Briefing for PWSRCAC Board of Directors – January 2021

INFORMATION ITEM

Sponsor: Betsi Oliver and SAC
Project number and name or topic: 9550 Dispersant Use Position Update

1. **Description of agenda item:** Briefing on the Dispersant Use Position Update project and invitation to join the project team.

The current Board position on the use of dispersants, adopted in 2006, is included here as Attachment A. The Scientific Advisory Committee (SAC) prepared supporting documents in 2006 and 2013, included as Attachment B and Attachment C. The intent of this project is to support the Board to make an informed decision regarding updating or possibly changing its 2006 position on the use of chemical dispersants, and to generate supporting documents.

The Council has thorough resources on the current state of dispersant science, compiled every few years by Merv Fingas with other contractors' contributions as well, and supported by volunteer and staff participation in professional contexts, including the Arctic Marine Oil Spill Program (AMOP) technical seminar. SAC has been reviewing and approving this work regularly and the Board has also received much of this information. The intention of this project is not to repeat those efforts, but to manage the synthesis of available data into a useable format for staff and the Board.

A contractor will be solicited to guide the Board through considering the numerous data and the impacts of possible positions the Council could adopt regarding the use of dispersants in our region. The project team will help select a contractor and provide guidance that supports the contractor to produce satisfactory deliverables. An important first step will be to compile our internal documentation from decades of monitoring dispersants research and providing recommendations on their use, so that it can be thoroughly reviewed. External resources related to the topic will also be considered.

Board members are encouraged to consider participating on the project team, especially considering the Board may be the invited to adopt or amend its formal position at the project's end as well as approve supporting messaging.

2. **Why is this item important to PWSRCAC:** Under the Oil Pollution Act of 1990 (OPA 90), PWSRCAC is authorized to participate in the development of plans and policy guidelines used in oil spill response. Additionally, federal agencies are required to consult with PWSRCAC prior to taking action in the region. Chemical dispersant use has been a longstanding controversial topic. The use of dispersants may impact the health of marine resources and human health. The use of dispersants also may compete with mechanical response for resources. PWSRCAC has invested significant time and resources in efforts to sponsor dispersant research, monitor dispersant research, and keep track of relevant regulations and policies governing dispersant use in the Prince William Sound region.

