not at least partially composed of a substance that is classified as oil under the Clean Water Act,[8] the use of a liquid simulant will be treated as an intentional discharge of oil.

Areas for discussion include the needs, appropriateness and limitations of various simulant materials to support trajectory modeling, booming, skimming, broken ice, and oil fate and effects. The two objectives for the workshops are: (1) build the business case for simulants (Panel 1), and (2) identify federal permitting requirements for simulant use (Panel 2). Other project objectives are to identify preferred substances to be used as simulants, develop criteria for evaluating simulants, identify state permitting requirements, consider whether permitting could be streamlined, and identify further research needs.

Mr. Robertson suggested that participants approach the discussion with awareness of and consideration for issues including the costs associated with various simulants, potential unintended consequences of simulant use,

[7] All presentations are linked through http://www.nukaresearch.com/projects/pwsrcacOSSW/meetings.htm

[8] Both EPA and the USCG interprets the Clean Water Act definition of oil to include non-petroleum oils such fats, oils, or greases of animal, fish, or marine mammal origin; vegetable oils, including oils from seeds, nuts, fruits, or kernels; and, other oils and greases, synthetic oils, mineral oils, oil refuse, or oil mixed with wastes other than dredged spoil. See definition of oil and non-petroleum oil in 40 CFR 112.2. It is possible that dyes may fall outside of the definition of oil.

decontamination of equipment, and recovery of materials. The facilitators used Powerpoint slides to capture information so that webinar participants could follow the note-taking in the room. The notes would focus on consensus items, issues requiring additional consideration, research needs, and a parking lot for items outside of the scope of the workshop. He then reviewed the agenda before introducing Panel 1.

Panel 1: The Need for Simulants

Mr. Robertson began by reviewing the goal of Panel 1, which was to establish a consensus-based statement of needs for oil simulants. Panelists have a range of expertise and experience on this topic. Discussion questions:

- Why are simulants needed?
- What purpose would simulants serve that cannot otherwise be accomplished?
- In what environments/settings would simulants be used?
- What types of simulants are best suited to each particular need?
- How are simulants being used at present?
- Are there alternatives to simulants?
- What are the costs and impacts associated with simulant use?

Each panel member then gave brief opening remarks. Presentation slides for Panel 1 are included in Appendix D.

BRIAN HOUSE, SCAA

Brian House introduced himself as a representative of the Spill Control Association of America (SCAA), which is a similar organization to the Association of Petroleum Industry Cooperative Managers (APICOM). SCAA represents for-profit spill removal organizations, while APICOM represents not-for-profit organizations. Mr. House noted that SCAA can provide expertise regarding the need for simulants to improve containment and recovery. He has reached out to his member organizations for their input and observations.

Mr. House noted that the need for simulants is driven by the objective of the exercise or test. SCAA members have experience with oranges, peat, cottonseed hulls, and popcorn. All are relatively easy to see and recover. In general, these can be used adequately to measure response time, boom performance, and a gross understanding of the overall response system. However, these particulate-based materials are not appropriate for testing recovery (skimming systems). Similarly, tank tests are adequate for testing recovery, but they lack the realism of a field deployment.

Mr. House noted that, “one size does not fit all” when considering simulants;

conditions vary and influence how oil or simulants may behave, and how response systems may perform. For some purposes, oil-based simulants should be able to mimic the behavior of oil over time, including weathering. To keep this issue and process alive, the group needs to be cognizant of the need for strong support and concerted effort. It is also important to keep the industry and responders at the table, and to proceed in a way that does not create an undue cost or regulatory burden. Responder immunity is a key concern to response organizations, particularly in the wake of Deepwater Horizon, and responder immunity must be addressed in the context of oil simulants.

To conclude, SCAA supports the use of simulants, including oil-based simulants or tests with oil, to create greater realism in equipment deployment and improve drills and exercises.

TODD PAXTON, APICOM

Todd Paxton, General Manager at CISPRI, represented APICOM. He described his membership, and noted that they deal with a range of oil products and that each product creates it own response challenges. Cook Inlet is a dynamic environment, with high currents that are challenging for on-water response. CISPRI has exercised with dyes and particle-based simulants, but none of these can perform like a simulated oil. Simulants would help to understand entrainment and improve tactics and techniques, particularly in high currents.

Mr. Paxton noted that response exercises lose their realism during skimming operations, because they are not actually encountering any product. CISPRI does use a test tank to help test and verify skimmer capabilities, and to train responders for working in oil. But, test tanks are a controlled environment and does not replicate the real world, particularly when sea ice is concerned. Tank-based ice conditions do not effectively mimic the real world. There is a need to understand the challenges around responding in sea ice and to practice arctic spill response techniques. A liquid simulant is critical to moving forward.

While there may be some challenges to getting liquid simulants approved, the benefits of being able to improve techniques is realized during actual spills. Learning or improving “on the fly” is often the consequence of being unable to test or train with oil or liquid simulants.

KURT HANSEN, USCG R&D CENTER

Kurt Hansen from the US Coast Guard explained that the R&D Center has been considering oil simulants for 10-15 years. Mr. Hansen’s first experience with oil simulants was in fast water, using popcorn, dye, and oranges. He showed photos of several other deployments where simulants were used. For fast water booming, the simulants provided a visualization of surface movement, but doesn’t tell the whole story about equipment performance. In recent years, he has worked with simulants in ice to test various techniques.

Mr. Hansen recommended using multiple simulant types to inform different issues. None of the simulants he has used really work for brush or drum skimmers. The amount of simulant or oil used is also important to understanding effectiveness. ASTM tests done at Ohmsett have illustrated this. Sometimes the small quantity of simulants allowed for use are not sufficient for the learning objectives. There are also no good simulant materials for sinking oil, which is a major concern for oil spill research and development. Sinking in-situ burning residues are also of interest. Finally, there is a need to simulate movement of oil in current and waves.

ROY ROBERTSON, PWSRCAC

Roy Robertson is a drill and training evaluator for the PWSRCAC, where he observes drills conducted by the Alyeska Pipeline Service Company's Ship Escort and Response System in Prince William Sound. He used photos from past exercises to illustrate his points. Simulants provide a great training tool and provide a good incentive for response training. Without simulants, responders never get to really practice oil recovery.

The backbone of the on-water response system in Prince William Sound is the fishing vessel program. Over 1,000 responders go through a 3-day annual training, which includes a day on the water practicing with the equipment. While they have the ability to tow boom and skimmers, they do not have an opportunity to assess whether oil loss might occur. Oil simulants should behave as much like oil as possible, to replicate gross loss and entrainment.

Mr. Robertson showed photos of entraining booms during a recent exercise. Simulants would have provided a visual cue that a particular boom configuration was not effective. Simulants could be used to test the effectiveness of various tactics, including exclusion, deflection, and diversion. It would also help verify assumptions about how and where oil might move.

Mr. Robertson noted that industry and regulators expend significant costs to deploy equipment and personnel in response training; the incremental cost of simulants would be well worth the added training value. He also noted that simulants provide a target for responders, and that realism has a significant value for training.

GLEN WATABAYASHI, NOAA

Glen Watabayashi added a few additional items to the list of simulant materials he has worked with, including drift cards and dog food. He noted that dog food attracts sharks. From the modeling and forecasting standpoint, simulants help to understand the physics of how the marine environment behaves. Dozens of drifters were deployed during Deepwater Horizon at different depths to help with forecasting. Similar projects have been conducted over time, and sometimes they show significant divergence or variance in water movement.

