August 3, 2015

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Re: Public Comments on Regulations
Establishing a List of Spill-Treating Agents (Canada Oil and Gas Operations Act)
as published in Canada Gazette*, Part 1, July 4, 2015*

Thank you for this opportunity to comment on the proposed regulations establishing a list of spill-treating agents under the Canada Oil and Gas Operations Act and other acts as amended by the Canada Energy Safety and Security Act of 2015.

These comments are submitted on behalf of signatories representing concerned scientists and health care professionals and charity and nonprofit organizations from Canada and the United States. Signatories include many people with first hand experience of oil disasters, as responders and planners, community members, scientists, and legal counsel. Our comments are grounded in lessons learned from maritime oil spills where Corexit dispersants were used – like the *Exxon Valdez* and BP *Deepwater Horizon* (DWH) disasters, direct experience living with the human health and environmental consequences of oil disasters, and scientific studies conducted in the wake of maritime spills worldwide.

The Energy Safety and Security Act, among other things, shifts the focus of spill response from containment and removal of oil with mechanical equipment by allowing for the use of chemical and biological spill-treating agents (STAs). Regarding STA product use, the Act "lifts the legal prohibitions that would otherwise prevent the use of an STA" [1] by removing barriers in other laws intended to protect the environment including, notably, harm from use under the polluter pays principle, as discussed below. The Act creates **interim use regulations**, consisting of: (1) a process to pre-authorize use of STAs by requiring only that an STA is listed in regulations and in an operator's contingency plan; and (2) a process to expedite use of STAs during spill response by requiring only that the Chief Conservation Officer (CCO) makes a determination that product use will achieve a net environmental benefit, that the CCO consults with the Minister of the Environment, and that the STA is used in accordance with any conditions stipulated by CCO. The Act also requires: development of **final use regulations** within five years from the time that the act goes into effect; and that STAs must be used in accordance with the final use regulations and any other conditions stipulated by the CCO at the time of a spill.

Accordingly, Environment Canada has proposed **interim use regulations,** consisting of listing two Corexit dispersants[2] – EC9500A and EC9580A – for interim use.

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[1] *Canada Gazette*, Part 1, July 4, 2015, p. 1618.

[2] NALCO manufactures and promotes Corexit® EC9500A and Corexit® EC9580A as "oil spill dispersants." NALCO also recommends Corexit EC9580A as a "surface washing agent." We refer

Our comments are divided into three parts: Part I. – General concerns; Part II. – Specific comments on the proposed interim use regulations; and Part III. – Recommendations for the proposed interim use regulations.

I. General Concerns

We have four general concerns with the proposed interim use regulations:

A. Use of the proposed Corexit dispersants is not likely to achieve a net environmental benefit.
B. The proposed Corexit dispersants are harmful to human health and wellbeing.
C. Canada is proposing to legalize products that the United States may ban.
D. The proposed regulations weaken the entire spill response regime.

We present our background and rationale for each of these general concerns.

A. Use of Corexit dispersants is not likely to achieve a net environmental benefit

Merv Fingas, former Chief of the Emergencies Science Division of Environment Canada and internationally renowned expert on dispersants and other "spill-treating agent" (STA) products, recently wrote an extensive review of recent literature on dispersant use in marine oil spill response.[3] According to Fingas, there are three primary motives for using oil spill dispersants: to reduce the impact of oil on shorelines; to reduce the impact on birds and mammals on the water surface; and to promote biodegradation of oil in the water column. Further, according to Fingas and other supporting evidence, these motives have proven to be largely invalid, based on ongoing evidence from the BP DWH disaster, in which at least 7 million litres (1.84 million gallons) of Corexit dispersants were applied, including Corexit 9500A and 9580A.

Impact on shorelines

Dispersants change the distribution, not necessarily the amount, of oil in a marine system. The act of dispersing oil makes it impossible to directly contain and remove oil from the environment or at least makes it much harder to do so. According to Fingas, oil spill dispersions are not stable – dispersed oil will de-stabilize and rise to the surface with half-lives of dispersions varying between 4 to 24 hours.[4] Further, more oil was found to settle to the bottom in the presence of dispersants, because dispersants increase the number of oil droplets in the water column and so facilitate opportunity for increased frequency of interaction between the oil droplets and suspended particulate matter. The result is relatively stable Oil-Mineral-Aggregates (OMAs) that drift about in

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to both as dispersants unless specifically noted. http://www.nalco.com/eu/applications/corexit-oil-spill-dispersants.htm Accessed July 19, 2015.

[3] Fingas, Merv, 2014, A review of literature related to oil dispersants, 2011–2014, for the Prince William Sound Regional Citizens' Advisory Council, Anchorage, Alaska. http://www.pwsrcac.org/programs/environmental-monitoring/dispersants/dispersant-literature-reviews/

[4] Fingas, 2014, Dispersant literature review.

the water column and may slowly sink or be deposited on shorelines years after the initial spill event.

For example, Gulf of Mexico fishermen in the area impacted by the BP DWH disaster noticed and reported the existence of such OMA plumes from **surface** spraying of dispersants after the BP DWH disaster. On May 12, 2010, scientists at the National Institute for Undersea Science and Technology discovered large oily plumes at depths of 1,000 to 1,400 meters. The largest was 16 km (10 miles) long, 5 km (3 miles) wide, and 91 meters (300 feet) thick in spots. Subsequently, other scientists also reported finding deep-sea oily plumes.[5] The OMA plumes can be stirred up by high-energy events such as hurricanes and deposited on beaches years after the initial oil spill, as is occurring – by the ton – along the Gulf Coast.[6]

Subsurface dispersant injection was used in the U.S. for the first time during the BP DWH disaster. The U.S. Coast Guard reported subsea usage of 3 million litres (771,272 gallons) of Corexit 9527A,[7] which has been banned in several countries including Great Britain.[8] Corexit 9527A contains up to 60 percent of 2-butoxyethanol,[9] an ingredient that is on the List of Toxic Substances, Schedule 1 of the Canadian Environmental Protection Act (CEPA).

However, the oil and gas industry advocates subsea dispersant injection technology as practical, cost effective, and "one of the more promising solutions for dealing with a deep water out-flow of oil." [10] Since there are no conditions for use listed in the interim use regulations and Environment Canada has not rejected this technology, we find it necessary to share our concerns with using subsea injection in Canadian waters.

According to Fingas, the pressure of oil release at depth basically changes the behavior and composition of the oil within seconds, resulting in formation of gaseous, oil plumes. Fingas described this phenomenon as "fold-out," analogous to formation of a mushroom cloud. Fold-out gives rise to discreet plumes based on densities and size of particulate matter. Once the jet-plume phase ends, the remaining oil changes rapidly with loss of volatiles and gas bubbles. The weathered oil and sometimes-emulsified oil

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[5] Cutler, Cleveland, *Deepwater Horizon* Oil Spill, 2010, The Encyclopedia of Earth, last updated Feb. 22, 2013. http://www.eoearth.org/view/article/161185/

[6] Marshall, B., More massive tar mats from BP oil spill discovered on Louisiana beaches, The *Advocate.com*, Dec. 26, 2013. http://theadvocate.com/home/7900900-125/more-massive-tar-mats-from

Foster, J., As summer officially begins, a 1,250-pound tar mat discovered off Florida beach, *ClimateProgress,* June 24, 2014, http://thinkprogress.org/climate/2014/06/24/3452292/florida-tar-mat/

[7] Staves, James, EPA Region 6, 2010, The *Deepwater Horizon:* Impact on dispersant use policies. http://www.boem.gov/uploadedFiles/BOEM/BOEM_Newsroom/Library/Publications/2012/PowerPoint_Source_Files/2C_0815_Staves_PPT.pdf

[8] Marcus, Jacqueline, 2013, BPs' final nail in the Gulf coffin: Why the feds must ban the toxic dispersant Corexit, Truth Out/Buzz Flash commentary, Oct. 25, 2013. http://www.truth-out.org/buzzflash/commentary/bp-coffin-feds-must-ban-corexit/18274-bp-coffin-feds-must-ban-corexit

[9] NALCO, 2012, Material Safety Data Sheet for Corexit® EC9527A.

[10] Drieu, Mike, Subsea dispersant injection: Technology and industry perspective, Presentation at the RRT 6 meeting in Little Rock, AR, June 14–15, 2011. http://www.rrt6.org/Uploads/Files/rrt_semi_annual_meeting_minutes_2011_june.pdf

rises slowly. *Most importantly, according to Fingas, the dispersed oil plume occurs whether or not dispersant is used.* In other words, during a subsea oil discharge, there is more than sufficient pressure to physically disperse the oil naturally, making subsea dispersant use unnecessary.

We believe that subsea dispersant use is also undesired. We find no scientific evidence to support the claim that subsea dispersant use provides a net environmental benefit or mitigates oil impacts to the benthic community. Also, oil-eating bacteria are concentrated in the upper zones of the ocean,[11] and biodegradation is a kinetic process that occurs faster in warmer water. Biodegradation at depth in cold water is extremely limited. Basically, in the absence of scientific evidence regarding dispersant impacts on deep-sea ecology, it is reasonable to assume that dispersants will have the same devastating short- and long-term impacts, noted below, on deep sea biota that they have had in other oceanic zones more accessible to scientists.

