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**State-of-Science on Dispersants and Dispersed Oil:
Public Health and Food Safety.**

May 24, 2016
**Flower Garden Banks
National Marine Sanctuary,
Galveston Texas**

Doug Helton



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Basic Options

- All response tools have limitations and trade-offs
- All have health and safety implications

RESPONDING TO OIL SPILLS AT SEA

DISPERSION
Chemical dispersion is achieved by applying chemicals designed to remove oil from the water surface by breaking the oil into small droplets.

BURNING
Also referred to as in situ burning, this is the method of setting fire to freshly spilled oil, usually while still floating on the water surface.

BOOMS
Booms are long, floating barriers used to contain or prevent the spread of spilled oil.

SKIMMING
Skimming is achieved with boats equipped with a floating skimmer designed to remove thin layers of oil from the surface, often with the help of booms.



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Changing the fate of the oil

- May be able to protect highly sensitive species and locations.
- Helps responders choose where the impacts are felt.
- Human impacts locations change too

Benthic Profile

Land, Nearshore rocky reefs, Mesophotic reefs, Continental slope, Continental Shelf, Wellhead, Deep-sea Benthos

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Safety of Responders

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NALCO
Environmental
Solutions LLC

COREXIT® EC9500A

OIL SPILL DISPERSANT

LOT NO.	DENSITY	NET WEIGHT
	7.91 kg/gal	

WARNING! May cause serious eye damage if not treated promptly. Keep away from heat. Keep away from sources of ignition - No smoking. Keep container tightly closed. Do not get in eyes, on skin, on clothing. Do not take internally. Avoid breathing vapor. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of soap and water. Wear suitable protective clothing.

STATE RIGHT-TO-KNOW:
Propylene Glycol ... 57-55-6

ATTENTION: For more information refer to the material safety data sheet. Empty containers may contain residual product. DO NOT reuse containers unless properly reconditioned.

EMERGENCY TELEPHONE NUMBERS: (800) 424-9389 (24 Hours) CHEMTREC

Nalco Environmental Solutions LLC
7705 Highway 90-A, Sugar Land, Texas USA 77478
(281)263-7000
Material: EC9500A.61 Generated: 4/5/2012

NFPA



HMS

HEALTH	2
FLAMMABILITY	1
PHYSICAL HAZARD	0
PERSONAL PROTECTION	A

U.S. DOT Shipping Name: PRODUCT IS NOT REGULATED DURING TRANSPORTATION
MARINE TRANSPORT (IMDGMO): PRODUCT IS NOT REGULATED DURING TRANSPORTATION

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U.S. Gulf oil spill poses public health threat: Response targeting workers, residents, food and air quality ➔

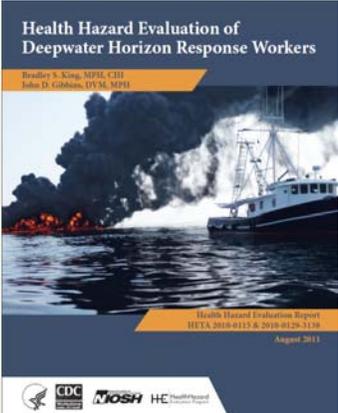
Kim Krisberg

Described as the worst environmental disaster in U.S. history, the massive oil spill in the Gulf of Mexico poses serious risks to human health too — risks that could persist far into the future and about which little is known.

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Human Health?

“Although all seven fishermen were hospitalized on the same day, we found that their symptoms could not be linked to the chemical dispersant... The seven fishermen worked on five different vessels, none of which were operating in the area of dispersant use.”



Health Hazard Evaluation of Deepwater Horizon Response Workers
Bradley S. King, MPH, CIH
John D. Gibbons, IV, M, MPH
Health Hazard Evaluation Report
HETA 2010-0115 & 2010-0129-3138
August 2011

CDC NIOSH HE

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Journal List > CMAJ > v.182(12); 2010 Sep 7 > PMC2934792

CMAJ·JAMC Journal Home Page Information for Authors
Medical knowledge that matters Des connaissances médicales d'envergure

CMAJ, 2010 Sep 7; 182(12): 1290–1292. PMID: PMC2934792
doi: 10.1503/cmaj.109-3329

Gulf oil spill exposes gaps in public health knowledge
Cal Woodward
Author information Copyright and License information

The Gulf of Mexico oil spill set in motion an army of health professionals deployed by Washington, states and centres of medical learning, all dedicated to helping Americans stay well in the throes of the catastrophe

ASSESSING THE EFFECTS OF THE GULF OF MEXICO OIL SPILL ON HUMAN HEALTH
A Summary of the June 2010 Workshop
INSTITUTE OF MEDICINE OF THE NATIONAL ACADEMIES

HEALTH
How Will The Gulf Oil Spill Affect Human Health?
3:50
June 23, 2010 - 12:00 AM ET
Heard on Morning Edition
Download Embed
RICHARD KNOX

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Breaking Down the Myths and Misconceptions About the Gulf Oil Spill

Does oil stick around in the ecosystem indefinitely? What was the deal with the deformed fish? Can anything bad that happens in the Gulf be blamed on oil?