No known simulant behaves exactly like oil. Oil changes over time. Different types of oil have different bulk properties and behave differently. Different simulants may be more or less appropriate. For example, skimmer tests must take into account viscosity, since emulsified oil becomes much more difficult to skim. This is a challenge with simulants. It is important to match the simulant to the goals of the exercise and the type and behavior of the product you are trying to mimic. The density of a material will impact the wind effect, and thus influence its movement. This is also important because the ability of a substance to mimic a type of oil may change over time, depending upon how the oil changes and how the simulant changes. During past incidents where trackers have been placed in an oil slick, their movement tends to diverge over time.

Modeling also has some inherent limitations. Some models perform well under some conditions, and not others, depending upon a series of complex interactions. Every oil spill is a modeling opportunity. Deepwater Horizon showed how a single source oil can change significantly over time. Attempting to simulate that process is challenging. There are also trade-offs that should be factored into simulant selection. During dye studies, there were issues with birds sitting in floating dye. There is potential for some simulants to have harmful effects.

Group Discussion: Parameters for Simulant Materials Use

Tim Robertson began a group discussion by opening the floor to comments from the webinar participants. A summary of discussion items follows, organized by topic area rather than chronological order of discussion.[9]

NEED FOR SIMULANTS

- The need for simulants must be clearly articulated to regulators and the public.
- Training needs:
    - Realism
    - Incentives
    - Repetition
    - Public perception
- R&D needs:
    - Measurable
    - Validate modeling assumptions

ALTERNATIVES TO SIMULANTS

[9] This workshop summary presents discussion items thematically. The entire discussion was audio-taped and can be replayed from the project website.

- Alternatives to oil simulants include:
  - Experimental oil spills;
  - Laboratory, bench and wave tank tests;
  - Natural oil seeps; and
  - Opportunistic testing during actual spills.
- Norway has a process in place to conduct experimental oil spills to improve spill response equipment and tactics.
- Canada has also had experimental oil spills.
- Norway is encouraging other countries to consider experimental spills to continue to build the body of knowledge. ICCOPR[10] is involved in ongoing discussions on this topic.
- Experimental spills are typically limited in size and held in less sensitive environments (e.g. offshore).
- Since experimental spills are infrequently conducted, they must be done with significant pre-planning and maximum efforts to extract as much information as possible.

UNIQUE QUALITIES OF SIMULANTS

- Simulants add realism to drills and exercises:
  - Liquid simulants require decontamination and waste management, and both are elements of spill response that are rarely practiced.
  - Simulants provide an opportunity to test complete response systems vs. individual components.
  - Simulants illustrate efficiency losses in on-water recovery.
  - Simulants provide a target and incentive for responders and drill participants.
  - Simulants remove the sense of "make-believe" that pervades some drills.
  - Use of simulants to test or demonstrate recovery rates might help calibrate expectations for how systems actually perform. For example, the estimated 3% mechanical recovery realized during the Deepwater Horizon spill differs greatly from most planning assumptions (NOAA, 2010).
- Simulants provide a number of advantages over tank tests. There are many situations that cannot be addressed or replicated in test tanks, including:
  - Sea ice behavior and movement and oil-ice interactions;
  - High current conditions;

[10] http://www.iccopr.uscg.gov/apex/f?p=118:20

  - Systems and tactics evaluation (You can look at components in a test tank, but to evaluate the interaction and coordination you need to be in the field.);
  - Logistics and communications;
  - Interactions among natural conditions (winds, sea state, debris, visibility, etc.);
  - Validate or calibrate efficiency estimates that are developed in tank tests;
  - Incorporate encounter rate (ability to encounter the oil with the skimmer, which is a major driver of overall efficiency).
- Simulants provide a means to develop reliable quantitative estimates of effectiveness of systems or components that can be used to compare techniques and foster decision-making.
- Response effectiveness estimates developed through simulant-based testing and exercises provide an opportunity to foster measurable improvement in tactics and equipment for oil recovery.
- Simulants could be used to train field observers.
- Simulants address the fact that oil spill responders do not typically train against real-world conditions. Training to use oil recovery equipment without actually recovering anything is analogous to training firefighters without fire present. The manner in which oil spill response equipment and personnel are trained is different than most other sectors.

SUITABILITY AND CONSTRAINTS OF SIMULANTS

- There are pros and cons to all simulant materials. Ease of recovery is a consideration. Edible simulants, such as oranges, tend to be eaten, which can be good and bad.
- Particle-based simulants are more appropriate for nearshore use, boom testing, and more frequent use. Liquid-based simulants may be more appropriately used offshore, less frequently, and only when there is sufficient justification.
- Specific comments about simulant types:
  - Sorbent pads – moderate price, secondary market, potentially high recovery rate due to intrinsic commercial value.
  - Oranges – visible, easy to recover, cannot be broadcast over wide area, good for containment but not skimming, can be fairly inexpensive based on location.
  - Dyes – some "pre-approval" in place, visible, possible wildlife impacts, does not mimic oil for boom entrainment.
- The group could not conceive of a liquid simulant material that would behave like oil but not actually be made from some oil-based material.

- It would be difficult to come up with a liquid simulant that floats and moves like oil but does not stick to feathers and fur.
- There may not be a one-size-fits-all simulant. It is more likely that different materials will be appropriate for different environments and testing or research objectives. It was suggested that in some cases, more than one type of simulant might be used during a test or exercise.
- It is challenging, if not impossible, to conceive of a non-oil based simulant that would match the complex and changing nature of oil when it is spilled to the environment.
- For some purposes, it would be useful to have simulant materials that can be broadcast across a large area to better simulate how oil slicks spread and diverge.
- An existing body such as the ASTM F20 Committee on Oil Spills and Hazardous Materials Response might be one body to investigate the development of a liquid simulant.
- Any oil-based liquid simulant, even non-petroleum based, has potential toxicity. Birds and mammals are vulnerable to coating by any oil. Some oils – like fish oil – may actually attract wildlife.
- There is interest in developing simulants that can be used to model submerged and sunken oils, as well as submerged oil plumes.
- There is interest in developing simulants to model sinking in-situ burn resides.
- Simulants are needed to better understand oil-in-ice behavior.
- Naturally-occurring materials like spruce needles or pollen could work as simulants.
- Public and stakeholder communication and education are critical.
- It may be appropriate to establish zones for simulant use, similar to the process used for dispersant use (this concept is explored more in Panel 2 discussion).
- It is subjective to apply terms like "safe" to simulants. It may be more effective to come up with criteria for acceptable risks.

PRESENT USE OF SIMULANTS

- Particle-based simulants are used occasionally, primarily for on-water containment or GRS/GRP exercises.
- Participants had firsthand experience with a range of simulants including: dyes, dog food, popcorn, rice hulls, oranges, grapefruit, cotton seed hulls, coconuts, peat, tracking buoys, drift cards, sugar cane, sorbent pads, and other miscellaneous fruits and vegetables.
- Simulants are used more frequently in jurisdictions where there are processes and procedures in place for using them. There are some jurisdictions, like Washington State, where it is very unlikely that simulant use would be permitted.
- There is no clear national policy governing the use of oil simulants.
- There are significant knowledge gaps, even among oil spill professionals, about the extent to which simulants are being used and the lessons learned through their application. There is a need for better knowledge management, and for a clearinghouse of information on simulant use, research, and lessons learned.