In sum**,** dispersant applications in major oil spills have never prevented oil from coming ashore,[12] and the oil that comes ashore is likely to have dispersant mixed with it. Once ashore, dispersants increase the penetration or downward migration of highly toxic polycyclic aromatic hydrocarbons (PAHs)[13] into beach subsurface sediments, making removal impossible or uncertain, while also risking groundwater contamination.[14]

Impact on birds and mammals – and more

As for mitigating harm to birds and marine mammals at the sea surface at the expense of fish and other wildlife below the sea surface, this logic is flawed. As observed by the Vice President of the Louisiana Shrimp Association, Clint Guidry, in his May 24, 2010, testimony to the U.S. Environmental Protection Agency (U.S. EPA) and congressional representatives, "The Gulf is the Mother and the estuaries are the nurseries. If the Mother dies, there will be no children to incubate." [15] The effect of dispersant and oil-dispersant combined on the waterproof and thermal properties of fur and feathers

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[11] Fingas, 2014 Dispersant Review.

[12] French, John, 2013, How do oil dispersants work as oil spill response counter measures?, presentation at the 6th annual Northwestern Tribal Water Rights Conference hosted by the Center for Water Advocacy, Anchorage, Alaska, October 2013.

[13] Peterson, Charles, *et al*., "Long-term Ecosystem Responses to the *Exxon Valdez* Oil Spill," 2003; 302:2082–2086.

Ott, Riki, 2004, *Sound Truth and Corporate Myths: The Legacy of the Exxon Valdez Oil Spill* (Dragonfly Sisters Press, Cordova, AK).

[14] Kirby, J., III, "Findings of Persistency of Polycyclic Aromatic Hydrocarbons in Residual Tar Product Sourced from Crude Oil Released during the *Deepwater Horizon* MC252 Spill of National Significance," supported by the Surfrider Foundation, April 14, 2012. http://surfrider.org/images/uploads/publications/Corexit_Connections.pdf

Zuijdgeest A, and M Huettel, 2012, Dispersants as Used in Response to the MC252-Spill Lead to Higher Mobility of Polycyclic Aromatic Hydrocarbons in Oil-Contaminated Gulf of Mexico Sand. PLoS ONE 7(11): e50549. doi:10.1371/journal.pone.0050549

[15] Guidry, Clint, 2010, Testimony, Galliano, Louisiana, May 24, 2010, provided by Mr. Guidry.

remains untested,[16] despite there being a long-standing recommendation of the National Research Council to do so[17].

Corexit dispersants contain chemical ingredients known to be neurotoxins, mutagens, teratogens (able to disturb the growth and development of an embryo or fetus), and carcinogens, and known to rupture red blood cells, causing hemolysis (bleeding) and liver and kidney damage, among other things.[18] Corexit dispersants contain many ingredients that target the same organs in the body as oil. Also, as oil-based solvents, they act as an oil delivery system, facilitating the entry of oil into the body, into cells, which can damage every organ system in the body.[19] According to a July 2010 scientific consensus statement, "The properties that facilitate the movement of dispersants through oil also make it easier for them to move through cell walls, skin barriers, and membranes that protect vital organs, underlying layers of skin, the surfaces of eyes, mouths, and other structures." [20]

Fingas reported that chemically-dispersed oil was up to 300 times more toxic than physically-dispersed oil, because of the increased PAHs in the water column. Studies in the wake of the BP DWH oil-dispersant disaster found that dispersants compounded harm instead of mitigating it to a wide variety of sea life[21] from the base of the food web such as bacteria, zooplankton, corals,[22] oysters, blue crabs, and killifish[23] to apex

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[16] Committee on Understanding Oil Spill Dispersants: Efficacy and Effects (National Research Council of the National Academies), *Oil Spill Dispersants: Efficacy and Effects,* The National Academies Press, Washington, DC, 2006.

[17] Committee on Effectiveness of Oil Dispersants (National Research Council, Marine Board, Commission on Engineering and Technical Systems), *Using Oil Spill Dispersants on the Sea,* National Academy Press: Washington, DC, 1989.

[18] Burns, K. and Harbut, M.R., 2010. *Gulf Oil Spill Hazards*, Sciencecorps, Lexington, MA, June 14, 2010. Available at http://www.sciencecorps.org/crudeoilhazards.htm

[19] Burns and Harbut, *Gulf Oil Spill Hazards*.

[20] Consensus Statement: Scientists oppose the use of dispersant chemicals in the Gulf of Mexico, July 16, 2010. *Statement drafted by Dr. Susan D. Shaw, Marine Environmental Research Institute. Quotes on pp. 1–2. http://www.meriresearch.org/Portals/0/Documents/CONSENSUS%20STATEMENT%20ON%20DISPERSANTS%20IN%20THE%20GULF%20updated%20July%2017.pdf*

[21] Kirby, David, 2013, Corexit, oil dispersants used by BP is destroying Gulf marine life, scientists say, *Huffington Post,* April 25, 2013. http://www.huffingtonpost.com/2013/04/25/corexit-bp-oil-dispersant_n_3157080.html

Sawyer, William, 2013, Gulf oil spill: Dispersants have potential to cause more harm than good, PRNewwire, May 11, 2013. http://www.prnewswire.com/news-releases/gulf-oil-spill-dispersants-have-potential-to-cause-more-harm-than-good-93424899.html

[22] McClain, Craig, et al., 2015, Given the choice, corals would prefer oil to dispersants, *Deep Sea News,* April 8, 2015. http://deepseanews.com/2015/04/given-the-choice-corals-would-prefer-oil-to-dispersant/

[23] Almeda R, Wambaugh Z, Wang Z, Hyatt C, Liu Z, et al. (2013) Interactions between Zooplankton and Crude Oil: Toxic Effects and Bioaccumulation of Polycyclic Aromatic Hydrocarbons. PLoS ONE 8(6): e67212. doi:10.1371/journal.pone.0067212

Fern, R., 2013, Acute toxicity of three alone and in combination with crude oil on *Callinectus sapidus* megalopa*e,* 2013 Gulf of Mexico oil spill & ecosystem science conference, Jan. 21–23, 2013, New Orleans, LA.

Fingas, 2014, Dispersant literature review.

Goodbody-Gringley G, et al., 2013, Toxicity of [BP] *Deepwater Horizon* Source Oil and the Chemical Dispersant, Corexit® 9500, to Coral Larvae. PLoS ONE 8(1): e45574.doi:10.1371/journal.pone.0045574

predators such as tuna and dolphins.[24] This was primarily due to the increase of PAHs in the chemically-enhanced water soluble fraction.[25] Scientists found deformed and dying sea life in the region was "spatially coordinated with oil from the [BP] *Deepwater Horizon*, both surface oil and subsurface oil," according to Dr. Jim Cowan with Louisiana State University's Department of Oceanography and Coastal Sciences.[26] This remains the case: a three-year study on bottlenose dolphins found the high rate of dolphin deaths and strandings "overlap in time and space with locations that received heavy and prolonged oiling" during the BP DWH disaster.[27]

Promotion of biodegradation of oil in the water column

As for mitigating impacts by promoting biodegradation in the water column through formation of smaller oil droplets, this has proven to be more theory than science. According to Fingas, "one-third of the studies noted inhibition of oil biodegradation, about one-third noted acceleration, and about one-third noted that the rates were the same…" [28] One study post-BP DWH disaster found Corexit EC9500A inhibited biodegradation, as the surfactants were toxic to beneficial oil-eating bacteria.[29] While some studies show that dispersants may facilitate degradation of simple hydrocarbons like alkanes, dispersants do not increase the biodegradation rate of the more toxic and

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Jung, SW, et al., 2012, Stronger impact of dispersant plus crude oil on natural plankton assemblages in short-term marine mesocosms, *Journal of Hazardous Materials*, Volumes 217–218, Pages 338-349, ISSN 0304-3894, 10.1016/j.jhazmat.2012.03.034

Laramore, S., 2013, Acute and sublethal impacts of MC252 oil and dispersants on early life stages of *Crassostrea virginica*, 2013 Gulf of Mexico oil spill & ecosystem science conference, Jan. 21–23, 2013, New Orleans, LA.

Rico-Martinez, Roberto, Terry Snell, and Tonya Shearer, 2013. "Synergistic toxicity of Macondo crude oil and dispersant Corexit 9500A® to the *Brachionus plicatilis* species complex (*Rotifera*)." *Environ. Pollution,* 173:5–10. http://www.sciencedirect.com/science/article/pii/S0269749112004344

[24] Carmichael, Ruth, et al., "Were Multiple Stressors a 'Perfect Storm' for Northern Gulf of Mexico Bottlenose Dolphins (*Tursiops truncatus*) in 2011?" *PLoS ONE* 2012; 7(7): e41155

Incardona, John P., et al., 2014, *Deepwater Horizon* crude oil impacts the developing hearts of large predatory pelagic fish, *Proceedings of the National Academy of Sciences,* online March 24, 2014, E1510–E1518. www.pnas.org/cgi/doi/10.1073/pnas.1320950111 www.pnas.org/lookup/suppl/doi:10. 1073/pnas.1320950111/

Sahagun, Louis, 2014, Toxins released by oil spills send fish hearts into cardiac arrest, *Science Now,* 2/13/14. http://www.latimes.com/science/sciencenow/la-sci-sn-tuna-hearts-oil-spill-toxins-20140213,0,5212912.story#axzz2tKbuS7Oy

Schwacke, Lori, et al., Health of Common Bottlenose Dolphins *(Tursiops truncatus)* in Barataria Bay, Louisiana, Following the *Deepwater Horizon* Oil Spill, dx.doi.org/10.1021/es403610f Environ. Sci. Technol. 2014, 48, 93−103, http://pubs.acs.org/doi/abs/10.1021/es403610f

[25] Fingas, 2014, Dispersant Review.

