OBSERVATIONS, QUESTIONS AND RECOMMENDATIONS REGARDING USE OF DISPERSANTS ON THE BP DEEPWATER HORIZON SPILL

OVERVIEW

The Prince William Sound Regional Citizens' Advisory Council has studied chemical dispersants for many years. We have observed dispersants trials, monitored dispersants effectiveness testing, and advised on and sponsored independent research on dispersants. After these many years of study, it is our position that dispersants should not be used on Alaska North Slope crude oil spills in the waters of our region. Until such time as dispersants effectiveness is demonstrated in our region and shown to minimize adverse effects on the environment, the council does not support dispersant use as an oil spill response option. Mechanical recovery and containment of crude oil spilled at sea should remain the primary response methodology employed in our region.

The council has significant concerns regarding the first response use of dispersants in the BP Deepwater Horizon spill in the Gulf of Mexico. Huge and unprecedented amounts of dispersants were applied via deep-water injection, a tactic that is unproven and potentially harmful. In the words of one federal official, "This is just a giant experiment going on and we're trying to understand scientifically what this means."[i]

The council's concern is so strong because this process set a bad precedent and the risk exists that independent scientific analysis, multi-year in nature, will not start promptly enough to document the impacts of this unprecedented use of dispersants. Therefore the council has decided to offer recommendations on the subject. The council's concern is compounded by the risk that the lack of timely independent analysis will allow broad, general claims to be made about the success of the dispersants applications, when none are readily apparent or can be proved scientifically. It will be important to see independent, verifiable

quantitative data on dispersant effectiveness relative to the BP Deepwater Horizon spill.

OBSERVATIONS, QUESTIONS AND RECOMMENDATIONS

MAJOR OBSERVATIONS

Following are some observations, questions, and recommendations from the council regarding the subject of unprecedented dispersants use in the Gulf of Mexico by BP.

Observation: Two visibly different types of surface oil were observed in the waters of the Gulf of Mexico as a result of the BP Deepwater Horizon spill. One was a red emulsion and the other was what appeared to be relatively unaltered black crude oil. The black oil looked and behaved like untreated crude oil on water. Reports from responders and observers hypothesized that the surfacing red mixture was the dispersant-treated oil mixture and that it was very distinct from the black crude oil. The red oil appeared to be a semi-emulsified mixture of dispersant and oil that was very close to neutral buoyancy. Responders and observers also reported that boom would not easily collect this emulsion when it came to the surface. No matter how slowly responders towed boom through the emulsion, it washed right under the boom. It was difficult or impossible to corral and collect for skimmers to pump out and it could not be burned. It will be important to firmly establish the difference between these two observed oils on the basis of chemical analysis.

In May and June 2010, there were slicks of around 10 square miles of the black, apparently untreated oil being mechanically recovered or burned. There were even larger areas covered with the red mixture that appeared to have been rendered untreatable for mechanical recovery, burning or any other techniques.

Questions: Has any analysis been done on these two distinct types of oil and are the results available to the public? Is any research (or additional research) planned?

Recommendation: The two visibly distinct types of oil observed in the spill should be tested at least for the following: standard physical properties such as Viscosity, Density, Sulfur Content, and Water Content. The SARA contents should be measured including the Distillation Curve. Gas chromatography analysis should be carried out yielding the typical hydrocarbon quantifications. Several studies have identified these properties as key to understanding oil behavior and fate.[ii] These same properties also constitute the input for a large

number of oil spill behavior models including NOAA's ADIOS and Environment Canada models on chemical dispersion, emulsification and evaporation. Analysis should also be done to determine the presence of surfactants from dispersants in the two types of oil.[iii]

Observation: During the week of May 24, 2010, the federal government requested that a NOAA/University of New Hampshire Research Center host a meeting of over 50 scientists in an effort to make recommendations on dispersant use in the BP Gulf of Mexico spill. This was the third in a series of closed meetings by government scientists but it is the only one for which minutes have been provided to the public. A group consensus statement from the meeting said that "use of dispersants and the effects of dispersing oil into the water column has generally been less environmentally harmful than allowing the oil to migrate on the surface into the sensitive wetlands and near shore coastal habitats." This type of conclusion should be based on estimates of the impact in the water column, but it is not clear that this impact has been adequately assessed and what scientific data was used to do such an assessment.

Recommendation: To ensure public acceptance of conclusions from such a group and to ensure that they are made in the best interest of the public, the group should be more broadly representative of the scientific community and include scientists whose research has raised concerns about dispersants effectiveness and toxicity, including those from NGOs and universities, and, especially, include researchers who have been out on the waters conducting active field work on the spill. Reports from such groups should make clear what data and assumptions they are using to arrive at their conclusions.

Observation: A common assumption that has appeared in media and elsewhere is that "dispersants save the shoreline." There are three basic reasons why this assumption is not likely to be valid. First, dispersants are not 100 percent effective. As observed daily with the BP Deepwater Horizon spill, a large percentage of the oil followed the laws of physics and resurfaced. A second assumption is that the "100 percent dispersed" oil will not affect the shoreline as oil dispersed within the water column. However, it is just as likely to travel onto the shoreline as to be carried offshore. Third, dispersed oil mixtures are in a form, at least temporarily, where they can more easily flow directly under or through protective nearshore response booming thus penetrating into the very shoreline it was intended to protect in a form that may well go more deeply into the substrate.

