R³: Regulator Relationships and Response - Unlocking the toolbox through stakeholder engagement’
Dispersant banned in USA

Credit: U.S. Coast Guard, Stephen Lehmann / Marine Photobank.
Following USA ban, Nigeria also bans the use of dispersant in national waters
What we have seen.......
Spill Science: a Rapidly Expanding Domain
(Growth at 4x overall science literature)

Average Annual Spill Papers*
(based on Murphy et al, 2016)

Deepwater Horizon (2010)

Torrey Canyon (1967)
Santa Barbara Blowout (1969)

Ixtoc 1 Blowout (1979)
Amoco Cadiz (1978)

Exxon Valdez (1989)
First Gulf War (1991)

Prestige (2002)

* Almost 4x faster growth than overall science literature

(>$1+ billion in research grants through 2040)

Original slide developed by Jordan Stout
With some alarmist headlines…

Photochemical Oxidation of Oil Reduced the Effectiveness of Aerial Dispersants Applied in Response to the Deepwater Horizon Spill

Colin F. Ward, Cassia J. Armstrong, Rabiny N. Corney, Deborah F. McCay, and Christopher M. Reddy

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Department of Chemistry, Trinity College, Hartford, Connecticut 06106, United States
National Risk Management Research Laboratory, Office of Research and Development, U.S. Environmental Protection Agency, Cincinnati, Ohio 45236, United States
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Photography

Samantha Joyce, a professor of marine sciences in the Franklin College of Arts and Sciences, studies the oil plumes generated by the 2010 Deepwater Horizon oil spill.

Oil dispersants can suppress natural oil-degrading microorganisms, new study shows

November 9, 2015

Writer: Alan Flurry
Contact: Samantha B. Joyce

Athens, GA.- The use of chemical dispersants meant to stimulate microbial crude oil degradation can in some cases inhibit the microorganisms that naturally degrade hydrocarbons, according to a new study led by University of Georgia marine scientists. Their findings are based on laboratory-simulated conditions that mimic Gulf of Mexico deep waters immediately following the Deepwater Horizon oil spill.

The study, published in the Proceedings of the National Academy of Sciences, examined microbial oil degradation in the Deepwater Horizon oil spill.
Before

Limited volumes of dispersant applied over a limited time (window of opportunity) surface use only.

Good body of evidence and knowledge exists from research over 40+ years e.g. US Natural Research Council publications in 1985 (Oil on the Sea), 1989 (Using Dispersants on the Sea), 2003 (Oil in the Sea III) and 2005 (Oil Spill Dispersants: Efficacy and Effects)

After

Large volumes of dispersant (6,980m³) applied over a long time (87 days) SSDI used for the first time.

A lot research into dispersants (and other) as a result

Media and public concern regarding toxicity to the environment and human health

Lack of understanding on how dispersants work and perception that effects not known or understood

Rico-Martinez et al, 2013 Reported as “Dispersant makes oil 52 times more toxic”

D’Andrea et al, 2013
Concludes “Clean-up workers exposed to the oil spill and dispersant experienced significantly altered blood profiles, liver enzymes, and somatic symptoms.”

Kleindeinst et al, 2015
Concludes “Dispersant use inhibits oil degrading microbes”

J.S. van Eenennaam et al, 2016
Hypothesis that dispersants (without oil) induced marine snow production by phytoplankton

Ward et al, 2018
Concludes “Partial Photo chemical oxidation was a dominant fate of DWH surface oil” and could have limited dispersant effectiveness

Paris et al, 2018
Concludes “Subsea dispersant injection ineffectual for the Macondo Blowout”
Perceived lack of effectiveness?

Unvalidated science?

Dispersant Impacts

Pelagic Impacts

Human health impacts?

Dispersed Oil

Perceived physico-environmental impacts?

“Alternative strategy”?