[26] Jamail, Dahr, 2012, "Gulf seafood deformities alarm scientists," *Aljazeera English*, April 20, 2012. http://www.aljazeera.com/indepth/features/2012/04/201241682318260912.html

[27] Schleifstein, Mark, 2015, Study associates 3-year pattern of Gulf of Mexico bottlenose dolphin deaths with BP oil spill, NOLA.com/*The Times-Picayune,* Feb. 12, 2015.

Venn-Watson, Stephanie, et al., 2015, Demographic Clusters Identified within the Northern Gulf of Mexico Common Bottlenose Dolphin (*Tursiops truncates*) Unusual Mortality Event: January 2010 - June 2013, PLoS ONE, Feb. 11, 2015, DOI: 10.1371/journal.pone.0117248. http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0117248

[28] Fingas, 2014, Dispersant literature review, quote on p. vii.

[29] Hamdan, Leila, and Preston Fulmer, "Effects of COREXIT® EC9500A on bacteria from a beach oiled by the *Deepwater Horizon* spill," *Aquatic Microbial Ecology*, 2011; 63:101-109.

complex aromatic hydrocarbons, specifically the PAHs.[30] On the whole, it seems that biodegradation of oil is best left to nature or biological agents, not chemical agents.

THEREFORE, we conclude that dispersant use does not reduce the impact of oil on shorelines and, in fact, acts to worsen impacts of stranded oil; it does not reduce the impact on birds and mammals on the water surface and, in fact, acts to worsen the impact; and it does not promote biodegradation of oil's most toxic components, the PAHs, and, in fact, actually inhibits biodegradation of alkanes in some cases. Thus, the weight of evidence strongly suggests that use of Corexit dispersants is likely **not** to create a net environmental benefit, because dispersant use exacerbates the toxic effects of oil.

B. Corexit dispersants are harmful to human health and wellbeing

The BP DWH disaster was the first time that effects of dispersants on human health were studied, and studies have found that chemically-dispersed oil is also more toxic to people. One study on cleanup workers exposed to oil and dispersant reported that participants had significantly altered blood profiles and liver enzymes, indicating higher risk for blood-related disorders, and a high prevalence of somatic symptoms – headaches, shortness of breath, skin rash, cough, dizzy spells, fatigue, painful joints, night sweats, and chest pain.[31] A study with human lung epithelial cells found the water-soluble fraction of oil-dispersant mixtures (Corexit 9527A, 9500A, and 9580A) caused cell death in a dose-dependent manner.[32] Cell death was through apoptosis, a genetically-directed process of cell destruction activated by the presence of a stimulating agent (the oil-dispersant mixture), and autophagy or controlled digestion of damaged organelles within a cell. A study with human fecal microbiota found mixtures of oil and Corexit 9500A decreased the abundance and diversity of the community more so than oil or dispersant alone.[33] Inhalation tests with rats exposed to Corexit 9500A vapors measured neural dysfunction in the brain with a potential imbalance in neurotransmitter signaling[34]; possible effects on breathing, also caused by brain dysfunction[35]; and dose-dependent increases in heart

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[30] Wilcock, R., et al., "Persistence of polycyclic aromatic compounds of different molecular size and water solubility in surficial sediment of an intertidal sandflat," *Environmental Toxicology and Chemistry*, 1996; 15:670-676.

Fingas, 2014, Dispersant literature review.

[31] D'Andrea, Mark and Kesava Reddy, 2013. "Health consequences among subjects involved in Gulf oil spill cleanup activities," *The American Journal of Medicine*, Vol. 126(11):966-974. http://download.journals.elsevierhealth.com/pdfs/journals/0002-9343/PIIS0002934313004944.pdf

[32] Wang, H., et al., 2012, Lung epithelial cell death induced by oil-dispersant mixtures, *Toxicol. in Vitro,* 26(5): 746–751. doi: 10.1016/j.tiv.2012.03.011. http://www.ncbi.nlm.nih.gov/pubmed/22504303

[33] Cerniglia, Carl, et al., 2012, Effects of crude oil, dispersant, and oil-dispersant mixtures on an *in vitro* culture system. mBio 3(5):e00376-12. doi:10.1128/mBio.00376-12.

[34] Sriram, K., et al., 2011, Neurotoxicity following acute inhalation exposure to the oil dispersant Corexit EC9500A, *J. of Toxicol. Environ. Health A: Current Issues,* 74(21):1405–18. doi: 10.1080/15287394.2011.606796. http://www.ncbi.nlm.nih.gov/pubmed/21916746

[35] Roberts, Jenny, et al., 2011, Pulmonary effects after acute inhalation of oil dispersant (Corexit EC9500A) in rats, *J. of Toxicol. Environ. Health A,* 74(21):1381–1396. doi: 10.1080/15287394.2011.606794. http://www.tandfonline.com/doi/abs/10.1080/15287394.2011.606794#.VOKY9UI8o5M

rate and blood pressure with reduced peripheral vascular function.[36] These studies were short-term exposures, and some results were transient.[37]

However, evidence from people living in impacted communities suggests chronic harm. During the BP DWH 2010 spill response, scientists found oil and oil-dispersant droplets aerosolized daily and became part of the Gulf hydrologic cycle.[38] Gulf coast residents and media documented an oily sheen on the leading edges of their airplanes after flying over the Gulf,[39] in puddles on door stoops after rain, and in outdoor swimming pools,[40] shallow bayous, bays, and coastal seas.[41] Coastal residents, BP spill response workers, filmmakers, writers, media, fishermen, tourists, and others also reported or documented adverse short-term health impacts, consistent with the major symptoms characteristic of exposure to oil spills: respiratory symptoms, central nervous system issues (headaches, vertigo, dizziness, tingling extremities, nausea, and fatigue), skin rashes and irritations, and eye issues (blurred vision).[42] Other symptoms widely reported included bleeding from nose and ears; blood in urine, stool, and vomit; blisters in the throat and reoccurring MRSA-like skin lesions; seizures; hair loss; and more.[43]

Unprecedented high levels of oil compounds were found in the blood of coastal residents during summer and fall of 2010.[44] A health and economic survey conducted in south Louisiana after the BP well was capped in July 2010 reported "almost three-quarters of respondents who believed they were exposed to crude oil or dispersant also

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[36] Krajnak, K., et al., 2011, Acute effects of Corexit EC9500A on cardiovascular functions in rats, *J. of Toxicol. Environ. Health A,* 74(21):1397–1404. doi: 10.1080/15287394.2011.606795. http://www.ncbi.nlm.nih.gov/pubmed/21916745

[37] Li, Fu Jun, et al., 2015, Heme oxygenase-1 protects Corexit 9500a-induced respiratory epithelial injury across species, *Plos One,* April 2, 2015, DOI: 10.1371/journal.pone.0122275. http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0122275

[38] "Oil Rain" Confirmed by NASA chief mission scientist: Clouds from Gulf did "rain oil" on land (video), Feb. 21, 2011. http://www.floridaoilspilllaw.com/oil-rain-confirmed-nasa-chief-mission-scientist-clouds-gulf-rain-oil-land-video/

[39] Wathen, John, Hurricane Creekkeeper, July 22, 2010 VIDEO. http://bpoilslick.blogspot.com/2010/07/breathing-toxic-oil-vapors.html

[40] Florida Oil Spill Law, "EXCLUSIVE: Tests find sickened family has 50.3 ppm of Corexit's 2-butoxyethanol in swimming pool — JUST ONE HOUR NORTH OF TAMPA," August 30, 2010. http://www.floridaoilspilllaw.com/exclusive-tests-find-sickened-family-has-50-3-ppm-of-corexits-2-butoxyethanol-in-swimming-pool-just-one-hour-north-of-tampa-lab-report-included/

[41] News 5 investigates: Testing the water, July 23, 2010. http://www2.wkrg.com/special_section/2010/jul/17/news-5-investigates-testing-the-water-ar-2121731/

[42] Barry Levy and William Nassetta, "The Adverse Health Effects of Oil Spills: A Review of the Literature and a Framework for Medically Evaluating Exposed Individuals," *Int J Occup Environ Health* 2011:17:121–167.

[43] Griffith, Shawn, executive producer, *Beyond Pollution,* 2012.
Hopkins, Bryon, producer, *Dirty Energy*, 2012.
Jamail, Dahr, BP blamed for ongoing health problems, *Aljazeera English*, April 20, 2012. http://www.aljazeera.com/indepth/features/2012/04/2012420725163795.html
Juhasz, Antonia, *Black Tide: the Devastating Impact of the Gulf Oil Spill* (Wiley, April 2011).
Ott, Riki, "Bio-remediation or bio-hazard? Dispersants, bacteria, and illness in the Gulf," Sept. 17, 2010. http://www.huffingtonpost.com/riki-ott/oil-spill-illness_b_873582.html
Tickell, Josh and Rebecca, producers, *The Big Fix,* 2011.
List is not exhaustive.