3. **Previous actions taken by the Board on this item:**

Meeting	Date	Action
Note: Please request a list of actions prior to 2001 from staff.		
Board	2/22/01	Approved the report on dispersant effectiveness tests by Adam Moles of Auke Bay Labs.
XCOM	6/22/01	Approved report "The Effectiveness of Corexit 9527 and 9500 in Dispersing Fresh, Weathered, and Emulsion of Alaska North Slope Crude Oil Under Subarctic Conditions."
XCOM	5/3/02	Approved the report titled, "A Review of Literature Related to Oil Spill Dispersants Especially Relevant to Alaska" by Dr. Merv Fingas.
XCOM	5/30/02	Approved the paper "Dispersants: Many Questions, Few Answers" for distribution at the 2002 AMOP.
XCOM	7/25/02	Approved "A White Paper on Oil Spill Dispersant Field Testing" by Dr. Merv Fingas.
XCOM	10/9/03	Approved the report titled "Review of Monitoring Protocols for Dispersant Effectiveness" by Dr. Merv Fingas.
XCOM	10/28/03	Approved the October 6, 2003 SAC position on Dispersant use.
XCOM	12/15/05	Approved the report titled "Dispersants, Salinity and Prince William Sound."
XCOM	2/7/06	Approved the report titled "A Review of Emulsification Tendencies and Long-term Petroleum Trends of Alaska North Slope (ANS) Oils and the White Paper on Emulsification of ANS Crude Oil Spilled in Valdez."
Board	5/2/06	Approved PWSRCAC Dispersant Use Statement.
XCOM	6/13/06	Approved the reported "Observers' Report: MMS Cold Water Dispersants Test conducted at the OHMSETT testing facility, February 28-March 3, 2006."
XCOM	12/11/06	Approved the report "Field Notes and Critical Observations from the OHMSETT Heavy Oil Dispersant Trials, October 13-16, 2003."
Board	1/22/09	Approved the dispersants literature surveys "A Review of Literature Related to oil Spill Dispersants 1997-2008", "A Review of Literature Related to oil Spill Dispersants Especially Related to Alaska 2002-2003," and the Solidifers Literature Review titled "A Review of Literature Related to oil Spill Solidifers 1990-2009."
Board	9/16/10	Approved the issue paper on the use of dispersants in the BP Deepwater Horizon spill.
Board	9/15/11	Approve contracting with University of Southern Maine not to exceed $70,000 for work on the toxicology of chemical dispersants in Alaska whales.
Board	9/15/11	Approve contracting with the Skidaway Institute of Oceanography at a cost of $14,520 for work on the uptake and effects of dispersed oil droplets by zooplankton.
Board	5/3/12	Approved contracting with Spill Science for a comprehensive monitoring program for a cost of $48,000.
Board	7/23/12	Approve contracting with NJIT for $183,100 for dispersed oil biodegradation.
Board	5/2-3/13	Accept DFO final report on dispersed oil effects on salmon, cod, and herring.
Board	5/2-3/13	Accept final report on hydrocarbon uptake by spot shrimp from Dick Lee of the Skidaway Institute of Oceanography.
Board	1/23/14	Accept "Analysis of Oil Biodegradation Products" by Merv Fingas.
XCOM	4/16/15	Approve comments to EPA on Subpart J, Dispersants.
Board	5/17/16	Approved the report titled "Toxicology of Chemical Dispersants in Alaskan Whales."
Board	5/2016	Accept Dispersants SMART Monitoring Protocol document.
Board	3/7/17	Authorized a contract with Merv Fingas for the development of a comprehensive synthesis of dispersants research in an amount not to exceed $65,000.
Board	5/3/18	Accepted the report titled "A Review of Literature Related to Oil Spill Dispersants, June 2017" by Merv Fingas of Spill Science, and the general version of the report titled "A Review of Literature Related to Oil Dispersants, September 2017" by Elise DeCola of Nuka Research & Planning Group, LLC.
XCOM	6/14/18	Approved report titled "A Review of Literature Related to Human Health and Oil Spill Dispersants."

4. **Summary of policy, issues, support or opposition:** PWSRCAC provided extensive comments during the Alaska Regional Response Team planning effort to establish a new policy for use of dispersants in state waters, which was adopted in January 2016, and presented to the Board by Linda Swiss in May 2016.

In March 2020, the Environmental Protection Agency convened a workgroup to review Subpart J of the National Oil and Hazardous Substances Pollution Contingency Plan, which relates to the use of dispersants and was last updated in 1994. Earlier this year, a coalition of four conservation groups and residents from Alaska and Louisiana sued the Environmental Protection Agency, asking a federal court to require the agency set new rules for use of oil spill dispersants. This lawsuit is still pending in the court.

There appears to be strong support in updating the Board's position based on new information and science, based on the fairly high ranking this project received by the Board in the Long Range Planning process (rank 5 out of 17).

5. **Committee Recommendation:** SAC discussed this project at their December 16, 2020 committee meeting and concurred that the project should proceed by having a contractor begin with a thorough review of available resources and then propose possible positions the Council could adopt regarding the use of dispersants in our region. No action was taken.

6. **Relationship to LRP and Budget:** Project 966 – Dispersants is in the approved FY2021 budget and annual work plan.

9550--Dispersants
As of December 14, 2020

FY-2021 Budget	$40,000.00
Actual and Commitments	0
Amount Remaining	$40,000.00

7. **Action Requested of the Board of Directors:** None, item is for discussion only.

8. **Attachments:**
   A. 2006 position
   B. 2006 supporting document
   C. 2013 supporting document

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Prince William Sound Regional Citizens' Advisory Council

Dispersant Use Position Statement

Approved May 3, 2006

After years of observing dispersant trials, dispersant effectiveness monitoring, advising and sponsoring independent research regarding chemical dispersant use, it is the position of the Prince William Sound Regional Citizens' Advisory Council (the Council) that dispersants should not be used on Alaska North Slope crude oil spills in the waters of our region. Until such time as chemical dispersant 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 methodology employed in our region.