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What are the risks for workers, public, and subsistence users?

Current evidence suggests minimal direct toxicity risks

Limited studies have been conducted to assess acute and chronic human health impacts



Environ Health Perspect. 2011 Aug; 119(8): 1062-1069.
Published online 2011 May 12. doi: [10.1289/ehp.1103507](https://doi.org/10.1289/ehp.1103507)
PMCID: PMC3237364
Review

A Review of Seafood Safety after the *Deepwater Horizon* Blowout

[Julia M Gohlke](#),²⁰ [Dzigbodi Doko](#),¹ [Meghan Tipton](#),² [Mark Leader](#),² and [Timothy Fitzgerald](#)³

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Possible Exposure Pathways

- Occupational and non-occupational
- Shorelines and Offshore
- Routes include inhalation, dermal absorption and ingestion.
- Offshore workers did come in contact with dispersants and oil
- Occupational exposures can be minimized by the appropriate use of personal protective equipment (PPE).

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Uncertainties

- Hard to study in field conditions
- Limited epidemiological studies
- Baseline health status of workers unknown
- Conditions varied across region and job type and over time
- Hard to tease out oil versus dispersant versus other stressors:
 - physical stress, heat stress, psychosocial stress, ergonomic and other injury hazards; and pre-existing personal health risk factors.

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Toxicity

- MSDS for dispersants warns against frequent and prolonged exposure to skin and inhalation risks
- Skin irritation and possible blood and kidneys
- Crude oil can cause similar conditions

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Uncertainties

- Key chemicals are common in other products, so exposure hard to pinpoint
- Oils are complex mixtures with thousands of incompletely defined compounds
- Few long term studies
- But non-human studies raise concerns
 - endocrine disruption, reproductive failures, immune suppression and impaired cardiac development
 - But are they realistic doses?



Food security and seafood safety

- Biggest concern is for subsistence users, who by definition get a large part of their diet from a highly localized source
- Sensitive subgroups in Gulf
 - (e.g., Vietnamese-American community)
- PAHs persists longer in molluscan shellfish versus finfish (weeks to months rather than days to weeks)
- Dispersant constituents did not accumulate in fish and shellfish tissues
- There is a risk from not consuming seafood if the diet shifts to less wholesome items

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Uncertainties

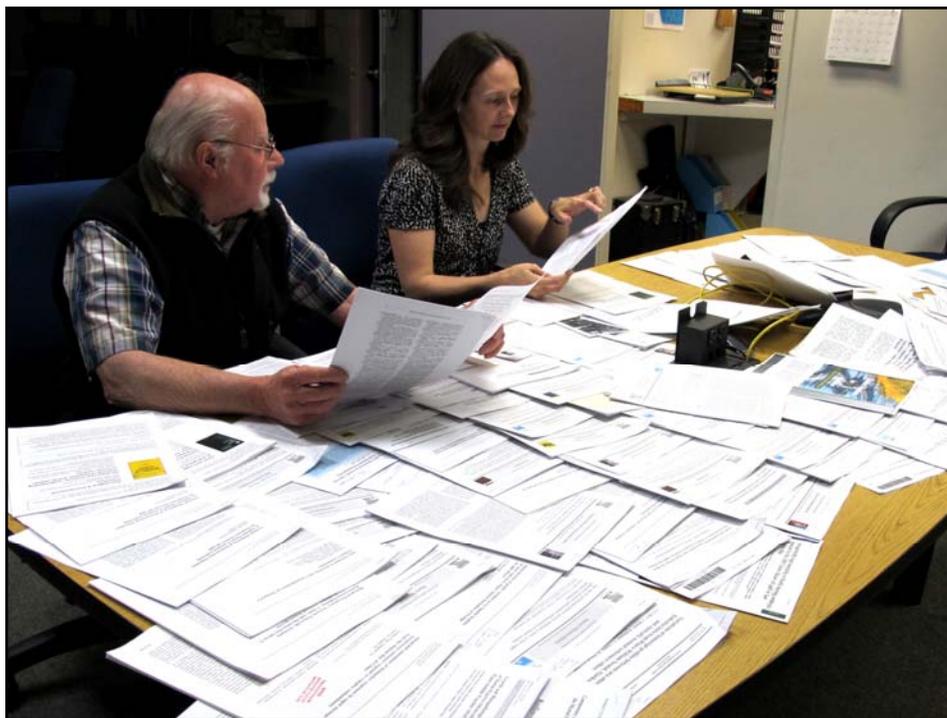
- Bioaccumulation and depurations not well known for species and different species.
- Trade-off of more oil in coastal environments and possibly persisting for decades
- Humans are less willing to accept involuntary risk than voluntary risk (e.g., oiled fish vs. smoked fish)
- Risk communication is challenging

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General conclusions

- None of the 6,000 water samples containing oil-dispersant exceeded EPA benchmarks for protection of human health
- None of the seafood testing found levels of human health concern
- “Although individuals directly handling dispersants or in the immediate area of dispersant applications during DWH may have been at greater risk of exposure and adverse effects than the general population, any adverse effects were expected to be mild”

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Gulf Long Term Follow-Up Study



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