[44] Wilma Subra, "BP spill blood test results – Louisiana residents: Evaluation of the test results of whole blood volatile solvents testing," Jan. 5, 2011. http://leanweb.org/our-work/community/public-health/bp-spill-blood-test-results-louisiana-residents

reported experiencing symptoms. Additionally, nearly half of all respondents reported an unusual increase in health symptoms consistent with chemical exposure." [45]

In March 2012, after denying health claims related to the disaster (except bodily injury) for nearly two years,[46] BP agreed to a class action medical benefits settlement[47] that was uncapped, but earmarked millions of dollars for medical treatment, medical monitoring, and compensation. The negotiated and agreed upon qualifying illnesses and symptoms listed in Exhibit 8 of the settlement were, by design, consistent with exposure to crude oil and dispersants.[48] Studies have reported that 40 percent or more of residents and workers directly exposed to crude oil and dispersants in the environment reported symptoms characteristic of oil exposure, that children were especially vulnerable, and that oil-dispersants combined were far more toxic to humans than oil alone.[49]

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[45] Louisiana Bucket Brigade, *Self-Reported Health and Economic Impact Survey: An Analysis of the Deepwater Horizon Oil Disaster in Seven Coastal Louisiana Communities,* March 3, 2011. http://www.labucketbrigade.org/downloads/2010_HEStudy_SummaryFINAL_1.pdf

[46] Administrator of BP's Gulf Coast Claims Facility (GCCF) Ken Feinberg said "the GCCF did not pay for respiratory illnesses, skin conditions or other spill-related ailments." Quoted in Susan Buchanan, "Health claims to be considered in BP's spill settlement," The Louisiana Weekly, March 12, 2012. http://www.louisianaweekly.com/health-claims-to-be-considered-in-bp's-spill-settlement/

[47] BP-Plaintiffs Medical Benefits Class Action Settlement Agreement, http://www.laed.uscourts.gov/OilSpill/6.pdf

[48] BP-Plaintiffs Medical Benefits Class Action Settlement Agreement, Exhibit 8: Specified Physical Conditions Matrix, Table 1: Acute SPECIFIED PHYSICAL CONDITIONS, and Table 3: Chronic SPECIFIED PHYSICAL CONDITIONS. http://louisiana-lawyer.com/bp-oil-spill-lawyer-blog/wp-content/uploads/2012/04/6273-10.pdf

[49] Abramson, David, et al., 2013. "Children's Health after the Oil Spill: A Four-State Study. Findings from the Gulf Coast Population Impact (GCPI) Project." National Center for Disaster Preparedness, NCDP Briefing Report 2013_1. Columbia University Mailman School of Public Health, New York. http://academiccommons.columbia.edu/item/ac:156715

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Young, Jeff, 2011, "Toxic Tide – Discovering the Health Effects of the [BP] Deepwater Disaster (sic)," Part 1, NPR Living on Earth, week of Feb. 11, 2011. http://www.loe.org/shows/segments.html?programID=11-P13-00007&segmentID=3

Young, Jeff, 2011, "Toxic Tide – Discovering the Health Effects of the [BP] *Deepwater Disaster* (sic)," Part 2, week of Feb. 21, 2011. Including segment on oil rain confirmed by scientist: Clouds from

According to an investigative report by Government Accountability Project, the leading whistleblower protection and advocacy organization in the United States, 95% of the witnesses reported that they experienced lingering, spill-related health problems as of April 2013 (publication date), and more than 50% reported that their children and/or grandchildren's health had also deteriorated. [50] Severe lingering health effects included abdominal pain; blood in urine; heart palpitations; hyper-allergic reactions to processed food and common household cleaning or petroleum based products; hypertension; inability to withstand exposure to sun; kidney damage; liver damage; migraines; multiple chemical sensitivity; neurological damage resulting in memory loss and in some cases IQ drop; rapid weight loss; respiratory system and nervous system damage; seizures; skin irritation, burning, and lesions; sudden inability to move or speak for sustained periods; temporary paralysis; and vomiting episodes.[51]

Government Accountability Project extended its investigation and reported five years after dispersant was used throughout the Gulf, "the overwhelming majority of original and new witnesses continue to experience adverse health impacts associated with dispersant and oil exposure. The phenomenon has been coined the 'BP Syndrome' or 'Gulf Coast Syndrome'." [52] Symptoms remained consistent with initial reports and also now included but were not limited to blood in urine and rectal bleeding; hyper-allergies to processed foods; violent vomiting episodes that last for hours and result in rapid weight loss; weakness and fatigue, at times leading to depression; migraines; abdominal pain attacks; skin irritation, burning and widespread lesions; rashes; inability to withstand exposure to sun; Multiple Chemical Sensitivity, resulting in new sensitivities to everyday household cleaning products or petroleum based products (plastic water bottles); impotence; heart palpitations; and hypertension. Further, "witnesses have begun reporting long-term health effects, including reproductive damage (such as genetic mutations), endocrine disruption, and cancer." [53]

Costs of harm to human health and wellbeing from air-borne pollutants associated with oil activities and spills are quantifiable. In South Korea, scientists applied the quantifiable metric "years lived with disability" (YLD) in long-term studies with volunteers who responded to the *Hebei Spirit* oil spill and found YLD

Gulf did "rain oil" on land (video). http://www.loe.org/shows/segments.html?programID=11-P13-00007&segmentID=3

[50] Devine, Shanna and Tom Devine, Government Accountability Project, 2013. Deadly Dispersants in the Gulf: Are Public Health and Environmental Tragedies the New Norm for Oil Spill Cleanups? http://www.whistleblower.org/gulftruth

[51] Ott, Riki, and Shanna Devine, 2014, Presentation to the Office of Management & Budget on Sept. 24, 2014, by the Coalition to Ban Toxic Dispersants and the Government Accountability Project, Washington, DC. http://www.reginfo.gov/public/do/viewEO12866Meeting?viewRule=false&rin=2050-AE87&meetingId=578&acronym=2050-EPA/SWER

[52] Jamail, Dahr, 2011, Gulf spill sickness wrecking lives, *Al Jazeera,* Mar 9, 2011. http://www.aljazeera.com/indepth/features/2011/03/201138152955897442.html

[53] Government Accountability Project, Devine, Shanna, and Tom Devine, 2015, Addendum Report to "Deadly Dispersants in the Gulf: Are Public Health and Environmental Tragedies the New Norm for Oil Spill Cleanups?" Apr 22, 2015.

of three to five years.[54] Scientists also conducted an environmental health study on mothers and young children after the *Hebei Spirit* oil spill and found children and developing fetuses were especially vulnerable to oil and petrochemical exposures, a finding confirmed in other studies.[55]

Because of such findings and implications for public health from oil spill disasters, Metro Vancouver with support from the Tseil-Waututh Nation recently contracted a study to determine health risk to area residents from a 16,000,000 litre spill in English Bay.[56] The air quality model estimated risk to people from airborne levels of benzene and found over one million people were likely to be exposed to acute levels of benzene exposure and experience mild and/or transient effects. The weight of evidence from the BP DWH disaster, as discussed, suggests that use of dispersants in oil spill response is likely to increase air-borne contaminants and human health risk.

In summary, scientists convened by the US National Oceanic and Atmospheric Administration and others to discuss the future of oil dispersant use in the US conclude that there is a human health risk associated with dispersant use [57]

THEREFORE, we submit that the current formulation of Corexit dispersants is harmful to human health; that water- and air- borne distribution of oil-dispersant mixtures during oil spill response can occur at levels that are harmful to human health; and that conditions of use need to include provisions to minimize such exposure to humans, including environmental monitoring requirements.

C. Canada is proposing to legalize products that the United States may ban.

The proposed regulations acknowledge the potential for cross-border oil spill incidents

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[54] Kim, Young-Min, et al., 2013, Burden of disease attributable to the *Hebei Spirit* oil spill in Taean, Korea, BMJ Open, Sept 20, 2013; 3(9):e003334. http://www.ncbi.nlm.nih.gov/pubmed/24056482

[55] Jung, Suk-Chul, et al., 2013, Respiratory effects of the Hebei Spirit oil spill on children in Taean, Korea, *Allergy Asthma Immunol Res.* 2013 Nov; 5(6):365–370. Doi: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3810542/

Sook, Hyun, et al., 2013, Mothers and children's environmental health study in *Hebei Spirit* oil spill, http://ehp.niehs.nih.gov/isee/p-3-27-19/

Mohan, Geoffrey, 2015, Air pollution takes a double toll on babies' brains, *Los Angeles Times,* March 25, 2015. http://www.latimes.com/science/sciencenow/la-sci-sn-air-pollution-baby-brains-20150324-story.html

Peterson, Bradley, et al., 2015, Effects of prenatal exposure to air pollutants (polycyclic aromatic hydrocarbons) on the development of white brain matter, cognition, and behavior in later childhood, *JAMA Psychiatry*, March 25, 2015. doi:10.1001/jamapsychiatry.2015.57. http://archpsyc.jamanetwork.com/article.aspx?articleid=2205842

[56] Levelton Consultants, Ltd., 2015, Air Quality Impacts from Simulated Oil Spills in Burrard Inlet & English Bay, An Air Quality Dispersion Modeling Report, prepared for Metro Vancouver. http://twnsacredtrust.ca/wp-content/uploads/2015/05/TWN-Assessment-Appendix-5.pdf

[57] Coastal Response Research Center (CRRC), Research Planning Incorporated, and the National Oceanic and Atmospheric Administration, *The Future of Dispersant Use in Oil Spill Response Initiative*, March 2012, on p. 36. https://crrc.unh.edu/sites/crrc.unh.edu/files/media/docs/Workshops/dispersant_future_11/Dispersant_Initiative_FINALREPORT.pdf

and the desirability of using products that are listed for use in both countries." [58] The proposed interim use regulations state that both Corexit EC9500A and Corexit 9EC9580A are "listed for possible use in the United States." [59] While true now and for past spills, this may not be true for future spills. In January 2015, the U.S. EPA initiated a rulemaking on use of chemical and biological agents and other oil spill mitigating devices and substances. The impetus for the rulemaking was the use of nearly 7.6 million litres (2 million gallons) of Corexit dispersants 9500A, 9527A, and 9500A, which raised many questions about efficacy, toxicity, environmental trade-offs, and monitoring challenges of dispersants – and significant public opposition to use of toxic dispersants, which EPA is seeking to address through the proposed revisions to Subpart J of the National Contingency Plan.