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Prince William Sound Regional Citizens' Advisory Council
Scientific Advisory Committee
Dispersant Position Paper – April 26, 2006

I. Introduction

The primary oil spill response method in Alaska is mechanical containment and recovery. Another tool available to oil spill responders is chemical dispersants. Dispersants are a mixture of surfactants and solvents. When used, they are applied to an oil spill slick with the intent of breaking up the slick into smaller droplets that can be carried off by currents and biodegraded. Dispersant use is intended to prevent a surface oil slick from moving into sensitive environments such as the intertidal area.

II. Discussion

The Scientific Advisory Committee has made a concerted effort to understand the research and policy that drives dispersant decisions. There are three main issues that need to be fully addressed before an informed decision can be made by the regulatory community in Alaska to allow use of dispersants: effectiveness, the protection of the shoreline, and toxicity.

a. Effectiveness

It has not been demonstrated that the chemical dispersants (Corexit 9527 and Corexit 9500) stockpiled in the region are effective on Alaska North Slope (ANS) crude oil spills in Prince William Sound waters. There is little evidence that dispersants work on ANS crude in the temperatures and salinities found in Prince William Sound waters.

The sole application of dispersants in the region occurred during the *Exxon Valdez* oil spill and effectiveness was not successfully demonstrated. Other field studies (most notable the North Sea trials in the 1990s) are not applicable to the conditions found in Prince William Sound. Factors that limit the effectiveness of a given dispersant during a spill are complex and depend to some extent on unique and variable chemical compositions and physical properties of crude oil, as well as properties of the sea water such as temperature, salinity and mixing energy. The composition and physical properties of ANS crude oil in protected, low-salinity cold water environments such as those found in Prince William Sound suggest ANS is a poor candidate for treatment with chemical dispersants.

b. Protection of Shoreline

The main argument for the use of dispersants is that they may prevent an oil slick from reaching a sensitive shoreline. However, dispersants seldom, if ever, prevent all the oil from reaching the shore. The toxicity of this dispersant/crude oil mixture on the intertidal ecosystem has not been well studied. It is simply assumed that the damage to the shoreline by the undispersed oil slick would be worse than the damage that could be caused by dispersing the oil with chemical dispersants. It is widely known that the dispersed oil mixture is more toxic than either the dispersant or the oil alone. It is also widely acknowledged that the dispersed oil "cloud" in the water column will probably kill aquatic organisms. Furthermore, there are very few field studies looking at the long-term effects and bioaccumulation. There are too many unanswered questions to accept the argument that use of dispersants would cause no further adverse effects.

c. Toxicity

Chemical dispersants increase the amount of oil in the water column and introduce a new chemical mixture. The mixture of oil and dispersants is more toxic than each part individually and may enhance bioavailability and toxicity. Salinity and water temperatures found in Prince William Sound may add to this effect. The chemically dispersed oil may eventually make it to the beach in any case adding to the already lethal and sublethal effects of the oil.

d. Other Considerations

Lindgren, *et al*. presented the following table entitled *Pros and cons for the use of dispersants at oil spills*[1] which includes additional considerations.

PROS	CONS
• The oil does not remain on the water surface • Often the method that produces the fastest results • Compared to other methods, dispersants are most effective in weather conditions that create fast mixing water • Easy to apply • Prevents the oil from emulsifying • Grinds up the oil making natural decomposition easier • Seabirds and marine mammals can be saved • Prevents oil contamination of beaches	• Builds an oil cloud underwater and can produce harmful effects for aquatic organisms that would otherwise not have been affected • Not always effective on all oil types • Limited window of time for use (relatively short) • Application is only possible when the oil slick is visible • Must be used where water masses are large for dilution • Mixing of the oil and dispersants can be more toxic than each part individually • Few studies looking at long-term effects in the field • If the oil is not sufficiently dispersed, drops can coagulate again • Oil drops can settle • During beach clean-up, dispersants can increase the penetration of the oil into the sedimentation • Few field studies on the effects of bioaccumulation.

III. Conclusion

Until such time as chemical dispersant effectiveness is demonstrated in our region and it is shown to minimize adverse effects on the environment, the Committee 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 methodology employed in our region. The Scientific Advisory Committee will continue to monitor dispersant research and developments on behalf of the Prince William Sound Regional Citizens' Advisory Council.

[1] Lingren, C., H. Lager, J. Fejes. 2001. *Oil Spill Dispersants: Risk Assessment for Swedish Waters.* Stockholm, Sweden.