COSTS AND IMPACTS

- Liability was identified as a concern, particularly in light of some of the issues with responder immunity that have resulted from the Deepwater Horizon spill.
- Because simulants provide an opportunity to enhance realism and improve evaluation of response tactics, field exercises that do not use simulants may be missing the opportunity to enhance the overall training and preparedness value.
- Net environmental benefit should be considered in determining when and how to use simulants. There could be situations where the knowledge gains from simulant use outweigh the potential environmental harm.
- There is a subtle but important difference between using simulants for training and for verification. Results of simulant-based exercises should not be used in a punitive sense.
- Simulants present an opportunity to foster continuous improvement in spill recovery technologies. While both government and industry engage in research and development, there is no clear incentive system for improving efficiency in on-water recovery systems, as long as they meet basic regulatory standards.
- The cost of simulant materials should be weighed against the total cost of the exercise. Large-scale field exercises can be very costly and the incremental cost of incorporating simulants may be minimal by comparison.

Panel 2: Federal Permitting and Regulatory Requirements

Elise DeCola introduced the topic of Panel 2, noting that the morning session had focused on the question of why simulants are needed, while the afternoon session would focus on the process of how simulants might be permitted for national use. The panel's goal would be to identify the applicable regulations and permitting requirements that apply to the use of oil simulants in the environment. Panelists represent key federal agencies with permitting authority. Discussion questions:

- Which agencies have permitting authority?
  - What is each agency's regulatory purview?
  - Are there specific permits/processes in place?
  - Who are the key individuals/departments with oversight/approval authority?
- Recent experience with federal permits for simulant use:
  - Have permits been issued in the past? To whom? For what purpose?
  - What are the criteria for issuing permits (retrieval, reporting, substance type, etc.)
- What actions are needed to make permitting requirements:
  - More clearly understood
  - Streamlined

Ms. DeCola noted that the panel would try to establish a common knowledge base regarding permitting requirements. Panel members then gave opening remarks. Presentation slides are included in Appendix D.

CRAIG MATTHIESSEN, EPA

Craig Matthiessen explained the role and purview of his emergency management program within EPA. His division is charged with regulation and policy development. Mr. Matthiessen provided a brief update on Subpart J of the National Contingency Plan, which contains the Product Schedule for dispersants and other chemical agents. Updates to the Subpart J regulations include toxicity evaluation, efficacy testing, and permitting processes. The proposed rule is still under internal review. There is strong interest in this document within the US and internationally.

Mr. Matthiessen discussed the Clean Water Act (CWA) sections[11] that apply to the question of intentional discharges and simulant use. There is a section in

[11] CWA Section 311 http://www.epa.gov/region07/public_notices/CWA/section311.htm (40 CFR 110.5 (c)).

the CWA that does allow the permitting of experimental oil discharges by the EPA Administrator.[12] However, this may be confounded by another part of the CWA that states that the discharge of any pollutant is illegal unless the party is in compliance with the NPDES (National Pollution Discharge Elimination System) permitting process.[13] EPA is looking into whether a one-time intentional discharge permit could be issued in compliance with NPDES, since NPDES permits are typically for ongoing operations.

Mr. Matthiessen said that despite the high hurdles, EPA recognizes the value of and need for experimental spills and simulant use. EPA does prioritize intentional discharges used for research rather than training. Simulants may be more appropriate for training. He emphasized that all oils, including fish oil, vegetable oils, and even milk, are regarded as oil and treated as pollutants by regulation.

In some respects, an intentional discharge should be a last resort, after all other research options – test tank, bench scale research, etc. – has been exhausted. The research needs to be scientifically valid. Any applications should spell this out. Minimal environmental impact is also critical. The American Petroleum Institute (API) has been looking at this issue post-Deepwater Horizon and considering the use of materials with well understood fate, effects, and environmental impacts.

A clear permitting process is needed. There is permit guidance on EPA's website, but it may not address all possible scenarios. It is not clear whether the permitting process for experimental spills include simulants. The permitting process is also not completely clear. The role of other stakeholders and state agencies is not clear. He suggested that the permit process should map out all of these steps, and also address issues such as quantity limits, time limits, geographic limits. EPA is trying to sort out these issues now, and determine how/when to adjust the permitting process. There has been at least one permit issued by EPA for experimental spills (1994).[14]

EPA needs to be able to articulate to the public why an intentional discharge is in the best interest of the environment. The role of the NRT and RRTs also need to be established.

Mr. Matthiessen acknowledged that he has raised more questions than he answered, but noted that EPA is strongly interested in addressing these

[12] http://www.epa.gov/osweroe1/docs/oil/edu/research.pdf

[13] http://cfpub.epa.gov/npdes/home.cfm?program_id=45

[14] The National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling's Staff Working Paper No. 7 highlights the need for a better understanding of the factors at play which mean that companies developing technology choose to test it in other countries rather than to seek a permit for an intentional discharge from the EPA. According to this document, which cites a conversation with Mr. Nick Nichols of the EPA (who participated in the workshop remotely), the only permit requested was granted.

questions and moving the process forward.

Nick Nichols noted that when he was first contacted about this project, the question was posed as to whether simulant materials belong on the Product Schedule. His initial response was no, but he posed that question back to the group. Mr. Matthiessen noted that there is no category under which simulants would fit.

CHRISTY BOHL, BSEE

Christy Bohl explained that BSEE does not really have a permitting role for simulant use, but they do have regulatory oversight of spill response capabilities for offshore oil and gas operators. BSEE is interested in ensuring offshore operators have strong contingency plans in place. In ensuring industry maintains these capabilities, BSEE has an active exercise and drill program, including both industry-led exercises and announced/unannounced drills. They would see simulants as a valuable component of their exercise evaluation process. They would support the process of seeking permits to use simulants within their own programs.

BSEE is also interested in the research value of simulant materials. Detection of oil under ice is a priority issue, and simulants could support such projects.

DAVE WESTERHOLM, NOAA

Dave Westerholm reviewed the permitting authorities that NOAA has in place, and also touched on US Fish and Wildlife Service permits. He began with species protection regulations, noted that there are permit requirements to interfere with or take certain species. While the permits may not be needed, it is important to be aware of these requirements and develop simulant tests or experimental spills that aim to avoid these types of impacts. Any simulant tests that might impact fisheries or protected species would likely not be permissible. Tests need to also be designed with cognizance of special marine areas (sanctuaries, protected areas, etc.)

NOAA supports the science side of oil spill response and natural resource damage assessment, and could apply this knowledge and experience to designing simulant exercises.

Mr. Westerholm also discussed marine debris and the Refuse Act[15], noting that under the marine debris act, we would need to be mindful of putting out simulant materials that, if unrecovered, could be considered refuse or debris. The EPA intentional discharge permit application has an appendix (Appendix

[15] The Refuse Act is the common term for a section of the Rivers and Harbors Act of 1899 (33 USC Sec. 407) that prohibited placing anything in navigable waterways without a permit from the Army Corps of Engineers. An Executive Order transferred the permit program to the US EPA when it was created, and the permit program (NPDES) has since been updated under the Clean Water Act.