Specific to the proposed Canadian interim regulations, the U.S. EPA is seeking to increase the overall soundness of the data – and the likelihood of achieving net environmental benefit of product use by requiring: (1) more detailed – public – information about product ingredients (i.e., no confidential business information); (2) improved and updated efficacy and toxicity testing protocols and new thresholds of performance (i.e., including chronic toxicity tests, minimum efficacy standards, and maximum toxicity standards); (3) testing on both product and oil-product combinations to better simulate environmental conditions and help ensure that products will perform as intended; (4) advanced monitoring during product use and long-term environmental monitoring post use; (5) protection for endangered species; (6) consideration of human health impacts; (7) certain prohibitions on product use; (8) specific protocol to remove products from the list or to stop use of products once initiated; and (9) specific protocol to transition from the old rules to the new rules. Further, the U.S. EPA also grants authority in area response plans to develop area-specific conditions of product use, including dispersants.

The proposed Canadian interim use regulations lack most of this detail. In effect, the proposed interim use regulations would give carte blanche preauthorization for two Corexit dispersants with essentially no guidelines or conditions for use other than stating that *criteria will be developed within the next five years*. In the interim period and in response to a spill, the relevant offshore board's Chief Conservation Officer may decide to use the Corexit dispersants – and any other STA products that may be listed/preauthorized – based on a determination of "net environmental benefit," *for which there are also no conditions or criteria in the proposed interim use regulations*.

THEREFORE, we submit that, if Environment Canada lists Corexit EC9500A and Corexit EC9580A for interim use as proposed, then Canada may well end up listing products for possible use that U.S. EPA may ban, or severely restrict, in the near future. This is contrary to what the proposed regulations imply; i.e., that Environment Canada is striving to list products that are compatible with products that are likely to be used in the United States, *including in future spills*.

D. Proposed regulations weaken entire spill response regime

[58] *Canada Gazette*, Part 1, July 4, 2015, p. 1619.
[59] *Ibid,* pp. 1621–22.

By expediting use of STA products at the federal government level, the Energy Safety and Security Act effectively circumvents what should be area-specific decisions.. This is a critical error that weakens the entire spill response regime.

To wit: A listing only determines what products may be used during oil spill response, not what products will be used. It is impossible for any blanket preauthorization to include the case-by-case consideration required to identify the quantities, if any, of product that are likely to achieve a net environmental benefit in a specific area, since this depends on where, when, and how much oil spilled. This should be the stuff of area response plans,[60] as developed by First Nations and local governments tasked with protecting workers, public health, and the environment. Local operators must also have response plans,[61] but operators should not decide what products are used, where they are used, or how much is used. Properly funded, designed, and implemented area response plans help to hold spillers accountable to the public and minimize spill-related damages to the environment, people, and local economies. Expediting use of STAs federally undermines local authority and sets the stage for contention during spill response and for loss of industry and spiller accountability – which undermines the entire spill response regime.

Area plans should be the crux of the entire response regime as they are supposed to provide detailed information to responders, including information on what products may or may not be used of the products listed in the regulations, and the criteria for use based on local conditions, needs, and sensitivities. Ideally, these determinations are made prior to spills as part of the planning process. Then operators know what STAs to list in their contingency products and what specific products to stockpile for use in different geographic areas. During a spill, the Chief Conservation Officer stipulates the conditions for product use, based on the area response plan.

The idea of a list of preapproved products seems to have come from the traditional disaster response world where preauthorization is used to save time and lives. We maintain that dispersants and other STA products do not lend themselves to this approach. An interim use list, *developed in the absence of conditions* determined by the Minister of the Environment and the Canadian Coast Guard working collaboratively with local municipalities, First Nations, and residents,[62] will lack practicalities crucial for effective disaster planning and response that truly mitigate environmental harm.

THEREFORE, we submit that, given strong evidence that dispersants actually do more

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[60] Canadian Coast Guard Environmental Response, 2011. Marine Spills Contingency Plan—National Chapter. http://www.ccg-gcc.gc.ca/CCG/ER/Marine-Spills-Contingency-Plan

[61] Transport Canada, National Oil Spill Preparedness & Response Regime, last updated April 29, 2015. https://www.tc.gc.ca/eng/marinesafety/oep-ers-regime-roles-101.htm

[62] Area response plans are the most direct way for local people to engage in spill prevention and response planning. Engaging local people in the oil spill prevention-and-response planning process has been found to combat government-industry complacency and infuse the planning process with a dose of practical reality. In fact, after the *Exxon Valdez* oil spill, the United States government institutionalized citizen involvement in oil spill prevention and response planning in Alaska as a model for the rest of the country. U.S. Oil Pollution Act of 1990, Section 5002, Terminal and Tanker Oversight and Monitoring, subsection (a)(2), Findings. This law created two Regional Citizens' Advisory Councils in Alaska.

harm than good, listing of Corexit dispersants and any other STA products *before conditions for listing and use are developed in detail and are fully integrated into area response plans,* is premature, unreasonable, and undesirable. Contrary to the stated intent of the law to improve oil spill "response, accountability, and transparency," the proposed interim use regulations are very poor policy that circumvents local knowledge and virtual guarantees a contentious, ineffective spill response that fails to hold the polluter accountable for harm from product use to the environment and public.

II. SPECIFIC COMMENTS ON PROPOSED REGULATIONS

A. Approach for the selection of products for inclusion on the List

1. Best-in-class approach is outdated and flawed

Environment Canada states that the objective of its evaluations was "to assess classes of STAs and identify those products that are known in the spill response community to offer high efficacy and low toxicity" (*Canada Gazette, Part 1, July 4, 2015, p. 1618).* However, the Corexit dispersants recommended for inclusion on the List have been studied, for decades, using test methods that only compare *relative effectiveness and toxicity* of products within each class.

The U.S. EPA is seeking to change this outdated approach. Based on lessons learned from the BP DWH disaster, U.S. EPA is proposing to update screening tests to include maximum toxicity criteria and minimum efficacy criteria, as discussed in Section B.2, below. Including specific criteria will eliminate toxic products or ineffective products. The "relative" approach is flawed in that it allows such products if they have consistently demonstrated "best-in-class" performance. In other words, if several dispersants are found to be highly toxic to test organisms in laboratory tests, but one product is consistently found to be slightly less toxic relative to the others, then that one product is considered "best-in-class" and listed. This does not necessarily mean that the product will achieve a net environmental benefit or that it won't be outright harmful to people and the environment – as U.S. EPA and the public learned during the BP DWH response and as noted in Part I.

Environment Canada's choice to list products based on a "best-in-class" approach, rather than on specific criteria for minimum efficacy and maximum toxicity, has created a situation in which Canada is proposing to legalize use of the some of the same Corexit dispersants – EC9500A and EC9580A – that the U.S. may ban in its final rulemaking, based on public opposition, experience, and current science.

2. CEPA List of Toxic Substances is of limited use in predicting ecological harm

In determining ecological risk from STA use, Environment Canada used, among other things, a comparison of the product ingredients to Schedule 1 of the CEPA 1999 to identify potential components of concern. While this approach may serve to eliminate products like Corexit dispersant EC9527A, which is currently formulated with 2-butoxyethanol (a listed compound of concern), Schedule 1 is not exhaustive, and it does not identify *products of concern*, based on synergistic combinations of ingredients. Both

of the Corexit dispersant proposed for interim use carry warning statements on their Safety Data Sheets (SDS) that are – or should cause – grounds for concern.

The SDS for Corexit EC9500A[63] identifies the product as an acute and chronic human health hazard, composed of petroleum distillates (10–30 percent), propylene glycol (1–5 percent), and organic sulfonic acid salt (10–30 percent). Acute human health hazards are listed as: eye damage, skin irritation, nausea and vomiting, chemical pneumonia if aspirated into lungs, respiratory irritant, and aggravation of an existing dermatitis condition. Methods for cleaning up large accidental releases warn: "Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Clean contaminated surfaces with water or aqueous cleaning agents. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations…" Under Environmental Precaution, the MSDS states, *"Do not contaminate surface water."*

The SDS for Corexit EC9580A[64] identifies it as an acute and chronic human health hazard, composed of hydrotreated light petroleum distillates (60–100 percent). Acute human health hazards are listed as: skin irritation, nausea and vomiting, chemical pneumonia if aspirated into lungs, central nervous system depression, respiratory irritation, and aggravation of an existing dermatitis condition. Methods for cleaning up large accidental releases warn: "Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Clean contaminated surfaces with water or aqueous cleaning agents. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations…" Under Environmental Precaution, the MSDS states, *"Prevent material from entering sewers or waterways."*

We find that the SDS alone contain sufficient information for a reasonable person to conclude that these products should not be accidentally or intentionally released in waterways; that use of these products is likely to do more harm than good; and that these products should be prohibited for use in oil spill response. Further, we find that intentional release of such products in marine oil spill response is in direct violation of the manufacturer's warning to prevent the product from entering waterways. A reasonable person would conclude that intentional releases would put the onus for harm on the government and absolve the manufacturer or polluter of any liability for product use, which is exactly what the U.S. Court decided in the BP DWH case[65] – and what Energy Safety and Security Act does. From our point of view, this is simply unreasonable and unacceptable policy, as it is abundantly clear from the manufacturer's SDS that the products are likely to do more environmental harm than good.