WHY PWSRCAC DOES NOT SUPPORT THE USE OF CHEMICAL DISPERSANTS

OVERVIEW - In theory, chemical dispersants are supposed to do as their name implies: disperse surface oil into the water column, diluting it, preventing it from fouling shorelines, and speeding up the process by which bacterial action might, over time, render it harmless.

The Prince William Sound Regional Citizens' Advisory Council has concluded that its many years of research have failed to bear out the claims of dispersant proponents regarding dispersants effectiveness in our cold and seasonally low salinity waters. New research also reveals increasing concerns about low-level chronic toxic effects from oil and dispersed oil. For instance, toxic effects on pink salmon and herring embryos from low level hydrocarbon exposure include heart abnormalities that lead to permanent changes in heart anatomy and physiological performance.

Because of these concerns about whether dispersants actually work, as well as the toxic effect they have on sea life and interference with mechanical removal options, the council does not support the use of dispersants.

THE IMPORTANCE OF INDEPENDENT RESEARCH - Many of the council's concerns are based on the findings in *Oil Spill Dispersants – Efficacy and Effects (2005)*. This summary report was put together by the National Research Council (NRC). The NRC organized a broad group of researchers and experts called the "Committee on Understanding Oil Spill Dispersants: Efficacy and Effects" to write this report which can be found at: http://www.nap.edu/catalog.php?record_id=11283.

More recent government research on dispersants was conducted by the Government Accountability Office in 2012. Information from this report (*Oil Dispersants: Additional Research Needed, Particularly on Subsurface and Arctic Applications (*GAO-12-585 , May 30, 2012) can be found at: http://www.gao.gov/products/GAO-12-585.

The council thinks it is important that the study of dispersants and their effects are conducted independently. Many of the studies done to date have been sponsored by the oil industry and manufacturers of dispersants. This type of market-driven research adds the appearance of bias and advocacy for dispersant use. A neutral scientific investigation like the GAO report avoids these concerns.

ADDITIONAL INFORMATION

The following table lists common misconceptions about dispersants and provides scientific counter observations. These counter observations arise from our decades of research and may be helpful in understanding why the PWSRCAC does not support dispersants use in our region.

Arguments For Dispersants Use	**Scientific Counter Observation**
Dispersants drive oil into the water column permanently	*Oil spill dispersions can coalesce back into surface slicks over time so that much of the oil will resurface in 3 to 8 hours in situations with little or no mixing energy.*
Dispersants can assist in oil biodegradation	*Most studies show that dispersants suppress oil biodegradation.*
Chemically dispersed oil is no more toxic than naturally dispersed oil	*The use of chemical dispersants results in oil concentrations in the water that are at least 10 to 100 times greater than the concentration one would get without the use of chemical dispersants. This mixture is much more toxic to aquatic organisms.*
Dispersing oil slicks can save birds or mammals	*Studies haven't shown this, considerations include the fact that the oil is never 100% dispersed and the oil is spreading over a much greater surface area - increasing contact potential.*
Dispersants will prevent the formation of water-in-oil emulsions	*This hasn't been shown by peer-reviewed research.*
Dispersants can break water-in-oil emulsions	*Tests, as well as actual applications on the Exxon Valdez spill, have shown that this does not occur.*
Dispersants can be used in calm seas	*The effectiveness of dispersants in calm seas is very poor, waves or some source of mixing energy is needed for reasonable effectiveness. In calm seas, the dispersant will not stay with the oil, but will be washed away, so dispersants cannot be applied in hopes the seas will come up. Mechanical mixing energy can be applied, but may not be practical on a large scale.*
Dispersants mix dispersed oil throughout the water column	*Fresh water layering that is common in Prince William Sound region waters can halt dispersed oil at the salinity boundary which can be 1 to 2 meters in depth.*
Dispersants work in cold waters such as those in Prince William Sound and the Gulf of Alaska	*Most research on dispersant use in cold water shows that it does not work well. Some tests of dispersant effectiveness in cold marine waters that are often cited as successful are from closed volume tank tests. The PWSRCAC has expressed concerns about the validity of those tests. For example, initially dispersed oil that re-aggregated and resurfaced was not properly considered.*

INFORMATION ON THE WEB

More information on dispersants can be found on the council's webpage: www.bit.ly/OilSpillDispersants.