Benthic Impacts

Doubtful, risk-averse policy makers

Media fuelled public perception

Perception or reality?
Some of what OSRL has done

- “Confident Ambassador”
- UK Regulators Workshop
- Nigerian Regulators discussions
- Working with the Singapore Chemical Standards Committee who is reviewing the standards for dispersants
- SSDI Workshop for Australian Offshore Regulator
- Support to National Academy of Science, Engineering and Medicine, Evaluation of the Use of Chemical Dispersants in Oil Spill Response review
- Support to IPIECA to finalise IMO Dispersant Guidelines (especially Part IV – SSDI) at PP4 Meeting
### What we have heard

Q: Please mention any concerns or issues you have with potentially using dispersant within the UK

<table>
<thead>
<tr>
<th>Concerns or Issues</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>We do not understand what the impact is upon the natural environment</td>
<td></td>
</tr>
<tr>
<td>Impact on marine chemistry and ecology</td>
<td></td>
</tr>
<tr>
<td>Impacts on the environment, protected sites, fisheries and bathing waters</td>
<td></td>
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<tr>
<td>Public perception / time window of opportunity</td>
<td></td>
</tr>
<tr>
<td>The media management and public perception.</td>
<td></td>
</tr>
<tr>
<td>Long term env. impacts, public perception</td>
<td></td>
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<tr>
<td>Public and media perception of use of chemicals, potential threat to public health etc</td>
<td></td>
</tr>
<tr>
<td>Inappropriate use</td>
<td></td>
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<tr>
<td>There appears to be a wish to use dispersants with minimal or no environmental rationale.</td>
<td></td>
</tr>
<tr>
<td>The use of large volumes of dispersant for no benefit.</td>
<td></td>
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</tbody>
</table>
How confidently could you explain and answer questions on how dispersants work?

Knowledge. On a scale of 1-5, with 1 being no knowledge and 5 being subject matter expert

How confidently could you explain how NEBA/SIMA relates to dispersant use?

Knowledge. On a scale of 1-5, with 1 being no knowledge and 5 being subject matter expert
The other side of the fence...

Operators will always ask to use dispersant as good "housekeeping".

We resent the 'faceless' request to spray dispersant, they just want to sweep their problems under the carpet.

We are all that's between the environment and Industry.

Industry just want to hide the problem to save money.

They see us as the bad guys...

We resent the unnecessary delays in granting permission to spray, we just want to minimise the damage.

We just want to do the right thing to protect the environment.

We want to understand what the regulators need to know to help them make a decision.
Discussion
Discussion

1. What else can we do?
- As an industry?
- As OSRL?
2. Are there any countries/regions that you particularly want us to target for dispersant outreach?
In 2017 it was recognised that Preparedness, Outreach and Response all have different priorities for engagement.
Response has prioritised our engagement activities based on spill risk.
Response prioritised countries have been assigned key focal points, or ‘Country Anchors’ to provide consistent visibility in that country to build longer term relations and provide a face for OSRL.
Discussion

What messages do we need to focus on delivering?
Some of our observations

- Exercises setting false expectations
- Be careful about the reasons used for dispersant use on exercises such as safety
- Asking to use dispersant and not putting it into the wider context
Reminder..resources available

IPIECA/IOGP

http://www.oilspillresponseproject.org

 Videos
 Good Practice Guides
 Guidance Documents
 Research Reports

API

http://www.oilspillprevention.org

 Fact Sheets
 Videos
 Links to Resources

OSRL

Technical Information Sheets

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National Academies Committee for the Evaluation of Dispersant Use for OSR

1. Assess the state of our knowledge about dispersant effectiveness (including comparisons across a range of dispersant formulations) and the fate, including short- and long-term fate, of untreated oil (no chemical dispersant applied), chemical dispersants, and chemically dispersed oil and the influence of dispersants on deposition (including marine snow), biodegradation, and/or transport of oil;

2. Evaluate and summarize research on the acute and chronic (sub lethal) toxicity of chemical dispersant formulations of comparable efficacy, chemically dispersed oil, and untreated oil at realistic environmental exposure levels. This will include characterization of the relative risks to wildlife health of untreated oil and chemically dispersed oil, taking into consideration exposure to volatile compounds, ingestion, and absorption of naturally versus chemically dispersed droplets;

3. Compare the benefits and limitations of dispersant application to the use of other clean-up methods (e.g. no-action, mechanical recovery, burning, and chemical herders in combination with burning);

4. Compare the relative human health risks for the use of dispersants with the use of other clean-up methods (exposure of response personnel and residents in Gulf coastal communities to oil and dispersants, and contamination of seafood);

5. Identify the research protocols and standards that would: i) increase the applicability of lab-based measurements to the field and ii) improve the comparability of research findings from different laboratories;

6. Assess the adequacy of the existing information to support risk-based decision-making or net environmental benefit analysis of response options under a variety of spill scenarios and recommend a “roadmap” of research and modelling to address identified information gaps.
Summary

- Presents an ongoing risk and challenge
- Full impact may only be realised in the event of an actual incident
- Proactive engagement with key stakeholders can only help (we think)