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[63] NALCO, 2012, Safety Data Sheet for Corexit® EC9500A. http://www.nalcoesllc.com/nes/documents/MSDS/NES-LLC-COREXIT-EC9500A-March_2012.pdf

[64] NALCO, 2012, Safety Data Sheet for Corexit® EC9580A. http://www.nalcoesllc.com/nes/documents/MSDS/NESLLC-COREXIT-EC9580A-Mar2012.pdf

[65] McEvoy, Claran, 2012, NALCO skirts lawsuits over Corexit use after BP oil spill, Law360.com. http://www.law360.com/articles/397322/nalco-skirts-lawsuits-over-corexit-use-after-bp-oil-spill

3. Consideration of Schedule of Prohibited STA products

Environment Canada should consider prohibitions for STA products, based on other compounds of concern and other information. For example, U.S. EPA has a long-standing prohibition on "sinking agents," meaning any STA or substance that acts to submerge oil beneath the water surface.[66] U.S. EPA is also considering to prohibit products that contain either nonylphenol (NP) or nonylphenol ethoxylates (NPEs); endocrine disrupting compounds[67]; and proprietary ingredients, undisclosed ingredients, or ingredients protected as Confidential Business Information.[68]

Given the goal of identifying products that are likely to achieve a net environmental benefit, Environment Canada should also consider prohibiting products for which the manufacturer has issued an SDS that lists human health hazards or warnings to prevent the product from entering waterways if accidentally released, as discussed above.

B. Environment Canada STA test criteria and test methods

1. Assumption that use of STAs will only result in acute exposure is flawed

Environment Canada states that a "significant weight will be given to lessons learned from experience gained during actual spill response, as available." [69] As discussed in the general comments, most of the assumptions regarding dispersant use have proven to be invalid in light of studies from the BP DWH disaster and research in cold water environments.

For example, regarding persistence of dispersants, one of the consensus points reached by the State-of-Science for Dispersant Use in Arctic Waters working group states: "*Specific components of dispersants have a longer half life in the environment than other components."* And also that *"Persistence of dispersant compounds is likely a function of environmental conditions: water column vs. sediment; depth of water column."* [70]

U.S. EPA is addressing new concerns raised by persistence of dispersants by proposing chronic and sub-chronic testing protocols in its 2015 rulemaking.

2. Acute toxicity tests are not predictive of ecosystem impacts

We have four specific concerns regarding Environment Canada's use of acute toxicity tests.

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[66] U.S. EPA, 1994, 40 CFR, National Oil and Hazardous Substances Pollution Contingency Plan, Subpart J Use of Dispersants and Other Chemicals, §300.910(e).
[67] U.S. EPA, 2015 Rulemaking on National Oil and Hazardous Substances Pollution Contingency Plan, FR 80(14):3380–3446, on p. 3391–92.
[68] U.S. EPA, 2015 Rulemaking, pp. 3413–14.
[69] *Canada Gazette*, Part 1, July 4, 2015, p. 1622.
[70] In: Prince William Sound Regional Citizens' Advisory Council, 2015, Comments on 40 CFR Parts 110 and 300, National Contingency Plan Subparts A and J, submitted to U.S. EPA for rulemaking docket ID No. EPA-HQ-OPA-2006-0090.

First, the State-of-Science for Dispersant Use in Arctic Waters working group noted that acute toxicity testing may miss some delayed mortality and other adverse ecological impacts: *"Data from standard acute LC50 and EC50 tests can miss delayed mortality and may also miss other adverse ecologically important endpoints that are expressed over a longer period of time."*

To partially address this concern, U.S. EPA is proposing to add three maximum acceptable standards for the acute toxicity test: a LC_{50} standard of greater than 10 part per million (ppm) at the lower 95% confidence interval; an inhibition concentration for 50% of the test species (IC_{50}) standard of greater than 10 ppm at the lower 95% confidence interval; and a sub-chronic No Observable Effect Concentration (NOEC) of greater than 1 ppm.

Public comments on the rulemaking support the trend to establish maximum acceptable toxicity standards, but found proposed thresholds far too lenient.[71] It is well established that PAH concentrations of 1–20 ppb sicken individual aquatic organisms and reduce entire populations of fish, birds, and mammals.[72] More recent studies on early life stages of bluefin tuna, yellowfin tuna, and amberjack found fish embryos were very sensitive to PAH-induced cardiotoxicity and that "exposures of 1–15 ppb total PAH cause specific dose dependent defects in cardiac function in all three species with circulatory disruption, culminating in pericardial edema and other secondary malformations." [73] Recent studies on humans corroborate the wildlife studies: Prenatal exposure to PAHs was found to be associated with subsequent cognitive and behavioral disturbances in childhood in a dose-response relationship.[74]

Since it is also standard practice to set the NOEC level at 100 times lower than the LC_{50} level, citizens requested a reduction of proposed thresholds by 10,000 times for the LC_{50} standard to 1 ppb; 10,000 times for the IC_{50} standard to 1 ppb; and 100,000 times for the NOEC standard to 1 part per trillion. Further, people requested that the thresholds should also apply to EPA's EDSTAC Tier 1 screening test for all products and the water-accommodated fraction of all test oils.

To further address the concern of over reliance on acute toxicity testing, public comments on the rulemaking also support use of chronic toxicity tests. The EDSTAC Tier 1 screening for endocrine disrupting compounds as an example of the type of analysis necessary to assess the complex sublethal effects that may be caused by exposure to dispersed oil fractions.

Second, Environment Canada is proposing interim use listing of products for marine oil spills based on testing of freshwater species, specifically, a vertebrate (rainbow trout),

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[71] Ott, Riki, ALERT, and the Citizens Coalition to Ban Toxic Dispersants, 2015, Comments on 40 CFR Parts 110 and 300, National Contingency Plan Subparts A and J, submitted to U.S. EPA for rulemaking docket ID No. EPA-HQ-OPA-2006-0090. www.alertproject.org

[72] Peterson et al., 2003, Long-term ecosystem responses.
Ott 2004, *Sound Truth,* Chapter 20.

[73] Incardona et al. 2014, BP DWH oil impacts developing hearts of large pelagic fish.

[74] Peterson, Bradley et al., 2015, Effects of prenatal exposure to air pollutants (PAHs) on the development of brain white matter, cognition, and behavior in later childhood, *JAMA Psychiatry,* Mar 25, 2025, http://archpsyc.jamanetwork.com/article.aspx?articleid=2205842

an invertebrate crustacean (*Daphnia* spp.), and a bacterium (luminescent species)." Environment Canada recognizes "that the reference methods traditionally used to determine the deleteriousness of the product may not be best suited to the marine context… and is taking steps to evaluate the applicability of alternative reference methods using relevant Canadian marine species, with species sensitivity being a major consideration." [75]

We consider it very premature to list products – even on interim use regulations – without conducting toxicity tests on species of concern, including sensitive life stages of environmentally and economically important species, in the medium in which the products are anticipated to be use. We consider Environment Canada's approach unreasonable, and we are concerned that it sets very poor precedent.

Third, the approach of testing only 2–3 species yields limited information of little real-world applicability. Scientists who convened in 2012 to evaluate dispersant use during the BP DWH disaster conceded that toxicity tests that focus on two or three species are of limited value in predicting ecosystem impacts and net environmental benefit.[76] In the aftermath the *Exxon Valdez* oil spill, scientists conducted decade-long, comprehensive ecosystem studies using multiple species over multiple generations. The collective work resulted in a paradigm shift in the field of oil ecotoxicology, based on findings that PAHs were consistently toxic to a variety of species in the range of 1–20 ppb.[77] The approach of evaluating products based on acute lethality to adult organisms of only a few species is no longer sufficient to determine ecosystem impacts and net environmental benefit.

Our fourth concern is that Environment Canada is only evaluating toxicity of STAs, not oil-STA combinations. This approach is also of limited use in predicting ecosystem impacts. During the BP DWH disaster, Rototox (rotifer) toxicity testing was used to evaluate toxicity of Corexit EC9527A. Results indicated the Corexit dispersant was not very toxic as rotifers had 90 percent survival rates when tested with the product alone. However, subsequent toxicity tests on rotifers using chemically-dispersed oil found the oil-dispersant combined was lethal to half of the early life stages of rotifers, a finding called "ecologically significant" by the authors.[78] Based on lessons learned from this disaster, U.S. EPA has proposed in its rulemaking that toxicity tests (acute, chronic, and sub-chronic) evaluate dispersants and some other products alone and in combination with oil.[79]

3. Consider environmental and other limitations of product use

According to Environment Canada, "an effective *dispersant* is one that rapidly and comprehensively transfers oil from a slick at the surface down into the water column as small droplets." However, as discussed in the general overview, oil spill dispersions are not stable and dispersed oil will de-stabilize and rise to the surface relatively quickly. In

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[75] *Canada Gazette*, Part 1, July 4, 2015, p. 1620.
[76] Coastal Response Research Center et *al.*, 2012, *Dispersant Initiative Report*.
[77] Peterson et *al.* 2003 Long-term ecosystem response.
Ott, 20004, Sound Truth and Corporate Myths.
[78] Rico-Martinez, 2013. http://www.sciencedirect.com/science/article/pii/S0269749112004344
[79] U.S. EPA, 2015 Rulemaking on National Oil and Hazardous Substances Pollution Contingency Plan, FR 80(14):3380–3446, on p. 3404–06.

his 2014 literature review, Fingas noted half-lives of dispersions between 4 and 24 hours. Somewhat paradoxically, dispersants also enhance formation of nearly neutrally buoyant oily plumes and sedimentation of oil to the bottom of the water body. As discussed earlier and evidenced along the Gulf of Mexico coast impacted by the BP DWH spill, oily plumes can be stirred up by weather events and deposited on shorelines years after the spill event.

