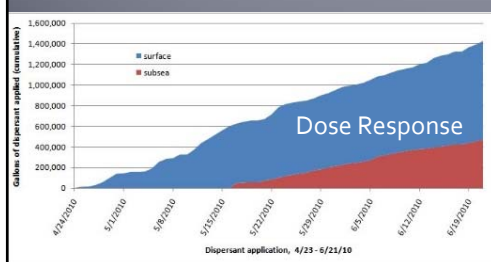




Risk & Oil Dispersants & Human Health

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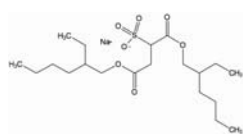
Four Steps of Risk Assessment



Hazard Identification

Product	Ingredients
BIODISPERS (Petrotech America)	Proprietary
JD-309 (GlobeMark Resources Ltd.)	Proprietary
JD-2000 (GlobeMark Resources Ltd.)	Proprietary
NOKOMIS 3-AA (Mar-Len Supply, Inc.)	Proprietary
NOKOMIS 3-F4 (Mar-Len Supply, Inc.)	Proprietary
COREXIT 9500 (Nalco Energy Services)	Sorbitan, mono-(2)-9-octadecenoate Sorbitan, mono-(2)-9-octadecenoate, poly(oxy-1,2-ethanediyl) deriv. Sorbitan, tri-(2)-9-octadecenoate, poly(oxy-1,2-ethanediyl) deriv. Butanedioic acid, sulfo-, 1,4-bis-(2-ethylhexyl) ester, sodium salt (Diocetyl sodium sulfosuccinate) (10 – 30%) 1-(2-butoxy-2-methylethoxy)-2-propanol (1 – 5%) Distillates (petroleum), hydrotreated light (10 – 30%)
COREXIT 9527 (Nalco Energy Services)	Sorbitan, mono-(2)-9-octadecenoate Sorbitan, mono-(2)-9-octadecenoate, poly(oxy-1,2-ethanediyl) deriv. Sorbitan, tri-(2)-9-octadecenoate, poly(oxy-1,2-ethanediyl) deriv. Butanedioic acid, sulfo-, 1,4-bis-(2-ethylhexyl) ester, sodium salt (Diocetyl sodium sulfosuccinate) (10 – 30%) 1-(2-butoxy-2-methylethoxy)-2-propanol (1 – 5%) Distillates (petroleum), hydrotreated light 2-Butoxy-ethanol (30 – 60%)
MARE CLEAN 200 (Taiho Industries Co. Ltd.)	Poly(oxy-1,2-ethanediyl), α -hydro- ω -hydroxy-, ether with 1,2,3-propanetriol (2)-9-octadecenoate Poly(oxy-1,2-ethanediyl), α -(2)-1-oxo-9-octadecen-1-yl- ω -hydroxy- Poly(oxy-1,2-ethanediyl), α -(2)-1-oxo-9-octadecen-1-yl- ω -(2)-1-oxo-9-octadecen-1-yl-oxy- (Polyethylene Glycol Diolate) Sorbitan, tri-(2)-9-octadecenoate, poly(oxy-1,2-ethanediyl) deriv. (Polysorbate 85) Alkanes, C ₁₄ -30
DISPERSIT SPC 2000 (U.S. Polychemical Corp.)	Poly(oxy-1,2-ethanediyl), α -(2)-1-oxo-9-octadecen-1-yl- ω -hydroxy Ethoxylated Amines, tallow alkyl N,N-bis(hydroxyethyl)- Amides, coco Ethoxylated Alcohols, C ₁₂₋₁₄ -secondary, 1(or 2) - (2-methoxymethylethoxy) - propanol
SAF-RON Gold (Sustainable Environmental Technologies, Inc.)	Proprietary
NEOS AB3000 (Neos Company, Ltd.)	Proprietary
SEA BRAT 4 (Alabaster Corp.)	Proprietary

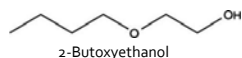
Dose-Response



Diocetyl sodium sulfosuccinate



Typical dose is 100 – 250 mg/day.



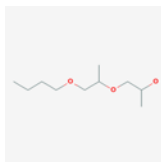
2-Butoxyethanol



Causes red blood cell damage in some animals, however, humans are significantly more resistant.

[Ambient] \approx $\mu\text{g}/\text{m}^3$
[Occupational] \approx mg/m^3

Some report irritation of the nose and eyes, headache, a metallic taste, or vomiting at 480 mg/m^3 at 4-8 hrs.

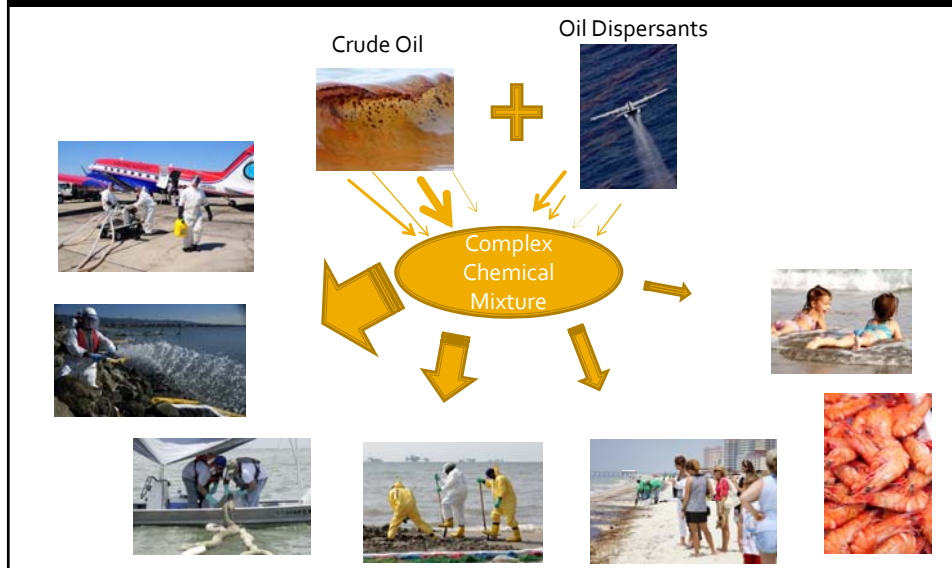


Dipropylene glycol butyl ether



Mostly used in production of industrial grade solvent products. In general, P-series glycol ethers are considered safer alternatives to E-series (ie. 2-butoxyethanol)

Exposure Assessment



Risk Characterization

- Dispersant risk during spill
 - Occupational > General Population
 - Moderate – Minimal
- Several ongoing health studies in the Gulf Region
 - Assessing exposure will be a big challenge.
- **Do dispersants affect distribution, exposure, and toxicity of oil?**
 - DSS is considered as a possible way to enhance drug delivery.
- Residual present-day effects – *Probably very low.*
 - Assuming ≈ 10% of Gulf was affected by DWH spill and then mixed with total volume of dispersant used, one would need to drink about 3 million gallons to get the amount of DSS contained in one dose of stool softener.