C) that lists agencies with possible oversight jurisdiction over issues related to experimental releases. He also emphasized the need to coordinate with states, since experimental spills or simulants, even when released in federal waters, have the potential to impact state waters. He suggested that the RRTs should have a strong coordinating role.

LT RHIANNA MACON, USCG/NRT

Rhianna Macon provided an issue paper outlining the USCG's position.[16] The Coast Guard is similar to BSEE in terms of their regulatory oversight of industry spill preparedness. Through the PREP guidelines, they require equipment tests and exercises to demonstrate capability. They support simulants to improve response capacity.

LT Macon noted that the Coast Guard also has a strong research and development program and also see the need for simulants to support R&D. She noted that the USCG doesn't have a clear understanding of the permitting requirements for simulant use, and they would support a more transparent and clearly understood process. It is important to match up the types of simulants used to the purpose of exercises. She suggested putting together some kind of matrix or tool that exercise planners might use to match the simulant to the exercise objectives and format.

The USCG is interested in developing simulants that can mimic the properties and behavior of oil, including weathering, sinking, submergence, dispersants. Simulants may have a role in ongoing work to understand effective daily recovery rate (EDRC) and equipment ratings. Now that the ICCOPR organization is re-energized, this may be a good platform to foster consensus on research and development needs.

Simulant use could be incorporated into the PREP guidelines and exercises, although this would probably be in the future.

Dave Westerholm suggested that liability should be a discussion point. A new law would be required to release liability for simulant use. The practical implication is that even if simulant use is properly permitted, there could still be liability exposure for both the parties using simulants and the agencies that approved or permitted their use. While this is a peripheral issue, it is important. There is no formal public process involved in the permits being discussed, yet there could be members of the public with concerns about their use or impacts to resources. It is important to move forward with a parallel consideration for public information and disclosure.

Kurt Hansen added that the USCG had looked at using biodegradable cotton bags full of beans as a surrogate for sunken oil, and were unsuccessful. There were significant concerns about smothering. It is more difficult to place

[16] Included in Appendix C.

materials on the seafloor compared to the surface. He also noted that there seems to be more latitude for testing or experimentation during an actual spill rather than a planned drill or exercise. His project attempting to use bean bags on the seafloor in California was not completed because the requirements by the California archeology authorities to have a qualified Archeologist survey the area in advance could not be accomplished due to the amount of seaweed and other obstructions.

Group Discussion: Permitting and Regulations

Elise DeCola initiated group discussion, noting that the types of nuances and subtle considerations that were brought up by the panelists are salient to the discussion, and underscore the importance of bringing this group together to mine the collective institutional knowledge. A summary of discussion items follows, organized by topic area rather than chronological order of discussion.[17]

AGENCY AUTHORITIES

- The EPA is a key player, with authorities under the CWA. The Office of Water may be the place to start; EPA is looking into this.
- It is unclear which federal agency has primacy over the Refuse Act.
- Other agency permitting or regulatory authority may be triggered by violations (e.g. disturbing fish habitat or endangered species), but these do not require permitting ahead of time. However, an awareness of activities and impacts to be avoided is critical.

EXISTING PERMITTING PROCESSES

- There is no standard permitting process in place specifically designed for oil simulants (liquid or particle-based). The pathways for permitting each type of simulant is probably different.
- The two major permitting pathways for liquid simulant use appear to be:
  - Experimental oil spills for research purposes
  - NPDES
- NPDES has never been applied to a liquid simulant, but it may be a pathway for blanket national approval. It may also be used for individual exercises, although this is a bit outside of how that permitting process typically works.
- To the extent that a liquid simulant could be considered a “pollutant” under federal law,[18] it may be possible to use the intentional oil spill for research permitting process for a liquid simulant release.

[17] This workshop summary presents discussion items thematically. The entire discussion was audio-taped and can be replayed from the project website.

[18] Defined at 40 CFR 112.2.

- It is unclear whether particle-based simulants rise to the occasion of federal permits.
- The National Product Schedule under the NCP was considered as a possible pathway to pre-authorize simulants but there is no clear nexus between simulants and the Product Schedule, which was developed for oil-treating agents. Since simulants are not used during a spill but as a training or research tool, they would likely be considered a pollutant rather than a spill treating agent. The EPA will initiate additional internal discussion as to whether there is a place for simulants on the Product Schedule or separately under the NCP.
- Properly securing all applicable permits does not necessarily remedy the issue of potential liability or responder immunity.
- Since existing permits and tools like the Product Schedule are not directly applicable to simulants, it was suggested that a new regulatory process be established to pre-qualify substances to be used as oil simulants, roughly analogous to the NCP Product Schedule. If simulants could be vetted at a national level, then RRTs or OSCs could direct their use at a state/regional level. It was agreed that while a regulatory process would provide opportunity for public and stakeholder review, and would address many of the unique considerations of simulants, it may be an extremely lengthy and not necessarily successful process.
- Regulatory agencies may have a harder time issuing blanket permits for multiple exercises as compared to individually authorizing the use of simulants.
- Terminology and thresholds are important. Where is the line between "contaminant" and "pollutant"?
- It might be possible to incentivize the use of simulants through oil spill contingency plan approvals, drill and exercise programs, or OSRO certification. Creating such a requirement would help to justify the need for permitting simulants. However, this is a complex issue and there is a bit of a chicken-and-egg. Regulators cannot require the use of substances that have no clear permitting process or approval.

PAST PERMIT EXPERIENCE

Have permits been issued in the past? To whom? For what purpose?

- It is unclear whether past exercises involving simulants have violated the CWA.
- Some past exercises with particle-based simulants have had permits or approvals issued by state regulatory agencies.
- The only federal permit ever issued for an experimental oil spill was in 1994, in Delaware. The permit was used to oil a shoreline segment to conduct experiments on bioremediation agents.

- No permit applications have been filed with EPA for experimental oil spills since 1994.
- There have been no federal permit applications for the use of liquid or particle-based simulants.

WAY FORWARD FOR PERMITTING SIMULANTS

- While state tolerance of simulant use seems to vary, a more defined national policy might facilitate state approval of simulants.
- A decision-making framework such as ecological risk assessment might help to inform decisions about when simulant use is appropriate or risks are acceptable.
- Dispersants policy provides a model of how to address a contentious issue through a combination of national and regional/state policy.
- There seems to be consensus that the best approach will provide guidance and a defined process, and will be inclusive of multiple jurisdictions.
- The NRT has a role in creating federal guidance. They should be approached about taking the lead for a guidance document.
- We are probably many steps away from being able to use simulants to measure response capability. This would be a complete change from the current system, and could create significant administrative and compliance burden.
- It is critical that the industry and spill response organizations be part of this process.
- It is critical that stakeholders and the public are included in the process.
- Developing a pathway for simulant permitting is the first step. A next step will be incorporating simulants into national preparedness.
- When considering liquid simulants, it is important to identify the benefits of the specific simulant as compared an experimental oil release. Are there advantages to the liquid simulant? Is it more benign?
- There is a need to catalog existing science on environmental impacts of various simulant materials.
- Permitting framework may need to address threshold quantities of various substances – or, this could be left to local/state jurisdictions. Threshold values may vary by location.
- Additional information should be compiled about the permitting processes in other jurisdictions, like Norway and Canada.