Recommendation: Evaluation of dispersants use must ensure that decisions to apply dispersants are made based on the best available scientific evidence, not the simplistic assumption that dispersants will save the shoreline.

Observation: The mass balance for a spill response has the following basic parameters: mechanical recovery, evaporation, natural dispersion, chemical dispersion and burning, and normal slick loss (typically about 30 percent).[iv] A bias often introduced in the mass balance evaluation of dispersants effectiveness is the attribution of evaporation and natural dispersion to chemical dispersion, so that dispersants appear more effective than they actually are. This bias in the approach to reporting dispersants effectiveness must be corrected in order to evaluate the response option efficacy appropriately, otherwise the rate of chemical dispersion will be overestimated.

OTHER OBSERVATIONS

Observation: Dispersed oil is more toxic than untreated oil alone and it kills life in the water column. It is not the toxicity of the dispersant that is relevant, it is the toxicity of the dispersed oil mixture within the water column that is important.[v]

Observation: Used as a first response, dispersants can render other responses – such as booming and skimming - less effective. The National Contingency Plan states that mechanical responses should be the priority, but for a variety of reasons dispersants have often been used immediately. Stated reasons for immediate use of dispersants have included such explanations as the weather is right, there's only a limited time window to use them so it should be done immediately, it should be done while the oil is away from shore, booming and skimming will be more difficult, etc. Focus on dispersants takes away from what should be the highest priority focus - actually recovering and removing the oil from the environment.

SUMMARY

The massive use of dispersants on the BP Deepwater Horizon spill in the Gulf of Mexico sets a bad precedent and it is not clear that independent scientific analysis, multi-year in nature, will start promptly enough to document the potential impacts of this unprecedented use of dispersants. Timely, independent analysis funded and conducted outside of the standard industry and agency framework will be essential to ensure that evaluations of the effectiveness of dispersant applications are based on scientific evidence. The recommendations and questions about dispersants use detailed above should be a major focus of the independent scientific community in the near future and over the long-term, multi-year evaluation of this spill's effects.

ADDITIONAL RESOURCES

- Prince William Sound Regional Citizens Advisory Council website www.pwsrcac.org/projects/EnvMonitor/dispers.html <http://www.pwsrcac.org/projects/EnvMonitor/dispers.html> on dispersants, which provides access to the relevant literature, including recent literature databases, surveys and syntheses.

- Oil Spill Dispersant Effects Research - 2005 National Academy of Sciences Report – Oil Spill Dispersants: Efficacy and Effects. A report by the National Academy of Sciences on the efficacy and effects of oil spill dispersants. Key findings are summarized.

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[i] http://www.guardian.co.uk/environment/2010/may/31/bp-oil-spill-death-impact, May 32, 2010

[ii] Fingas, M.F., A Review of Literature Related to Oil Spill Dispersants 1997-2008, Prince William Sound Regional Citizens' Advisory Council (PWSRCAC), Anchorage, Alaska, http://www.pwsrcac.org/docs/d0053000.pdf, September, 2008.

[iii] Wang, Z. and M. F. Fingas, "Analysis of Sorbitan Ester Surfactants: Part II: Capillary Supercritical Fluid Chromatography", Journal of High Resolution Chromatography, Vol. 17, pp. 85-90, 1994

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[iv] Brown, H.M. and R.H. Goodman, "Dispersant Tests in a Wave Basin: Four Years of Experience", in Proceedings of the Eleventh Arctic Marine Oilspill Program (AMOP) Technical Seminar, Environment Canada, Ottawa, ON, pp. 501-514, 1988;
Page, C., J. Bonner, C. Fuller and M. Sterling, "Dispersant Effectiveness in a Simulated Shallow Embayment", in Proceedings of the Twenty-Fifth Arctic Marine Oilspill Program Technical Seminar, Environment Canada, Ottawa, Ontario, pp. 721-733, 2002a;
Fingas, M.F., "Dispersants: A Review of Effectiveness Measures and Studies", in Proceedings of a Dispersant Workshop, December, 1989, Reston, VA, sponsored by National Oceanic and Atmospheric Administration, Washington, DC, 1989, p.18;
Fingas, M.F., "A White Paper on Oil Spill Dispersant Field Testing", Prince William Sound Regional Citizens' Advisory Council (PWSRCAC) Report, Anchorage, AK, 40 p., 2002; and
Fingas, M.F. and E. DeCola, Oil Spill Dispersant Effectiveness Testing in OHMSETT, Prince William Sound Regional Citizens' Advisory Council (PWSRCAC), Anchorage, Alaska, http://www.pwsrcac.org/projects/EnvMonitor/dispers.html, 27 p., May, 2006.

[v] Fingas, M.F., A Review of Literature Related to Oil Spill Dispersants 1997-2008, Prince William Sound Regional Citizens' Advisory Council (PWSRCAC), Anchorage, Alaska, http://www.pwsrcac.org/docs/d0053000.pdf, September, 2008.