In short, dispersants do not actually make oil go "away." Rather dispersants "remove" oil from the water surface, temporarily in some cases, and spread it and the oil throughout the water column to the bottom of the water body. Further, a more effective dispersant is also a more toxic dispersant, due to the increase of PAHs in the water column, as discussed in Part 1 – at least with the current formulations of dispersant products. We find that no net environmental benefit is likely from use of such products.

Environment Canada recognizes that *dispersant effectiveness* varies depending on several factors, including oil type, oil-weathering state, sea energy, salinity and temperature, and dispersant dose. U.S. EPA is proposing to limit use of dispersants to saltwater environments in its 2015 rulemaking,[80] because in fresh water environments, dispersants have demonstrated little to no effectiveness.[81] However, U.S. EPA points out that surfactants, the active ingredient in dispersants, are also not effective in brackish waters. There should be thresholds for dispersant use based on salinity and temperature. The published literature supports limiting use in waters with a salinity of less than 15 parts per thousand or an ambient temperature of less than 10ºC (50ºF).[82]

4. Choice of efficacy screening tests

Dispersants: We have two concerns with the tests proposed by Environment Canada. First, due to the loss in efficacy with temperature, noted above, U.S. EPA is proposing in its 2015 rulemaking to conduct efficacy tests at both 5ºC and 25ºC with minimum performance criteria at each temperature. Environment Canada should consider this approach, as it is more likely to yield information relevant to field performance.

Second, Environment Canada is proposing to use two different efficacy tests. The Swirling Flask test was designed by Environment Canada and is now an accepted, standard test that has been used for over 20 years. It is a lower energy test, which better mimics wind-wave mixing conditions in environment than the Baffled Flask Test. The latter is a non-standard test designed by industry to boost efficacy of dispersants, especially in cold water environments with heavier weight crude oils. The mixing conditions are unrealistically high – except possibly in hurricane-force winds. There is also the temptation to average test results, which would yield meaningless data for predicting field performance. Averaging of efficacy tests between heavy and lighter weight reference oils is still allowed in the United States, but U.S. EPA is proposing to eliminate this practice in its 2015 rulemaking. We support use of standard testing

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[80] U.S. EPA, 2015 Rulemaking, p. 3406.

[81] Fingas, Merv, (Ed.), 2011, *Oil Spill Science and Technology,* Gulf Professional Publishing, pp. 513– 518.

[82] Prince William Sound Regional Citizens' Advisory Council, resource and source material on dispersants, including several literature review by Merv Fingas. http://www.pwsrcac.org/programs/environmental-monitoring/dispersants/

protocols ONLY.

Surface washing agents: We support use of the accepted, standard Inclined Trough Test, as proposed by Environment Canada, to evaluate efficacy of surface washing agents. This test was designed by Environment Canada; it has a high reliability and a very large database on product effectiveness.

5. Need for environmental monitoring

Environment Canada notes the importance of conducting environmental monitoring of product use to verify field performance. However, Environment Canada does not propose any environmental monitoring requirements as a condition of product use.

As a required condition of use, we find it would be reasonable to include stipulations for both baseline environmental monitoring and environmental monitoring during and after product use. These stipulations would not be considered "research projects" under the Energy Safety and Security Act, but rather required conditions for industry operations that have a risk of spilling oil, regardless of whether an STA product may be used during spill response.

Issues of concern include, among others: what entity – government or industry – is responsible for conducting the pre- and post-spill monitoring; should there be a minimum threshold to trigger post-spill monitoring, based on the size of the spill and/or the quantity of product used; and how long after the spill and/or product use should monitoring be conducted.

Further, given concerns with air quality and human health impacts, another issue raised during the EPA rulemaking was scope of environmental monitoring; specifically, that it include air-borne pollutants. Concerns about air-borne pollutants associated with marine oil spills and spill response near urbanized areas have been also expressed by the Vancouver, BC, municipalities, First Nations, and the public in comments to the National Energy Board, regarding the proposed Kinder Morgan Trans Mountain expansion project, as discussed in the general comments.[83]

6. Need for protocol to remove products that don't work as intended

Environment Canada notes, "Should new information become available that indicates a listed product poses a greater risk to the environment than originally estimated, the product can be removed from the list." [84] We have four concerns with this statement of intention.

First, it creates a double standard. Environment Canada is proposing to list products for interim use based on a standard that the product is likely to achieve a net environmental benefit, but is proposing to remove products from the list based on a standard that the

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[83] Levelton Consultants, Ltd., 2015, Air Quality Impacts from Simulated Oil Spills in Burrard Inlet & English Bay, An Air Quality Dispersion Modeling Report, prepared for Metro Vancouver. http://twnsacredtrust.ca/wp-content/uploads/2015/05/TWN-Assessment-Appendix-5.pdf

[84] *Canada Gazette*, Part 1, July 4, 2015, p. 1622.

product poses a greater risk to the environment than originally estimated. This is not the same as a removing a product that fails to achieve a net environmental benefit.

Given the current state of scientific understanding and the warnings on the manufacturer's SDS of health hazards and possible harms to humans and the environment, we find that a reasonable person could anticipate a great deal of harm to human health and the environment from use of Corexit dispersants. Therefore, the proposed standard of posing a greater risk than anticipated is not likely to be achieved. Further, this is no longer a reasonable standard. The issue at present is how much harm is *acceptable to the people in the area impacted by the oil spill and product use.*

Second, Environment Canada does not propose any criteria for making a determination that a product has not achieved a net environmental benefit. Without specific conditions and a protocol for removing products *as a condition of product use*, we find it unlikely that any product, regardless of how much harm it causes, will actually be removed from the list once it is approved.

Third, Environment Canada does not indicate who is responsible for making the determination that a product has achieved a net environmental harm. Since environmental harm or benefit will occur in the area where the oil has spilled and product is used, local authorities – municipalities and First Nations – and the public who live with the consequences of these policies should develop area-specific conditions and criteria for product use, including not allowing use or cessation of use during oil spill response, as part of their area response plan. In response to a spill, the relevant offshore board's Chief Conservation Officer could then make a determination of net environmental harm and recommend that the Minister of the Environment remove the product from the list. Once a determination of net environmental harm has been achieved, there should be a stipulation that the Minister of the Environment must immediately remove the product from the list.

Finally, and most importantly, Environment Canada makes no mention in its proposed interim use regulations of the need to also include *preauthorized conditions for cessation of product use during spill response* in the event that it becomes apparent that the product is doing more harm than good or that community acceptance of risk has shifted to oppose product use. The need for cessation of use protocols is more likely to occur with prolonged product use such as occurred during the BP DWH spill response. Cessation of use protocols should be developed by local authorities and the public as part of their area response plans, and implemented by the CCO, similar for the comments noted above for removal protocols.

7. Clarify that interim use does not guarantee listing under final use rules

Environment Canada makes no mention of how products listed for interim use will be considered once final use regulations are in place. Given that interim use listings are not based on any conditions, we request that any product listed for interim use must be evaluated under, and meet all the conditions of use stipulated under, the final use regulations. We request that no interim use products are "grandfathered" under the final use regulations, simply because the product was listed for interim use.

C. Proposed STA products for listing

The weight of evidence, based on experience with dispersant use during the BP DWH response, recent studies, and literature reviews, as discussed, has called into question the benefits of dispersant use. We find that Environment Canada's proposal to list Corexit EC9500A and Corexit EC9580A for interim use is not supported by current science. Further, the proposed regulations lack convincing evidence that use of these products is likely to achieve a net environmental benefit. Therefore, we cannot support these listings.

D. Amendments to the List of spill-treating agents

For reasons discussed throughout our comments, we do not agree with the "best-in-class" approach or toxicity evaluations using outdated testing protocols. We also find the stated standard of net environmental benefit cannot be achieved without the conditions discussed above. We find it appalling and irresponsible that Environment Canada "may" consider listing products without ascertaining the risks and potential ecological impacts related to product use, including oil mobility, that may affect the fate and transport of the treated oil and the toxicity of degradation by-products.[85] Therefore, we submit: while the Minister of the Environment has the legal authority to create interim use regulations listing STAs and products authorized for use, the Minister is not required to exercise this authority. We appeal to the Minister to instead await the further investigation contemplated by the Department and recommended herein. These may then be adopted in final use regulations – *and fully integrated into area response plans developed by local authorities – municipalities and First Nations with public input*.

E. Regulatory Burden

Environment Canada has determined that its proposed regulation will not impose an administrative or compliance burden on business. While it may not burden the oil industry, the fact is that it does create a compliance burden for other businesses and provincial and local governments that will bear the liability of product use. Ignoring the risk of product use does not make it go away; it transfers it to other non-exempted parties, including the government.[86]

We find that this rule imposes a compliance burden on municipalities, First Nations, and businesses operating in areas at-risk of marine oil activities and spills. The rule also has huge implications for public health and welfare. Adverse effects from dispersants or other product use may harm areas designated for special use or protection such as national and provincial parks and marine protected areas, national wildlife refuges, and wildness areas; culturally-significant or historical areas such as First Nations' sacred sites or archeological resources; human use activities such as subsistence, commercial or charter fishing, and boating or other recreational use activities; and public or private facilities such as fish hatcheries, aquaculture and mariculture facilities, public water intakes, boats, and docks. Harm from dispersants may also raise needs for temporary evacuation and housing and disaster relief funds.