Group Discussion: Next Steps

Tim Robertson resumed the final discussion session, which focused on identifying consensus items and action items/next steps from the workshop. All participants were invited to share their thoughts and feedback about where this group and process should focus moving forward.

CONSENSUS ITEMS

The Workshop attendees agreed on the following:

- There is a need to improve on-water oil spill response technologies and tactics in the US, and simulants provide an avenue to increase response proficiency.
    - Actual spills are infrequent, and are not always feasible opportunities to run experiments or test new equipment.
    - Test tanks do not replicate the real world.
    - Exercises and drills without spill simulants lack realism.
    - There is no way to evaluate and improve oil response technologies without being able to measure their effectiveness.
- There is a need for clearly defined process to allow for simulants (including experimental oil spills) to further oil spill response capabilities and preparedness.
    - Training
    - Exercises
    - Research & development
- Oil spill simulants, should be built into the framework of national spill response policy. The process of increasing the use of simulants needs to be addressed through a broad, inclusive process that includes industry, stakeholders, and regulators.
    - The NRT should address this issue.
    - The rationale and need for simulant use needs to be clearly communicated to stakeholders and the public.
    - The process should be inclusive of all stakeholders.
    - There should be incentives to use simulants to improve response capacity.
    - Once a national policy is in place, states or regions should have the opportunity to build on or refine their own local requirements.
- There may be tradeoffs involved in using simulants.
    - Potential for toxicity and wildlife impacts.
    - A systematized approach such as net environmental benefit analysis or ecological risk assessment could be used to assess potential impacts and benefits.
    - Thresholds should be established.

  - There are opportunity costs to not using simulants to improve response preparedness and technologies.
- The potential liability exposure for using simulants must be established before the use of simulants is acceptable to response organizations.
- Liquid and particle-based simulants differ in purpose and will likely require different permitting efforts. Before simulants can be incorporated into oil spill training and exercises, there must be a clear path for permitting approval.
  - The existing permitting requirements for liquid simulants (intentional discharges) have been established, but no permits have been requested since 1994.
    - It is unknown whether an experimental oil spill permit could or would be issued, if requested.
    - It may be useful to apply for a permit to test the system.
  - There are no existing federal permitting requirements for particle simulants (that are not oil based).
    - Permits have been issued at state level only.
    - Federal authority for liquid and particle simulants are probably different, likely with different permitting processes.
    - Submitting one or more permit applications may be the best way to test the system.
- The type of simulant used should be linked to the exercise/training/research objectives, the operating environment, the equipment and tactics being tested, and the environmental sensitivities. The principle of *causing the least harm commensurate with meeting the objectives of simulant use* should guide the selection of the correct simulant for each application.
- There are major knowledge gaps regarding past and present use of oil simulants in field exercises. There is a need for a state-of-knowledge review and lessons learned or knowledge-management system.

ACTION ITEMS AND NEXT STEPS

Table 2 identifies action items and next steps, with assignments and timelines where appropriate.

Table 2. Action Items from Oil Simulants Workshop

ACTION ITEM	LEAD ORGANIZATION	TIMELINE	NOTES
Develop Workshop Final Report	Nuka Research	April 2013	Provide opportunity for review/comment from workshop participants.
Develop Clean Gulf paper	PWSRCAC, OSRI, SCAA	Conference in November 2013	Abstract submitted
Determine applicable permitting process for oil simulants – liquid and particle	EPA	2013	Get determination on NPDES for liquids. Identify appropriate agency and point of contact for Refuse Act permits
Engage National Response Team	USCG/NOAA	2013 co-chairs meeting (currently postponed)[19]	Provide workshop summary. Request consideration of effort by Science & Technology committee; need to develop national policy & guidance.
Maintain website and workgroup list	Nuka Research	Ongoing	Periodic communications
Collect information from response organizations regarding past and current simulant use	SCAA/APICOM	Ongoing	Compile for incorporation in state-of-knowledge report
Outreach to IMO & international community	NOAA & USCG	2013	Request information about simulant use and permitting in other nations. Work through existing channels with Norwegians, Canadians, Cedre, others
Outreach to ICCOPR	USCG	2013	Provide workshop summary. Request support on simulants for research & development.
Develop whitepaper on state-of-knowledge & knowledge management system for oil simulants and intentional oil spills	Nuka Research	April 2013 (Completed)	Submit in response to BAA for possible BSEE funding
Propose a session at IOSC 2014 on Oil Simulants and Intentional Oil Spills	NOAA	2013	Encourage paper submittals from workgroup members. Abstracts due July.
Outreach to NGO community on attitudes/positions.	Pew Environment Group	2013	Begin process of educating and informing environmental groups.

[19] http://nrt.sraprod.com/nrtconf/

ACTION ITEM	LEAD ORGANIZATION	TIMELINE	NOTES
Develop whitepaper on testing the permitting process	Nuka Research	April 2013	Propose a process to apply for various permits to use simulants. Submit in response to BAA for possible BSEE funding.
Outreach to Great Lakes states for support/input	USCG R&D Center	Ongoing	Also look at other areas with strong bias toward mechanical recovery as potential stakeholders.

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Appendices

Appendix A: Workshop Invitees

ORGANIZATION	INDIVIDUAL(S)
Alaska Department of Environmental Conservation (ADEC)	Crystal Smith, Emergency Response Program Gary Folley, State On-Scene Coordinator Neil Huddleston, Emergency Response Program Vince Kelly, Industry Preparedness Program Young Ha, Emergency Response Program
Alyeska/SERVS	Mike Day, Operations Manager
American Petroleum Institute	Richard Ranger, Senior Policy Advisor
Association of Petroleum Industry Cooperative Managers (APICOM)	Ernie Quesada, General Manager, Clean Rivers Cooperative Ike Ikerd, General Manager, Clean Seas Todd Paxton, General Manager, Cook Inlet Spill Prevention and Response, Inc. (CISPRI)
Bureau of Safety and Environmental Enforcement (BSEE)	Christy Bohl, Alaska Oil Spill Program Regional Administrator Kelly Schnapp, Senior Oil Spill Response Advisor Lori Medley, Oil Spill Response Research Coordinator
Cook Inlet Regional Citizens Advisory Council (CIRCAC)	Steve “Vinnie” Catalano, Director of Operations
Environmental Protection Agency (EPA)	Calvin Terada, Alaska Federal On-Scene Coordinator Craig Matthiessen, Director, Regulation and Policy Development Division, Office of Emergency Management, (RPDD OEM) Greg Wilson, Office of Emergency Management Matt Carr, Alaska Federal On-Scene Coordinator Nick Nichols, RPDD OEM, NCP Product Schedule
National Oceanic and Atmospheric Administration (NOAA)	Dave Westerholm, Director, Office of Response and Restoration Doug Helton, Incident Operations Coordinator Gary Shigenaka, Marine Biologist Glen Watabayashi, Modeler John Tarpley, Operations Branch Chief John Whitney, Scientific Support Coordinator Mark Dix, Emergency Response Deputy Chief Robert Jones, Chemist Ruth Yender, Scientific Support Coordinator Steve Lehmann, Scientific Support Coordinator/NRT
Nuka Research and Planning Group, LLC	Andrew Mattox, Analyst Elise DeCola, Operations Manager Tim Robertson, General Manager
The Pew Charitable Trusts	Marilyn Heiman, US Arctic Program Director Melissa Parks, Associate
Oil Spill Recovery Institute (OSRI)	W. Scott Pegau, Research Program Manager
Prince William Sound Regional Citizens' Advisory Council (PWSRCAC)	Jeremy Robida, Project Manager* Mark Swanson, Executive Director Roy Robertson, Project Manager/Drill Monitor

ORGANIZATION	INDIVIDUAL(S)
Spill Control Association of America (SCAA)	Brian House, Moran Environmental Recovery
States/British Columbia Task Force	Sarah Brace, Executive Coordinator
United States Coast Guard (USCG)	Kurt Hansen, Research & Development Center John Caplis, Office of Marine Environmental Response Policy Mark Wagner, D17 Nick Olmstead, D17 Rhianna Macon, Office of Marine Environmental Response Policy Sara Booth, Office of Marine Environmental Response Policy
University of New Hampshire Coastal Response Research Center (CRRC)	Nancy Kinner, Director Kathy Mandsager, Program Coordinator
Washington Department of Ecology	Dale Jensen, Program Manager Elin Storey, Preparedness Section Drill Coordinator

Appendix B: Workshop Agenda

Nuka Research and Planning Group, LLC

*Participants who cannot travel to the workshop will have the option to participate via webinar. Instructions for webinar will be distributed prior to the workshop.

WORKSHOP PURPOSE

The Prince William Sound Regional Citizens' Advisory Council (PWSRCAC), the Oil Spill Recovery Institute (OSRI), and the Spill Control Association of America (SCCA) convened this high level Workgroup of oil spill response and marine environment experts from around the U.S. to:

- Determine if there is a national consensus that oil spill simulants are needed to improve oil spill response technologies and tactics in the U.S.
- Identify preferred substances for use as simulants in on-water oil spill response exercises and equipment trials.
- Identify state and federal permitting requirements for simulant materials to be used in on-water oil spill response exercises and equipment trials.
- Determine whether blanket permits may be issued to facilitate on-water oil spill response exercises and equipment trials without harming the environment.

AGENDA

8:00 am	**Continental Breakfast**	
8:30 am	**Welcome & Introductions**	Mark Swanson, PWSRCAC
8:45 am	**Workshop Purpose & Scope**	Tim Robertson, Nuka Research
9:00 am – 10:45 am	**Panel 1: The Need for Oil Simulants** The panel will begin with presentations from panel members identifying needs in four focus areas: • Trajectory Modeling • Booming and Containment • On-water recovery/skimming • Broken Ice/Arctic spill response A facilitated group discussion will follow. The goal of this panel discussion is to develop a consensus list of oil simulant needs for the four focus areas.	**Panel 1 Members** Glen Watabayashi, NOAA Roy Robertson, PWSRCAC Kurt Hansen, USCG R&D Center (teleconference) Brian House, SCAA Todd Paxton, APICOM
10:45am	**Coffee Break**	

Page 1 of 2

Nuka Research and Planning Group, LLC

AGENDA (Continued)		
11:00 am	**Group Discussion: Parameters for Simulant Material Use** The group will review and briefly discuss oil simulant materials in two categories: liquid and particle-based. Discussion points will include a review of past experience with simulants and considerations of the pros and cons associated with specific simulant materials, including their environmental impacts, ease of recovery, costs, and other considerations. The goal of this discussion is to identify the range of simulants available and their applicability to meet the needs identified during Panel 1. Facilitator: Tim Robertson, Nuka Research	
12:15pm	**Lunch Break**	
1:00 pm	**Panel 2: Federal Permitting & Regulatory Requirements** Each panel member will provide a 5-10 minute opening statement summarizing their agency's regulations and/or permit requirements for use of oil simulants in the environment, including requirements based on type of material, limitations on amounts, and other restrictions or requirements. A facilitated group discussion will follow. The goal of this panel discussion is to identify the federal regulatory parameters for simulant use and to develop a consensus approach to securing permits.	**Panel 2 Members:** Craig Matthiessen, EPA Christy Bohl, BSEE (teleconference) Dave Westerholm, NOAA LT Rhianna Macon, USCG/NRT (representing CAPT John Caplis)
3:15 pm	**Coffee Break**	
3:30 pm	**Group Discussion: Next Steps** The group will review all consensus items from Panel and Group discussions. The group will identify the critical next steps for moving forward with oil simulant approvals for use in U.S. waters. Next steps may include permit applications, additional workshops/meetings, research and development projects, or other topics as identified by the group. Facilitator: Elise DeCola, Nuka Research	
4:30 pm	**Adjourn**	
7:00 pm	**No-host dinner in "U" Village**	Location TBA
MEETING MATERIALS		
Oil Spill Simulants Workshop Briefing Document - Link		
PROJECT WEBSITE		
Web address: http://www.nukaresearch.com/projects/pwsrcacOSSW/documents.htm Login: simulants PW: oranges		
QUESTIONS OR ADDITIONAL INFORMATION		
Contact Elise DeCola for more information. elise@nukaresearch.com or 508-454-4009		

Page 2 of 2

Appendix C: Discussion Questions

DISCUSSION QUESTIONS

PANEL 1: The Need for Oil Simulant Materials

Goal: The goal of this panel is to establish a consensus-based statement of needs for oil simulants. Panelists have expertise in one or more of the focus areas listed.

Focus Areas: Consider the need for simulants for the following purposes:

- Drills and exercises
- Equipment trials and testing
- Research and development
- Validation and improvement of trajectory modeling
- Arctic/oil-in-ice spill response
- Evaluating equipment performance

For each of the focus areas, consider:

- Why are simulants needed?
- What purpose would simulants serve that cannot otherwise be accomplished?
- In what environments/settings would simulants be used?
- What types of simulants are best suited to each particular need?
- How are simulants being used at present?
- Are there alternatives to simulants?
- What are the costs and impacts associated with simulant use?

Notes:

PANEL 2: Federal Permitting and Regulatory Requirements

Goal: The goal of this panel is to identify the applicable regulations and permitting requirements that apply to the use of oil simulants in the environment. Panelists represent key federal agencies with permitting authority.