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[85] *Ibid.*
[86] McEvoy, 2012, NALCO skirts lawsuit.

F. Consultation

Because of the huge potential for harm to human health, public welfare, and local economies, we find that determinations of product use are *best done in collaboration with First Nations, and consultation with coastal municipalities*.

For example, Coastal First Nations are on record opposing dispersant use. In their final argument to the Joint Review Panel, Coastal First Nations concluded that, based on their evidence, there was a lack of information upon which to make a decision to use dispersants and that consultation should be done before any decision is made.

Many First Nations in the United States also oppose dispersant use. For example, thirteen Tribal Governments in Alaska passed resolutions calling for a ban on chemical dispersant use in their subsistence waters.[87] The Makah Tribe in northwest Washington State took a different approach that could serve as a model of engagement for First Nations in Canada (Exhibit 1).[88] The Makah used an 1855 treaty to secure fishing and whaling rights in both state and federal waters in their Usual and Accustomed (U&A) fishing and whaling grounds on the Olympic Coast. The Makah Tribal Council received federal funding to work with federal agencies including the U.S. Coast Guard and state agencies to secure authority to self-determine dispersant use on a case-by-case basis – meaning no pre-authorization – within the Makah U&A marine area. The Makah U&A marine area extends from the shore out 200 miles to the limit of the Exclusive Economic Zone (Map, Exhibit #2). The Northwest Area Contingency Plan was changed to only allow dispersant use on a case-by-case basis within the Makah U&A marine area.[89]

G. Rationale

Environment Canada maintains that the proposed Regulations establishing a list of STAs fulfills the definition of a "spill-treating agent" as contemplated in the *Energy Safety and Security Act* and that, in order to enable the spill response regime that has been 'enhanced' by the permissible use of STAs, the provisions of the *Energy Safety and Security Act* must come into force.

In the past, Environment Canada has been a respected leader in the field of marine oil spill response. Now is no time to duck and run for cover. When presented with an extremely onerous law such as the Energy Safety and Security Act, clearly designed to advantage the oil industry, we expect and encourage Environment Canada and the Minister of the Environment to stand strong and adopt regulations that return the best advantage to the environment and the citizens of Canada.

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[87] Calcote, Delise, Letter from Alaska Inter-Tribal Council to Commander of the 17th Coast Guard District, Juneau, Alaska, Feb. 14, 2014. Under Global Alliance tab at http://protectmarinelifenow.org/global-alliance

[88] Tierney, Michael, 2013, Sovereign Cooperation: The Makah Tribe's Office of Marine Affairs and the fundamentals of partnering with Uncle Sam, Boston College Law School, paper for Environmental Law class with Prof. Zygmunt Plater, Nov 2013.

[89] EPA Region 10, 2015, Regional Response Team and the Northwest Area Committee, Northwest Area Contingency Plan, Section 9406, Dispersant Tools, Job Aids, and Decision Process. http://www.rrt10nwac.com/nwacp/

We submit that Environment Canada and the Minister of the Environment can establish proposed regulations that *do not list any products for interim use* but still enables the spill response regime established under the Energy Safety and Security Act. This would be the responsible and professional action, based on a finding that no product is likely to achieve a net environmental benefit without careful consideration of conditions upon which to base this determination.

III. RECOMMENDATIONS FOR PROPOSED REGULATIONS

A. Preferred option

We recommend the following as interim use regulations:

A simple statement to the effect of – "For these Regulations, Environment Canada scientists have conducted scientific evaluations of STA products with a focus on dispersants and surface-washing agents known to offer best-in-class characteristics based on extensive long-term study. However, we have determined, based on weight of evidence during actual oil spill responses in other jurisdictions and countries, that the best-of-class approach is not capable of identifying products likely to achieve net environmental benefit, as the law requires. The evaluations concluded that, at this time, there are no products that possess favourable characteristics as oil spill countermeasures and offer the potential for high efficacy coupled with limited toxicity to biota in cold water marine environments and limited harm to human health and wellbeing during marine spills. The Minister of the Environment therefore proposes that no specific STA products be included in the Regulations until development and adoption of final use regulations, which will establish a set of requirements, standards, and conditions to evaluate and determine what products are likely to achieve a net environmental benefit, and conditional use requirements developed in conjunction with area response plans."

B. Alternative options

IF the Minister of the Environment decides to proceed with its recommendation for interim use listing of Corexit EC9500A and Corexit EC9580A, THEN we recommend the following concepts for consideration as interim use regulations. We consider these the *minimum acceptable requirements* necessary to increase the overall soundness of the data – and the likelihood of achieving net environmental benefit of product use.

1. More detailed – public – information about the product, including:
   - √ manufacturer's contact information;
   - √ information on accredited laboratory that conducted toxicity and efficacy tests;
   - √ identity and concentration of all components in the product;
   - √ physical and chemical properties of the product;
   - √ recommended use under different environmental variables;
   - √ environmental fate, including oil mobility that may affect the fate and transport of the treated oil;
   - √ toxicity of degradation by-products;

- √ human health hazards and potential health impacts;
- √ ability to recover the product after use; and
- √ a current SDS.

As a useful guideline, we suggest that Environment Canada consider the proposed set of data and information requirements used and/or being considered by U.S. EPA.[90]

2. Improved and updated toxicity testing protocols with maximum performance standards, including:

- √ Testing for all products, product-oil combinations, and the water-accommodated fraction of test oils.

- √ Three maximum acceptable standards for the acute toxicity test: a LC_{50} standard of greater than 10 parts per billion (ppb) at the lower 95% confidence interval; an inhibition concentration for 50% of the test species (IC_{50}) standard of greater than 10 ppb at the lower 95% confidence interval; and a sub-chronic No Observable Effect Concentration (NOEC) standard. Since it is standard practice to set the NOEC level at least 100 times lower than the LC_{50} level, the NOEC standard should be greater than 100 parts per trillion.

- √ Chronic toxicity testing with application of the maximum toxicity standards to U.S. EPA's EDSTAC Tier 1 screening for endocrine disrupting compounds – or other similar tests to assess sublethal effects.

- √ Conducting toxicity tests on species of concern, including sensitive life stages of environmentally and economically important species, in the medium in which the products are anticipated to be used, and with a range of standard reference oils of the types anticipated to be spilled.

3. Improved and updated efficacy testing protocols with minimum performance standards, including:

- √ Testing for all products with a range of standard reference oils of the types anticipated to be spilled.
- √ Conducting efficacy tests at 5ºC and 25ºC with minimum performance criteria at each temperature.
- √ No averaging of test results across temperatures or reference oils.

4. Use of standardized testing protocols and accredited laboratories ONLY

5. Certain prohibitions on product use, including:

- √ use as sinking agents;
- √ products that contain nonylphenol (NP), nonylphenol ethoxylates (NPEs), endocrine disrupting compounds, or substances listed on Schedule 1 of the CEPA 1999 List of Toxic Substances;
- √ products that contain proprietary ingredients, undisclosed ingredients, or ingredients protected as Confidential Business Information;

[90] U.S. EPA, 2015 Rulemaking, Section C (4)(a)pp. 3399–3402.

√ products for which the manufacturer has issued an SDS listing human health hazards or warnings to prevent the product from entering waterways if accidentally released; and

√ specifically for dispersants, prohibitions on use in waters with a salinity of less than 15 parts per thousand or an ambient temperature of less than 10ºC (50ºF).

6. General requirements for environmental monitoring, including:

√ benchmark criteria to make determinations of net environmental benefit and net environmental harm, including community acceptance in the area impacted by the spill and as determined by the area response plan;

√ minimum threshold criteria to trigger post-spill monitoring, based on the size of the spill and/or the quantity of product used;

√ how long after the spill and/or product use should monitoring be conducted, based on life cycles of key environmentally and economically important species;

√ coordination with area response plans developed by municipalities and First Nations;

√ protocol for protection for endangered species;

7. Conditional use, based on development and approval by the Canadian Coast Guard of area response plans developed by municipalities and First Nations that include:

√ identification of priority sensitive areas for protection;

√ various discharge scenarios including Realistic Maximum Oil Discharge;

√ various environmental monitoring scenarios for tracking air- and water-borne pollutants;

√ a baseline environmental monitoring program;

√ rapid risk health assessment protocol and a plan to protect worker and public health;

√ a Quality Assurance Program;

√ acceptance of product use by area and community residents;

√ area-specific conditions and criteria for product use, if any, such as quantities and the duration of use; water depth, distance to shoreline, and proximity to populated areas and water intake structures; approved storage and staging areas for products;

√ public notification of product use;

√ cessation of use criteria during spill response;

√ Memoranda of Understanding with the relevant offshore board CCO, the industry response organization, and First Nations to establish procedures for concurrence, coordination, and withdrawal of concurrence, regarding environmental monitoring and protection of worker safety and public health

8. Protocol to remove products from the list, including:

√ Determination of net environmental harm by the relevant offshore board's Chief Conservation Officer;

√ Stipulation that once a determination of net environmental harm has been determined by the relevant offshore CCO, the Minister of the Environment must immediately remove the product from the list

9. Protocol to stop use of products once initiated during spill response, including:

√ Determination of net environmental harm by the relevant offshore board's Chief Conservation Officer; and

√ Revoking of concurrence by First Nations or community acceptance in the area impacted by the spill.

10. Protocol to transition from the old rules to the new rules, including:

√ A requirement that any product listed for interim use regulations must be re-evaluated and re-listed under the final use regulations, once in force.

All of which is respectfully submitted by:

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