Focus Areas: Consider the regulatory environment for simulant use:

- Which agencies have permitting authority?
  - What is each agency's regulatory purview?
  - Are there specific permits/processes in place?
  - Who are the key individuals/departments with oversight/approval authority?
- Recent experience with federal permits for simulant use:
  - Have permits been issued in the past? To whom? For what purpose?
  - What are the criteria for issuing permits (retrieval, reporting, substance type, etc.)
- What actions are needed to make permitting requirements:
  - More clearly understood
  - Streamlined

Notes:

Appendix D: Panelist Presentation Slides

SCAA
SPILL CONTROL ASSOCIATION OF AMERICA

Oil Simulants Workgroup

"An Industry Perspective"

Spill Control Association of America
(SCAA)
March 21, 2013

SCAA
SPILL CONTROL ASSOCIATION OF AMERICA

Spill Control Association of America
"The Voice of Spill Response Professionals"

- SCAA represents a broad coalition of emergency responders and equipment manufacturers
  - "For profit" representation of OSRO community
  - Currently 72 members strong
    - *Collection & Recovery input*

1

SCAA

Input from SCAA Membership

- Common Theme: “What is the Goal of the Exercise”?
  - Dictates best option for simulant use
- Oranges, peat moss and popcorn are most commonly used simulants by SCAA membership
- Current options provide adequate measure of response time, boom deployment and tactics (*Collection Measures*)

SCAA

Input from SCAA Membership (Con’t)

- Entrainment and recovery less effective with simulants currently being used (*Recovery Measures*)
  - Physical properties and stability of materials create issues
  - Tank Testing results adequate in absence of oil-based simulants

2

SCAA
SPILL CONTROL ASSOCIATION OF AMERICA

Challenges

- Paradox of "one size does not fit all'
  - Different oils, different conditions – how do you "*simulate*" field conditions?
  - Impact of dispersed oil?
- Sustainability and Momentum
  - Can the cause generate enough momentum for consideration and implementation?
  - Funding, prioritization and regulatory hurdles

SCAA
SPILL CONTROL ASSOCIATION OF AMERICA

Challenges (Con't)

- Client & Industry input
  - Additional burden & costs for exercises?
- Responder Immunity
  - Potential liability concerns for use of oil-based simulants

3

SCAA

SPILL CONTROL ASSOCIATION OF AMERICA

SCAA's Position & Recommendations

- SCAA supports continued evaluation and standardization of simulants, including those that are oil-based
- Any tool that creates greater "realism" in an equipment deployment or exercise will enhance the overall response capability
- The study must consider the specific challenges identified

SCAA

SPILL CONTROL ASSOCIATION OF AMERICA

4

Acquisition Directorate
Research & Development Center

Use of Oil Simulants In R&D

RDC | Kurt Hansen
Simulants Workshop
Seattle, WA
March 21, 2013

Oil Simulants with Fast Water

Popcorn and Rice Hulls provided limited testing ability

Acquisition Directorate
Research & Development Center

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R&D Center Strategic Value & Capability/
RDC/CAPT Jones/RADM Blore/3 Aug 07   1

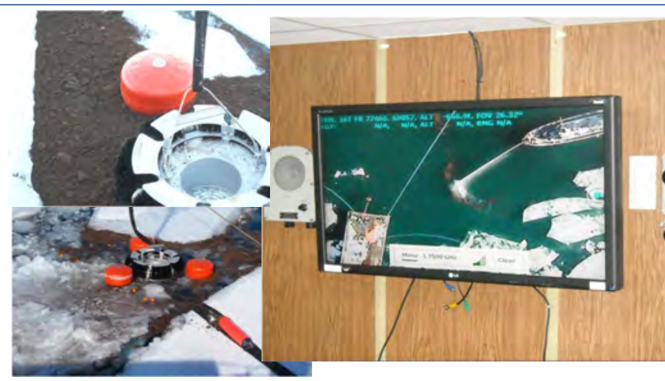
Use of Dye and Oranges for Booming

Oranges good for visibility

Acquisition Directorate
Research & Development Center

UNCLASS/R&D Center 4/3/13 11:57 2

Use of Simulants for oil-in-ice



Combining oranges and peat moss provided good visibility and approximate oil movement

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Research & Development Center

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R&D Center Strategic Value & Capability/
RDC/CAPT Jones/RADM Blore/3 Aug 07 2

Other Issues

- Current simulants approximate only partial oil characteristics
- Multiple simulants may be needed for each deployment
- None appear to work for brush and some belt skimmers (little adhesion)
- Not clear if dyes really approximate oil in water column
- Would like one that can be used in large quantities
- No sinking simulants available (no transition in characterictics)
- Need to be able to simulate motion in currents and waves

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Research & Development Center
UNCLASS/R&D Center 4/3/13 11:57 4

Questions?

Contact: Kurt Hansen (860) 271-2865
Kurt.A.Hansen@USCG.Mil

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Research & Development Center
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R&D Center Strategic Value & Capability/
RDC/CAPT Jones/RADM Blore/3 Aug 07 3

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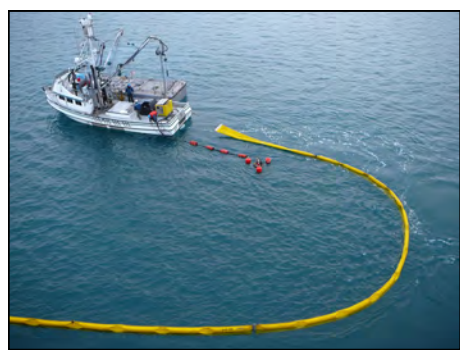
Roy Robertson, PWSRCAC



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Grapefruit and boom from 2012 Miami exercise

Oil Simulants and Modeling

March 21, 2013 Seattle, Wa
Emergency Response Division
National Oceanic and Atmospheric Administration
Seattle, Washington USA
http://response.restoration.noaa.gov

HAZMAT/ERD Experience

- Fruits (mostly oranges)
- Dye
- Popcorn
- Dog food
- Bagasse, Peat
- Drift Cards
- Drifters

Strait of Juan De Fuca dye with bird in dye plume

1

Why do we care?

- During an event it may help track oil
- To help us understand currents and winds

DWH drogue tracking

What have we learned

- After a few hours to days, objects will distance themselves from actual oil
- Different simulants for different purposes

Drift cards released monthly from tanker offloading site. 2 year study to see how how might move under different conditions.

2

The challenges

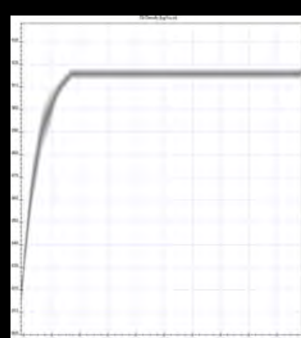
- Simulants do not behave like oil. They don't have the bulk physical properties of oil.
- Oil properties change with time and environmental conditions
- Different oils have different properties

Santa Barbara experiment with fruits and vegetables

Oil Density

Peat Moss field exercise

USCG Oil-in-Ice III Exercise 2/13



ADIOS 2 output for density vs time

How does simulant reflect this behavior?

3

Different Oils

API Examples

- Coal Oil Point Seep (11.7)
- Platform Irene (11.2)
- Hondo (19.6)
- Platform Gail (20.6)
- Carpinteria (22.9)
- Point Aguello Light (30.3)
- Pitas Point (38.0)

2006 NOAA Safe Seas Exercise, driftcards and dye

California crude oils

Small differences make a big difference

- Small differences in bulk properties will result in transport difference over hours to days that can be large.

Global HyCOM currents off Oregon

Marine Debris graphic of why floatables disperse

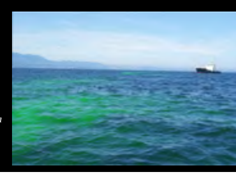
4

Bushy's Rule

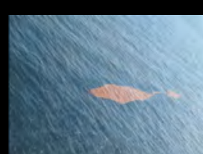
- No model will give good answers all the time.
- No model will give good answers in it's entire domain for a single time step.

Using oil simulants to calibrate or measure model skill will not guarantee that the model will preform well or poorly under different conditions or for different locations.

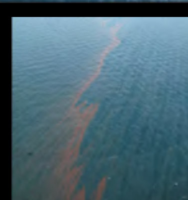
Dye drop in Strait of Juan De Fuca



Last slide. Every oil spill is a modeling opportunity



Can we simulate DWH floating oil?



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Oil Simulants Workshop

Role of EPA:

Permitting Intentional Discharge

R. Craig Matthiessen
Office of Emergency Management (OEM)
US EPA, Washington, DC
March 21, 2013

Statutes/Regulations

- Clean Water Act (CWA) Section 311 (40 CRF 110.5 (c)):
  - (c) Any discharge of oil explicitly permitted by the Administrator in connection with research, demonstration projects, or studies relating to the prevention, control, or abatement of oil pollution.
- However, CWA 301:
  - The discharge of any pollutant by any person is unlawful except as in compliance with CWA 301. Oil is a pollutant and the discharge of such would be unlawful absent compliance with 301 (via NPDES* permit, etc.)

*National Pollution Discharge Elimination System (NPDES)

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Policy/Perspective

- We support efforts on oil spill research and use of simulants
- Focus of intentional oil discharge should be research
- Simulants may have a role
- But, oil or pollutant discharge should be:
  - Last resort; exhaust all other alternatives
  - Result in minimal environmental impact, if any
- Work out a clear permit process

Permit Guidance

- Needs revision:
  - Consider recognition of simulants?
    - Special concerns that may need to be addressed?
  - Clearance process:
    - What kind of permit(s) actually needed and how to get it(them)?
    - Role of states and other stakeholders
  - Quantity (1,000 gal) and/or time limits?
  - Location limits?

2

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Next Steps

- Intentional discharge *can* be permitted:
  - Its been done before (1994)
  - There are high hurdles:
    - Scientifically valid; broad stakeholder involvement and review; thorough, controlled
  - Concerns:
    - Perception
  - Role of the National Response Team (NRT)

3

NOAA | National Ocean Service | Office of Response and Restoration

NOAA’s Role

Key Mandates and Responsibilities

- Species Protection and Regulation
  - Endangered Species Act
  - Magnuson-Stevens Fishery Conservation and Management Reauthorization Act
  - Marine Mammal Protection Act

- Managed Areas
  - Coral Reef Conservation Act
  - Marine Protection, Research and Sanctuaries Act
  - National Estuarine Research Reserve

- Oil and Chemical Spills (OPA 90 & CERCLA/Superfund)
  - Response Support to Federal On Scene Coordinator (Coast Guard and EPA)
  - Natural Resource Damage Assessment (NOAA is a Federal Trustee)

- Marine Debris Research, Prevention and Reduction Act

Prepared: 3/20/2013

OFFICE OF MARINE ENVIRONMENTAL RESPONSE POLICY

Issue Paper

Subject: Oil Simulants

Background

- The USCG relies on test facilities and on-water exercises/demonstrations to evaluate the effectiveness and performance of oil spill response and recovery equipment and countermeasures. The Coast Guard (as well as BSEE, EPA and DOT PHMSA) requires its plan holders to have access to spill response equipment that is effective and efficient. The government requires industry to test this equipment to ensure that it is within standards.
- The Coast Guard Research and Development Center has relied primarily on controlled environment test tank facilities, such as OHMSETT, to test the effectiveness of mechanical oil response equipment using spilled oil.
- Field exercises also provide the opportunity to deploy oil spill response equipment and test spill countermeasures, such as booming strategies, using approved stimulant materials such as oranges, rice hulls and peat moss.
- Permits to discharge oil for R&D purposes must be submitted in accordance with 40 CFR 110.5 and require EPA approval as well as additional state or local approvals.

Analysis/Concerns

- Currently, very little opportunity exists for field testing of oil spill recovery equipment and countermeasures using spilled oil or simulants that have the same physical characteristics of oil. Without the ability to test equipment in real world conditions industry and government are hindered in their abilities to identify the best and most environmentally effective equipment.
- Field tests or demonstrations tend to use the simulant material that is either most available or the easiest to gain approval for from local or state authorities.
- This severely limits the ability to accurately evaluate the equipment's performance since theses materials do not accurately mimic the physical characteristics of oil or the material is not suited for the environment in which the equipment is being evaluated. For example, while dyes are very visible, they behave more like water instead of oil. Conversely, popcorn or rice hulls, while readily available; do not provide accurate interaction with the equipment. These simulants also cannot mimic the changes to the physical characteristics of oil as a result of weathering.
- Additionally, there are currently no simulants which could be used to evaluate submerged oil issues or tracking oil residues from in-situ burning.
- Because of these limitations; test and demonstrations of equipment using simulants cannot provide a full picture of the equipment's performance or effectiveness. Therefore, equipment and countermeasures cannot be fully evaluated during industry and government required field exercises under the PREP program.

Next Steps / Action Items

- The Coast Guard recognizes the need to have the ability to test response tools and validate systems that would be used during an oil spill response. Simulant use may provide an environmentally acceptable means for industry to conduct such tests under government supervision.
- While current simulants used to evaluate these systems are largely chosen based on availability and pose less risk to the environment; they cannot fully test oil spill response systems in an open water environment.
- The USCG understands that the decision to use an oil simulant must consider the net environmental benefit of introducing the material into the environment and requires an acceptable level of risk from all stakeholders. The USCG relies on EPA and NOAA to define these acceptable parameters of risk.
- The USCG recommends the development, perhaps through the NRT, of a tool that provides guidance to users that matches a recommended simulant to the equipment being tested, taking into consideration the environment that the test or demonstration will occur.
- The USCG also supports the continued research, leveraging the ICCOPR for interagency consensus, on oil simulants that more accurately mimic oil properties and behavior (to include sinking and submerged oil) in the open water environment.

Prepared by LT Rhianna Macon (CG-MER) and Kurt Hansen (USCG R&D Center)

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Appendix E: Acronyms

ADEC	Alaska Department of Environmental Conservation
API	American Petroleum Institute
APICOM	Association of Petroleum Industry Cooperative Managers
ASTM	American Society for Testing and Materials
BAA	Broad Area Announcement
BSEE	Bureau of Safety and Environmental Enforcement
CFR	Code of Federal Regulations
CIRCAC	Cook Inlet Regional Citizens Advisory Council
CISPRI	Cook Inlet Spill Prevention and Response, Inc.
CRRC	Coastal Response Research Center
CWA	Clean Water Act
EDRC	Estimated daily recovery capacity
EPA	Environmental Protection Agency
GRP	Geographic response plan
GRS	Geographic response strategy
ICCOPR	Interagency Coordinating Committee on Oil Pollution Response
IMO	International Maritime Organization
IOSC	International Oil Spill Conference
LLC	Limited Liability Company
LT	Lieutenant
NCP	National Contingency Plan
NGO	Non-governmental organization
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollution Discharge Elimination System
NRT	National Response Team
OEM	Office of Emergency Management (EPA)
OSC	On-Scene Coordinator
OSRI	Oil Spill Recovery Institute
OSRO	Oil Spill Removal Organization
PREP	Preparedness for Response Exercise Program
PWSRCAC	Prince William Sound Regional Citizens' Advisory Council
R&D	Research and Development
RPDD	Regulation and Policy Development Division (EPA)
RRT	Regional Response Team
SCAA	Spill Control Association of America
US	United States
USCG	United States Coast Guard
WA	Washington